

Former Sugar Beet Factory, Brigg, Lincolnshire

palaeoenvironmental borehole survey

on behalf of

Eco2 North Lincs Ltd

Report 2153

February 2009

Archaeological Services

Durham University

South Road

Durham DH1 3LE

Tel: 0191 334 1121

Fax: 0191 334 1126

archaeological.services@durham.ac.uk

www.durham.ac.uk/archaeologicalservices

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Eco2, Trafford Plaza, Seymour Grove, Old Trafford, Manchester, M16 0LD

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1. Summary

The project

- 1.1 This report presents the results of a palaeoenvironmental borehole survey conducted in advance of a proposed development at the former sugar beet factory at Brigg, Lincolnshire. The works comprised the excavation of eight hand-augured boreholes and the examination of logs of previously drilled geo-technical boreholes.
- 1.2 The works were commissioned by Eco2 North Lincs Ltd and conducted by Archaeological Services in accordance with a written scheme of investigation provided by Archaeological Services.

Results

- 1.3 Deposits below made ground for the former factory consisted of clay overlying sand, which overlay bedrock. The clay was oxidised and orange-brown in colour towards the west, probably representing former plough soil, but towards the east this was replaced by increasing thicknesses of light grey-brown clay. As this direction lies towards the course of the River Ancholme, this clay is probably an alluvial deposit from a former course of the river.
- 1.4 Small patches of peat were identified within and at the base of this alluvial clay along the eastern boundary of the proposed development area. Unfortunately, the small amount of these deposits means that they would provide only limited palaeoenvironmental information about the site.

Recommendations

- 1.5 Because of the limited extent of the peat deposits identified, no further work is recommended in relation to this scheme.

2. Project background

Location (Figure 1)

- 2.1 The site is located at the former sugar beet factory, Brigg, Lincolnshire (NGR: SE 9880 0614). It comprises around 5.26ha, bounded by Glanford Brigg power station to the south, farmland to the east and west and Scawby Beck to the north.

Development proposal

- 2.2 It is proposed to construct a biomass fuelled renewable energy plant on the site.

Objective

- 2.3 The objective of the borehole survey was to assess whether any peat deposits containing palaeoenvironmental information are likely to survive within the proposed development area, so that an informed decision may be made regarding the nature and scope of any further scheme of archaeological works that may be required in advance of development.

Methods statement

- 2.4 The works have been undertaken in accordance with a written scheme of investigation provided by Archaeological Services (reference number COB09.24).

Dates

- 2.5 Fieldwork was undertaken between 16th and 17th February 2009. This report was prepared between 18th and 24th February 2009.

Personnel

- 2.6 Works were conducted by Andy Platell, Richie Villis, Ed Davis and Charlotte O'Brien (Project Manager).

OASIS

- 2.7 The site code is **BSB09**, for **Brigg**, former **Sugar Beet Factory 2009**. Archaeological Services is registered with the **Online Access to the Index of archaeological investigationS** project (OASIS). The OASIS ID number for this project is **archaeol3-55813**.

3. Landuse, topography and geology

- 3.1 At the time of the survey the proposed development area comprised buildings of the former sugar beet factory and concrete- or rubble-covered open spaces where buildings of this former factory had been demolished. Some of the buildings were in temporary use as a warehouse for a plasterboard recycling plant.
- 3.2 The site lies at a mean elevation of 3-4m OD within the Ancholme Valley, to the west of the current course of the river. The solid geology of the area is the

Elsham Sandstone, part of the Ancholme Clay Group of the Upper Jurassic period. This is overlain by marine or estuarine alluvium.

4. Historical and archaeological background

- 4.1 A desk-top assessment of the archaeological potential of the area has been prepared as part of the Environmental Impact Assessment for this development proposal (Pre-Construct Archaeology 2008). This identified that the proposed development area lies away from known archaeological sites and is shown as farmland on maps of the area until the sugar beet factory was built in 1928-9.
- 4.2 The River Ancholme followed a course that meandered closer to the town of Brigg to the east, until this meander was truncated by an artificial cut in the post-medieval period. This new cut forms the eastern boundary of the former sugar beet factory.

5. The palaeoenvironmental boreholes

- 5.1 Hand-auguring was carried out where permitted by ground conditions, in order to maximise the understanding of the palaeoenvironmental potential of the site (Figure 2). This was supplemented by information derived from geo-technical borehole logs to produce the east-west section shown in Figure 3. Palaeoenvironmental borehole logs are presented in Appendix 1. The geo-technical borehole logs which have also informed this assessment can be made available upon request
- 5.2 Borehole 1 was located at the western end of an area of lawn outside the main offices of the former factory. A dark grey-brown loam topsoil 0.40m thick, overlay 0.10m of yellow fine sand, and then 0.44m of orange-brown clay. This overlay orange coarse sand that was not fully penetrated. No deposits likely to produce useful environmental evidence were encountered.
- 5.3 Borehole 2 was located at the eastern end of the area of lawn outside the main offices. Topsoil 0.23m thick overlay 0.13m of yellow-brown clay silt, 0.52m of orange-brown clay and then coarse sand. No deposits likely to produce useful environmental evidence were encountered.
- 5.4 Borehole 3 was located on an area of rough ground to the south of the main offices. A very stony soil containing concrete fragments 0.40m thick overlay 0.57m of orange-brown clay and then coarse sand. No deposits likely to produce useful environmental evidence were encountered. An attempt was made to drill a borehole about 20m further east, but the ground proved too full of rubble to allow this.
- 5.5 Borehole 4 was located at the western end of a triangular area of rough grass and undergrowth to the north of the main standing building of the former factory. This borehole was close to Scawby Beck to the north of the site and deposits in this borehole may be influenced by this stream channel. A very

soft topsoil up to 0.48m thick (0.27m of the borehole core was not recovered here) overlay 0.73m of grey-brown silt, 0.19m of light grey-brown clay mottled with plant roots, a further 0.16m of grey-brown silt, followed by a further 0.64m of light grey-brown clay mottled with plant roots, 0.29m of dark brown slightly organic silt and then coarse sand.

- 5.6 Borehole 5 was located at the eastern end of the triangular area of rough grass sampled by Borehole 4. Silt and rubble made ground was encountered and this could not be drilled through. The borehole was discontinued at a depth of 0.4m.
- 5.7 Borehole 6 was located in an area of scrub vegetation close to an open drain at the eastern side of the proposed development area. Made ground 0.85m deep overlay 0.13m of grey-brown silt and this overlay 1.48m of light grey-brown clay mottled with plant roots, similar to that seen in Borehole 4. This overlay 0.35m of peat and then coarse sand.
- 5.8 Borehole 7 was located around 20m to the east of Borehole 6 in the same area of scrub vegetation. Below 0.24m of made ground was 0.19m of grey-brown silt and then 2.27m of light grey-brown clay mottled with plant roots, similar to that seen in Boreholes 4 and 6. Below this was 0.16m of peat similar to that seen in Borehole 6 and then coarse sand. A sample was collected from the peat deposit for laboratory assessment.
- 5.9 Borehole 8 was located around 20m to the east of Borehole 7. Made ground more than 0.43m deep was encountered and this could not be fully penetrated.

6. The geo-technical boreholes

- 6.1 Following completion of the hand-auger borehole survey, data from a geo-technical borehole survey of the site were identified and examined, and are summarised below (Geotechnics Ltd 2008). Palaeoenvironmentally useful data from the borehole logs have been incorporated into the section on Figure 3. The height and location information for these boreholes is taken from the Geotechnics Ltd report, which can be made available upon request.
- 6.2 Results were broadly comparable with those of the hand-auger survey. Limestone bedrock was identified at depths of around 2m to 4m below sea level. Above this were generally deposits of sand, with clay above this and then made ground from the construction of the factory. The clay was orange-brown in colour towards the west and grey-brown towards the east, with the latter thickening eastwards.
- 6.3 The log from borehole 3 contained the only description of peat. The grey-brown clay is described as 'very soft grey/brown organic slightly sandy CLAY/SILT with occasional pockets (up to 60mm) of plastic pseudo fibrous dark brown peat' (Geotechnics Ltd 2008). This suggests that the peat deposits found by the geo-technical survey were thinner than those found by the palaeoenvironmental survey and also within the clay deposit rather than at its base.

7. The peat deposit

- 7.1 A sub sample of the peat deposit from the Borehole 7 was washed over a 250 μm sieve. The residue was examined using a low-powered microscope and was found to contain macrofossil remains of plant species typical of waterside, damp ground or shallow water environments. These included alder (*Alnus glutinosa*), celery-leaved buttercup (*Ranunculus sceleratus*) and rushes (*Juncus* spp). Fragments of wood and monocot stem were also recorded. This peat is likely to represent the western extent of a former channel of the River Ancholme. Pollen is likely to be preserved within the peat, but the limited nature of the deposit means that its analysis would provide only a 'snap-shot' of the past vegetation at the site. A longer sequence, coupled with radiocarbon analysis, would be required in order to provide a meaningful picture of the natural- and anthropogenically-derived influences on the palaeoenvironmental history of the site. It is possible that more extensive deposits lie to the east of the development area.

8. Conclusions

- 8.1 Deposits below made ground for the former factory consisted of clay overlying sand, which overlay bedrock. The clay was oxidised and orange-brown in colour towards the west, probably representing former plough soil, but towards the east this was replaced by increasing thicknesses of light grey-brown clay containing organic remains. As this direction lies towards the course of the River Ancholme, this clay is probably an alluvial deposit from a former course of the river.
- 8.2 Small patches of peat were identified within and at the base of this alluvial clay along the eastern boundary of the proposed development area. These have the potential to provide only limited palaeoenvironmental information about the site.

9. References

Geotechnics Ltd, 2008 *Ground investigation at Silversides Lane, Brigg*, unpublished report **PC073193**, for Rolton Group Ltd

Pre-Construct Archaeology, 2008 Appendix 13-1 – Archaeology and Heritage Assessment, in Rolton Group Ltd, *Phases 1 & 2 environmental site assessment of the former Brigg biomass power station site at North Lincs*, report 07-0370

Appendix 1: Palaeoenvironmental borehole data

Borehole 1

Description	Height (aOD)	
	Top	Base
Topsoil	3.91	3.51
Yellow fine sand	3.51	3.41
Orange-brown silty clay	3.41	3.19
Orange clay	3.19	3.11
Reddish-brown clay	3.11	2.98
Orange-brown clay	2.98	2.97
Orange gritty sand	2.97	-

Borehole 2

Description	Height (aOD)	
	Top	Base
Topsoil	3.77	3.54
Yellow-brown clay silt	3.54	3.41
Dark orange-brown clay	3.41	3.17
Light orange-brown clay	3.17	3.04
Orange-brown silty clay	3.04	2.89
Orange-brown sand	2.89	2.77
Pinkish-white sand	2.77	2.74
Orange-brown sand	2.74	2.67
Orange sand	2.67	2.63

Borehole 3

Description	Height (aOD)	
	Top	Base
Silt/rubble made ground	3.59	3.19
Dark orange-brown silty clay	3.19	2.99
Dark orange-brown clay	2.99	2.83
Light orange-brown clay	2.83	2.62
Orange gritty sand	2.62	2.48
Light orange-brown clay	2.48	2.20

Borehole 4

Description	Height (aOD)	
	Top	Base
Topsoil	2.72	2.45
Unrecovered	2.45	2.24
Grey-brown silty sand	2.24	1.99
Dark grey-brown sandy silt	1.99	1.74
Dark brown silt	1.74	1.51
Light grey-brown clay	1.51	1.32
Dark grey-brown clay silt	1.32	1.18
Black silt	1.18	1.16
Light grey-brown clay	1.16	0.52
Dark grey-brown sandy silt	0.52	0.23
Light grey-brown silty sand	0.23	-0.01
Light grey-brown gritty sand	-0.01	-0.48

Borehole 5

Description	Height (aOD)	
	Top	Base
Silt/rubble made ground	2.15	1.75

Borehole 6

Description	Height (aOD)	
	Top	Base
Topsoil	2.17	2.02
Silt/rubble made ground	2.02	1.54
Orange gritty sand	1.54	1.32
Dark brown clay silt	1.32	1.19
Light grey-brown clay	1.19	-0.29
Peat	-0.29	-0.64
Orange-brown silty sand	-0.64	-0.84
White gritty sand	-0.84	-1.02

Borehole 7

Description	Height (aOD)	
	Top	Base
Silt/rubble made ground	2.07	1.83
Dark grey-brown sandy silt	1.83	1.73
Mid brown clay silt	1.73	1.64
Light grey-brown clay	1.64	1.25
Light grey-brown clay mottled with black roots	1.25	-0.21
Unrecovered	-0.21	-0.38
Light grey-brown clay mottled with black roots	-0.38	-0.63
Peat	-0.63	-0.79
Mid-grey sand	-0.79	-0.84
White sand	-0.84	-1.02

Borehole 8

Description	Height (aOD)	
	Top	Base
Silt/rubble made ground	1.78	1.35