Connah's Quay Low Carbon Power

Environmental Statement Volume IV
Appendix 14-E: Agricultural Land Classification Survey Report

Planning Inspectorate Reference: EN010166
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Planning Act 2008 (as amended)
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(a)
Revision 00

August 2025

This report presents a survey of a larger area which was considered for the Scheme during the application and assessment process. As such there are areas surveyed and presented in this report which are no longer within the Order limits. This does not impact on the conclusions of this report.

ROBERTS
ENVIRONMENTAL LTD

Agricultural Land Classification (ALC) Report

Land at Connah's Quay

February 2025

AECOM Ltd

Reference: 240317.AC.02

Contents

Figures

Tables

Appendices

1. Scope & Objectives

The Services	Agricultural Land Classification (ALC) Report	
The Client	[redacted]	
Site Name	Land at Connah's Quay	
Site Address	Land at, and in the vicinity of, the existing Connah's Quay Power Station (Kelsterton Road, Connah's Quay, Flintshire, CH6 5SJ) ("**the Property**")	
Proposed Use	The proposed development is for a Combined Cycle Gas Turbine (CCGT) Generating Plant fitted with a Carbon Capture Plant (CCP).	
Information Sources (Where appropriate documents are contained in appendices with data extracts provided and summarised within pertinent sections of this report. List not exhaustive)	**Online Source**	Agricultural Land Classification (ALC) Database and Mapping, Natural Resources Wales (NRW), 2025.
		NRW, Post 1988 Agricultural Land Classification (Wales) Surveys, 2025.
		British Geological Survey (BGS) Database and Mapping.
		BGS Geoindex Web Mapping Service.
		BGS 1: 50,000 scale Provisional Series, Geological Map, England and Wales, Sheet Number 108 (Flint), available on the BGS map portal.
		Google Historic Satellite Imagery.
		National Library of Scotland Historical Ordnance Survey England and Wales, 1930-1969 Maps.
	Documentation Source	Soil Classification for Soil Survey, Monographs on Soil Survey, Butler, B E (1980), Clarendon Press, Oxford.
		Hodgson, J.M (ed.) (2022). *Soil Survey Field Handbook*. Soil Survey Technical Monograph No. 5, Cranfield.
		Meteorological Office (Met Office), 1989, Climatological Data for Agricultural Land Classification – Gridpoint Datasets of Climatic Variables, at 5km intervals, for England and Wales.
		MAFF, 1988, Agricultural Land Classification of England and Wales – Revised Guidelines and Criteria for Grading the Quality of Agricultural Land.
		Natural England, Technical Information Note TIN049, 2012.
		Natural England, Technical Information Note TIN037, 2008.
		Soils and their use in Wales, 1984, Soil Survey of England and Wales Memoir and accompanying 1:250,000 scale map.
	Previous Reports	An REL Desk Based ALC Report was available for review; REL, Agricultural Land Classification Report, Connah's Quay, North Wales, Dated: July 2024, Reference: 240317.PA.05. One third party Post-1988 ALC report available for adjacent land; HyNet North West, Environmental statement – Volume III, Appendix 11.4 Agricultural Land Classification and Soil Resources (Newbuild Carbon Dioxide Pipeline) Report, Dated: September 2022, Reference: D.6.3.11.4. See **Section 4** for further details.
	Site Works	The site works were undertaken by REL in December 2024.

2. Site Details

National Grid Ref.	Approximate centre of the site: 327347, 371374
Ground Level Topography	Range 6m – 8m AOD, average for site: c. 8m AOD.
Order Limits	105 hectares (ha)
Survey Site Area	30 ha.
Location	The site is located within land at, and in the vicinity of, the existing Connah's Quay Power Station (Kelsterton Road, Connah's Quay, Flintshire, CH6 5SJ). The nearest towns are Connah's Quay, located approximately 0.6 km to the south-east, and Flint, located approximately 0.8 km to the north-west (to their respective nearest extents). For the purpose of this ALC assessment, only the area indicated in **Figure 2** below has been subject to survey. Therefore this boundary will be taken forward as the Survey Site for the purpose of this report.

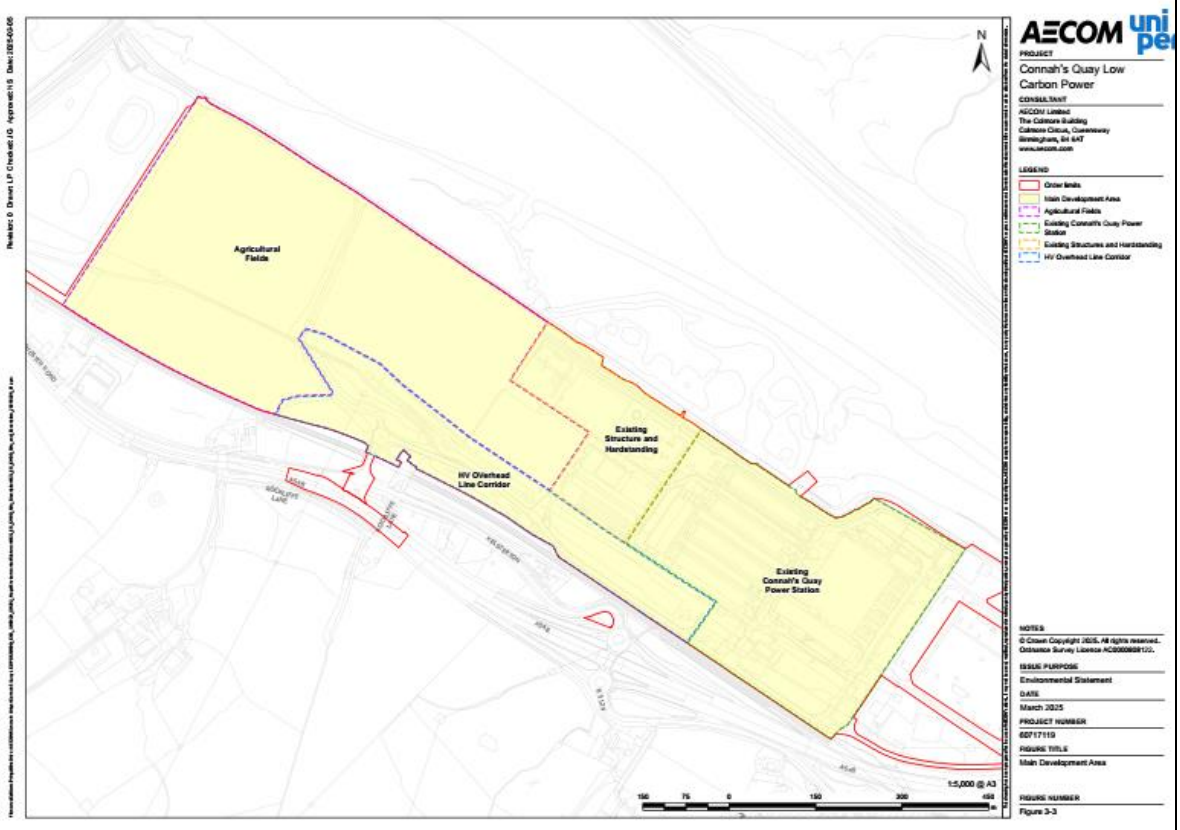


Figure 1: Total Order Limits (boundary indicated in red)

Figure 2: Site Survey Area (boundary indicated in red)

Survey Site Description and Usage	The Survey Site comprises agricultural fields that is currently used for livestock grazing.
Surrounding Land Uses	Surrounding land uses comprise Connah's Quay Power Station to the southeast of the site and the Connah's Quay Nature Reserve is adjacent north of the Order Limits. The town of Flint is located to the northwest, with wetlands separating the site and the town. To the south Chester Road (A548) is located, with agricultural fields present beyond the road.
Site History	The review of the publicly available historical maps has shown that the Survey Site historically comprised *saltings* and *sand and mud* (tidal mud flats) as part of the River Dee, with the majority of the site below the High Tide Line up until pre-1969.
Current Grading	The Survey Site is currently mapped as **Grade 2** and **Urban** land on the provisional Predictive Data Map Wales (MAFF, 1983) see **Appendix V** for key to the gradings.

3. Methodology

Desk Study

Using published data sources, an initial desk-based study has been undertaken to provide a reconnaissance of the general site characteristics, including soil type(s) and agricultural classification.

Where available, Post-1988 ALC Surveys (undertaken at varying scales and levels of detail, ranging from 1:5,000 to 1:50,000 scale) have been consulted. Surveys included on this map provide the most detailed and up to date ALC grading following surveys between 1989 and 1999 by MAFF (now part of DEFRA).

Climatological data provided by the Met Office has been used to determine the overriding agroclimatic site limitations, using interpolated values based on the central point of the site.

Intrusive Soil Survey

The intrusive soil survey comprised at least one hand auger boring per hectare to a depth of 1.20m below ground level (where achievable) in accordance with current guidance. These were undertaken to examine the soil profiles, using standard soil survey methods.

In addition, in order to determine subsoil structure, at least one inspection pit has been excavated for each soil type encountered.

ALC Grade Assessment

All potential limiting ALC grade factors (listed in **Appendix V**) have been considered as part of the assessment, including those which pose no limitation on the ALC grading for the site.

Using the information collected during the site survey and the MAFF ALC guidance documents, an ALC grade was then determined for the site, or for each soil type based on the most limiting ALC grade (**Appendix I**). A brief overview of relevant terminology is included in **Appendix V**.

4. Desk Based Reconnaissance

Prior to the intrusive site investigation, a review of available desk-based information was undertaken. Pertinent information has been summarised below.

Climate Data

Using the climatological data set (Met Office, 1989) the following information (**Table 1**) has been calculated for the Survey Site. Calculations comprised altitude adjustment and interpolation, using the formula presented within the data set.

Table 1: Summary of Agroclimatic Data for the Site

(Centre Grid Reference: 327012, 371631		
Average Annual Rainfall (mm)	AAR	744.37
Accumulated Temperature (˚C)	ATO	1459.49
Field Capacity Duration (Days)	FCD	175.86
Moisture Deficit Wheat (mm)	MDWHT	102.15
Moisture Deficit Potatoes (mm)	MDPOT	92.75

The Survey Site is identified to have an average ATO and FCD, and slightly below average AAR when compared to the mapped values for the area south-east of Flint (Soils and their Use in Wales, 1984).

Using the AAR and ATO values within **Table 1,** the Survey Site is not considered to be limited by climate (Figure 1 of the MAFF guidance document).

Topography

The Survey Site was identified to have a gradient between 0˚ and 1˚, therefore topography is identified to not be a limiting factor of the ALC grade (Table 1, MAFF 1988).

BGS Published Data

A review of BGS information has identified that Made Ground is present on the Survey Site.

The Survey Site is situated within an area of superficial Tidal flat deposits (Clay, Silt and Sand).

The bedrock geology is indicated as the Etruria Formation (Mudstone, Sandstone and Conglomerate) in the east of the Survey Site, whilst the Gwespyr Sandstone Formation (Sandstone and Argillaceous rocks) is recorded to be present in the centre of the Survey Site

and the Pennine Lower Coal Measures Formation (Mudstone, Siltstone and Sandstone) present in the west.

Published Soils Data

Soils mapping for the area as shown on *Soils and their use in Wales*, 1984, Soil Survey of England and Wales Memoir and accompanying 1:250,000 scale map has been reviewed as part of this assessment. The location of the Survey Site is shown in the soils mapping extract below in **Figure 3**.

The soils mapping suggests the soils on the Survey Site comprise the Clifton Association and Wisbech Association. The soils are described as follows:

- **Clifton Association (711n)** - Slowly permeable seasonally waterlogged reddish fine and coarse loamy soils and similar soils with slight seasonal waterlogging. Some deep coarse loamy soils seasonally affected by groundwater.

- **Wisbech Association (812b) -** Deep stoneless calcareous coarse silty soils. Groundwater usually controlled by ditches or pumps. Flat land with low ridges. Risk of wind erosion locally

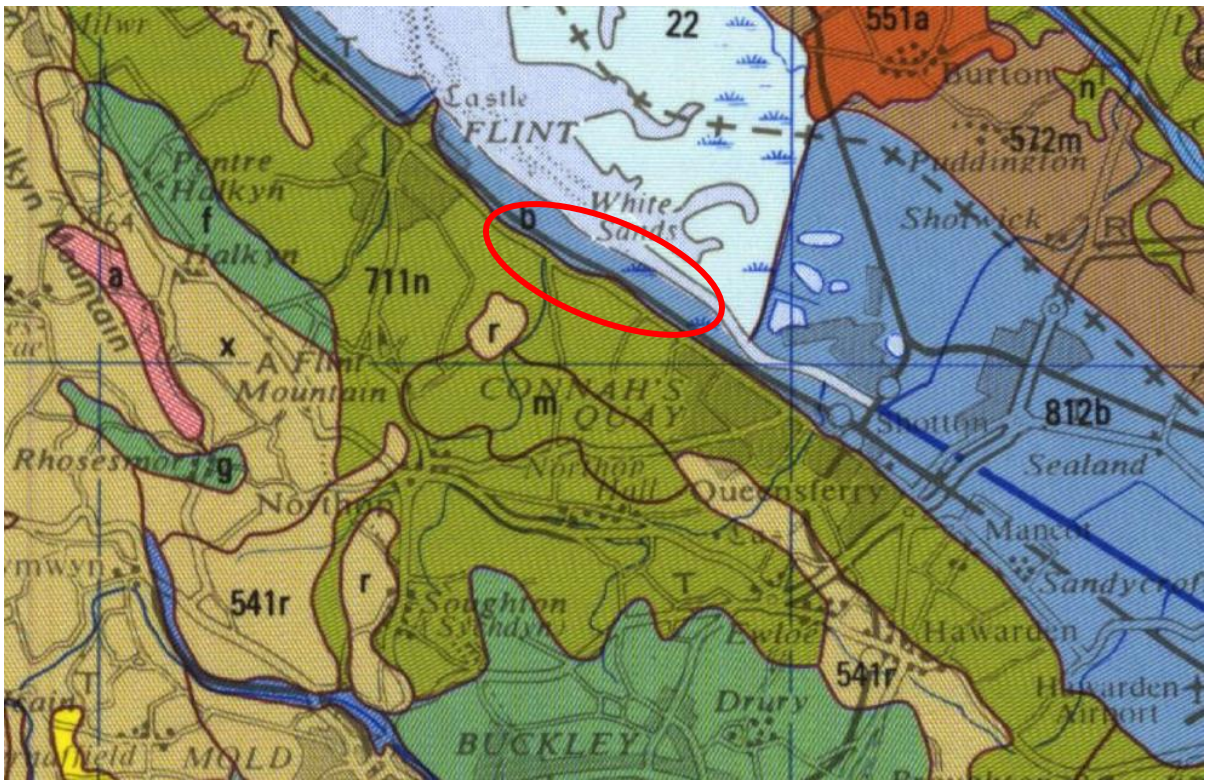


Figure 3: Soils Mapping for the Survey Site and Surrounding Area (approximate Survey Site location indicated in red)

Historical Mapping Review

The review of the publicly available historical maps has shown that the Survey Site historically comprised *saltings* and *sand and mud* (tidal mud flats) as part of the River Dee, with the majority of the Survey Site below the High Tide Line up until pre-1969.

Figure 4: OS 1:10,560 Mapping (SJ27SE – A), Surveyed / Revised: Pre-1930 to 1953, Published: 1954 (Approximate Survey Site location shown in red)

Figure 5: OS 1:10,560 Mapping (SJ27SE – A), Surveyed / Revised: 1962 to 1968, Published: 1969 (Approximate Survey Site location shown in red)

By mapping dated 1969, the Survey Site appears to have been reclaimed and is no longer *saltings* or below the High Tide Line. Multiple drains are present on the Survey Site. Therefore, it is considered that a significant depth of Made Ground may be present at the Survey Site, related to this reclamation.

In addition, although not shown on the historic mapping, DataMapWales mapping indicates that there were two historic landfills which overlie the Survey Site location. They are named as follows:

- Name: Connah's Quay Power Station 3, Ash Lagoon, accepted: Inert and Industrial waste, last input 1962;
- Name: Connah's Quay Power Station, accepted: Inert, Industrial and Commercial, last input 1991.

Previous Reports

Roberts Environmental Limited, Agricultural Land Classification Report, Connah's Quay, North Wales, Dated: July 2024, Reference: 240317.PA.05

A desk based ALC assessment was undertaken by REL to assess the Order Limits as defined in **Figure 1** of this report. The Desk Study concluded that due to the Survey Site containing quantities of Made Ground in addition the Order Limits being recorded to be underlain by two historic landfills. As such, the soils could be classified as being disturbed, potentially changing the Wetness Class, which in turn could result in the reduction of the overall ALC Grade, or for the Order Limits to be mapped as Non-Agricultural land. However, being a Desk Study, no site investigation was undertaken and no samples were obtained. As such, from available information the limitations taken in account during the study related to the Flood Risk or Wetness Limitation derived from *Soils and their use in Wales,* leading the study to conclude that the Survey Site was assessed to be ALC Grade 3b.

The report recommended that an intrusive investigation be undertaken for the Order Limits to accurately determine the ALC grade.

HyNet North West, Environmental statement – Volume III, Appendix 11.4 Agricultural Land Classification and Soil Resources (Newbuild Carbon Dioxide Pipeline) Report, Dated: September 2022, Reference: D.6.3.11.4

In addition to the above, a report by HyNet Northwest was provided for the land adjacent to the Survey Site, indicated as the Proposed CO2 Connection Corridor on **Figure 1** of this report. HyNet Northwest concluded that the area subject to their report was ALC Grade 3a.

Flood Risk Assessment

The potential limitations due to flood risk on the site have been reviewed using publicly available flood risk mapping. A preliminary assessment of the potential flood risks for the Survey Site is provided below.

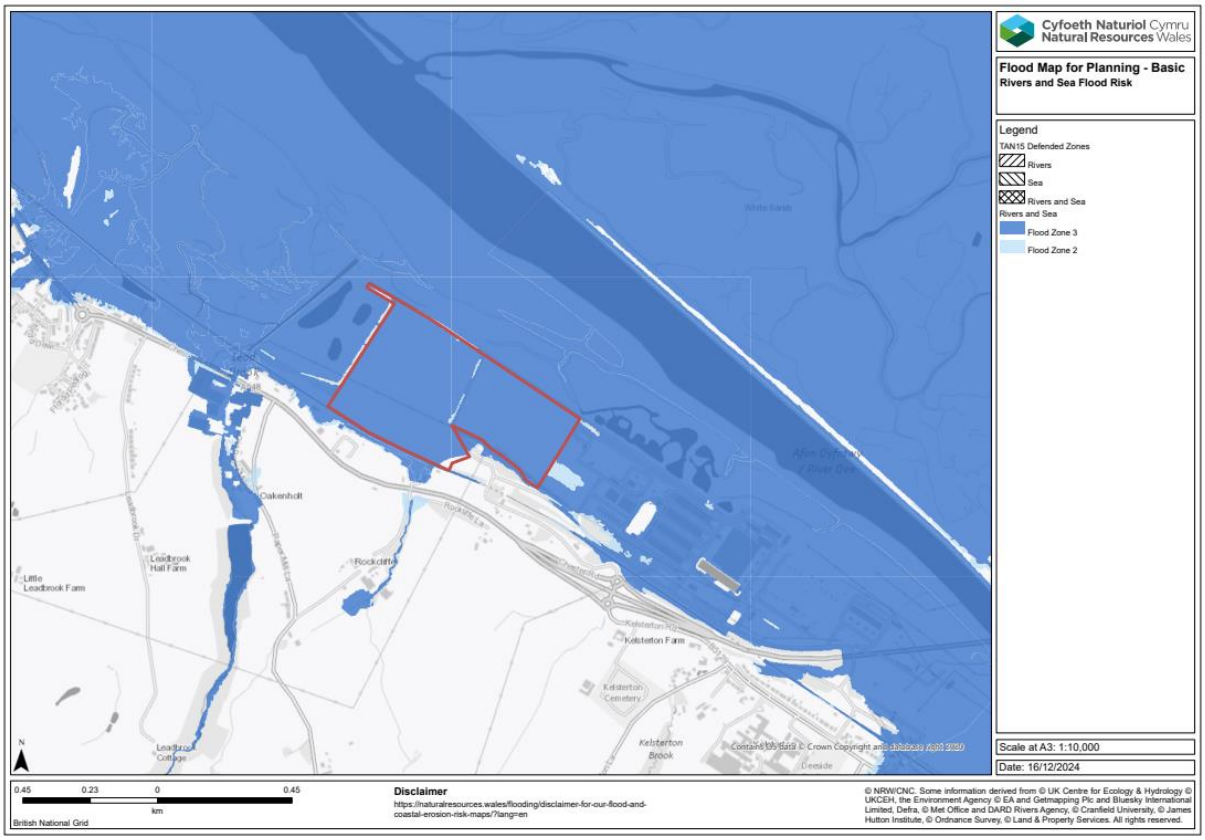


Figure 6: Flood Risk Present from Rivers and the Sea for the Survey Site (boundary defined in red)

The interactive Natural Resources Wales Flood Map for Planning on the NRW website identifies the Survey Site to be within Flood Zone 3 (the combined 1% risk of flooding from rivers and the sea including climate change.) (**Figure 6**).

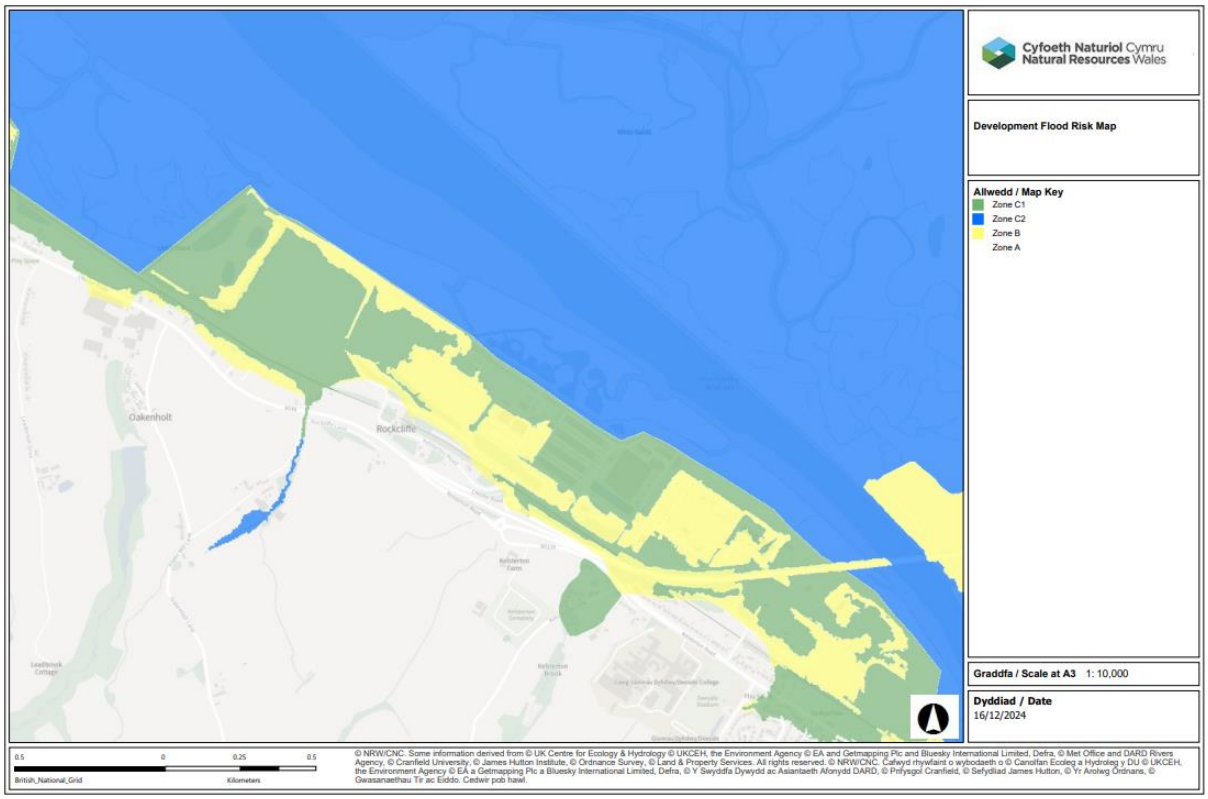


Figure 7: Development Advice Map and the National Flood Hazard and Risk Map for the Survey Site and surrounding land

Figure 7 records the Survey Site to contain land that is situated inside both Zone C1 and Zone B. Zone C1 is denoted as being served by significant infrastructure, including flood defences, whilst Zone B is recorded as being areas known to have flooded in the past. As much of the Survey Site is recorded as Zone C1 and is protected by infrastructure, REL considers that the Survey Site cannot be classed as having a high probability of flooding from rivers and sea. It is noted that the map was last updated in January 2020.

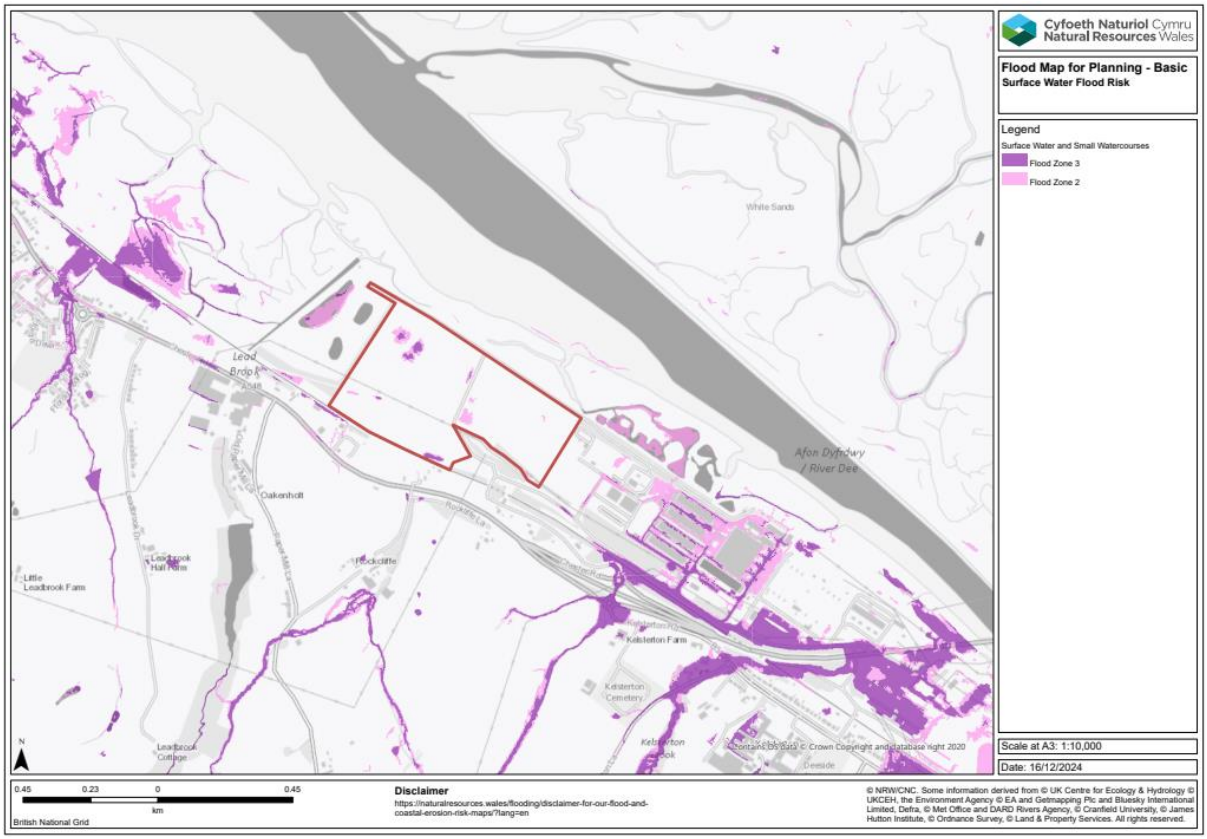


Figure 8: Flood Risk Present from Surface Water for the Survey Site (boundary defined in red)

Figure 8 shows that the Survey Site has a number of discrete areas indicated as being within Flood Zone 2 and Flood Zone 3, with Flood Zone 3 recorded as being an area with more than 1% (1 in 100) chance of flooding in a given year, including the effects of climate change.

The impact of flood risk is assessed to confirm if it can pose a limitation to the ALC grade of the site, in accordance with the guidance available in Tables 2 and 3 (MAFF, 1988).

The mapping identifies a High risk of flooding from rivers and the sea within the boundary of the Survey Site and a High risk of surface water flooding in some discrete areas.

For the purpose of grading, due to the lack of detailed information relating to duration of flooding and based on the assumption that flood defences are operational and regularly maintained, REL would tentatively assess the potential flood risk based on **Figure 7**. This is based on the assumption that NRW would look to protect essential national infrastructure (Connah's Quay Power Station) adjacent east of the Order Limits. However, due to the lack of detailed information relating to the duration and frequency of on-site flooding, the potential flood risk limitation cannot be fully determined. It is understood that for the purposes of a planning submission, a detailed Flood Consequence Assessment will be undertaken for the Survey Site and included within the Development Consent Order Application.

5. Intrusive Survey Findings

The survey identified One Soil Type across the entire Survey Site. A generalised profile of the soil type encountered has been described as below (**Table 2**) however, please note some localised variations were recorded. Complete soil logs are provided in **Appendix II** and photographs of the surveyed soils are presented in **Appendix III**.

Table 2: Summary of Soils Identified on the Survey Site

	Depth (cm)	Texture	Colour	Stones (%)	Mottles	Structure
Soil Type 1	0-10	Medium Silty Clay Loam (MZCL)	Very Dark Brown (10YR 2/2)	5	No	Medium Angular Blocky
	10-35	Medium Sandy Silt Loam (MSZL)	Very Dark Grey (2.5Y 3/1)	5	No	Medium Angular Blocky
	At 35	ROCK	N/A	100	N/A	N/A

The general profile for the soil type identified on the Survey Site has been used to assess the Wetness Class (WC) for the Soil Type (see **Appendix V** for the MAFF decision flow chart). The general profile is reflective of the findings in the soil pit associated with the Soil Type identified. The assessment process and results of the in-field wetness assessment is provided within **Table 3** below with a plan of the distribution of the soil types across the Survey Site shown in **Appendix I** (where applicable).

Table 3: Wetness Class Assessment for Soil Types Encountered

Soil Type	Parameters (Figure 6, MAFF)						
	Disturbed	FCD	SPL (depth cm) Justification	Colour	Gleying (depth cm) Justification	Ref	Wetness Class
Soil Type 1	Yes	175.86	No SPL was identified	N/A	No gleying was identified	N/A	I*

Notes: This Table follows the flow chart of Figure 6 of the MAFF ALC guidance to identify the wetness classification per Soil Type.
* The flow chart guides the assessor to 'assess WC from site and soil factors' and as such, the soil type has been likened to that of the Wisbech Series shown on the soils mapping for the Survey Site to determine a WC for the soils on the Survey Site.

6. Conclusions

The ALC grading for the Survey Site is summarised below within **Table 4**, overall findings of this assessment can be found in **Appendix IV**. The table below identifies the grades of the areas of agricultural land present across the Survey Site (**Appendix I**).

Table 4: ALC Classification

ALC Grade	Area (Ha)	Percentage
Grade 1	0.0	0.0%
Grade 2	0.0	0.0%
Subgrade 3a	0.0	0.0%
Subgrade 3b	28.0	92.8%
Grade 4	0.0	0.0%
Grade 5	0.0	0.0%
Non-Agricultural	2.0	7.2%
Total BMV	0.0	0.0%
Total Non-BMV	30.0	100%
Total Surveyed Area	**30.0**	**100%**

Soil Type 1 – Droughtiness Limitation

A combination of the soil textures and the soil water regime results in **ALC Grade 3b** with a limitation due to droughtiness for wheat crop.

Overall Site ALC Grade and Conclusions

28ha surveyed as part of this assessment has been determined to be **ALC Grade 3b**, whilst 2ha has been identified as Non-Agricultural land. As such, no BMV land has been identified on the Survey Site.

APPENDIX I SITE PLANS

Legend

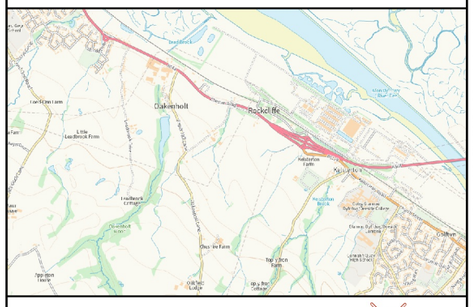
- Reporting Boundary
- Soil Type 1
- Non-Agricultural
- Borehole Location

0 30 60 90 120 150 m

Figure	Soil Type
Job	Land at Connahs Quay
Client	AECOM Ltd

Figure No.	Revision	Date
1	2	28 January 2025
Drawn by	**Checked by**	**Scale**
JN	LM	1:3,331.364957

Job No. 240317



DO NOT SCALE. NOT FOR CONSTRUCTION

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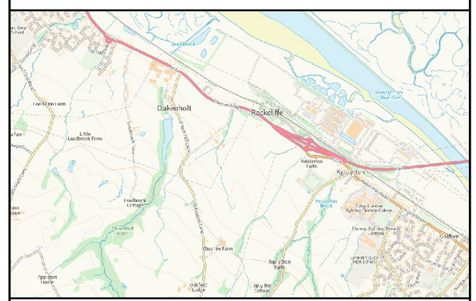
Legend

- Reporting Boundary
- ALC Grade 3b
- Non-Agricultural
- Borehole Location

0 30 60 90 120 150 m

Figure: ALC Grade		
Job: Land at Connahs Quay		
Client: AECOM Ltd		
Figure No.: 2	Revision: 2	Date: 28 January 2025
Drawn by: JN	Checked by: LM	Scale: 1:3,331.364957
Job No.: 240317		



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APPENDIX II SITE SURVEY LOGS

240317 Connah's Quay																			
No.	Depth (cm)	Texture	Stones	Mottling	Structure	Depth (cm)	Texture	Stones	Mottling	Structure	Depth (cm)	Texture	Stones	Mottling	Structure	Depth (cm)	Texture	Stones	Mottling	Structure
BH1	0-10	MZCL	5	*	MSAB	10-35	MSZL	15	*	MSAB	35	ROCK	100							
BH2	0-10	MZCL	5	*	MSAB	10-35	MSZL	15	*	MSAB	35	ROCK	100							
BH3	0-20	MZCL	5	*	MSAB	20-40	MSZL	15	*	MSAB	40	ROCK	100							
BH4	0-15	MZCL	5	*	MSAB	15-40	MSZL	15	*	MSAB	40	ROCK	100							
BH5	0-15	MZCL	5	*	MSAB	15-40	MSZL	15	*	MSAB	40	ROCK	100							
BH6	0-10	MZCL	5	*	MSAB	10-35	MSZL	15	*	MSAB	35	ROCK	100							
BH7	0-10	MZCL	5	*	MSAB	10-35	MSZL	15	*	MSAB	35	ROCK	100							
BH8	0-10	MZCL	5	*	MSAB	10-35	MSZL	15	*	MSAB	35	ROCK	100							
BH9	0-15	MZCL	5	*	MSAB	15-40	MSZL	15	*	MSAB	40	ROCK	100							
BH10	0-15	MZCL	5	*	MSAB	15-30	MSZL	15	*	MSAB	30	ROCK	100							
BH11	0-15	MZCL	5	*	MSAB	15-30	MSZL	15	*	MSAB	30	ROCK	100							
BH12	0-15	MZCL	5	*	MSAB	15-38	MSZL	15	*	MSAB	38	ROCK	100							
BH13	0-15	MZCL	5	*	MSAB	15-30	MSZL	15	*	MSAB	30	ROCK	100							
BH14	0-15	MZCL	0	*	MSAB	15-30	MSZL	35	*	MSAB	30	ROCK	100							
BH15	0-15	MZCL	0	*	MSAB	15-30	MSZL	35	*	MSAB	30	ROCK	100							
BH16	0-15	MZCL	0	*	MSAB	15-30	MSZL	35	*	MSAB	30	ROCK	100							
BH17	0-15	MZCL	0	*	MSAB	15-30	MSZL	35	*	MSAB	30	ROCK	100							
BH18	0-10	MZCL	5	*	MSAB	10-25.	MSZL	35	*	MSAB	25	ROCK	100							
BH19	0-10	MZCL	0	*	MSAB	10-30.	MSZL	0	FFO	MSAB	30	ROCK	100							
BH20	0-10	MZCL	0	*	MSAB	10-30.	MSZL	0	FFO	MSAB	30	ROCK	100							
BH21	0-15	MZCL	0	*	MSAB	15-120	MSZL	0	FFO	MSAB										
BH22	0-10	MZCL	0	*	MSAB	10-30	MSZL	0	*	MSAB	30	ROCK	100							
BH23	0-15	MZCL	0	*	MSAB	15-30	MSZL	0	*	MSAB	30	ROCK	100							
BH24	0-10	MZCL	0	*	MSAB	10-30cm	MSZL	0	FFO	MSAB	30	ROCK	100							
BH25	0-10	MZCL	0	*	MSAB	10-30cm	MSZL	0	FFO	MSAB	30	ROCK	100							
BH26	0-15	MZCL	0	*	MSAB	15-35	MSZL	0	*	MSAB	35-55	MCL	35	*	SAB	55	ROCK	100	*	*
BH27	0-10	MZCL	0	*	MSAB	10-30cm	MSZL	0	FFO	MSAB	30	ROCK	100							
BH28	0-10	MZCL	0	*	MSAB	10-30cm	MSZL	0	FFO	MSAB	30	ROCK	100							

Structure	
MSAB	Medium Subangular Blocky
AB	Angular Blocky
CP	Coarse Prismatic
MSAB	Massive
SAB	Subangualr Blocky
CP	Coarse
W	Weak

Stones	
5	Very Slightly Stony
15	Slightly Stony
35	Moderately Stony

Texture	
C	Clay
ZC	Silty Clay
SC	Sandy Clay
CL	Clay Loam
ZCL	Silty Clay Loam
SCL	Sandy Clay Loam
SZL	Sandy Silty Loam
SL	Sandy Loam
LS	Loamy Sand
S	Sand
ZS	Silty Sand
MG	Made Ground
F (sand)	Fine
M (sand)	Medium
C (sand)	Coarse
H (clay)	Heavy
M (clay)	Medium

Rock Type	
Ca	Calcareous

Mottling	
*	No Mottling
X	Fine Grey
O	Fine Ochreous
N	Numerous Mottles
F	Few Mottles
D	Fine Brown

Cell Colours	Reason
	Livestock in field - not accessed
	Woodland/Made Ground/Urban
	Inaccesible areas
	N/A

APPENDIX III SITE SURVEY PHOTOGRAPHS

Photograph Number	Photograph Description	Photograph
1.	**Land at Connah's Quay** View of site from northern boundary – Sheep Grazing present.	
2.	**Land at Connah's Quay** Presence of services underground – disturbed soils.	
3.	**Land at Connahs Quay** Buried structure in centre of site, presumed linked to drainage.	

Photograph Number	Photograph Description	Photograph
4.	**Land at Connah's Quay** Soil auger sample.	
5.	**Land at Connah's Quay** Subsoil structure.	
6.	**Land at Connah's Quay** Soil pit.	

APPENDIX IV SUMMARY OF FINDINGS

Job Name:	Land at Connah's Quay
Job Number:	240317
Date:	28/01/2025
Completed By:	JN

Site Altitude:	8
Centre Grid Ref:	327067 371574

AAR	744.37
ATO	1459.49
FCD	175.86
MDMWHT	102.15
MDMPOT	92.75

	Soil Type 1
AP WHT	68.78
MB WHT	-33.37
AP POT	65.775
MB POT	-26.97

Site Limitations Summary

	Soil Type 1
Wetness Class	I
Wetness Grading	1
Droughtiness Wheat	3b
Droughtiness Potato	3a
Gradient Limitation	1
Soil Depth Limitation	3a
Stoniness Limitation	1
	Overall
Site Climatic Limitation	1
Overall Grade	**3b**

APPENDIX V TERMINOLOGY

Agricultural Land Classification (ALC)

The Agricultural Land Classification (ALC) provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long- term limitations on agricultural use. The limitations can operate in one or more of four principal ways: they may affect the range of crops which can be grown; the level of yield; the consistency of yield and the cost of obtaining it. The classification system gives considerable weight to flexibility of cropping, whether actual or potential, but the ability of some land to produce consistently high yields of a somewhat narrower range of crops is also taken into account.

These factors form the basis for classifying agricultural land into one of five grades (with Grade 3 land divided into Subgrades 3a and 3b since the guidelines were revised in 1988), ranked from Excellent (Grade 1) to Very Poor (Grade 5). ALC grading is determined using the Ministry of Agriculture Food and Fisheries (MAFF) ''*Agricultural Land Classification of England and Wales – Revised guidelines and criteria for grading the quality of agricultural land*'.

Definition of Agricultural Land Classification Grades

ALC Grade	Description
Grade 1	**Excellent quality agricultural land** No or very minor limitations to agricultural use.
Grade 2	**Very good quality agricultural land** Minor limitation which affect crop yield, cultivation or harvesting.
Subgrade 3a (pre-1988 Grade 3)	**Good quality agricultural land** Capable of producing moderate to high yields of a narrow range of arable crops or moderate yields of a wider range of crops.
Subgrade 3b (pre-1988 Grade 3)	**Moderate quality agricultural land** Capable of producing moderate yields of a narrow range of arable crops and/or lower yields of a wider range of crops.
Grade 4	**Poor quality agricultural land** Severe limitations which significantly restrict the range of crops and/or levels of yield.
Grade 5	**Very poor quality agricultural land** Very severe limitations which restrict use to permanent pasture or rough grazing.

Best and Most Versatile (BMV) Agricultural Land

The National Planning Policy Framework (NPPF) (Department for Communities and Local Government, 2012) defines Best and Most Versatile (BMV) agricultural land as land of Excellent (ALC Grade 1), Very Good (Grade 2) and Good (Grade 3a) agricultural quality. BMV land is provided a degree of protection against development within planning policy, with most Local Plans including specific policies which refer to the protection of BMV agricultural land.

Non-BMV agriucltural land, i.e. Moderate, Poor and Very Poor quality agricultural land is designated subgrade 3b or Grades 4 and 5 respectively, and is restricted to a narrower range of agricultural uses. Limited to no protection is provided against development on this grade land within planning policy.

Limiting Factors

Main Factor	Sub Factor	Explanation
Climatic Limitations	Overall Climatic Limitation	Using a dataset of five parameters, as set on a 5km grid for the whole of the UK, the site climatic values are used to determine if there is an overriding limiting factor for the site with regard to the wider climate.
	Local Climatic Factors	Where the above climatic factors are liable to be modified by local factors such as aspect, gradient and elevation then one or more of these factors may become a limiting factor for the site.
Site Limitations	Gradient	Gradient may have an impact on mechanised farm operations and also on soil erosion. The ALC grade limitations with reference to gradient are given in Table 1 of the MAFF guidance.
	Microrelief	Complex changes in slope angle and direction over short distances may have an impact on agricultural machinery. The effect of microrelief is considered in conjunction with overall gradient.
	Flooding	The extent, duration, frequency and timing of flooding may have an influence over the ALC Grade and could become the limiting site factor. The ALC grade limitations with reference to flooding are given in Tables 2 and 3 of the MAFF guidance.
Soil Limitations	Soil Texture and Structure	Soil texture and structure can influence the water retention, water movement and aeration of the soil and therefore affect the workability, trafficability, poaching risk and suitability for plant growth. Soil texture is determined by the proportions of sand, silt and clay and is used to assess the wetness class of the soil.
	Soil Depth	Soil depth can influence the available water capacity of the soil, restrict nutrient uptake, root growth and root anchorage. The ALC grade limitations with reference to soil depth are given in Table 4 of the MAFF guidance.
	Stoniness	Stone content can influence the cultivation, harvesting and crop growth and may negatively impact machinery. The ALC grade limitations with reference to stoniness are given in Table 5 of the MAFF guidance.
	Chemical Limitations	Certain physical limitations may limit soil chemical properties, such as saline conditions, organic matter and toxic elements.
Interactive Limitations	Soil Wetness	Soil wetness is assessed using a combination of factors including climate, soil water regime and soil texture. The ALC grade limitations with reference to soil wetness are given in Tables 6 and 7 of the MAFF guidance.
	Droughtiness	Soil droughtiness is assessed using a combination of factors including available water capacity, moisture deficit, moisture balance and irrigation. The ALC grade limitations with reference to droughtiness are given in Table 8 of the MAFF guidance.
	Soil Erosion	Soil erosion may be caused by wind or water action and is determined by interactions between weather, soil type, topography and vegetation cover.

Soil Series

Soil series is the lowest categorical level used for classifying soils in England and Wales. According to the Soil Survey of England and Wales 1984:

"Soil series are defined using a combination of three main properties, the broad type of parent material present (substrate type), the texture of the soil material (textural grouping) and the presence or absence of material with a distinctive mineralogy."

Higher categories are: Major Soil Group, Soil Group, and Soil Subgroup, which are not explicitly used in this report.

Soil Association

A soil association is a geographic grouping of soils identified by the name of the most frequently occurring soil series and by the combination of additional soil series.

Gleying

Gleying is the process of iron reduction (opposite to oxidation) in soils from ferric (reddish in colour) to ferrous compounds (grey or colourless), by microorganisms or by-products of decomposing organic matter. Gleying occurs in areas devoid of oxygen when the soil is waterlogged. The resulting mottling (spots or blotches of colour) can therefore be used to identify the existence of a Slowly Permeable Layer (SPL); as defined within the MAFF ALC guidance.

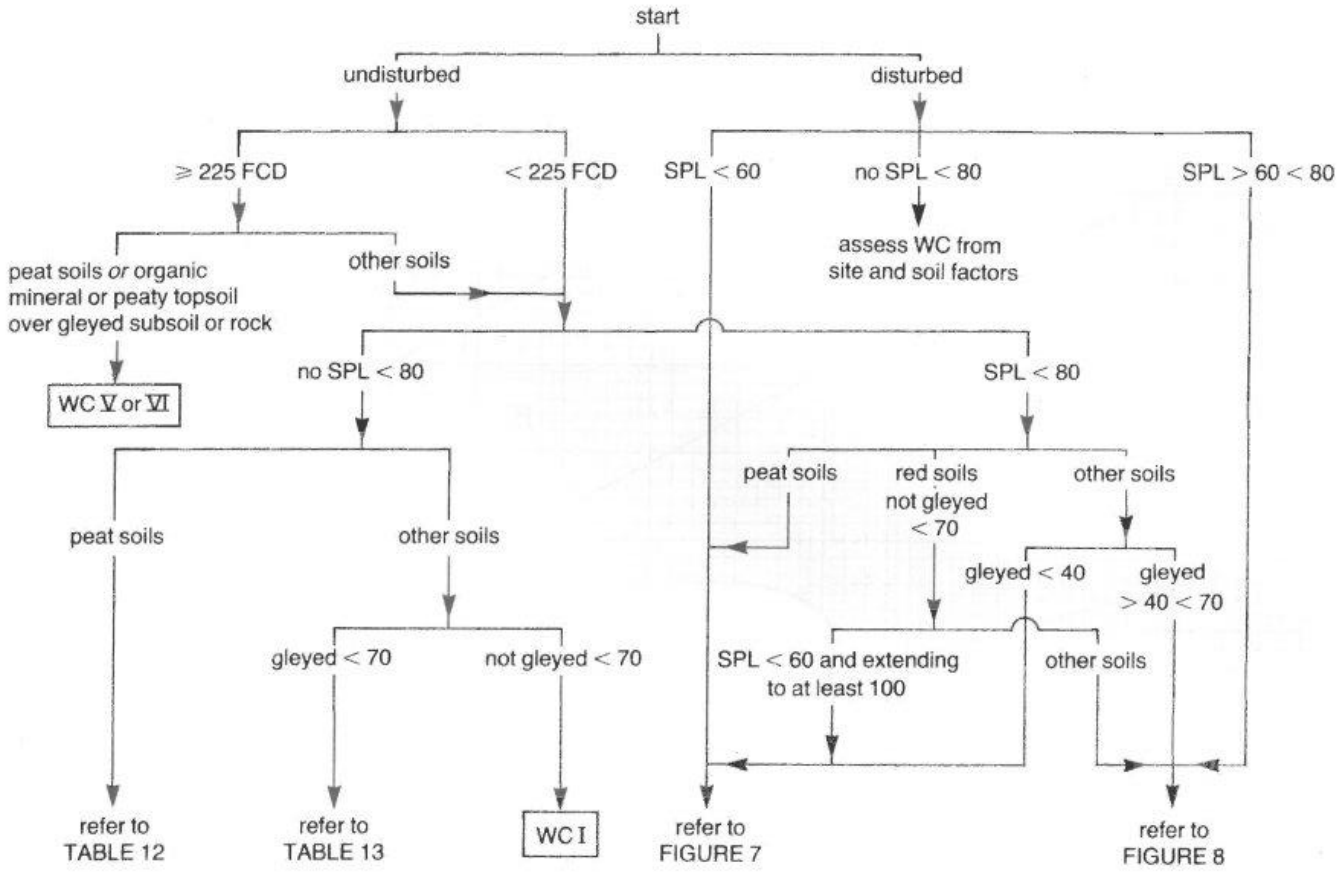

Figure 6. Flow diagram for assessing soil wetness class (WC) from field capacity days (FCD), depth to gleying (in cm) and depth to a slowly permeable layer (SPL, in cm)