

WEST KNIGHTON QUARRY, WEST KNIGHTON, DORSET
EXTENSION TO SAND AND GRAVEL QUARRY

Site Physical Record, Report of Survey

In November 1989 three soil pits were examined in the proposed extension area. These served to verify the developer's statements on soil resources and their descriptions were used in conjunction with this statement to draw up the following site physical record. See also the attached soil pit descriptions which are typical of the area, and the topsoil resource map.

Topsoil Resource: 'Topsoil' is defined as the darker, more organic-rich surface horizons of Medium Sandy Silt Loam (MSZL), Medium Clay Loam (MCL) and Medium Silty Clay Loam (MZCL).

Two topsoil map units have been identified. From the point of view of workability of the topsoil the MSZL textures should be striped and stored separately from the MCL and MZCL.

There is a common average topsoil depth for both units: 25 cm.

Map Unit	Texture	Area (ha)	Volume (m ³)
A	MSZL	3.4	8,500
B	MCL/MZCL	17	42,500

Combining A and B, this gives a Total Topsoil Resource of 51,000 m³

Subsoil Resource: 'Subsoil' is defined as the non-organic-rich lower horizons of MCL, Heavy Clay Loam (HCL) and Clay (C).

The typical soil profile for the area reveals an upper subsoil of MCL or HCL which may overlie a band of clay or sit directly on gravel deposits.

This upper subsoil horizon should be stripped and stored separately. Although it is normal practice to handle MCL and HCL separately, the variation observed is such that this is not practicable. There is, therefore, a single unit of upper subsoil throughout the site which may be stripped to a depth of 40 cm below the topsoil. This will provide a Total Upper Subsoil Resource of 81,600 m³.

Increases in stone content in the subsoil below approximately 65 cm prevent auger penetration, yet the soil pits reveal that gravel (ie +70% stone) does not typically occur until deep in the profile. The three MAFF pits revealed gravel at 81, 105 and 110 cm. A conservative estimate would therefore suggest that a lower subsoil horizon 35 cm thick could be excavated. This layer would contain a variable mix of MCL, HCL, SCL and C

textures. The variability would again preclude attempting to differentiate between the textures; this lower subsoil should be stripped as one unit but should be handled and stored separately from both the topsoil and upper subsoil resources.

This will provide a Total Lower Subsoil Resource of 71,400 m³.

Parent Material:

the arable potential of the site reflects the fact that crops are able to exploit the reserves of available water to a depth of at least 1.2 metres. This means that the upper layers of the gravel play an important agricultural role in relation to the soil profile above.

The soil profile should therefore be restored to a depth of at least 1.2 m and, to facilitate this, a 20 cm layer of gravel deposits should be stripped and stored separately in preparation for replacement at the base of the restored profile.

A Total Gravel Resource of 40,800 m³ should therefore be stored.

Soil Handling:

the soil pit descriptions attached reveal the moderate structural conditions that prevail in the subsoils throughout the site. All soil handling should take place under dry conditions. Given the clay contents of the subsoil textures, poor handling would result in a deterioration of subsoil structure. Such a deterioration would have two effects: to restrict the ability of crops to extract water from the subsoil or to create a soil waterlogging problem. Either problem would lower the agricultural potential of the site and would mean that the area had not been restored to its pre-working position.

SITE NAME
West Knighton
Dorset, Minerals

PROFILE NUMBER

1

SLOPE AND ASPECT

Flat

LAND USE

Temp Grass
Heavy Fertiliser
Application

Av Rainfall :- 975
ATO :- 1508
FC Days :- 197
Climatic grade:- 1

PARENT MARIAL

Sand and Gravel Deposits

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	21	10YR44	MSZL	2% vsst visual hard	-	Weak V Coarse Subangular Blocky (breaking to MSAB)	Good	-	Friable	-	-	-	Gradual
2	53	7.5YR46 7.5YR54 from 44cm	HCL	2% vsst visual hard	Not gleyed, but some feint grey	Weak CSAB breaks to	Good	Moderate	Friable	-	-	-	Gradual
3	75	7.5YR56	HCL	2% vsst visual hard	-	Moderate CSAB	Good	Moderate	Firm	-	-	-	Distinct
4	81	7.5YR56	HCL	approx 50% sst visual hard	-	-	-	Moderate assumed	-	-	-	-	-
5	+ 81cm	GRAVEL deposits with +70% stone											

Depth to Slowly Permeable Horizon :-

Wetness Class :- I

Wetness Grade :- II

RPG0023/WJC

Available Water Wheat :- 114

Potatoes :- 116

Moisture Deficit Wheat :- 97

Potatoes :- 89

Balance

Moisture ~~XXXX~~ Wheat :- +17

Potatoes :- +27

Droughtiness Grade :- 2

Final ALC Grade :- 2

Main Limiting Factor(s) :- Droughtiness

Remarks :- Assuming easily available water in gravel down to 120 cm

SITE NAME
West Knighton,
Dorset; Minerals

PROFILE NUMBER
2

SLOPE AND ASPECT
Flat

LAND USE
Temp Grass

Av Rainfall :- 975
ATO :- 1508
FC Days :- 197
Climatic grade:- 1

PARENT MARIAL
Sand and Gravel Deposits

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	27	10YR43	MCL	2% vsst, visual	-	Weak MSAB	Good	-	Friable	-	-	-	Gradual
2	65	10YR44	MCL	10% sst, visual hard	-	Weak MSAB	Good	Good	Friable	-	-	-	Gradual
3	110	10YR56	C	2% vsst visual hard	-	Weak MSAB	Good	Moderate	Firm	-	-	-	-
4	+110cm	Gravel deposits with + 70% hard stone											

Depth to Slowly Permeable Horizon :-

Wetness Class :- I

Wetness Grade :- 2

RPG0023/WJC

Available Water Wheat :- 131

Potatoes :- 111

Moisture Deficit Wheat :- 97

Potatoes :- 87

Moisture Deficit Wheat :- +34

Potatoes :- +24

Droughtiness Grade :- 1

Final ALC Grade :- 2

Main Limiting Factor(s) :- Workability (MCL topsoil)

Remarks :-

SITE NAME West Knighton, Dorset; Minerals	PROFILE NUMBER 3	SLOPE AND ASPECT Flat	LAND USE Temp Grass	Av Rainfall :- 975 ATO :- 1508 FC Days :- 197 Climatic grade:- 1	PARENT MARIAL Sand and Gravel Deposits
---	---------------------	--------------------------	------------------------	---	---

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	22	10YR43	MCL	2% vsst visual hard	-	-	Good	-	-	-	-	-	Distinct
2	57	10YR44	HCL	2% vsst visual hard	-	Weak CSAB breaks to MSAB	Good	Moderate	Friable	-	-	-	Distinct colour change
3	95	10YR54	C	5% sst visual hard	-	Weak CSAB	Good	Moderate	Firm	-	-	-	-
4	105	10YR54	C	approx 50% gravel	-	-	-	Moderate assumed	-	-	-	-	-
5	+105cm	Gravel deposits with + 70% stone											

Depth to Slowly Permeable Horizon :-	Available Water Wheat :- 124 Potatoes :- 114	Final ALC Grade :- 2
Wetness Class :- I	Moisture Deficit Wheat :- 97 Potatoes :- 87	Main Limiting Factor(s) :- Droughtiness Workability
Wetness Grade :- 2	Moisture Deficit Wheat :- +27 Potatoes :- +27	
RPG0023/WJC	Droughtiness Grade :- 2	Remarks :-