



The Sizewell C Project

6.6 Volume 5 Two Village Bypass Chapter 10 Soils and Agriculture Appendix 10A Agricultural Land Classification Report

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CLASSIFICATION REPORT

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Executive Summary

An assessment of agricultural land quality, involving a desktop study and a detailed Agricultural Land Classification (ALC) survey, has been undertaken to determine the quality of agricultural land at the proposed two village bypass for Sizewell C. The assessment was undertaken in accordance with the ALC system for England and Wales, October 1988 ('the ALC Guidelines').

The detailed survey found agricultural land in Grades 2 (2.0 hectares(ha)), 3a (25.1ha), 3b (19.5ha) and 4 (0.6ha). Grade 2 and 3a land is considered to be among the best and most versatile agricultural land in England and Wales. A total of 3.1ha of the site was not surveyed and 4.5ha is non-agricultural land.

1. Agricultural Land Classification

1.1 Introduction

1.1.1 This report presents an assessment of agricultural land quality (Agricultural Land Classification; ALC) at the proposed two village bypass development (hereafter referred to as the proposed development) for Sizewell C. The purpose of this report is to present details of the agricultural land quality at the site. This report has been prepared by Arcadis on behalf of SZC Co.

1.1.2 The site covers approximately 54.8ha of primarily agricultural land.

1.1.3 The route of the two village bypass would comprise a new, permanent, 2.4 kilometre (km) single carriageway road that would depart from the A12 to the south-west of Stratford St. Andrew before re-joining the A12 to the east of Farnham. The two village bypass would create a new route around the south of Stratford St. Andrew and Farnham, thus by-passing the two villages. Once operational, the two village bypass is proposed to be a permanent bypass that would form a new section of the A12.

1.1.4 The two village bypass has been split into three main sections as follows:

- Western section – A12 / Tinker Brook to Pond Wood;
- Central section – Pond Wood to north of Farnham Hall; and
- Eastern section – north of Farnham Hall to A12 / A1094 (Friday Street).

1.1.5 When surveyed in July 2019 the site was mostly in use as grazing for cattle and arable (mostly wheat). The northern extent of the site comprised a car boot sale and grow your own vegetable patch.

1.2 Agricultural land planning policy and context

1.2.1 This ALC assessment is consistent with the direction given by the National Planning Policy Framework¹ (NPPF). Paragraph 170 of the NPPF states:

“Planning policies and decisions should contribute to and enhance the natural and local environment by: recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including

¹ National Planning Policy Framework. Department for Communities and Local Government, February 2019
<https://www.gov.uk/government/publications/national-planning-policy-framework--2>

the economic and other benefits of the best and most versatile agricultural land, Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality”.

1.2.2 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. Grade 1 land is excellent quality agricultural land with very minor or no limitations to agricultural use, and Grade 5 is very poor quality land, with severe limitations due to adverse soil characteristics, relief, climate or a combination of these. Grade 3 land is subdivided into Subgrade 3a (good quality land) and Subgrade 3b (moderate quality land).

1.2.3 Grades 1, 2 and 3a are defined as the best and most versatile land.

1.2.4 The site falls within the administrative area for the Suffolk Coastal District Local Plan. The core strategy for this district was adopted in July 2013. Until replaced by policies from new Site Allocation and Area-Specific Policy documents², the Council will continue to apply policy saved from the preceding Local Plan. However, Policy AP11: Agricultural Land and Commercial Woodlands, was not saved. In the absence of an extant local planning policy related to best and most versatile land, guidance reverts to the NPPF.

1.3 Agricultural Land Classification methodology

a) Ministry of Agriculture, Food and Fisheries Agricultural Land Classification system

1.3.1 The Ministry of Agriculture, Fisheries and Food (MAFF) ALC³ system of grading land quality for use in land use planning purposes divides farmland into five grades according to the degree of limitation imposed upon land use by the inherent physical characteristics of climate, site and soils. As detailed above, Grade 1 land is of an excellent quality, whilst Grade 5 land has very severe limitations for agricultural use.

1.3.2 Accordingly, a detailed assessment of the proposal site has been undertaken using the MAFF revised guidelines and criteria for ALC published October 1988.

² Suffolk Coastal Core Strategy Adopted July 2013 <http://www.eastsuffolk.gov.uk/planning/local-plans/suffolk-coastal-district-local-plan/>

³ Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land. Ministry of Agriculture Fisheries and Food, October 1988. <http://archive.defra.gov.uk/foodfarm/landmanage/land-use/documents/alc-guidelines-1988.pdf>

- 1.3.3 The detailed survey involved examination of the soil's physical properties at 58 locations on a 100m by 100m grid. The grid reference of the sample locations was recorded to enable these to be relocated for verification, if necessary.
- 1.3.4 At each location, the soil profile was examined to a maximum depth of approximately 1.2m by hand with the use of a 5cm diameter Dutch (Edleman) soil auger. A number of soil pits were excavated at selected locations with a spade in order to examine the physical soil profile characteristics, including subsoil structure, of the main representative soil types.
- 1.3.5 The soil profile at each sample location was described using the Soil Survey Field Handbook: Describing and Sampling Soil Profiles⁴. Each soil profile was ascribed an ALC grade following the MAFF ALC Guidelines.
- 1.3.6 These MAFF guidelines require that the following factors be investigated:
- Climate: average annual rainfall and accumulated temperature above 0°C between January and June.
 - Site: gradient, micro relief and flooding.
 - Soils: texture, structure, depth, stoniness, and chemical toxicity.
 - Interactive factors: soil wetness, soil droughtiness and liability to erosion.
- 1.3.7 To confirm soil texture a topsoil sample was collected from six auger locations and sent to an accredited laboratory for particle size distribution analysis. The data sheet is included as **Annex 10A.2** to this volume.
- b) [Natural England technical advice note 049](#)
- 1.3.8 Use of the ALC methodology is also supported by Natural England Technical Advice Note 049⁵ (TIN049), published in 2012.
- 1.3.9 TIN049 describes a detailed ALC survey as having approximately one sample point per hectare. To achieve this sample density and to remove surveyor selection bias, as noted above, sample points were set at 100m

⁴ Soil Survey Field Handbook: Describing and Sampling Soil Profiles' (Ed. J.M. Hodgson, Cranfield University, 1997).

⁵ Agricultural Land Classification: protecting the best and most versatile agricultural land (TIN049). Natural England, 2012. <http://publications.naturalengland.org.uk/publication/35012>

intersections aligned with the National Grid, located in the field by hand held GPS.

1.4 Agricultural Land Classification assessment

a) Climate

1.4.1 Climatological data for ALC are provided for 5km intersections of the National Grid by the Meteorological Office, in collaboration with the National Soil Resources Institute. The data from these points can be interpolated providing climate data for specific sites. Interpolated data for the proposal site is given in **Table 1.1**.

Table 1.1: Two Village Bypass ALC climate data.

Reference Point.	National Grid Reference TM 407 702.
Altitude (m).	23
Average annual rainfall (mm).	598
Accumulated temperature above 0°C between January and June (day degrees).	1422
Moisture deficit for wheat (mm).	121
Moisture deficit for potatoes (mm).	117
Field capacity days.	111

1.4.2 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 above 0°C between January and June as a measure of the warmth in the growing season.

1.4.3 Climate does not impose an overall limitation on ALC grade at this site. Climate does, however, have an important influence on the interactive limitations of soil wetness and soil droughtiness. The site has both relatively low rainfall and a long growing season, acting to decrease the severity of any potential soil wetness limitation, but increasing the severity of any potential soil droughtiness limitation.

b) The site

1.4.4 The extent of the site is shown on **Figure 10.3**.

1.4.5 The western section lies between approximately 5 and 20m above ordnance datum. The land falls gently from the A12 towards the River Alde, rising up again more steeply to Pond Wood. The central and eastern

sections have flatter topography, lying at approximately 20m above ordnance datum.

1.4.6 Gradient and micro-topography do not limit ALC Grade within the site.

1.4.7 The River Alde runs north to south through the western section. A number of drainage ditches are also present in the western section in the fields bordered by Tinker Brook and the A12. Land within the river's floodplain is shown on the Environment Agency flood maps⁶ as lying within Flood Zone 3, where there is a 1 in 100 or greater probability of fluvial flooding.

1.4.8 It is considered likely that this risk, along with associated soil conditions, will limit the ALC grade through the River Alde floodplain.

c) **Soils and parent materials**

1.4.9 The British Geological Survey Geology of Britain viewer⁷ shows the western section of the site are underlain by Red Crag Formation (quaternary and neogene sands) and overlain by Lowestoft Formation and Alluvium (quaternary sedimentary superficial deposit of clay, silt, sand and gravel).

1.4.10 The central section of the site is underlain by Chillesford Church Sand Member (quaternary sedimentary bedrock) with overlying drift deposits of Lowestoft Formation.

1.4.11 The eastern section of the site is underlain by the Crag Group (quaternary shallow-water marine and estuarine sands, gravels, silts and clays), with overlying drift deposits of Lowestoft Formation (superficial diamicton deposits comprising an extensive sheet of poorly-sorted matrix-supported chalky till as well as outwash sands and gravels, silts and clays).

1.4.12 In the western part of the western section the soils are described as slightly acid loamy and clayey soils with impeded drainage. These soils belong to the Burlingham 3 Soil Association⁸. The main land use associated with these soil types is cereals, sugar beet and other arable crops.

1.4.13 Along the River Alde floodplain the soils are described as deep peat soils associated with clayey over sandy soils which in part are very acidic. These soils belong to the Mendham Soil Association. The main land use on

⁶ Environment Agency Flood Map for Planning. <http://apps.environment-agency.gov.uk/wiyby/37837.aspx>

⁷ British Geological Survey Geology of Britain viewer.
<http://www.bgs.ac.uk/data/mapViewers/home.html?src=topNav>

⁸ Soil associations represent a group of soil types which are typically found occurring together in the landscape.

these soils is permanent grassland, cereals, sugar beet and potatoes with groundwater control.

- 1.4.14 For the rest of the site the soils are mapped as being freely draining slightly acid sandy soils. These are shown to belong to the Newport Soil Association (representing a group of soil types which are typically found occurring together in a landscape). The main land use on these soils is described as being arable crops such as barley, other cereals and sugar beet, with some coniferous woodland and lowland heath habitats.
- 1.4.15 Field survey work at the most north eastern limits of the site found soil material that was predominantly light to medium textured (loams and sands), to the south-east along the proposed route of the scheme soil material was predominantly found to be medium to heavy textured (loams to clays) with the remainder of the site to be a mixture of the textures.
- 1.4.16 Stone content often rises in the lower subsoil but the topsoil content of larger stones (above 2cm) is not enough to limit ALC grade.

d) **Interactive factors**

- 1.4.17 Of two typical soil profiles found at the site, the first consisted of a medium textured clay loam or sandy clay loam over a heavy textured clayey subsoil. The clayey subsoil impedes the drainage of excess water down through the soil profile, however due to the relatively low rainfall the land is only occasionally wet (Wetness Class II and III) therefore limitation due to wetness is not the limiting factor for the majority of these profiles.
- 1.4.18 Instead these profiles are limited to Grades 3a and 3b mostly by droughtiness.
- 1.4.19 These profiles are typically found through the central section of the proposed scheme and the eastern section (except the very north-most area).
- 1.4.20 The second typical soil profile found at the site comprised a medium textured loam over light textured loamy sands and sands, the sandy subsoil allows free draining of water therefore maintaining a high Wetness Class I across these profiles.
- 1.4.21 The permeable sandy subsoil has moderate to good structure that does not limit root penetration. However, the free draining nature of the soils limits the volume of water held by the soil that is available to the plant.
- 1.4.22 These soil profiles are limited by droughtiness to ALC Grade 3b.

- 1.4.23 These profiles are typically found at the northern limits of the eastern section of the proposed scheme and the majority of the western section.
- 1.4.24 The areas of the western section which aren't characterised by the above include an area in close proximity to the River Ade. Here, profiles are characterised by medium textured loams overlaying heavy textured clayey upper subsoils and medium to light textured sandy loams and sands. These profiles are all limited to either Grade 2, 3a or 3b by droughtiness, wetness or both.
- 1.4.25 In addition to this, an area comprising a light textured sandy loam overlying impenetrable gravel which is limited to ALC Grade 4, due to droughtiness.

1.5 Agricultural Land Classification Grade Distribution.

- 1.5.1 A small area of the site is classed as non-agricultural comprising a mixture of roads and woodland. The remainder of the site is agricultural land in ALC Grades 2, 3a, 3b and 4.
- 1.5.2 The extent of ALC grades across the site shown on **Figure 10.3**, with area measurements given in **Table 1.2**.

Table 1.2: ALC grade distribution.

ALC Grade.	Area (ha).	Area (%).
2 – very good quality agricultural land.	2.0	3.65
3a - good quality agricultural land.	25.1	45.80
3b – moderate quality agricultural land.	19.5	35.58
4 – poor quality agricultural land.	0.6	1.10
Non-agricultural	4.5	8.21
Not surveyed.	3.1	5.66
Total	54.8	100.00

- 1.5.3 Grade 2 land covers an area of 2.0ha (approximately 3.65% of the site), comprising soils with key characteristics including medium to light textured subsoils overlaying heavy textured subsoils limited to Grade 2 by wetness and/or droughtiness. These soils are located in close proximity to the River Ade.
- 1.5.4 Grade 3a land covers 25.1 ha in total (approximately 45.80% of the site). Grade 3a land is present throughout the proposed scheme within the eastern, western and central sections. The soil is mostly characterised by a medium textured topsoil overlaying a heavy textured subsoil resulting in low

permeability in the soil, however low rainfall means soils are only occasionally waterlogged (Wetness Class II and III) and instead soils are limited mostly by droughtiness. Grade 3a land in close proximity to the River Ade in the western section is characterised by heavy textured topsoils overlying light textured sands, these soil profiles are limited by droughtiness or droughtiness and wetness.

1.5.5 Grade 3b land comprises 19.5ha (approximately 35.58% of the site) characterised by two main soil profiles, the first being medium textured topsoils overlying light textured subsoils found predominantly at the northmost area of the eastern section. This permeable free draining profile limits the grade by droughtiness. The other profile type is characterised by a medium textured topsoil overlying a heavy textured subsoil resulting in low permeability in the soil, however low rainfall means soils are only occasionally waterlogged (Wetness Class II and III) and instead soils are limited mostly by droughtiness. These are found in the western and eastern sections of the proposed scheme.

1.5.6 Grade 4 land covers 0.6ha (approximately 1.10% of the site) this small area in the western section bordering the A12 is characterised by a shallow soil comprising a light textured topsoil overlying gravel, limited to Grade 4 by droughtiness.

1.5.7 Non-agricultural land makes up 8.21% of the site (4.5ha) and comprises roads including the A12 and Friday Street, as well as multiple areas of woodland.

1.5.8 Approximately 5.66% of the site remains un-surveyed (approximately 3.1ha).

1.6 Conclusions

1.6.1 A detailed ALC survey of the proposed two village bypass found agricultural land in Grades 2 (2.0ha), 3a (25.1ha), 3b (19.5ha) and 4 (0.6ha). Grade 2 and 3a land is considered to be among the best and most versatile agricultural land in England and Wales, making up 49.45% of the site.



Appendix 10A1: Auger log and key

Point	Grid ref.			Alt	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		Calc.	Mn C	SUBS STR	SPL	Drought			Wet		Classification		Point notes
	Sqr.	E	N			Top	Bttm	Thick	Colour	Form	Colour	Form	Colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
1	TM	35546	59339	5	Parsnips	0	45	45	10YR33						LS	1	HR					-15.55	-17.34	3a	I	1*	3a	Drought	STOP @ Gravelly Sand (Grey v. wet)
						45	70	25	10YR44	C	10YR58			Y	SL	2	HR			G									
						70	100	30	10YR54						S	10	HR			M									
						IMP																							
2	TM	35460	59437		Parsnips	0	30	30	10YR62						SL	2	HR					-23.865	-40.16	3b	I	1	3b	Drought	
						30	75	45	10YR53	C	10YR56				S	5	HR			M									
						75	105	30	10YR44					Y	S	5	HR			G									
						105	120	15	10YR22					Y	S	1	HR			G									
3	TM	35560	59437		Parsnips	0	42	42	10YR22						SL	5	HR					-46.4	-42.4	3b	I	1	3b	Drought	STOP @ Gravel
						42	50	8	7.5YR33						LS	10	HR			M									
						IMP																							
4	TM	35660	59437		Meadow	0	40	40	10YR32						C	2	HR					-13.03	-29.64	3a	I	1	3a	Drought	Water @ 1m / V. wet sand
						40	50	10	10YR54	F	10YR58	F	10YR32	Y	S	2	HR			G									
						50	120	70	10YR63					Y	S	2	HR			G									
5	TM	35760	59437		Meadow	0	32	32	10YR32						C	1	HR		Y		P	8.181	-14.168	3a	III	3b	3b	Wet	Water @ 0.6m Peat ORGANIC
						32	72	40	2.5Y42	C	2.5Y51	C	7.5Y46	Y	C	1	HR			M									
						72	94	22	10YR21						SL	1	HR			G									
						94	120	26	10YR41					Y	S	1	HR			G									
6	TM	35467	59536	5	Meadow/ Grazing	0	34	34	10YR22						LS	2	HR					-32.761	-45.696	3b	I	1*	3b	Drought	Large Flint Water @ 0.7m STOP @ Gravelly Sand
						34	54	20	10YR43						LS	5	HR			M									
						54	92	38	10YR44	F	Gley26N			Y	S	5	HR		Y	G									
						92	100	8	10YR42	F	Gley26N			Y	SCL	5	HR			G									
						IMP																							
7	TM	35560	59537			0	36	36	10YR21						LS	2	HR					-10.305	-25.232	3a	I	1*	3a	Drought	Water @ 0.5m / Large Flint
						36	56	20	10YR42	F	10YR66	F	10YR58	Y	SCL	5	HR			G									
						56	120	64	5Y41					Y	S	2	HR			G									
8	TM	35657	59562		Meadow	0	45	45	10YR32						C	2	HR		Y		G	-13.3595	-25.136	3a	I	3a	3a	Drought/Wet	Water @ 0.5m / Large Flint STOP @ Gravel
						45	67	22	10YR42	F	10YR66	F	10YR58	Y	S	5	HR			G									
						67	110	43	5Y41					Y	S	2	HR			G									
						IMP																							

Point	Grid ref.		Alt	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		Calc.	Mn C	SUBS STR	SPL	Drought			Wet		Classification		Point notes	
	Sqr.	E			N	Top	Bttm	Thick	Colour	Form	Colour	Form			Colour	%					Type	MBw	MBp	Gd	WC	Gw	Grade		Limitation
9	TM	35390	59643	10	Onions	0	44	44	10YR43				SL	5	HR					-28.625	-20.74	3b	I	1	3b	Drought	Large Flint Surface STOP @ Gravel		
						44	62	18	10YR43				LS	10	HR														
						62	72	10	10YR21	F	2.5YR36		S	5	HR														
						IMP																							
10	TM	35460	59637			0	44	44	10YR43				SL	5	HR					-26.88	-17.38	3b	I	1	3b	Drought	Large Flints Surface STOP @ Gravel		
						44	70	26	10YR34	F	7.5YR58		LS	10	HR														
						IMP																							
11	TM	35546	59653	7	Onions	0	48	48	10YR43				SL	10	HR					-47.08	-43.08	3b	I	1	3b	Drought	Large Flint Surface STOP @ Gravel		
						IMP																							
12	TM	35368	59729	12	Onions	0	38	38	10YR33				SL	2	HR					-36.824	-28.16	3b	I	1	3b	Drought	Large Flint Surface STOP @ Gravel		
						38	58	20	10YR34				LS	5	HR														
						58	70	12	10YR46				S	2	HR														
						IMP																							
13	TM	35460	59737		Onions	0	42	42	10YR33				SL	2	HR					-4.559	-19.634	3a	I	1	3a	Drought	Large Flint Surface		
						42	60	18	10YR44				LS	5	HR														
						60	120	60	10YR56	C	7.5YR58		S	5	HR														
						IMP																							
14	TM	35560	59737		Onions	0	38	38	10YR33				SL	2	HR					-10.27	-25.604	3a	I	1	3a	Drought	Large Flints Surface		
						38	52	14	10YR44				LS	2	HR														
						52	106	54	10YR46				S	10	HR														
						106	120	14	2.5Y64				S	2	HR														
						IMP																							
15	TM	35628	59825	8	Onions	0	42	42	10YR33				SL	5	HR					-52.96	-48.96	4	I	1	4	Drought	Large Flint Surface STOP @ Gravel		
						IMP																							
16	TM	35667	59750	2	Meadow/ Grazing	0	30	30	10YR33				SL	2	HR					7.305	-19.4	3a	I	1	3a	Drought	Peat ORGANIC		
						30	100	70	10YR52	M	10YR33		LS	1	HR														

Point	Grid ref.		Alt	Land use	Depth (cm)			Soil matrix Colour 10YR52	Mottle 1		Mottle 2		Gley	Texture S	Stones		Calc.	Mn C	SUBS STR	SPL	Drought			Wet		Classification		Point notes	
	Sqr.	E			N	Top	Bttm		Thick	Form	Colour	Form			Colour	%					Type	MBw	MBp	Gd	WC	Gw	Grade		Limitation
17	TM	35760	59737	2	Meadow/ Grazing	0 30 80	35 80 120	35 45 20	10YR33 10YR52 10YR52	M	10YR33			SL LS S	1 1 1	HR HR HR			G G G		-7.57	-16.445	3a	I	1	3a	Drought	Peat ORGANIC	
18	TM	35663	59636	5	Meadow/ Grazing	0 35 47 72	35 47 72 120	35 12 35 48	10YR33 10YR52 10YR54 10YR51	M F	10YR33 10YR33	M	10YR58	Y Y Y	SL LS S LS	2 1 1 1	HR HR HR HR		Y	G G G		12.378	-28.39	3a	I	1	3a	Drought	Water @ 0.6m
19	TM	35760	59637		Meadow/ Grazing	0 40 62 74 98 110	40 62 74 98 110	40 22 12 14 12 10	10YR31 10YR51 10YR21 10YR41 7.5YR42 10YR31	F M	10YR58 10YR58			Y Y Y Y	SCL C CL LS LS SL	1 1 1 1 1 1	HR HR HR HR HR HR		Y	P G G G G	Y	20.254	-4.664	2	II	2	2	Drought / Wet	Wet @ 0.7m / Peat ORGANIC
20	TM	35860	59637		Meadow/ Grazing	0 42 74 102	42 74 102 120	42 32 28 18	10YR33 10YR51 7.5YR46 10YR21	C F	7.5YR56 5YR34			Y Y	SCL C C SL	1 1 1 1	HR HR HR HR		Y Y	P P M	Y Y	15.705	-10.208	3a	II	2	3a	Drought	
21	TM	36060	59637		Barley	0 42 64	42 64 120	42 22 56	10YR33 10YR44 10YR56					SL LS S	2 1 1	HR HR HR			M G		-7.737	-23.156	3a	I	1	3a	Drought		
22	TM	36160	59637		Barley	0 40 58 70 75	40 58 70 75 120	40 18 32 5 45	10YR33 10YR44 10YR56 10YR46 10YR46					SL LS LS SC C	2 1 5 2 1	HR HR HR HR HR			G M G G		56.7745	-18.558	3a	I	1	3a	Drought		
23	TM	36260	59637		Barley	0 42 74	42 74 120	42 32 46	10YR33 10YR44 10YR56					SL LS S	2 1 1	HR HR HR			M G		-6.747	-21.968	3a	I	1	3a	Drought		

Point	Grid ref.			Alt	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		Calc.	Mn C	SUBS STR	SPL	Drought			Wet		Classification		Point notes
	Sqr.	E	N			Top	Bttm	Thick	Colour	Form	Colour	Form	Colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation	
24	TM	36060	59837		Barley	0	50	50	10YR33					SL	5	HR					-3.348	-18.8	3a	I	1	3a	Drought		
						50	78	28	10YR44					LS	5	HR			M										
						78	120	42	10YR56					S	2	HR			G										
25	TM	36060	59737		Barley	0	50	50	10YR33					SL	5	HR					-2.696	-18.8	3a	I	1	3a	Drought		
						50	86	36	10YR44					LS	5	HR			M										
						86	120	34	10YR56					S	2	HR			G										
26	TM	35763	59520	4	Meadow	0	30	30	10YR42	F	5YR58	F	Gley16N	Y	C	1	HR				Y	30.0525	0.88	2	III	3b	3b	Wet	Peat ORGANIC Water @ 0.6m / Peat ORGANIC STOP @ Gravel
						30	45	15	10YR31					SL	1	HR			G										
						45	100	55	10YR21					SL	1	HR			G										
						100	105	5	10YR41				Y	S	1	HR			G										
						IMP																							
27	TM	35860	59537		Meadow	0	50	50	10YR36					SL	2	HR					10.945	-7.84	2	II	1	2	Drought	Water @ 1.2m	
						50	120	70	10YR33	C	Gley16N	C	7.5YR58	Y	C	1	HR		Y	P	Y								
28	TM	35892	59467	2	Meadow/ Grazing	0	5	5	10YR32					C	2	HR					22	-21	3a	I	1	3a	Drought	Water @ 0.5m	
						5	60	55	10YR32					C	1	HR			P										
						60	70	10	10YR43	M	5YR46	C	7.5YR56	Y	C	1	HR		Y	M									
						70	106	36	10YR21					C	1	HR			G										
						106	120	14	10YR41				Y	S	1	HR			G										
29	TM	35952	59442	4	Meadow/ Grazing	0	8	8	10YR43					C	2	HR					32.6	-8	2	III	3b	3b	Wet	Water @ 0.5m	
						8	34	26	10YR43	F	Gley16N	F	7.5YR58	Y	C	1	HR		Y	P	Y								
						34	62	28	10YR32	F	2.5YR48			C	1	HR		Y	M										
						62	104	42	10YR21					C	1	HR			G										
						104	120	16	10YR41				Y	S	1	HR			G										
30	TM	36060	59437		Crop Potatoes?	0	40	40	10YR44					LS	2	HR					-4.575	-24.35	3a	I	1*	3a	Drought		
						40	60	20	10YR56					SL	1	HR		Y	M										
						60	85	25	10YR46					LS	1	HR			G										
						85	120	35	10YR66					S	1	HR			G										
31	TM	36060	59337		Crop Leeks?	0	34	34	10YR33					SL	5	HR					-21.559	-37.8	3b	I	1	3b	Drought	Large Flints Surface	
						34	54	20	10YR46					S	5	HR			G										
						54	108	54	10YR56					S	5	HR			G										
						108	120	12	10YR68					S	1	HR			G										

Point	Grid ref.		Alt	Land use	Depth (cm)			Soil matrix Colour	Mottle 1		Mottle 2		Gley	Texture	Stones		Calc.	Mn C	SUBS STR	SPL	Drought			Wet		Classification		Point notes
	Sqr.	E			N	Top	Bttm		Thick	Form	Colour	Form			Colour	%					Type	MBw	MBp	Gd	WC	Gw	Grade	
32	TM	36160	59337		Crop Leeks?	0 32 32 32 54 22 54 120 66	10YR33 10YR34 10YR46						SL S S	2 HR 2 HR 5 HR							-21.761	-37.768	3b	I	1	3b	Drought	Large Flints Surface
33	TM	36260	59337		Crop Leeks?	0 34 34 34 62 28 62 120 58	10YR33 10YR34 10YR46						SL S S	2 HR 2 HR 2 HR							-18.91	-35.52	3b	I	1	3b	Drought	Large Flints Surface
34	TM	36360	59337		Barley	0 18 18 18 34 16 34 70 36 IMP	10YR33 2.5Y63 2.5Y63					Y Y	C C C	1 CH 2 CH 5 CH	V V S		Y Y	P P		Y Y	-37.082	-21.632	3b	III	3b	3b	Drought / Wet	Water @ 0.2m STOP @ Gravel
35	TM	36360	59437		Barley	0 30 30 30 72 42 72 120 48	10YR33 10YR53 10YR54	M Gley16N M Gley16N		F 10YR58		Y Y	SCL SC C	2 HR 5 HR 2 CH		Y Y	G P		Y Y		27.531	5.44	2	III	3a	3a	Wet	Large Flints Surface
36	TM	36360	59537		Barley	0 36 36 36 68 32 68 120 52	10YR33 10YR53 10YR54	F Gley15N F Gley15N		F 10YR68		Y Y	SL C C	2 HR 2 CH 5 CH	S C	Y Y	P P		Y Y		3.988	-13.64	3a	III	2	3a	Drought	Large Flints Surface
37	TM	36460	59437		Barley	0 22 22 22 78 56 78 100 22 IMP	10YR42 10YR56 10YR34	F 5YR58 F Gley16N				Y	SCL C C	1 HR 2 HR 15 CH		Y Y	P G		Y		-0.773	-18.704	3a	II	2	3a	Drought	Large Flints Surface STOP @ Gravel
38	TM	36560	59448	25	Barley	0 40 40 40 76 36 76 100 24 100 120 20	10YR42 10YR44 10YR56 10YR54	F Gley16N F Gley16N		F 10YR58		Y Y	SCL C LS C	1 HR 1 HR 2 HR 15 CH		Y Y	P G P		Y		13.976	-11	3a	II	2	3a	Drought	
39	TM	36556	59522	24	Barley	0 32 32 32 102 70	10YR42 10YR46						SCL SL	1 HR 8 HR				M			23.07	-10.368	3a	I	1	3a	Drought	Large Flints Surface

Point	Grid ref.		Alt	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		Calc.	Mn C	SUBS STR	SPL	Drought			Wet		Classification		Point notes
	Sqr.	E			N	Top	Bttm	Thick	Colour	Form	Colour	Form			Colour	%					Type	MBw	MBp	Gd	WC	Gw	Grade	
40	TM	36660	59537		Barley	0	32	32	10YR42				SL	2	HR						-4.619	-22.714	3a	I	1	3a	Drought	Large Flints Surface
						32	62	30	10YR36				LS	5	HR													
						62	82	20	10YR46				LS	10	HR													
						72	94	12	10YR46				C	1	HR		Y											
						94	120	26	10YR56				S	1	HR													
41	TM	36660	59637		Barley	0	28	28	10YR42				SL	5	HR		Y				33.91	-18.924	3a	I	1	3a	Drought	Large Flints Surface
						28	58	30	10YR36				LS	10	HR													
						58	120	62	10YR56				SL	2	HR													
42	TM	36660	59737		Barley	0	20	20	10YR32				CL	2	HR						11.927	-4.752	2	II	2	2	Drought / Wet	Large Flints Surface
						20	44	24	10YR43				SCL	5	HR													
						44	84	40	10YR46	C	10YR32		C	1	HR	S	Y											
						84	120	36	10YR54				C	10	CH	V	Y											
43	TM	36760	59737			0	28	28	10YR43				SL	2	HR						-21.071	-8.096	3b	I	1	3b	Drought	
						28	38	10	10YR34				LS	2	HR													
						38	62	24	10YR56				SC	5	HR	C												
						62	72	10	10YR56				C	5	CH	V	Y											
						IMP																						STOP @ GRAVEL
44	TM	36660	59837			0	22	22	10YR43				SCL	2	HR						38.246	-15.324	3a	I	1	3a	Drought	
						22	40	18	10YR54	F	10YR58		C	5	HR													
						40	56	16	10YR56				C	5	HR	S												
						56	14	70	10YR68				SC	15	CH	V	Y											STOP @ GRAVEL
						IMP																						
45	TM	36773	59833			0	22	22	10YR32				SCL	2	HR		Y				-35.757	-20.208	3a	II	2	3a	Drought	Large Flints Surface
						22	40	18	10YR44				C	5	HR		Y											
						40	56	16	2.5Y54	F	10YR58	F	C	2	HR	S	Y											
						56	70	14	2.5Y54	F	10YR58		C	5	CH	V	Y											
						IMP						Y																
46	TM	36760	59937		Barley	0	26	26	10YR43				SCL	5	HR		Y				-25.535	-16.76	3b	I	1	3b	Drought	
						26	44	18	10YR56	F	7.5YR58		SL	5	HR	S	Y											
						44	60	16	10YR46	F	10YR58		SC	5	HR		Y											STOP @ GRAVEL
						IMP																						

Point	Grid ref.			Alt	Land use	Depth (cm)			Soil matrix	Mottle 1		Mottle 2		Gley	Texture	Stones		Calc.	Mn C	SUBS STR	SPL	Drought			Wet		Classification		Point notes		
	Sqr.	E	N			Top	Bttm	Thick	Colour	Form	Colour	Form	Colour			%	Type					MBw	MBp	Gd	WC	Gw	Grade	Limitation			
47	TM	36896	60065	19	Wheat	0	46	46	10YR34						SCL	2	HR					37.7195	-9.648	2	II	1	2	Drought	Large Flints Surface STOP @ GRAVEL		
						46	70	24	10YR44	F	2.5YR36	F	7.5YR58		C	2	HR		Y	P	Y										
						70	90	20	10YR46						SCL	2	HR			G											
						90	115	25	10YR54	M	10YR58				C	5	CH	V		G											
						IMP																									
48	TM	36894	60166	23	Wheat	0	42	42	10YR43						LS	5	HR					-1.812	-40.168	3b	I	1*	3b	Drought	STOP @ GRAVEL		
						42	74	32	10YR44						LS	2	HR			M											
						74	110	36	10YR54						SL	2	HR			G											
						IMP																									
49	TM	36966	60243	21	Wheat	0	36	36	10YR43						SCL	2	HR					38.106	-13.568	3a	II	1	3a	Drought			
						36	76	40	10YR56	F	10YR43				C	2	HR	S	Y	P	Y										
						76	108	32	10YR56						C	5	HR	S	Y	G											
						108	120	12	10YR56	C	10YR43				C	2	HR	S	Y	G											
50	TM	36860	60337	22	Wheat	0	22	22	10YR33						SCL	2	HR					-12.52	-12.32	3a	II	1	3a	Drought	Large Flints Surface Large Flints Large Flints Large Flints		
						22	46	24	10YR44						C	2	HR		Y	P	Y										
						46	60	14	2.5Y64						C	60	CH	V		G											
						60	80	20	2.5Y64						SC	20	CH	V		G											
51	TM	36953	60347	20	Wheat	0	46	46	10YR34						SZL	5	HR					7.182	-11.856	3a	II	1	3a	Drought			
						46	84	38	10YR54	F	2.5Y48				C	2	HR		Y	P	Y										
						84	120	36	10YR54						C	20	CH	V		P											
52	TM	37084	60358	17	Wheat	0	44	44	10YR43						LS	5	HR					11.242	-13.976	3a	II	1*	3a	Drought			
						44	76	32	10YR44						SCL	2	HR		Y	G											
						76	96	20	10YR44	F	7.5YR68				C	5	CH	Y	Y	P	Y										
						96	120	24	10YR54	F	7.5YR68		Y	C	5	CH	Y	Y	P												
53	TM	36888	60440	22	Wheat	0	40	40	10YR43						SL	5	HR					-40.462	-35.025	3b	I	1	3b	Drought	Large Flints Surface Large Flints STOP @ Gravel		
						40	55	15	7.5YR44						LS	5	HR			G											
						IMP																									
54	TM	36960	60437	22	Wheat	0	38	38	10YR34						SL	5	HR					-47.99	-43.99	3b	I	1	3b	Drought	Large Flints Surface Large Flints STOP @ Gravel		
						38	48	10	10YR44						LS	5	HR			G											
						IMP																									

Point	Grid ref.		Alt	Land use	Depth (cm)			Soil matrix Colour	Mottle 1		Mottle 2		Gley	Texture	Stones		Calc.	Mn C	SUBS STR	SPL	Drought			Wet		Classification		Point notes
	Sqr.	E			N	Top	Bttm		Thick	Form	Colour	Form			Colour	%					Type	MBw	MBp	Gd	WC	Gw	Grade	
55	TM	37060	60437	22	Wheat	0	38	38	10YR34				SL	5	HR						-47.99	-43.99	3b	I	1	3b	Drought	Large Flints Surface Large Flints STOP @ Gravel
						38	48	10	10YR44				LS	5	HR			G										
						IMP																						
56	TM	37154	60442	17	Ploughed No Crop	0	48	48	10YR43				SCL	5	HR						-26.305	-20.664	3b	I	1	3b	Drought	Large Flint Surface STOP @ Gravel
						48	68	20	10YR46				LS	5	HR			Y	M									
						68	78	10	10YR46				S	2	HR			M										
						IMP																						
57	TM	37250	60443	15	Grass Car Boot	0	36	36	10YR43				SL	5	HR	C					-45.7925	-41.505	3b	I	1	3b	Drought	
						36	51	15	10YR46				LS	5	HR	C			G									
						IMP																						
58	TM	37250	60443	15	Grass Car Boot	0	35	35	10YR43				SL	5	HR	C					-34.2625	-25.95	3b	I	1	3b	Drought	STOP @ Gravel
						35	65	30	10YR46				LS	5	HR	C			G									
						IMP																						

Auger Log key

Depth - Top

xx Underlining denotes depth to the top of a slowly permeable layer

Land use	Mottle 1,2 - Form	Texture	Limitations
ARA Arable	FF Few Feint	CS Coarse Sand	NN None
CER Cereal	FD Few Distinct	MS Medium sand	OC Overall climate
WHT Wheat	FP Few Prominent	FS Fine Sand	AE Aspect
BAR Barley	CF Common Feint	LCS Loamy Coarse Sand	EX Exposure
MZE Maize	CD Common Distinct	LMS Loamy Medium Sand	FR Frost risk
OAT Oats	CP Common Prominent	LFS Loamy Fine Sand	GR Gradient
OSR Oilseed rape	MF Many Feint	CSL Coarse Sandy Loam	MR Microrelief
LIN Linseed	MD Many Distinct	MSL Medium sandy loam	FL Flood risk
FBE Field beans	MP Many Prominent	FSL Fine Sandy Loam	TX Texture
POT Potatoes	VF Very many Feint	CSZL Coarse Sandy Silt Loam	DP Soil depth
SBT Sugar beet	VD Very many Distinct	MSZL Medium Sandy Silt Loam	CH Chemical
BRA Brassicas	VP Very many Prominent	FSZL Fine Sandy Silt Loam	WE Wetness
FOD Fodder crops		ZL Silt Loam	WK Workability
FRT Soft and top fruit		SCL Sandy Clay Loam	DR Droughtiness
HRT Horticultural crops		MCL Medium Clay Loam	ER Erosion risk
PAS Pasture		HCL Heavy Clay Loam	WD Wetness/Droughtiness
LEY Ley grass		MZCL Medium Silty Clay loam	ST Topsoil stoniness
PGR Permanent pasture		HZCL Heavy Silty Clay Loam	
RGR Rough grazing		SC Sandy Clay	
SCR Scrub		ZL Silty Clay	
HTH Heathland		C Clay	
BOG Bog or marsh		P Peat	
DCW Deciduous Woodland		SP Sandy Peat	
CFW Coniferous woodland		LP Loamy Peat	
PLO Ploughed		PL Peaty Loam	
STB Crop stubble		PS Peaty Sand	
FLW Fallow (inc. set aside)		MZ Marine Light Silts	
SAS Set aside (where known)		IMP Impenetrable to roots	
OTH Other			

Stones - Type

HR	All hard rocks and stones
MSST	Soft, medium or coarse grained sandstone
SI	Soft weathered igneous or metamorphic rock
SLST	Soft oolitic or dolomitic limestone
FSST	Soft, fine grained sandstone
ZR	Soft, argillaceous or silty rocks
CH	Chalk or chalk stones
GH	Gravel composed of non-porous (hard) stones
GS	Gravel composed of porous (soft) stones

Subs Str (subsoil structural condition)

G	Good
M	Moderate
P	Poor

Calcareousness

N	Non-calcareous (<0.5% CaCO ₃)
VS	Very slightly calcareous (0.5 - 1% CaCO ₃)
S	Slightly calcareous (1 - 5% CaCO ₃)
M	Moderately calcareous (5 - 10% CaCO ₃)
V	Very calcareous (>10% CaCO ₃)
Y	Calcareous (>1% CaCO ₃)

Mn C (ferrimanganous concretions)

F	Few
C	Common
M	Many
V	Very many
Y	Common or greater



Appendix 10A2: Particle size distribution data sheets



Analysis Results (SOIL)

Customer ARCADIS (UK) LIMITED
THE MILL
BRINSCOMBE PORT
STROUD
GL5 2QG

Distributor ARCADIS (UK) LTD
THE MILL
BRINSCOMBE PORT
BRINSCOMBE
STROUD
GLOS
GL5 2QG

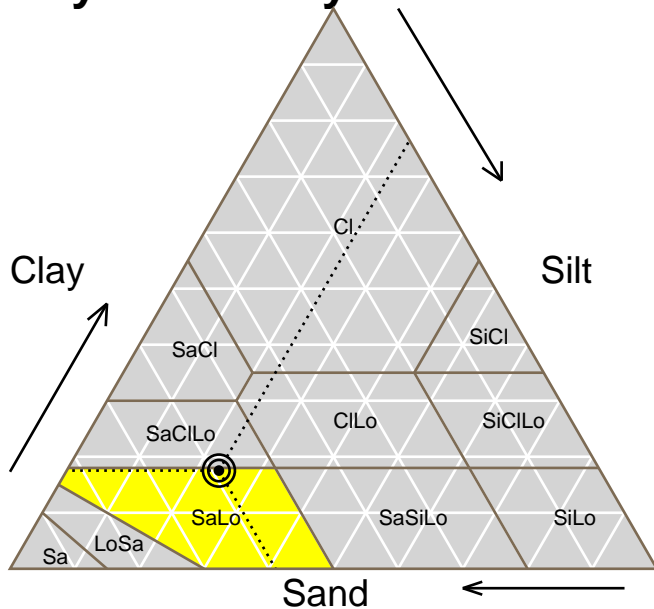
Sample Ref TVB POINT 3 TOPSOIL

Date Received 30/07/2019 (Date Issued: 05/08/2019)

Sample No E337879/07

Crop

Physical Analysis



Analysis	Result (%)
Sand	58.94
Silt	23.53
Clay	17.53
Very Fine Sand	3.53
Fine Sand	20.42
Medium Sand	27.83
Coarse Sand	7.16
Very Coarse Sand	< 0.01
Stones >2mm	9.50
Soil Type	SaLo Sandy Loam

Property	Assessment
Available Water	Low to Medium
Drainage Rate	Rapid
Inherent Fertility	Low to Medium
Potential C.E.C.	Low to Medium
Leaching Risk	High to Moderate
Warming Rate	Rapid



Analysis Results (SOIL)

Customer ARCADIS (UK) LIMITED
THE MILL
BRINSCOMBE PORT
STROUD
GL5 2QG

Distributor ARCADIS (UK) LTD
THE MILL
BRINSCOMBE PORT
BRINSCOMBE
STROUD
GLOS
GL5 2QG

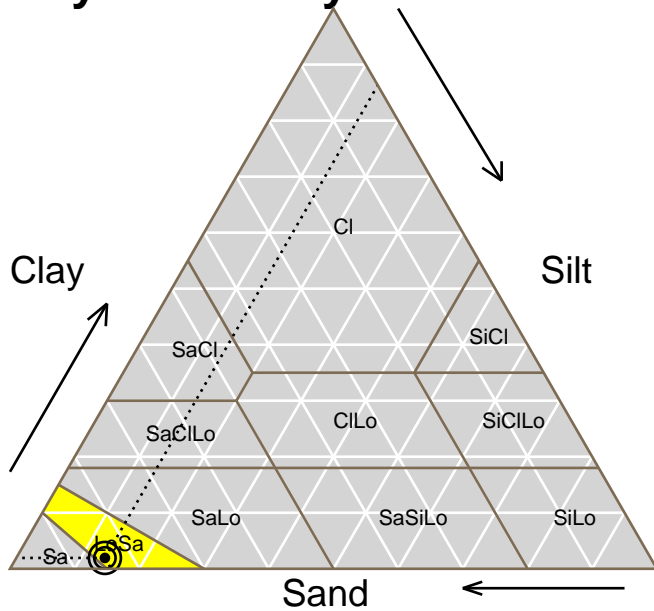
Sample Ref TVB POINT 6 HORIZON 1

Date Received 30/07/2019 (Date Issued: 05/08/2019)

Sample No E337879/08

Crop

Physical Analysis



Analysis	Result (%)
Sand	84.36
Silt	13.70
Clay	1.94
Very Fine Sand	10.57
Fine Sand	33.64
Medium Sand	28.57
Coarse Sand	10.06
Very Coarse Sand	1.53
Stones >2mm	2.70
Soil Type	LoSa Loamy Sand

Property	Assessment
Available Water	Low to Medium
Drainage Rate	Rapid
Inherent Fertility	Low to Medium
Potential C.E.C.	Low to Medium
Leaching Risk	High to Moderate
Warming Rate	Rapid



Analysis Results (SOIL)

Customer ARCADIS (UK) LIMITED
THE MILL
BRINSCOMBE PORT
STROUD
GL5 2QG

Distributor ARCADIS (UK) LTD
THE MILL
BRINSCOMBE PORT
BRINSCOMBE
STROUD
GLOS
GL5 2QG

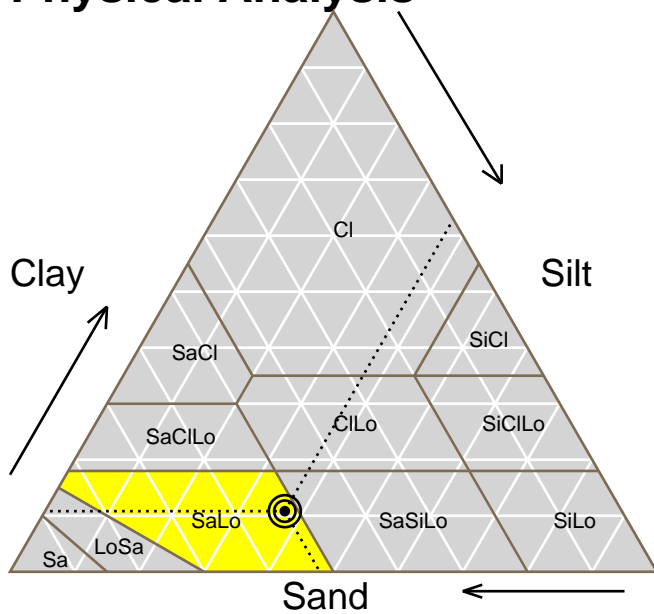
Sample Ref TVB 20 SUBSOIL 4

Date Received 30/07/2019 (Date Issued: 05/08/2019)

Sample No E337879/09

Crop

Physical Analysis



Analysis	Result (%)
Sand	52.11
Silt	37.07
Clay	10.82
Very Fine Sand	7.43
Fine Sand	18.67
Medium Sand	18.96
Coarse Sand	6.80
Very Coarse Sand	0.26
Stones >2mm	3.60
Soil Type	SaLo Sandy Loam

Property	Assessment
Available Water	Low to Medium
Drainage Rate	Rapid
Inherent Fertility	Low to Medium
Potential C.E.C.	Low to Medium
Leaching Risk	High to Moderate
Warming Rate	Rapid



Analysis Results (SOIL)

Customer ARCADIS (UK) LIMITED
THE MILL
BRINSCOMBE PORT
STROUD
GL5 2QG

Distributor ARCADIS (UK) LTD
THE MILL
BRINSCOMBE PORT
BRINSCOMBE
STROUD
GLOS
GL5 2QG

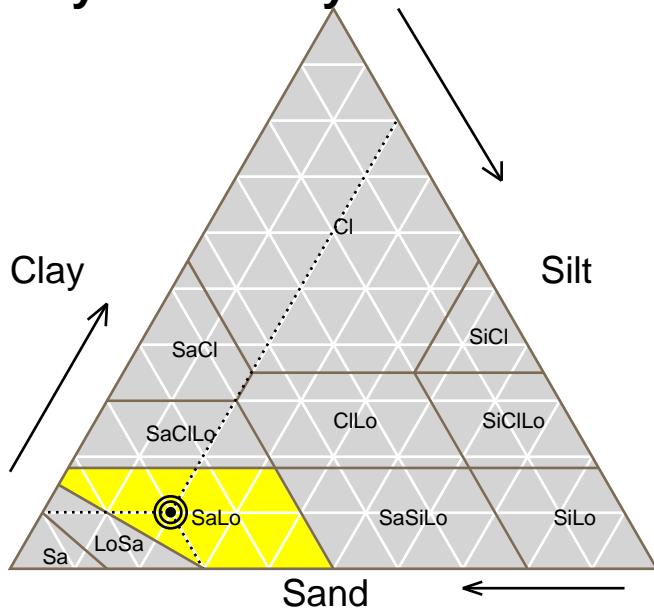
Sample Ref TVB 27 TOPSOIL

Date Received 30/07/2019 (Date Issued: 05/08/2019)

Sample No E337879/10

Crop

Physical Analysis



Analysis	Result (%)
Sand	70.12
Silt	19.79
Clay	10.09
Very Fine Sand	3.65
Fine Sand	21.05
Medium Sand	32.89
Coarse Sand	12.54
Very Coarse Sand	< 0.01
Stones >2mm	3.70
Soil Type	SaLo Sandy Loam

Property	Assessment
Available Water	Low to Medium
Drainage Rate	Rapid
Inherent Fertility	Low to Medium
Potential C.E.C.	Low to Medium
Leaching Risk	High to Moderate
Warming Rate	Rapid



Analysis Results (SOIL)

Customer ARCADIS (UK) LIMITED
THE MILL
BRINSCOMBE PORT
STROUD
GL5 2QG

Distributor ARCADIS (UK) LTD
THE MILL
BRINSCOMBE PORT
BRINSCOMBE
STROUD
GLOS
GL5 2QG

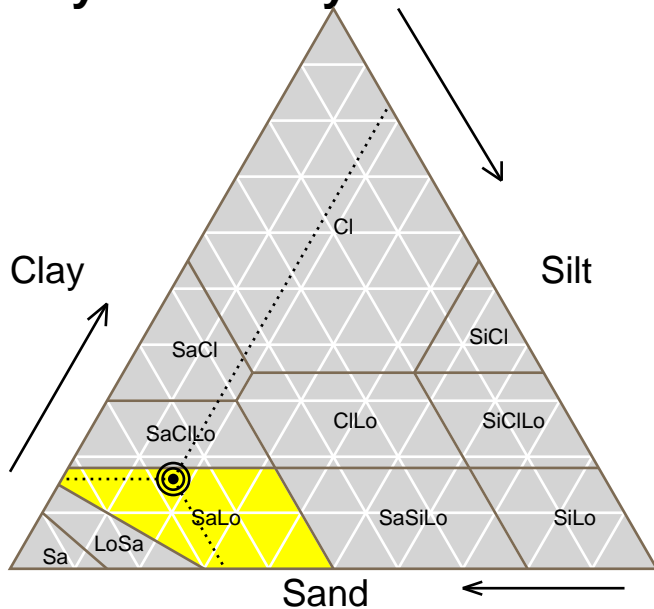
Sample Ref TVB 30 HORIZON 2

Date Received 30/07/2019 (Date Issued: 05/08/2019)

Sample No E337879/11

Crop

Physical Analysis



Analysis	Result (%)
Sand	66.75
Silt	17.23
Clay	16.02
Very Fine Sand	5.60
Fine Sand	44.69
Medium Sand	16.28
Coarse Sand	0.18
Very Coarse Sand	< 0.01
Stones >2mm	1.00
Soil Type	SaLo Sandy Loam

Property	Assessment
Available Water	Low to Medium
Drainage Rate	Rapid
Inherent Fertility	Low to Medium
Potential C.E.C.	Low to Medium
Leaching Risk	High to Moderate
Warming Rate	Rapid



Analysis Results (SOIL)

Customer ARCADIS (UK) LIMITED
THE MILL
BRINSCOMBE PORT
STROUD
GL5 2QG

Distributor ARCADIS (UK) LTD
THE MILL
BRINSCOMBE PORT
BRINSCOMBE
STROUD
GLOS
GL5 2QG

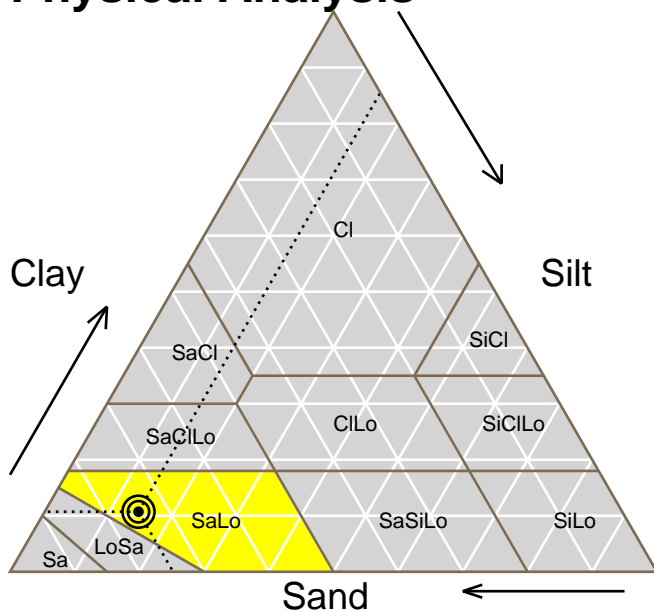
Sample Ref TVB POINT 36 HORIZON 1

Date Received 30/07/2019 (Date Issued: 05/08/2019)

Sample No E337879/12

Crop

Physical Analysis



Analysis	Result (%)
Sand	74.78
Silt	14.50
Clay	10.72
Very Fine Sand	3.71
Fine Sand	34.06
Medium Sand	32.19
Coarse Sand	4.83
Very Coarse Sand	< 0.01
Stones >2mm	2.30
Soil Type	SaLo Sandy Loam

Property	Assessment
Available Water	Low to Medium
Drainage Rate	Rapid
Inherent Fertility	Low to Medium
Potential C.E.C.	Low to Medium
Leaching Risk	High to Moderate
Warming Rate	Rapid