

APPENDIX IX

Borehole survey field notes

Drilling was supervised by James Rackham for most of the fieldwork except for one day when John Aram was supervising and one day when the drilling crew were left unsupervised, but contactable by telephone.

July 16th

With no consistent results from the geophysical surveys three boreholes were rapidly sunk to prove the depth of the quarry and locate intact gravel deposits.

All boreholes are located on Figure L.

Borehole 1 (Ground level – 86.7m OD) was placed south of the track and line of the 1972 Alabaster and Straw section in what was assumed to be backfilled quarry.

It produced clays to a depth of approximately 14.5 metres (72.2m OD), then iron coated sands to 18 metres (68.7m OD) into chalk. The borehole was stopped at 18.5 metres depth after proving the chalk.

Borehole 2 (ground level – 86.76m) was placed north of the track and the 1972 section line to test for gravel. The core was taken to 10 metres depth (76.76m OD) and encountered only clays which are presumed to be backfill.

Borehole 3 (ground level – 85.12m) was located only 2 metres from the base of the standing cliff of the quarry in the hope that intact gravels would be found. Gravels were hit within 3 metres. After penetrating an orange brown silt consistent with the deposits overlying the gravels in the trial pit of 2001.

It was concluded that the gravels of the bench that were recorded in the early 1970's had been removed right back to the cliff face and a series of 8 auger locations were laid out along the base of the cliff (see Fig. L2).

July 17th

Borehole 4 (ground level 85.81m OD)

The top 3 metres of the borehole were drilled out through clay with chalk. Clay and orange brown silts were encountered between 300 and 350cm and gravels at 350-370cm. Sampling commenced at 370 in the gravels.

Sleeve 1 – 370-470 – gravels with thin silt lens. 10 cm compression (result of vibration?)

Sleeve 2 – 470-570 – gravels with top 15cm shaken up and some compression

Sleeve 3 – 570-670 – gravels – no compression- slight shake up at the top

Sleeve 4 – 670-752 coring aborted due to lack of movement – sleeve found to be full – sediment expanded! Shoe sample taken at 752.

Sleeve 5 – 752-802 very compact hard sands – coring stopped for the day with the intention of using a smaller sampling tube tomorrow.

Sampler tube lost down the core the following day and the borehole was aborted.

Water at about 5.2m below ground level. This was the only borehole which produced water.

July 18th

Borehole 5 (ground level – 85.63m)

The crew drilled unsupervised in borehole 5 and commenced sampling at 300cm depth. After taking 4 cores still in clay the drilling was aborted at 7 metres after discussion with myself on the telephone and moved 2-3 metres north.

Borehole 5A (ground level 85.85m)

This borehole hit gravels between 5-6 metres, and sampling commenced at 400.

Sleeve 1 – 400-500 – clays

Sleeve 2 – 500-600 – clays

Sleeve 3 – 600-700 – gravels

Sleeve 4 – 700-800 – plastic sleeve concertinaed in gravels.

July 21st

Borehole 5A continued.

Sleeve 5 – 800-850 - very slow penetration, 30 minutes for 50cm depth, shoe sample at 850. Sampler put back in at 850 and made only 100mm in half an hour. 850-860 was not picked up by the sampler.

Boring aborted in iron rich hard gravels at 860.

Borehole 8 (ground level – 85.31m)

0-100 - chalky boulder clay

100-150 – chalky boulder clay and gravel

150-200 – onto orangey silts and orange brown laminated silts at 227

Sleeve 1 – 227 – 327 – first 20cm pushed in with hydraulic ram, then compressed air hammer used. Core took 15 minutes to sink but the extraction of the core from the sampler took 1 hour and the core will have been disturbed and slightly damaged. The basal 5cm of core gravel broke off during extraction and the bottom of the silts. The latter has been placed in a separate bag as has the shoe sample of gravel.

Core cleaned with the auger to 350 losing a small part of the sequence.

Sleeve 2 – 350-418 – core took 8 minutes to drive in but the bottom 32cm of core dropped out and sleeve only contains 68cm.

22nd July

Borehole cased to 4 metres.

Sleeve 3 – 420-500 – sampler driven in in 3 minutes. Top 10cm of core contaminated (discard) – silt band in basal half

Sleeve 4 – 500-600 – sampler driven in in 10 minutes. Gravel throughout – some compression (10-15cm of sleeve sawn off)

Sleeve 5 – 600-700 – some compression (about 10cm), top 15-20cm shaken up, last 30cm of core proved very hard, sampler driven in in 20 minutes.

Sleeve 6 – 700-800 – sampler driven in in 15 minutes. Some compression (10cm of sleeve cut off)

Sleeve 7 – 800-893 – stopped 7cm short of full metre after 42 minutes being driven in - some compression, top very shaken

Sleeve 8 – 893-985 – sampler driven in in 14 minutes, but 8cms short - clay with flints throughout, sleeve broken into 2 pieces during extraction and two pieces of core put in a new sleeve labelled 893-985. Shoe sample and base of core (985-1000) taken in separate bag.

23rd July

Sleeve 9 – 1000-1100 – sampler driven in in 8 minutes, shoe sample at 1100

Sleeve 10 – 1100-1183 – sampler initially pushed in 25cm and then hammered, very slow penetration and coring stopped after 83cm - core had expanded to fill sleeve. Just onto iron rich sandy gravels at base in shoe at 1190; shoe sample at 1183

Sleeve 11 – 1183-1283 – sampler driven in in 7 minutes, sleeve constricted. Iron rich clay with flints at the base; shoe sample at 1283

Borehole stopped at 1283.

Borehole 7 (ground level – 85.51m)

Borehole cleaned out with auger down to 3 metres at which point the orangey silts begin to appear.

Sleeve 1 – 300-400 – sampler driven in in 4 minutes - clay, laminated silts, gravels

Sleeve 2 – 400-500 – some compression of core, and a bit of rubbish from the backfill in the top of the core. All flint gravels

Sleeve 3 – 500-530 – sampler driven in in 5 minutes - bottom 70cm lost (fell out in hole), heavy vibration disturbance to the top 15cm

Sleeve 4 – 530-630 – taken to pick up what fell out of previous sample. Core came out OK but upper 70cm likely to be disturbed. Top 15cm disturbed by vibration. Shoe sample at 630.

Sleeve 5 – 630-694 – sampling stopped before metre due to lack of movement – all gravel. Top 20cm disturbed by vibration.

Sleeve 6 – 700-800 – 10cm of compression. Shoe sample of fine laminated sandy silts taken at 800.

Sleeve 7 – 800-900 – pushed in by hydraulics – compressed, laminated sandy silts

24th July

John Aram supervising – Borehole 7 continued and borehole 9 started

Sleeve 8 – 900-1000 – laminated silts- expanded

Sleeve 9 – 1000-1100 – expanded silts, sleeve constricted, gravels at base. Shoe sample taken from 1100-1125- clay with flints.

Borehole stopped at 11.25 metres depth.

Borehole 9 (ground level – 85.6m)
Upper part of borehole supervised by John Aram
Sleeve 1 – 370-470 – silts into gravels
Sleeve 2 – 470-520 – gravels
Sleeve 3 – 520-620 - gravels

25th July

Sleeve 4 – 620-720 – mainly gravels
Sleeve 5 – 720-820 – mainly gravels
Sleeve 6 – 820-920 – mainly gravels; shoe sample at 920
Sleeve 7 – 920-1020 – sampler driven in in 8 minutes, through gravels into laminated silts; shoe sample at 1010-1020.
Sleeve 8 – 1020-1120 – sampler driven in in 3 minutes - silts!, slightly harder through the last 20cm, shoe sample at 1115-1120
Sleeve 9 – 1120-1190 – no penetration after 70cm – sleeve full, some material taken down from higher up and deposits expanded.
Borehole stopped at 1190.

28th July

Borehole 10 (ground level – 85.85m)
Borehole drilled to 270 through clays – the auger bit broke at 1.2m.
Sleeve 1 – 270-370 – sampler driven in in 6 minutes, sleeve severely concertinaed, possibly some overburden in hole (top of core), and probably expanded. Shoe sample at 370-380
Sleeve 2 – 370-470 – sampler driven in in 7 minutes - silt at the top with a silt lens in gravels below.
Sleeve 3 – 470-570 - sampler driven in in 5 minutes - all gravels
Sleeve 4 – 570-670 – all gravel- full.
Next sample went in very slowly (16cm in 20 minutes) and was stopped. Core extracted and found to contain only a few loose flints. Borehole drilled out to 700.
Sleeve 5 – 700-800 – sampler driven in in 5 minutes - possibly some collapse in the top of this sleeve. Core split during extraction with compressed air. A large flint in the top was probably responsible for the blockage at 686. The compressor compacted basal 20-30cms have been placed in a plastic bag. Shoe sample at 800.
Sleeve 6 – 800-880 – sampler driven in 78cm in 10 minutes, coring stopped - sample core full- sediments expanded, although some clays in top of the sleeve may have been taken down because the hole was not cased. Shoe sample at 870-880.
Sleeve 7 – 880-920 – sampler driven in easily in 1 minute but appeared to fall through a 20cm void! Bottom half of core lost in the borehole. Core material in sleeve a bit loose (disturbed?). Shoe sample at 920-935.

29th July

Borehole 10 continued
Very little progress with next sleeve – no progress after 15 minutes of hammering – core extracted and about 15cm of disturbed core from yesterday taken.
Hole cleaned out to 950 to remove obstruction (large flint)
Sleeve 8 – 950-1035 – penetration slow, 14 minutes to make 85cm so stopped short of the metre. Core sample full. Sleeve concertinaed. Core expanded. Shoe sample at 1035. Core was extracted using compressed air.
Sleeve 9 – 1035-1095 – core stopped completely at 59cms after being hammered for over 20 minutes, some expansion in sleeve, and chalk in the bottom half.
Borehole stopped at 1095 in chalk.

Borehole 6 (ground level – 85.56m)

Tested for gravel in case it lay outside the face. Coring continued to 680 and stopped still in clays.

Borehole 11 (ground level – 85.81m)

Taken to check boreholes 4 and 5A

Drilled out the top 350cm. Orange silt/clays at 320 and gravel at about 350.

Sleeve 1 – 350-428 – sampler driven 78cm in 21 minutes - coring stopped due to lack of penetration. Some overburden in top few centimetres, large flint obstruction at base.

Borehole cleaned out to 450 with the auger.

Sleeve 2 – 450-550 – sampler driven in in 23 minutes - through gravels into clay with flints. Some compression of the core. Top third well vibrated!

Borehole stopped at 3.00pm through lack of time.

Samples processed for macrofossil analysis

Borehole 8
Depth

<2mm

2-6.65mm

>6.65mm