



Norwich Western Link

Environmental Statement

Chapter 13: Geology & Soils

Appendix 13.6: Soil Depth Probing Survey

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1 Introduction

- 1.1.1 During a preliminary ground investigation (GI) an area was identified where peat may be present within the proposed Norwich Western Link (the Proposed Scheme) red line boundary. This area of possible peat was within the floodplain of the River Wensum (shown in Figure 1 of this Appendix) which the Proposed Scheme would cross with a viaduct. The extent of peat in this area therefore needed to be determined to inform the Soil Management (SMP) and construction design.
- 1.1.2 To assess the extent of peat in the area two surveys were undertaken on the 1st of November 2022:
- A Soil Resource Survey by Reading Agricultural Consultants (RAC) that described the composition of soil to a depth of 1.2m (**Ref.1**).
 - A soil depth survey to ascertain the extent that peat may be present below 1.2m.
- 1.1.3 This report summarises the methods and findings of the soil depth survey. It also combines soil composition information from the Soil Resource Survey (**Ref.1**) to state the likelihood of peat beyond 1.2m.



Figure 1 - Sample area within the red line boundary



2 Methodology and limitations

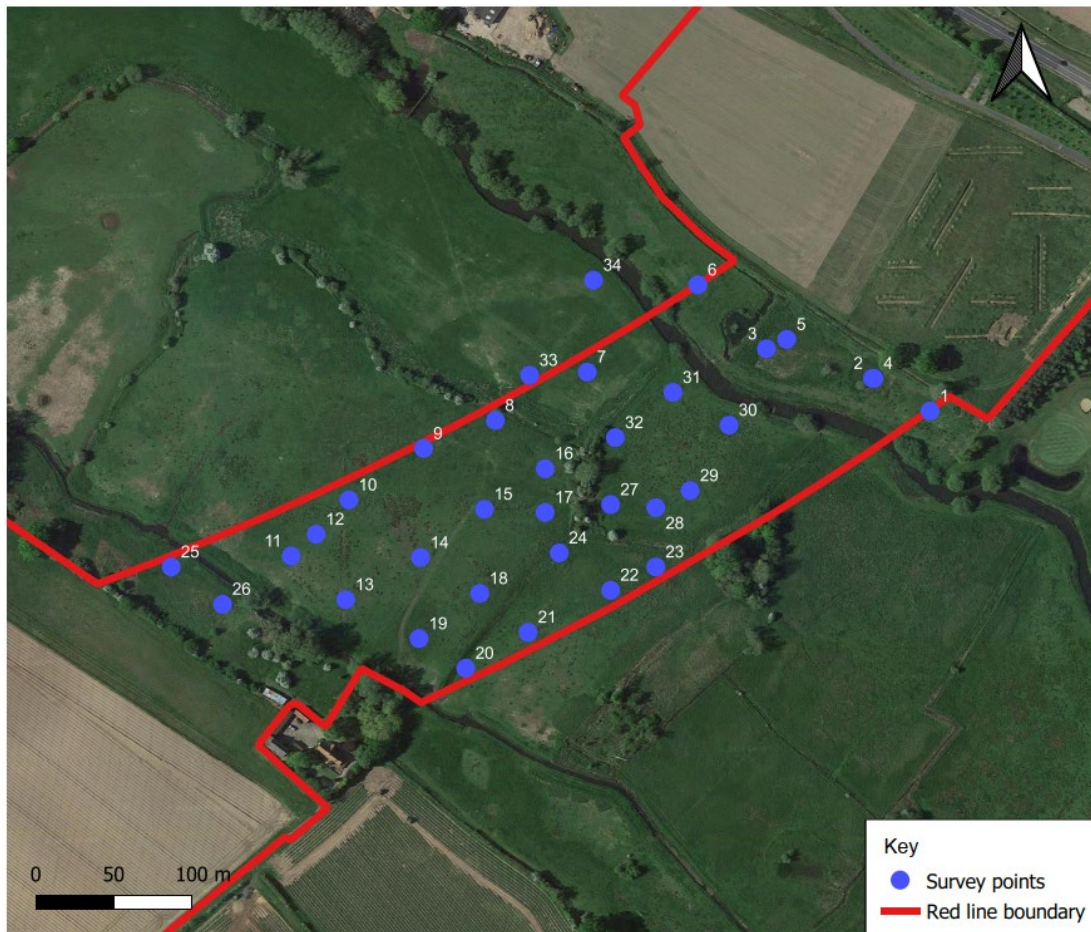
- 2.1.1 A 50m x 50m grid of survey points was identified before reaching site to guide the sampling. Where possible, the same sampling points as the Soil Resource Survey (at every 1 ha) were used so that the two surveys were well aligned.
- 2.1.2 For the depth probe survey 34 locations were surveyed (positions shown on Figure 2). The area to the south of point 26 and west of point 13 was not sampled due to it being inaccessible at the time of survey.



2.1.3 To measure soil depth a narrow fibreglass rod (depth probe) was pushed into the ground, at each survey point, until the underlying substrate was detected. The depth to the nearest 0.1m was recorded. The survey did not define the composition of the material.

2.1.4 The composition of the material is determined by combining the depth probing results with the Soil Resource Survey (**Ref.1**). To give the measured depths a likely soil classification, the Soil Resource soil description closest to each depth probe was used. The Soil Resource Survey points used are given in **Table 1**. Additional soil information is available in **Ref.1**.

Figure 2 - Depth probing survey points within a 5m range





3 Findings

3.1 Soil Depth

3.1.1 The measured soil depths ranged between 0.2m and 2.2m. A map of the estimated depths is shown in Figure 3 and the depths recorded are given in Table 1.

3.1.2 Of the 34No. locations, 19No. locations had a depth of 0.5m or under, 8No. locations between 0.5 and 1m and 7No. locations over 1m. The deepest soil depths were found at sampling points 3 (1.4m), 5 (1.9m), 7 (1.4m), 12 (1.6m) and 18 (2.2m). The shallowest depths were found at sample points 8, 10, 16, 17 and 27. Here soil depths were 0.2m, 0.3m, 0.3m, 0.3m and 0.3m (respectively).

Figure 3 - Estimated soil depths from depth probing





4 Peat Extent

4.1.1 Peat (a soil with over 50% organic matter content (**Ref.2**)) was not detected by the Soil Resource Survey. However, highly organic peaty soils were found to be present. The likely soil composition for each of the depth probe points (as informed by the Soil Resource Survey) are presented in **Table 1**.

4.1.2 Topsoils were typically classified as an organic loam with between 9.2%-22.7% organic matter content. In terms of subsoils, 21 of the depth probe survey points likely comprised Loamy Peat or Peaty Loam. Organic matter in these ranged between 12%-36.7% (**Ref.1**).

4.1.3 There are seven instances where soil depth exceeded 1.2m. At four of these locations (3, 5, 12 and 34) a Sandy Loam or Loamy Sand is the lowermost soil composition recorded. This suggests it is unlikely that peaty soil is present below these depths. At sample points 7, 18 and 31 Peaty Loam or Loamy Peat is present at 1.2m, implying that these soil types, and possibly peat, could be present to the depths of 1.4m, 2.2m and 1.4m (respectively).

Table 1 - Depth probe measurements for each point surveyed (the closest soil resource survey point and the soil composition of that point)

Soil classification abbreviations: Sand: S; Loamy sand: LS; Sandy loam: SL; Sandy clay loam: SCL; Clay loam: CL; Silty clay loam: ZCL; Clay: C; Silty Clay: ZC; Sandy Clay: SC; Peat: P; Sandy peat: SP; Loamy peat: LP; Peaty loam: PL; Peaty sand: PS; Marine light silts: MZ; Organic Heavy: oh; Organic: o; Medium grained sand (less than $\frac{2}{3}$ fine sand and less than $\frac{1}{3}$ coarse sand): m (**Ref.1 and Ref.2**).

Survey Point	Depth measured (to nearest 0.1 m)	Closest Soil Resource Survey Point	Soil Composition Depth (cm)	Soil Composition Soil Texture
1	0.5	1	0-30 30-45 45-55	ohCL hcl LmS
2	0.3	1	0-33	ohCL



Survey Point	Depth measured (to nearest 0.1 m)	Closest Soil Resource Survey Point	Soil Composition Depth (cm)	Soil Composition Soil Texture
3	1.4	2	0-33 33-70 70-105 105-120	ohCL PL PL LmS
4	0.5	1	0-30 30-45 45-55	ohCL hcl LmS
5	1.9	2	0-33 33-70 70-105 105-120	ohCL PL PL LmS
6	0.5	3	0-35 35-62	ohCL PL
7	1.4	4	0-25 25-100 100-120	ohCL PL PL
8	0.2	5	0-7 7-15 15-120	oLmS LmS LmS
10	0.3	7	0-20 20-40	oSCL SCL



Survey Point	Depth measured (to nearest 0.1 m)	Closest Soil Resource Survey Point	Soil Composition Depth (cm)	Soil Composition Soil Texture
11	1	8	0-25 25-70 70-100	ohCL ohCL LP
12	1.6	8	0-25 25-70 70-100 100-120	ohCL ohCL LP mSL
13	0.3	9	0-30	oSCL
14	0.8	10	0-23 23-80	oSCL PL
15	0.5	11	0-24 24-50	OscL PL
16	0.3	12	0-25 25-30	oLmS LmS
17	0.3	12	0-25 25-30	oLmS LmS
18	2.2	13	0-22 22-80 80-120	ohCL LP LP
19	0.6	14	0-25 25-50 50-63	ohCL LP LP



Survey Point	Depth measured (to nearest 0.1 m)	Closest Soil Resource Survey Point	Soil Composition Depth (cm)	Soil Composition Soil Texture
20	0.8	15	0-24 24-80	ohCL LP
21	0.8	15	0-24 24-80	ohCL LP
22	0.5	16	0-22 22-45 45-60	ohCL LP mSL
23	0.4	25	0-25 25-80	ohCL PL
24	0.5	17	0-23 23-50	ohCL LP
25	0.3	18	0-25 25-65	SCL SC
26	0.5	19	0-40 40-120	oSCL SCL
27	0.3	17	0-23 23-5	ohCL LP
28	0.6	20	0-30 30-120	oLmS LmS
29	0.4	25	0-25 25-80	ohCL PL
30	0.6	22	0-20 20-110	ohCL PL



Survey Point	Depth measured (to nearest 0.1 m)	Closest Soil Resource Survey Point	Soil Composition Depth (cm)	Soil Composition Soil Texture
31	1.4	21	0-22 22-60 60-120	ohCL LP PL
32	0.4	12	0-25 25-30 30-120	oLmS LmS LmS
33	0.7	4	0-25 25-100	ohCL PL
34	1.7	3	0-35 35 -62 62-70 70-120	ohCL PL mSL LmS



5 Conclusions and recommendations

- Highly organic soils, including Loamy Peat and Peat Loam, were present in the area surveyed. Although not as sensitive as peat these will be less resilient than more minerogenic soils and therefore will require careful management.
- The organic soils present will also have a high carbon content. It is recommended that soil carbon tests are undertaken to estimate the carbon resource and inform management plans during construction.
- The combined information from this depth probe study and the Soil Resource Survey can be used to inform the SMP for this area. The SMP will provide guidance on how to manage soils during the lifecycle of the development.

6 References

- **Ref 1:** Reading Agricultural Consultants (RAC) (2022). Norwich Western Link: Soil Resource Survey.
- **Ref 2:** Ministry of Agriculture, Fisheries and Food (MAFF). Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land. October 1988.