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Evaluation of archaeometallurgical residues from Ardreigh, Co. Kildare, [00E0156]

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Abstract

The assemblage from Ardreigh comprised approximately 67kg of material collected from 127 contexts. Well over 60% of the assemblage was identifiable as residue from iron-working (smithing), with just 4% positively identifiable as having been produced during iron smelting. The remainder of the assemblage was strictly indeterminate; there was no evidence for the working of non-ferrous metals.

The iron-working slags are diverse, suggesting a variety of processes were undertaken – probably both primary and secondary smithing – together, perhaps, with other techniques. The smithing slags were accompanied by ceramic tuyères, the main means of blowing smithing hearths in the early medieval and medieval periods in Ireland. The iron smelting slags are few, but are indicative of smelting in a non-slag tapping furnace, the typical technology of iron smelting in medieval Ireland.

The stratigraphic distribution of the residues shows that iron smelting and working had commenced in the early phase of the site, prior to development of the burial ground. The vast majority of the residues were recovered from contexts interpreted as being medieval in age. None of the material recovered possessed what might be considered typical later post-medieval characteristics.

The spatial distribution of the residues shows no particular concentration suggesting an original area of activity – rather the residues are widely distributed at low concentrations, indicating that the deposition of waste occurred sparsely over the site and that the centre(s) of metalworking were probably outside the excavated area. In contrast to the interpretation given in the prelim report, it seems unlikely the burial ground was a focus of metalworking. Preservation of substantial and fragile pieces of tuyère may indicate those deposits containing the least reworked residues – and these mainly occur in Cutting 6 area 5, in features associated with the southern side of the burial ground and the northern edge of the hollow-way.

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Methods

All materials were examined visually with a low-powered binocular microscope where required. As an evaluation, the materials were not subjected to any high-magnification optical inspection, not to any form of instrumental analysis. The identifications of materials in this report are therefore necessarily limited and must be regarded as provisional. The summary catalogue of examined material is given in Table 1.

This project was undertaken for Rubicon Heritage as part of the R417 Athy-Carlow re-alignment scheme.

Results

Description of the residues

The catalogue of the residues is presented in Table 1, with a summary of the distribution of residue classes by context in Table 2.

Iron smelting slag

Just 2.4kg of iron smelting slag was identified (4% of the assemblage). This material represents just a small fraction of the likely slag waste from one smelt – and indicates that smelting is very unlikely to have been undertaken close to the excavated area.

The examples of smelting slag include flow slags and parts of the main 'furnace bottom' (FB) slag mass, from non-tapping furnaces of the slagpit variety – in which the slag produced during the smelt descends into a pit below the shaft. This slag can be cleared from the pit to allow the furnace to be re-used. Slagpit shaft furnaces were the main type of furnace employed in Ireland for smelting iron from the onset of the Iron Age, probably into the early post-medieval period. A wide variety of furnace designs are becoming recognised, but the present material does not permit identification of the furnace employed in medieval Ardreigh.

Before smelting commenced, the slagpit of such a furnace was packed with an organic material. The Ardreigh slags clearly indicate a packing with large wood pieces, the most common approach in Ireland (e.g. Carlin 2008; the alternative use of grass or cereals is much less common, e.g. Camlin 3, Young 2011).

The residue materials from smelting were all fairly stout and strong fragments, suggesting that this material is largely residual in the contexts in which it was found.

Iron working (smithing) slag

Slags from iron-working were the dominant type of residue on the site, with 62% of the assemblage being slags identifiable as being from *smithing hearth cakes* (SHCs). Much of the 22% of residue from the site that was slag that was strictly indeterminate, was probably also either comminuted SHC debris or other forms of hearth slag.

Smithing hearth cake is a generic term for a wide variety of broadly plano-convex slag cakes that form in smithing hearths. Whilst these were originally thought to be produced during forging activities (the heating of iron to permit forming and welding) it is increasingly being recognised that other processes, most notably various remelting techniques, may also be involved in their generation.

Several distinct forms of SHC are now recognised (e.g. Young 2009a, in press), but are currently the subject of on-going research. These are currently loosely termed '*conventional SHCs*' (with variably vesicular and/or charcoal-bearing low dense sections and upper often glassy sections), '*thin crust SHCs*' with a dominant skeletal texture of large olivine crystals forming a meshwork and '*thick crust SHCs'* with a thick, dense lower crust, often with long, bladed, olivine crystals and tubular vesicles and often with large tabular vesicles just blow the upper surface of the dense layer, which may be overlain by charcoal-rich slag, sometimes with an intervening void space. In addition, low density, prilly, variants of the '*conventional SHCs*' may grade into a low-iron slag type with a smooth, glassy lining-influenced upper part above a prilly, more iron rich base, that have been designated as '*pro-tuyère tongues*' (Young 2008).

The Ardreigh assemblage includes examples of all of these varieties of SHC, suggesting (irrespective of the current poor understanding of the genesis of the different types) that several different processes were being undertaken by the smiths in the town.

The sizes and contexts of those SHCs that were sufficiently complete to be able to measure or estimate their original size is given in Table 3 and a comparison of the weights of the SHCs in the assemblage with those of other similar assemblages, in Table 4.

The number of complete (or almost complete) SHCs is quite low, probably as a result of a high level of residuality. Of the 32 measurable examples, 69% weighed less than 500g, 88% less than 850g and 9% weighed more than 1kg. The largest example was 2.67kg (although larger examples were probably indicated by more fragmentary material). The mean weight was 495g (Table 4).

The maximum weight and mean weights are higher (Table 4) than for sites (of high medieval or post-medieval age) that are interpreted as having been solely concerned with the end-use of iron (i.e. were only blacksmithing; e.g. Ballykillaboy, Gorteens, Garryleagh, a site on the edge of Clonmacnoise and Collamurry). They are more closely comparable with those of sites (e.g. Gortnahown, Carrigoran and Parknahown) where smelting is known to have been undertaken (thereby increasing the need for primary smithing or refining processes producing large cakes). Some sites (e.g Coolamurry, Blackchurch and Ballyellin) have high maximum and mean SHC weights despite having no evidence for smelting; these have been interpreted as indicating that iron was moved from source to end-user smith, in the earlier medieval period at least, in the form of incompletely refined metal, so that there was requirement for smiths to finish the refinement of the metal at the point of end-use. This means that the evidence does not necessarily indicate that a large amount of smelting was undertaken at Ardreigh, particularly given the very small amount of smelting residue. By the late medieval period it would appear that movement of fully refined iron was more common, so that average and maximum SHC sizes on late- and post-medieval blacksmithing sites are typically low. Late- and post-medieval smelting sites (e.g. Ballykilmore) continue to show high SHC weights.

One observation on the Ardreigh assemblage was that the proportion of specimens of SHCs for which corrosion suggested the former presence of large iron clasts seemed very high compared to that on other sites. However, such an observation is extremely subjective and any suggestion that this medieval ironworking may have incurred more metal loss than in the early medieval assemblages that form the majority of the comparative material, must remain a very tentative and speculative suggestion.

Besides the SHCs a slightly unusual, but common class of residue at Ardreigh and apparently associated with the smithing, are flows of slightly oxidised (i.e. maroon –surfaced) brittle, thin, flows and sheets of slag. These are often seen to have rather complex forms with void-rich, sheet-like masses. Other sites

have produced evidence for thin concave-topped flows of slag along the underneath of the tuyère. These materials from Ardreigh do not have the same morphology, but may have formed in the same area close to the tuyère, but instead flowed down the wall of the hearth. Some of the fragments show a distinctly planar, non-wetted, base to the flows, so it is possible that they were generated in hearths in which the tuyère rested on stone.

Tuyères and lining slag

Small fragments of ceramic tuyères were recovered from several contexts, with large pieces just from ditch [c3198] (fill c4221), ditch [c699] (fills c5337 and c5338) and ditch [c1024].

The few relatively complete tuyère faces show the use of a transversely-oriented oval front face. If the face were to have been completely oval it would have been 160mm wide by 140mm high, but it seems likely the base was flattened (making the height rather less). Most of the recovered blowhole fragments suggest that the tuyères were abandoned when the blowhole had reached c. 20mm diameter, but it may have been slightly less during use. This size seems about typical for early medieval and medieval tuyères, but the sizes of very late medieval and post-medieval tuyères may have been rather larger to judge by the material from Ballykilmore (Young 2009b).

Various small fragments of lining slag were recovered, which may reflect ceramic melting from the front of a tuyère, accidental incorporation of clay/soil within the fuel or possibly wall material from the smelting furnaces.

Other materials

The assemblage contains a large quantity of indeterminate iron slag. Much of this material was probably derived from the classes of material described above, but present in fragments too small for certain identification. Other materials were probably smithing hearth slags that were not incorporated within a distinct SHC.

There were occasional pieces of corroded iron and concretions cored on iron throughout the assemblage, but with no specific patterns and with few pieces that would definitely require X-Ray investigation (the object from [c85] being a possible exception).

High temperature residues of probable non-metallurgical origin were not prominent in the collection. Fired clay from [c1105] was probably non-metallurgical, as was a tiny quantity of fuel ash slag (FAS) was recovered from [c1996]. FAS may be generated in metallurgical hearths, but equally may be formed in domestic hearths or cereal drying kilns.

Distribution of materials

The distribution of residue classes by context is summarised in Table 2.

Materials are widely distributed across the site in a sparse manner, suggesting a dispersal of waste materials either during their primary disposal or through prolonged reworking.

The only slight concentration of material (and the location of the best-preserved fragile tuyère material) is within Cutting 6 Area 5 – perhaps suggesting disposal of residues into 'waste' ground along the margins of the hollow-way.

Stratigraphically, the residues are associated with all phases of the medieval activity from the early, pre-burial ground features, through the possible bailey ditches and the features associated with the margins of the burial ground and the associated limekiln.

There is no particular association of archaeometallurgical residues with post-medieval features.

Interpretation

Iron smelting contributed rather little material to the assemblage. It was represented by material indicative of a moderately well-understood, but very long-lived technology. In the light of the suggested residuality of at least some of the material, it remains unclear whether smelting continued beyond the early phases of the site, although it probably did. It was clearly undertaken, and the residues mainly disposed of, outside the area excavated.

Iron-working is the main activity represented in the residues, but they show evidence for a diversity of processes in detail. Some progress is being made in relating smithing hearth cake slag type to process, but full understanding of the relationships has yet to be reached. Large 'thick crust' cakes have been related to bloom refining processes, possibly including remelting processes of the kind described by Evenstad (1790, translations by Jensen 1968 and Wagner 1990) and probably used to lower the phosphorus content of the iron (the phosphorus content of iron smelted from bog iron ores may be too high for some purposes – including the manufacture of carbon steel). Small examples of thick crust style SHCs resemble the slags produced in the small-scale steel-making furnace used by several experimental archaeologists and bladesmiths known as the 'Aristotle Furnace' (Wagner 1990, Sauder *in prep.*).

Slag cakes over 2kg in weight examined from Clonfad (Young 2009a) and Woodstown (Young 2009d) showed chemical characteristics suggestive of inherited smelting slag – and such an inheritance might either be the result of the loss of primary slag during primary smithing (bloomsmithing) or remelting process, or by the use of smelting slag to create a slag bath (needed for some remelting processes).

In contrast, the majority of small SHCs (a weight <850g seems to be a practical division) appear to be the product of secondary smithing and do not show such chemical influences. These cakes typically show a '*conventional'* structure.

The creation of 'thin crust' SHCs is currently not well understood at all.

Whatever the actual processes behind the creation of the different types of waste, it is clear that the smiths of Ardreigh were using a variety of techniques, presumably reflecting their activities to control the nature of the material as well as the fabrication of artefacts. Those techniques reflect their heritage of early medieval ironworking in Ireland, rather than any contemporary external influences.

Evaluation of potential

Some individual pieces are well-preserved and interesting examples of their types. In particular, comparative analyses of the smelting slags and some of the well preserved SHCs would be a valuable exercise, as would comparison of the thick- and thin-crust types of SHCs. Such studies would assist with understanding the nature of the resources exploited and the processes employed.

Because, however, the archaeometallurgical materials are not clearly associated with metallurgical structures and may have a high degree of residuality, they have a reduced potential for producing archaeologically useful information from further analytical investigation.

The assemblage is unusual in its date, range of processes and site type - and is therefore worthy of retention in full by the NMI for the benefit of future researchers.

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Table 1. Summary catalogue, ordered by area and context.

cutting	area	context	sample	weight	number	description	Orig SHC wt
6a	1	5662	2596	238	total		
				238	1	very worn and accreted slag lump, with well developed flow lobe on one side - just possibly a flow slag. Extremely dense.	
6a	2	1679	454	308	total		
				130	17	well flowed blistery slags similar to 103 material, one shows glassy basal contact	
				146	20	brittle porous slags with small charcoal moulds - probably gradational with the group above; mostly formed of open mesh of olivine crystals	
				10	1	small fragment from side of tuyère	
				12	3	small lining slag drips/flows	
						also small bag of magnetic residue - mainly rust	
6a	2	4208	1655	716	1	neat dense deep SHC, top slightly dished smooth maroon, but deeply buried by deep brash of slag rich in fine charcoal, base obscure but probably slightly prilly, 110x110x65mm (45mm bowl) plus small bag of bits	716
6a	2	5194	432	4	1	small maroonish slightly flowed blebby slag, dense	
6a	3	3865	1483	978	1	probably c65% of classic thick crust cake. Base slightly dimpled/prilly lower crust c25mm with tubular vesicles. Passes up into zone of large tabular voids to 40mm with coarse shiny crystal linings. Top not reserved. Well worth further study, upper layer 30mm thick, piece 130x110x65 plus small bag of bits	1630
6a	3	3991	1247	12	1	thin sheet of concretion spalled from flat iron surface	
6a	3/4	4002	1442	142	total		
				132	1	major fragment (rest bits of) very highly weathered small SHC, fragment (60) x (70) x 30mm. Coarsely crystalline bowl abruptly overlain by charcoal-rich top, proportion of cake unknown	

cutting	area	context	sample	weight	number	description	Orig SHC wt
6a	3	4031	1497	556	total		
				314	1	plano-convex lump - clearly iron-rich - iron bearing small SHC or small bloom piece? Very dense 75x55x45mm (20 bowl)	314
				208	1	dense slag incorporating several large charcoal moulds - slagpit smelting slag	
				32	4	broken piece of fine charcoal-rich slag	
6a	3	4032	1502	28	1	small, hemispherical lump of very weathered slag	
6a	4	3696	1440	1215	total		
				1200	1	SHC, 160x150x50mm, triangular, dished top, probably with charcoal dimples but mainly hidden, base markedly prilly, cake feels dense and solid, plus bits (mainly from adhering concretion)	1200
6a	4	3831	1681	110	1	fragment from margin of dense medium SHC - contains green glazed pebble on margin	
6a	4	3871	1453	340	total		
				340	2	angular broken blocks of thick crust SHCs, finely granular slag texture with rounded vesicles in places. Not bladed, not tubular vesicles - so perhaps more burr than lower crust?	
6a	4	3972	1439	208	1	triangular slab - probably part of an SHC, rather smooth slag, with intense rusting on upper surface - indicating former metal content.	
6a	4	3991	1247	16	1	flow lobed black glassy slag - slightly unusual	
6a	4	3991	1247	28	1	irregular slag nub	
6a	4	3991	1247	250	1	very worn and obscure, dense SHC (50)x80x40(30) ?c. 50%	500
6a	5	3524	1319	628	1	large piece of fairly thick crust SHC, crust to 12mm, overlain by rusty material, SHC 125mm across, base continues as flat surface distally (?) below rising curst - with the extension of dense but charcoal-rich material lying on basal crust, 50mm deep at deepest. base prilly plus small bag of bits	

cutting	area	context	sample	weight	number	description	Orig SHC wt
6a	5	3566	1242	978	1	triangular SHC. Top dished with smooth maroon surface (partially hidden by iron concretion) beyond the dished surface is a lateral frill on the distal side, the base is slightly irregular and finely prilly. The cake is overall well formed and dense 120x120x50	978
6a	5	3588	1225	208	1	90x70x35 small SHC. Base rough, incorporates charcoal, rusty, top rusty, incorporates charcoal and large cellular voids, upper face of thin skin with large tabular olivine crystals over part. Unusual. plus small bag of bits	208
6a	5	3730	1278	190	1	central part of small SHC, broken and probably slightly folded, moderate crust overlain by charcoal bearing granular slag	
6a	5	3898	1376	138	1	dense slag lump, probably a burr, intensely oxidised so whole piece is now reddish purple, granular texture	
6a	5	4157	1613	122	total		
				20	4	broken tuyère sherd	
				6	1	rusty low density slag scrap	
				92	1	small dense sub-semicircular SHC, 50x70x20mm, slightly prilly base, smooth top with rusty adhesions, slightly lobate margin plus small bag of bits	92
6a	5	4160	1554	84	2	prills of dense slags with adhering ash and rust - probably slagpit smelting slags plus small bag of bits	
6a	5	4162	1553	38	1	vitrified ceramic- probably tuyère face sherd	
6a	5	4165	1555	178	total		
				22	1	vitrified ceramic, oxidised fired, probably tuyère face sherd	
				152	1	dense sheet of coalesced prills and dimpled flow lobes, top obscured, but contains significant iron. Very dense, unclear if basal sheet from SHC or a smelting slag plus small bag of bits	
6a	5	4165	1555	58	1	highly rusted dark fragment of charcoal-rich slag	
6a	5	4166	3873	114	1	very fine brash of charcoal and iron oxides - probably concealing corrosion around a piece of iron plus small bag of bits	

cutting	area	context	sample	weight	number	description	Orig SHC wt
6a	5	4221	1672	138	total		
				134	1	rusty prilly dark slag penetrating between charcoal. One face is flat and very rusted - if this was an iron contact it be a piece of FB - otherwise inverted it might be from furnace hearth floor plus small bag of bits	
6a	5	4221	1620	2550	bag #1		
				2185	bag #2		
				262	11	sherds of tuyère, at least two conjoin to give 19mm blowhole, impression of quite small tuyères - nearest approach of hole to edge is just 25mm (though may not be original edge...)	
				156	4	sherds of tuyère	
				732	1	large piece (certainly <40%) of a moderately thick crust cake with a tabular crust and tubular vesicles and a rather messy upper section 130x120mm fragment, 70mm tall, of which bowl 40mm with crust 25mm.	
				324	1	smaller fragment of similar (or even the same) cake - this has a smoother top over similar coralline material resting on tubular vesicular crust	
				434	3	large blocks of rusty slag containing very coarse charcoal fragments - potentially, but not certainly smelting slags	
				210	8	masses of blebby gravelly lining slag	
				100	1	small piece of rather conventional appearing dense SHC with slightly maroon top, dense slag with some vesicles	
				1010	16	pieces of very rusty slag - suggesting iron-rich SHC fragments - some probably exploded, largest piece shows hint of SHC structure with glassy top - but rest too fragmentary	
				488	28	rather nondescript and small fragments of slag - mostly slightly blebby or charcoal-bearing but none very diagnostic or with clear form	
				80	4	blebby/prilly dense slags	
				94	1	slabby/blebby crust with lots of lining material - probably all or part of a poorly developed SHC	
				64	1	Iron-rich SHC crust fragment	
				202	1	100x65x40 small plano-convex mass - top (probably) has dimples and strongly raised blebs, base is very iron-rich and exploding	202
				160	1	fragment of a deeper SHC with a lining slag rich texture, a pale dimpled base with exploding iron clasts and a porous charcoal-rich body, top not clearly seen	
				70	1	charcoal-rich tongue like fragment	
				70	1	dense iron-rich rusty tongue- like piece - dimples on top and prills below	
				126	1	part of a low density charcoal-rich SHC/tongue with a gravelly base, porous charcoal-rich body and slight gravelly glassy top	
				170	1	twisted fragment of dimpled slag sheet	
6		5191	421	36	1	irregular slag nub with lobed base penetrating into smallish charcoal	

cutting	area	context	sample	weight	number	description	Orig SHC wt
6	2	25	426	634	total		
				626	1	105x110x45mm SHC with smooth, somewhat dimpled maroonish top and charcoal-rich prilly/dimpled base. Top very smooth of blowing side- more dimpled further away plus bag bits	626
6	2	40	410	12	1	lobed lining slag, probably spalled from tuyère face	
6	2	85	5 (405)	1190	total		
				404	1	block from the proximal end of a large thick crust cake - crust with tubular vesicles is up to 40mm and is abruptly overlain by brown weathering very rusty slag, precise orientation of piece and overall size not known	
				34	1	exploding iron - rod with bifurcating ends - might be waste or might be artefact	
				78	1	small piece from moderate sized thick crust cake	
				118	1	rounded worn lump of charcoal-rich slag	
				30	1	vesicular dense slag fragment	
				124	1	55x50x30mm (25mm bowl) small puck-like very dense SHC with iron on upper surface, sides unusually steep	124
				400	1	large complex mass of thin crust like material - possibly a deformed lump - at least one original finely dimpled surface	
6	2	86	4244	8	1	buff, almost tufa-like piece - probably natural (alternatively lime waste)	
6	2	88	414	90	1	slags encased in ashy concretion	
6	2	579 (519)	1166	618	total		
				8	1	small rounded iron lump	
				14	1	tuyère sherd	
				4	1	blebby lining slag	
				44	1	piece of possible small SHC, charcoal-rich upper on crust with gravel, apparently rather twisted	
				116	2	pieces of possible small SHC with rough to dimpled basal surfaces and probably twisted margins	
				178	11	dull blebby slags, one possibly a tuyère hood	
				124	12	slags of which at least a part is a dark dense flow lobe - very amorphous and porous frequently	
				2	2	tiny scraps of very dense fine grained flow lobes	
				102	26	other fragments of rough porous slags gradational with the categories above	
						plus bag of mag residue - mainly broken slag but a few flake hammerscale pieces	
6	2	707	1206	396	1	large piece of slag encased in concretion - probably a large SHC fragment but too obscured to be certain	

cutting	area	context	sample	weight	number	description	Orig SHC wt
6	2	1227	336	972	total		
				354	1	part of moderately large slag cake, fairly thin crust, slightly flowed at edges, charcoal-rich	
				122	1	part of a small dense concavo-convex cake, curst all of thickness, moderately coarse, pale, 10-15mm thick, like Aristotle cake, shape suggests small cake <100mm across	
				146	1	rounded worn and accreted slag lump - ?burr	
				148	1	lip from cake with open prilly structure with large charcoal moulds, raised lip, non-wetting wall contact and very rusty top - probably a piece of FB close to blowhole	
				28	7	flow slag fragments, dark brittle, largest piece is a good well-formed horizontal prill	
				40	1	small fragment of burr with accreted sediment	
				84	5	various brittle dark slag fragments, variably spiky or lobed but most with some sheet attributes	
				44	5	low density slags with a lobate component, brittle dark, furnace floor lags?	
				10		bag of bits	
6	2	5213	1182	174	total		
				174	1	part of small SHC with prilly base, dense top, with large lump of concreted iron, dense iron-rich	
6	2	5259	400	716	1	intact SHC, outer bowl incomplete ?proximally but possibly original, all obscured by accretion including excellent iron oxide-replaced straw on upper surface 100x130x75mm - dense lower crust, dense upper layer - maybe softer between, but unclear, rather conical in shape with irregular but flattish top	716
6	2	5262	1214	756	1	very large burr fragment, probably smelting, c90 high, 45mm burr extending back 45mm, and 45mm vertical wall with prills below, foot not seen. Hint of very large charcoal down one side. Very dense. Good piece for analysis	
6	2	5274	3738	320	1	rusted fragment from large SHC, crust 15 of bowl 45, upper part appears to be mainly skeletal texture, possibly with a smooth top in places - but all very weathered	
6	2	5292	2245	278	total		
				106	1	fragment of charcoal-rich slag	
				102	3	fragments of variable slag all with string iron corrosion products, all rather amorphous forms	
				38	1	low density slag mass attached to reduced fired clay	
				28	1	slag sheet - low density greenish glassy, dimpled base, lobate top - tongue-like	
						plus small bag of fine magnetic debris	
6	2	5481	337	116	total		
				88	1	oddly-shaped slag mass of microprilly surface, slightly maroon, internally has some tubular vesicles - shape no diagnostic	

cutting	area	context	sample	weight	number	description	Orig SHC wt
				12	3	broken fragment of vitrified ceramic	
				18	1	blebby fragment of lining slag	
				10	1	chip of microdimpled base with tubular vesicles above in pale slag	
6	3	606 (6)	403	16	1	ash-coated fragment of contorted flowed maroon slag in thin contorted sheets	
6	3	440	1176	670	total		
				64	1	exploding small piece of iron-rich slag	
				114	1	probable dimpled base of charcoal-rich SHC and prominent stone clast, too fragmented to estimate size	
				226	1	small SHC with dense upper slab grading down into charcoal-rich material, 80x60x40mm	226
				264	1	curiously smoothly rounded lip of medium sized SHC, significant iron concretion	
6	3	5183	493	110	1	slightly deformed SHC lip. Up-curved lip, upper surface with some charcoal imprints over moderately coarse slag, crust slightly twisted, c12mm max, base with small charcoal moulds - possible Aristotle - very dense/compact	
6	3	5183	493	378	1	fragment of thick crust cake, crust to 25mm, microdimpled base, abrupt transition to highly weathered, concreted upper section - which must have been rich in iron - up to 25mm thick	
6	3	5381	1200	4190	total		
				996	1	badly decomposed, large, charcoal-rich SHC, 200x150x100mm surviving part - shows several crusts with intervening charcoal rich layers - so may have been one of the Clonfad-style concentrically-topped cakes originally	
				802	3	large block, broken into three, from base and side of very large cake with internal granular/coralline texture, basal crust is fairly solid - and thick for a thin crust style cake, but vesicles start within a few mm of contact and increase upwards over 40mm to the preserved fractured top	
				806	1	very odd curving slab of slag, probably from below blowhole, external face shows thinly laminated and blisters haematised slag films, inner face is massive, smooth haematised, slag sheet is c20mm thick and vesicular 170x120mm overall - very difficult to interpret	
				130	1	85x70x15mm, thin plate-like SHC, top dimpled with proximal glassy surface, base smoothly dimpled	130
				200	1	lump is mixture of blebs and charcoal rich material - just possibly a discrete SHC though far from certain, 70x70x40mm, plano-convex.	
				170	1	80x70x55mm -possible charcoal-rich SHC - though probably just a piece of something like the 996g block above. Has two prilly 'crusts' running through it and vaguely plano-convex shape	
				248	1	130x70x35mm spoon-shaped object - like small charcoal-rich SHC with runner 35x25mm section off one end. Unusual	248
				270	1	rusted twisted and fractured piece of fairly thin crust from large SHC	
				146	1	slab of well preserved haematised slag -rather tap slag like but fracture and thin- prills add to form thin sheet.	

cutting	area	context	sample	weight	number	description	Orig SHC wt
				132	12	indeterminate slag fragments -most probably from SHCs	
						plus bag of bits	
6	4	1227	4254	114	total		
				106	1	long flow lobe (c. 90mm long) leading from side of lip of SHC (fractured away)	
				4	1	small prilly slag fragment	
6	4	1353	438	50	total		
				48	3	low density flow slags associated with moderately large charcoal moulds	
6	4	4002	831	26	1	fragment of very charcoal-rich slag	
6	4	5182	1191	116	total		
				46	4	rounded balls of lining slag - 3 of the 4 are strongly maroon	
				48	2	rusty iron slags with large charcoal moulds, possibly deformed	
				22	1	slag with finely dimpled base - probably a fragment from a SHC	
						plus fine bag of slag debris (mag res)	
6	5	1022	351	2185	total		
				248	5	sherds of tuyère. 1 piece shows a fragment of 25mm diameter blowhole,	
				770	18	strange slightly clinkery brittle but dense purplish slag in complicated deformed flow lobed forms	
				226	1	dense block of microprilly slag - probably part of a deformed SHC	
				84	1	rather friable porous slag with outer strongly curved, slightly dimpled purplish crust, similar to some of the 18 pieces above - but appears to be margin of SHC?	
				140	1	very strange slag sheet. Base has slightly concave central portion with white material adhering, edge slightly lobate, interior/upper has open textured friable slag - cut by possible poker hole. All suggests slag in hearth base stuck to ?limestone	
				56	1	dimpled porous slag sheet - either folded or with poker hole	
				602	1	part of very rusty and possibly partly deformed corroded SHC, partly charcoal-rich and partly sandy base, lots of corrosion on break and top suggests large iron inclusions	

cutting	area	context	sample	weight	number	description	Orig SHC wt
6	5	1024	334	2135	total		
				1035	20	sherds of tuyère. Variably slagged, two pieces show 20m blowholes, margins 45-60mm from blowhole margins where seen - but shape hard to reconstruct. One large piece either has slagged crack or was slightly recoated.	
				436	1	large piece of curving slag sheet - probably the margin of a large open SHC 160x100x35, mainly c15mm thick, lobed margin, charcoal-rich material adhering to base, inside rather obscure - probably part of a dense fill in lower part	
				306	1	curious rounded slag mass, maroonish /brown surface with thin more flowed dark layer on top. Possibly an entire small SHC - or possibly part of an SHC that was not frozen when broken, transverse shape with steep proximal side	
				78	3	fragments of a broke, highly porous, cavernous slag sheet - possibly from a tuyère front?	
				106	6	small blebby slag fragments	
				48	1	fragment of weathered SHC crust	
				92	1	irregular prilly mass- rusty, possibly small SHC or similar	
6	5	4168	4250	24	1	vitrified oxidised fired ceramic - presumably tuyère though no diagnostic shape	
6	5	5336	341	172	total		
				172	1	fragment from a SHC with strongly haematised smooth top over very prilly mass, 35mm thick, probably from a small SHC	
6	5	5337	1202	2530	total		
				828	15	badly fragmented tuyère - very heavily slagged and failed - difficult to reconstruct original form	
				66	4	very fine hard dense slag with smooth lobed surface and finely bladed fayalite up to almost 10mm - refining cake fragment??	
				288	12	small pieces of indeterminate slags - all fragments with no diagnostic form but resembling other SHC materials in this collection	
				288	1	rusty block of slag including burr with limey adhesion and ark glass on top, front part of cake broken away	
				86	1	dense slag prills running between large charcoal moulds	
				370	1	dense rusty block - probably the proximal end of a very large SHC	
				234	1	c. 90% of small plano-convex SHC, slight maroon smoothish top (with accretion) moderate amount of charcoal showing, 70x80x40, reasonably dense and compact	260
				34	1	thin maroon slag flow, possibly deflated	
				274	1	dense block of slag - conical dense dimpled base of SHC passing up to green glassy surface - all edges missing very dense	
				50	1	rusty wispy maroon slag mass - possibly part of tongue or tuyère mass	
6	5	5353	465	326	total		
				318	1	prilly mass of slag enclosing some large charcoal fragments - probably a FB fragment - probably 75mm thick preserved	
						plus small bag of fragments	

cutting	area	context	sample	weight	number	description	Orig SHC wt
6	5	5353	465	6	1	small exploding iron concretion	
6	5	5382	1199	1410	total		
				212	2	slab of dense dark slag with micro-prills and lobes, fractured from overlying material. Includes long moulds of straw or very narrow sticks, base appears to show conventional small dimples, slag in very thin sheets with planar tops - could be odd SHC or smelting furnace bottom	
				536	1	large sub-blowhole block - good lining influenced slag sitting on top of prilly mass, probably just the end of a large prilly SHC	
				324	1	90x110x70mm, slightly folded complete small dense SHC, somewhat prilly base is rather reddened	324
				100	3	charcoal-rich slag - just possibly fragments from one of the other pieces	
				202	1	curved slag sheet with decomposed slag with cavities above- base of thin crust SHC possibly	
						plus bag of bits	
6	5	1014/5392	1197	3420	total		
				110	1	attachment of dimpled pale tongue like mass to tuyère front, below tuyère is an inclined set of lobes, all pale a bit like some slagpit margins	
				392	1	58x95x55mm (35mm bowl) neat dense SHC, base dimpled, internal slag, vesicular, inclined glassy plate on top	392
				500	1	moderately thin crust cake (105)x(55)mm, with neat dense bowl with tubular vesicles, with extension or earlier SHC (85x70x30mm) on proximal side, much more inclined	
				548	1	wide flat SHC resting on slag pad - or earlier small SHC. 110x100x70mm	548
				140	1	tongue or prilly SHC - 85x65x45mm - long prills hang down below - pale, top is darker slightly raised lobes of glass	140
				728	15	fragments of various weathered open-textured thin crust types with coarse olivine meshes. One appears in ‘wasps nest’ form with ringed bowl,	
				232	1	thin crust type SHC bowl - filled with olivine mesh - 110x80x35mm	
				214	3	fragments of prilly SHCs or tongues	
				34	2	good flow slag prills	
				494	20	very small slag fragments, mainly/entirely from SHCs of various types	
						plus bag of bits	
6	5	5385	1198	212	total		
				126	1	haematised dense SHC lip, or tuyère slag - thin veneer of tuyère fabric attached to outside of crescentic shape - not clear if inner side connected to further SHC or not	
				90	2	small concretions on iron, or more likely iron-rich slag fragments	
						plus bag of bits	
6	5	5392	843	38	total		
				2	1	fragment of lobe of lining slag	

cutting	area	context	sample	weight	number	description	Orig SHC wt
				36	1	irregular fragment of open textured thin crust type material, with small area of microprilly base	
6	5	5404	4238	44	total		
				16	1	contorted lining slag lump	
				28	1	iron accretion fallen form iron-rich object of slag - itself possibly slag rich	
6	5	5338	425	4415	total		
				1555	1	250x180x90mm, broken large slag mass. Shows good base, although details hidden by accretion, porous slag with moulds of very large charcoal, some flat-lying flowed lobes, highest edge is very rusty mass. Could be a very odd SHC or FB	
				292	1	pale grey burr with adhering sediment. Slag irregularly porous near surface with almost velvety texture	
				490	6	iron-rich concretions containing blebby or lobed slags - could be associated with the large mass above or could be entirely separate concretions	
				154	3	pieces of thin rusted slag sheet, possibly assoc above mass	
				172	4	four pieces of tick rusted slag sheet, probably assoc with above	
				342	1	large equant slag piece - thick crust cake (c. 50mm if so) of perhaps more likely burr - texture of base of piece matches the mass above, but does not appear to join it	
				84	1	mass of dark, purplish, clinkery looking slag, including some parts in this blister-like sheets, 1 side looks like possible stone contact?	
				32	1	slightly brittle irregularly curving sheet of iron-rich dark slag	
				70	1	dense slag lump with charcoal impressions/dimples - different colour from most of above	
				114		bag of debris	
				1110	11	tuyère fragments - assemble into four pieces, largest fragment shows blowhole 20mm diameter, centre 20mm above truncated base, top nearly semicircular 80mm diameter laterally, 70mm above blowhole; second shows 20mm hole, 55mm diameter above, 80mm laterally, 40mm below to possible original planar base,	
6	3	5336	1207	92	total		
				26	1	concretion with slag fragments and sand and small piece of iron with right angle bend	
				14	1	lining slag bleb with maroon surface on one side	
				6	1	maroon slag in thin internal sheets - complex	
				46	1	moderately coarse grained fragment of SHC crust	
6	7	1009	338	226	total		
				42	1	dimpled pale lining slag sheet	

cutting	area	context	sample	weight	number	description	Orig SHC wt
				38	2	small dense slag nub (SHC fragment?) broken in 2	
				140	1	weathered decalcified cherty limestone	
6	7	1010	345	52	total		
				52	1	very worn rounded slag fragment - now unidentifiable except it is very dense	
6	7	5408	352	1930	total		
				1930	52	pieces of abraded slag (an one small piece of probable iron) - all representing smithing slags, but with a diverse range of textures, 1 piece shows dimpled/prill y base with upper surface with crystal terminations, around 4 pieces show very fine grained upper puddles, 3 pieces appear to be biconvex lobes - but this shape may be from wear	
6	7	5409	1180	466	1	rather abraded block representing most or all of small SHC - very compact and dense, plano-convex, 85x 85 x 45mm, top locally smooth, basal surface shows vesicles - surface probably missing from most of piece	
6	7	5410	353	268	total		
				166	1	good example of multiple prill flow slag, represents flows fanning onto floor over fuel	
				102	2	two fragments from tiny SHCs - each probably a sub-100g example originally, both dense, both dimpled bases	
						plus bag of bits	
6	7	5414	419	206	total		
				58	1	small fragment of SHC crust	
				148	1	fragment of thick crust SHC, crust 30mm ,occasional vesicle and charcoal fragment but mainly clean bladed olivine, top smooth haematised, slag becoming fine just below. Completely different from most SHCs in this collection	
6	8	5425	335	2645	total		
				2585	1	very large block, 200x150x80 with dense lower crust - irregular but almost planar, upper part is porous dense granular slag with a series of depressions - one major. Appears to be a part of a very large SHC of unknown but possibly irregular form.	
6,7		119	1106	334	total		
				134	3	dark rusty charcoal-bearing lag fragments - possibly from a disintegrated small iron-rich SHC	
				80	3	pale weathered low density greenish slag - some with lobes indicating poor flow	
				88	4	rather non-descript charcoal-bearing slag fragments	
				20	1	greenish low density slag with a curved crust, large internal pores and layered structure similar to some of the dark blistery slag seen in other contexts	

cutting	area	context	sample	weight	number	description	Orig SHC wt
				6	1	dark shiny flowed slag sheet suggestive of thin flow on non-wetting surface	
						plus bag of slag detritus	
7	1	119	1158	726	total		
				288	1	fragment from large irregular SHC, bowl to >45mm thick with 15mm particularly dense crust, pale grey, top irregular broken, base sand/clay contact probably	
				152	1	fragment from rim of SHC with abundant rust - so high iron content, probably fragment caused by prior explosion	
				38	2	tapslag like lobes with a thin hollow sheet morphology, similar to material from 1022	
				242	15	small slag fragments, variable SHC-like textures, but all too small to determine form, many worn	
7	1	134	1153	64	total		
				18	1	corroded iron	
				24	1	reduced fired clay - or possibly natural	
				22	1	dense nub of slag with one maroon surface = possibly from the margin of an irregular SHC	
						plus bag of mag res - slag fragments and corrosion form iron piece	
7	1	147	1157	220	total		
				214	1	dense lump of charcoal bearing slag - probably/possibly a fragment from SHC has curved faces but worn and possibly deformed, so no regular shape	
				4	1	tiny fragment of charcoal-rich slag	
7	1	154	1163	6	1	deeply dimpled irregular lump of lining slag	
7	1	175	441	24	total		
				24	1	blebby slag with large rounded voids - possibly deep open dimples, but piece too small to identify	
7	1	179	1145	24	total		
				24	1	very pale grey slag with planar base - probably base of SHC, possibly stone contact?	
7	1	198	404	90	total		
				84	3	exploding block of iron bearing slag - just a rounded nub from what can be seen	
				6	1	low density slag bleb	

cutting	area	context	sample	weight	number	description	Orig SHC wt
7	1	233	1100	760	total		
				156	1	dense stack of flow lobes, not reddened (though weathered) - so probably flow slag. Later flows may have knocked over earlier, base dimpled, flows merging, but individually up to 20mm wide	
				410	1	massive to slightly layer dense coarsely equantly crystalline slag - possibly from a burr or big SHC, but has no original edges to judge	
				190	1	small very dense fragment from layered coarsely crystalline slag, probably from an SHC with large inclusions of charcoal or possibly iron on some surface. Very coarse on top surface	
7		4613	1096	18	total		
				16	1	small nub of dense slag with irregular rounded surface	
				1	1	bleb of probable lining slag	
7	1	4630	1131	208	total		
				8	1	concavo-convex piece of slag with dark glassy edge - a dense flow of unusual composition	
				54	1	irregular num of lining slag, locally with a dark surface. Very irregular shape - probably from close to tuyère	
				100	1	irregularly shaped lump of dense vesicular slag - possibly the end of a small SHC with a couple of marked tool marks extending down and out from the cake?	
				44	1	dense lump of charcoal-containing slag with prilly base and hint of lining slag on top - not clear is part of a small SHC or a stray lump plus bag of mag res slag debris	
7	1	4631	1164	8	1	small fragment of very porous slag	
7	1	4635	4253	98	total		
				82	3	fragments from a small dense conventional SHC with abundant white gravel near base, very fine grained, 25mm seen but original top not preserved	
				14	1	sherd from tuyère face with margin of cracked and deformed blowhole	
				2	1	tiny lobate slag fragment	
7	1	4740	1103	2	total	small bag of fine debris of decomposed slag	
7	1	4748	1128	1	2	dense slag in complex prilly blebs	
7	2	161	1143	192	total		
				178	1	part of small SHC with lobate, almost folded, dense upper part grading down into slightly more vesicular material below, base slightly lobate, to with small patches of possible devitrified glass in hollows. Original size not determinable, but this might be 40%	

cutting	area	context	sample	weight	number	description	Orig SHC wt
						plus mag res bag of broken slag	
7	2	194	1139	1230	total		
				796	1	120x130x55mm most or all of slab-like charcoal-rich SHC, very dense, top slightly concave - all rather irregular	796
				232	1	limestone - natural	
				106	1	very rusty ball of slag clearly containing iron lump	
				90	14	fragments of blebby and charcoal-rich slag similar to major piece	
						also small bag of mag residue - mainly fragmented slag	
7	2	210	1129	232	total		
				68	1	fragment of porous skeletal thin crust material - possibly fragment from a cake margin	
				164	1	dense slag lump comprising several coalesced nubs - presumably a complex hearth slag	
7	2	279	1155	834	total		
				140	12	highly fragment porous thin crust cake fragment - almost like pumice with almost no real crust	
				342	1	large lump from steep side of fairly thick crust cake (crust to 25mm) with coarse slag and tubular vesicles, inside of bowl is just a large rounded concretion - suggesting significant iron attached to crust.	
				120	1	small fragment from fairly thin crust cake, or margin or larger SHC	
				54	1	nub of charcoal-rich slag	
				28	1	iron - possibly broad headed nail?	
				44	1	slag rich concretion broken from iron above	
				31	3	small indeterminate blebby slag pieces	
				64	1	slag from presumed tuyère face, low density in flat lobes?	
7	2	1105	1150	976	total		
				316	2	pieces of thin crust cake, mainly open 'coralline slag on top of variably vesicular lower crust	
				408	1	large part of an open- textured, but dense SHC. 100x75x45mm fragment, original size not known	
				58	1	concretion on corroded iron	
				8	1	small porous slag lump	
				178	7	pieces of moderately hard buff fired clay	
						plus bag of mag residues debris	

cutting	area	context	sample	weight	number	description	Orig SHC wt
7	2	1111	481	10	total		
				10	3	3 small slag fragments, 1 a bulbous lobe of low density material, 1 tiny prill and 1 indeterminate fragment	
7	2	4620	2464	4	2	small pieces of pale slag flowed between fine charcoal	
7	2	5082	1159	16	total		
				10	2	shiny dark dense slag in small hollow prills	
				2	1	dull slag bleb	
7	2	5084	1098	432	total		
				244	1	porous slag cake with very large olivines and poorly developed crust	
				114	1	strongly convex lump from weathered SHC, dense lower crust and open porous upper part	
				36	1	dense slag flow with maroon surface and coarse (3-4mm olivine) - almost tapslag like	
				22	1	weathered vesicular slag sheet/crust fragment	
				16	3	slag scraps	
						plus small bag of sag debris	
7	2	5827	1122	54	total		
				44	1	irregular dimpled rusty slag lump	
				8	2	small fragments of charcoal-rich slag	
7	3	8	415	190	total		
				100	8	exploded tiny SHC, iron near lip on one side, 55x60x25mm (15mm bowl), smooth top, dished, base sandy	100
				34	1	possible granular SHC fragment	
				38	1	gravelly concretion	
				12	1	small complex slag bleb in dense slag	
7	3	151	1148	40	total		
				34	3	exploded iron-bearing slag fragment, indeterminate	
				6	1	exploding small iron piece or iron-bearing slag	

cutting	area	context	sample	weight	number	description	Orig SHC wt
7	3	1126	1133	580	total		
				312	1	dense, puddle type SHC - slightly biconvex, 85wx105lx30d mm, top smooth puddle, slightly lobate at margins, base mostly rough with some large charcoal and possible burnt bone	312
				88	1	fragment from small SHC with slightly sandy base	
				184	9	somewhat blebby amorphous hearth slags - all indeterminate	
						plus bag of mag res - slag fragments	
7	3	4398	430	12	1	very rusted material - probably slag with iron - but might just be iron corroded onto slag	
7	3	5806	1141	484	total		
				484	2	substantial fragments of thin crust type cakes - highly porous, grey slag grading up to greener upper parts. Bases appear full of fine charcoal, upper parts have more rounded voids	
7	4	251	1107	20	1	small fragment of dimpled base spalled from a larger fairly porous slag piece	
7	4	274	1126	84	1	fragment of crust from small SHC, twisted and split, one end shows rounded end of slag sheet protruding as lobe	
7	4	1108	1093	148	total		
				134	5	various fragments of generally porous slag, some with maroon surfaces, one possibly folded	
				4	1	corroded iron?	
				4	1	vitrified grey ceramic fragment - presumably tuyère sherd	
						plus small bag of fine magnetic debris	
7	4	5086	1109	248	total		
				188	3	pieces of dense slag, details not visible, with intense iron corrosion	
				28	1	prilly slag with dimpled base - possible from the margin of an SHC	
				14	1	natural stone	
				16	1	complex dark flowed slag with maroon surface forming complicated layers and descending prill	
7	4	5087	1101	18	total		
				18	4	broken probable tuyère sherd, buff slightly gravelly fabric	

cutting	area	context	sample	weight	number	description	Orig SHC wt
7	4	5089	1144	18	total		
				8	2	slagged highly bloated grey ceramic	
				8	1	vesicular dense slag with dark slightly lobed surface	
7	4	5580	1162	182	total		
				130	1	rounded dense slag nub - possibly a slightly folded SHC - 80x40x40mm (20mm bowl) - lump on top might folded from side?	130
				22	1	low density flowed slag - poor flow lobes on top, dimpled base, slightly reddened top	
				22	1	dense slag lump	
				6	2	flowed dense shiny dark slag in thin blisters	
7	5	423	1169	362	total		
				48	10	tiny slag fragments - many are parts of dense blebs/flows	
				306	1	fragment from side of a large thin crust cake - very porous slag with rounded vesicles. Overall quite dense but no distinct dense crust as such plus mag res bag of slag fragments	
7		1130	1130	1195	total		
				152	1	chert - natural	
				58	1	small SHC fragment grading from dense bowl into open-textured material	
				200	1	SHC fragment grading from thick crust (40mm) with tubular vesicles into abruptly overlying rusty dense slag (30mm) with lobes and moderately large charcoal impressions	
				784	1	150x110x65mm, rather worn SHC has neat proximal 2/3 bowl, then level drops to continue in the more charcoal-rich material, base smooth/sandy? Proximally but charcoal distally	784
7	5	1133	1185	42	total		
				42	2	fragments from coarse grained SHC basal crusts	
7	5	1134	1192	44	total		
				28	1	dimpled pale slag sheet	
				14	1	corroding iron-rich slag nub	
7	5	5594	1181	738	total		
				350	1	dense angular block of charcoal-rich slag - probably a fragment from a large SHC, but no original surfaces	

cutting	area	context	sample	weight	number	description	Orig SHC wt
				290	1	SHC margin or burr fragment - has sub-horizontal large rounded sediment-coated lobes stacked up, but massive internally with some tubular vesicles, fractured on inner surface	
				40	1	c8mm thick fragment of thin dimpled basal sheet, fractured on top	
				48	1	very fine grained probable SHC fragment with coarsely lobate base and smooth top	
						plus bag of mag res - slag fragments	
7	8	481	1174	4	1	small bleb/flow of greenish dense slag with intensely maroon surface	
7	9	1167	1215	16	1	small slag chip probably from basal dimpled crust of an SHC	
7	10	630	1168	690	total		
				60	1	small rotten tongue-like fragment, charcoal bearing, dimpled top prilly base, incomplete	
				8	1	vitrified ceramic fragment - presumed tuyère sherd	
				614	1	large slab from wide flat SHC, 110x110x40, worn fragment	
						plus bag of bits	
7	10	630	1196	66	total		
				30	1	rounded lobe of fine grained, clinkery appearing slag, slightly maroon, fine red clinkery superficial layer spalling off in places	
				34	4	exploded concretion - probably around small fragment of sheet iron	
7	10	5115	1213	28	1	slightly pyramidal piece of iron c28mm across - possibly large nail head or rivet although no sign of shank, possibly wood impression on rear	
7	ara 13	753	1208	54	1	fragment from very small SHC with dimpled base, very worn and rolled	
7	15	1985	418	58	7	small fragments from broken small SHCs, largest fragment has tubular vesicles despite small size	

cutting	area	context	sample	weight	number	description	Orig SHC wt
7	15	2770	895	122	total		
				120	7	fragment of small very dense SHC broken into 7 pieces, c25mm thick, slightly lobate base	
7	15	2770	1030	52	total		
				24	1	dense dark slag nub	
				26	1	small fragment of very porous slag	
7	15	2799	920	48	1	very dense fragment of weathered SHC crust	
7	15	3152	937	144	3	broken small SHC roughly 80% complete, thin dense lower crust overlain by very gravelly upper layer 70x60x25mm, base smoothly convex with faint dimpling, top irregular pale glassy	180
7	15	3152	937	360	total		
				356	2	complete double layer SHC, upper conventional p-c, lower more like a plate, upper 65x65x25 lower 96, 65 x 20	356
7	15	3155	950	36	2	broken dark slag sheet with included charcoal, extending into lobes on margin	
7	15	3165	934	304	total		
				116	1	beard of lining lag from below tuyère tip	
				182	1	gravelly burr attached to very fine grained slag in SHC - bowl with smooth/slightly dimpled top, more markedly prilly base. plus small bag of bits	
7		3166	942	32	1	probable SHC fragment, fine grained	
7	15	3167	931	108	1	60x50x30mm 80% of small very dense but gravelly SHC plus small bag of bits	135
7	15	3288	1020	10	2	tiny rusty slag scraps	
8	area1	1996	392	<1	total	multiple tiny fragments of khaki vesicular probable FAS	

cutting	area	context	sample	weight	number	description	Orig SHC wt
8	2	4593	359	306	1	90x75x30mm (20mm bowl) small dense biconvex SHC with heavy rusting on upper surface, base slightly lobed	306
8	5	686	1194	388	1	95x75x50 plano-convex dense SHC starting to explode, top probably dimpled but surface details obscured by accretion	388
9	7	2143	725	<1	1	dark slag drip, glassy	
9	8	2144	735	2665	1	a very heavily overgrown medium SHC. Bowl appears to be 150x180x50mm with small charcoal on the outside. The bowl is well formed with a slightly angular profile. The 60mm thick accretion on upper surface hides its nature - but an SHC with an inclined pro-tuyère slab seems likely	2665
9	8	2145	734	1475	total		
				272	1	95x80x45mm (30mm bowl) complete SHC, slightly biconvex with deeply dimpled top, base rough with fine charcoal and possible tool-mark	272
				92	1	SHC crust fragment with fine charcoal	
				24	1	prilly charcoal bearing crust fragment	
				496	1	segment from deep thick crust cake with coarse grained slag to 40mm, overall cake 70mm deep, upper part not well seen, rusty	
				582	5	generally rounded pieces of slag inside concretions - adhering material precludes proper identification	
						plus small bag of bits	
9	8	2145	745	102	total		
				96	3	lobes of flowed lining slag forming large rusty concretions	
						plus small bag of bits	
9	7	2170	738	398	total		
				398	3	heavily overgrown slag pieces -all slightly sheet-like, probably SHC crust fragments	
						plus small bag of bits	
9	8	2170	758	2260	total		
				488	1	large block of thick crust SHC, shows crust to 25mm overlain by more slag of at least 35mm, base possibly continued distally by charcoal-rich slags above intermittent basal crust	
				152	1	SHC fragment - from side of probably a fairly thick-crust cake or conventional, slightly biconvex, charcoal bearing n top	

cutting	area	context	sample	weight	number	description	Orig SHC wt
				166	1	fragment from side of thick crust cake, v thick crust with tubular vesicles overlain by tabular voids and dimpled top	
				318	1	small dense intact SHC, 80x75x40mm, base sandy, top dimpled, sides steep, internally moderately coarsely crystalline	318
				1000	6	large blocks of slag, probably mainly SHC fragments, but too overgrown to characterise	
				88	8	small slag fragments, any rather overgrown	
				74	6	maroon surfaced flowed slags in thin sheets, blebs and blisters	
						plus small bag of bits	
12	6	12	408	598	total		
				412	3	Rounded, probably worn, rusted lumps of very dense slag - appear to comprise amalgamations of roundish lumps with voids - but no clear overall morphology	
				94	1	section from a very dense, fairly fine-grained SHC c35mm thick	
				18	1	dimple slag fragment	
				2	1	slightly maroon flattened hollow lobe	
				72	1	very fresh section from lower part of coarse grained SHC - black shiny dimpled base, lower slag with abundant tubular vesicles, feeding some larger oblate pores >40mm wide with coarse, but very shiny surfaces. All dark and fresh	
						plus very small bag of fine mag res- slag debris	

Table 2: Summary of residues classes by area and context.
Green tone indicates general medieval contexts, orange tone indicates pre-graveyard contexts, blue tone indicates contexts associated with the limekiln; lilac tone indicates post-medieval contexts; uncoloured contexts are those for which the prelim report did not indicate a likely date.

Cutting	Area	Context	Context description	SHC						Smelting slag	Indet. slag	Tuyère	Lining slag	FAS	Conc.	iron	Fired clay	Totals	
				Thick crust	Thin crust	Conv.	Undiff.	tongue	blister H									*Context*	*Area*
6a	1	5662	A fill of ditch 5661.	0	0	0	0	0	0	0	238	0	0	0	0	0	0	*238*	
																			238
6a	2	1679	Fill of linear feature 3500/090	0	0	0	0	0	276	0	0	10	12	0	0	0	0	*298*	
6a	2	4208	Upper fill of pit 4209.	0	0	0	716	0	0	0	0	0	0	0	0	0	0	*716*	
6a	2	5194	Fill of linear 092 (re-cut of graveyard boundary 3672).	0	0	0	0	0	4	0	0	0	0	0	0	0	0	*4*	
																			1018
6a	3	3865	A fill of medieval oval shaped pit 3862.	978	0	0	0	0	0	0	0	0	0	0	0	0	0	*978*	
6a	3/4	4002	A fill of medieval N/S aligned ditch 1692	0	0	0	132	0	0	0	0	0	0	0	0	0	0	*132*	
6a	3	4031	Fill of medieval pit 4021.	0	0	0	314	0	0	208	32	0	0	0	0	0	0	*554*	
6a	3	4032	Fill of medieval pit 4021.	0	0	0	0	0	0	0	28	0	0	0	0	0	0	*28*	
																			1692
6a	4	3696	A fill of pit 3546.	0	0	0	1200	0	0	0	0	0	0	0	0	0	0	*1200*	
6a	4	3831	Medieval deposit.	0	0	0	110	0	0	0	0	0	0	0	0	0	0	*110*	
6a	4	3871	A fill of medieval E/W ditch.	340	0	0	0	0	0	0	0	0	0	0	0	0	0	*340*	
6a	4	3972	Fill of medieval sub-rectangular pit.	0	0	0	208	0	0	0	0	0	0	0	0	0	0	*208*	
6a	4	3991	Fill of medieval N/S aligned ditch 088.	0	0	0	250	0	0	0	28	0	16	0	12	0	0	*306*	
																			2164
6a	5	3524	Fill of linear feature 3523.	628	0	0	0	0	0	0	0	0	0	0	0	0	0	*628*	
6a	5	3566	Fill of large sub-rectangular pit 3570/3569.	0	0	0	978	0	0	0	0	0	0	0	0	0	0	*978*	
6a	5	3588	Fill of large square-shaped pit 3586. .	0	0	0	208	0	0	0	0	0	0	0	0	0	0	*208*	
6a	5	3730	A fill of pit 3546.	0	0	0	190	0	0	0	0	0	0	0	0	0	0	*190*	
6a	5	3898	A fill of medieval sub-rectangular pit	0	0	0	138	0	0	0	0	0	0	0	0	0	0	*138*	
6a	5	4157	A fill of ditch 3198.	0	0	0	92	0	0	0	6	20	0	0	0	0	0	*118*	
6a	5	4160	A fill of ditch 3198	0	0	0	0	0	0	84	0	0	0	0	0	0	0	*84*	
6a	5	4162	A fill of ditch 3198..	0	0	0	0	0	0	0	0	38	0	0	0	0	0	*38*	

Cutting	Area	Context	Context description	SHC						Smelting slag	Indet. slag	Tuyère	Lining slag	FAS	Conc.	iron	Fired clay	Totals	
				Thick crust	Thin crust	Conv.	Undiff.	tongue	blister H									*Context*	*Area*
6a	5	4165	A fill of ditch 3198..	0	0	0	0	0	0	0	210	22	0	0	0	0	0	*232*	
6a	5	4166	A fill of ditch 3198..	0	0	0	0	0	0	0	0	0	0	0	114	0	0	*114*	
6a	5	4221	A fill of ditch 3198..	1056	0	100	520	266	0	134	2182	418	210	0	0	0	0	*4886*	
6		5191	Fill of linear feature 029 It was probably late medieval in date.	0	0	0	0	0	0	0	36	0	0	0	0	0	0	*36*	
																			7650
6	2	25	Deposit in late medieval boundary ditch which cut into the backfill of lime kiln 707 in the cemetery area.	0	0	0	626	0	0	0	0	0	0	0	0	0	0	*626*	
6	2	40	Backfill of lime kiln 707 in graveyard area.	0	0	0	0	0	0	0	0	0	12	0	0	0	0	*12*	
6	2	85	Cut of pit dug into disused lime kiln 707 in cemetery area.	482	400	0	124	0	0	0	148	0	0	0	0	34	0	*1188*	
6	2	86	Cut of kiln															*0*	
cuttin 6	2	88	Cut of N/S aligned ditch to north of cemetery	0	0	0	0	0	0	0	90	0	0	0	0	0	0	*90*	
6	2	579 (519)	Medieval deposit in north of cemetery area.	0	0	0	160	0	0	0	406	14	4	0	0	8	0	*592*	
6	2	707	Cut of limekiln in cemetery area.	0	0	0	0	0	0	0	396	0	0	0	0	0	0	*396*	
6	2	1227	Cut of ditch pre-dating cemetery.	0	0	0	662	0	84	220	0	0	0	0	0	0	0	*966*	
6	2	5213	Fill of northern flue of limekiln 707. Contemporary with cemetery.	0	0	0	174	0	0	0	0	0	0	0	0	0	0	*174*	
6	2	5259	Fill of main chamber of limekiln 707 in cemetery area.	0	0	0	716	0	0	0	0	0	0	0	0	0	0	*716*	
6	2	5262	Fill of main chamber of limekiln 707 in cemetery area.	0	0	0	0	0	0	756	0	0	0	0	0	0	0	*756*	
6	2	5274	Fill of northern flue of limekiln 707 in cemetery area.	320	0	0	0	0	0	0	0	0	0	0	0	0	0	*320*	
6	2	5292	Fill of north/south aligned ditch 1692 at north side of cemetery and contemporary with this.	0	0	0	0	28	0	0	208	0	38	0	0	0	0	*274*	
6	2	5481	Fill of ditch 1277 which pre-dates cemetery.	0	0	0	10	0	0	0	88	12	18	0	0	0	0	*128*	
																			6238
6	3	606 (6)	Deposit - Medieval. Collapsed wall of Structure A. Same as 002, 003, 004, 006, 134, 136, 144 & 4615	0	0	0	0	0	16	0	0	0	0	0	0	0	0	*16*	
6	3	440	Cut of medieval ditch to south of cemetery- possible boundary ditch	0	0	0	604	0	0	0	64	0	0	0	0	0	0	*668*	
6	3	5183	Fill of ditch 1227 which pre-dates cemetery.	378	0	0	110	0	0	0	0	0	0	0	0	0	0	*488*	
cutting6	3	5381	Upper fill of ditch 5604. Medieval.	0	1072	0	1744	0	952	0	132	0	0	0	0	0	0	*3900*	
																			5072
6	4	1227	Cut of curvilinear ditch	0	0	0	106	0	0	0	4	0	0	0	0	0	0	*110*	
6	4	1353	Cut of ditch pre-dating cemetery. Cuts into ditch 1227.	0	0	0	0	0	0	0	48	0	0	0	0	0	0	*48*	
6	4	4002	Fill of north/south aligned ditch 1692 at north side of cemetery and contemporary with this.	0	0	0	0	0	0	0	26	0	0	0	0	0	0	*26*	

Cutting	Area	Context	Context description	SHC						Smelting slag	Indet. slag	Tuyère	Lining slag	FAS	Conc.	iron	Fired clay	Totals	
				Thick crust	Thin crust	Conv.	Undiff.	tongue	blister H									*Context*	*Area*
6	4	5182	Fill of post-medieval pit 554 in cemetery area.	0	0	0	22	0	0	0	48	0	46	0	0	0	0	*116*	
																			300
6	5	1022	Cut of linear ditch in southwest of Cutting 6	0	0	0	912	0	770	0	196	248	0	0	0	0	0	*2126*	
6	5	1024	Re-cut of ditch which cut the south boundary ditch of the cemetery.Medieval.	0	0	0	790	0	0	0	276	1035	0	0	0	0	0	*2101*	
cuttin 6	5	4168	Fill of ditch 3198	0	0	0	0	0	0	0	0	24	0	0	0	0	0	*24*	
6	5	5336	Fill of linear feature 695 which cut ditch 699 which in turn cut southern cemetery boundary ditch 693.	0	0	0	172	0	0	0	0	0	0	0	0	0	0	*172*	
6	5	5337	Fill of ditch 699 which truncated southern cemetery boundary ditch 693.	0	0	0	1232	0	84	86	288	828	0	0	0	0	0	*2518*	
6	5	5353	Fill of pit 1535 - possible lime mortar storage pit associated with limekiln 707.	0	0	0	0	0	0	318	0	0	0	0	0	6	0	*324*	
6	5	5382	Fill of ditch 5604 which lay to the south of the southern cemetery boundary. Medieval	0	202	324	536	0	0	212	100	0	0	0	0	0	0	*1374*	
6	5	1014/5392	Fill of ditch 5604 which lay to the south of the southern cemetery boundary. Medieval	0	1460	0	1294	110	0	34	494	0	0	0	0	0	0	*3392*	
6	5	5385	Basal fill of ditch 5604 which lay to the south of the southern cemetery boundary. Medieval	0	0	0	0	0	0	0	126	0	0	0	90	0	0	*216*	
6	5	5392	Fill of ditch 5604 which lay to the south of the southern cemetery boundary. Medieval.	0	36	0	0	0	0	0	0	0	2	0	0	0	0	*38*	
6	5	5404	Fill of hollow-way/linear 631	0	0	0	0	0	0	0	0	0	16	0	28	0	0	*44*	
6	5	5338	Fill of medieval NE/SW ditch 699.	342	0	0	0	0	84	0	2275	1110	0	0	490	0	0	*4301*	
																			16630
6	3	5336	Fill of linear 695 which cut ditch [F699]	46	0	0	0	0	6	0	0	0	14	0	26	0	0	*92*	
																			92
6	7	1009	Cut of linear ditch which lay between 'hollow way' and another ditch to the south.	0	0	0	0	0	0	0	38	0	42	0	0	0	0	*80*	
6	7	1010	Cut of linear ditch directly to the south of similar ditch 1009.	0	0	0	0	0	0	0	52	0	0	0	0	0	0	*52*	
6	7	5408	Fill of medieval pit 1005 which cut into possible hollow-way to south of cemetery.	0	0	0	0	0	0	0	1930	0	0	0	0	0	0	*1930*	
6	7	5409	Fill of 1008. Possible stone pathway associated with hollow-way to south of cemetery.	0	0	0	466	0	0	0	0	0	0	0	0	0	0	*466*	
6	7	5410	Upper fill of 1009 - a ditch to the south of the 'hollow-way'. See slag sample logged under cut number.	0	0	0	102	0	0	166	0	0	0	0	0	0	0	*268*	
6	7	5414	Fill of 1011 which was a linear channel which linked ditch 1009 and possible hollow-way 631.	148	0	0	58	0	0	0	0	0	0	0	0	0	0	*206*	
																			3002
6	8	5425	Fill of medieval pit 1021 located to the south of the 'hollow-way'.	0	0	0	2585	0	0	0	0	0	0	0	0	0	0	*2585*	
																			2585
6,7		119	Deposit - Partially sealed structure A. Medieval..	288	0	0	286	0	64	0	410	0	0	0	0	0	0	*1048*	
7	1	134	Deposit - Medieval. Collapsed wall of Structure A.	0	0	0	22	0	0	0	0	0	0	0	0	18	0	*40*	
7	1	147	Basal fill of medieval linear 138.	0	0	0	214	0	0	0	4	0	0	0	0	0	0	*218*	

Cutting	Area	Context	Context description	SHC						Smelting slag	Indet. slag	Tuyère	Lining slag	FAS	Conc.	iron	Fired clay	Totals	
				Thick crust	Thin crust	Conv.	Undiff.	tongue	blister H									*Context*	*Area*
7	1	154	Cut for hearth associated with Structure A. Medieval.	0	0	0	0	0	0	0	0	0	6	0	0	0	0	*6*	
7	1	175	Deposit, possibly ground levelling, associated with the construction of Structure A. Medieval.	0	0	0	0	0	0	0	24	0	0	0	0	0	0	*24*	
7	1	179	Floor levelling deposit in west part of Structure A. Medieval.	0	0	0	24	0	0	0	0	0	0	0	0	0	0	*24*	
7	1	198	Deposit associated with Structure A. Early in the sequence of activity in the area.	0	0	0	0	0	0	0	90	0	0	0	0	0	0	*90*	
7	1	233	Cut of ditch	0	0	0	600	0	0	156	0	0	0	0	0	0	0	*756*	
7		4613	Fill of curvilinear medieval feature 125	0	0	0	0	0	0	0	16	0	1	0	0	0	0	*17*	
7	1	4630	Fill of north-south aligned medieval linear 149, possibly a drainage ditch.	0	0	0	144	0	0	0	8	0	54	0	0	0	0	*206*	
7	1	4631	Fill of hearth 150 which was close to Structures A & B and may have been associated with them.	0	0	0	0	0	0	0	8	0	0	0	0	0	0	*8*	
7	1	4635	Fill of pit 157	0	0	82	0	0	0	0	2	14	0	0	0	0	0	*98*	
7	1	4740	Fill of hearth 231 which formed part of figure-of-eight kiln along with cut 4742.	0	0	0	0	0	0	0	2	0	0	0	0	0	0	*2*	
7	1	4748	Fill of medieval pit 239.	0	0	0	0	0	0	0	2	0	0	0	0	0	0	*2*	
																			2539
7	2	161	Structure B was defined by (F161), the remains of a positive feature south of Structure A..	0	0	0	178	0	0	0	0	0	0	0	0	0	0	*178*	
7	2	194	Cut of keyhole shaped grain drying kiln.	0	0	0	796	0	0	0	196	0	0	0	0	0	0	*992*	
7	2	210	Deposit of dark brown silty sand,	0	68	0	0	0	0	0	164	0	0	0	0	0	0	*232*	
7	2	279	Floor levelling deposit within Structure B. (F279) = (F278) = (F4833)	342	260	0	0	0	0	0	85	0	64	0	44	28	0	*823*	
7	2	1105	Fill of medieval ditch 160. (F1103) = (F1105)	0	724	0	0	0	0	0	8	0	0	0	0	58	178	*968*	
7	2	1111	Upper fill of medieval pit 1194.	0	0	0	0	0	0	0	10	0	0	0	0	0	0	*10*	
7	2	4620	Fill of north-northwest aligned medieval linear 139.	0	0	0	0	0	0	0	4	0	0	0	0	0	0	*4*	
7	2	5082	Fill of medieval pit 215.	0	0	0	0	0	0	0	12	0	0	0	0	0	0	*12*	
7 area 2		5084	Fill of medieval domestic waste pit 280.	0	244	0	114	0	0	0	74	0	0	0	0	0	0	*432*	
7	2	5827	Deposit partially sealing Structures A & B.	0	0	0	0	0	0	0	52	0	0	0	0	0	0	*52*	
																			3703
7	3	8	Deposit - Medieval., probably rake-out from hearth [F163] or kiln [F194] 3.25m to the north.	0	0	0	134	0	0	0	12	0	0	0	38	0	0	*184*	
7	3	151	Deposit - Ground levelling deposit between and associated with Structures A & B. Medieval	0	0	0	0	0	0	0	40	0	0	0	0	0	0	*40*	
7	3	1126	Fill of medieval linear 219, N/S aligned possible drainage ditch.	0	0	0	400	0	0	0	184	0	0	0	0	0	0	*584*	
7	3	4398	Fill of medieval stakehhole 009.	0	0	0	0	0	0	0	12	0	0	0	0	0	0	*12*	
7	3	5806	Fill of medieval ditch 218.	0	484	0	0	0	0	0	0	0	0	0	0	0	0	*484*	
																			1304

Cutting	Area	Context	Context description	SHC						Smelting slag	Indet. slag	Tuyère	Lining slag	FAS	Conc.	iron	Fired clay	Totals	
				Thick crust	Thin crust	Conv.	Undiff.	tongue	blister H									*Context*	*Area*
7	4	251	Fill of medieval pit 5800.	0	0	0	0	0	0	0	20	0	0	0	0	0	0	*20*	
7	4	274	Construction deposit associated with kiln	0	0	0	84	0	0	0	0	0	0	0	0	0	0	*84*	
7	4	1108	Fill of linear 250	0	0	0	0	0	0	0	134	4	0	0	0	4	0	*142*	
7	4	5086	Fill of medieval waste pit 220.	0	0	0	0	0	16	0	216	0	0	0	0	0	0	*232*	
7	4	5087	Fill of medieval waste pit 252.	0	0	0	0	0	0	0	0	18	0	0	0	0	0	*18*	
7	4	5089	Fill of medieval waste pit 277.	0	0	0	0	0	0	0	8	8	0	0	0	0	0	*16*	
7	4	5580	Fill of medieval north-south aligned linear 203, possibly a drainage ditch	0	0	0	130	0	6	0	44	0	0	0	0	0	0	*180*	
																			692
7	5	423	Cut of medieval waste pit.	0	306	0	0	0	0	0	48	0	0	0	0	0	0	*354*	
7 area 5		1130	Upper fill of medieval ditch 212/3280. (F1130) = (F3279)	0	0	784	258	0	0	0	0	0	0	0	0	0	0	*1042*	
7	5	1133	Fill of medieval pit 431.	42	0	0	0	0	0	0	0	0	0	0	0	0	0	*42*	
7	5	1134	Fill of medieval posthole 435.	0	0	0	0	0	0	0	42	0	0	0	0	0	0	*42*	
7	5	5594	Fill of medieval waste pit 434.	0	0	0	338	0	0	0	390	0	0	0	0	0	0	*728*	
																			2208
7	8	481	Fill of waste pit 5818. Medieval.	0	0	0	0	0	4	0	0	0	0	0	0	0	0	*4*	
																			4
7	9	1167	Fill of medieval posthole 659 - part of Structure C.	0	0	0	16	0	0	0	0	0	0	0	0	0	0	*16*	
																			16
7	10	630	Upper fill of keyhole shaped kiln 608/658. (F5113) = (F630) = (F657)	0	0	0	614	60	30	0	0	8	0	0	34	0	0	*746*	
7	10	5115	Fill of medieval pit 1000.	0	0	0	0	0	0	0	0	0	0	0	0	28	0	*28*	
																			774
7	13	753	Domestic waste deposit sealing features associated with Structure C. Similar to 1985.	0	0	0	54	0	0	0	0	0	0	0	0	0	0	*54*	
																			54
7	15	1985	a large accumulation of dumped domestic waste.	0	0	0	58	0	0	0	0	0	0	0	0	0	0	*58*	
7	15	2770	Fill of medieval ditch [F2769] = [F2790].	0	0	0	120	0	0	0	50	0	0	0	0	0	0	*170*	
7	15	2799	Fill of N/S aligned medieval ditch 3056.	0	0	0	48	0	0	0	0	0	0	0	0	0	0	*48*	
7	15	3152	Upper fill (1 of 10) of medieval pit/ well 3153.	0	0	356	144	0	0	0	0	0	0	0	0	0	0	*500*	
7	15	3155	Fill of east-west orientated medieval drainage ditch 3156.	0	0	0	0	0	0	0	36	0	0	0	0	0	0	*36*	

Cutting	Area	Context	Context description	SHC						Smelting slag	Indet. slag	Tuyère	Lining slag	FAS	Conc.	iron	Fired clay	Totals	
				Thick crust	Thin crust	Conv.	Undiff.	tongue	blister H									*Context*	*Area*
7	15	3165	One of 10 fills of medieval pit/well 3153.	0	0	0	182	0	0	0	0	0	116	0	0	0	0	*298*	
7	15	3166	One of 10 fills of medieval pit/well 3153	0	0	0	32	0	0	0	0	0	0	0	0	0	0	*32*	
7	15	3167	One of 10 fills of medieval pit/well 3153.	0	0	0	108	0	0	0	0	0	0	0	0	0	0	*108*	
7	15	3288	Fill of hearth 3397.	0	0	0	0	0	0	0	10	0	0	0	0	0	0	*10*	
																			1260
8	area1	1996	Cut of small medieval ditch.	0	0	0	0	0	0	0	0	0	0	1	0	0	0	*1*	
																			1
8	2	4593	Fill of cut 629. Medieval midden deposit.	0	0	306	0	0	0	0	0	0	0	0	0	0	0	*306*	
																			306
8	5	686	Possible medieval midden deposit.	0	0	0	388	0	0	0	0	0	0	0	0	0	0	*388*	
																			388
9	7	2143	Fill of medieval E/W orientated ditch 2113.	0	0	0	0	0	0	0	1	0	0	0	0	0	0	*1*	
																			1
9	8	2144	Fill of medieval well/pit 2166. 1 of 8 fills (2204, 2170, 2171, 2169, 2168, 2167, 2145, 2144)	0	0	0	2665	0	0	0	0	0	0	0	0	0	0	*2665*	
9	8	2145	Fill of medieval well/pit 2166. 1 of 8 fills (2204, 2170, 2171, 2169, 2168, 2167, 2145, 2144)	496	0	0	388	0	0	0	0	0	96	0	582	0	0	*1562*	
9	7	2170	Fill of medieval well/pit 2166. 1 of 8 fills (2204, 2170, 2171, 2169, 2168, 2167, 2145, 2144)	806	0	0	318	0	74	0	1486	0	0	0	0	0	0	*2684*	
																			6911
12	6	12	May have been a levelling deposit. Overlay the hollow way and all archaeological features	0	0	0	166	0	0	0	432	0	0	0	0	0	0	*598*	
																			598
			TOTAL	**6692**	**5256**	**1952**	**27284**	**464**	**2470**	**2374**	**14529**	**3831**	**767**	**1**	**1458**	**184**	**178**	***67440***	
			Total as percentage of assemblage	*10%*	*8%*	*3%*	*40%*	*1%*	*4%*	*4%*	*22%*	*6%*	*1%*	*0%*	*2%*	*0%*	*0%*		

Table 3: List of smithing hearth cakes (SHCs) for which the original weight could be estimated or measured, together with details of the context. Contexts of reasonably certain medieval age are in green tone (information after Prelim Report 2009), other contexts may also be medieval.

cutting	*area*	*context*	*context description*	*SHC weights*		
cutting 6a	area 2	4208	Upper fill of pit 4209.	716		
cutting 6a	area 3	3865	Fill of medieval oval shaped pit 3862.	1630		
cutting 6a	area 3	4031	Fill of medieval pit 4021.	314		
cutting 6a	area 4	3696	Fill of pit 3546.	1200		
cutting 6a	area 4	3991	Fill of medieval N/S aligned ditch 088	500		
cutting 6a	area 5	3566	Fill of large sub-rectangular pit 3570/3569.	978		
cutting 6a	area 5	3588	Fill of large square-shaped pit 3586.	208		
cutting 6a	area 5	4157	Fill of ditch 3198.	92		
cutting 6a	area 5	4221	Fill of ditch 3198.	202		
cutting 6	area 2	25	Deposit in late medieval boundary ditch	626		
cutting 6	area 2	85	Cut of pit dug into disused lime kiln 707 in cemetery area.	124		
cutting 6	area 2	5259	Fill of main chamber of limekiln 707 in cemetery area.	716		
cutting 6	area 3	440	Cut of medieval ditch to south of cemetery- possible boundary ditch	226		
cutting6	area 3	5381	Upper fill of ditch 5604 Medieval.	130	248	
cutting 6	area 5	5337	Fill of ditch 699 which truncated southern cemetery boundary ditch 693.	260		
cutting 6	area 5	5382	Fill of ditch 5604 . Medieval.	324		
cutting 6	area 5	1014/5392	Fill of ditch 5604 . Medieval.	392	548	148
cutting 7	area 2	194	Cut of keyhole shaped grain drying kiln.	796		
cutting 7	area 3	8	Deposit - Medieval.	100		
cutting 7	area 3	1126	Fill of medieval linear 219	312		
cutting 7	area 4	5580	Fill of medieval north-south aligned linear 203, possibly a drainage ditch	130		
cutting 7	area 5	1130	Upper fill of medieval ditch 212/3280. (F1130) = (F3279)	784		
cutting 7	area 15	3152	Upper fill (1 of 10) of medieval pit/ well 3153.	180	356	
cutting 7	area 15	3167	Fill of medieval pit/well 3153.	135		
cutting 8	area 2	4593	Fill of cut 629. Medieval midden deposit.	306		
cutting 8	area 5	686	Possible medieval midden deposit.	388		
cutting 9	area 8	2144	Fill of medieval well/pit 2166.	2665		
cutting 9	area 8	2145	Fill of medieval well/pit 2166.	272		
cutting 9	area 7	2170	Fill of medieval well/pit 2166.	318		

Table 4: Summary statistics for SHC weight, compared with those for assemblages from other relevant sites.

Site	Ballykillaboy	Gorteens	Garryleagh	Clonmacnoise	Coolamurry	Ardreigh	Gortnahown 2	Carrigoran	Parknahown 5	Blackchurch 48	Ballyellin 1	Ballykilmore 6
County	Kilkenny	Kilkenny	Cork	Offaly	Wexford	Kildare	Cork	Clare	Laois	Kildare	Wexford	Westmeath
Age	16th-17th	17th-18th	13th-14th	medieval	12th-13th	medieval	e-med	e-med	e-med	7th-9th	9th-10th	e-med/med
minimum	50	52	84	68	62	92	78	124	86	108	143	80
maximum	478	748	802	1457	2588	2665	3450	3866	2898	2450	1525	4033
% <500g	100%	93%	76%	79%	80%	69%	68%	72%	70%	53%	33%	52%
% <850g	100%	100%	100%	94%	93%	88%	87%	89%	79%	80%	67%	71%
% >1kg	0%	0%	0%	6%	5%	9%	8%	11%	16%	19%	24%	24%
% >3kg	0%	0%	0%	0%	0%	0%	2%	6%	0%	0%	0%	7%
mean	134	206	316	341	386	495	498	553	564	629	684	887
count	106	27	25	33	41	32	98	18	89	70	33	42
smelting?	no	no	no	no	no	trace	yes	yes	trace	no	no	yes
Ref.	Young 2010	Dabal & Young 2011	Young 2009f	Author's unpub. data	Young 2008a & in prep.		Young 2009e	Young 2006	Young 2009c	Young. & Kearns 2010a	Young. & Kearns 2010b	Young 2009b & in press

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