

## **Assessment of the Briquettage from the Conoco Pipeline, North Killingholme (CHP2002)**

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Whilst working on the Iron Age and later pottery from an excavation conducted on the line of the Conoco pipeline at North Killingholme by Humber Field Archaeology, the author noted a small number of sherds which were interpreted as being fragments of trays used in the evaporation of brine (which together with the stilts and clips used alongside these trays is collectively known as briquettage). This led to a request to assess other material extracted from the finds collection by HFA as being briquettage. However, it was decided not to re-examine all of this material since in many cases the finds were fragmentary and few in number (as determined by their mean weight).

This assessment is based therefore on three groups of material: a) briquettage found within the pottery collection, b) briquettage identified and extracted by HFA and c) re-examined and re-classified briquettage selected from (b) above.

### **Description**

All of the briquettage and submitted fired clay (class c above) was examined at x20 magnification using a stereo microscope and on this basis was divided into fabric groups. Large groups of amorphous lumps of clay, however, were not classified to fabric. Where possible, the form of the original item was also identified and recorded. Finally, notes on the use of the material were made.

### **Fabrics**

The fabrics can be broadly grouped into three. The first, Fabric A, consists of fine-textured, calcareous, silty micaceous clay. This is undoubtedly estuarine mud deposited on the mud flats and coastal salt marshes which occur at the mouth of the Humber and along the Lindsey Marshes coast. Theoretically, one should expect the quantity of silt to increase as one travels west up the Humber and the material does indeed appear to be finer in texture than ceramics made from this estuarine clay at Beverley and Flixborough, for example. This fabric sometimes contains voids caused by the presence of organic matter and in a few cases the fragments have impressions around the edge which suggest the presence of reeds with circular stems about 2-5mm diameter. Some of the smaller voids are lined with a dark brown cryptocrystalline deposit, presumably composed of manganese and/or iron oxides. They appear to be a mixture of fine grass stems, seeds, rootlets and possible animal burrows but would require identification by an archaeobotanist or soil scientist.

Fabric B shares the same calcareous, silty, micaceous groundmass as Fabric A but in addition contains a variable quantity of quartzose sand, consisting of subangular quartz grains ranging up to 0.5mm across, and abundant organic voids. The latter are coarser in texture than those found within Fabric A and are always aligned parallel with the surface(s) of the clay. The possible reed impressions noted in Fabric A are absent.

This fabric is interpreted as being produced by the deliberate tempering of the local estuarine clay (Fabric A) by the addition of fine sand and straw. However, this conclusion requires testing in various ways (such as thin section analysis, chemical analysis and identification of the organic temper by an archaeobotanist).

Fabric C has a very different groundmass and contains abundant, ill-sorted quartzose and other mineral inclusions, which include angular flint, rounded fine-grained sandstone fragments, rounded basic igneous rock fragments, and sometimes rounded limestone inclusions. Organic inclusions are present in some examples (Fabric C1) but absent in others (Fabric C2). There is also a very calcareous version (Fabric C3) which in some cases has fired to a mottled yellow and pink colour. This fabric is interpreted as being produced using the sandy, sometimes chalky, boulder clay which outcrops along the northern and western fringes of the Lincolnshire Wolds. This boulder clay formed the bedrock in Trench 2 also outcrops near the Open Area excavation. However it is also possible that objects made of this clay were made elsewhere or that the clay was imported to the site in a raw state, since fragments of daub accidentally included in the pottery collection appear to be made from this clay. Here again, thin section and chemical analysis could probably provide further evidence.

## **Forms**

In addition to trays, a number of different objects were recognised in the collection, although it was not certain what the original form of many of these might have been.

### **Trays**

One hundred and eight fragments of tray were examined. All were constructed out of Fabric B. No large fragments were present but a couple of rims, a base angle sherd and some large wall sherds confirm that the trays were flat-bottomed vessels which were probably rectangular in plan although no corner pieces were present. Trays of two thicknesses seem to be represented and it is possible that there is a difference in the quantity of sand present in the fabrics of the two groups. The narrower walled sherds are between 7mm and 10mm thick whereas the larger walled vessels are between 14mm and 20mm thick. There are rim sherds of both thicknesses present which demonstrate that the sherds do not simply come from walls which tapered in profile from bottom to top. The surfaces of the sherds are normally in poor condition with a smoother inner surface than outer.

### Clips

A few fragments might come from clips, oval pads of clay which were wrapped around two adjoining trays to stop them from moving. None were particularly convincing. One oval pad from context 2024 has been folded, but not to the extent which would keep two trays together. However, it is possible that the pad was used the other way around, to keep two trays separated.

### Stilt?

A single pyramidal lump of clay with a triangular base with sides 18mm long and 40mm tall was found. It appeared to be made from Fabric B or Fabric A with grass impressions on the surfaces.

### Tuyere or triangular loomweight?

Fragments of one or possibly two objects from contexts 1206 and 1210 are made from Fabric C. At least some of the surfaces are curved but are too small to tell if they come from an object with a circular cross-section or a sub-rectangular one. Fuel ash slag and vitrified clay occur on some of the surfaces. Two or three pieces indicate the existence of a cylindrical hole or holes through the body, with diameters in the order of 20-30mm.

Two possible interpretations of these fragments are that they come from a tuyere, the clay cone which surrounds the ends of a bellows in a metalworking hearth, or that they come from a triangular loomweight. These loomweights have a single wide hole pierced through the pyramidal weight somewhere in the upper half of the object.

Some of these fragments have been subjected to considerable heat but the thickness of the clay (sometimes over 25mm) seems excessive for a tuyere whilst the hole or holes are wider than one might expect for a loomweight and are inconsistent with wattle impressions. It would therefore be necessary to undertake further study of the fuel ash glaze to see if there is any evidence for hammerscale or other metals in the glaze.

### Unknown Object

Two joining fragments from an object with complex curved surfaces were found in context 1054. They are possibly from the upper end of a triangular loom weight, some of which have two "horns" at the top corners with a convex depression between them.

### Cut silt blocks

A large number of fragments of Fabric A have a single flat surface. They are too thick to be a daub coating and have clearly been cut with a tool rather than smoothed to a flat surface by hand. Furthermore, the clay shows no sign of the laminations and lenses which one gets

from the human working of clay. It is suggested, therefore, that these are actually fired blocks of natural estuarine clay. This interpretation is consistent with the clumps of reed impressions seen at the edges of some fragments.

### Amorphous clay lumps

A large number of amorphous clay lumps were recorded. Almost all appear to be of Fabric A but it was not thought worthwhile to spend time identifying the fabrics in detail. Whilst some of these are probably fragments of cut silt blocks they may also indicate the accidental inclusion of estuarine clay crumbs in the hearths used in evaporating the brine or in domestic hearths.

### Lightweight ashy lumps

A single assemblage produced several large fragments of very lightweight lumps. Under x20 magnification these appeared to be composed of unfired or low-fired soil containing a large amount of ash, charcoal and burnt clay pellets. It is assumed that they represent the soil matrix which filled these features, possibly subjected to some burning.

### Bars

Nineteen fragments of flat bars of clay of various shapes were examined. All come from Trench 2 and all consist of flat slabs, between 13mm and 29mm thick (although one fragment tapers to about 10mm thick at one end). Seven fragments have two or more sides but it is clear that they all have rather different shapes. All seven should be illustrated and an attempt made to cross-join fragments from different contexts.

All but one of the bars is made from a Fabric C fabric, although they vary in whether or not the clay is calcareous and whether it has added organic temper. This could be partly due to variation in the clay source and partly to the difficulty of examining the fabric without destructive analysis.

### Function

The main evidence for function in this collection is the colour and degree of firing of the clay. From this we can see that the cut silt blocks and the amorphous clay lumps are the lowest fired, some being extremely soft and powdery to the touch. However, there are some examples of both groups which have a purplish tinge which is typical of fired clays associated with salt working. Some of these fragments (very few) have been heated to a temperature where the colour turns from purple to a light green.

By contrast, the trays are all hard-fired and only rarely have this colouration. Instead, they sometimes have the white 'salt-surfacing' brought about by the firing of calcareous clay in the presence of salt. Why there are clearly two different series of chemical reactions

evidence here is not known but is presumably due to the different functions of the objects (the trays, for example, were heated with liquid brine whereas the silt blocks presumably were not) rather than simply differences in firing temperature

The bars were probably fired at a higher temperature than the remaining objects and have a similar appearance to medieval and post-medieval calcareous bricks (such as those made in the Low Countries and Cambridgeshire) and post-medieval biscuit delftware, which is made from similar clays. The firing temperature of the tuyere/loom weight does not appear to have been any higher than that of the various salt-related objects and it is likely that it is vitrified because of the presence of fluxes which lower the vitrification point of the clay. Such fluxes would include plant ash (such as might be found in a burning building or, possibly, a domestic fire) and iron.

## Discussion

The majority of the objects related to salt-working come from the backfill of the various pits which make up a ring of pits in Trench 2. Table 1 shows the distribution of these finds by form. In the Open Area, there are only 53 fragments associated with salt-production, and all of these are small scraps of tray (or too small to identify precisely). The largest collection comes from Ditch 1212 but only consists of 11 fragments.

*Table 1*

trench	context group	BAR	BRIQUETAGE	CLIP	MOULD?	OBJECT	STILT	TRAY	TRAY?	TUYERE/LOOM WEIGHT	UNID	Grand Total
Open Area	Ditch [1058]					26		38				64
	Ditch [1212]							33		313	3	349
	Group context No. for fills of Ditch [1058]							3				3
	Silty Clay Deposit		6									6
	Ditch [1055]					52		4				56
	Ditch [1072]							7				7
	Ditch [1325]		4					19				23
	Ditch [1326]								11			11
	Ditch [1338]				0.5			3			1	4.5
	Ditch [1352]							7	3			10
	Ditch [1363]							2	4			6
	Ditch Re-Cut [1143]		3									3
	Post Hole [1139]							20				20



which it was boiled and it is possible that that the trays found in the Open Area ditches represent the domestic supply of salt used by the inhabitants. Alternatively, they may be strays from areas of dumping of salt-working waste, although there is a lack of the other fired clay objects in those deposits. It may be significant that 43 fragments in the collection were abraded and that all of these come from various contexts in the Open Area excavation.

It is unlikely that examination of the so-far un-viewed briquettage from the site would significantly alter these conclusions and it is not recommended that they be studied. All were, in any case, excluded because of their small size or low quantity.

### **Costing of Recommended further work**

*Table 2*

Task	Cost	Notes
Further work on bars: selection for illustration, search for comparanda.	£45	Illustration not included (since it is assumed that HFA has its own graphics department).
Fabric characterisation: thin section analysis	£337.50 plus VAT	Three samples of each major fabric (A, B, C1 C2 C3) at £22.50 plus VAT each
Fabric characterisation: identification of organic impressions	Estimate to be obtained from James Rackham	Samples from two fabric groups, A and B
Fabric characterisation: chemical analysis	£607.50 plus VAT	Comparison of fabrics A and B to test suggested origin. Samples of Fabric C to compare with samples of boulder clay from Barton and Grimsby. Samples of purple and greenish-tinged and salt-surfaced Fabric A. 27 samples in total.

*Appendix: List of recorded Briquettage and other fired clay*

Context	trench	fabric	Form	Nosh	NoV	Action	Description	Part	Weight	Use	Condition
1054	Open Area	B	TRAY	2	2			BS	4		
1054	Open Area	C3	OBJECT	3	1		POSSIBLY TOP OF HORNED LOOM WEIGHT BUT ORIGINAL SHAPE UNCERTAIN	BS	52		
1064	Open Area	B	TRAY?	1	1			BS	3		VABR
1067	Open Area	B	TRAY	1	1			BS	7		ABR
1082	Open Area	B	TRAY	1	1			R	10		VABR
1097	Open Area	B	TRAY	5	1			BS	38		SPALLED
1120	Open Area	B	TRAY	1	1			BS	1		VABR
1121	Open Area	B	BRIQUETAGE	1	1			BS	4		
1121	Open Area	B	TRAY	4	4			BS	8		
1122	Open Area	B	TRAY	1	1			BS	3		VABR
1138	Open Area	B	TRAY	4	4			BS	20		
1142	Open Area	B	BRIQUETAGE	2	2			BS	3		
1172	Open Area	B	TRAY?	1	1			BS	2		
1190	Open Area	B	BRIQUETAGE	1	1			BS	3		
1198	Open Area	B	BRIQUETAGE	1	1			BS	6		VABR



Context	trench	fabric	Form	Nosh	NoV	Action	Description	Part	Weight	Use	Condition
1206	Open Area	B	TRAY	5	5			BS	10		
1206	Open Area	C1	TUYERE/LOOM WEIGHT	15	1		CYLINDRICAL HOLE, ROUGHLY 30MM DIAM	BS	80	SOME VITRIFICATION	
1207	Open Area	B	TRAY	1	1			BS	7		ABR
1208	Open Area	C1	AMORPHOUS LUMPS	1	1		AMORPHOUS LUMP	BS	25		
1209	Open Area	B	TRAY	2	2			BS	9		VABR
1209	Open Area	B	UNID	1	1			BS	3		VABR
1210	Open Area	B	TRAY	1	1			BS	5		
1210	Open Area	B	TRAY	1	1			BS	2		
1210	Open Area	C1	TUYERE/LOOM WEIGHT	12	1		FRAGS FROM AN OBJECT WITH VITRIFIED SURFACES AND AT LEAST ONE CYLINDRICAL HOLE THROUGH BODY INTERNAL DIAMETER ROUGHLY 20MM	BS	233		
1221	Open Area	A/B/C	AMORPHOUS LUMPS	1	1			BS	3	PURPLE-TINGED	
1232	Open Area	B	TRAY?	1	1			BS	2		VABR
1261	Open Area	B	TRAY?	8	2			BS	11		
1271	Open Area	B	TRAY	1	1			B	4		
1271	Open Area	B	TRAY	1	1			BS	3		
1312	Open Area	B	TRAY	1	1		RECT VESSEL	R	3		
1334	Open	C3	UNID	1	1			BS	1		VABR

Context	trench Area	fabric	Form	Nosh	NoV	Action	Description	Part	Weight	Use	Condition
1336	Open Area	B	TRAY	1	1		ROUNDED, SLIGHTLY OUTTURNED RIM	R	3		
1351	Open Area	B	TRAY?	1	1			BS	3		VABR
1362	Open Area	B	TRAY	1	1		7MM	BS	2		
1362	Open Area	B	TRAY?	1	1			BS	4		VABR
1392	Open Area	A	CUT SILT BLOCKS?	166	1		SEVERAL FRAGS HAVE ONE FLAT FACE; SOME UP TO 35MM THICK	BS	1570	SLIGHT PURPLE TINGE BUT MOSTLY SIMILAR FIRING	
1392	Open Area	C1	OBJECT	1	1		FRAGMENT WITH CYLINDRICAL CONVEX SURFACE;POSSIBLY SOME SORT OF STILT	BS	26		
2014	Trench 2	A	CUT SILT BLOCKS?	2	2		FLAT FACE;CUT SILT?	BS	14	SALT SURFACED FLAT FACE	
2014	Trench 2	A/B/C	AMORPHOUS LUMPS	1	1		AMORPHOUS LUMP	BS	4	PURPLE-TINGED	
2014	Trench 2	A/B/C	AMORPHOUS LUMPS	6	6		AMORPHOUS LUMPS	BS	22		
2014	Trench 2	B	TRAY	4	4			BS	35		
2018	Trench 2	A/B/C	AMORPHOUS LUMPS	1	1			BS	1		
2018	Trench 2	C2	BAR	3	1	DR	21MM THICK FLAT WITH FLAT SIDES	BS	49		
2023	Trench 2	A	CUT SILT BLOCKS?	19	19		ONE FLAT FACE;CUT SILT?	BS	76	PURPLE-TINGED	
2023	Trench 2	A	CUT SILT BLOCKS?	26	26		ONE FLAT FACE;CUT SILT?	BS	110		

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Context	trench	fabric	Form	Nosh	NoV	Action	Description	Part	Weight	Use	Condition
2023	Trench 2	A/B/C	AMORPHOUS LUMPS	24	24		AMORPHOUS LUMPS	BS	128		
2023	Trench 2	B	TRAY	1	1	DR	10MM;ROUNDED RIM;SLIGHTLY CURVED WALL	R	42		
2023	Trench 2	B	TRAY	7	7		13MM - 14MM	BS	63		
2024	Trench 2	A	CUT SILT BLOCKS?	20	20		ONE FLAT FACE	BS	122		PURPLE TINGED
2024	Trench 2	A	CUT SILT BLOCKS?	9	9		ONE FLAT FACE	BS	54		
2024	Trench 2	A	OBJECT	1	1		FLAT OVAL LUMP, BENT INTO A SEMI CIRCLE ALONG LONG AXIS;ORGANIC IMPRESSIONS ON SURFACES;LOOK LIKE SOME SORT OF CLIP	BS	11		PURPLE TINGED
2024	Trench 2	A/B/C	AMORPHOUS LUMPS	33	33			BS	130		
2024	Trench 2	B	TRAY	1	1		12MM THICK	BS	29		
2027	Trench 2	A	CUT SILT BLOCKS?	7	7		ONE FLAT FACE;CUT SILT?	BS	56		PURPLE-TINGED
2027	Trench 2	A	CUT SILT BLOCKS?	4	4		ONE FLAT FACE;CUT SILT?	BS	15		
2027	Trench 2	A/B	STILT	1	1	DR	TRIANGULAR-SECTIONED SHORT STILT;40MM TALL;SIDES AT BASE 18MM	BS	10		
2027	Trench 2	A/B/C	AMORPHOUS LUMPS	8	8		AMORPHOUS LUMPS	BS	31		
2027	Trench 2	B	TRAY	5	5		8MM TO 15MM	BS	72		
2027	Trench 2	C1	UNID	2	2			BS	15		
2028	Trench 2	A/B/C	AMORPHOUS LUMPS	2	2			BS	15		PURPLE-TINGED AND SOME VITRIFICATION
2030	Trench 2	A	CUT SILT BLOCKS?	5	5		ONE FLAT FACE	BS	42		

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Context	trench	fabric	Form	Nosh	NoV	Action	Description	Part	Weight	Use	Condition
2030	Trench 2	A/B/C	AMORPHOUS LUMPS	4	4		AMORPHOUS LUMPS	BS	103		
2030	Trench 2	C2	BAR	1	1		ONE STRAIGHT EDGE;13MM THICK	BS	30		
2030	Trench 2	C3	BAR	2	1	DR	FLAT BAR WITH ONE STRAIGHT EDGE AND TWO CURVED;17MM THICK	BS	96		SALT-SURFACED
2030	Trench 2	C3	BAR	1	1		ONE STRAIGHT EDGE;15MM THICK	BS	65		SALT-SURFACED
2031	Trench 2	A	CLIP	3	3		POSSIBLE CLIPS	BS	50		
2031	Trench 2	A	CUT SILT BLOCKS?	18	18		ONE FLAT FACE;POSSIBLY CUT TURVES	BS	172		
2031	Trench 2	A/B/C	AMORPHOUS LUMPS	83	83		AMORPHOUS LUMPS	BS	506		
2031	Trench 2	B		7	7		THICKNESSES RANGE FROM 10MM TO 20MM	BS	123		
2031	Trench 2	C3	BAR	4	4	DR	20MM - 24MM THICK;EDGES POSSIBLE KT;OXID THROUGHOUT	BS	305		
2031	Trench 2	SOIL?		38	38		LOW- OR UN-FIRED;VERY LIGHT WEIGHT	BS	605		
2037	Trench 2	A/B/C	AMORPHOUS LUMPS	8	8		AMORPHOUS LUMPS	BS	22		PURPLE-TINGED
2037	Trench 2	A/B/C	AMORPHOUS LUMPS	4	4		AMORPHOUS LUMPS	BS	18		
2037	Trench 2	A/B/C	AMORPHOUS LUMPS	12	12		AMORPHOUS LUMPS	BS	53		
2037	Trench 2	B	TRAY	17	17			BS	188		
2037	Trench 2	C1	BAR	1	1	DR	FLAT BAR WITH ONE STRAIGHT SIDE AND ONE ANGLED	BS	61		SALT SURFACED ESPECIALLY ON ANGLED SIDE
2039	Trench 2	A/B/C	AMORPHOUS LUMPS	26	26		AMORPHOUS LUMPS	BS	141		

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Context	trench	fabric	Form	Nosh	NoV	Action	Description	Part	Weight	Use	Condition
2039	Trench 2	B	TRAY	10	10		6MM TO 12MM THICK	BS	84		
2039	Trench 2	B	TRAY	1	1	DR	13MM THICK;ROUNDED RIM AND SLIGHTLY CURVED BODY	BS	16		
2039	Trench 2	C2	BAR	2	1		FLAT BAR;20MM TAPERING TO 10MM;ONE ORIGINAL FLAT SIDE	BS	58		
2041	Trench 2	A/B/C	AMORPHOUS LUMPS	5	2			BS	17		
2041	Trench 2	C3	BAR	2	2	DR	FLAT BAR15MM THICK;TWO CURVED EDGES, ONE CONCAVE AND ONE CONVEX	BS	45		
2043	Trench 2	A	BAR	1	1		FLAT BAR 29MM	BS	40		PURPLE/PINK SURFACES
2051	Trench 2	B	TRAY?	1	1			BS	4		
2052	Trench 2	A/B/C	AMORPHOUS LUMPS	8	8		AMORPHOUS LUMPS	BS	38		
2052	Trench 2	A/B/C	AMORPHOUS LUMPS	1	1		AMORPHOUS LUMPS	BS	3		
2052	Trench 2	B	TRAY	5	5		5MM TO 14MM THICK	BS	32		
2054	Trench 2	A	CUT SILT BLOCKS?	9	9		ONE FLAT FACE;CUT SILT?	BS	80		PURPLE-TINGED
2054	Trench 2	A/B/C	AMORPHOUS LUMPS	9	9		AMORPHOUS LUMPS;CUT SILT?	BS	50		PURPLE-TINGED
2054	Trench 2	A/B/C	AMORPHOUS LUMPS	19	19		AMORPHOUS LUMPS	BS	53		
2054	Trench 2	A/B/C	AMORPHOUS LUMPS	7	7		AMORPHOUS LUMPS	BS	228		
2054	Trench 2	B	TRAY	1	1		14MM THICK	R	44		SALT-SURFACED, ESP ON TOP OF RIM
2054	Trench 2	B	TRAY	1	1		12MM	BS	22		
2054	Trench 2	C2	BAR	1	1	DR	22MM TWO TAPERING FLAT EDGES	BS	54		
2055	Trench 2	B		141	141		AMORPHOUS LUMPS, SOME WITH FLAT FACES	BS	697		

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Context	trench	fabric	Form	Nosh	NoV	Action	Description	Part	Weight	Use	Condition
2055	Trench 2	B	CLIP	2	2		POSSIBLE CLIPS	BS	47		
2055	Trench 2	B	TRAY	1	1		17MM THICK	BS	10		
2055	Trench 2	B	TRAY	2	2		7MM THICK	BS	18		
2055	Trench 2	B	TRAY	2	1		FLAT BASE;EX T SURFACE QUITE ROUGH	BS	80		
2055	Trench 2	B	TRAY	20	20		15MM THICK	BS	197		
2057	Trench 2	A/B/C	AMORPHOUS LUMPS	2	2		AMORPHOUS LUMPS	BS	8		
2057	Trench 2	B	TRAY	8	8			BS	49		
2057	Trench 2	C2	BAR	1	1	DR	FLAT BAR WITH TWO FLAT SIDES MEETING AT POINT;18MM THICK	BS	26		
2059	Trench 2	A/B/C	AMORPHOUS LUMPS	1	1			BS	7		PURPLE-TINGED
2059	Trench 2	B	TRAY	3	3		14MM THICK	BS	56		