An Assessment of the ferrous and vitrified materials from excavations at HS2 Ladbroke 2020.

Introduction

A small assemblage of ferrous and vitrified materials (Table 1X) from excavations at Ladbroke were examined to assess the potential for further research. All finds were examined by hand in order to confirm field identification, material and artefact type. Where necessary samples were lightly cleaned using a soft brush and distilled water/alcohol to aid material and type identification. All samples were photographed prior to and after cleaning.

Where appropriate individual finds were examined microscopically to assist with identification of accreted remains and/or fabrication. Where material was ambiguous or hard to identify chemical analysis was undertaken to confirm material type.

Context

The assemblage comprised two finds of vitrified material and two ferrous objects. The ferrous objects came from Trenches 11 and 12 (1101 and 1201) and the vitrified material come from Trenches 16 and 46 (1616; 4623) Context descriptions are included in Table1X.

The assemblage

The assemblage comprised a total of 22 objects recovered from 4 contexts across 2 trenches (1 and 4). The assemblage was made up of two classes of material, ferrous metal and vitrified material identified in the field as slag.

Table 1X presents the members of the assemblage along with measurements and weights.

Object	Context	Mass (g)	Comments	Image (Scale 100mm)

Ferrous fragment	**C1201 md_1** A dark greyish brown silty clay topsoil with occasional stone inclusions	57.2	90x24x4mm A ferrous fragment with a possible head of a fitting intact cemented in corrosion products	
Vitrified material	**C1616** A mid brown green silty clay with occasional stone inclusions and rare flecks of charcoal. Fill of pit [1615] and represents disuse in the form of natural silting.	30.5	Six piece of vitrified material ranging in size from 20mm-60mm.	
S shaped bar	**C1101 MD_OZ** A dark greyish brown silty clay topsoil with occasional stone inclusions	184.1	A circular bar 270mm in length and ∅9mm. The bar is bent in to a 'S' form.	
Vitrified material	**C4623** A fine textured primary fil of Pit [4622l, comprised of dark grey brown silty clay. Formed through weathering of the sides.	483	14 pieces of vitrified material ranging in size from 10-120mm. Presence of ceramic inclusions noted.	

Table 1X The metals and vitrified materials assemblage from Labroke

Ferrous fragment C1201 57.2g 90x24x4mm

A curved fragment of iron with what appears to be the head of a fitting preserved in corrosion products. The fragment is corroded but heavily magnetic indicating that it contains remnant metallic phases. The fragment has a curved profile suggestive of a horseshow fragment.

Figure 1Ferrous fragment from C 1201

Six fragments of vitrified material C1616 30g 20-60mm

Six fragments of vitrified material ranging in size from 20-60mm. Each fragment exhibits fracture surfaces indicating that they are derived from large fragments. Where surfaces are original they show a vesicular texture indicative of high temperature vitrification. Within the bloated porous mass there are inclusions of unvitrified coarsely tempered oxidised ceramic.

Figure 2 Six fragments of vitrified material

'S' shaped bar C1101 184g 270 x ∅9mm

A 270mm length of iron bar with a circular 9mm diameter cross-section. The bar has been bent to for a contorted ‘S’ shape. On terminal is bent at a more acute angle than the other giving the impression that it may have functioned as a hook.

The bar is heavily corroded. It is highly magnetic indicating that it contains remnant metallic phases.

Figure 3 'S' shaped ferrous bar from C1101

Fourteen fragments of vitrified material C4623 483g 10-120mm

Fourteen fragments of vitrified material ranging in size from 10-120mm. Each fragment exhibits fracture surfaces indicating that they are derived from larger fragments. Where surfaces are original they show a vesicular texture indicative of high temperature vitrification. Within the bloated porous mass there are inclusions of unvitrified coarsely tempered oxidised ceramic (Figure 5).

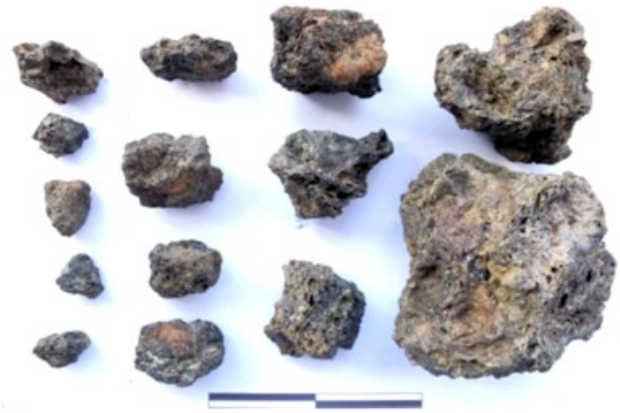

Figure 4 Fourteen fragments of Vitrified material

Figure 5 Close up of a fragment of vitrified material showing inclusions of oxidised ceramic.

Discussion

The two ferrous objects, 'S' bar and fragment, are both suggestive of specific artefact types yet cannot be identified with certainty. The ferrous fragment is suggestive of a horse-shoe yet the proud nature of the in-situ fitting would suggest otherwise. Dating should provide further insight in to the artefact type as ferrous horse shoes as not known until the end of the 1st millennium AD. The 'S' shaped bar appears to resemble a hook and the asymmetric returns seem to support this identification.

Two contexts produced vitrified material C 1616 and C4623. The material was very similar from both contexts suggesting that the material was derived from the same process. The material is formed from the vitrification of a coarsely tempered ceramic. Parent ceramic remains visible as inclusions in the mass of the material. Above 1000^{o}C ceramics begin to melt and vitrify forming porous, low-density masses that upon solidification resemble metallurgical slags. Unlike metallurgical slags which are dense, resistant, and dark grey to black, vitrified ceramic is friable and lighter in density and colour.

Vitrified ceramic is formed at temperatures higher than what are normally encountered in a domestic hearth and can be considered to be indicative of processes involving extreme heat. Burning of wattle and daub structures can give rise to vitrified ceramic but it would usually be accompanied by burnt and baked daub giving rise to a conflagration event assemblage (Dungworth and Paynter 2015, 57). Like burnt or baked daub, vitrified ceramic can also preserve the impressions of wattle providing a means to positively identify vitrified ceramic in some instances. Ceramic kilns can also produce vitrified ceramic in moderate quantities as can iron smithing and smelting. However, for iron metallurgy vitrified ceramic is usually accompanied with assemblages of smithing or smelting slag. In bringing these considerations to bear on the Ladbroke vitrified ceramic it is difficult to identify the specific process responsible for the material although a high temperature process such as used in kiln-based ceramic production remains a possibility. No wattle impressions were noted in any sample and no metallurgical slags were recovered from the site.

Conclusion

The assemblage includes two classes of material, ferrous objects and vitrified ceramic. None of the materials are particularly diagnostic. The ferrous objects are difficult to identify and offer no insight in to date.

The vitrified ceramic indicates that high temperature processes took place on or in the vicinity of the site. What specific process this was cannot be determined solely by examination of the material. While it is clearly not related to metallurgy the possibility of ceramic production or a domestic burning events remain.

The significance of the vitrified ceramic would be better considered in light of reviewing the wider site assemblage for materials related to burning i.e burnt ceramic and reviewing context records and geophysics results for evidence of burning.

References

Dungworth and Paynter 2015 *Archaeometallurgy Guidelines for Best Practice*. Historic England Accessed 21 April 2020 https://historicengland.org.uk/images-books/publications/archaeometallurgy-guidelines-best-practice/heag003-archaeometallurgy-guidelines/