

# Hinckley Road, Sapcote, 

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# Hinckley Road, Sapcote, Leicestershire 

## Archaeological Excavation Report

Written by Lawrence Billington

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## Summary

Between January and June of 2019 Oxford Archaeology carried out archaeological excavations to the south of Hinckley Road in Sapcote, Leicestershire (SP 4830 9343). Three separate excavation areas were investigated, covering a total of 1.7ha.

Evidence for prehistoric activity was restricted to a small quantity of residual flintwork and a single pit associated with Late Bronze Age/Early Iron Age pottery. Most of the features revealed by the excavations related to RomanoBritish activity, with a set of conjoined rectangular enclosures representing a long-lived, relatively low-status Romano-British farmstead. Although no structural remains were found, a small ditched enclosure may have represented a building compound, and the enclosures were associated with a number of discrete pits, including a large well. The finds assemblages from the enclosure ditches and associated features were relatively modest but included over 300 sherds of Roman pottery dating from the mid-1st century to 4th century AD. The fills of several pits within and around the enclosures produced evidence for crop processing and metalworking (smithing), as well as assemblages of fired clay and reused ceramic building material probably representing the remains of ovens. The most notable individual find was a large fragment of quern stone bearing unusual grooved decoration, recovered from one of the enclosure ditches. Activity at the site seems to have ended in the 4th century, and later activity is represented by a single pit associated with a small quantity of Anglo-Saxon pottery and the remains of extensive medieval to post-medieval ridge and furrow.

The Roman activity recorded at Hinckley Road represents an important addition to the corpus of excavated Roman rural settlements in this part of Leicestershire and is also significant in terms of its proximity to a major, but poorly understood, villa complex located a little over 1 km to the east at Calver Hill.

## Acknowledgements

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The project was managed for Oxford Archaeology by John Boothroyd (fieldwork) and Tom Philips (post-excavation). The fieldwork was directed by Tom Black, Diana Chard and Berna Rzadek, who were supported by Chris Clark, Tom Lawrence, Belle Neilson, David Pinches, Dan Pond, Adam Rapiejko, Jacob Spriggs, Jack Traill, Bj Ware and Katie Webster. Thanks are also extended to the teams of OA staff that cleaned and packaged the finds under the supervision of Leigh Allen, processed the environmental remains under the supervision of Rebecca Nicholson and prepared the archive under the supervision of Nicky Scott.

## 1 INTRODUCTION

### 1.1 Scope of work

1.1.1 Oxford Archaeology (OA) was commissioned by RPS on behalf of Miller Homes to undertake an excavation on land off Hinckley Road, Sapcote, Leicestershire (Fig. 1; NGR SP 4830 9343).
1.1.2 The work was undertaken as a condition of Planning Permission (planning ref. 17/0247/OUT). The Local Authority's requirements for work were established during discussion between Alexandra Thornton, RPS, and Richard Clark, Principal Planning Archaeologist for Leicestershire County Council. A written scheme of investigation (WSI) was produced by RPS (CgMs 2018) detailing the agreed scope of works, supplemented by a separate Method Statement produced by OA (Boothroyd 2019), setting out the methods by which OA proposed to meet the requirements of the Local Authority.
1.1.3 The excavation was preceded by a geophysical survey (MOLA 2016). The results of the survey were obscured by widespread magnetic debris from green waste imported onto the site and although the survey indicated that the remains of ridge and furrow occurred across the development area no other features were identified. Following this, a programme of trial trenching was carried out by OA in May-June 2017 (Chard and Boothroyd 2017), which identified a single Late Bronze Age/Early Iron Age feature and a series of ditches dated to the Late Iron Age to Roman periods. The work reported here was carried out between January and June of 2019, and entailed the excavation of three areas ( $\mathrm{A}, \mathrm{B} \& \mathrm{C}$ ) covering a total area of 1.7ha.
1.1.4 The site archive is currently held by OA and will be deposited with Leicestershire Museums under the accession code X.A7.2019 in due course.

### 1.2 Location, topography and geology

1.2.1 The site lies on the western edge of the village of Sapcote, Leicestershire.
1.2.2 The area of proposed development was within a single arable field which measures approximately 7.2 ha of which 4 ha was proposed for development. The site lies to the south of Hinckley Road and is bounded to the east and west by residential properties and agricultural land to the south.
1.2.3 The site lies at approximately 90 m OD, on a gentle north facing slope which runs down to a minor west to east running watercourse some 200 m beyond the northern limits of excavation. The geology of the area is mapped as the Mercia Mudstone Group, a sedimentary bedrock formed approximately 200 to 251 million years ago in the Triassic Period. Superficial deposits of Wolston Sand and Gravel are recorded as overlying the mudstone geology across the majority of the site. Along the northern edge of the site, however, deposits of diamicton (glacial till) belonging to the Thussington Member overlie the mudstone (British Geological Survey Online Viewer).

### 1.3 Archaeological and historical background

1.3.1 The archaeological and historical background of the site has been described in detail in an archaeological desk-based assessment (CgMs 2016), and is summarised below, with the location of selected Leicestershire Historic Environment Records plotted on Figure 2.

## Prehistoric

1.3.2 No evidence of prehistoric activity had been recorded within the development area itself prior to the 2017 evaluation (see below). A single Palaeolithic flint tool was recovered from Sapcote gravel pit approximately 460 m to the north of the site (MLE6043). A large assemblage of Bronze Age flintwork has been recovered some 200m to the west of the site (MLE287), whilst a side looped Middle Bronze Age spearhead was found some 500 m north of the site in 2003 (MLE 9899). A single sherd of Iron Age or Roman pottery was recovered from 39 Church Street, Sapcote, 300m east of the site (MLE10197).

## Roman

1.3.3 No evidence of Roman activity had previously been recorded within the development area itself.
1.3.4 A possible Roman inhumation cemetery consisting of between six and ten inhumations is recorded at Sapcote gravel pit, c. 400 m to the north of the site (MLE284). Several Roman coins have been recovered within 900 m to the south of the site (MLE9897; MLE9898). Finds of this date have also been made within the historic core of Sapcote, to the east of the site, with a small amount of residual Roman pottery and tile recovered during archaeological recording off Leicester Road (MLE16205) and sherds of pottery from Park House Farm (MLE8512).
1.3.5 More significantly, on the eastern side of Sapcote, just over 1 km east of the site and 700 m to the west of the course of the Fosse Way Roman Road, is the site of Sapcote (or Calver Hill) Roman Villa (MLE283). The presence of an important Roman site here has been known since the early 19th century, and although much has been destroyed by extensive stone quarrying in the area, observations and small-scale fieldwork undertaken in the 1930s and 1970s suggest this was the site of a high-status building complex.

## Anglo-Saxon

1.3.6 Sapcote is recorded in Domesday Book (1086) as Scepecote, or Sapecote, an Old English name meaning 'the sheep shelters' (Ekwall 1951, 404), in the Hundred of Guthlaxton. The settlement is recorded as having a population of 15.5 households.
1.3.7 Saxo-Norman linear ditches were excavated during an evaluation in 2011 c. 670 m to the northeast of the site (MLE20120). A single sherd of Stamford ware pottery was recovered during the works. A gold and garnet pendant, and a copper-alloy object of 7th-century date have been recovered within the vicinity of the site. The precise
locations of the find spots are unknown, but the nature of the objects may indicate high-status Saxon activity in the area.

## Medieval

1.3.8 Approximately 60 m northeast of the site is Sapcote Castle (MLE279), a motte and bailey fortification, one of three castles in southwest Leicestershire constructed immediately following the Norman Conquest.
1.3.9 A late medieval enclosure is located immediately to the east of the site (MLE282), and a second, moated, enclosure is located c. 40 m to the northeast (MLE280). The earthwork ditch which forms the eastern boundary of the site marks the western edge of the late medieval enclosure. The parish church, dating from the 14th century, is located $c 240 \mathrm{~m}$ to east of site within the historic core of the village.
1.3.10 Find spots of medieval or post-medieval coins, an ampulla and a harness fitting have been recovered within the vicinity of the site (not mapped on Fig. 2).

## Post-medieval and modern

1.3.11 The enclosure map, dating from 1778 , shows the development area within two fields, a smaller field adjacent to Hinckley Road and a larger field to the south. The boundary between the two fields is shown to consist of trees on the 1887 Ordnance Survey map. Three footpaths and a pond are also shown on the map (see CgMs 2016).
1.3.12 The boundary between the two fields was removed between 1993 and 1998, creating the current arrangement of fields.

## Previous work

1.3.13 A trial trench evaluation was carried out in 2013 in the adjacent field to the west of the site (Fig. 2). No archaeological features, except medieval furrows, were identified during the works (Upson-Smith and Muldowney 2013).
1.3.14 A geophysical survey of the development area was carried out in 2016. The results of the survey were compromised by the presence of widespread magnetic debris resulting from recent manuring of the site, and although the survey was able to demonstrate the extensive remains of ridge and furrow across the site no other features were identified (MOLA 2016).
1.3.15 The trial trenching which preceded the excavations reported here entailed the excavation of 28 trenches across the development site (see Fig. 1; Chard and Boothroyd 2017). This identified a single Late Bronze Age/Early Iron Age feature (interpreted as a ditch) in the southeastern part of the site, and a series of ditches dated to the Late Iron Age to Roman periods in the central part of the site.
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## 2 Excavation Aims and Methodology

### 2.1 Aims and objectives

2.1.1 The project's original aims and objectives, as set out in the WSI (CgMs 2018, 6-7) were as follows:
i. to determine the location, extent, date, character, condition, significance and quality of any archaeological remains within the excavation areas;
ii. to determine the extent, character, function, and significance of the Late Bronze Age / Early Iron Age ditch identified in the previous phase of work;
iii. to determine the extent, character, function, and significance of the Late Iron Age / Roman field system identified in the previous phase of work;
iv. to assess the Bronze Age / Early Iron Age and Late Iron Age / Roman activity in line with the relevant regional research agendas/objectives (Knight et al. 2012)
v. to record in detail all archaeological remains encountered;
vi. to consider the site within its local, regional, and national context as appropriate;
vii. to deposit the site archive with an appropriate museum;
viii. to provide information for the local HER to ensure the long-term survival of the excavated data.

### 2.2 Fieldwork methodology

2.2.1 The methodology used followed that detailed in the written scheme of investigation (Boothroyd 2019).
2.2.2 Machine excavation was carried out by a $360^{\circ}$ type excavator using a 2 m wide flatbladed ditching bucket under constant supervision by a suitably qualified and experienced archaeologist.
2.2.3 Spoil, exposed surfaces and features were scanned with a metal detector. All metaldetected and hand-collected finds were retained for inspection, other than those which were obviously modern.
2.2.4 All archaeological features and deposits were recorded using OA's pro-forma sheets. All plans and sections were recorded at appropriate scales and colour and monochrome photographs were taken of all relevant features and deposits.
2.2.5 Bulk environmental samples were taken from contexts deemed likely to preserve ecofactual remains in order to gain data that could aid with the interpretation of past land use.
2.2.6 All archaeological features were planned (pre-excavation) using a Leica GS08 GPS.

## 3 Results

### 3.1 Introduction and presentation of results

3.1.1 The results of the excavation are presented below, organised by Period and Area, and include a stratigraphic description of the archaeological remains. Details of all contexts are included in Appendix $A$, with finds and environmental reports presented in Appendices $B$ and $C$ respectively. Overall base plans of all features and deposits in each of the three excavation areas ( $\mathrm{A}, \mathrm{B}$ and C ) are provided in Figs 3, 4 and 5. An overall phased plan of all three areas showing features belonging to Period 1,2 and 3 is provided by Fig. 6, with fully detailed phased plans for each area are provided by Figs 7-15. Selected section drawings are presented in Figs 15 and 16, whilst selected photographs are reproduced in Plates 1-13.
3.1.2 Throughout the text cut numbers appear in bold. Where multiple interventions have been excavated through a single feature, the feature is referred to by the lowest cut number, which has been emphasised on the relevant plans. Where appropriate features have been grouped together (e.g. Enclosures 1-3). Context numbers allocated to features and deposits during the evaluation phase have been prefixed with ' $E$ ' throughout the text and graphics of this report to distinguish them from those of the excavation phase.

## Site phasing

3.1.3 Phasing of the site was based on a combination of the analysis of dateable material recovered from features (mostly pottery) and of stratigraphic and spatial relationships. Although a small proportion of features remain unphased, the preference has been to include features into defined phases - with uncertainties highlighted in the text where appropriate. Many of the excavated features produced few finds and in the case of the main, Roman, phase of activity pottery recovered from features could only be broadly dated and/or included material with a wide date range. In light of this, a simple phasing structure has been adopted, with the Romano-British period activity tentatively divided into two broad sub-periods, as discussed in more detail below.
3.1.4 This period-based phasing for the site is as follows:

- Period 1: Late Bronze Age/Early Iron Age (c. 1200-350 BC)
- Period 2: Romano British (AD 43-410)
- Period 2.1 Early Romano-British (c. AD 43-150)
- Period 2.1 Early to Late Romano-British (c. AD 100-410)
- Period 3: Anglo-Saxon
- Period 4: Medieval to early modern
- Undated


## General soils and ground conditions

3.1.5 The natural geology, typically a light yellowish brown silty sand with frequent gravel clasts, was overlain by a mid yellowish brown subsoil up to 0.3 m thick, which in turn was overlain by topsoil with an average thickness of 0.35 m .
3.1.6 Ground conditions throughout the excavation were generally good, and the site remained largely dry. Archaeological features, where present, were easy to identify against the underlying natural geology.

### 3.2 Natural features

3.2.1 Features of natural origin were very widespread across all three excavation areas (Figs 3-5) and a large proportion were test excavated - although only one feature, tree throw 1026, in Area A was formally recorded (Fig. 3). These features generally took the form of discrete sub-circular/oval-shaped hollows, most of which were under 2 m across and 0.2 m deep, but which included some large features. Some of the smaller features represented tree throws, but many, including the larger examples, seem likely to have been formed as a result of periglacial processes and essentially represent shallow hollows filled by sterile silty deposits. No finds of any kind were found during the investigation of any of these natural features.

### 3.3 Period 1: Late Bronze Age/Early Iron Age (c. 1200-350 BC)

## Area B (Figs 6 and 7)

3.3.1 The only feature belonging to this period was located in the southern part of Area B and was first exposed during the evaluation in Trench 27 where it was recorded as a possible east to west aligned ditch (E2704), 1.5 m wide and up to 0.4 m deep. Excavation during the evaluation produced three base sherds ( 36 g ) from a Late Bronze Age or Early Iron Age pottery vessel and a small quantity of animal bone (not identifiable to species), with sampling yielding two cereal grains and a knotgrass seed (Chard and Boothroyd 2017).
3.3.2 The feature was subsequently fully exposed during the excavation, which revealed that, rather than a ditch, this feature was actually a relatively large oval-shaped pit (3040), measuring $2.9 \mathrm{~m} \times 1.3 \mathrm{~m}$ and up to 0.42 m deep, with moderately steeply sloping sides and a concave base (S. 3016, Fig. 16; Plate 1). It contained a lower fill of midgreyish blue silty clay (3041) and an upper fill of mid greyish orange silty clay (3042). Despite total excavation of its fills, no further pottery or bone was recovered, with finds limited to two unretouched flint flakes.
3.3.3 The only other traces of prehistoric activity revealed during the excavation took the form of a very small quantity of residual worked flint ( 15 pieces) recovered from later features and deposits and whilst some of this may be contemporary with the LBA/EIA activity represented by pit 3040, much of this appears to attest to earlier, Mesolithic/Early Neolithic to Early Bronze Age, activity (see Donnelly, App. B.2).

### 3.4 Period 2.1: Early Romano-British (c. AD 43-150)

## Introduction

3.4.1 The vast majority of archaeological features encountered during the excavations can be attributed very broadly to the Romano-British period (Period 2). As noted above (Section 1.3), sub-dividing this period into coherent, well-dated, phases proved challenging, with many features producing relatively undiagnostic coarse ware Romano-British pottery. The majority of the Romano-British features, consisting of a major group of rectilinear enclosures and associated discrete features in Area C have been attributed to Period 2.2 (see below), with a smaller number of features attributed to Period 2.1 on the basis of their spatial and stratigraphic relationship to these later features.
3.4.2 These Period 2.1 features consisted largely of a series of north-northeast to south-southwest/west-northwest to east-southeast aligned ditches, laid out on a slightly different alignment to those of Period 2.2, and exposed across all three excavation areas (Fig. 6). Very few dateable finds were recovered from these features, but in Area C they were consistently stratigraphically earlier than the rectilinear enclosure system of Period 2.2, and appear to relate to an earlier, more extensive system of ditched boundaries. In Areas $A$ and $B$ these ditches cut a number of other east to west aligned ditches which, whilst essentially undated, have also been attributed to this sub-period.

Area A (Fig. 8)
3.4.3 Area A was dominated by a large L-shaped ditch (1003) laid out on the north-northeast to south-southwest/west-northwest to east-southeast alignment shared by the Period 2.1 features in Area B and C. Two earlier, differently aligned ditches (1004 and 1015) were, however, cut by this ditch and are also discussed here. It should be emphasised that no pottery at all was recovered from any of these features, and their dating rests solely on the shared alignment of ditch $\mathbf{1 0 0 3}$ with those exposed in the more southerly excavation areas.
3.4.4 Ditch $\mathbf{1 0 0 4}(\mathbf{1 0 0 4}, \mathbf{1 0 2 4})$ was a northeast to southwest aligned linear feature which extended from the northeastern corner of the area. A 10 m length of the ditch was exposed, and although it was cut by ditch $\mathbf{1 0 0 3}$ at its southeastern end, it appeared to be terminating at this point. This feature was up to 1 m wide, 0.4 m deep and was filled by a light to mid brownish grey silty sand from which no finds were recovered.
3.4.5 To the south of ditch 1004, an east to west aligned ditch, 1015 ( $\mathbf{1 0 1 5}, \mathbf{1 0 2 8}, \mathbf{1 0 4 5 )}$, was also cut by ditch 1003. This feature extended across the full width of Area A (>32m) and was up to 0.9 m wide and 0.4 m deep. Where investigated, it contained up to two fills, none of which produced any finds.
3.4.6 L-shaped ditch $\mathbf{1 0 0 3}(\mathbf{1 0 0 3}, \mathbf{1 0 1 8}, \mathbf{1 0 2 1})$ was a more substantial feature than these two earlier ditches. Measuring up to 2.5 m wide and 1 m deep, it had steeply sloping sides and a concave base and along its north-northeast to south-southwest aligned section contained two fills of grey to brown silty sands (S. 1002, Fig. 16; Plate 2). A more complex fill sequence was recorded at the corner of the ditch to the north (1003), with
a series of eight naturally accumulated deposits infilling the ditch, from which a small quantity of residual worked flint was recovered.

## Area B (Fig. 9)

3.4.7 In Area B, the most southerly of the excavation areas, a similar sequence of ditches to those in Area A was encountered. Two lengths of north-northeast to south-southwest ditch on a comparable alignment to the Period 2.1 features in Area C were exposed ( $\mathbf{3 0 6 0}$ and 3081), one of which cut one of four less substantial east to west aligned ditches (3085, 3025, 3029 and 3031).
3.4.8 The stratigraphically earliest feature in Area B was ditch 3085 (3072, 3085, 3087), an east to west aligned feature cut by ditch $\mathbf{3 0 6 0}$ This feature measured 1.2 m wide but was very shallow, up to 0.1 m deep and containing a dark brown grey clay silt from which no finds were recovered.
3.4.9 To the south, two short and heavily truncated parallel east to west aligned linear features were exposed ( 3029 and 3031). These were also very shallow, neither deeper than 0.1 m and were filled by similar deposits of reddish brown silty clay. The fill of 3029 (3030) contained a single small sherd of pottery (3g) dating to AD 70-200.
3.4.10 Some four metres to the south a further east to west aligned ditch was exposed, extending from the eastern edge of excavation (3025); its northern extent was masked by Period 4 furrow 3023. This feature measured 0.6 m wide and 0.16 m deep and produced no finds.
3.4.11 North-northeast to south-southwest aligned ditch $\mathbf{3 0 6 0}(\mathbf{3 0 6 0}, \mathbf{3 0 7 6}, \mathbf{3 0 9 4})$ extended from beyond the northern limit of the area for a distance of 34 m before ending in a regular rounded terminus, cutting across ditch 3085, and cut in turn by Period 2.2 pit 3049. Measuring up to 1.6 m wide and 0.75 m deep, in one of the excavated sections (3060) there was evidence for two episodes of partial recutting (recuts 3063 and 3066; S.3022, Fig. 16). Filled by mid blue to brownish grey sandy silts and clays this feature produced no finds.
3.4.12 To the south, the alignment of ditch $\mathbf{3 0 6 0}$ was continued by ditch $\mathbf{3 0 8 1}$. Although its northern end was obscured by furrow $\mathbf{3 0 2 3}$ (Period 4) it seems to have terminated close to the southern end of $\mathbf{3 0 6 0}$, and extended southwards for some 14 m before terminating close to Period 1 pit $\mathbf{3 0 4 0}$. Measuring up to 1.5 m wide and 0.7 m deep and containing two clayey sand fills, no finds were recovered from this feature and a sample taken from its basal fill yielded sparse charcoal and a single fragment of charred legume seed (Sample 3016).

Area C (Fig. 10)
3.4.13 Features attributed to Period 2.1 in Area C were dominated by a series of ditches delineating a major north-northeast to south-southwest aligned boundary which was exposed (discontinuously) across most of the length of the excavation area, a distance of some 130 m ( $\mathbf{1 0 4 1}, \mathbf{1 0 3 7}, \mathbf{2 3 0 7}, \mathbf{2 1 3 0}$ ). Several ditches arranged parallel or perpendicular to this ditch line seem to represent part of the same system (2303, 2299, 2234) and may have defined a series of rectilinear enclosures/paddocks.
3.4.14 In the northern part of the area, the major north-northeast to south-southwest aligned boundary appears to have been defined by two short linear 'ditch segments' 1041 and 1037/1054 (the latter recorded during the evaluation in Trench 5 as E506). Ditch 1041 was a substantial feature, extending some 10 m from the northern edge of excavation and measuring up to 2.4 m wide and 0.6 m deep, and had a basal fill of light reddish grey sandy silt overlain by an upper fill of mid brownish red sandy clay. Despite extensive excavation of this feature, no finds were recovered. Ditch 1037/1054 also failed to produce any finds aside from a single fragment (51g) of non-diagnostic ceramic building material. This short linear feature measured 5.5 m long and up to 1.3 m wide and 0.54 m deep and appeared to have infilled naturally with a sequence of grey to brown silty sands and clays.
3.4.15 Immediately to the south of ditch 1037 was a substantial pit (1031), which, due to its comparable dimensions to ditch 'segments' 1041 and 1037, is thought likely to have been related to the discontinuous boundary represented by these features and ditch 2307 to the south. Sub-circular in plan, with a U-shaped profile, this feature was filled by a sequence of five deposits of clayey sands and sandy silts, all of which seem to represent natural silting, and none of which produced finds.
3.4.16 Some six metres south of pit 1031, was the northern terminus of north-northeast to south-southwest aligned ditch 2307 (2307, 2329, 2332), which was traced for a distance of 48 m to the south, where it was cut, and continued, by L-shaped ditch 2130. This was a relatively substantial feature, measuring between 1.9 and 2.5 m wide and up to 0.8 m deep, with steeply sloping sides and a slightly concave or flat base (Section 2073, Fig. 16; Plate 3). Where excavated, this feature was filled by two or three deposits of silty or sandy clay, representing natural infilling. The only find recovered was a single sherd of pottery (11g) dating to between AD 70-200 from the basal fill (2330) of intervention 2329.
3.4.17 As noted above, ditch 2307 was continued and cut by the north-northeast to southsouthwest aligned section of an L-shaped ditch, 2130 (2130, 2160, 2181, 2193, 2291, 2301, 2305; Section 2073, Fig. 16; Plate 3) which continued this major boundary alignment to the south and, at its northern end, extended to the east on a southsouthwest to north-northeast alignment. This feature varied somewhat in size and was more substantial along its southern part, measuring between 0.54 m wide and 0.22 m deep (intervention 2301) and 2.34 m wide and 0.64 m deep (intervention 2193). Some of the narrower and shallower parts of the ditch contained a single fill but in the more substantial sections up to three fills were recorded; invariably orangey or greyish brown sandy silts. Very few finds were recovered: a fragment of ceramic tile from the lower fill (2182) of intervention 2181 and two small sherds (3g) of grog-tempered 1st century AD pottery from a secondary fill (2195) of intervention 2193, whilst a single sherd (19g) of pottery dated to c. AD 150-200 was collected from the surface of this feature close to intervention 2160.
3.4.18 The south-southwest to north-northeast aligned length of ditch 2130 appeared to be continued, following a break of 10 m , by a 15 m long length of ditch (2303) on the same alignment which extended to close to the eastern edge of the excavation. This feature had similar dimensions to that of the northern part of ditch 2130: up to 0.56 m wide
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and 0.26 m deep with moderately steeply sloping sides and a concave base. It was filled by a mid greyish brown silty sand which produced no finds.
3.4.19 To the west of the northern end of ditch $\mathbf{2 1 3 0}$ two further ditches ( $\mathbf{2 2 3 4}$ and $\mathbf{2 2 9 9}$ ) were likely to be associated with this major boundary; they shared the same alignment as 2130 and were stratigraphically earlier than features making up the Period 2.2 rectilinear enclosures. Ditch $2234(2234,2297)$ was aligned parallel to ditch 2307 and the southern part of ditch 2130 and was up to 0.7 m wide and 0.5 m deep with a Ushaped profile. Filled by a single greyish orange to greyish brown sandy clay, this feature produced no finds.
3.4.20 Ditch 2299 was laid out perpendicular to ditch 2234. Given its modest depth, it may once have continued westwards to meet ditch 2130, having been truncated. This feature measured up to 0.5 m wide and 0.16 m deep and was filled by a dark greyish brown clay sand from which no finds were recovered.

### 3.5 Period 2.2 Early to Late Romano-British (c. AD 100-410)

## Introduction

3.5.1 The vast majority of the archaeological features exposed in the largest excavation area (Area C) have been attributed to Period 2.2, whilst several pits in Area B (one of which clearly postdates the linear features in this Area described above) have also been assigned to the broad phase of the site's use (see Fig. 6). In Area C these remains took the form of a system of rectilinear enclosures laid out across the central and southern part of the area (Enclosures 1-3), associated with a series of discrete features.
3.5.2 The pottery recovered from features attributed to this period is dominated by material dating broadly to the later 1st and 2nd centuries, and although several features did produce later, 3rd and 4th century material, it seems that much of the activity can be attributed to the earlier part of the Roman period.

Area B (Fig. 11)
3.5.3 Three features, pits 3049, $\mathbf{3 0 5 8}$ and 3082, in Area $B$ have been attributed to this period. In the case of pits of $\mathbf{3 0 5 8}$ and $\mathbf{3 0 8 2}$ this is very tentative as neither demonstrably postdated the Period 2.1 ditches exposed in this area, but large pit/watering hole 3049 was clearly superimposed on the junction of two of these earlier ditches ( 3085 and 3060).
3.5.4 Pit $\mathbf{3 0 4 9}$ ( $\mathbf{3 0 4 9}, \mathbf{3 0 7 4}, \mathbf{3 0 7 8}, \mathbf{3 0 8 9})$ was a somewhat irregular oval shape in plan, measuring 6.7 m by 4.3 m . Its sequence was most fully investigated via a 1 m wide intervention excavated across the full width of the feature (3049; S. 3020, Fig. 17). Here, the pit was up to 1.22 m deep, the upper part of its profile was moderately sloping with a marked step on its northern side, and a narrow bowl-shaped base. Its basal fill was a light yellowish orange sandy silt (3050), representing material eroded from the sides of the feature as it weathered - this produced a single small sherd of pottery (1g) dating to c. AD 70-200. This was overlain by a series of mid brown/grey silty sands which appeared to represent more gradual episodes of silting (3051-3054). Small quantities of animal bone (nine fragments of large mammal bone, including a single cattle tooth) and ceramic building material ( 78 g ) were recovered from these
deposits, and the uppermost fill (3054) contained a large sherd of pottery ( 45 g ) dated to the 3rd or 4th century AD.
3.5.5 In the southern part of the area were a pair of substantial pits, $\mathbf{3 0 5 8}$ and 3082. Pit $\mathbf{3 0 5 8}$ was oval in plan, 2.3 m long and 0.9 m wide, and was up to 0.9 m deep, with steeply sloping sides and a flat base. It was filled by three deposits of greyish to yellowish brown clay sands, the uppermost of which (3059) produced degraded fragments of shale $(20 \mathrm{~g})$ and two indeterminate cereal grains from a bulk sample (Sample 3012).
3.5.6 Just to the north, pit $\mathbf{3 0 8 2}$ was similar in morphology: oval in plan measuring 3 m long, 1.8 m wide and up to 0.9 m deep with steeply sloping sides and a flat base. Its fills of greyish or yellowish clay sands were also comparable to those of pit 3058 and its upper fill (3099) produced three fragments of fired clay belonging to a triangular brick (see App. B.3) and a single small sherd of pottery ( 2 g ) - dated to the late 1st or 2nd century AD - whilst sampling produced a single charred wheat grain (Sample 3013).

## Area C (Fig. 12)

## Summary

3.5.7 As noted above, the majority of the features in Area C have been attributed to Period 2.2, and are dominated by a series of rectilinear enclosures laid out on a slightly different alignment to those of Period 2.1, closer to north-south/east-west than the earlier features. This enclosure system was only partly exposed within the excavation area, and three major enclosures (Enclosures 1-3; see Figs 6 and 12) have been identified here, each associated with various internal features and ditched subdivisions. Further ditches to the west of these may represent parts of further enclosures but their precise layout is unclear. The separation of the various ditched boundaries in this way is essentially a heuristic device, facilitating description and presentation of the various features; further consideration of the layout and sequence of the enclosure system can be found in the Discussion (Section 4).
3.5.8 In the following sections each of the three main enclosures is described separately, beginning with the northernmost enclosure (Enclosure 1). These descriptions include features exposed within each separate enclosure's interior. Following this, the various features exposed to the west of the enclosures are described, and the small number of Period 2.2 features exposed elsewhere in the area.

## Enclosure 1 and associated features

3.5.9 Enclosure 1 was defined on its northern and western sides by a major L-shaped ditch, 2091 (2091, 2128, 2134, 2152, 2156, 2167, 2231). The western side of this ditch was 35 m long, with its southern terminus appearing to cut the fills of ditch 2062, which defined the western and southern sides of Enclosure 2 (see below). The northern side of 2091 was almost 80 m long, extending to close to the eastern edge of excavation. This L-shaped feature thus defined an area of some $2800 \mathrm{~m}^{2}$ ( 0.28 ha ). However, the southern side of the enclosure, as defined here, was bounded by a ditch, 2126 (2126, 2198, 2229, 2319, E1903; also forming the northern side of Enclosure 2), which was only 60 m long, with a separate north to south aligned ditch 2165 (2165, 2317), (interrupted by a 1.2 m wide entranceway) running from its eastern terminus to meet
the northern side of ditch 2091, and forming either a subdivision or the eastern side of the enclosure. This smaller area defined on all four sides by diches 2091, 2126 and 2165 covered c. $2100 \mathrm{~m}^{2}$ ( 0.21 ha ). At some point in its history, the interior of the enclosure appears to have been subdivided by a single north to south aligned ditch, 2149 (2149, 2161, 2173, 2179), which cut across the top of Period 2.1 ditch 2130.
3.5.10 Investigation of the junctions between these various ditches appeared to show that the features represented multiple phases, with, for instance, north to south aligned ditches $\mathbf{2 1 4 9}$ and 2165 being cut by L-shaped ditch 2091. However, in most cases these relationships, as observed in plan and section, were ambiguous and it has not been possible to construct a coherent sequence of the enclosure's development.
3.5.11 The various ditches defining this enclosure varied in size and morphology. Ditch 2091 was the most substantial, typically over 1.5 m wide and up to 0.66 m deep (S. 2043, Fig. 17; Plate 4), whilst ditches 2126 and 2149 were generally 1.2 to 1.3 m wide and between 0.3 and 0.6 m deep. Ditch 2165 was a less substantial feature, measuring up to 0.4 m wide and 0.3 m deep. The fills of these features were undistinguished dominated by mid to light grey, orange and brown silty sands and silty clays, with no clear evidence for any deliberate backfill deposits. This said, some of these fills did produce finds, dominated by pottery ( 78 sherds, 1463 g in total) and ceramic building material ( 19 fragments, 3521g, in total). The pottery includes a large proportion of undiagnostic coarse wares, dateable only very generally to the Romano-British period, but some contexts produced material dateable to the 3rd to 4 th centuries AD, including two sherds (73g) from an upper fill of ditch 2091 (intervention 2167, fill 2169) and two sherds (115g) from the surface of ditch 2126. One exceptional find from ditch 2126 (intervention 2198, basal fill 2199) was a large fragment of the upper part of a rotary quern stone bearing decoration on its upper surface (SF 2002; Fig. 19; App. B.4).
3.5.12 In the interior of Enclosure 1, a range of features were recorded including an L-shaped ditch defining a sub-enclosure/compound, a large pit/well and a series of discrete pits and short lengths of gullies.
3.5.13 L-shaped ditch 2108 ( $2108,2170,2186$ ) defined a small sub-rectangular 'subenclosure' or compound in the southwestern corner of Enclosure 1, enclosing an area of approximately $416 \mathrm{~m}^{2}$ ( 33 m by 13 m ; Fig. 12, inset plan 1). This feature appeared to cut ditch 2149 (see above), but the relationship was not entirely clear. The ditch itself was up to 1.2 m wide and 0.5 m deep with moderately steep sloping sides and a flat or slightly concave base (S. 2041, Fig. 17). In the excavated interventions it contained between one and three fills, of clayey or silty sand. Finds were sparse but included three fragments of ceramic tile (163g) of and nine sherds (132g) of Romano-British pottery, including a sherd from a Samian ware dish (intervention 2186, fill 2187).
3.5.14 A further short length of east to west aligned ditch (2184) joined the eastern side of ditch 2108. At 7.5 m long, 0.36 m wide and just 0.1 m deep, this was an insubstantial feature and produced no finds from its light brown sandy silt fill.
3.5.15 Within the area enclosed by ditch 2108 were several short lengths of gully, their function is unclear but it is possible that some may have been associated with structures of some kind (see Section 4 for discussion). Gully 2083 (2083, 2085, 2087) was slightly curvilinear in plan, aligned broadly east to west and measured some 5.5 m
long, up to 0.7 m wide and 0.2 m deep, with moderately steeply sloping sides and a flat base. It was filled by a single mid greyish/orange brown sandy silt from which no finds were recovered. Just to the north of the eastern end of gully 2083, a short length of linear gully or elongated pit, 2089, aligned northeast to southwest, was exposed. This measured just 2.3 m long, 0.6 m wide and 0.26 m deep, and was filled with a mid orange brown sandy silt.
3.5.16 Some 4 m to the east of this pair of features was a more regular, L-shaped, gully (2201; 2201, 2203), aligned parallel to ditch 2108. The southern (east to west aligned) side of this feature measured 2.5 m long, whilst the western (north to south aligned) side extended for 6 m . Some 0.3 m wide and up to 0.2 m deep, this feature had steeply sloping sides and a flat or slightly concave base (S. 2053, Fig. 17; Plate 5) and contained a single deposit of greyish brown sandy silt from which a single fragment (27g) of ceramic tile was recovered. Further to the east, a length of east to west aligned gully (2261) appeared to have been cut by ditch 2149 (which bisected Enclosure 1, see above); this feature was at least 3 m long, up to 0.2 m wide and 0.15 m deep, with a relatively dark grey brown sandy clay fill.
3.5.17 Also within the area enclosed by ditch 2108 were five pits and postholes (2257, 2259, 2263, 2266 and 2268). Typically circular or sub-circular in plan, these feature ranged from 1.3 to 0.5 m in diameter and up to a maximum of 0.24 m deep, filled by single deposits of greyish brown sandy silts. The only finds were small quantities of grey ware pottery from the fills of pits 2266 ( 2 sherds, 7 g ) and 2268 ( 1 sherd, 16 g ).
3.5.18 Elsewhere in Enclosure 1, the most significant feature was a large pit or well/watering hole located in the northwestern corner of the enclosure (2110). This feature was circular in plan, measuring up to 5 m in diameter at the surface. The full depth of this feature was not excavated; it was initially excavated to depth of 1.2 m (Plates 6 and 7), following which the upper profile of the feature and the surrounding area was lowered by machine to allow further excavation (Plates 8 and 9), to a total depth of 2.2 m . As excavated, the sides of the feature were regular and steeply sloping and a complex sequence of fills were recorded (S. 2033, Fig. 16).
3.5.19 The earliest deposits recorded were a series of light/mid yellowish orange sandy clays $(2326,2327,2328)$ representing material eroded from the upper part of the feature's profile, restricted to the sides of the feature and from which eight sherds of grey ware pottery were recovered. Overlying these deposits, in the central part of the feature, were two deposits of soft, dark greyish blue sandy clay (2321, 2332). These waterlogged deposits contained several large angular pieces of limestone (up to c. 0.25 m in maximum dimension) and flint cobbles, as well as frequent pieces of (unworked) roundwood fragments. Sampling of these lower fills produced waterlogged seeds belonging to plants indicative of disturbed ground such as chickweed, goosefoot, bramble and nettle, whilst seeds of sedge and the presence of eggs belonging to planktonic crustaceans (Daphnia) confirm that the feature had held standing water (see App. C.1).
3.5.20 These deposits were overlain by two successive layers of mid reddish grey clayey sand (2323 and 2324) with poorly sorted gravel inclusions, interpreted as deliberate backfill deposits, which produced 42 fragments of animal bone, including two specimens of
cattle, and eight sherds (154g) of grey ware pottery. The uppermost of these fills were overlain by further deposits deriving from weathering of the sides of the feature and more gradual silting (2119 and 2121), again restricted to the sides of the feature. These greyish orange or reddish grey clay sands produced 139g of fired clay and 16 sherds of pottery, dominated by grey wares but including a small amount of residual flinttempered Iron Age material. Overlying these was a further probable backfill deposit of mid bluish grey sandy clay containing a fragment of ceramic tile and 13 sherds (274g) of pottery (2118), overlain by a deposit of mid orange grey silty sand containing two sherds of pottery, representing a further episode of natural silting/weathering (2116).
3.5.21 The upper part of the feature was filled by a series of mid dark brown/grey silty sands which appear to largely represent gradual natural infilling (2117, 2115, 2114 and 2113). These deposits produced a substantial quantity of pottery ( 60 sherds, 717 g ) and three fragments $(558 \mathrm{~g}$ ) of ceramic building material (including flue tile), alongside an iron object knife or tool tang fragment. The pottery from these upper fills, particularly the two uppermost fills, 2113 and 2114, was notable for including a large proportion of material dating to the 4th century AD (see Perrin, App. B.1).
3.5.22 No other features were recorded in the immediate vicinity of pit 2110, although a localised buried soil deposit, up to 0.35 m thick (2042=2270), was found to seal part of ditch 2091, immediately to the west (investigated in intervention 2156). This produced a small quantity of Roman pottery (six sherds) and a single small (13g) fragment of CBM.
3.5.23 Three further features within Enclosure 1 have been attributed to Period 2.2, a cluster of three pits $\mathbf{( 2 1 0 3}, 2111$ and 2138) located some 10 m to the southeast of pit 2110. These features were sub-circular in plan, measuring between 1.7 m and 0.6 m in diameter and up to 0.32 m deep with similar greyish brown sandy silt fills; none produced finds.

## Enclosure 2 and associated features

3.5.24 As noted above, the northern side of Enclosure 2 was defined by ditch 2126 (described above), whilst its southern and western sides were formed by an L-shaped ditch, 2062 (2062, 2097, 2105, 2122, E2403), which effectively mirrored, but was cut by, the Lshaped ditch forming the western and northern side of Enclosure 1 (2091). No boundary was, however, found on the eastern side of Enclosure 2, and the southern side of ditch 2062 extended beyond the eastern limit of excavation. There was no evidence for a major subdivision of Enclosure 2 similar to that represented by ditch 2149 in Enclosure 1, but a short length of ditch (2227) was identified running perpendicular to ditch 2126 in the northern part of Enclosure 2.
3.5.25 As exposed in the excavation area Enclosure 2 (as defined by ditches 2062 and 2126) covered area approximately 25 m wide (north to south) and potentially over 70 m long (east to west), an area of over $1750 \mathrm{~m}^{2}$. L-shaped ditch 2062 was a fairly substantial feature, typically over 1.5 m wide (up to a maximum of 1.8 m ) and, where, excavated was up to 0.44 m deep, with moderately steeply sloping sides and a flat base. It contained two or three silty sand fills, typically mid brownish grey in colour, which appeared to represent natural infilling deposits. A secondary fill of intervention 2097 produced a single sherd of pottery (24g) dated to the 1st century AD (fill 2099), whilst
a less diagnostic sherd of Romano-British pottery was recovered from the lower fill of intervention 2062 (fill 2069), together with two sherds from the upper fill (2252). A total of three fragments ( 276 g ) of ceramic tile (tegulae) were also recovered from intervention 2097 and 2122.
3.5.26 In the northern part of the enclosure a short length of ditch (2227) was exposed on a north to south alignment, its northern end meeting, and perhaps being cut by ditch 2126 (see Fig. 12, inset 1 for detail). This was up to 0.45 m wide and 0.18 m deep and although only 5.2 m long, may have been plough truncated at its southern end, and have originally continued to form a subdivision of Enclosure 2. It produced nine sherds of pottery (203g) - including a large sherd from a grey ware jar of 3rd century date and two fragments of ceramic tile.
3.5.27 Within the interior of Enclosure 2, just south of the southern terminus of Period 2.1 ditch 2130, was a relatively dense cluster of intercutting features (Fig. 12, inset plan 2), with two ditches/gullies, $2205(\mathbf{2 2 0 5}, 2216)$ and $2207(2207,2209,2293,2295)$ and six pits/postholes (2211, 2214, 2218, 2220, 2222 and 2225). Collectively these features, especially a cluster of four intercutting pits, produced a relatively substantial finds assemblage including 34 sherds ( 374 g ) of pottery, 844 g of fired clay and almost 3 kg of ceramic building material.
3.5.28 One of the earliest features in this sequence was pit 2225; this sub-circular feature was cut along its northern side by gully 2207 and measured 1 m across and 0.14 m deep. Its single fill of mid orange brown sandy silt produced six sherds of pottery (156g), and a single fragment of CBM (19g) was also recovered. Gully 2207 also truncated a short length of gully (2205) to the north of pit 2225. This feature was up to 0.7 m wide and 0.14 m deep and produced four grey ware sherds from its mid orangey brown sandy silt fill (2206 = 2217).
3.5.29 Gully 2207 itself was somewhat irregular, some 21 m long and curvilinear/sinuous in plan, aligned broadly east to west. It measured between 0.55 and 1.1 m wide and was shallow, typically less than 0.15 m deep. It contained a single fill of mid orangey brown or greyish brown sandy silt which produced ten sherds ( 95 g ) of Roman pottery.
3.5.30 To the north of, and cutting, gully 2205, was a cluster of four intercutting pits and a single posthole (S. 2050, Fig. 17; Plate 10). The finds and environmental remains associated with each of these features are summarised in Table 1. The earliest feature in the sequence was pit 2222, a sub-circular feature, 1 m in diameter and 0.19 m deep filled by a mid greyish brown sandy silt which produced three sherds of Roman pottery. This was cut by pit 2211, a regular, steep-sided circular feature measuring 0.9 m in diameter and 0.25 m deep. This pit was filled by two distinctive deposits, a lower dark greyish brown clayey silt, which contained six small sherds of grey ware pottery and small quantities of fired clay, and an upper very dark grey silt, rich in charcoal and which also contained a little fired clay, alongside a small piece of slag, hammerscale and $22(572 \mathrm{~g})$ fragments of CBM including tegulae fragments. This latter deposit appears to represent a deliberate dump of waste associated with metalworking/smithing.
3.5.31 Pit 2211 was in turn cut by pit 2220, an oval-shaped feature, 1.55 m long, 1.2 m wide and 0.23 m deep with a single mid brownish grey, charcoal-rich, sandy silt fill which
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produced a substantial finds assemblage including over 2 kg of CBM, including brick and tile fragments, burnt stone, 621 g of fired clay, hammerscale, and three small sherds of pottery. Twenty-five iron hobnails recovered from this fill presumably represent part a single shoe or boot deposited in this feature. A sample of this fill produced a rich assemblage of charred grain and chaff, dominated by the remains of spelt wheat, representing the residue of crop processing. The northern edge of pit 2220 was cut by a smaller pit, 2218, which measured 0.7 m in diameter and 0.34 m deep. Again, this feature had been backfilled with a dark, charcoal-rich, sandy silt which produced two sherds of pottery, 159g of fired clay, slag, seven fragments of tegula and almost 700 g of burnt stone. Pit 2211 was also cut by posthole 2214, this oval-shaped feature measured up to 0.22 m across and 0.14 m deep and was filled by a mid brownish grey sandy silt which produced no finds.

| Pit (cut) | Fills | Finds | Environmental remains (charred plant remains) |
| :---: | :---: | :---: | :---: |
| 2211 | 2212 | 22 pieces (572g) of CBM (including heataffected tegulae) <br> Slag (x1) <br> Hammerscale | Assessment level only: Charcoal, rare grain and chaff (Sample 2001) |
|  | 2213 | Six sherds (31g) of pottery (grey ware, c. AD 70-400) <br> 39 g (13 frags) of fired clay (amorphous) <br> Hammerscale | Full Analysis: low quantities of charred barley and wheat grains and chaff. Rare weed seeds (Sample 2004) |
| 2222 | 2223 | Three sherds $(24 \mathrm{~g})$ of pottery (grey ware, $c$. AD 70-400) | $\mathrm{n} / \mathrm{a}$ |
| 2220 | 2221 | Three sherds (13g) of pottery (grey ware, c. <br> AD 70-400) <br> 30 pieces (2179g) of CBM (including large fragments of heat affected brick and tegula) 621g (6 frags) off fired clay (amorphous) 504g (3 pieces) burnt stone Hammerscale Iron (25 hobnails=shoe/boot) | Full analysis: Large assemblage of charred grain dominated by wheat with an extremely rich assemblage of glume wheat chaff alongside wild plant (weed) seeds (Sample 2003) |
| 2218 | 2219 | Two sherds (6g) of pottery (1x grey ware; $1 \times$ residual ?lron Age) <br> Seven pieces (225g) of CBM (heat affected tegula) <br> 159g (119 frags) of fired clay (including probable oven lining) <br> 699g (six pieces) of burnt stone <br> Slag (x10 frags) | Assessment level only: Charcoal, frequent grain and chaff (wheat and barley) and weed seeds (Sample 2002) |

Table 1. Finds and environmental remains recovered from four intercutting pits within Enclosure 2
3.5.32 Some 5 m to the north of this cluster of features, close to the northern side of the enclosure, were a pair of intercutting pits (Fig. 12, inset plan 1). The earliest of these (2282) was sub-circular in plan, 1.25 m in diameter and 0.34 m deep and produced nine sherds of pottery (178g), including material dated to the 3rd/4th century AD, from its single fill of light brownish grey sandy silt. This was cut on its southern edge by a larger, oval-shaped pit (2278) measuring up to 2.2 m across and 0.6 m deep with steeply
sloping sides and a flat base. Its two lower fills produced no finds but its uppermost fill, a brownish grey sandy silt produced six sherds of pottery (99g), again including sherds of 3rd/4th century date.
3.5.33 In the southeastern part of Enclosure 2 a large oval-shaped pit (2271) was exposed, measuring 3.3 m long and 1.3 m wide. It was up to 0.3 m deep and was filled by a dark orangey brown sandy silt containing numerous large (up to 0.5 m long) sub-angular fragments of limestone laid on its base (Plate 11). None of the stones showed traces of working/dressing or burning/heating and it is unclear whether they were simply dumped in the pit or whether this feature provided a foundation/surface for a structure of some kind. Two possible small postholes (2287 and 2289) were found cut into the base of this feature, both filled by dark brown silty clays (Plate 12). No finds were recovered from these features and a bulk sample taken from the fill of posthole 2287 yielded only a very small amount of wood charcoal (Sample 2010).
3.5.34 The final feature identified in Enclosure 2 was a sub-circular pit (2308) in the northwestern corner of the enclosure, which measured 1.4 m in diameter and 0.25 m deep. This feature contained a very dark greyish brown, charcoal-rich lower fill, which produced 2 g of fired clay and 53 g of burnt stone. Sampling of this deposit yielded only wood charcoal, in poor condition (Sample 2005). This was sealed by two paler sandy silts which contained no finds.

## Enclosure 3 and associated features

3.5.35 The features attributed here to Enclosure 3 were only partially exposed in the southern part of Area C, and the layout and character of this putative enclosure is poorly understood in comparison with Enclosures 1 and 2. The northern side of Enclosure 3 was formed by the southern side of L-shaped ditch 2062 (see above; Enclosure 2), whilst its western side was defined by a series of intercutting ditches: 2011 (2011, 2029), 2054 (2054=2059) and 2003 (2003, 2015, 2050=2057, 2095). Three north to south aligned ditches possibly representing internal subdivisions of the enclosure were also exposed (ditches E2406, 2061 and 2074), and an east to west aligned ditch also bisected the enclosure (ditch 2077; 2077, 2079), and may have continued beyond its limits to the west.
3.5.36 Close to the southern edge of the excavation, the western side of Enclosure 3 was defined by ditch 2011. This was a relatively large feature, measuring 1.75 m wide and up to 0.5 m deep with moderately steeply sloping sides and a concave base (S. 2003, Fig. 16; Plate 13). Where fully excavated (intervention 2011) it contained a basal fill of mid greyish brown silty sand (2012) which produced a single sherd of pottery dating to $c$. AD 70-200, sealed by upper deposits of mid greyish/orangey brown silty sands which contained no finds.
3.5.37 To the north, excavation along the same ditch line revealed two intercutting ditches, 2054 and 2003 - it is not clear which of these was equivalent to ditch 2011. Ditch 2003 was the earliest of these two ditches and could be traced for a length of some 18 m , meeting the corner of L-shaped ditch 2062, with which it formed the northwestern corner of Enclosure 3. Ditch 2003 was rarely more than 1 m wide (ranging from 1.2m0.5 m in the excavated interventions) and was up to 0.44 m deep, with steep or moderately steeply sloping sides and a concave or flat base. It was filled by a single
deposit of mid to light grey brown silty sand, with finds restricted to a single sherd of pottery dated to c. AD 70-150 from intervention 2003.
3.5.38 At is southern end (intervention 2050=2057), ditch 2003 was cut by a somewhat larger ditch (2054) which extended for 7 m to the north before ending in a regular rounded terminus. This feature measured up to 1.7 m wide and 0.57 m deep and was filled by mid to light grey brown silty sands which produced no finds.
3.5.39 The easternmost of the north-south aligned ditches within the interior of Enclosure 3 was only sampled in the evaluation phase (Trench 24; E2406) - when it was recorded as measuring 0.4 m wide and 0.15 m deep, with a single fill which produced no finds (Chard and Boothroyd 2017, 9). To the west, ditches 2061 and 2974 may have formed a single discontinuous north to south aligned boundary within the enclosure. Ditch 2061 was up to 1.2 m wide and at least 0.35 m deep, whilst ditch 2074 was up to 1 m wide and at least 0.25 m deep. Both features were filled by mid brownish grey silty sands which produced no finds. East to west aligned ditch 2077 measured up to 0.9 m wide and 0.26 m deep and was filled by a similar mid brown silty sand - again producing no finds.
3.5.40 Few other features were recorded with Enclosure 3. An oval shaped pit (2081) was found on the northern edge of ditch 2077, but the relationship between the two features was uncertain. This feature measured 1.3 m long by 0.7 m wide and up to 0.25 m deep and was filled by a mid greyish brown silty sand from which no finds were recovered. Another pit was exposed within the northwest corner of Enclosure 3 during the evaluation (E2207; Trench 22). This feature showed signs of in situ burning/heating and although it contained no finds, a sample from its basal charcoal-rich fill produced a relatively rich assemblage of charred plant remains including cereal grain and chaff, representing crop processing residues (Boothroyd and Chard 2017; see also App. C.1).
3.5.41 Close to the southern edge of excavation, two short lengths of gully (one unexcavated) and a pit were exposed. The gully was aligned north to south and its northern end was obscured by furrow 2005 (Period 4). It measured at least 2.6 m long and was up to 0.55 m wide and 0.13 m deep. This feature appeared to cut an adjacent pit (2009) -sub-circular in plan and measuring 0.8 m in diameter and 0.22 m deep. Neither feature produced any finds.

Features to the west of Enclosure 1-3
3.5.42 Features to the west of Enclosures 1-3 included several lengths of east to west aligned ditches which may have represented boundaries for further enclosures in this part of the site, but given their partial exposure, their layout is uncertain. These features include ditch $2070(\mathbf{2 0 7 0}, \mathbf{2 0 7 2})$, which continued the east to west alignment of the northern side of Enclosure 1, and an unexcavated ditch in the southwestern corner of the site which may represent a continuation of the east to west aligned ditch that bisects Enclosure 3 (2077). Ditch 2070 extended from the western edge of excavation for 27 m before terminating, leaving a 2.5 m wide gap between its terminus and the northwestern corner of Enclosure 1 (ditch 2091). Up to 0.54 m wide and 0.2 m deep, this feature contained a single greyish brown sandy silt, which produced no finds.
3.5.43 A total of nine discrete pits were found dispersed across the area to the west of Enclosures 1-3. Although only four of these produced dateable finds, they have all been tentatively attributed to Period 2.2. The majority of these features (E1203, 2013, 2024, 2036, 2043, 2065) were circular/sub-circular features, ranging between 0.4 and 1 m in diameter and up to 0.3 m deep with single fills of sterile mid brown/grey sandy silts. Of these features, only one produced any finds, a single small sherd of grog tempered Late Iron Age/Roman pottery recovered from pit E1203 during the evaluation phase of fieldwork (see Chard and Boothroyd 2017).
3.5.44 The remaining three pits $(\mathbf{2 0 2 6}, 2038$ and 2041$)$ contained what appeared to be deliberate backfill deposits and were associated with more significant assemblages of finds. Pit 2026, located just west of the western side of Enclosure 3, was a regular circular feature, measuring 1 m in diameter and up to 0.25 m deep with steeply sloping sides and a slightly concave base (S. 2007, Fig. 16). Its basal fill (2027) was a thin layer of very dark grey charcoal-rich silt which produced burnt flint, stone and a single sherd of grey ware pottery. This was sealed by a thicker upper deposit of mid brownish grey sandy silt. A sample of the basal fill of this feature produced a large quantity of charred grain, dominated by barley but including some wheat, with an absence of chaff indicating that this represents a fully processed crop (App. C.1).
3.5.45 Pit 2038 was located in the northwestern part of Area C, 1 m south of ditch 2070. This oval shaped pit was 2 m long, and up to 0.4 m wide and 0.21 m deep and was filled by a dark greyish brown sandy silt which, exceptionally, contained an almost complete small grey ware jar dated to AD 70-200. Finally, pit 2041 was found in the southwestern corner of Area C. It was oval in plan, 1.3 m long and 0.9 m wide with a depth of 0.3 m . Its basal fill was a very dark grey, charcoal-rich silty sand (2046), overlain by a mid brownish grey silty sand. This lower fill produced a small quantity $(22 \mathrm{~g})$ of burnt stone, quantities of hammerscale and a small crumb of fired clay $(2 \mathrm{~g})$, whilst a sample from this deposit yield a rich assemblage of charred grain (App. C.1).

### 3.6 Period 3: Anglo-Saxon

## Area C (Fig. 15)

3.6.1 A single Anglo-Saxon pit was identified during the excavation, in Area C. This feature (2162) was located just to the north of Period 2.2 Enclosure 1, and it cut the upper fill of ditch 2091, which defined the northern side of the Enclosure (S. 2046, Fig. 17). This pit was sub-circular in plan, measuring 1.5 m in diameter and up to 0.37 m deep, with a bowl-shaped profile. Its lower fill of mid brownish grey silty sand (2163) produced a large sherd of pottery with a coarse micaceous fabric, probably of Anglo-Saxon date $(28 \mathrm{~g})$ and two small residual Roman sherds. This was sealed by a sterile mid orangish brown silty sand.

### 3.7 Period 4: medieval-early modern

3.7.1 Period 4 was largely represented by the heavily truncated remains of a system of east to west aligned furrows exposed in parts of Areas B and C, representing the remains of medieval/early post-medieval ridge and furrow cultivation typical of the open fields
of the East Midlands. A small number of discrete features of modern date were also recorded, alongside a network of field drains.

Area A (Fig. 13)
3.7.2 A modern field drain and square (?machine cut) pit (both unexcavated) were exposed in Area A.

## Area B (Fig. 14)

3.7.3 The truncated remains of five east to west aligned furrows were exposed in Area $B$ (3043, 3035/3037, 3033/3023/3027, 3019 and 3005). They were up to 2.3 m wide and were typically less than 0.2 m deep, filled by orangey brown/grey silty sands. Quantities of Roman CBM (271g), post-medieval pottery and a single iron nail were recovered from these features. In some cases, the furrows were closely spaced (c. 3m apart) and may represent two or more phases of ridge and furrow cultivation.
3.7.4 A series of broadly north to south and east to west aligned field drains were also exposed, as well as a rectangular (?machine excavated) pit (3083) which cut Period 2.2 pit 3082 (see Fig. 4) and a posthole (3013) with a distinctive topsoil derived fill.

## Area C (Fig. 15)

3.7.5 The truncated remnants of at least 10 furrows were recorded in Area C, concentrated in the southeastern part of the area where truncation appears to have been less severe. Most of these features were sample excavated (2005, 2017, 2031, 2033, 2040, 2048, 2063, 2101,), but, unlike those in Area B, they rarely produced finds, with a single sherd of post-medieval pottery coming from the fill of furrow 2276.
3.7.6 A single short length of 'gully' or elongated pit was exposed to the east of Period 2.1 ditch 2307. This feature had a topsoil derived fill and contained a single sherd of postmedieval pottery.

### 3.8 Unphased features

3.8.1 A total of 20 features, almost exclusively small pits and postholes, remain unphased; most of these were recorded in Area B, with a smaller number in Areas A and C.

Area A (Fig. 13)
3.8.2 Two pits ( $\mathbf{1 0 4 7}$ and 1052) in Area A are unphased. One of these, pit 1047, measuring 1.56 m across and 0.18 m deep, was located in the eastern part of the area and intercut with Period 2.1 ditch 1015. The relationship between these two features was ambiguous but it was thought probable that the pit was cut by the ditch - in which case this feature should probably be regarded as prehistoric in date. Some 16 m to the southwest was a further sub-circular pit (1052), measuring 1.2 m across and 0.2 m deep.

Area B (Fig. 14)
3.8.3 A total of eleven small undated pits/postholes, ranging between 1.2 and 0.3 m in diameter and between 0.1 and 0.35 m deep, were found in Area B. Six of these features
were found in the southeastern part of the site, with a cluster of three intercutting pits (3003, $\mathbf{3 0 5 0}$ and $\mathbf{3 0 7 0}$ ) located just the west of a cluster of three further pits (3007, 3009 and 3011); all filled with grey/brown silty sands. Approximately 17 m to the northwest of these features another similar, undated, pit (3017) was exposed, and some 20 m to the north of this a pair of similar features ( 3045 and 3047 ) were uncovered. One undated pit was also revealed in the eastern part of the site (3015), to the west of Period 2.1 ditch 3081. Bulk samples were taken from the fills of eight of these undated features (3003, 3007, 3009, 3011, 3015, 3017, 3055, 3070) but produced very small amounts of charred plant remains, with rare cereal grains, legume fragments and weed seeds.

## Area C (Fig. 15)

3.8.4 Three pits and a single ditch remain unphased in Area C. The pits comprise two small features ( $\mathbf{2 2 7 2}$ and 2274) found to the east of Period 2.1 ditch 2307, and a poorly defined feature found between Period 2.1 ditch 2130 and Period 2.2 ditch 2149 in the area of Period 2.1 Enclosure 1(2159).
3.8.5 In the northwestern part of Area C, a short length of L-shaped/curvilinear ditch (2315) was exposed. This feature was unexcavated and despite its broadly similar alignment to the Period 2.1 features to the west it had a distinctive orange upper fill quite different to other features exposed in the area and its date and status remains uncertain.

### 3.9 Finds and environmental summary

## Pottery (App. B.1)

3.9.1 A total of 310 sherds (4793g) of Roman pottery and a single sherd (15g) of probable Anglo-Saxon pottery were recovered, alongside a very small quantity of post-medieval ceramics. The condition of the pottery is mixed with a mean sherd weight of 15 g and a mean rim percentage of 11 suggesting a fragmented assemblage; some sherds are abraded. The Roman pottery appears to date mainly from the mid-1st to later 2nd century with some later 3rd and possibly 4th century material. Reduced grey wares account for around two-thirds of the assemblage by sherd count and weight. The vessels are mainly jars together with flanged bowls, plain-rimmed dishes, beakers and mortaria and largely represent a utilitarian assemblage with a small quantity (around $10 \%$ ) of fine wares.

## Flint (App. B.2)

3.9.2 A small assemblage of just 17 struck flints and eight fragments of burnt unworked material weighing 337 g were recovered. The flints were scattered across many contexts with no more than three flints in any feature. The only material which may have been broadly contemporary with the feature from which it derived were two undiagnostic flakes from Period 1 pit 3040, with the vast majority of the flint deriving from Period 2 (Roman) features. The bulk of the assemblage was undiagnostic and only a few pieces could be broadly assigned to either early or later prehistory. The
early forms have a broad date range that could span the upper Palaeolithic through to the early Neolithic, but the former date is very unlikely due to the overall rarity of such material. Later prehistoric flint use appears to have been on a very occasional basis and included the use of flints as pot boilers in heating/cooking activities.

## Ceramic building material (App. B.3)

3.9.3 A modest assemblage of ceramic building material (CBM) amounting to 107 fragments weighing 7240 g was recovered, predominantly from pits and ditches of Roman date in Area C and a small quantity from two Roman pits and several post-medieval furrows in Area B. All the CBM is of Roman date and comprises standard forms of tegula, imbrex, brick and flue tile. The condition of the material is relatively poor and fragmentary: the CBM assemblage has a low mean fragment weight (MFW) of 68g and abrasion is predominantly moderate to heavy. It is probable that the material was acquired second-hand from a more affluent settlement, perhaps one with which the site had some link and used largely for the construction of hearths or used within ovens, as evidenced by traces of burning on many pieces.

Fired clay (App. B.3)
3.9.4 Fired clay totalling 155 fragments weighing 1054g was recovered, predominantly from Roman (Period 2.2) pits in Area C. Much of this material consists of small amorphous fragments, but some pieces could be identified as deriving from oven walls/lining and fragments of two probable portable objects were identified.

## Stone (App. B.4)

3.9.5 Twenty-three fragments of burnt (unworked) stone (1.7kg) were recovered alongside two worked stone objects; fragments of an unidentified shale artefact from pit 3058 (Period 2.2) and a large segment of rotary quern with unusual incised decoration on its upper surface from Period 2.2 ditch 2198 (Fig. 19).

## Metals (App. B.5)

3.9.6 The metals from the site are limited in range. Only a small number of iron objects were recovered. No copper alloy or lead was recovered. In addition to objects, a few pieces of slag were recovered and some hammerscale was identified from soil samples. Excluding hammerscale, the assemblage comprises 27 iron objects and 12 pieces of slag. The iron objects comprise one nail tip (context 3024, furrow 3033, Phase 4) and one possible knife or tool tang fragment (context 2113, pit 2110, Phase 2.2). The latter comprises a rod or tang of circular cross section pointed at one end and with the remains a possible narrow blade at the other end (extant $\mathrm{L}: 112 \mathrm{~mm}$.). The remaining finds are 25 hobnails from Phase 2.2 pit 2220, context 2221.

## Environmental samples (App. C.1)

3.9.7 Twenty-eight bulk samples were processed and assessed, primarily for the retrieval of charred plant remains, with four samples subsequently selected for detailed analysis. All of the latter came from the fills of pits attributed to Period 2.2 and produced assemblages of charred grain (dominated by barley and wheat), accompanied in each
case by large quantities of chaff indicative of processing residues. Four subsamples were also processed for the recovery of waterlogged plant remains from Period 2.2 well 2110; this produced waterlogged seeds belonging to plants indicative of disturbed ground such as chickweed, goosefoot, bramble and nettle, whilst seeds of sedge and the presence of eggs belonging to planktonic crustaceans (Daphnia) confirm that the feature held water.

## Animal bone (App. C.2)

3.9.8 A total of 53 specimens were recovered from the site, all of them from Romano-British pits - specifically, cuts 2110 and 3049 (Period 2.2). Both of these contained large mammal specimens and domestic cattle (Bos taurus taurus) specimens with all material in a very poor state of preservation.

## 4 DISCUSSION

### 4.1 Introduction

4.1.1 The original research aims of the excavation, as outlined in Section 2.1, were focused on understanding the extent and significance of the remains encountered during the evaluation trenching, especially in terms of the evidence for two main phases of activity, during the Late Bronze Age/Early Iron Age and the Late Iron Age/Early Roman periods. In the event, the excavation demonstrated that Late Bronze Age/Early Iron Age activity (Period 1) was represented only by a single feature, whilst the ditches originally assigned to the Late Iron Age/Early Roman period were shown to belong to a fairly extensive series of boundaries and enclosures which appear to have been in use for much of the Romano-British period (Period 2). The excavation also provided some evidence for activity in the Anglo-Saxon period (Period 3) in the form of a single pit, and confirmed the presence of the remains of extensive ridge and furrow, reflecting the location of the site within the open fields of Sapcote in medieval and post-medieval times (Period 4).
4.1.2 The discussion that follows is organised chronologically, by period, with an emphasis on the main period of Romano-British activity (Period 2). Although the finds and environmental evidence associated with the Romano-British enclosures were relatively meagre, they provide some insights into the chronology and character of the site, which appears to have been a small, relatively low-status but potentially longlived farmstead with its origins in the late 1st century AD, with continued activity into the 4th century.

### 4.2 Period 1: Late Bronze Age/Early Iron Age activity

4.2.1 Further investigation of a feature in Area B which had yielded a small assemblage of prehistoric pottery in the evaluation (broadly dateable to the Late Bronze Age or Early Iron Age) demonstrated that this was an isolated pit (3040). Despite extensive excavation of this relatively substantial feature, finds were meagre, comprising three sherds of pottery, a small quantity of unidentified animal bone and sparse charred plant remains (including four fragmentary cereal grains).
4.2.2 As in many other parts of southern Britain, settlement remains of this broad date have proved elusive in Leicestershire (Clay 2002, 38-41, 114-15). This at least partly reflects the open, unenclosed character of most settlement remains of this period (invariably characterised by dispersed groups of pits, sometimes accompanied by posthole structures), which can be difficult to identify using standard prospection methods such as aerial survey, geophysics and trial trenching (ibid.; Willis 2006, 92). In the case of the evidence from Hinckley Road, although the presence of pottery, flintwork, animal remains and charred cereals (if the latter are not intrusive) may be taken as evidence for domestic-type activity, there is no indication of sustained settlement and it may represent a very short-lived episode of occupation.
4.2.3 The very small quantity of worked flint from the site (15 pieces in total, accompanied by a small amount of burnt flint) suggest very limited prehistoric activity in the area,
but attests to occasional visits to the site from the Mesolithic/Early Neolithic through to the Early Bronze Age (see Donnelly App. B.2)

### 4.3 Period 2: Roman agriculture and settlement

## Sequence and chronology

4.3.1 As noted above (Section 3.1), the relative paucity of closely dateable finds and the generally small quantities of finds recovered from individual features has presented difficulties in terms of dating and phasing the Romano-British remains. On the basis of stratigraphic relationships and major changes in ditch alignment a basic distinction between two phases (Periods 2.1 and 2.2) has been made here, effectively grouping features into those which appear to belong to a major set of conjoined rectangular enclosures in Area C (Period 2.2), and those which predate it (Period 2.1).
4.3.2 The date and character of the Period 2.1 features are particularly poorly understood. A very small quantity of finds were recovered from the ditches attributed to this phase, and although most of the features assigned to the phase in Area C very clearly predate the Period 2.2 enclosures, the assignation of similarly aligned ditches (and a series of earlier east to west aligned ditches) in Area $A$ and $B$ to Period 2.1 must be seen as highly tentative. Just ten sherds of pottery were recovered from Period 2.1 contexts, but of the closely dateable material all was of 1st or early 2 nd century date, except for a single sherd dated to AD 150-200 collected from the surface of ditch 2130 (Area C). On the basis of the recovery of small quantities of pottery dating to the mid-1st century AD from some contexts on the site it seems likely that some elements of the earlier ditch alignments relate to activity during the conquest/pre-Flavian period, or perhaps even earlier, and it is notable that among the material from Period 2.1 ditch 2130 were two small grog-tempered sherds probably dating to the mid-1st century AD (see App. B.1)
4.3.3 The Period 2.2 enclosure ditches in Area C (Enclosures 1, 2 and 3) produced a somewhat larger assemblage of pottery, but the quantities of material from individual contexts were invariably small and were often of mixed date, probably reflecting high levels of residuality and extended sequences of ditch infilling and maintenance. This is well illustrated by Fig. 18, which shows the distribution of closely dated Roman pottery across Area C. Although over 100 sherds were recovered from the ditches making the various enclosure ditches, almost two thirds of these were made up of poorly dated coarsewares (mostly grey wares), whilst the more diagnostic material included material of 1st to 4th century date - but was dominated by later 1st to 3rd century pottery, with small amounts of 4th century material derived from the upper fills of some of the ditches.
4.3.4 Although far from certain, on this basis it seems likely that the enclosures were used and infilled over an extended period of time, perhaps from the late 1st or early 2nd century AD through to the 4th century. Support for this lengthy sequence of use also comes from pottery from other features associated with the enclosures. Thus, whilst L-shaped ditch 2108 within Enclosure 1 and several features within Enclosure 2 such as gully 2207 and pit $\mathbf{2 2 2 5}$ produced small assemblages of pottery with diagnostic
material dating exclusively to the late 1st or 2nd centuries, other features, notably intercutting pits $\mathbf{2 2 7 8}$ and $\mathbf{2 2 8 2}$ in Enclosure 2, produced 3rd and 4th century material indicating later activity taking place within the enclosures. Most revealing in this context is the relatively large assemblage of pottery recovered from well 2110, located in the northwest corner of Enclosure 1, which Perrin suggests indicates a 4th century date for the final infilling of this feature (App B.1).

## Site layout and function

4.3.5 Given that the geophysical survey of the development area was hindered by the presence of widespread magnetic debris, preventing the identification of any of the elements of the Roman enclosure system and outlying boundary/field system ditches, our understanding of the overall extent and layout of the remains of this period are dependant solely on the results of the trial trenching and area excavations.
4.3.6 The ditches assigned to Period 2.1 appear to have belonged to a potentially extensive system of boundaries, having been identified in Area A, B and C. Ditches on two, very different, alignments have been subsumed into this phase, an earlier set of east to west aligned ditches exposed in Areas A and B and a later series of northeast to southwest/northwest to southeast aligned ditches exposed in all three excavation areas. Although, as discussed above, the boundaries of this phase could be shown to predate the Period 2.2 conjoined enclosures in Area C, their dating/phasing in Areas A and $B$ is much more tentative and it seems possible that some elements of the later northeast to southwest/northwest to southeast boundaries in these areas remained in use during the later occupation of Area C. The layout and function of the Period 2.1 boundaries remains unclear; they produced very few finds and it seems possible they represent the remains of extensive systems of field boundaries, as opposed to being associated with any settlement or other more intensive activities.
4.3.7 The layout and character of the conjoined enclosure system assigned to Period 2.2 is better understood. Although the southern extent of the enclosures is uncertain, as the ditches of Enclosure 3 extended south beyond the limits of the development area, the area excavations and trenching suggest that the main area of activity was exposed within Area C ; and it is notable here that no archaeological features were encountered during trial trenching to the west of the site (Upson-Smith and Muldowney 2013; see Fig. 2). The enclosures themselves were clearly subject to a degree of remodelling and sub-division over time, but they all appear to have enclosed relatively small areas of well under half a hectare, and Enclosures 1 and 2 were associated with a range of internal features including pits, gullies and, in the case of Enclosure 1, a large well (2110).
4.3.8 Although modest, the finds and environmental material from the enclosure ditches and other associated features make it clear that they were associated, at least at certain points of their history, with domestic-type activity (see below), and the complex as a whole is best described as an enclosed farmstead. On morphological grounds, the enclosures could be described as forming a farmstead of 'linear complex' type, characterised by multiple bounded areas, sometimes with evidence for distinct areas given over to particular uses such as for domestic buildings, processing or storage of agricultural goods, livestock management and industrial/craft activities and
often set within a wider system of trackways and fields/paddocks (Smith et al. 2016, 28-33). Such enclosed farmsteads are one of the most common forms of Roman rural settlement in Southern Britain and excavated examples are well-represented in parts of the East Midlands and parts of Eastern England, especially in Northamptonshire, Bedfordshire and Cambridgeshire (ibid.). Locally, a pair of enclosures partially revealed during excavations at Coventry Road, Hinckley, seem likely to belong to a similar farmstead complex (Chapman 2004).
4.3.9 There was no unequivocal evidence for buildings/structures associated with Enclosures 1-3, but this is not unusual in the context of other contemporary sites lacking masonry buildings and is probably largely a product of the low archaeological visibility of the remains of timber-built buildings based on shallow beam slots or other insubstantial footings (see Liddle 2004, 77; Evans et al. 2013, 24). The most convincing evidence for the possible presence of structures comes from Enclosure 1, where the small sub-enclosure/compound formed by L-shaped ditch 2108 (measuring $33 \mathrm{~m} x$ 13 m ) enclosed a series of shallow, and presumably heavily truncated, gullies, some of which could represent the remains of one or more rectangular beam slot structures. Similar features have been revealed by excavations at Cadeby, in the west of the county, where a series of ephemeral gullies within a small rectangular enclosure were suggested to relate to two rectangular buildings of 1st century AD date (Speed 2011).
4.3.10 The only other notable feature from Enclosure 1 was the large well situated in the enclosure's north-west corner (2110). The waterlogged remains recovered from the lower fills of this feature confirmed that the well held standing water, and they also included the seeds of ruderal plants indicative of disturbed ground, including bramble, nettle, chickweed and goosefoot (App. C.1), These remains are likely to relate to plants growing immediately adjacent to the well, but it is possible that they reflect the presence of more extensive areas of disturbed ground in parts of Enclosure 1 resulting from intensive activity and footfall in the area - perhaps associated with the putative building compound represented by ditch 2108.
4.3.11 The character of the remains exposed within Enclosure 2 contrasted with those of Enclosure 1, and were dominated by a series of relatively finds-rich pits, including features associated with what appears to be the residue of 'industrial-type' activity in the form of metalworking waste and crop processing residues (see below). Notwithstanding the long history of activity at the site and the probability that the use of the enclosures varied substantially over the period as a whole, the differences between the features associated with Enclosures 1 and 2 may provide evidence for functionally distinct areas within the wider complex - representing a level of intra-site organisation which, as noted above, has been documented at analogous sites elsewhere.

## Economy and craft/industry

4.3.12 Although the faunal assemblage from the site was very small (a result of the local soil conditions), and consequently of little interpretive value (App. C.2), several relatively rich assemblages of charred plant remains from Period 2.2 features provide some insights into the agricultural economy/organisation of the farmstead, supplemented
to some extent by other finds including a decorated quern stone and reused tile and brick perhaps deriving from ovens/corndryers.
4.3.13 The most informative charred plant remains - those selected for full analysis (see App. C.1) - were derived from four pits; two features forming part of the complex of intercutting features in Enclosure 2 (2211 and 2220) and two pits to the west of the enclosure system ( 2026 and 2041), whilst a further relatively rich assemblage was derived from a pit within Enclosure 3, excavated during the evaluation (E2207; Trench 22; Boothroyd and Chard 2017; see App. C.1). Although all attributed to Period 2.2, dating of these features is poor; they produced either no dateable pottery or small quantities of undiagnostic grey wares. With this caveat in mind, and as discussed in detail in App. C.1, the samples provide clear evidence for the production/consumption of barley, wheat (spelt) and, to a lesser extent, oats. Most of the samples appear to represent the remains of processed crops, with little chaff and occasional weed seeds representing probable contaminants. The sample from pit 2220 (one of the two intercutting pits in Enclosure 2), however, produced very large quantities of spelt wheat chaff and a richer and more diverse weed seed assemblage alongside wheat and barley grains, and seems to at least partly represent the residue of an earlier stage of crop processing (de-husking). Although potentially attesting to a specific episode of crop-processing, this assemblage was recovered from a relatively finds-rich deposit which also included ceramic building material, hobnails, hammerscale, fired clay and burnt stone - and hence within what could crudely be described as a middenlike/refuse deposit.
4.3.14 This same feature (2220), and several other of the pits in this intercutting cluster (see above, Table 1), produced other, indirect evidence for possible crop processing in the form of heat-affected, reused, brick and tile which may have derived from ovens/corndryers. Thus, although none of the features investigated during the excavation could be demonstrated to represent the remains of such processing facilities, their presence on the site seems certain. Possible evidence for the final processing of crops on-site is also provided by the decorated quern stone fragment from the basal fill of ditch 2126 (intervention 2198), on the boundary between Enclosures 1 and 2, associated with a mortarium sherd dated to the 3rd or 4th century AD. Described as deriving from either a small millstone or large hand-powered quern (App. B.4), this find, with its very unusual decoration, is discussed in detail in App B. 4 (and see Fig. 19).
4.3.15 Alongside this evidence for agricultural activity, there are also indications of other craft/industrial type activities. Again, the best evidence comes from the relatively finds-rich cluster of pits in Enclosure 2, where several features were associated with quantities of smithing waste including hammerscale and small quantities of slag (see Table 1 and App. B.5), suggesting that at least some small-scale metalworking was taking place on the site.

## Regional setting and settlement status

4.3.16 The Roman remains at Sapcote lay some 15 km south-southwest of the major Roman urban centre at Leicester (Ratae Corieltauvorum; civitas capital of the Corieltauvi) and was well-placed in terms of the contemporary road network, located less than 2 km
west of the Fosse Way, which here ran broadly north to south between Leicester and a small town at the crossroads between the Fosse Way and Watling Street, at High Cross/Wigston Parva (Venonae; see Liddle 1995), some 5km to the south of the site. Rural settlements in this part of southern Leicestershire are generally known only through surface finds scatters, but these suggest a widely settled landscape (Liddle 2004, fig. 1), and other areas of the county which have seen more sustained and systematic fieldwalking and survey have revealed evidence for an even and relatively dense pattern of settlement suggestive of a "developed agricultural landscape" (ibid, 77).
4.3.17 As discussed above, the morphology of the Period 2.2 enclosures at Sapcote suggest it is best seen as a fairly typical rural farmstead. Perrin's analysis suggests that the pottery assemblage is of a 'fairly basic utilitarian nature' (App. B.1), and although fine wares make up around $10 \%$ of the assemblage, its overall character suggests it derives from a modest, relatively low-status, domestic context. The other finds provide a similar impression, with a paucity of metalwork and no coins, whilst the small assemblage of ceramic building material clearly represents reused material from elsewhere, brought to the site to be used on a small scale for the construction of ovens/hearths. Relatively low-status farmsteads such as this probably formed the vast majority of rural settlements in the area, but their place in wider systems of land tenure and organisation and their relationship to other sites, such as small towns or villas, often remains unclear (see Millett 2016).
4.3.18 In this context, it is important to consider the relationship between the Roman activity at Hinckley Road and the villa recorded on the other side of the modern village, close to the Fosse Way, at Calver Hill (MLE283; see Section 1.3; Fig. 2). The site has been known since the early 19th century when stone quarrying revealed and destroyed what appears to have been a substantial masonry building, with reports of a tessellated surface and building foundations associated with Roman pottery, coins and building material. These early observations were reported by Arthur Pickering, who, in the early 1920s, examined the site and partially excavated what appears to have been a demolition layer or dump exposed by the quarrying, which contained large quantities of building material, alongside painted wall plaster, pottery, shell, animal bone and metalwork (Pickering 1935). The character and quantity of the building material and plaster implied the presence of an elaborate, multi-roomed masonry building and the pottery suggested activity during the 2nd and 3rd centuries AD. Subsequent work in the area has showed that remains of the villa complex were extensive, extending well beyond the area of 19th century quarrying, with programmes of fieldwalking and small-scale excavation during the 1960s and 1970s partially revealing the remains of a bath house and what is described as a tesserae workshop, both lying within a rectangular stone-walled enclosure measuring at least $40 \mathrm{mx40m}$. Unfortunately, this work has only been reported in summary form (Smith 1970; 1971; 1974; 1975; 1976; Liddle 2004, fig. 14), but it was suggested that "primary levels on the site date from the mid-first century AD" whilst the 'workshop' was in use during the late 3rd to early 4th century.
4.3.19 Whilst the exact layout and character of the villa remain uncertain, this was clearly a major, high-status site. It has been noted that Sapcote is one of many villas in the

English Midlands located in close proximity to small towns (Venonae, High Cross, in the case of Sapcote, located some 4 km to the south). Rivet described such sites, including Sapcote, as 'satellite' villas, and suggested they might have been official residences linked to the towns, performing administrative duties such as tax collection (Rivet 1955, 32), but this interpretation has since been questioned, and should now be regarded as highly speculative (Todd 1980, 126). Perhaps more relevant here is the extent to which the Sapcote villa may have been at the centre of a larger landed estate, and what the relationship between the activity at Hinckley Road and the villa may have been. In general terms it seems probable that some farmsteads in the immediate vicinity of villas may have been subsidiary or dependant settlements belonging or providing services and labour to larger 'estates', whilst others were essentially selfsufficient settlements with surplus agricultural goods allowing them access to local markets, but there is very little evidence from the Hinckley Road site capable of directly addressing this issue. Some of the finds from the site, including the decorated quern stone and the recycled building material, do hint at direct links with the villa (see Shaffrey, App. B.4, and Poole, App. B.3), but at present the extent of the economic and social dependency between the sites remains a matter for speculation, especially in the absence of detailed analysis and presentation of the results of the villa complex itself.

### 4.4 Periods 3 and 4: Anglo-Saxon and later land-use

4.4.1 The single small pit containing a sherd of probable Anglo-Saxon pottery provides the only evidence for activity on the site in the post-Roman period. The significance of this feature is difficult to gauge, and it cannot be taken as evidence for a continuation of the earlier Romano-British settlement into this period, although it is possible that the ditched boundaries of the enclosures remained visible as earthworks. Any such vestigial traces of the enclosures would, however, have been levelled by later cultivation, with the extensive traces of ridge and furrow revealed by the geophysics and the excavations clearly demonstrating that the site later lay within the open fields of Sapcote during medieval and post-medieval times.

### 4.5 Conclusions

4.5.1 The excavations of the remains of what is interpreted as a long-lived Romano British farmstead at Hinckley Road is of some significance in the immediate context of southern Leicestershire, where excavated rural settlements remain relatively rare. Although some aspects of the site's interpretation remain obscure, and the finds assemblages can only be described as modest, it provides an example of a relatively low-status site which is probably fairly typical of the large number of rural farmsteads in the wider area known from surface finds. The site arguably assumes a greater significance in light of its proximity to, and possible relationship with, the major villa complex to the east, and although the nature of the relationship between the two sites remains unclear, the results of the excavation will be of some importance if and when the results of fieldwork at the villa itself are examined in detail.

## 5 Publication and Archiving

### 5.1 Publication

5.1.1 It is proposed that a synthetic, illustrated report on the results of the fieldwork will be submitted for publication in the Transactions of the Leicestershire Archaeological and Historical Society.
5.1.2 This report both supplements the published article and is superseded by any new data and interpretations presented within it.

### 5.2 Archiving, retention and dispersal

5.2.1 The site archive is presently held by Oxford Archaeology and will be deposited with Leicestershire Museums in due course (under accession code X.A7.2019).
Hinckley Road，Sapcote，Leicestershire

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| 7 7 |  | $\begin{gathered} \infty \\ \underset{\sim}{0} \end{gathered}$ | $\underset{\sim}{\infty} \underset{\sim}{\infty}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{\infty} \\ & \hline \end{aligned}$ | $\begin{aligned} & \overrightarrow{0} \\ & \underset{\sim}{n} \end{aligned}$ | $\underset{\sim}{\underset{\sim}{0}}$ | $\underset{\sim}{n}$ | $\begin{aligned} & \underset{\tilde{n}}{\theta} \\ & \hline \end{aligned}$ | $\underset{\underset{r}{2}}{\underset{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{O}}$ | $\underset{\substack{n \\ \widehat{O} \\ \hline}}{ }$ |
| әd $\Lambda_{\perp}$ <br>  |  | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{\pi}{0} \end{aligned}$ | $\begin{aligned} & \frac{5}{4} \\ & \frac{\ddot{4}}{0} \end{aligned}$ | $\begin{aligned} & \frac{5}{4} \\ & \frac{\ddot{4}}{0} \end{aligned}$ |  | 言 | $\stackrel{\square}{\square}$ | $\stackrel{\square}{2}$ | \＃ | \＃ | 宕 |
|  |  | 芌 | ¢ | 戸 | $\stackrel{\rightharpoonup}{3}$ | 戸 | 戸 | 戸 | ¢ | ¢ | 芌 |
| eəıV |  | ＜ | ＜ | ＜ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ |
| ұхәұиоэ |  | $\underset{\sim}{\infty}$ | $\begin{aligned} & \underset{\sim}{\mathrm{O}} \\ & \underset{\sim}{2} \end{aligned}$ | $\underset{\substack{0 \\ \hline \\ \hline}}{ }$ | $\underset{\sim}{\underset{\sim}{0}}$ | $\underset{\sim}{N}$ | $\begin{aligned} & \text { n } \\ & \underset{\sim}{n} \end{aligned}$ | $\underset{\substack{\mathrm{O} \\ \hline \\ \hline}}{\text { N}}$ | $\underset{\substack{n \\ \\ \hline}}{ }$ | $\begin{aligned} & 0 \\ & \underset{\sim}{O} \\ & \hline \end{aligned}$ | $\underset{\sim}{n}$ |


| $\begin{gathered} \text { uo! } \\ \text {-ұеұиә!̣о } \end{gathered}$ |  |  |  | $\underset{\sim}{3}$ |  |  |  | $\underset{\dot{U}}{3}$ |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| әseg |  |  |  | $\begin{aligned} & \text { 긍 } \\ & \stackrel{0}{0} \text {. } \end{aligned}$ |  |  |  | $\begin{array}{\|l\|l\|} \hline \stackrel{\rightharpoonup}{0} \\ \stackrel{U}{\mathrm{O}} & \\ & 0 \end{array}$ |  | $\stackrel{+}{4}$ |  |  |  |  |
| adols „0 уеә」я |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| әр！ऽ |  |  |  |  |  |  |  |  |  | $\stackrel{\rightharpoonup}{0}$  <br> $\frac{\pi}{\tilde{0}}$  <br> $\frac{0}{0}$  <br> $E$ 0 |  |  |  |  |
| ueld u！ədeys |  |  |  | $\begin{aligned} & \stackrel{\text { 㐫 }}{\stackrel{~}{=}} \end{aligned}$ |  |  |  | $\begin{aligned} & \frac{1}{む} \\ & \stackrel{\text { ® }}{=} \end{aligned}$ |  |  |  |  |  |  |
| quәuodmos әи！़ |  | त्र $\frac{\pi}{0}$ $\frac{\pi}{0}$ 0 0 0 |  |  |  | $\begin{array}{\|l} \frac{त}{0} \\ \frac{\pi}{0} \\ \overrightarrow{0} \\ \underset{\sim}{0} \\ \end{array}$ | 0 <br> $\frac{0}{c}$ <br> 0 <br> $\frac{0}{\lambda}$ <br> $\frac{0}{0}$ <br> 0 |  |  |  |  |  |  |  |
| גnolo |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| （m）$\cdot 0$ | N | $\underset{O}{\sim}$ | $\underset{\circ}{\bullet}$ | $\stackrel{N}{0}-\infty_{\infty}^{\infty}$ | স্ণ | $$ | $\underset{\sim}{n}$ | $\underset{\sim}{0}$ | $\begin{gathered} 0 \\ \underset{0}{n} \end{gathered}$ | $\underset{\sim}{\infty} \underset{\sim}{\infty}$ | $\stackrel{\infty}{\infty} \underset{\sim}{1}$ |  |  |  |
| （w）$M / \mathrm{M} /$ g |  |  | $\stackrel{0}{0}$ | $\stackrel{\infty}{\underset{\sim}{N}}$ |  |  |  | $\infty_{\infty}^{\infty}$ |  | $\begin{aligned} & 0 \\ & \stackrel{0}{n} \\ & i \end{aligned}$ |  |  |  |  |
| （w） 7 |  |  | $\square$ | $\bigcirc$ |  |  |  |  |  |  |  |  |  |  |
| se zures |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 人я рә｜！！ |  |  |  | $\underset{A}{\text { U' }} \text { N゙ }$ |  |  |  | $\begin{array}{\|c} 0 \\ \underset{A}{0} \\ \hline \end{array}$ |  | $\underset{\sim}{\infty}$ |  |  |  |  |
| －ou әıņeəy |  |  |  |  |  |  |  | $\underset{\sim}{n}$ | $\begin{array}{\|c} n \\ \underset{\sim}{2} \\ \hline \end{array}$ |  |  |  |  |  |
| poupd | $\underset{\sim}{\sim}$ | $\underset{i}{i}$ | $\underset{\sim}{i}$ | $\underset{\sim}{i}$ | $\underset{\sim}{i}$ | $\underset{\sim}{i}$ | $\underset{\sim}{i}$ | $\underset{\sim}{i}$ | $\stackrel{\rightharpoonup}{i}$ | $\begin{aligned} & \stackrel{\rightharpoonup}{0} \\ & \stackrel{5}{5} \text { 앙 } \end{aligned}$ | $\left\|\begin{array}{l} \mathrm{r} \\ \mathrm{O} \\ 5 \\ 5 \\ \hline \end{array}\right\|$ | $\stackrel{\widetilde{0}}{\text { I }}$ | $\underset{\sim}{i}$ | $\stackrel{\square}{\text { c }}$ |
| 7 7 | $\stackrel{N}{\hat{n}}$ | $\begin{aligned} & \hat{n} \\ & \hat{\lambda} \end{aligned}$ | 苟 | $\underset{-}{\underset{寸}{O}}$ | $\underset{-}{\underset{寸}{\prime}}$ | $\underset{\rightarrow}{\underset{寸}{-1}}$ | $\begin{gathered} \hat{n} \\ \underset{\sim}{n} \end{gathered}$ | No |  | $\stackrel{\wedge}{\mathrm{O}}$ |  | $\bigcirc$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\bigcirc$ |
| əd $\wedge_{\perp}$ <br>  | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{\pi}{0} \end{aligned}$ | $\begin{aligned} & \frac{ᄃ}{y} \\ & \frac{1}{0} \end{aligned}$ | \＃ | $\begin{aligned} & \text { 毕 } \\ & \stackrel{y}{0} \end{aligned}$ | $\begin{aligned} & \stackrel{ᄃ}{y} \\ & \stackrel{y}{0} \end{aligned}$ |  | $\begin{aligned} & \text { ᄃ } \\ & \stackrel{y}{\mathrm{I}} \end{aligned}$ |  | $\begin{aligned} & \frac{5}{4} \\ & \frac{\pi}{0} \end{aligned}$ | $\stackrel{\square}{2}$ | 艺 | $\begin{aligned} & \text { ⿳亠二口欠} \\ & \frac{0}{00} \end{aligned}$ | $\begin{array}{\|l} \frac{5}{y} \\ \frac{15}{2} \end{array}$ | ¢ |
|  | ¢ | ¢ | 戸 | 芌 | ¢ | ¢ | 戸 | 芌 | $\overline{\text { ¢ }}$ | \＃ | ¢ | $\begin{aligned} & \text { O} \\ & \vdots \\ & 0.0 \\ & 0.0 \end{aligned}$ | $\begin{aligned} & \circ \\ & \vdots \\ & \vdots \\ & \vdots 0 \end{aligned}$ | ¢ |
| eər $\forall$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\varangle$ | ＜ | ＜ | ＜ |  | $\varangle$ |  |
| ұхәұиоэ | $\begin{aligned} & \infty \\ & \underset{\sim}{0} \\ & \hline \end{aligned}$ | $\begin{aligned} & \text { or } \\ & 0 \\ & \hline-1 \end{aligned}$ | of | $\underset{\text { In }}{\vec{y}}$ | $\underset{\sim}{\text { Y }}$ | $\underset{\sim}{n}$ | $\begin{aligned} & \text { 寸 } \\ & \hline- \end{aligned}$ |  | $\begin{aligned} & 0 \\ & \underset{\sim}{0} \\ & \hline \end{aligned}$ | 合 | $\underset{\substack{\infty \\ \underset{\sim}{\circ} \\ \hline}}{ }$ | $\underset{-9}{9}$ | $\underset{\substack{0 \\ 0 \\ 0 \\ \hline}}{ }$ |  |

Hinckley Road，Sapcote，Leicestershire

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| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| әseg |  |  | $\begin{array}{\|l\|l} \stackrel{\rightharpoonup}{\mathrm{O}} \\ \stackrel{0}{0} \\ 0 \\ 0 \end{array}$ | $\begin{array}{\|l} \stackrel{\rightharpoonup}{\text { İ }} \\ \stackrel{0}{0} \\ 0 \end{array}$ |  | $\begin{array}{\|l\|} \hline \stackrel{\rightharpoonup}{0} \\ \stackrel{0}{0} \\ 0 \\ 0 \\ \hline \end{array}$ |  | $\left\|\begin{array}{ll} \stackrel{\rightharpoonup}{0} & \\ \stackrel{0}{0} & \\ 0.0 & 0 \end{array}\right\|$ |  | 范 |  | $\begin{aligned} & \text { त्ण } \\ & \stackrel{0}{0} \\ & 0 \end{aligned}$ |  |
| ədols f0＞еə」я | $\left\lvert\, \begin{aligned} & \frac{2}{0} \\ & \frac{\pi}{4} \end{aligned}\right.$ |  |  |  |  |  |  |  |  |  |  |  |  |
| әр！ऽ | $\begin{aligned} & \stackrel{\circ}{む} \\ & \stackrel{\sim}{心} \end{aligned}$ |  | $\begin{aligned} & \stackrel{\rightharpoonup}{\stackrel{0}{0}} \\ & \stackrel{\rightharpoonup}{0} \\ & \stackrel{0}{0} \\ & \dot{E} \end{aligned}$ | $\begin{aligned} & \stackrel{\varrho}{\circlearrowright} \\ & \stackrel{\sim}{*} \end{aligned}$ |  | $\begin{array}{\|l} \frac{3}{3} \\ \stackrel{3}{\bar{N}} \\ \frac{\pi}{4} \end{array}$ |  | $\begin{array}{\|l} \frac{3}{3} \\ \frac{0}{\bar{N}} \\ \frac{\pi}{\omega} \end{array}$ |  |  |  | $\begin{aligned} & \stackrel{+}{0} \\ & \frac{\pi}{0} \\ & \frac{0}{0} \\ & 0 \\ & \xi \end{aligned}$ |  |
| ueld u！ədeus |  |  | $\begin{array}{\|l} \frac{0}{0} \\ \stackrel{0}{3} \\ \vdots \\ \hline \end{array}$ |  |  |  |  |  |  | $\frac{\frac{1}{3}}{\frac{2}{3}}$ |  |  |  |
| ұuәuodmos әи！़ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ınopo |  |  |  |  |  |  | 资 |  |  |  |  |  |  |
| （m）$\cdot 0$ |  | $\underset{\sim}{7}$ | $\stackrel{\bullet}{\circ}$ | $\underset{\sim}{2}$ | $\underset{0}{2}$ | $\underset{\substack{0 \\ \underset{\sim}{0} \\ \hline}}{ }$ | $\underset{\substack{0 \\ \underset{0}{0} \\ \hline}}{ }$ | $\underset{\sim}{\underset{0}{9}}$ | $\underset{\substack{0 \\ 0}}{ }$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\stackrel{n}{0}$ | $\underset{0}{0}$ |
| （m）$\cdot M /$ ¢ |  |  | $\stackrel{\bullet}{\circ}$ | $\stackrel{\infty}{\stackrel{\infty}{\circ}}$ |  | $\underset{\sim}{\underset{\sim}{n}}$ | $\underset{\sim}{\underset{i}{N}}$ | $\begin{array}{\|c} \sim \\ \sim \\ 0 \end{array}$ |  | $\underset{o}{\mathrm{~A}}$ |  | $\stackrel{\underset{\sim}{\lambda}}{\underset{\sim}{2}}$ |  |
| （w） 7 |  |  | $\rightarrow$ |  |  |  |  |  |  | ${ }_{0}^{\infty}$ |  |  |  |
| se zues |  |  |  |  |  |  |  |  |  |  |  | $\underset{\sim}{\underset{\sim}{\mathrm{N}}} \underset{\sim}{0}$ |  |
| кя рә｜！！ | $\begin{array}{\|c} n \\ \underset{\sim}{n} \\ \hline \end{array}$ |  | $\underset{\substack{0 \\ \hline \\ \hline \\ \hline \\ \hline}}{ }$ | O- |  | OO |  | $\underset{\sim}{\infty}$ |  | $\underset{\sim}{\mathrm{O}}$ |  | $\begin{array}{lc} \text { Ni } \\ \text { Ni } \\ \text { Ni } \\ \text { N } \end{array}$ |  |
| －ou әıпıeə」 |  |  |  | $\underset{\sim}{\mathrm{O}}$ | $\underset{\sim}{\infty}$ |  |  |  |  |  |  | $\underset{\sim}{\underset{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{2}}$ |
| poüd | $\left\lvert\, \begin{aligned} & \mathrm{r} \\ & \stackrel{\mathrm{O}}{2} \\ & 5 \\ & 5 \end{aligned}\right.$ | $\begin{aligned} & \stackrel{+}{0} \\ & \stackrel{0}{0} \\ & \stackrel{5}{5} \\ & \hline \end{aligned}$ | $\stackrel{+}{i}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\checkmark$ | $\checkmark$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ |
| 7 J | $\begin{aligned} & \text { N } \\ & \underset{\sim}{0} \end{aligned}$ | $\begin{aligned} & \text { N } \\ & \underset{\sim}{O} \end{aligned}$ | $\underset{\substack{\underset{\sim}{2} \\ \hline}}{ }$ | $\underset{\sim}{\mathrm{O}}$ | O্N | $\underset{\sim}{\mathrm{O}}$ | NON | $\underset{\sim}{\mathrm{O}}$ | $\underset{\sim}{\mathrm{O}}$ | or | O- | $\underset{\sim}{\underset{\sim}{2}}$ | $\underset{\sim}{i}$ |
| әd／$\perp_{\perp}$ <br>  | \＃ | 亮 | \＃ | $\begin{aligned} & \text { 先 } \\ & \stackrel{t}{0} \end{aligned}$ | $\begin{aligned} & \text { ᄃ } \\ & \vdots \\ & 0 \end{aligned}$ | $\left\lvert\, \begin{aligned} & 3 \\ & 0 \\ & 0 \\ & 3 \\ & \hline \end{aligned}\right.$ | $\begin{array}{\|l\|l\|} 3 \\ 0 \\ \hline \end{array}$ |  | $\underset{\bar{\rightharpoonup}}{\bar{\lambda}}$ | $\stackrel{\square}{2}$ | 言 |  | $\begin{aligned} & \frac{5}{4} \\ & \text { 능 } \end{aligned}$ |
|  | 苛 | $\overline{\text { ¢ }}$ | 艺 | \％ | $\overline{\text { ¢ }}$ | 艺 | ¢ | \＃ | ¢ | － | $\overline{\text { ¢ }}$ | 芌 | ¢ |
| eəJV | ＜ | ＜ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ |
| ұхәұиоэ | $\begin{aligned} & \text { N} \\ & \text { N} \\ & \hline \end{aligned}$ | $\begin{aligned} & n \\ & \\ & \end{aligned}$ | $\begin{aligned} & \underset{\sim}{\mathrm{O}} \\ & \mathbf{O} \end{aligned}$ | $\underset{\sim}{n}$ | $\underset{\sim}{\text { O}}$ | Non | OO-N | $\underset{\sim}{\hat{O}}$ | oio | O- | $\underset{\sim}{\mathrm{O}}$ | $\underset{\sim}{\underset{\sim}{7}}$ | $\underset{\sim}{\underset{\sim}{1}}$ |


| uo！ －ұедиә！ィо |  |  | z |  | 3 |  |  |  |  | $\sum^{\text {u }}$ |  |  |
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| әseg | 烒 |  | $\begin{array}{\|l\|l} \stackrel{\rightharpoonup}{0} \\ \stackrel{0}{c} \\ 0 \\ 0 \\ 0 \end{array}$ |  | $\stackrel{\text {＋}}{4}$ |  |  |  |  | $\stackrel{+}{4}$ |  | 产 |
| ədols f0＞еə」я |  |  | $\begin{aligned} & \frac{3}{3} \\ & \frac{0}{\bar{\pi}} \\ & \frac{\pi}{\omega} \end{aligned}$ |  |  |  |  |  |  |  |  |  |
| әр！ऽ |  |  |  |  |  |  |  |  |  | $\stackrel{\pi}{0}$  <br> $\frac{0}{0}$  <br> $\frac{0}{E}$  <br> $\xi$ 0 |  |  |
| ueld u！ədeपS |  |  | $\left\lvert\, \begin{aligned} & \stackrel{\rightharpoonup}{\varpi} \\ & \stackrel{ٍ}{ٍ} \end{aligned}\right.$ |  |  |  |  |  |  |  |  | － |
| łuәuodmoэ әи！़ |  |  |  | $\begin{aligned} & \stackrel{ \pm}{n} \\ & \frac{\lambda}{0} \\ & \underset{\sim}{\bar{N}} \end{aligned}$ |  |  | $\begin{aligned} & \stackrel{H}{\bar{n}} \\ & \frac{\lambda}{2} \\ & \frac{\pi}{v} \\ & i \end{aligned}$ |  |  |  |  |  |
| anopo |  |  |  |  |  |  |  |  | .읕 |  |  |  |
| （m）$\cdot 0$ | へo | $\stackrel{\wedge}{\circ}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty} \underset{\sim}{\infty}$ | $\underset{\sim}{n}$ | $\underset{\sim}{\sim}$ | $\begin{gathered} \infty \\ \underset{0}{\infty} \end{gathered}$ | $\underset{\sim}{0}$ | $\underset{\substack{\infty \\ \underset{\sim}{2} \\ \hline}}{ }$ | $\underset{\sim}{\infty} \underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\underset{\sim}{i}}$ |
| （m）$M / \mathrm{M}$＇g | $\underset{\sim}{G}$ |  | $\stackrel{n}{n}$ |  | $\underset{\vdots}{\star}$ |  |  |  |  |  |  | $0$ |
| （w） 7 | $\begin{aligned} & \text { O} \\ & \text { O. } \end{aligned}$ |  |  |  |  |  |  |  |  |  |  |  |
| se әmes |  |  |  |  |  |  |  |  |  |  |  |  |
|  | $\underset{\sim}{\underset{\sim}{A}}$ |  | $\underset{\sim}{0}$ |  |  |  |  |  |  | $\underset{\sim}{\sim}$ |  | $\underset{\sim}{\underset{\sim}{N}}$ |
| －ou əınıeə |  |  | $\underset{\sim}{\infty}$ | $\underset{\sim}{O}$ |  |  |  | $\underset{\sim}{\underset{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{7}}$ |  |  |  |
| ро！ıəd | $\stackrel{\text { N }}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\checkmark$ | $\checkmark$ | － | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\checkmark$ | － | N |
| 7 7 | $\underset{\sim}{n}$ | $\underset{\sim}{\underset{\sim}{2}}$ | $\underset{\sim}{n}$ | $\underset{\sim}{\underset{\sim}{c}}$ | $\begin{aligned} & \stackrel{\rightharpoonup}{\mathrm{N}} \\ & \underset{\sim}{2} \end{aligned}$ | $\underset{\sim}{\underset{N}{2}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{1}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\text { ন্ণ }}$ |
| әd／$\perp_{\perp}$ <br> əયクłeə」 | \＃ | 亮 | $\begin{aligned} & \frac{5}{U} \\ & \frac{\ddot{y}}{0} \end{aligned}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{14}{0} \end{aligned}$ | 毫 | $\begin{array}{\|l\|l\|l\|} 3 \\ 3 \\ 3 \end{array}$ | $\frac{3}{0}$ | $\begin{aligned} & \stackrel{ᄃ}{4} \\ & \stackrel{\rightharpoonup}{0} \end{aligned}$ | $\begin{aligned} & \frac{5}{4} \\ & \frac{1 \pi}{0} \end{aligned}$ | 毫 | $\left\lvert\, \begin{aligned} & 3 \\ & 3 \\ & \hline \end{aligned}\right.$ | \＃ |
|  | 苞 | ¢ | 艺 | $\overline{\text { ¢ }}$ | － | 戸 | 戸 | $\overline{\text { ¢ }}$ | $\overline{\text { ¢ }}$ | 芌 | $\overline{\text { ¢ }}$ | 苞 |
| eวлV | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ |
| ұхәұиоэ | $\underset{\sim}{\underset{\sim}{n}}$ | $\underset{\sim}{\underset{N}{A}}$ | $\underset{\sim}{\sim}$ | $\begin{aligned} & 0 \\ & \underset{N}{1} \\ & \hline \end{aligned}$ | $\underset{\sim}{\hat{N}}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\underset{\sim}{2}}$ | O | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{\sim}}$ | ষ্ণ |


| $\begin{aligned} & \frac{\rightharpoonup}{x} \\ & \stackrel{\rightharpoonup}{0} \\ & 0 \end{aligned}$ | $\stackrel{\text { ® }}{\text { 区 }}$ | $\begin{aligned} & \text { Z} \\ & 0 \\ & 0 \\ & \text { H } \\ & 0 \end{aligned}$ |  | J | $\begin{aligned} & \text { 을 } \\ & \hline \text { 20, } \end{aligned}$ |  | $\begin{aligned} & \text { ते } \\ & \text { ס } \\ & \text { = } \end{aligned}$ | $\begin{aligned} & \tilde{\sim} \\ & \stackrel{1}{\tilde{E}} \\ & \tilde{\sim} \end{aligned}$ | $\underset{\text { E }}{ }$ | $\underset{\infty}{\underline{\xi}}$ | $\stackrel{E}{\square}$ | 言 |  |  | $\stackrel{\%}{0}$ |  | $\begin{gathered} \tilde{\sim} \\ \text { N } \end{gathered}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2025 | C | fill | pit | 2024 | 2.2 |  |  |  |  |  | 0.14 | greyish brown | clayey silt |  |  |  |  |  |
| 2026 | C | cut | Pit | 2026 | 2.2 |  | $\begin{aligned} & 2027, \\ & 2028 \end{aligned}$ |  | 1.02 | 0.92 | 0.26 |  |  | square | steep | mod | concav $\mathrm{e}$ |  |
| 2027 | C | fill | Pit | 2026 | 2.2 |  |  |  |  |  | 0.06 | black | sandy silt |  |  |  |  |  |
| 2028 | C | fill | pit | 2026 | 2.2 |  |  |  |  |  | 0.8 | mid <br> brownis <br> h grey | sandy silt |  |  |  |  |  |
| 2029 | C | cut | ditch | 2029 | 2.2 | 2011 | $\begin{aligned} & 2030, \\ & 2035 \end{aligned}$ | $\begin{aligned} & 2011, \\ & 2054 \end{aligned}$ |  | 0.8 | 0.57 |  |  | indetermin ate | moderat <br> e | moderate | concav <br> e | N-S |
| 2030 | C | fill | ditch | 2029 | 2.2 | 2011 |  |  |  |  | 0.29 | light brownis h grey | silty sand |  |  |  |  |  |
| 2031 | C | cut | furrow | 2031 | 4 |  | 2032 |  |  | 0.4 | 0.12 |  |  | linear | shallow | gentle | flattish | E-W |
| 2032 | C | fill | furrow | 2031 | 4 |  |  |  |  |  | 0.12 | mid orange brown | silt clay |  |  |  |  |  |
| 2033 | C | cut | furrow | 2033 | 4 |  | 2034 |  |  | 1.08 | 0.12 |  |  | linear | moderat <br> e | moderate | flat | NW-SE |
| 2034 | C | fill | furrow | 2033 | 4 |  |  |  |  |  | 0.12 | greyish brown | sandy silt |  |  |  |  |  |
| 2035 | C | fill | ditch | 2029 | 2.2 | 2011 |  |  |  |  | 0.3 | mid greyish brown | silty and |  |  |  |  |  |
| 2036 | C | cut | pit | 2036 | 2.2 |  | 2037 |  | 0.98 | 0.74 | 0.17 |  |  | square | shallow | gentle | concav <br> e |  |
| 2037 | C | fill | pit | 2036 | 2.2 |  |  |  |  |  | 0.17 | mid orangish brown | sandy silt |  |  |  |  |  |
| 2038 | C | cut | pit | 2038 | 2.2 |  | 2039 |  |  | 1.98 | 0.21 |  |  | circular | moderat e | moderate | flat |  |
| 2039 | C | fill | pit | 2038 | 2.2 |  |  |  |  |  | 0.21 | greyish brown | sandy silt |  |  |  |  |  |
| 2040 | C | cut | Furrow | 2040 | 4 |  | 2045 |  |  | 0.66 | 0.29 |  |  | linear | steep | moderate | $\begin{aligned} & \text { concav } \\ & \text { e } \end{aligned}$ | E-W |
| 2041 | C | cut | pit | 2041 | 2.2 |  | $\begin{aligned} & 2046, \\ & 2047 \end{aligned}$ |  | 1.3 | 0.9 | 0.3 |  |  | subcircular | moderat e | moderate | concav <br> e |  |


| $\begin{gathered} \text { uo! } \\ \text {-ұеұиә!! } \end{gathered}$ |  |  |  |  |  |  | $\sum_{3}^{\prime} \sum_{u}^{u}$ |  |  |  | $\sum_{3}^{\prime}$ |  | $\underset{3}{3}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| əseg |  | 范 |  |  |  |  | $\begin{aligned} & \stackrel{\rightharpoonup}{0} \\ & \stackrel{0}{0} \\ & \stackrel{0}{0} \end{aligned}$ |  |  |  | $\begin{aligned} & \text { 范 } \\ & \stackrel{0}{0} \\ & \hline 0 \end{aligned}$ |  |  |
| ədols f0 》еә」я |  |  |  |  |  |  |  |  | $\left\lvert\, \begin{aligned} & \stackrel{\Theta}{\stackrel{\rightharpoonup}{U}} \\ & \underset{\sim}{\omega} \\ & \hline \end{aligned}\right.$ |  |  |  |  |
| әр！ऽ |  | 軎 |  |  |  |  | $\begin{array}{\|l\|l} \frac{3}{0} \\ \stackrel{0}{\sqrt{n}} \\ \frac{N}{n} \end{array}$ |  | $\begin{aligned} & \frac{3}{3} \\ & \frac{3}{\bar{N}} \\ & \frac{\pi}{\omega} \end{aligned}$ |  |  |  | $\stackrel{\rightharpoonup}{0}$  <br> $\frac{0}{0}$  <br> 0  <br> $\dot{E}$ 0 |
| ueld u！ədeus |  | $\frac{\frac{1}{7}}{\substack{3}}$ |  |  |  |  | $\begin{aligned} & \stackrel{1}{\varpi} \\ & \stackrel{ভ}{\leftrightarrows} \end{aligned}$ |  |  |  |  |  |  |
| ұиәиodmoэ əu！」 |  |  |  | $\begin{aligned} & \frac{0}{0} \\ & \tilde{n} \\ & \underset{n}{n} \\ & \stackrel{n}{n} \end{aligned}$ |  |  |  | $\begin{aligned} & 0 \\ & \frac{0}{0} \\ & \tilde{\sim} \\ & \frac{\lambda}{\bar{n}} \end{aligned}$ |  |  |  |  |  |
| anojo |  |  |  |  |  |  |  |  |  |  |  |  |  |
| （m）$\cdot 0$ | $\underset{\substack{0 \\ \underset{o}{2} \\ \hline}}{ }$ | $\stackrel{\rightharpoonup}{\underset{O}{3}}$ | $\stackrel{\rightharpoonup}{\underset{O}{3}}$ | $\begin{gathered} 9 \\ \\ \hline \end{gathered}$ | $\underset{\substack{0 \\ \hdashline \\ \hline}}{ }$ | $\begin{gathered} 0 \\ \vdots \\ 0 \\ \hline \end{gathered}$ | $\underset{0}{0}$ | $\underset{\sim}{\underset{\sim}{i}}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\stackrel{m}{0}$ | $\stackrel{m}{0}$ | $\underset{\sim}{N}$ |
| （w）$M /{ }^{\prime} \cdot$ g |  | $\stackrel{+}{\circ}$ |  |  |  |  | $\begin{aligned} & 0 \\ & 0 \\ & 0 \end{aligned}$ |  | $\underset{\underset{\sim}{\underset{\sim}{2}}}{\underset{\sim}{2}}$ |  | $\stackrel{\sim}{\infty}$ |  | $\underset{\sim}{\underset{\sim}{4}}$ |
| （w） |  | $\stackrel{\infty}{\infty}$ |  |  |  |  |  |  |  |  |  |  |  |
| se zmes |  |  |  |  |  |  |  |  |  |  |  |  | $\underset{\sim}{\underset{\sim}{2}}$ |
| кя рә｜！ı |  | $\underset{\sim}{\text { 寸 }}$ |  |  |  |  | O-寸 |  | $$ |  | $\underset{\sim}{\sim}$ |  |  |
| －ou әıņeay |  |  |  |  |  |  |  |  | $\underset{\sim}{n}$ | $\underset{\sim}{\mathrm{O}}$ |  |  |  |
| роиəə | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\checkmark$ | $\underset{\sim}{N}$ | $\underset{\sim}{N}$ | † | $\checkmark$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\dagger$ | $\checkmark$ | N |
| 7n） | $\bigcirc$ | $\underset{\sim}{\underset{\sim}{n}}$ | $\underset{\sim}{\sim}$ | ơ | $\underset{\sim}{\underset{\sim}{c}}$ | $\underset{\sim}{\underset{\sim}{c}}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\circ}$ | 응 | N N N N | $\underset{\sim}{N}$ | $\underset{\sim}{\underset{\sim}{\mathrm{O}}}$ |
| əd $\wedge_{\perp}$ <br>  |  | 㪣 | \＃ | $\begin{aligned} & 3 \\ & 0 \\ & 0 \\ & \frac{3}{3} \end{aligned}$ | 言 | 言 | $\left\lvert\, \begin{aligned} & 3 \\ & 0 \\ & 0 \\ & 3 \\ & \hline 3 \end{aligned}\right.$ | $\begin{aligned} & 3 \\ & 0 \\ & 0 \\ & 3 \end{aligned}$ |  |  | $\begin{array}{\|l\|l\|} \frac{3}{0} \\ \frac{2}{3} \end{array}$ | $\left\lvert\, \begin{aligned} & 3 \\ & \frac{3}{2} \\ & 4 \end{aligned}\right.$ | $\begin{aligned} & \text { ᄃ } \\ & \text { y } \\ & 0 \end{aligned}$ |
| 人108ə¢е） |  | 芌 | （ | ¢ | 产 | $\overline{\text { ¢ }}$ | 苛 | $\overline{\text { i }}$ | 苛 | $\overline{\text { ¢ }}$ | \＃ | $\overline{\text { ¢ }}$ | 苛 |
| eวлV | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ |  |  | $\cup$ |
| ұхәұиоэ | $\underset{\sim}{\text { Y }}$ | $\underset{\sim}{\underset{\sim}{c}}$ | $\underset{\sim}{\text { 寸 }}$ | $\underset{\sim}{\text { No }}$ | $\underset{\substack{0 \\ \underset{\sim}{2} \\ \hline}}{ }$ | $\underset{\sim}{\text { No }}$ | $\underset{\sim}{\infty}$ | $\underset{\text { O }}{\underset{\sim}{\text { O}}}$ | OiN | 듬 | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\underset{\sim}{\mathrm{O}}}$ |


| $\begin{gathered} \text { uo! } \\ \text {-ұеұиә!! } \end{gathered}$ |  |  | $\begin{aligned} & \text { u } \\ & \sum_{2}^{2} \\ & \sum^{2} \end{aligned}$ |  | $\left\lvert\, \begin{aligned} & \sum_{2}^{3} \\ & \underset{z}{u} \\ & \sum_{2} \end{aligned}\right.$ |  | ～ | $\underset{\dot{山}}{3}$ | 3 |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| əseg |  |  | $\begin{aligned} & \text { त्U } \\ & \stackrel{\text { O}}{0} \end{aligned}$ |  | $\begin{aligned} & \text { 苍 } \\ & \stackrel{C}{0} \end{aligned}$ |  | $\left\|\begin{array}{ll} \underset{0}{c} \\ \underset{0}{0} & \\ 0 & 0 \end{array}\right\|$ | $\begin{aligned} & \text { T} \\ & \stackrel{\rightharpoonup}{0} \\ & \text { O } \end{aligned}$ | $\begin{array}{ll} \text { 긍 } \\ \stackrel{0}{0} \\ \stackrel{0}{0} & 0 \end{array}$ |  | 芴 |  |  |
| ədols f0 》еә」я |  |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \frac{2}{0} \\ & \frac{\pi}{5} \end{aligned}$ |  |  |
| әр！ऽ |  |  | $\begin{aligned} & \stackrel{+}{0} \\ & \stackrel{\rightharpoonup}{\omega} \\ & \stackrel{\rightharpoonup}{0} \\ & \stackrel{\rightharpoonup}{E} \end{aligned}$ |  | $\stackrel{\stackrel{Q}{\Perp}}{\stackrel{\sim}{\sim}}$ |  | $\begin{aligned} & \stackrel{\varrho}{\otimes} \\ & \stackrel{\sim}{*} \end{aligned}$ |  | $\begin{aligned} & \frac{3}{3} \\ & \frac{0}{\bar{N}} \\ & \frac{1}{\omega} \end{aligned}$ |  | $$ |  |  |
| ueld u！ədeus |  |  |  |  |  |  |  | $\begin{aligned} & \stackrel{1}{\varpi} \\ & \stackrel{ভ}{\leftrightarrows} \end{aligned}$ |  |  | $\begin{aligned} & \frac{0}{0} \\ & \stackrel{0}{z} \\ & \underset{G}{0} \end{aligned}$ |  |  |
| ұиәиodmoэ əu！」 | $\begin{aligned} & 0 \\ & \frac{0}{\tilde{N}} \\ & \tilde{n} \\ & \frac{\pi}{n} \\ & \hline \end{aligned}$ |  |  |  |  |  |  |  |  | $\begin{aligned} & 0 \\ & \frac{0}{c} \\ & \tilde{\sim} \\ & \frac{\lambda}{\bar{n}} \end{aligned}$ |  |  |  |
| anopo |  |  |  |  |  |  |  |  |  |  |  |  |  |
| （m）$\cdot 0$ | $\underset{\sim}{n}$ | O- | $\underset{\sim}{寸}$ | $\underset{\sim}{~}$ | N | $\underset{o}{n}$ | $\underset{\sim}{m}$ | $\underset{o}{n}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\substack{0 \\ 0 \\ 0}}{ }$ | $\underset{\sim}{0}$ | $\begin{gathered} m \\ 0 \\ \hline \end{gathered}$ |
| （w）$M /{ }^{\prime} \cdot$ g |  |  | $\underset{\sim}{\sim}$ |  | $\stackrel{\infty}{\stackrel{\infty}{\circ}}$ |  | $\stackrel{\ominus}{\circ}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty} \underset{\sim}{\infty}$ |  | $\underset{\substack{\infty \\ \underset{\sim}{2} \\ \hline}}{ }$ |  |  |
| （w） 7 |  |  |  |  |  |  |  |  |  |  | $\begin{array}{\|c} 0 \\ 0 \\ 0 \end{array}$ |  |  |
| se zmes |  |  | $\underset{\sim}{n}$ | $\underset{\sim}{\text { O- }}$ |  |  |  | Nò |  |  |  |  |  |
| кя рә｜！ı |  |  | $\underset{\sim}{\infty}$ |  | OO |  | $\underset{\sim}{\hat{O}}$ | $\begin{array}{ll} \infty \\ \hline 0 \\ \hline 0 \\ \hline \end{array} 0$ | $\underset{\sim}{n}$ |  | $\begin{aligned} & \bullet \stackrel{\ominus}{0} \\ & \text { O} \end{aligned}$ |  |  |
| －ou әıņeay |  |  | $\underset{\sim}{\mathrm{O}}$ | Nòio |  |  |  | $\underset{\sim}{\mathrm{O}}$ |  |  |  |  |  |
| роиəə | N | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\checkmark$ | $\checkmark$ | $\underset{\sim}{\sim}$ | $\stackrel{\sim}{\sim}$ | $\underset{\sim}{\sim}$ |
| 7 7 | N | $\underset{\sim}{\mathrm{O}}$ | $\underset{\sim}{n}$ | $\underset{N}{\hat{N}}$ | $\begin{aligned} & \text { on } \\ & \text { O } \end{aligned}$ | No | $\begin{array}{\|c} \underset{\sim}{0} \\ \text { N } \end{array}$ | $\underset{\sim}{\underset{\sim}{O}}$ | $\underset{\sim}{n}$ | $\underset{\sim}{\text { O}}$ | $\begin{aligned} & \text { n } \\ & \hline 0 \\ & \hline \end{aligned}$ | $\underset{\sim}{\mathrm{O}}$ | $\underset{\sim}{\underset{O}{2}}$ |
| əd $\wedge_{\perp}$ <br>  | $\begin{aligned} & \frac{ᄃ}{y} \\ & \frac{\ddot{y}}{2} \end{aligned}$ | $\begin{array}{\|l} \frac{ᄃ}{4} \\ \stackrel{y}{0} \end{array}$ |  | $\begin{aligned} & \frac{ᄃ}{y} \\ & \frac{\ddot{y}}{2} \end{aligned}$ | $\begin{aligned} & \text { ᄃ } \\ & \text { y } \\ & \hline 0 \end{aligned}$ |  | $\begin{aligned} & \frac{5}{4} \\ & \frac{\square}{0} \end{aligned}$ |  | $\begin{array}{\|l\|l\|} 3 \\ 0 \\ \hline \end{array}$ | $\left\lvert\, \begin{array}{l\|} \frac{3}{0} \\ 0 \\ 2 \\ \hline \end{array}\right.$ | $\begin{aligned} & \overline{0} \\ & \stackrel{0}{\leftrightarrows} \\ & \stackrel{\rightharpoonup}{\mathrm{o}} \\ & \hline \end{aligned}$ |  |  |
| 人108ə¢е） | ¢ | 产 | 苛 | $\overline{\text { ¢ }}$ | $\stackrel{\square}{3}$ | \＃ | 苛 | $\stackrel{3}{3}$ | 芌 | （ | 芌 | ¢ | \＃ |
| eวлV | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ |
| ұхәұиоэ | $\begin{array}{\|c} \stackrel{\sim}{\mathrm{N}} \\ \mathrm{~N} \end{array}$ | $\underset{\sim}{e}$ | $\underset{\sim}{N}$ | $\begin{gathered} \infty \\ \underset{\sim}{0} \\ \hline \end{gathered}$ | $\underset{\sim}{\text { Non }}$ | Oి | $\underset{\sim}{\underset{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{2}}$ | $$ | ষ্ণ | $\begin{aligned} & \text { n} \\ & \hline 0 \\ & \hline \end{aligned}$ | \|e | $\underset{\sim}{\hat{O}}$ |


| $\begin{gathered} \text { uo! } \\ \text {-ұеұиә!!о } \end{gathered}$ |  |  |  | 3 |  | $\underset{\substack{~} \underset{山}{>}}{\substack{2}}$ |  | un |  |  | $\underset{3}{3}$ |  | $\underset{\text { 3 }}{3}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| әseg |  |  |  | $\stackrel{+}{4}$ |  | $\stackrel{\text { T }}{4}$ |  | $\left\|\begin{array}{ll} \stackrel{\rightharpoonup}{0} & \\ \stackrel{0}{c} \\ \stackrel{0}{0} & \\ 0 \end{array}\right\|$ |  |  | $\left\|\begin{array}{ll} \vec{~} & \\ \underset{0}{0} \\ 0 & 0 \end{array}\right\|$ |  |  |  |
| adols „0 уеә」я |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| әр！ऽ |  |  |  | $\stackrel{\rightharpoonup}{0}$  <br> $\frac{0}{0}$  <br> $\frac{0}{0}$  <br> $E$ 0 |  |  |  |  |  |  | $\left\|\begin{array}{ll} \stackrel{\rightharpoonup}{0} & \\ \frac{0}{0} & 0 \\ 0 & 0 \\ \dot{B} & \underset{0}{0} \end{array}\right\|$ |  | $\stackrel{\rightharpoonup}{0}$  <br> $\frac{0}{\sigma}$  <br> 0  <br> $E$ 0 |  |
| ueld u！ədeus |  |  |  |  |  |  |  |  |  |  | $\left\lvert\, \begin{aligned} & \stackrel{\text { 㐫 }}{\stackrel{~}{=}} \end{aligned}\right.$ |  | $\begin{aligned} & \stackrel{\text { 㐫 }}{\stackrel{~}{=}} \end{aligned}$ |  |
| quәuodmos әи！़ |  |  |  |  | $\begin{aligned} & \stackrel{H}{N} \\ & \stackrel{\rightharpoonup}{n} \\ & \frac{\lambda}{c} \\ & \frac{\Gamma}{N} \end{aligned}$ |  |  |  |  | $\begin{aligned} & \underset{\sim}{c} \\ & \stackrel{\rightharpoonup}{n} \\ & \underset{\sim}{z} \\ & \stackrel{\rightharpoonup}{n} \end{aligned}$ |  |  |  |  |
| גnolo |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| （m）$\cdot 0$ |  | $\underset{\sim}{\underset{0}{\circ}}$ | $\underset{\sim}{2}$ | O. | O. | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty} \underset{\sim}{\infty}$ | $\underset{\sim}{n}$ | $\begin{gathered} \infty \\ \underset{\sim}{\infty} \end{gathered}$ | $\underset{\substack{m \\ \hdashline \\ \hline}}{ }$ | $\underset{\sim}{\infty} \underset{\sim}{\infty}$ | $\underset{\sim}{\infty} \underset{\sim}{\infty}$ | $\underset{\substack{0 \\ \underset{0}{0} \\ \hline}}{ }$ | $\underset{\sim}{0}$ |
| （m）$M / \mathrm{g}$ |  |  |  | $0$ |  | H |  | $\underset{\sim}{\sim}$ |  |  | $\underset{\circ}{\circ}$ |  | $9$ |  |
| ר＇（w） |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| se әues |  |  |  |  |  |  |  |  |  |  | $\left\lvert\,\right.$ |  |  |  |
|  |  |  |  | $\underset{\sim}{\underset{\sim}{N}}$ |  | $\underset{\sim}{n} \underset{\sim}{n}$ |  | $\begin{array}{ll} \text { nio } \\ \text { O } \\ \text { O } \\ \hline \end{array}$ |  |  | $\underset{\sim}{\infty}$ |  | $\underset{\sim}{\infty}$ |  |
| ¢ou әınłeə」 |  | $\underset{\sim}{\mathrm{O}}$ | $\underset{\sim}{\underset{\sim}{2}}$ |  |  |  |  |  |  |  |  |  |  |  |
| poüad |  | $\stackrel{\text { N }}{\text { N }}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ |
| 7n） |  | $\underset{\sim}{\underset{\sim}{2}}$ | No | oi | oin | $\underset{\sim}{N}$ | $\underset{\sim}{\mathrm{N}}$ | $\underset{\sim}{\text { A }}$ | $\underset{\sim}{\text { N}}$ | $\underset{\sim}{\mathrm{N}}$ | $\underset{\sim}{\mathrm{N}}$ | $\underset{\sim}{\hat{N}}$ | $\underset{\sim}{\underset{\sim}{2}}$ | on |
| әd $\Lambda_{\perp}$ əયクłeə」 |  | $$ |  | $\begin{aligned} & \text { 告 } \\ & \frac{y}{0} \end{aligned}$ |  | $\begin{aligned} & \frac{5}{4} \\ & \frac{1}{0} \end{aligned}$ | $\begin{aligned} & \frac{5}{y} \\ & \frac{\ddot{y}}{2} \end{aligned}$ |  |  | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{1}{0} \end{aligned}$ |  | $\begin{aligned} & \text { 䂸 } \\ & \hline \text { 2 } \end{aligned}$ | $\begin{aligned} & \text { 䂸 } \\ & \hline \text { 2 } \end{aligned}$ | $\begin{aligned} & \text { 告 } \\ & \frac{y}{0} \end{aligned}$ |
|  |  | ¢ | $\overline{\text { ¢ }}$ | 艺 | 戸 | 艺 | 戸 | 苂 | $\overline{\text { ¢ }}$ | 戸 | 芌 | 戸 | 芌 | $\overline{\text { ¢ }}$ |
| eәıV |  | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ |
| ұхәұиоэ |  | $\underset{\sim}{\infty}$ | oio | O | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\underset{\sim}{n}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{i n} \underset{\sim}{i}$ | $\underset{\sim}{0}$ | $\underset{\sim}{\mathrm{N}}$ | $\stackrel{\infty}{\stackrel{\infty}{\sim}}$ | $\underset{\sim}{\underset{\sim}{n}}$ | $\underset{\sim}{\infty}$ |


| uo！ －ұеұиә！ло |  |  | 䳪 |  |  |  |  |  |  |  | $\underset{\substack{3} \underset{~}{3}}{ }$ |  |  |  | n |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| əseg | ¢ |  | $\stackrel{\text { T }}{4}$ |  | $\stackrel{\text { T }}{4}$ |  | $\stackrel{\text {＋}}{4}$ |  | $\stackrel{\text {＋}}{4}$ |  | $\stackrel{\text { T }}{4}$ |  |  |  | $\stackrel{\text {＋}}{4}$ |
| adols <br>  |  |  |  |  |  |  | $\begin{array}{\|l\|l} \frac{3}{0} \\ \frac{0}{\bar{\pi}} \\ \frac{1}{n} \end{array}$ |  | $\begin{array}{\|c} \frac{2}{⿺} \\ \frac{\pi}{4} \end{array}$ |  |  |  |  |  |  |
| әр！ऽ |  |  |  |  |  |  |  |  | $\begin{aligned} & \stackrel{\varrho}{\ddot{*}} \\ & \stackrel{\star}{*} \end{aligned}$ |  |  |  |  |  | $\left\lvert\, \begin{aligned} & \stackrel{\rightharpoonup}{\tilde{0}} \\ & \stackrel{\rightharpoonup}{\nabla} \\ & \stackrel{\rightharpoonup}{\partial} \\ & \dot{E} \end{aligned}\right.$ |
| ueld u！ədeys |  |  |  |  |  |  |  |  | ¢ |  |  |  |  |  |  |
| ұиәиodmoэ әи！़ |  |  |  | $\begin{aligned} & \stackrel{\rightharpoonup}{n} \\ & \overrightarrow{0} \\ & \stackrel{\lambda}{0} \\ & \stackrel{\Gamma}{n} \end{aligned}$ |  | $\begin{aligned} & 0 \\ & \stackrel{0}{\pi} \\ & \sim \\ & \\ & \end{aligned}$ |  |  |  | $\begin{aligned} & \stackrel{\rightharpoonup}{n} \\ & \overrightarrow{0} \\ & \stackrel{\rightharpoonup}{n} \\ & \end{aligned}$ |  |  |  |  |  |
| anopo |  | .을 |  |  |  |  |  |  |  |  |  |  | 㐫 |  |  |
| （m）$\cdot 0$ | $\underset{\sim}{n}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\underset{\sim}{N}}$ | or | $\begin{aligned} & 9 \\ & 0 \\ & 0 \end{aligned}$ | $\stackrel{\ominus}{\circ}$ | $\stackrel{\ominus}{\circ}$ | $\begin{array}{\|c} 0 \\ 0 \\ 0 \\ \hline \end{array}$ | $\begin{gathered} 0 \\ \underset{0}{N} \end{gathered}$ | $\begin{aligned} & \stackrel{\rightharpoonup}{\mathrm{O}} \\ & \stackrel{\rightharpoonup}{0} \end{aligned}$ | $\underset{\sim}{ন}$ | $\underset{\sim}{\sim}$ | $\begin{gathered} \infty \\ \underset{0}{\infty} \end{gathered}$ | $\begin{aligned} & \infty \\ & \underset{0}{\infty} \\ & \hline \end{aligned}$ |
| （w）${ }^{\prime} / \mathrm{M} /$ ¢ | ¢ |  | $\stackrel{\infty}{\infty}$ |  | $\stackrel{\wedge}{\circ}$ |  | H |  | $\begin{aligned} & \stackrel{n}{0} \\ & 0 \end{aligned}$ |  | $\underset{\sim}{\mathrm{O}}$ | $\begin{aligned} & \text { d } \\ & \text { O } \end{aligned}$ |  |  | $\underbrace{0}_{0}$ |
| （w） 7 | $\stackrel{m}{\square}$ |  |  |  |  |  |  |  | $\underset{\sim}{\mathrm{m}}$ |  |  |  |  |  |  |
| se ames |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $\begin{array}{ll} \underset{\sim}{2} & n \\ \underset{\sim}{\circ} \\ \hline \end{array}$ |
|  | $\underset{\sim}{\infty}$ |  | $\underset{\sim}{\infty}$ |  | $\underset{\sim}{\infty}$ |  | $\begin{aligned} & \infty \\ & \infty \\ & 0 \\ & \underset{\sim}{\infty} \end{aligned}$ |  | O |  |  |  |  |  | ò |
| －ou әınłeas |  |  | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\begin{aligned} & \infty \\ & 0 \\ & \hline \sim \end{aligned}$ |  |  | $\underset{\sim}{\underset{O}{\mathrm{O}}}$ | ন্ণ | ন্ণী | ন্ত寸 | OON |
| ро！əəd | N | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{N}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{N}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ |
| 7 20 | $\underset{\substack{\infty \\ \underset{\sim}{0} \\ \hline}}{ }$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\hat{\infty}}$ | $\underset{\sim}{\infty}$ | O | $\begin{gathered} \text { O} \\ \text { O } \\ \text { N } \end{gathered}$ | $\underset{\sim}{\text { ה্N }}$ | ন্ত্ণ | ন্ত্ণ | ন্ত্ণ | Non |
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| ＇ou әınłeə」 | 合 |  | $\underset{\sim}{\text {-̇ה }}$ | 각 |  |  |  |  |  |  |  |  |  |  |  |
| poüd | $\underset{\sim}{\sim}$ |  | $\underset{\sim}{\sim}$ | $\underset{\sim}{\mathrm{i}}$ | $\underset{\sim}{i}$ | $\underset{\sim}{\sim}$ | $\stackrel{\pi}{\square}$ | $\stackrel{\mathfrak{C O}}{\beth}$ | $\stackrel{\pi}{\text { Co }}$ | $\stackrel{\pi}{\square}$ | $\stackrel{\pi}{\square}$ | $\stackrel{\pi}{\beth}$ | $\stackrel{\pi}{\text { Cl}}$ | $\stackrel{\sim}{c}$ | $\stackrel{\sim}{\square}$ |
| 7n） | $\stackrel{+}{\sim}$ |  | $\stackrel{\stackrel{\rightharpoonup}{N}}{\underset{\sim}{n}}$ | $\underset{\sim}{\underset{N}{N}}$ | $\stackrel{\infty}{\underset{\sim}{N}}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{n} \end{aligned}$ | $\bigcirc$ | － | － | $\bigcirc$ |  | $\bigcirc$ | － | $\bigcirc$ | $\bigcirc$ |
| әd／」 <br>  | $\begin{aligned} & \text { 듬 } \\ & \text { 능 } \end{aligned}$ |  | $\begin{aligned} & \frac{1}{4} \\ & \stackrel{t}{0} \end{aligned}$ | $\begin{aligned} & \text { 苞 } \\ & \text { in } \end{aligned}$ | $\begin{aligned} & \frac{5}{y} \\ & \frac{y}{0} \end{aligned}$ | $\begin{aligned} & \frac{ᄃ}{y} \\ & \frac{\ddot{y}}{0} \end{aligned}$ |  |  |  |  |  |  |  | $\frac{0}{3}$ |  |
|  | ¢ |  | $\bar{¢}$ | $\overline{\text { ¢ }}$ | $\underset{3}{3}$ | ¢ | $\begin{aligned} & \text { O} \\ & \frac{0}{3} \\ & \text { D } \end{aligned}$ | $\begin{aligned} & \text { O} \\ & 0 \\ & 0.0 \end{aligned}$ | $\begin{aligned} & \text { O} \\ & 0 \\ & 0 \end{aligned}$ | $\begin{aligned} & \text { O} \\ & \frac{0}{0} \\ & 0 \end{aligned}$ | $\begin{aligned} & \text { O} \\ & \frac{0}{3} \\ & \text { Don } \end{aligned}$ | $\begin{aligned} & \text { O} \\ & \vdots \\ & \vdots \\ & 0 \end{aligned}$ | $\begin{aligned} & \text { O} \\ & 0 \\ & 0 \\ & 0 \end{aligned}$ | $\begin{aligned} & \text { O} \\ & \vdots \\ & \vdots \\ & \hline 0.0 \end{aligned}$ | $\begin{aligned} & \text { O} \\ & \frac{0}{0} \\ & \text { O} \end{aligned}$ |
| eว入V | $\cup$ |  | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ |
| ұхәұиоэ | $\stackrel{\sim}{n}$ |  | $\stackrel{\stackrel{\sim}{n}}{\underset{\sim}{2}}$ | $\stackrel{\underset{\sim}{n}}{\underset{\sim}{n}}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{n} \end{aligned}$ | $\underset{\underset{\sim}{\sim}}{\underset{\sim}{n}}$ | $\underset{\sim}{\underset{\sim}{d}}$ | $\underset{\underset{\sim}{J}}{\underset{\sim}{7}}$ | $\underset{\underset{\sim}{\sim}}{\underset{\sim}{\sim}}$ | $\underset{\underset{\sim}{N}}{\underset{\sim}{n}}$ | $\underset{\sim}{\underset{\sim}{2}}$ | $\stackrel{\underset{\sim}{N}}{\underset{\sim}{n}}$ | $\begin{aligned} & \underset{\sim}{\underset{\sim}{2}} \end{aligned}$ | $\underset{\underset{\sim}{N}}{\underset{\sim}{J}}$ | $\underset{\sim}{\underset{\sim}{\sim}}$ |


| uo！ －ұеұиә！̣о | n |  |  |  |  |  |  | z |  |  |  | $\begin{aligned} & 3 \\ & \underset{\sim}{3} \\ & \underset{\sim}{u} \\ & \stackrel{y}{2} \end{aligned}$ | ～ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| әseg |  |  |  |  |  |  |  | $\begin{array}{\|l\|l\|} \hline \stackrel{\rightharpoonup}{0} & \\ \stackrel{0}{C} \\ \text { O} & \\ \hline \end{array}$ |  |  | lll | $\begin{aligned} & \text { 긍 } \\ & \stackrel{0}{0} \\ & \text { O} \end{aligned}$ | 产 |
| ədols †0＞еә」я | $\begin{aligned} & \frac{2}{⿺} \\ & \frac{\pi}{4} \\ & \hline \end{aligned}$ |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \frac{2}{0} \\ & \frac{5}{5} \end{aligned}$ |  |  |
| әр！ऽ | $\begin{aligned} & \stackrel{\varrho}{\ddot{2}} \\ & \stackrel{\sim}{*} \end{aligned}$ |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \stackrel{\varrho}{む} \\ & \underset{\sim}{*} \end{aligned}$ |  |  |
| ueld u！ədeus |  |  |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \text { 츷 } \\ & \stackrel{ٍ}{\equiv} \end{aligned}$ |  |
| łuәuodmoэ əu！̣ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| anopo |  |  |  |  |  |  |  |  |  |  |  |  |  |
| （w）$\cdot 0$ | $\underset{\substack{\infty \\ \underset{\sim}{2} \\ \hline}}{ }$ | $\underset{\sim}{n}$ | $\stackrel{\rightharpoonup}{\underset{O}{-}}$ | $\stackrel{\bullet}{\bullet}$ | $\underset{\sim}{\infty}$ | $\underset{O}{\circ}$ | $\underset{O}{\sim}$ |  | $\underset{O}{-1}$ | $\underset{\sim}{\infty}$ | $\underset{\substack{\infty \\ \multirow{2}{*}{\hline}\\ \hline}}{\substack{\infty \\ \hline \\ \hline}}$ | $\stackrel{\sim}{\sim}$ | $\underset{\sim}{n}$ |
| （m）$M / \mathrm{M}$＇g | $\cdots$ |  |  | ¢ |  |  |  | $\stackrel{0}{\stackrel{0}{+}} \stackrel{+}{i}$ |  |  | $\underset{\sim}{\underset{\sim}{\circ}} \underset{\sim}{\circ}$ | $\stackrel{\bullet}{\circ}$ | $\stackrel{+}{\circ}$ |
| 7］（w） |  |  |  |  |  |  |  |  |  |  |  |  |  |
| se әues |  |  |  |  |  |  |  |  |  |  |  | $\stackrel{\underset{\sim}{n}}{\underset{\sim}{n}}$ | $\underset{\underset{\sim}{7}}{\underset{\sim}{g}}$ |
| кя рә｜！！ | $\begin{array}{cc} 0 & -1 \\ \stackrel{n}{7} \\ \underset{\sim}{n} \end{array}$ |  |  |  |  |  |  | $\left\|\begin{array}{c} \stackrel{\sim}{n} \\ \underset{\sim}{n} \\ \underset{\sim}{n} \\ \hline \end{array}\right\|$ |  |  | $\left\|\begin{array}{ll} \infty & 0 \\ \infty \\ \underset{\sim}{1} & - \\ N \end{array}\right\|$ | $\begin{array}{cc} \stackrel{\rightharpoonup}{\circ} \\ \underset{\sim}{\lambda} \end{array}$ | $\underset{\underset{\sim}{2}}{\underset{\sim}{2}}$ |
|  | $\underset{\underset{\sim}{c}}{\underset{\sim}{g}}$ | $\underset{\underset{\sim}{g}}{\underset{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{g}}$ | ন্ত | ন্ণ | 守 | ন্ত寸 | 卆 | $\underset{\sim}{\underset{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{2}}$ |  | $\stackrel{\underset{\sim}{i}}{\underset{\sim}{2}}$ | $\stackrel{\substack{7 \\ \sim \\ \sim}}{ }$ |
| poüd | $\stackrel{\text { N }}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\left\|\begin{array}{l} \frac{\pi}{0} \\ \frac{0}{5} \\ \frac{8}{0} \end{array}\right\|$ | $\stackrel{-}{\sim}$ | $\stackrel{\text { N }}{\text { N }}$ |
| 7 7 | $\underset{\underset{\sim}{g}}{\underset{\sim}{g}}$ | $\underset{\sim}{\underset{\sim}{g}}$ | $\underset{\sim}{\underset{\sim}{2}}$ | $\stackrel{\underset{\sim}{N}}{\underset{\sim}{n}}$ | $\begin{gathered} \underset{N}{N} \\ \underset{\sim}{2} \end{gathered}$ | $\underset{\sim}{N}$ | $\begin{aligned} & N \\ & \underset{N}{N} \end{aligned}$ | $\stackrel{e}{i}$ | $\stackrel{e}{\stackrel{0}{2}}$ | $\begin{aligned} & \stackrel{0}{n} \\ & \underset{\sim}{2} \end{aligned}$ | $\stackrel{\underset{\sim}{n}}{\underset{\sim}{n}}$ | $\begin{aligned} & \stackrel{\rightharpoonup}{7} \\ & \underset{\sim}{2} \end{aligned}$ | $\begin{aligned} & \overrightarrow{0} \\ & \underset{\sim}{n} \end{aligned}$ |
| әd／$\perp_{\perp}$ <br>  |  | $\begin{aligned} & \frac{5}{4} \\ & \frac{\pi}{0} \end{aligned}$ |  | $\begin{aligned} & \stackrel{y}{4} \\ & \stackrel{y}{0} \end{aligned}$ |  |  |  |  | $\begin{aligned} & \frac{5}{y} \\ & \text { y } \end{aligned}$ | $\begin{aligned} & \stackrel{5}{u} \\ & \stackrel{u}{0} \end{aligned}$ | 言 | $\begin{aligned} & \frac{1}{4} \\ & \frac{i t}{0} \end{aligned}$ | ¢ |
| N1082te） | 芌 | ¢ | $\overline{\text { ¢ }}$ | $\stackrel{\text { 芌 }}{ }$ | ¢ | 戸 | $\overline{\text { ¢ }}$ | \＃ | ¢ | $\overline{\text { ¢ }}$ | 艺 | \％ | 艺 |
| eər $\forall$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ |
| ұхәұиоэ | $\underset{\underset{\sim}{\prime}}{\underset{\sim}{g}}$ | $\begin{aligned} & \mathrm{O} \\ & \underset{\sim}{\mathrm{n}} \end{aligned}$ | $\stackrel{\underset{n}{n}}{\underset{\sim}{n}}$ | $\stackrel{\underset{\sim}{N}}{\mathrm{~N}}$ | $\stackrel{n}{N}$ | $\stackrel{\underset{\sim}{\mathrm{N}}}{\mathrm{I}}$ | $\stackrel{\text { N }}{\stackrel{n}{2}}$ | $\stackrel{0}{\stackrel{0}{7}}$ | $\stackrel{N}{n}$ | $\stackrel{\sim}{\sim}$ | $\stackrel{\underset{\sim}{n}}{\underset{\sim}{n}}$ | $\begin{aligned} & 0 \\ & \underset{i}{\prime} \end{aligned}$ | $\begin{aligned} & \underset{\sim}{2} \\ & \underset{\sim}{2} \end{aligned}$ |

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| uo！ －ұедиә！ィо |  |  |  | $\begin{aligned} & 3 \\ & \underset{\sim}{3} \\ & \underset{\sim}{4} \end{aligned}$ |  |  |  |  | $\underset{\substack{3 \\ 山 己}}{ }$ |  |  | $\begin{aligned} & 3 \\ & \underset{\sim}{3} \\ & \underset{z}{2} \end{aligned}$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| əseg | $\begin{array}{\|l\|} \hline \stackrel{\rightharpoonup}{\mathrm{U}} \\ \stackrel{0}{0} \\ \hline 0 \end{array}$ |  |  | $\begin{array}{ll}\text { 증 } \\ \text { OU } \\ 0 & \\ 0\end{array}$ |  | $\left\|\begin{array}{ll} \underset{\sim}{\mathrm{O}} & \\ \underset{O}{O} & \\ \hline \end{array}\right\|$ |  |  |  |  |  | $\begin{aligned} & \text { 긍 } \\ & \stackrel{0}{0} \text { e } \end{aligned}$ |  |  |
| adols f0 》еә」я |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| әр！ऽ |  |  |  |  |  | $\stackrel{+}{0}$ <br> $\stackrel{\rightharpoonup}{0}$ <br> $\stackrel{\rightharpoonup}{\partial}$ <br> $\dot{E}$ |  |  | $\begin{aligned} & \stackrel{\rightharpoonup}{\tilde{0}} \\ & \frac{0}{0} \\ & \stackrel{\rightharpoonup}{0} \\ & \dot{\xi} \end{aligned}$ |  |  |  |  |  |
| ueld u！ədeपS |  |  |  | $\begin{aligned} & \stackrel{-1}{\mathbb{D}} \\ & \stackrel{=}{\leftrightarrows} \end{aligned}$ |  |  |  |  |  |  |  |  |  |  |
| ұиәиodmoэ əu！」 |  |  |  |  | $\begin{aligned} & \frac{0}{0} \\ & \stackrel{c}{n} \\ & \frac{2}{n} \\ & \stackrel{n}{n} \end{aligned}$ |  | $\begin{aligned} & \frac{0}{0} \\ & \stackrel{c}{n} \\ & \frac{2}{n} \\ & \stackrel{n}{n} \end{aligned}$ | $\begin{aligned} & \frac{0}{n} \\ & \stackrel{n}{n} \\ & \frac{2}{n} \\ & \end{aligned}$ |  |  |  |  |  |  |
| ınopo |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| （m）$\cdot 0$ | $\begin{gathered} n \\ 0 \\ 0 \end{gathered}$ | $\begin{aligned} & \underset{\sim}{7} \\ & \underset{O}{2} \end{aligned}$ | $\underset{\sim}{N}$ | m | $\stackrel{m}{0}$ | \& | $\underset{0}{0}$ | $$ | $\begin{gathered} \infty \\ \underset{o}{0} \end{gathered}$ | $\underset{\substack{0 \\ \underset{\sim}{0} \\ \hline}}{ }$ | $\begin{array}{\|c} 0 \\ 0 \\ 0 \\ \hline \end{array}$ | $\begin{aligned} & \underset{O}{O} \\ & 0 \\ & \hline \end{aligned}$ | $\underset{\sim}{\infty} \underset{\sim}{\infty}$ | $\underset{\sim}{\infty} \underset{\sim}{\infty}$ |
| （m）$M / \mathrm{g}$ | $\stackrel{m}{\square}$ |  |  | ন্ণ |  | $\underset{\sim}{\underset{\sim}{n}}$ |  |  | $\underset{0}{\bullet}$ |  |  | $\underset{\sim}{\underset{\sim}{2}}$ |  |  |
| （w） 7 | $\stackrel{n}{\sim}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| se әmes |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| кя рә｜！ı」 | $\begin{aligned} & \underset{\sim}{N} \\ & \underset{\sim}{1} \\ & \hline \end{aligned}$ |  |  | $\begin{aligned} & \stackrel{\ominus}{0} \\ & \underset{\sim}{2} \end{aligned}$ |  | $\left\|\begin{array}{ll} \infty & 0 \\ 0 & 0 \\ & \lambda \end{array}\right\|$ |  |  | $\begin{aligned} & \text { İ } \\ & \underset{\sim}{\lambda} \\ & \underset{N}{2} \end{aligned}$ |  |  |  |  |  |
| －ou ankłead |  |  |  | $\begin{aligned} & \text { n } \\ & \underset{\sim}{\lambda} \end{aligned}$ | $\begin{aligned} & \text { n} \\ & \underset{\sim}{N} \end{aligned}$ | $\underset{\sim}{\text { rin }}$ | ন্ণ | ন্ত寸 | $\begin{aligned} & \infty \\ & \underset{\sim}{\sim} \end{aligned}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{\sim} \end{aligned}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{\sim} \end{aligned}$ | $\underset{\underset{i}{g}}{\underset{\sim}{g}}$ | $\underset{\underset{\sim}{\prime}}{\underset{\sim}{g}}$ | $\underset{\underset{\sim}{\prime}}{\underset{\sim}{g}}$ |
| роبə． | m | m | m | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ |
| 7 J | $\begin{array}{\|c} \underset{\sim}{0} \\ \stackrel{1}{2} \end{array}$ | $\begin{aligned} & \underset{\sim}{N} \\ & \underset{\sim}{2} \end{aligned}$ | $\begin{aligned} & \underset{\sim}{N} \\ & \underset{\sim}{n} \end{aligned}$ | $\begin{aligned} & \underset{\sim}{0} \\ & \underset{\sim}{n} \end{aligned}$ | $\begin{aligned} & \text { ñ } \\ & \stackrel{\rightharpoonup}{N} \end{aligned}$ | $\stackrel{\underset{\rightharpoonup}{n}}{\underset{\sim}{2}}$ | $\begin{aligned} & \hat{e} \\ & \hat{\lambda} \end{aligned}$ | $\begin{aligned} & \hat{0} \\ & \underset{\lambda}{2} \end{aligned}$ | $\begin{aligned} & \circ \\ & \underset{\sim}{\lambda} \end{aligned}$ | $\begin{aligned} & \circ \\ & \text { 그N } \end{aligned}$ | $\begin{aligned} & \circ \\ & \underset{\sim}{\lambda} \end{aligned}$ | $\underset{\sim}{\underset{\sim}{n}}$ | $\stackrel{n}{\underset{\sim}{\lambda}}$ | $\underset{\sim}{\underset{\sim}{n}}$ |
| әd／$\mu_{\perp}$ əયクłeə」 | \＃ | 言 | \＃ | $\begin{aligned} & \text { 듷 } \\ & \frac{1}{2} \end{aligned}$ |  | $\begin{aligned} & \text { 告 } \\ & \frac{y}{0} \end{aligned}$ |  | $\begin{aligned} & \text { 듷 } \\ & \end{aligned}$ |  | $\begin{aligned} & \frac{5}{4} \\ & \frac{1}{0} \end{aligned}$ |  | $\begin{aligned} & \text { 年 } \\ & \text { 능 } \end{aligned}$ | $\begin{aligned} & \frac{5}{4} \\ & \text { 능 } \end{aligned}$ |  |
| ＾108ə¢е） | 苛 | ¢ | 戸 | 苛 | ¢ | 芌 | 戸 | ¢ | \＃ | $\overline{\text { ¢ }}$ | 戸 | 芌 | ¢ | $\overline{\text { ¢ }}$ |
| eədV | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ |
| ұхәұиоэ |  | $\begin{aligned} & \underset{\sim}{n} \\ & \underset{\sim}{2} \end{aligned}$ | $\begin{aligned} & \text { 寸 } \\ & \stackrel{\rightharpoonup}{N} \end{aligned}$ | $\begin{aligned} & \text { n } \\ & \underset{\sim}{n} \end{aligned}$ | $\begin{aligned} & \bullet \\ & \stackrel{\ominus}{\lambda} \\ & \hline \end{aligned}$ | $\begin{aligned} & \stackrel{\rightharpoonup}{6} \\ & \underset{\sim}{2} \end{aligned}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{n} \\ & \hline \end{aligned}$ | $\begin{aligned} & 9 \\ & \underset{\sim}{0} \end{aligned}$ | $\begin{aligned} & \circ \\ & \underset{\sim}{\lambda} \end{aligned}$ | $\stackrel{\underset{N}{\lambda}}{\underset{\sim}{2}}$ | $\underset{\underset{N}{N}}{\underset{\lambda}{N}}$ | $\stackrel{n}{\underset{\sim}{\lambda}}$ | $\underset{\sim}{\underset{N}{N}}$ | $\stackrel{n}{\mathrm{~N}}$ |


| uo！ －ұеұиә！̣о |  |  |  | ñ |  | ～ |  |  | 䳪 |  | $\begin{aligned} & 3 \\ & \underset{\sim}{3} \\ & \stackrel{y}{2} \end{aligned}$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| əseg |  |  |  | $\stackrel{\text {＋}}{4}$ |  | $\stackrel{\text { T }}{4}$ |  |  | $\stackrel{\text { T }}{4}$ |  | $\stackrel{\text { T }}{4}$ |  |  |
| ədols †0＞еә」я |  |  |  |  |  |  |  |  |  |  |  |  |  |
| әр！ऽ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ueld u！ədeus |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ұиәиодшоэ əu！」 |  | $\begin{aligned} & \frac{\lambda}{0} \\ & \stackrel{\rightharpoonup}{\Gamma} \\ & \tilde{N} \\ & \frac{\lambda}{\bar{n}} \\ & \frac{\pi}{0} \end{aligned}$ | $\begin{aligned} & \frac{\lambda}{n} \\ & \frac{\pi}{n} \\ & \stackrel{\rightharpoonup}{0} \\ & \stackrel{\rightharpoonup}{0} \\ & \stackrel{\pi}{0} \end{aligned}$ |  | $\begin{aligned} & \stackrel{H}{\bar{n}} \\ & \stackrel{\rightharpoonup}{0} \\ & \stackrel{\rightharpoonup}{\bar{N}} \end{aligned}$ |  | $\begin{aligned} & \stackrel{H}{\bar{n}} \\ & \frac{2}{0} \\ & \stackrel{\rightharpoonup}{\overline{0}} \end{aligned}$ | $\begin{array}{\|l} \stackrel{H}{\bar{n}} \\ \stackrel{\rightharpoonup}{0} \\ \stackrel{\rightharpoonup}{N} \end{array}$ |  | $\begin{aligned} & \stackrel{H}{\bar{n}} \\ & \stackrel{\rightharpoonup}{0} \\ & \stackrel{\rightharpoonup}{N} \\ & \hline \end{aligned}$ |  |  |  |
| גnopo |  |  |  |  |  |  |  |  |  |  |  |  |  |
| （w）${ }^{\text {O }}$ | O. | $\underset{\sim}{N}$ | $\underset{0}{0}$ | $\underset{\sim}{\underset{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{2}}$ | $\underset{\sim}{\sim}$ | $\underset{\substack{-\underset{\sim}{2} \\ \hline}}{ }$ | $\underset{\substack{n \\ \hdashline \\ \hline}}{ }$ | $\begin{array}{r} -1 \\ \hline \end{array}$ | $\begin{array}{r} -1 \\ O \end{array}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $$ |
| （u）$\cdot \mathrm{M} /$＇g |  |  |  | $\underset{0}{0}$ |  | $\underset{\sim}{\infty}$ |  |  | $\begin{gathered} 0 \\ \underset{0}{2} \end{gathered}$ |  | $\stackrel{\bullet}{\circ}$ |  |  |
| （w） 7 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| se әmes |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | $\stackrel{\infty}{\underset{\sim}{\sim}}$ |  | $\left\lvert\, \begin{array}{ll} \underset{\sim}{\infty} & \infty \\ \underset{\sim}{\lambda} & \infty \\ \end{array}\right.$ |  |  | $\underset{\sim}{\infty}$ |  | $\stackrel{\substack{\infty \\ \underset{\sim}{n}}}{ }$ |  |  |
| －ou əınłeə」 | $\underset{\underset{\sim}{\prime}}{\underset{\sim}{g}}$ | $\begin{aligned} & \underset{\sim}{g} \\ & \underset{\sim}{2} \end{aligned}$ | $\underset{\underset{\sim}{f}}{\underset{\sim}{f}}$ | $\underset{\underset{\sim}{g}}{\underset{\sim}{g}}$ | $\underset{\underset{\sim}{g}}{\underset{\sim}{g}}$ | $\underset{\underset{\sim}{n}}{\stackrel{N}{2}}$ | $\underset{\underset{i}{n}}{\underset{\sim}{n}}$ | $\underset{\underset{N}{n}}{\stackrel{n}{2}}$ |  |  | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ |  |
| poüd | $\stackrel{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{N}$ | $\underset{\sim}{i}$ | $\underset{i}{i}$ | $\underset{\sim}{i}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\mathrm{N}}$ | $\stackrel{\text { N }}{\sim}$ | $\left\lvert\,\right.$ |
| 7n | $\begin{aligned} & n \\ & \underset{\sim}{i} \end{aligned}$ | $\begin{aligned} & n \\ & \underset{\sim}{n} \end{aligned}$ | $\underset{\underset{\sim}{n}}{\stackrel{n}{2}}$ | $\begin{aligned} & \underset{\sim}{2} \\ & \underset{\sim}{n} \end{aligned}$ | $\frac{9}{i}$ | $\stackrel{\rightharpoonup}{\infty} \underset{\sim}{\sim}$ | $\stackrel{\underset{\sim}{\infty}}{\underset{\sim}{n}}$ | $\stackrel{\underset{\infty}{\infty}}{\underset{\sim}{n}}$ | $\begin{aligned} & \underset{\infty}{\infty} \\ & \underset{\sim}{n} \end{aligned}$ | $\stackrel{\underset{\infty}{\infty}}{\underset{\sim}{N}}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{\infty} \\ & \hline \end{aligned}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{\infty} \\ & \hline \end{aligned}$ | $\stackrel{\underset{\sim}{9}}{\underset{\sim}{n}}$ |
| əd $\wedge_{\perp}$ <br>  | $\begin{array}{\|l} \frac{ᄃ}{4} \\ \stackrel{\rightharpoonup}{0} \end{array}$ | $\begin{aligned} & \frac{5}{y} \\ & \stackrel{y}{0} \end{aligned}$ | $\begin{aligned} & \stackrel{ᄃ}{y} \\ & \stackrel{y}{0} \end{aligned}$ | $\begin{aligned} & \stackrel{y}{4} \\ & \text { 花 } \end{aligned}$ | $\begin{array}{\|l} \hline \frac{5}{y} \\ \text { 흥 } \end{array}$ | $\begin{aligned} & \frac{5}{4} \\ & \frac{\pi}{0} \end{aligned}$ | $\begin{array}{\|l} \frac{ᄃ}{4} \\ \stackrel{\rightharpoonup}{0} \end{array}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \stackrel{\rightharpoonup}{0} \end{aligned}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \stackrel{y}{0} \end{aligned}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{\ddot{4}}{2} \end{aligned}$ | $\begin{aligned} & \frac{5}{4} \\ & \frac{4}{0} \end{aligned}$ | $\begin{array}{\|l} \hline \frac{5}{U} \\ \stackrel{\rightharpoonup}{0} \end{array}$ | \＃ |
|  | 戸 | $\overline{\text { ¢ }}$ | ¢ | 苛 | $\overline{\text { ¢ }}$ | 艺 | $\overline{\text { ¢ }}$ | $\overline{\text { ¢ }}$ | 芌 | ¢ | $\stackrel{\text { U }}{3}$ | $\overline{\text { ¢ }}$ | $\overline{\text { ¢ }}$ |
| еəコV | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ |
| ұхәұиоэ | $\underset{\sim}{\stackrel{0}{\lambda}} \stackrel{1}{2}$ | $\underset{\underset{N}{N}}{\underset{\sim}{N}}$ | $\stackrel{\infty}{\stackrel{\infty}{\lambda}}$ | $\begin{aligned} & \underset{\sim}{2} \\ & \underset{\sim}{2} \end{aligned}$ | $\underset{\sim}{\infty}$ | $\begin{aligned} & -\underset{\sim}{\infty} \\ & \underset{\sim}{n} \end{aligned}$ | $\underset{\sim}{\infty}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{n} \end{aligned}$ | $\begin{aligned} & \underset{\infty}{\infty} \\ & \underset{\sim}{n} \end{aligned}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{\infty} \\ & \hline \end{aligned}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{\infty} \end{aligned}$ | $\underset{\underset{\sim}{\infty}}{\substack{\infty \\ \hline}}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{\infty} \\ & \underset{\sim}{2} \end{aligned}$ |


| －ұеұиә！！о |  |  |  |  | n |  |  |  |  | 3 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| əseg |  |  |  |  | $\begin{aligned} & \stackrel{\rightharpoonup}{0} \\ & \stackrel{0}{c} \\ & \overbrace{0} \\ & \hline \end{aligned}$ |  |  |  |  |  |  |
| ədols f0 》еә」я |  |  |  |  |  |  |  |  |  |  |  |
| әр！ऽ |  |  |  |  |  |  |  |  |  | $\left\|\begin{array}{c} \stackrel{\rightharpoonup}{0} \\ \frac{0}{0} \\ \stackrel{0}{0} \\ \dot{\xi} \end{array}\right\|$ |  |
| ueld u！ədeus |  |  |  |  |  |  |  |  |  |  |  |
| ұиәиodmoэ əu！」 |  | $\begin{aligned} & \frac{0}{c} \\ & \frac{c}{0} \\ & \frac{0}{0} \\ & \frac{\pi}{0} \end{aligned}$ | $\begin{aligned} & 0 \\ & \frac{0}{0} \\ & 0 \\ & \underset{\sim}{0} \\ & \frac{0}{0} \\ & \hline \end{aligned}$ |  |  | $\begin{array}{\|l} \vec{~} \\ \frac{त}{0} \\ \stackrel{\rightharpoonup}{0} \\ \stackrel{\Gamma}{0} \\ \end{array}$ |  |  |  |  |  |
| גnooo |  |  |  | ( |  |  |  |  |  |  |  |
| （m）$\cdot 0$ | $\stackrel{\rightharpoonup}{\mathbf{m}}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\infty} \underset{\sim}{\infty}$ | $\underset{\sim}{n}$ | + | $\underset{\sim}{\underset{\sim}{2}}$ | $\underset{\sim}{\sim}$ | r- | $\underset{\sim}{n}$ | $\underset{\sim}{\underset{\sim}{r}}$ | $\underset{\sim}{\underset{\sim}{3}}$ |
| （m）$M / \mathrm{M}$＇g |  |  |  |  | $\underset{\sim}{\underset{\sim}{\mathrm{N}}}$ |  |  |  |  | $\underset{\underset{i}{\underset{\sim}{~}} \underset{\sim}{2}}{ }$ |  |
| （w） 7 |  |  |  |  |  |  |  |  |  |  |  |
| se zues |  |  |  |  | $\stackrel{\rightharpoonup}{\infty}$ |  |  |  |  |  |  |
| кя pә｜！！ |  |  |  |  |  |  |  |  |  |  |  |
| －ou әıņeay |  | $\underset{\underset{\sim}{n}}{\stackrel{n}{2}}$ | $\underset{\sim}{\underset{\sim}{n}}$ | $\underset{\sim}{\underset{\sim}{c}}$ | $\underset{\underset{\sim}{n}}{\underset{\sim}{n}}$ | $\underset{\sim}{\underset{\sim}{n}}$ | $\underset{\underset{\sim}{n}}{\stackrel{\rightharpoonup}{n}}$ | $\underset{\sim}{\underset{\sim}{n}}$ | $\underset{\sim}{\underset{\sim}{n}}$ | $\begin{aligned} & \underset{\sim}{N} \\ & \underset{\sim}{2} \end{aligned}$ | $\begin{aligned} & \underset{\sim}{\sim} \\ & \underset{\sim}{2} \end{aligned}$ |
| poupd | $\left\lvert\, \begin{aligned} & \stackrel{\pi}{0} \\ & \stackrel{0}{5} \\ & \stackrel{8}{2} \end{aligned}\right.$ | $\stackrel{\sim}{i}$ | $\underset{\sim}{i}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{i}$ | $\underset{\sim}{i}$ | $\underset{\sim}{i}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{i}$ | $\underset{\sim}{N}$ | $\underset{\sim}{N}$ |
| 7 7 | $\stackrel{\underset{\sim}{n}}{\underset{\sim}{n}}$ | $\stackrel{\stackrel{\rightharpoonup}{0}}{\underset{\sim}{2}}$ | $\begin{aligned} & \mathrm{O} \\ & \text { in } \end{aligned}$ | $\begin{aligned} & \overrightarrow{0} \\ & \vec{\lambda} \end{aligned}$ | $\underset{\underset{\sim}{\lambda}}{\underset{\sim}{2}}$ | $\underset{\underset{\sim}{N}}{\stackrel{m}{2}}$ | $\stackrel{m}{\underset{\sim}{\lambda}}$ | $\underset{\underset{\sim}{\lambda}}{\underset{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{n}}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{N} \end{aligned}$ | $\stackrel{\infty}{\underset{\sim}{\lambda}}$ |
| əd $\wedge_{\perp}$ <br>  | 芜 | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{\pi}{\sigma} \end{aligned}$ | $\stackrel{\square}{2}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{\pi}{0} \end{aligned}$ | $\begin{aligned} & \stackrel{ᄃ}{y} \\ & \stackrel{y}{0} \end{aligned}$ | $\begin{aligned} & \stackrel{ᄃ}{ \pm} \\ & \stackrel{\rightharpoonup}{0} \end{aligned}$ | $\begin{array}{\|l} \hline \frac{5}{U} \\ \stackrel{\rightharpoonup}{0} \end{array}$ | $\begin{aligned} & \stackrel{ᄃ}{y} \\ & \stackrel{y}{0} \end{aligned}$ |  |  | $\begin{aligned} & \text { 䂸 } \\ & \hline \text { 2 } \end{aligned}$ |
|  | $\overline{\text { ¢ }}$ | ¢ | 戸 | ¢ | 芌 | 戸 | $\overline{\text { ¢ }}$ | 戸 | ¢ | 艺 | 戸 |
| eวлV | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ |
| ұхәұиоэ | $\begin{aligned} & \infty \\ & \underset{\sim}{\infty} \end{aligned}$ | $\underset{\underset{\sim}{\prime}}{\stackrel{\circ}{2}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{\sim}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{2}}$ | $\stackrel{\stackrel{n}{2}}{\underset{\sim}{n}}$ | $\begin{aligned} & \stackrel{\otimes}{\lambda} \\ & \stackrel{\rightharpoonup}{N} \end{aligned}$ | $\underset{\underset{\sim}{\lambda}}{\stackrel{\rightharpoonup}{\lambda}}$ | $\stackrel{\infty}{\underset{\sim}{\sim}}$ | $\underset{\underset{\sim}{\prime}}{\stackrel{g}{2}}$ |


| $\begin{aligned} & \stackrel{\rightharpoonup}{x} \\ & \stackrel{\rightharpoonup}{0} \\ & 0 \end{aligned}$ | $\stackrel{\text { ® }}{\substack{4}}$ | $$ |  | $\underset{J}{\Xi}$ | $\begin{aligned} & \text { 은 } \\ & \hline \text { 20, } \end{aligned}$ | $\begin{aligned} & \text { ㅇ } \\ & \text { む } \\ & \text { D. } \\ & \text { む } \end{aligned}$ | $\begin{aligned} & \text { त } \\ & \text { छ } \\ & \text { 흪 } \end{aligned}$ | $\begin{aligned} & \tilde{\sim} \\ & \stackrel{\sim}{\ddot{N}} \\ & \underset{\sim}{0} \end{aligned}$ | $\underset{\text { E }}{\underline{\text { J}}}$ | $\frac{\bar{\xi}}{\sum}$ | $\underline{\bar{E}}$ | 言 |  |  | $\stackrel{\%}{0}$ |  | $\begin{gathered} \stackrel{\sim}{\omega} \\ \text { © } \end{gathered}$ |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |  |  |  |  | light <br> grey and orange patches |  |  |  |  |  |  |
| 2200 | C | fill | ditch | 2198 | 2.2 | 2126 |  |  |  |  | 0.19 | dark <br> greyish <br> brown | silty sand |  |  |  |  |  |
| 2201 | C | cut | gully | 2201 | 2.2 | 2201 | 2202 |  |  | 0.33 | 0.18 |  |  | linear | steep | sharp | flat | N－S |
| 2202 | C | fill | gully | 2201 | 2.2 | 2201 |  |  |  |  | 0.18 | greyish brown | sandy silt |  |  |  |  |  |
| 2203 | C | cut | gully | 2203 | 2.2 | 2201 | 2204 |  |  | 0.29 | 0.06 |  |  | indetermin ate | moderat <br> e | moderate | flat | E－W |
| 2204 | C | fill | gully | 2203 | 2.2 | 2201 |  |  |  |  | 0.06 | greyish brown | sandy silt |  |  |  |  |  |
| 2205 | C | cut | gully | 2205 | 2.2 |  | 2206 |  |  | 0.72 | 0.14 |  |  | linear | shallow | gentle | concav <br> e | NNE－SSW |
| 2206 | C | fill | gully | 2205 | 2.2 |  |  |  |  |  | 0.14 | mid orangish brown | silty sand |  |  |  |  |  |
| 2207 | C | cut | ditch | 2207 | 2.2 | 2207 | 2208 |  |  | 1.14 | 0.16 |  |  | indetermin ate | moderat e | moderate | concav <br> e | E－W |
| 2208 | C | fill | ditch | 2207 | 2.2 | 2207 |  |  |  |  | 0.16 | mid orangish brown | sandy silt |  |  |  |  |  |
| 2209 | C | cut | ditch | 2209 | 2.2 | 2207 | 2210 |  |  | 0.56 | 0.08 |  |  | linear | shallow | gentle | concav <br> e | E－W |
| 2210 | C | fill | ditch | 2209 | 2.2 | 2207 |  |  |  |  | 0.08 | mid brownis h grey | sandy silt |  |  |  |  |  |
| 2211 | C | cut | pit | 2211 | 2.2 |  | $\begin{aligned} & 2212, \\ & 2213 \end{aligned}$ |  | 0.9 | 0.9 | 0.25 |  |  | circular | moderat <br> e | moderate | concav <br> e |  |
| 2212 | C | fill | pit | 2211 | 2.2 |  |  |  |  |  | 0.1 | black | silty |  |  |  |  |  |
| 2213 | C | fill | pit | 2211 | 2.2 |  |  |  |  |  | 0.16 | dark <br> greyish <br> brown | clayey silt |  |  |  |  |  |
| 2214 | C | cut | post <br> hole | 2214 | 2.2 |  | 2215 |  | 0.1 | 0.22 | 0.14 |  |  | L－shaped | steep | sharp | concav <br> e |  |


| uo！ －ұеұиә！ло |  | $\begin{aligned} & \sum_{2}^{3} \\ & \underset{z}{u} \\ & \sum_{z} \end{aligned}$ |  |  |  |  |  |  |  |  |  |  | 亳 |  | $\sum_{\text {u }}^{\substack{\text { u }}}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| әseg |  | $\left\|\begin{array}{ll} \stackrel{\rightharpoonup}{0} \\ \stackrel{0}{C} \\ \stackrel{O}{0} & \\ \hline \end{array}\right\|$ |  | $\begin{aligned} & \frac{0}{\overline{1}} \\ & \frac{\pi}{5} \\ & 3 \end{aligned}$ |  | $\left\|\begin{array}{ll} \stackrel{\rightharpoonup}{0} \\ \stackrel{0}{C} \\ \stackrel{0}{0} & \\ \hline \end{array}\right\|$ |  | $\begin{array}{ll} \stackrel{\rightharpoonup}{0} \\ \stackrel{U}{0} \\ \text { O} & 0 \end{array}$ |  |  | $\begin{aligned} & \stackrel{\rightharpoonup}{0} \\ & \stackrel{0}{0} \\ & \stackrel{0}{0} \end{aligned}$ |  | $\begin{array}{\|l\|} \hline \stackrel{\rightharpoonup}{\mathrm{U}} \\ \stackrel{0}{\mathrm{O}} \\ \hline \end{array}$ |  | 苞 |
| ədols „0 みセコ」я |  |  |  |  |  |  |  | $\begin{aligned} & \frac{3}{3} \\ & \frac{0}{\bar{\pi}} \\ & \frac{\pi}{5} \end{aligned}$ |  |  |  |  |  |  |  |
| әр！ऽ |  |  |  | $\begin{aligned} & \vec{T} \\ & \frac{\pi}{D} \\ & \stackrel{D}{0} \\ & \dot{E} \end{aligned}$ |  |  |  |  |  |  |  |  |  |  |  |
| ueld u！ədeus |  |  |  | $\frac{\frac{1}{3}}{\frac{2}{3}}$ |  |  |  | $\begin{gathered} \frac{\frac{1}{3}}{3} \\ \frac{3}{3} \\ \frac{3}{3} \end{gathered}$ |  |  |  |  |  |  | $\stackrel{\text { 「 }}{\stackrel{\text { ® }}{\square}}$ |
| ұuәuodmos әи！〕 |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \frac{\lambda}{0} \\ & \frac{\pi}{0} \\ & \frac{\lambda}{0} \\ & \underset{\sim}{0} \\ & \hline \end{aligned}$ |  |  |  |  |  |
| 1nooo |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| （w）$\cdot 0$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\underset{O}{A}}$ | $\underset{\sim}{\underset{\sim}{*}} \underset{\sim}{*}$ | $\underset{\substack{j \\ \hline}}{ }$ | $\underset{\sim}{\circ}$ | $\underset{\sim}{n}$ | $\underset{\sim}{\underset{O}{N}}$ | $\stackrel{\rightharpoonup}{3}$ | $\underset{\sim}{\underset{\sigma}{*}}$ | $\underset{O}{\circ}$ | $\underset{\sim}{\underset{O}{3}}$ | $\underset{\sim}{\underset{\sim}{A}}$ | $\underset{\sim}{\infty} \underset{\sim}{\infty}$ | $\underset{\sim}{\infty} \underset{\sim}{\infty}$ | $\begin{gathered} \underset{\sim}{\sim} \\ \underset{\sim}{2} \end{gathered}$ |
| （w）$M / \mathrm{M} /$ g |  | $\underset{\sim}{\infty}$ |  | $\stackrel{0}{\stackrel{0}{0}}$ |  | $\underset{\sim}{\underset{\sim}{N}}$ |  | $\underset{O}{\square}$ |  |  | $\underset{\sim}{\underset{\sim}{\mathrm{O}}}$ |  |  |  | $\underset{\sim}{\infty}$ |
| （w） 7 |  |  |  | $\underset{i}{N}$ |  | $\underset{\sim}{n} \underset{\sim}{n}$ |  | $\begin{aligned} & \text { d } \\ & \hline- \end{aligned}$ |  |  |  |  |  |  |  |
| se zues |  | $\underset{\sim}{\underset{\sim}{n}}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| кя рәІ！！ |  | $\underset{\underset{\sim}{\lambda}}{\underset{\sim}{n}}$ |  | $\begin{aligned} & \underset{\sim}{\lambda} \\ & \hline \end{aligned}$ |  | $\underset{\sim}{\underset{\sim}{N}}$ |  | $\underset{\underset{\sim}{\sim}}{\sim}$ |  |  | $\begin{aligned} & \underset{\sim}{\underset{N}{2}} \end{aligned}$ |  | $\begin{aligned} & \underset{\sim}{\sim} \\ & \hline \end{aligned}$ |  | $\underset{\sim}{\underset{\sim}{N}}$ |
| ¢ou ənnłeay |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \infty \\ & \underset{\sim}{\lambda} \end{aligned}$ |  |  |  |  | $\stackrel{\sim}{\sim}$ |
| роиə． | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\stackrel{\sim}{\sim}$ |
| 7n） | $\begin{aligned} & \underset{\sim}{\underset{N}{2}} \end{aligned}$ | $\underset{\underset{\sim}{\sim}}{\underset{\sim}{2}}$ | $\begin{aligned} & \underset{\sim}{N} \\ & \underset{\sim}{n} \end{aligned}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{N} \end{aligned}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{\sim} \end{aligned}$ | $\begin{aligned} & \underset{\sim}{\sim} \end{aligned}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\begin{aligned} & \circ \\ & \underset{\sim}{n} \end{aligned}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\mathrm{N}}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\underset{\sim}{N}}$ |
| əd $\Lambda_{\perp}$ <br> әıグеә」 | $\begin{aligned} & \text { 范 } \\ & 0 \\ & \hline 0 \end{aligned}$ | $\begin{aligned} & \stackrel{y}{t} \\ & \stackrel{t}{0} \end{aligned}$ | $\begin{array}{\|l} \frac{ᄃ}{4} \\ \frac{1 \pi}{0} \end{array}$ | \＃ | \＃ | \＃ | \＃ | $\stackrel{\square}{\square}$ | $\frac{\square}{2}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{\pi}{0} \end{aligned}$ | \＃ | \＃ | $\begin{array}{\|l} \frac{ᄃ}{4} \\ \frac{14}{0} \end{array}$ | $\begin{array}{\|l} \frac{5}{4} \\ \stackrel{t}{0} \end{array}$ |  |
|  | ¢ | 艺 | ¢ | － | 戸 | 芌 | ¢ | $\stackrel{3}{3}$ | 戸 | 戸 | 艺 | ¢ | 3 | ¢ | 艺 |
| eədV | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ |
| ұхәұиоэ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\underset{\sim}{2}}{\underset{1}{2}}$ | $\begin{aligned} & \underset{\sim}{\lambda} \\ & \text { n } \end{aligned}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{\lambda} \end{aligned}$ | $\underset{\sim}{\underset{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\sim}$ | $\underset{\underset{\sim}{\underset{N}{N}}}{ }$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\underset{\sim}{\sim}}{\underset{\sim}{n}}$ | $\underset{\sim}{\mathrm{N}}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\underset{\sim}{N}}$ |

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| uo！ －ұеұиә！̣о |  | ～～ |  |  | $\underset{\substack{u \\ \sum_{i}^{\prime} \\ \sum_{n}^{1} \\ \hline}}{ }$ |  |  |  | $\begin{aligned} & \text { u } \\ & \sum_{z}^{\prime} \\ & \sum^{2} \end{aligned}$ |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| әseg |  | $\stackrel{\rightharpoonup}{0}$  <br> 웅  <br>   |  |  | $\begin{aligned} & \text { 范 } \\ & \stackrel{0}{0} \\ & \hline 0.0 \end{aligned}$ |  |  |  |  |  |  |  |  |  |  |
| ədols „0 みセコ」я |  | $\begin{aligned} & \frac{2}{0} \\ & \frac{\pi}{n} \end{aligned}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| әр！ऽ |  | $\begin{aligned} & \stackrel{Q}{\Perp} \\ & \stackrel{\sim}{*} \end{aligned}$ |  |  | $\begin{aligned} & \stackrel{\rightharpoonup}{0} \\ & \frac{0}{U} \\ & \frac{\partial}{0} \\ & \dot{E} \end{aligned}$ |  |  |  |  |  |  |  |  |  |  |
| ueld u！ədeus |  |  |  |  |  |  | \％ |  | $\begin{aligned} & \stackrel{1}{\varpi} \\ & \stackrel{ٍ}{\leftrightarrows} \end{aligned}$ |  |  |  |  |  |  |
| ұиәиodmoэ əu！」 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ınopo |  |  |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \text { C } \\ & \\ & \frac{5}{3} \\ & 0 \\ & 0 \\ & 0 \end{aligned}$ |  |  |  |
| （w）$\cdot 0$ | $\underset{\sim}{\tilde{0}}$ | $0$ | $\underset{\substack{2 \\ \underset{O}{2}}}{ }$ | $\begin{array}{\|c} \stackrel{n}{0} \\ \stackrel{0}{2} \end{array}$ | $\stackrel{\sim}{0}$ |  |  |  |  |  |  |  |  |  |  |
| （m）＇M／g | $\underset{0}{\infty}$ | n |  |  | $\stackrel{\wedge}{\circ}$ |  | $\stackrel{\infty}{\infty}$ |  | $\stackrel{\ominus}{\circ}$ | $\stackrel{\ominus}{\circ}$ |  |  |  |  | $\underset{\sim}{\underset{\sim}{N}}$ |
| ¢ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| se əues |  |  |  |  |  |  |  |  |  |  |  |  |  | $\underset{\sim}{\sim}$ |  |
| кя рә｜！ı |  | $\begin{gathered} \underset{\sim}{\sim} \\ \underset{\sim}{\sim} \\ \sim \end{gathered}$ |  |  | $\underset{\sim}{\sim}$ |  | $\underset{\sim}{\underset{\sim}{N}}$ |  |  | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{\sim}}$ |  |  |  | ～ก |
| －ou ankleat | $\begin{aligned} & \stackrel{\sim}{\sim} \\ & \underset{\sim}{n} \end{aligned}$ | $\underset{\sim}{\text { O}}$ | 珨 | $\underset{\underset{\sim}{\sim}}{\underset{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{\sim}}$ | $\underset{\sim}{\text { O}}$ |  |  |  |  |  |  | ¢ |  |  |
| роиəəd | N | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{i}$ | $\underset{\sim}{i}$ | $\underset{\sim}{N}$ | $\checkmark$ | $\checkmark$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\stackrel{\sim}{\sim}$ |
| 7n） | $\underset{\sim}{\sim}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\underset{\sim}{\sim}}{\underset{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{\sim}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{\sim}}$ | $\underset{\sim}{\infty}$ | $\begin{aligned} & \underset{\sim}{\sim} \\ & \hline \end{aligned}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\underset{\sim}{O}}$ | $\underset{\sim}{\underset{\sim}{\circ}}$ | $\underset{\sim}{\sim}$ | $\underset{\underset{N}{N}}{N}$ | $\underset{\sim}{\underset{\sim}{J}}$ |
| $\quad \partial d \wedge_{\perp}$ ə．nłeə」 |  | $\begin{aligned} & \frac{5}{y} \\ & \stackrel{y}{0} \end{aligned}$ |  |  |  | $\begin{aligned} & \stackrel{ᄃ}{y} \\ & \stackrel{y}{\mathrm{I}} \end{aligned}$ | 影 | \＃ | $\begin{aligned} & \stackrel{\AA}{y} \\ & \stackrel{y}{0} \end{aligned}$ |  | \＃ | $\stackrel{\square}{2}$ | $\begin{aligned} & \frac{5}{4} \\ & \frac{\ddot{4}}{2} \end{aligned}$ |  | \％ |
|  | 戸 | 芌 | 戸 | 戸 | \＃ | ¢ | 芌 | $\overline{\text { ¢ }}$ | 艺 | $\overline{\text { ¢ }}$ | $\stackrel{3}{3}$ | 戸 | 戸 | $\overline{\text { ¢ }}$ | $\stackrel{3}{3}$ |
| eวлV | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ |
| ұхәұиоэ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\begin{aligned} & \underset{\sim}{\sim} \\ & \underset{\sim}{n} \end{aligned}$ | $\underset{\sim}{N}$ | $\begin{aligned} & \underset{\sim}{\sim} \\ & \hline \end{aligned}$ | $\begin{aligned} & \underset{\sim}{N} \\ & \hline \end{aligned}$ | $\underset{\sim}{\underset{\sim}{\sim}}$ | $\underset{\sim}{\underset{\sim}{A}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{\sim}}$ | $\underset{\sim}{\underset{N}{Z}}$ |


| $\begin{gathered} \text { uo! } \\ \text {-ұеұиә!! } \end{gathered}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $\underset{\text { d }}{3}$ |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| əseg |  |  |  |  |  |  |  |  |  |  |  |  |  | $\left\|\begin{array}{ll} \underset{\mathrm{U}}{2} & \\ \stackrel{C}{0} & \\ \hline 0 \end{array}\right\|$ |  | $\left\|\begin{array}{ll} \underset{\sim}{0} \\ \underset{\sim}{0} \\ 0 \\ 0 & 0 \end{array}\right\|$ |  | 3  <br>   <br> O  <br> 0  |
| adols f0 》еә」я |  |  |  |  |  |  |  |  |  |  |  |  |  | $\begin{gathered} \frac{2}{0} \\ \frac{\pi}{5} \end{gathered}$ |  | $\frac{\frac{2}{0}}{\frac{1}{5}}$ |  |  |
| әр！ऽ |  |  |  |  |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \stackrel{\varrho}{\otimes} \\ & \stackrel{\sim}{*} \end{aligned}$ |  | $\begin{aligned} & \stackrel{\circ}{\otimes} \\ & \stackrel{\sim}{心} \end{aligned}$ |  |  |
| ueld u！ədeys |  |  |  |  |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \frac{\sqrt{\pi}}{3} \\ & \frac{2}{3} \end{aligned}$ |  | $\begin{aligned} & \underset{\text { ᄃ }}{\underset{ٍ}{ٍ}} \\ & \hline \end{aligned}$ |  | （ |
| 廿uәuodmos әи！़ |  |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \stackrel{H}{\bar{n}} \\ & \frac{\lambda}{0} \\ & \stackrel{\Gamma}{0} \\ & \tilde{n} \end{aligned}$ |  |  |  |  |  |  |  |
| 1nooo |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| （m）$\cdot 0$ |  |  |  |  |  |  |  |  |  |  |  | $\underset{\sim}{\underset{O}{2}}$ | $\underset{\sim}{\underset{O}{2}}$ | $\underset{\sim}{n}$ | $\underset{o}{\stackrel{\rightharpoonup}{0}}$ | $\begin{array}{\|c} 0 \\ \vdots \\ 0 \end{array}$ | $$ | $\stackrel{+}{\substack{*}}$ |
| （w）$M / \mathrm{M} /$ g | $\underset{\sim}{\underset{\sim}{N}}$ |  |  | $\begin{array}{\|c} \underset{\sim}{\mathrm{O}} \\ \mathbf{O} \end{array}$ | $\underset{\sim}{\underset{O}{0}}$ | $\underset{\sim}{\underset{O}{0}}$ |  |  |  | $\begin{aligned} & \text { 寸 } \\ & \text { O- } \end{aligned}$ | $\underset{\sim}{\text { I }}$ | $\underset{\substack{2 \\ \hline \\ \hline}}{ }$ |  |  |  | $\underset{\sim}{\underset{\sim}{N}}$ |  | $\stackrel{+}{+}$ |
| （w） 7 |  |  |  |  |  |  |  |  |  |  |  | $\xrightarrow[i]{\text { O}}$ |  |  |  |  |  | $\stackrel{\sim}{n}$ |
| se zues |  |  |  |  |  |  |  | oio | $\begin{aligned} & \underset{\sim}{\lambda} \\ & \underset{\sim}{2} \end{aligned}$ |  |  |  |  |  |  |  |  |  |
|  |  |  |  | $\underset{\sim}{\underset{\sim}{g}}$ |  |  |  |  |  | $\underset{\sim}{N}$ |  | $\underset{\sim}{\sim}$ |  | $\underset{\sim}{\circ}$ |  | $\underset{\sim}{\underset{\sim}{N}}$ |  | $\begin{array}{cc} \underset{\sim}{\underset{\sim}{N}} \underset{\sim}{0} \\ \underset{\sim}{0} \end{array}$ |
| ¢ou әınłeə」 |  | $\stackrel{\underset{\sim}{n}}{\underset{\sim}{n}}$ | $\begin{aligned} & \underset{\sim}{\mathrm{I}} \\ & \hline \end{aligned}$ |  |  | $\begin{aligned} & \underset{\sim}{N} \\ & \text { N } \end{aligned}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{2}}$ | ন্ণী |  |  |  |  |  |  |  |  |  |
| роиə． | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{n}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{n}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\mathrm{N}}$ |
| 7n） | N | $\begin{aligned} & \stackrel{8}{0} \\ & \underset{\sim}{n} \end{aligned}$ | $\begin{aligned} & \overrightarrow{0} \\ & \vec{N} \end{aligned}$ | $\underset{\sim}{\underset{\sim}{\infty}}$ | $\underset{\sim}{\infty}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{\lambda} \end{aligned}$ | $\underset{\sim}{\mathrm{N}}$ | $\underset{\sim}{\mathrm{O}}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{\lambda} \end{aligned}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{N}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\underset{\sim}{\sim}}$ | $\underset{\sim}{\sim}$ | $\begin{aligned} & \underset{0}{0} \\ & \underset{\sim}{n} \end{aligned}$ | $\begin{aligned} & \underset{\sim}{\underset{\sim}{2}} \end{aligned}$ | $\stackrel{\sim}{N}$ |
| әd $\Lambda_{\perp}$ <br>  | $\stackrel{\square}{2}$ | $\begin{aligned} & \frac{5}{y} \\ & \stackrel{y}{0} \end{aligned}$ | $\begin{aligned} & \overrightarrow{0} \\ & \underset{\sim}{N} \end{aligned}$ | 艺 | \＃ | $\begin{aligned} & \text { 毕 } \\ & \stackrel{\rightharpoonup}{0} \end{aligned}$ | $\begin{aligned} & \stackrel{5}{4} \\ & \stackrel{y}{0} \end{aligned}$ |  |  | \＃ | $\frac{\square}{2}$ | 彦 | $\stackrel{\square}{2}$ |  | 或 | $\underset{\bar{\rightharpoonup}}{\bar{\lambda}}$ | $\underset{\overline{\bar{\partial}}}{\bar{\lambda}}$ | \＃ |
| ＾108ə¢е） | 戸 | ¢ | $\overline{\text { ¢ }}$ | 芌 | 产 | ¢ | $\overline{\text { ¢ }}$ | $\stackrel{3}{3}$ | ¢ | 3 | ¢ | 3 | ¢ | 芌 | 戸 | 3 | 戸 | $\stackrel{3}{3}$ |
| eәл | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ |
| ұхәұиоว | $\underset{\sim}{\underset{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{+}}$ | $\underset{\underset{\sim}{*}}{\underset{\sim}{\underset{N}{2}}}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\underset{\sim}{\sim}}$ | $\underset{\sim}{\mathrm{N}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{\sim}}$ | $\stackrel{\sim}{\sim}$ | $\underset{\sim}{\mathrm{N}}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\underset{\sim}{0}}$ | $\begin{aligned} & \underset{O}{0} \\ & \underset{\sim}{n} \end{aligned}$ | $\begin{aligned} & \underset{\sim}{\underset{N}{N}} \end{aligned}$ | $\underset{\underset{\sim}{\underset{\sim}{e}}}{\substack{0 \\ \hline}}$ |


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| әseg |  |  | 苞 |  | $\stackrel{\text {＋}}{4}$ |  |  | $\stackrel{+}{4}$ |  |  | $\begin{aligned} & \text { 긍 } \\ & \stackrel{0}{0} \\ & \text { O } \end{aligned}$ |  | $\begin{array}{ll}\text { J } \\ \text { J } \\ \text { O} \\ 0 & 0\end{array}$ |  | 華 |
| ədols „0 みセコ」я |  |  |  |  |  |  |  | $\begin{aligned} & \frac{2}{0} \\ & \frac{\pi}{4} \end{aligned}$ |  |  |  |  |  |  |  |
| әр！ऽ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ueld u！ədeus |  |  |  |  |  |  |  |  |  |  | $\begin{array}{\|l} \frac{\pi}{0} \\ \frac{\pi}{7} \\ \cdot \frac{3}{6} \end{array}$ |  | $\begin{array}{\|l} \hline \frac{0}{2} \\ \frac{0}{3} \\ \vdots \\ \hline \end{array}$ |  | \％ |
| 廿uәuodmos әи！़ |  | $\begin{aligned} & \frac{\pi}{0} \\ & \frac{0}{0} \\ & \stackrel{\rightharpoonup}{c} \\ & \underset{\sim}{n} \end{aligned}$ |  |  |  | $\begin{aligned} & \stackrel{H}{\bar{n}} \\ & \overrightarrow{0} \\ & \stackrel{\rightharpoonup}{0} \\ & \tilde{0} \end{aligned}$ |  |  |  |  |  | $\begin{aligned} & \frac{\pi}{0} \\ & \frac{\pi}{0} \\ & \frac{\lambda}{n} \end{aligned}$ |  | $\frac{\pi}{0}$ $\frac{\pi}{0}$ $\frac{\lambda}{n}$ |  |
| ınojo |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| （w）$\cdot 0$ | ${ }_{\circ}^{\circ}$ | $\stackrel{\infty}{\stackrel{\rightharpoonup}{0}}$ | $\underset{\sim}{\underset{O}{A}}$ | $\stackrel{\rightharpoonup}{A}$ | Fab | $\underset{O}{-1}$ |  | $\begin{gathered} \mathrm{m} \\ \hline \end{gathered}$ | $\underset{\substack{\text { ָה } \\ \hline}}{ }$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\stackrel{\infty}{\circ}$ | $\stackrel{\infty}{\infty}_{\infty}^{\infty}$ | $\underset{-}{\infty}$ | ${\underset{O}{\circ}}_{\infty}^{\infty}$ | $\underset{\sim}{\infty}$ |
| （m）$M /$ g |  |  | $\stackrel{\rightharpoonup}{\mathbf{O}}$ |  | $\stackrel{\infty}{\stackrel{\infty}{-}}$ |  |  | $\underset{\sim}{\mathrm{m}}$ | $\underset{i}{0} \underset{+}{i}$ |  | $\infty$ |  | $\underset{\sim}{\text { ¿ }}$ |  | $\underset{\sim}{\infty} \underset{-}{\infty}$ |
| （w） 7 |  |  |  |  |  |  |  |  | $\underset{\sim}{\sim}$ |  | $\underset{\infty}{\infty}$ |  | $\stackrel{\infty}{\infty}$ |  |  |
| se ames |  |  |  |  |  |  | $\underset{\sim}{\underset{\sim}{2}}$ |  |  |  |  |  |  |  |  |
| кя pə｜！！ |  |  | $\underset{\sim}{\underset{\sim}{N}}$ |  | $\begin{aligned} & \underset{\sim}{0} \\ & \underset{\sim}{2} \end{aligned}$ |  |  | $\begin{aligned} & \underset{\sim}{\infty} \\ & \underset{\sim}{2} \end{aligned}$ | $\underset{\sim}{n}$ |  | $\underset{\sim}{\underset{\sim}{n}}$ |  | $\underset{\sim}{\underset{N}{N}}$ |  | $\begin{aligned} & \text { oi } \\ & \underset{\sim}{\sim} \underset{\sim}{\sim} \\ & \underset{\sim}{\sim} \\ & \sim \end{aligned}$ |
| －ou әınıeə |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| poüd | $\underset{\sim}{\sim}$ | N | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\left\|\begin{array}{l} \frac{\pi}{0} \\ \frac{5}{5} \\ \hline 0 \end{array}\right\|$ | $\begin{aligned} & \stackrel{\pi}{0} \\ & \frac{5}{5} 8 \end{aligned}$ | $\begin{aligned} & \frac{\pi}{0} \\ & \frac{1}{5} \\ & \hline 0 \end{aligned}$ | $\stackrel{\stackrel{\pi}{0}}{\stackrel{5}{5}}$ | $\checkmark$ | $\checkmark$ | $\stackrel{\text { N }}{\sim}$ |
| 7n） | $\stackrel{\sim}{\sim}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\underset{\sim}{0}}{\stackrel{0}{2}}$ | $\underset{\sim}{\circ}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\bigcirc$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{N}{N}}$ | $\underset{\sim}{N}$ | $\underset{\underset{N}{\lambda}}{\underset{\sim}{2}}$ | $\underset{\underset{N}{\lambda}}{\underset{\sim}{\lambda}}$ | $\stackrel{0}{\underset{\sim}{N}}$ | ¢ | $\underset{\sim}{\infty}$ |
| әd／$\perp_{\perp}$ <br>  | 哀 | \＃ | \＃ | \＃ | \＃ | \＃ |  | 产 | 言 | 艺 | － | \＃ | \＃ | \＃ | \＃ |
| 人108วte） | \＃ | 三 | 芌 | ¢ | 芌 | 戸 |  | \＃ | 芌 | 戸 | 艺 | ¢ | 芌 | ¢ | 芌 |
| eว入V | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ |
| ұхәұиоэ | ※ | $\underset{\sim}{\sim}$ | $\begin{aligned} & \stackrel{e}{\sim} \\ & \underset{\sim}{2} \end{aligned}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\infty}$ | $\begin{aligned} & \underset{\sim}{0} \\ & \underset{\sim}{2} \end{aligned}$ | $\underset{\underset{\sim}{N}}{\stackrel{\rightharpoonup}{n}}$ | $\underset{\text { N }}{\text { ה }}$ | $\underset{\sim}{\underset{N}{N}}$ | $\underset{\sim}{\mathrm{N}}$ | $\underset{\underset{N}{\star}}{\underset{\sim}{\lambda}}$ | $\underset{\sim}{i n}$ | $\begin{aligned} & \stackrel{0}{\lambda} \\ & \underset{\sim}{n} \end{aligned}$ | $\underset{\sim}{\mathrm{N}}$ | $\underset{\sim}{\infty}$ |


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| əseg |  |  |  | $\stackrel{\text { T }}{4}$ |  | $\stackrel{+}{4}$ |  |  | $\stackrel{+}{4}$ |  | 苞 |  | $\begin{array}{ll} \stackrel{\rightharpoonup}{0} \\ \stackrel{0}{0} \\ \stackrel{0}{0} & 0 \end{array}$ |  | 范 |  |
| adols f0 》еә」я |  |  |  |  |  |  |  |  | $\begin{aligned} & \frac{2}{\bar{n}} \\ & \frac{\pi}{5} \end{aligned}$ |  | $\begin{aligned} & \frac{2}{0} \\ & \frac{\pi}{5} \end{aligned}$ |  |  |  |  |  |
| әр！S |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 年 |  |
| ueld u！ədeys |  |  |  | $\frac{\frac{2}{3}}{3}$ |  | $\begin{aligned} & \frac{\pi}{3} \\ & \frac{\pi}{7} \\ & \frac{5}{3} \end{aligned}$ |  |  |  |  |  |  |  |  | － |  |
| ұиәиodmos әи！़ | $\begin{aligned} & \stackrel{H}{\bar{N}} \\ & \frac{2}{0} \\ & \frac{0}{\Gamma} \\ & 0 \end{aligned}$ | $\begin{aligned} & \frac{\pi}{0} \\ & \frac{\lambda}{n} \\ & \frac{\lambda}{n} \end{aligned}$ |  |  |  |  |  | $\begin{aligned} & \stackrel{\rightharpoonup}{n} \\ & \overrightarrow{0} \\ & \stackrel{\lambda}{0} \\ & \stackrel{\Gamma}{n} \end{aligned}$ |  | $\begin{array}{\|l} \frac{7}{0} \\ \frac{\pi}{0} \\ \frac{\lambda}{0} \\ \frac{\bar{v}}{0} \end{array}$ |  | $\begin{array}{\|l} \frac{\rightharpoonup}{0} \\ \frac{\pi}{0} \\ \frac{\pi}{0} \\ \stackrel{\rightharpoonup}{0} \\ 0 \end{array}$ |  |  |  |  |
| ınopo |  |  | $\frac{त}{0}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| （m）$\cdot 0$ | $\underset{\sim}{0}$ | $\begin{array}{\|c} 0 \\ \underset{\sim}{0} \end{array}$ | $\stackrel{m}{0}$ | $\stackrel{\rightharpoonup}{\mathrm{m}}$ | $\underset{\substack{+ \\ \hline \\ \hline}}{ }$ |  |  | m | $\stackrel{m}{0}$ | $\stackrel{m}{0}$ | $\underset{\sim}{n}$ | $\begin{array}{\|c} \stackrel{n}{0} \\ \underset{0}{2} \end{array}$ | $\underset{\substack{0 \\ \underset{o}{n} \\ \hline}}{ }$ | $\underset{\substack{0 \\ \underset{\sim}{n} \\ \hline}}{ }$ | $\underset{\sim}{\underset{O}{2}}$ | $\underset{\sim}{\sim}$ |
| （w）$M / \mathrm{M} \cdot$ g |  |  | $\stackrel{0}{\stackrel{0}{0}}$ | $\underset{\sim}{\underset{\sim}{\bullet}} \underset{\sim}{2}$ |  |  |  |  | $\underset{0}{0}$ |  | $\underset{\substack{n \\ \\ \hline}}{ }$ |  | $\stackrel{\infty}{\stackrel{\infty}{\infty}}$ |  | $\underset{\sim}{\text { ju}}$ |  |
| （w） 7 |  |  |  |  |  |  |  |  | $\underset{0}{6}$ |  |  |  |  |  | $\stackrel{+}{\circ}$ |  |
| se әues |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| кя рә｜！ı |  |  |  | $\underset{\sim}{\infty}$ |  | $\underset{\sim}{\infty}$ |  |  | $\underset{\sim}{\infty}$ |  | $\underset{\sim}{\underset{\sim}{2}}$ |  | $\underset{\sim}{\underset{\sim}{N}}$ |  | ホ |  |
| \％ou әınıeay |  |  |  |  |  |  |  |  |  |  |  |  | $\underset{\sim}{\underset{\sim}{n}}$ | $\underset{\underset{\sim}{N}}{\stackrel{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{2}}$ | へ |
| ро！əə | $\stackrel{\text { N }}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{i}$ | $\stackrel{\sim}{i}$ | $\stackrel{\sim}{\sim}$ | $\underset{\sim}{\sim}$ |
| 7 O | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\sim}$ | $\underset{\underset{\sim}{\infty}}{\underset{\sim}{\infty}}$ | $\underset{\sim}{\underset{\sim}{\infty}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\infty}$ | $\underset{\underset{\sim}{\infty}}{\underset{\sim}{\infty}}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{\infty} \end{aligned}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{n}}$ | $\underset{\sim}{\underset{\sim}{n}}$ |
| əd $\wedge_{\perp}$ әıグеә」 | 言 | \＃ | 言 | 言 | 言 | \＃ | 言 | \＃ | $\begin{aligned} & \text { 范 } \\ & 0 \\ & 0 \end{aligned}$ | 落菦 | 言 | \％ | $\begin{aligned} & \text { 䂸 } \\ & \hline \text { 2 } \end{aligned}$ |  |  |  |
| ＾108ə¢е） | $\overline{\text { ¢ }}$ | 戸 | $\overline{\text { ¢ }}$ | 芌 | ¢ | \＃ | $\overline{\text { ¢ }}$ | 戸 | 芌 | 戸 | 芌 | 戸 | 芌 | 戸 | 芌 | $\overline{\text { ¢ }}$ |
| eәл | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ |
| ұхәұиоэ | $\underset{\sim}{\underset{\sim}{x}}$ | $\begin{aligned} & \underset{\sim}{\infty} \\ & \hline \end{aligned}$ | $\underset{\sim}{\underset{\sim}{\infty}}$ | $\underset{\sim}{\underset{\sim}{\sim}}$ | $\underset{\sim}{\infty}$ | $\underset{\underset{\sim}{\infty}}{\underset{\sim}{\infty}}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\underset{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{2}}$ |


| $\begin{aligned} & \text { 艺 } \\ & \stackrel{4}{0} \\ & 0 \end{aligned}$ | 【 | $$ |  | $\underset{J}{J}$ | $\begin{aligned} & \text { 을 } \\ & \hline \text { 2 } \end{aligned}$ |  |  | $\begin{aligned} & \text { 几 } \\ & \stackrel{0}{0} \\ & \stackrel{\pi}{n} \end{aligned}$ | $\underset{-}{\xi}$ | $\underset{\sim}{\xi}$ | $\stackrel{\bar{E}}{\square}$ | $\begin{aligned} & \text { 흥 } \\ & \text { 웅 } \end{aligned}$ |  | $\begin{aligned} & \text { 드 } \\ & \stackrel{c}{o} \\ & \frac{\pi}{0} \\ & \stackrel{\pi}{n} \end{aligned}$ | $\frac{\%}{i n}$ | $\begin{aligned} & \stackrel{4}{0} \text { 。 } \\ & \frac{\sim}{\circ} \\ & \stackrel{0}{0} \\ & \stackrel{0}{0} \end{aligned}$ | $\begin{gathered} \stackrel{\sim}{0} \\ \text { © } \end{gathered}$ | $\begin{aligned} & \text { 岗 } \\ & \text { 든 } \\ & \text { 은 } \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2295 | C | cut | ditch | 2295 | 2.2 | 2207 | 2296 |  |  | 1 | 0.2 |  |  | indetermin ate | shallow | moderate | concav <br> e | SW－NE |
| 2296 | C | fill | ditch | 2295 | 2.2 | 2207 |  |  |  |  | 0.2 | mid greyish brown | silty sand |  |  |  |  |  |
| 2297 | C | cut | ditch | 2297 | 2.1 | 2234 | 2298 |  |  | 0.56 | 0.3 |  |  | linear | steep | sharp | flat | NNE－SSW |
| 2298 | C | fill | ditch | 2297 | 2.1 | 2234 |  |  |  |  | 0.3 | dark greyish brown | sandy clay |  |  |  |  |  |
| 2299 | C | cut | ditch | 2299 | 2.1 |  | 2300 |  |  | 0.42 | 0.16 |  |  | linear | moderat <br> e | sharp | concav $\mathrm{e}$ | WNW－ ESE |
| 2300 | C | fill | ditch | 2299 | 2.1 |  |  |  |  |  | 0.16 | dark greyish brown | clayey sand |  |  |  |  |  |
| 2301 | C | cut | ditch | 2301 | 2.1 | 2130 | 2302 |  |  | 0.54 | 0.22 |  |  | linear | steep | moderate | concav $\mathrm{e}$ | SE－NW |
| 2302 | C | fill | ditch | 2301 | 2.1 | 2130 |  |  |  |  | 0.22 | mid greyish brown | silty clay |  |  |  |  |  |
| 2303 | C | cut | ditch | 2303 | 2.1 |  | 2304 |  |  | 0.56 | 0.26 |  |  | linear | moderat <br> ely steep | gradual | $\begin{aligned} & \text { concav } \\ & \text { e } \\ & \hline \end{aligned}$ | NW－SE |
| 2304 | C | fill | ditch | 2303 | 2.1 |  |  |  |  |  | 0.26 | mid greyish brown | silty sand |  |  |  |  |  |
| 2305 | C | cut | ditch | 2305 | 2.1 | 2130 | 2306 |  |  | 0.7 | 0.14 |  |  | linear | moderat <br> e | regular | $\begin{aligned} & \text { concav } \\ & \text { e } \end{aligned}$ | E－W |
| 2306 | C | fill | ditch | 2305 | 2.1 | 2130 |  |  |  |  | 0.15 | greyish brown | sandy clay |  |  |  |  |  |
| 2307 | C | cut | ditch | 2307 | 2.1 | 2307 | $\begin{aligned} & 2313, \\ & 1312, \\ & 2314 \end{aligned}$ |  |  | 2.5 | 0.6 |  |  | linear | stepped | regular | concav <br> e | NE－SW |
| 2308 | C | cut | pit | 2308 | 2.2 |  | $\begin{aligned} & 2309, \\ & 2310, \\ & 2311 \end{aligned}$ |  | 1.38 | 1.45 | 0.25 |  |  | sub－ circular | moderat <br> e | moderate | concav e |  |
| 2309 | C | fill | pit | 2308 | 2.2 |  |  |  |  |  | 0.2 | dark <br> greyish <br> brown <br> with | sandy silt |  |  |  |  |  |


| $\begin{gathered} \text { ио! } \\ \text {-ұеұиә!! } \end{gathered}$ |  |  |  |  |  |  |  |  | $\begin{aligned} & \aleph \\ & \frac{1}{2} \end{aligned}$ |  | 3 |  |  |  |
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| әseg |  |  |  |  |  |  |  |  | $\stackrel{+}{4}$ |  | 苞 |  |  |  |
| ədols f0＞еә」я |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| әр！ऽ |  |  |  |  |  |  |  |  | $\stackrel{\rightharpoonup}{0}$  <br> $\frac{0}{U}$  <br> 0  <br> $\dot{E}$ 0 |  |  |  |  |  |
| ueld u！ədeus |  |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \text { 㐫 } \\ & \stackrel{\rightharpoonup}{\equiv} \end{aligned}$ |  |  |  |
| quәuodmos әи！़ |  |  |  |  |  | $\begin{aligned} & \frac{त}{0} \\ & \frac{\pi}{0} \\ & \frac{\pi}{0} \\ & \stackrel{\Gamma}{0} \end{aligned}$ |  | $\begin{aligned} & \stackrel{H}{\bar{n}} \\ & \frac{\lambda}{0} \\ & \frac{\Gamma}{0} \\ & \hline \end{aligned}$ |  | $\begin{aligned} & \frac{\pi}{0} \\ & \frac{\pi}{0} \\ & \stackrel{\lambda}{n} \end{aligned}$ |  | $\begin{aligned} & \frac{त}{0} \\ & \frac{\pi}{0} \\ & \frac{\lambda}{n} \end{aligned}$ | $\begin{aligned} & \stackrel{\rightharpoonup}{u} \\ & \stackrel{\rightharpoonup}{0} \end{aligned}$ | $\begin{aligned} & \frac{\rightharpoonup}{0} \\ & \frac{\pi}{0} \\ & \frac{0}{0} \\ & \stackrel{0}{0} \\ & 0 \end{aligned}$ |
| גnopo |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| （m）$\cdot 0$ |  | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | No | $\underset{0}{\sim}$ | n |  |  | $\underset{O}{-1}$ | $\begin{array}{r} -1 \\ O \end{array}$ | $\underset{\substack{0 \\ 0 \\ 0}}{ }$ | $\underset{\sim}{0}$ | $\underset{\sim}{\stackrel{\sim}{0}}$ | O- |
| （m）$M / \mathrm{g}$ |  |  |  |  |  |  | $\underset{\sim}{n}$ |  | $\stackrel{\rightharpoonup}{\circ}$ |  | $\underset{\sim}{\infty} \underset{\sim}{\infty}$ |  |  |  |
| （w） 7 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| se әmes |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 人я рә｜！ı |  |  |  |  |  |  | $\mid \underset{\sim}{e}$ |  | $\underset{\sim}{\infty} \underset{\sim}{\infty}$ |  | $\underset{\sim}{2}$ |  |  |  |
| ¢ou əıņeay |  |  |  | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{n}$ | $\underset{\sim}{\underset{\sim}{N}}$ |  |  | $\stackrel{n}{2}$ | $\begin{aligned} & \text { n } \\ & \underset{\sim}{N} \end{aligned}$ | $\begin{aligned} & \underset{\sim}{N} \\ & \underset{\sim}{n} \end{aligned}$ | $\begin{aligned} & \underset{\sim}{\sim} \\ & \underset{\sim}{n} \end{aligned}$ |  |  |
| poupd |  | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{i}$ | $\underset{\sim}{i}$ | $\underset{\sim}{i}$ | $\left\lvert\, \begin{aligned} & \frac{\pi}{0} \\ & \stackrel{5}{5} \\ & \hline \end{aligned}\right.$ | $\begin{aligned} & \stackrel{\rightharpoonup}{0} \\ & \stackrel{5}{5} \text { 응 } \end{aligned}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ |
| 7 7 |  | $\underset{\sim}{\infty}$ | $\underset{\sim}{\infty}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{i}$ | $\underset{\sim}{\underset{\sim}{n}}$ | $\underset{\sim}{n} \underset{\sim}{n}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\underset{\sim}{n}}{\underset{\sim}{n}}$ | $\underset{\sim}{\underset{\sim}{\sim}}$ | $\underset{\underset{\sim}{\sim}}{\underset{\sim}{2}}$ | $\underset{\underset{N}{N}}{\stackrel{\rightharpoonup}{7}}$ | $\begin{aligned} & \mathrm{O} \\ & \underset{\sim}{n} \end{aligned}$ |
| əd $\wedge_{\perp}$ әıグеә」 |  | \％ | \％ | $\begin{aligned} & \frac{ᄃ}{U} \\ & \frac{\pi}{0} \end{aligned}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \stackrel{y}{0} \end{aligned}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{\pi}{0} \end{aligned}$ | $\begin{array}{\|l} \frac{ᄃ}{4} \\ \stackrel{y}{0} \end{array}$ | $\begin{aligned} & \frac{ᄃ}{む} \\ & \stackrel{t}{0} \end{aligned}$ | $\begin{array}{\|l} \frac{ᄃ}{4} \\ \stackrel{y}{0} \end{array}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{\pi}{0} \end{aligned}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{\ddot{4}}{2} \end{aligned}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{\pi}{0} \end{aligned}$ | \＃ | \＃ |
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| eərt |  | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $u$ |
| ұхәұиоэ |  | $\underset{\sim}{\underset{\sim}{\sim}}$ | $\underset{\underset{\sim}{\sim}}{\underset{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{\sim}}$ | $\underset{\sim}{\underset{\sim}{n}}$ | $\underset{\sim}{\underset{\sim}{\sim}}$ | $\stackrel{n}{n} \underset{\sim}{n}$ | $\underset{\sim}{\underset{\sim}{\sim}} \underset{\sim}{n}$ | $\underset{\sim}{\underset{\sim}{n}}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{\sim} \end{aligned}$ | $\underset{\sim}{\underset{\sim}{\sim}}$ | $\begin{aligned} & \underset{\sim}{\sim} \\ & \underset{\sim}{2} \end{aligned}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\begin{aligned} & \underset{\sim}{\sim} \\ & \hline \end{aligned}$ |


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| $\begin{gathered} \text { әdo\|S } \\ \text { fo уеәдя } \end{gathered}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| әр！ऽ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ueld u！ədeus |  |  |  |  |  | $\begin{aligned} & \stackrel{\rightharpoonup}{\varpi ㇒} \\ & \stackrel{\vdots}{\equiv} \end{aligned}$ |  |  |  |  |  |  |  |
| ұuәuodmos әи！〕 |  |  | $\begin{array}{\|l} \vec{~} \\ \frac{\pi}{0} \\ \stackrel{\rightharpoonup}{0} \\ \stackrel{\Gamma}{0} \\ 0 \end{array}$ | $\begin{aligned} & 0 \\ & \frac{0}{\tilde{0}} \\ & \tilde{\sim} \\ & \frac{\lambda}{0} \\ & \frac{\pi}{0} \end{aligned}$ |  |  | $\begin{aligned} & \frac{\pi}{0} \\ & \frac{\pi}{v} \\ & \frac{\lambda}{\omega} \end{aligned}$ |  |  | $\begin{array}{\|l} \frac{\rightharpoonup}{\pi} \\ \frac{\pi}{0} \\ \frac{\lambda}{0} \\ \stackrel{\Gamma}{N} \\ \hline \end{array}$ |  | $\begin{array}{\|l} \frac{\lambda}{~} \\ \frac{\pi}{0} \\ \stackrel{\rightharpoonup}{0} \\ \stackrel{\Gamma}{0} \\ \hline \end{array}$ | $\begin{aligned} & \frac{\#}{\bar{n}} \\ & \frac{\partial}{\omega} \\ & \frac{\pi}{0} \end{aligned}$ |
| dnopos |  |  |  |  |  |  |  |  |  |  |  | $\left\lvert\, \begin{array}{ll} n & 3 \\ & 0 \\ 3 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & c \\ 0 \end{array}\right.$ |  |
| （m）$\cdot 0$ | $\underset{\substack{0 \\ \\ \hline}}{ }$ | $\underset{\sim}{\underset{\sim}{4}}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{7}$ | $\underset{\sim}{\text { Y }}$ | $\stackrel{\infty}{\infty}$ | $\underset{\sim}{n}$ |  | $\stackrel{\infty}{n}$ | $\underset{o}{m}$ | $\stackrel{-1}{0}$ | $\stackrel{-}{0}$ |  |
| （w）＇M／G |  |  |  |  |  | $\underset{\sim}{\underset{\sim}{n}} \underset{\sim}{n}$ |  |  |  |  |  |  |  |
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| se әmes |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 人я рә｜！ |  |  |  |  |  | $\begin{array}{ll} 0 \\ \underset{\sim}{2} & -1 \\ \underset{\sim}{n} \end{array}$ |  |  | $\underset{\sim}{\sim}$ |  |  |  |  |
| －ou әınłeə」 |  |  |  |  |  | $\underset{\sim}{\underset{\sim}{n}}$ | $\begin{aligned} & \underset{\sim}{N} \\ & \underset{\sim}{n} \end{aligned}$ | $\underset{\sim}{\underset{\sim}{n}}$ | $\begin{aligned} & \underset{\sim}{\sim} \\ & \hline \end{aligned}$ | $\underset{\sim}{\underset{\sim}{n}}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{\sim}{\underset{\sim}{n}}$ |  |
| роиə． | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{i}$ | $\underset{\sim}{i}$ | $\underset{\sim}{i}$ | $\underset{i}{i}$ | $\underset{\sim}{i}$ | $\underset{\sim}{i}$ | $\underset{\sim}{i}$ | $\stackrel{®}{\square}$ |
| 7n） | 윽 | $\begin{aligned} & \text { 윽 } \end{aligned}$ | $\begin{aligned} & \text { O} \\ & \text { 그́ } \end{aligned}$ | $\begin{aligned} & \mathrm{I} \\ & \underset{N}{n} \end{aligned}$ |  | $\underset{\sim}{\sim}$ | $\underset{\sim}{\underset{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{2}}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\bigcirc$ |
| $\quad \partial d K_{\perp}$ әиヱеә」 | \＃ | \％ | \＃ | 立 | \＃ | $\begin{array}{\|l} \frac{ᄃ}{4} \\ \stackrel{y}{0} \end{array}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{\pi}{0} \end{aligned}$ |  | $\begin{aligned} & \frac{ᄃ}{U} \\ & \stackrel{t}{0} \end{aligned}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{\ddot{4}}{0} \end{aligned}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{\pi}{0} \end{aligned}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{\ddot{4}}{2} \end{aligned}$ | $\begin{aligned} & \overline{\overline{0}} \\ & \overline{0} \\ & \hline 0 \end{aligned}$ |
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| eadv | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\cup$ | $\stackrel{\square}{\square}$ |
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| əseg |  |  | 产 |  | $\begin{aligned} & \text { त्ల } \\ & \stackrel{0}{0} \\ & \hline \end{aligned}$ |  | $\begin{array}{\|l\|l\|} \hline \stackrel{\rightharpoonup}{0} \\ \stackrel{0}{0} \\ \vdots \\ 0 & 0 \end{array}$ |  |  |  | $\begin{array}{\|l\|} \stackrel{\rightharpoonup}{\mathrm{U}} \\ \stackrel{\mathrm{C}}{\mathrm{O}} \\ \hline \end{array}$ |  | $\begin{array}{\|l\|l} \stackrel{\rightharpoonup}{0} \\ \stackrel{0}{c} \\ 0 \\ 0 & 0 \end{array}$ |  | 증 |
| ədols „0 みセコ」я |  |  |  |  |  |  | $\begin{aligned} & \frac{2}{⿺} \\ & \frac{\pi}{4} \end{aligned}$ |  | $\begin{aligned} & \frac{2}{0} \\ & \frac{\pi}{5} \end{aligned}$ |  | $\begin{aligned} & \frac{2}{⿺ ⿻} \\ & \frac{\pi}{4} \end{aligned}$ |  | $\begin{aligned} & \frac{2}{0} \\ & \frac{\pi}{4} \end{aligned}$ |  | 年 |
| әр！ऽ |  |  | $\begin{aligned} & \stackrel{\varrho}{\Perp} \\ & \stackrel{\sim}{\psi} \end{aligned}$ |  |  |  | $\begin{aligned} & \stackrel{\varrho}{\Perp} \\ & \stackrel{\sim}{\star} \end{aligned}$ |  | $\begin{aligned} & \stackrel{\varrho}{\Perp} \\ & \stackrel{\sim}{\star} \end{aligned}$ |  | $\begin{aligned} & \stackrel{\varrho}{\ddot{*}} \\ & \stackrel{\star}{*} \end{aligned}$ |  | $\begin{aligned} & \stackrel{\varrho}{\ddot{*}} \\ & \stackrel{\star}{*} \end{aligned}$ |  | 边 |
| ueld u！ədeys |  |  | $\begin{array}{\|l} 0 \\ \hline \frac{0}{0} \\ \frac{1}{0} \\ \hline \end{array}$ |  |  |  | $\begin{array}{\|l} \frac{.}{2} \\ \frac{\sqrt{3}}{3} \\ \cdot \frac{3}{6} \end{array}$ |  | $\begin{array}{\|l} \frac{1}{2} \\ \frac{\sqrt{3}}{3} \\ \cdot \frac{3}{y} \end{array}$ |  |  |  | $\begin{aligned} & \frac{1}{\sqrt{3}} \\ & \frac{3}{3} \\ & \cdot \frac{3}{y} \end{aligned}$ |  | － |
| ұиәиodmos әи！़ |  | $\frac{\widehat{\pi}}{0}$ |  | $\begin{aligned} & \frac{\pi}{0} \\ & \frac{\pi}{0} \\ & \frac{\lambda}{0} \\ & \underset{\sim}{0} \end{aligned}$ |  | $\begin{aligned} & \frac{\pi}{0} \\ & \frac{\pi}{0} \\ & \frac{\lambda}{0} \\ & \underset{0}{0} \end{aligned}$ |  | $\begin{aligned} & \frac{7}{0} \\ & \frac{\pi}{0} \\ & \frac{\lambda}{0} \\ & \frac{c}{0} \end{aligned}$ |  | $\begin{aligned} & \frac{\lambda}{\pi} \\ & \frac{\pi}{0} \\ & \frac{\lambda}{0} \\ & \underset{\sim}{0} \end{aligned}$ |  | $\begin{aligned} & \frac{7}{0} \\ & \frac{\pi}{0} \\ & \frac{\lambda}{0} \\ & \frac{c}{0} \end{aligned}$ |  | $\begin{aligned} & \frac{7}{0} \\ & \frac{\pi}{0} \\ & \frac{\lambda}{0} \\ & \frac{c}{0} \end{aligned}$ |  |
| anopos |  | $\begin{array}{r} \frac{0}{0} \\ -\frac{0}{\bar{E}} \frac{0}{0} \frac{0}{\overline{0}} \end{array}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| （w）$M /{ }^{\prime} \cdot$ g |  |  | $0$ |  | $\underset{\sim}{\infty}$ |  | $\underset{0}{0}$ |  | $\stackrel{\infty}{n}$ |  | $\begin{array}{\|c} 0 \\ 0 \\ 0 \end{array}$ |  | ¢ |  | $\underset{\sim}{\infty}$ |
| （w） 7 |  |  |  |  |  |  | ণ |  | $\underset{0}{0}$ |  | $\underset{\sim}{\sim}$ |  | $\underset{0}{0}$ |  | J |
| se zmes |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | প্লি |  | - |  | o্ট |  | $\begin{aligned} & \underset{\sim}{\tilde{m}} \\ & \hline \end{aligned}$ |  | $\underset{\sim}{\underset{\sim}{\mathrm{N}}}$ |  | $\left\lvert\, \begin{aligned} & 0 \\ & 0 \\ & \hline 0 \\ & \hline \end{aligned}\right.$ |
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| poüd | $\stackrel{\square}{\square}$ | $\stackrel{\square}{\square}$ |  | $\begin{aligned} & \stackrel{\pi}{0} \\ & \stackrel{C}{5} \\ & \hline 8 \end{aligned}$ | $\downarrow$ | $\checkmark$ | $\begin{aligned} & \left\lvert\, \frac{\pi}{\pi}\right. \\ & \stackrel{\pi}{5} \\ & \hline \end{aligned}$ | $\begin{aligned} & \frac{\pi}{0} \\ & 5 \\ & 5 \\ & \hline \end{aligned}$ | $\left\|\begin{array}{l} \frac{\pi}{0} \\ \frac{5}{5} \\ \hline 8 \end{array}\right\|$ | $\begin{aligned} & \frac{\pi}{0} \\ & 5 \\ & 5 \\ & \hline \end{aligned}$ | $\begin{aligned} & \frac{\pi}{0} \\ & \frac{5}{5} \\ & \hline 0 \end{aligned}$ | $\begin{aligned} & \frac{\pi}{0} \\ & 5 \\ & 5 \\ & \hline \end{aligned}$ | $\checkmark$ | $\checkmark$ | $\begin{aligned} & \left\|\begin{array}{l} \stackrel{\pi}{0} \\ \stackrel{0}{5} \\ \hline 0 \end{array}\right\| \end{aligned}$ |
| 7 7 | $\bigcirc$ | $\bigcirc$ | òo | OO-M | in | No | $\stackrel{\rightharpoonup}{\mathrm{O}}$ | Nò | \|ờ | or | $\begin{aligned} & \underset{\sim}{-1} \\ & \underset{\sim}{n} \end{aligned}$ | $\underset{\sim}{\underset{\sim}{7}}$ | $\underset{\sim}{\underset{m}{2}}$ | $\underset{\sim}{m}$ | $\left\lvert\, \begin{aligned} & n \\ & \stackrel{n}{2} \\ & \hline \end{aligned}\right.$ |
| əd $\Lambda_{\perp}$ <br>  | $\begin{aligned} & \overline{\overline{0}} \\ & \bar{u} \\ & \bar{亏} \end{aligned}$ |  | $\begin{aligned} & \text { 苍 } \\ & \text { o } \\ & \hline 0 \end{aligned}$ | $\begin{aligned} & \text { \# } \\ & \text { O} \\ & 0 \end{aligned}$ | $\begin{aligned} & \stackrel{ᄃ}{y} \\ & \stackrel{y}{0} \end{aligned}$ | $\begin{aligned} & \frac{5}{4} \\ & \frac{\pi}{0} \end{aligned}$ | $\left\lvert\, \begin{aligned} & \text { 范 } \\ & 0 \\ & 0 \end{aligned}\right.$ |  | $\left\|\begin{array}{ll}  \pm \\ 0.0 \\ 0 \\ 0 \end{array}\right\|$ | $\begin{aligned} & \text { 茷 } \\ & 0 \\ & \hline \end{aligned}$ |  |  | $\begin{aligned} & \text { 证 } \\ & 0 \\ & \hline 0 \end{aligned}$ | $\begin{aligned} & \stackrel{\rightharpoonup}{\mathrm{O}} \mathrm{O} \\ & \mathrm{O} \end{aligned}$ | 䓂 |
| 人10827） |  |  | 艺 | $\overline{\text { ¢ }}$ | \＃ | $\overline{\text { ¢ }}$ | 艺 | 戸 | 芌 | 戸 | 芌 | 戸 | 芌 | 戸 | $\underset{3}{7}$ |
| eədV | $\stackrel{\pi}{\leq}$ | $\stackrel{\pi}{C}$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ |
| ұхәұиоэ | $\underset{\sim}{-7}$ | O | òo | ষ্ল | nin | O-O | \|òm | oio | or | $\begin{aligned} & \text { O} \\ & \text { O} \\ & \hline \end{aligned}$ | $\begin{aligned} & \underset{\sim}{I} \\ & \underset{\sim}{2} \end{aligned}$ | $\begin{aligned} & \underset{\sim}{\sim} \\ & \underset{\sim}{2} \end{aligned}$ | $\underset{\substack{m \\ \hline \\ \hline}}{ }$ | $\underset{\sim}{\underset{\sim}{\prime}}$ | $\begin{array}{\|c} n \\ \underset{\sim}{n} \\ \hline \end{array}$ |


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| əseg |  | $\stackrel{\text { T }}{4}$ |  |  |  | $\stackrel{\text { T }}{4}$ |  | 즌 |  | 즌 |  | 증 $\stackrel{0}{0}$ 0 |  | $\left\|\begin{array}{ll} \stackrel{\rightharpoonup}{0} \\ \stackrel{0}{C} \\ \stackrel{0}{0} & \\ \hline \end{array}\right\|$ |  |
| ədols <br> f0＞еә」я |  | $\begin{aligned} & \frac{2}{0} \\ & \frac{\pi}{4} \end{aligned}$ |  |  |  |  |  | $\begin{aligned} & \frac{2}{0} \\ & \frac{\pi}{5} \end{aligned}$ |  |  |  |  |  |  |  |
| әр！S |  | $\begin{aligned} & \mathrm{O} \\ & \underset{\varepsilon}{\mathrm{E}} \end{aligned}$ |  |  |  |  |  | 菏 |  |  |  |  |  | $\begin{aligned} & \frac{3}{z} \\ & \stackrel{y}{\bar{N}} \\ & \frac{\pi}{\omega} \end{aligned}$ |  |
| ueld u！ədeys |  | $\begin{aligned} & \frac{0}{U} \\ & \stackrel{0}{z} \\ & \vdots \end{aligned}$ |  |  |  |  |  |  |  | $\stackrel{\stackrel{1}{\succsim}}{\stackrel{\text { ® }}{=}}$ |  |  |  |  |  |
| quәuodmos әи！़ | $\begin{array}{\|l} \frac{\pi}{0} \\ \frac{\pi}{0} \\ \frac{\lambda}{0} \\ \underset{\sim}{0} \\ \hline \end{array}$ |  | $\begin{array}{\|l} \frac{त}{0} \\ \frac{\pi}{0} \\ \frac{\lambda}{0} \\ \stackrel{\Gamma}{0} \\ 0 \end{array}$ |  | $\begin{aligned} & \frac{0}{\tilde{0}} \\ & \tilde{N} \\ & \frac{\pi}{0} \\ & \frac{\pi}{0} \end{aligned}$ |  | $\begin{aligned} & \underset{0}{\check{c}} \\ & \tilde{0} \\ & \underset{\sim}{\omega} \\ & \frac{\pi}{0} \end{aligned}$ |  |  |  | $\begin{aligned} & \underset{0}{0} \\ & \tilde{0} \\ & 0 \\ & \frac{0}{0} \\ & \frac{\pi}{0} \end{aligned}$ |  |  |  |  |
| גnopo |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| （m）$\cdot 0$ | $\underset{0}{-9}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | O. | O. | $\underset{\sim}{\underset{\sim}{i}}$ | $\underset{\sim}{\underset{O}{3}}$ | $\underset{\sim}{7}$ | $\underset{\sim}{\underset{O}{A}}$ | $\stackrel{\circ}{\circ}$ | $\stackrel{\circ}{\circ}$ | $\begin{aligned} & \underset{0}{7} \\ & \hline \end{aligned}$ | $\underset{0}{7}$ | $\infty_{0}^{\infty}$ | $\infty_{0}^{\infty}$ |
| （w）$M / \mathrm{M} /$ g |  | $\begin{array}{\|c} \substack{0 \\ 0 \\ \hline} \end{array}$ |  | $\underset{r}{r}$ |  | $\underset{\sim}{\underset{\sim}{i}}$ |  | $\begin{aligned} & \bullet \\ & \infty \\ & \stackrel{\infty}{+} \end{aligned}$ |  | $\stackrel{\bullet}{\circ}$ |  | $\begin{aligned} & \bullet \\ & \infty \\ & + \end{aligned}$ |  | $\hat{o}_{0}$ |  |
| （w） 7 |  | $\stackrel{\bigcirc}{\circ}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| se zmes |  |  |  |  |  |  |  | $$ |  |  |  | $\underset{\sim}{\underset{\sim}{\mathrm{N}}} \underset{\sim}{m}$ |  |  |  |
| 人я рә｜！ı |  | $\begin{aligned} & \infty \\ & \underset{\sim}{1} \\ & \hline \end{aligned}$ |  | Ò O |  | $\underset{\sim}{\underset{\sim}{N}}$ |  | ন্ভু |  | $\begin{aligned} & 0 \\ & \underset{\sim}{N} \\ & \hline \end{aligned}$ |  | $\begin{gathered} \infty \\ \underset{\sim}{\infty} \\ \hline \end{gathered}$ |  | O |  |
| －ou әınłeə」 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| poü． | $\begin{aligned} & \stackrel{\pi}{0} \\ & \stackrel{\rightharpoonup}{5} \\ & \hline 8 \end{aligned}$ | $\begin{aligned} & \frac{\pi}{0} \\ & 5 \\ & 5 \\ & \hline \end{aligned}$ | $\begin{aligned} & \stackrel{\rightharpoonup}{0} \\ & 5 \\ & 5 \\ & \hline \end{aligned}$ | $\checkmark$ | $\checkmark$ | ＊ | $\checkmark$ | ＊ | $\checkmark$ | ＊ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\underset{\sim}{i}$ | $\stackrel{-}{i}$ |
| 7 J | $\begin{array}{\|c} n \\ \underset{\sim}{n} \\ \hline \end{array}$ | $\begin{aligned} & \hat{\prime} \\ & \underset{\sim}{n} \end{aligned}$ | $\underset{\underset{N}{n}}{\hat{\prime}}$ | $\begin{aligned} & \underset{\sim}{9} \\ & \underset{\sim}{2} \end{aligned}$ | $\begin{aligned} & \underset{\sim}{9} \\ & \underset{\sim}{2} \end{aligned}$ | $\underset{\sim}{\underset{\sim}{2}}$ | ন্ত্শ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\begin{aligned} & \text { N } \\ & \text { On } \end{aligned}$ | $\begin{array}{\|c} \underset{N}{\mathrm{~N}} \\ \mathrm{O} \end{array}$ | N | $\begin{array}{\|c} \text { N} \\ \text { Non } \end{array}$ | $\begin{gathered} \mathrm{O} \\ \text { O} \\ \hline \end{gathered}$ | Ò |
| əd／$\perp_{\perp}$ <br>  | $\begin{aligned} & \text { 范 } \\ & \text { O } \\ & \hline 1 \end{aligned}$ | \＃ | \＃ | $\begin{aligned} & 3 \\ & 0 \\ & 0 \\ & 2 \\ & 2 \end{aligned}$ | 毫 | $\begin{aligned} & \frac{3}{0} \\ & 2 \\ & 2 \\ & \hline \end{aligned}$ | 毫 | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{\pi}{0} \end{aligned}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{\pi}{0} \end{aligned}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \frac{\pi}{0} \end{aligned}$ | $\begin{array}{\|l} \frac{5}{4} \\ \frac{1}{0} \end{array}$ | $\begin{aligned} & \frac{5}{y} \\ & \stackrel{y}{0} \end{aligned}$ |  | $\begin{aligned} & \frac{5}{U} \\ & \frac{\square}{0} \end{aligned}$ | $\begin{aligned} & \stackrel{y}{4} \\ & \text { 능 } \end{aligned}$ |
|  | ¢ | 芌 | 戸 | 芌 | 戸 | 芌 | 戸 | 艺 | 戸 | 芌 | ¢ | 艺 | ¢ | 艺 | ¢ |
| eədV | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ |
| ұхәұиоэ | $\begin{aligned} & 0 \\ & \underset{1}{0} \\ & \underset{m}{2} \end{aligned}$ | $\underset{\mathrm{m}}{\stackrel{\rightharpoonup}{2}}$ | $\begin{aligned} & \infty \\ & -8 \\ & -\quad \end{aligned}$ | $\begin{aligned} & \underset{\sim}{9} \\ & \underset{\sim}{2} \end{aligned}$ | Ò O | $\underset{\sim}{\underset{\sim}{2}}$ | $\underset{\sim}{\underset{\sim}{2}}$ | $\underset{\sim}{\sim}$ | ন্ত্যু | $\begin{array}{\|c} \underset{\sim}{\mathrm{N}} \\ \hline \end{array}$ | $\begin{aligned} & 0 \\ & \underset{\sim}{\mathrm{O}} \end{aligned}$ | İ | $\underset{\substack{\infty \\ \hline \\ \hline \\ \hline}}{ }$ | ò | o্থ |


| uo！ －ұеұиә！мо | 3 |  | $\underset{\dot{U}}{\underset{u}{3}}$ |  | $\underset{\dot{U}}{\underset{u}{3}}$ |  | $\underset{\text { 3 }}{3}$ |  |  |  |  | 3 |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| әseg | 范 |  |  |  | $\stackrel{+}{4}$ |  | $\begin{array}{\|l\|} \hline \stackrel{\rightharpoonup}{\mathrm{O}} \\ \stackrel{0}{0} \\ \hline 0 \end{array}$ |  | $\begin{array}{ll}\stackrel{\rightharpoonup}{0} & \\ \text { O} \\ 0 & \\ 0 & 0\end{array}$ |  |  | $\begin{array}{\|l\|l} \stackrel{\rightharpoonup}{0} \\ \underset{0}{0} \\ 0 & 0 \end{array}$ |  |  |  |
| ədols „0 ヌセә」я | $\begin{array}{\|l} \frac{3}{3} \\ \frac{0}{\bar{N}} \\ \frac{\pi}{\omega} \end{array}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| әр！ऽ | $\begin{array}{\|l\|l} \frac{3}{3} \\ \frac{0}{\bar{N}} \\ \frac{\pi}{n} \end{array}$ |  |  |  |  |  | $\begin{aligned} & \dot{0} \\ & \stackrel{0}{0} \\ & \vdots \\ & \stackrel{\sim}{4} \end{aligned}$ |  | $\stackrel{\rightharpoonup}{0}$  <br> $\frac{0}{0}$  <br> 0  <br> $\dot{E}$ $e$ |  |  |  |  | $\left\|\begin{array}{ll} \stackrel{\rightharpoonup}{0} & \\ \frac{0}{0} & \\ \stackrel{0}{0} \\ \dot{\xi} & 0 \end{array}\right\|$ |  |
| ueld u！ədeus |  |  | $\begin{aligned} & \stackrel{\rightharpoonup}{\varpi} \\ & \stackrel{ٍ}{\equiv} \end{aligned}$ |  | $\begin{aligned} & \stackrel{\rightharpoonup}{\varpi} \\ & \stackrel{ٍ}{\equiv} \end{aligned}$ |  |  |  | ¢ |  |  | $\begin{aligned} & \text { ᄃ } \\ & \stackrel{\text { ® }}{=} \end{aligned}$ |  | （ |  |
| ұиәиodmoэ əu！」 |  | $\begin{aligned} & \frac{\pi}{U} \\ & \frac{\lambda}{U} \\ & \frac{\lambda}{n} \end{aligned}$ |  | $\begin{aligned} & \underset{0}{0} \\ & \stackrel{0}{v} \\ & \underset{\sim}{u} \\ & \frac{\sim}{0} \end{aligned}$ |  |  |  |  |  | $\begin{aligned} & \frac{\pi}{0} \\ & \frac{\pi}{0} \\ & \frac{\lambda}{n} \end{aligned}$ |  |  |  |  |  |
| anopo |  |  |  |  |  |  |  |  |  | 을 |  |  |  |  |  |
| （m）$\cdot 0$ | $\stackrel{\sim}{\circ}$ | $\stackrel{\circ}{\circ}$ | $)_{0}^{\infty}$ | $\stackrel{\infty}{\circ}_{\infty}^{\circ}$ | O | O- | $\underset{\sim}{\sim}$ | $\underset{\sim}{\underset{\sim}{n}}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\underset{O}{3}}$ | $\begin{aligned} & \mathrm{m} \\ & \hline \end{aligned}$ | $\stackrel{\sim}{N}$ | $\stackrel{\sim}{N}$ | $\underset{\sim}{\infty}$ | $\begin{aligned} & \infty \\ & \underset{0}{\infty} \\ & \hline \end{aligned}$ |
| （w）$\cdot \mathrm{M} /$ ¢ | $$ |  | $\underset{\sim}{\underset{\sim}{\mathrm{N}}}$ |  | $\underset{\sim}{寸}$ |  | $\underset{\sim}{\sim}$ |  | $\underset{\sim}{m}$ |  |  | $\underset{\sim}{e}$ |  | $\underset{\substack{\text { ® } \\ \text { n } \\ \hline}}{ }$ |  |
| （w） 7 |  |  |  |  |  |  |  |  |  |  |  |  |  | 9 |  |
| se әmes |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | $\underset{\sim}{N}$ |  | $\underset{\sim}{\text { }}$ |  | $\left\lvert\, \begin{aligned} & 0 \\ & \underset{\sim}{0} \\ & \hline \end{aligned}\right.$ |  | $\begin{aligned} & \infty \\ & 0 \\ & 0 \\ & \hline \end{aligned}$ |  |  |  |  |  |  | $\begin{aligned} & 0 \\ & Q_{0} \end{aligned}$ |  |
| －ou əıņeay |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| poupd | $\underset{\sim}{i}$ | $\underset{\sim}{i}$ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\checkmark$ | $\left\|\begin{array}{l} \frac{\pi}{0} \\ \frac{1}{5} \\ \hline \end{array}\right\|$ | $\begin{aligned} & \stackrel{\rightharpoonup}{0} \\ & \stackrel{\rightharpoonup}{5} \\ & \hline 8 \end{aligned}$ |
| 7 7 | $\underset{\sim}{\underset{\sim}{n}}$ | $\underset{\sim}{\underset{\sim}{n}}$ | $\begin{aligned} & n \\ & \underset{\sim}{2} \\ & \hline \end{aligned}$ | $\begin{aligned} & \text { M } \\ & \underset{\sim}{2} \end{aligned}$ | $\begin{array}{\|c} \underset{\sim}{n} \\ 0 \\ \hline \end{array}$ | $\begin{aligned} & \text { ñ } \\ & \underset{\sim}{0} \end{aligned}$ | $\begin{aligned} & \hat{m} \\ & \underset{m}{n} \end{aligned}$ | $\begin{aligned} & \hat{N} \\ & \mathbf{N} \end{aligned}$ | O | O | of | $\begin{aligned} & \text { m } \\ & \underset{\sim}{2} \end{aligned}$ | $\begin{aligned} & \text { m } \\ & \underset{\sim}{2} \end{aligned}$ | 隻 | 隻 |
| əd $\wedge_{\perp}$ <br>  | $\begin{aligned} & \frac{ᄃ}{4} \\ & \stackrel{\rightharpoonup}{0} \end{aligned}$ | $\begin{aligned} & \frac{ᄃ}{4} \\ & \stackrel{y}{0} \end{aligned}$ | $\left\lvert\, \begin{aligned} & \frac{3}{0} \\ & \frac{0}{3} \\ & \hline \end{aligned}\right.$ | $\begin{array}{\|l\|l\|} \frac{3}{0} \\ 0 \\ 2 \end{array}$ | $\begin{array}{\|l} \frac{5}{4} \\ \frac{\ddot{4}}{2} \end{array}$ | $\begin{aligned} & \frac{ᄃ}{y} \\ & \frac{\ddot{y}}{2} \end{aligned}$ | $\left\lvert\, \begin{aligned} & 3 \\ & 3 \\ & \hline \end{aligned}\right.$ | $\begin{aligned} & \frac{3}{3} \\ & \frac{2}{2} \\ & \hline \end{aligned}$ | \＃ | \＃ | $\stackrel{\square}{2}$ | 花 | $\left\lvert\, \begin{aligned} & 3 \\ & 20 \\ & \hline \end{aligned}\right.$ | \＃ | \＃ |
|  | 艺 | $\overline{\text { ¢ }}$ | 艺 | ¢ | 苛 | 戸 | 芌 | $\overline{\text { ¢ }}$ | 芌 | $\overline{\text { ¢ }}$ | 戸 | 芌 | $\overline{\text { ¢ }}$ | 艺 | $\overline{\text { ¢ }}$ |
| eวлV | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ |
| ұхәұиоэ | $\underset{\sim}{\underset{\sim}{n}}$ | $\underset{\sim}{N}$ | $\begin{gathered} \underset{m}{n} \\ \underset{\sim}{2} \end{gathered}$ | $\underset{\mathrm{m}}{\underset{\sim}{2}}$ | $\begin{aligned} & n \\ & \\ & \end{aligned}$ | $\begin{aligned} & 0 \\ & \underset{\sim}{n} \\ & 0 \end{aligned}$ | $\begin{aligned} & \widehat{n} \\ & \underset{\sim}{2} \end{aligned}$ | $\begin{aligned} & \infty \\ & \underset{\sim}{\infty} \\ & \hline \end{aligned}$ | of | $\overrightarrow{\text { I }}$ | ঙ্ল゙ | $\underset{\sim}{n}$ | ষ্ল | 杂 | $\left\lvert\,\right.$ |

V． 1

| uo！ －ұеұиә！̣о |  |  |  |  |  |  |  |  |  |  |  |  |
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| әseg |  |  | $\begin{array}{\|l\|l} \stackrel{\rightharpoonup}{0} \\ \stackrel{0}{0} \\ \stackrel{0}{0} & \\ \hline \end{array}$ |  |  |  |  |  | $\stackrel{+}{4}$ |  | 華 |  |
| ədols f0＞еə」я |  |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \frac{2}{⿺} \\ & \frac{\pi}{5} \end{aligned}$ |  |
| әр！ऽ | $\stackrel{\rightharpoonup}{0}$  <br> $\frac{0}{0}$  <br> $\frac{0}{E}$  <br> $E$ 0 |  |  |  |  |  |  |  | $\stackrel{\rightharpoonup}{0}$  <br> $\frac{0}{0}$  <br> $\frac{0}{0}$  <br> $E$ 0 |  |  |  |
| ueld u！ədeus |  |  |  |  |  |  |  |  | $\frac{\frac{2}{3}}{\substack{3}}$ |  | ¢ |  |
| ұuәuodmos әи！़ |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \frac{0}{0} \\ & \frac{\pi}{0} \\ & 0 \\ & \frac{\lambda}{0} \\ & \frac{\pi}{0} \end{aligned}$ |  |  |
| ınopo |  |  |  |  |  |  |  |  |  |  |  |  |
| （m）$\cdot 0$ | $\underset{\sim}{\underset{\sim}{7}}$ | $\begin{aligned} & \underset{\sim}{7} \\ & \underset{0}{2} \end{aligned}$ | $\underset{\sim}{\underset{\sim}{N}}$ | $\underset{o}{\stackrel{\rightharpoonup}{0}}$ | $\underset{\sim}{\underset{O}{\sim}}$ | $\stackrel{m}{0}$ | $\stackrel{m}{0}$ | $\underset{0}{2}$ | $\begin{gathered} \mathrm{m} \\ 0 \end{gathered}$ | $\stackrel{m}{0}$ | $\underset{\sim}{\infty}$ |  |
| （m）$M / \mathrm{M}$＇g | $\underset{\sim}{\underset{O}{\circ}}$ |  | $\underset{\sim}{\sim}$ |  |  |  |  |  | $\underset{\sim}{G}$ |  | $9$ |  |
| （w） 7 | $\underset{\sim}{\infty}$ |  |  |  |  |  |  |  | $\underset{\sim}{\sim}$ |  | $\begin{aligned} & \underset{\sim}{N} \\ & \underset{\sim}{2} \end{aligned}$ |  |
| se zures |  |  |  |  |  |  |  |  |  |  |  |  |
| кя рә｜！！ | $\begin{aligned} & \infty \\ & \underset{\sim}{\infty} \\ & \hline \end{aligned}$ |  | oin Nin N్రై |  |  |  |  |  | $\begin{aligned} & \text { en } \\ & \text { On } \\ & \hline \end{aligned}$ |  | $\begin{array}{ll} \text { oin } \\ \text { Nò } \\ \text { in } \\ \text { In } \\ \hline \end{array}$ |  |
| ¢ou әınłeə」 |  |  | 守 | 守 |  | ơ | 俞 |  |  |  |  |  |
| pourd | $\begin{aligned} & \frac{\pi}{0} \\ & \stackrel{0}{5} \text { 잉 } \end{aligned}$ | $\begin{aligned} & \stackrel{+}{0} \\ & \stackrel{0}{0} \\ & \stackrel{5}{5} \\ & \hline \end{aligned}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{N}$ | $\underset{\sim}{N}$ | $\begin{aligned} & \stackrel{\rightharpoonup}{0} \\ & \stackrel{5}{5} 8 \\ & \hline \end{aligned}$ | $\begin{aligned} & \stackrel{\pi}{0} \\ & \stackrel{y}{5} \\ & \hline 8 \end{aligned}$ | $\underset{\sim}{\sim}$ | $\underset{\sim}{\sim}$ |
| 7 J | $\stackrel{\text { Y}}{\mathrm{O}}$ | $\underset{\mathrm{O}}{\mathrm{Y}}$ | 俞 | 各 | ơ |  | 守 | 各 | $\begin{array}{\|l\|l} \text { N } \\ \hline \mathrm{O} \\ \hline \end{array}$ | $\begin{array}{\|c} \text { N } \\ \text { NO } \\ \hline \end{array}$ | $\begin{aligned} & \infty \\ & 0 \\ & 0 \\ & \hline 0 \end{aligned}$ | $\begin{aligned} & \infty \\ & 0 \\ & 0 \\ & \hline 0 \end{aligned}$ |
| əd／$\perp_{\perp}$ <br>  | \＃ | \＃ | \＃ | \＃ | \＃ | \＃ | \＃ | \＃ |  | 落道 | \＃ | \＃ |
|  | 芌 | $\overline{\text { ¢ }}$ | 苞 | ¢ | $\overline{\text { ¢ }}$ | $\overline{\text { ¢ }}$ | ¢ | 戸 | 苂 | ¢ |  | 戸 |
| eəJV | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ | $\infty$ |
| ұхәұиоэ |  | $\begin{aligned} & \infty \\ & \stackrel{\infty}{+} \\ & \hline \end{aligned}$ | 守 | O | $$ | N | $\begin{aligned} & \mathrm{M} \\ & \mathbf{N} \\ & \hline \end{aligned}$ | 芯 | \|n | $\begin{array}{\|l\|l\|} \hline 0 \\ \hline 0 \\ \hline 0 \end{array}$ | $\begin{aligned} & \infty \\ & 0 \\ & \hline 0 \\ & \hline \mathbf{N} \end{aligned}$ | $\begin{array}{\|c} \mathbf{9} \\ \hline \mathbf{0} \\ \hline \end{array}$ |

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| uo！ －ұеұиә！ло | ～～ |  |  | $\left\lvert\, \begin{aligned} & \sum_{2}^{3} \\ & \underset{z}{u} \\ & \sum_{2} \end{aligned}\right.$ |  |  |  |  |  |  |  | 3 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| əseg | $\begin{array}{\|l\|} \hline \stackrel{\rightharpoonup}{0} \\ \stackrel{U}{0} \\ 0 \\ 0 \end{array}$ |  |  | $\left\|\begin{array}{ll} \stackrel{\rightharpoonup}{0} & \\ \stackrel{0}{C} & \\ 0.0 & 0 \end{array}\right\|$ |  |  | $\begin{aligned} & \stackrel{\rightharpoonup}{0} \\ & \stackrel{0}{0} \\ & \stackrel{0}{0} \end{aligned}$ |  |  | $\frac{\text { T }}{4}$ |  | 产 |  |  |
| ədols f0 》еә」я |  |  |  | $\begin{aligned} & \frac{2}{0} \\ & \frac{\pi}{5} \end{aligned}$ |  |  |  |  |  |  |  |  |  | 年 |
| әр！S |  |  |  | $\begin{aligned} & \stackrel{Q}{\ddot{2}} \\ & \stackrel{\sim}{*} \end{aligned}$ |  |  | $\begin{array}{\|l} \frac{3}{3} \\ \frac{0}{\bar{T}} \\ \frac{\pi}{n} \end{array}$ |  |  | $\begin{aligned} & \stackrel{\rightharpoonup}{\tilde{0}} \\ & \stackrel{\rightharpoonup}{0} \\ & \stackrel{0}{0} \\ & \dot{E} \end{aligned}$ |  | $\begin{array}{\|l} \frac{3}{3} \\ \stackrel{0}{\bar{N}} \\ \frac{\pi}{n} \end{array}$ |  | 颜 |
| ueld u！ədeus |  |  |  | $\begin{aligned} & \text { 㐫 } \\ & \stackrel{ٍ}{ٍ} \end{aligned}$ |  |  | $\begin{aligned} & \stackrel{\rightharpoonup}{\varpi ㇒} \\ & \stackrel{\rightharpoonup}{\equiv} \end{aligned}$ |  |  |  |  |  |  |  |
| quәuodmos әи！़ |  | $\begin{aligned} & \frac{\vec{\pi}}{\omega} \\ & \frac{\lambda}{\bar{u}} \end{aligned}$ |  |  |  |  |  |  |  |  |  |  | $\begin{aligned} & \stackrel{\rightharpoonup}{\hat{N}} \\ & \stackrel{\rightharpoonup}{\mathrm{~N}} \end{aligned}$ |  |
| 1nooo |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| （m）$\cdot 0$ | $\underset{\substack{\mathrm{o}}}{\underset{\sim}{2}}$ | $\underset{\sim}{\infty} \underset{\sim}{\infty}$ | $\xrightarrow[0]{\infty}$ | $\underset{\sim}{7}$ | $\underset{\sim}{\underset{\sim}{*}}$ | $\stackrel{m}{0}$ | $\underset{\sim}{\underset{O}{2}}$ | ${ }_{0}^{\circ}$ | $\underset{\sim}{\infty} \underset{\sim}{\infty}$ | $\underset{\sim}{\underset{\sim}{3}}$ |  | $\infty_{0}^{\infty}$ | $)_{0}^{\infty}$ | $\underset{\sim}{\underset{\sim}{2}}$ |
| （w）$M / \mathrm{M} /$ g | $\underset{\sim}{\underset{\sim}{7}}$ |  |  | $\hat{0}$ |  |  | $\underset{\sim}{\sim}$ |  |  | $\underset{\sim}{\sim}$ |  | O |  | $\begin{array}{\|c} 0 \\ 0 \\ 0 \\ 0 \end{array}$ |
| （w）$\rceil$ |  |  |  |  |  |  |  |  |  | $\underset{\sim}{\circ}$ |  |  |  | $\stackrel{-}{+}$ |
| se әmes |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 人я рә｜！ı」 | $\begin{aligned} & \text { İ } \\ & \hline \mathbf{O} \\ & \text { O} \end{aligned}$ |  |  | $\begin{aligned} & \mathrm{O} \\ & \underset{O}{\mathrm{O}} \mathrm{O} \\ & \hline \mathrm{O} \end{aligned}$ |  |  |  |  |  | $\underset{\sim}{\underset{\sim}{\mathrm{O}}}$ |  | $\begin{array}{\|l} n \\ \underset{\sim}{n} \end{array}$ |  | Non |
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| 3075 | B | fill | pit | 3074 | 2.2 | 3049 |  |  |  |  | 0.22 | mid brown grey | clayey silt |  |  |  |  |  |
| 3076 | B | cut | ditch | 3076 | 2.1 | 3060 | 3077 |  |  | 0.84 | 0.34 |  |  | linear | moderat <br> e | moderate | concav $\mathrm{e}$ | NNE－SSW |
| 3077 | B | fill | ditch | 3076 | 2.1 | 3060 |  |  |  |  | 0.21 | mid brown grey | clayey silt |  |  |  |  |  |
| 3078 | B | cut | pit | 3078 | 2.2 | 3049 | 3079 |  |  | 0.74 | 0.19 |  |  | sub－ circular | moderat <br> e | moderate | concav <br> e |  |
| 3079 | B | fill | pit | 3078 | 2.2 | 3049 |  |  |  |  | 0.19 | mid brown grey | silty sand |  |  |  |  |  |
| 3080 | B | fill | ditch | 3076 | 2.1 | 3060 |  |  |  |  | 0.12 | mid brown grey | clayey silt |  |  |  |  |  |
| 3081 | B | cut | ditch | 3081 | 2.1 |  | $\begin{aligned} & \hline 3101, \\ & 3105 \end{aligned}$ |  |  | 0.76 | 0.7 |  |  | linear | stepped | moderate | flat |  |
| 3082 | B | cut | pit | 3082 | 2.2 |  | $\begin{aligned} & 3099, \\ & 3104 \end{aligned}$ |  |  | 1.3 | 0.9 |  |  | sub－ circular | moderat <br> e | moderate | flat |  |
| 3083 | B | cut | pit | 3083 | 4 |  | 3100 |  |  |  |  |  |  |  |  |  |  |  |
| 3085 | B | cut | ditch | 3085 | 2.1 | 3072 | 3086 |  |  | 0.92 | 0.06 |  |  | linear | shallow | gentle | $\begin{aligned} & \text { concav } \\ & \text { e } \end{aligned}$ | E－W |
| 3086 | B | fill | ditch | 3085 | 2.1 | 3072 |  |  |  |  | 0.06 | dark grey brown | clay silt |  |  |  |  |  |
| 3087 | B | cut | ditch | 3087 | 2.1 | 3072 | 3088 |  |  | 1.2 | 0.06 |  |  | linear | moderat <br> e | shallow | concav e |  |
| 3088 | B | fill | ditch | 3087 | 2.1 | 3072 |  |  |  |  | 0.06 | dark brown grey | clay silt |  |  |  |  |  |
| 3089 | B | cut | pit | 3089 | 2.2 | 3049 | $\begin{aligned} & 3090, \\ & 3091 \end{aligned}$ |  |  | 5 | 0.58 |  |  | sub－ circular | moderat <br> e | moderate | concav e |  |
| 3090 | B | fill | pit | 3089 | 2.2 | 3049 |  |  |  |  | 0.34 | mid grey brown | sandy clay silt |  |  |  |  |  |
| 3091 | B | fill | pit | 3089 | 2.2 | 3049 |  |  |  |  | 0.28 | dark brown grey | sandy silt |  |  |  |  |  |

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## APPENDIX B FINDS REPORTS

## B. 1 Pottery

By Rob Perrin

## Introduction

B.1.1 In terms of methodology, the assemblage was sorted into fabrics within context groups with sherds quantified by sherd count, weight (in grams) and estimated vessel equivalence (EVE), based on rims. Vessel types were identified primarily from rims. An attempt is made to relate the fabrics and vessel codes to Oxford Archaeology's recording guidelines for Late Iron Age and Roman pottery (Booth n.d.). Imported continental pottery and regionally-traded wares are coded according to the National Roman Fabric Reference Collection (Tomber and Dore 1998). Some 311 sherds, weighing 4808g with a rim EVE of 5.25 were recovered from 65 contexts in 47 features; around 50 separate vessels were noted. The condition of the pottery is mixed with a mean sherd weight of 15 g and a mean rim percentage of 11 suggesting a fragmented assemblage; some sherds are abraded.
B.1.2 The pottery appears to date mainly from the mid-1st to later 2nd century with some later 3rd and possibly 4th century material. Additionally, a single body sherd (28g) of ?handmade pottery in a coarse dark greyish brown micaceous fabric from pit 2162 (Area C ) is tentatively suggested to be of Anglo-Saxon date.

## Features, Phases and Groups

B.1.3 Table 2 summarises the amount of pottery from the various features.

| Feature | Type | No. | Wt. (g) | Rim EVE | Vessels |
| :--- | :--- | ---: | ---: | ---: | ---: |
| 2003 | Ditch | 1 | 8 |  |  |
| 2011 | Ditch | 1 | 10 | 0.06 | 1 |
| 2026 | Pit | 1 | 4 |  |  |
| 2038 | Pit | 1 | 214 | 0.49 | 1 |
| 2062 | Ditch | 3 | 45 |  |  |
| 2091 | Ditch | 1 | 36 |  | 1 |
| 2097 | Ditch | 1 | 24 |  |  |
| 2108 | Ditch | 5 | 10 |  |  |
| 2110 | Pit | 107 | 1445 | 1.72 | 13 |
| 2134 | Ditch | 7 | 90 |  |  |
| 2149 | Ditch | 10 | 211 | 0.19 | 1 |
| 2152 | Ditch | 16 | 194 | 0.14 | 2 |
| 2156 | Ditch | 1 | 15 |  |  |
| 2160 | Ditch | 1 | 19 |  |  |
| 2161 | Ditch | 1 | 15 | 0.05 | 1 |
| 2162 | Pit | 3 | 38 | 0.07 | 1 |
| 2167 | Ditch | 3 | 113 | 0.1 | 3 |

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| Feature | Type | No. | Wt. (g) | Rim EVE | Vessels |
| :--- | :--- | ---: | ---: | ---: | ---: |
| 2170 | Ditch | 3 | 114 | 0.17 | 1 |
| 2173 | Ditch | 1 | 17 | 0.08 | 1 |
| 2179 | Ditch | 3 | 21 |  |  |
| 2186 | Ditch | 1 | 8 | 0.06 | 1 |
| 2193 | Ditch | 2 | 3 |  |  |
| 2198 | Ditch | 12 | 247 | 0.3 | 2 |
| 2205 | Gully | 4 | 49 |  |  |
| 2207 | Ditch | 10 | 95 | 0.11 | 1 |
| 2211 | Pit | 6 | 31 |  |  |
| 2218 | Pit | 2 | 6 |  |  |
| 2220 | Pit | 3 | 13 |  |  |
| 2222 | Pit | 3 | 24 |  |  |
| 2225 | Pit | 6 | 156 | 0.19 | 2 |
| 2227 | Ditch | 9 | 203 | 0.3 | 2 |
| 2229 | Ditch | 23 | 504 | 0.25 | 2 |
| 2238 | Ditch | 7 | 166 | 0.15 | 3 |
| 2240 | Pit | 1 | 15 |  |  |
| 2244 | Pit | 14 | 197 | 0.15 | 1 |
| 2248 | Pit | 1 | 26 |  |  |
| 2254 | Pit | 1 | 4 | 0.03 | 1 |
| 2266 | Pit | 2 | 7 |  |  |
| 2268 | Pit | 1 | 16 |  |  |
| 2278 | Pit | 7 | 99 | 0.17 | 2 |
| 2282 | Pit | 9 | 178 | 0.27 | 3 |
| 2284 | Pit | 3 | 9 | 0.03 | 1 |
| 2329 | Ditch | 1 | 11 | 0.06 | 1 |
| 3029 | Ditch | 1 | 3 |  |  |
| 3049 | Pit | 2 | 46 |  |  |
| 3082 | Pit | 1 | 2 |  |  |
| NA | Buried soil | 9 | 47 | 0.11 | 2.25 |
| Total |  | 311 | 4806 |  | 50 |
|  |  |  |  |  |  |

Table 2. Quantification of pottery by feature
B.1.4 There are two main feature categories together with a gully and buried soil. Table 3 shows the feature category quantification.

| Feature type | No. | Wt. (g) | Rim EVE | Vessels |
| :--- | ---: | ---: | ---: | ---: |
| Ditch | 124 | 2182 | 2.02 | 24 |
| Gully | 4 | 49 |  |  |
| Pit | 174 | 2530 | 3.12 | 24 |
| Buried soil | 9 | 47 | 0.11 | 2 |
| Total | $\mathbf{3 1 1}$ | $\mathbf{4 8 0 8}$ | $\mathbf{5 . 2 5}$ | $\mathbf{5 0}$ |

Table 3. Feature category quantification
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B.1.5 The features occur in three areas, $\mathrm{A}, \mathrm{B}$ and C , and are divided into four phases of which only one, Phase 2 , is Roman. Area A has no pottery and Phase 2 has two subdivisions. Almost all of the pottery is from Phase 2.2 (Table 4).

| Phase | No. | Wt. (g) | Rim EVE | Vessels |
| :--- | ---: | ---: | ---: | ---: |
| 2.1 | 10 | 46 | 0.06 | 1 |
| 2.2 | 298 | 4724 | 5.12 | 48 |
| 3 | 3 | 38 | 0.07 | 1 |
| Total | $\mathbf{3 1 1}$ | $\mathbf{4 8 0 8}$ | $\mathbf{5 . 2 5}$ | $\mathbf{5 0}$ |

Table 4. Roman Phase quantification

## Fabrics

B.1.6 Oxford Archaeology's Roman pottery codes are detailed and largely region-specific, so general categories are used for pottery from this site. The equivalent Leicestershire fabric codes are also given. Regionally-traded and imported continental wares are coded according to the National Roman Fabric Reference Collection (Tomber and Dore 1998). Table 5 shows the fabric range and quantities.

| OAU Fabric | Leics. Fabric | Description | No. | Wt. <br> $\mathbf{( g )}$ | Rim <br> EVE | Vessels |
| :--- | :--- | :--- | ---: | ---: | ---: | ---: |
| F | FL | Flint? | 5 | 40 |  |  |
| G | GT | Grog | 5 | 93 |  |  |
| G | GT? | Grog? | 4 | 35 |  |  |
| C10 | CG | Shell | 27 | 248 | 0.62 | 4 |
| R30 | GW | Grey | 163 | 2796 | 3.16 | 21 |
| R30 | GW | Rark grey | 25 | 438 | 0.21 | 4 |
| O10 | OW | Buff | 24 | 162 | 0.23 | 3 |
| O10 | OW | La Graufesenque samian | 9 | 37 |  |  |
| LGF SA | LGF SA | Lezoux samian | 13 |  |  |  |
| LEZ SA 2 | LEZ SA 2 | East Gaulish samian ? | 4 | 27 | 0.09 | 2 |
| EG SA? | EG SA? | Lower Nene Valley colour-coat | 13 | 242 | 0.29 | 4 |
| LNV CC | LNV CC | Lower Nene Valley colour-coat? | 9 | 42 | 0.05 | 2 |
| LNV CC? | LNV CC? | LNV WH/MAH WH | 1 | 63 |  | 1 |
| LNV WH/MAH WH | LNV WH/MAH WH | Man |  |  |  |  |
| MAH WH | MAH WH | Mancetter-Hartshill white | 4 | 128 | 0.18 | 3 |
| MAH WH? | MAH WH? | Mancetter-Hartshill white? | 2 | 58 |  | 1 |
| OXF RS | OXF RS | Oxfordshire red-slipped | 2 | 52 |  |  |
| OXF RS? | OXF RS? | Oxfordshire red-slipped? | 3 | 26 |  |  |
| DOR BB 1 | DOR BB 1 | Dorset black-burnished 1 | 8 | 218 | 0.42 | 4 |
| Total |  |  | 311 | 4808 | 5.25 | 50 |

Table 5. Fabric/vessel quantification

## Composition of the assemblage

B.1.7 Reduced grey wares account for around two-thirds of the assemblage by sherd count and weight. The vessels are mainly jars together with flanged bowls, plain-rimmed dishes, beakers and mortaria.

## Flint-gritted ware

B.1.8 The few possible flint-gritted sherds are residual in Phase 2.2 contexts.

## Shell-tempered ware

B.1.9 The four shell-gritted vessels are all jars, two of which have triangular rims. Most of this ware is from Phase 2.2 pit 2110.

## Grog-tempered wares

B.1.10 The few grog-tempered sherds are mainly in Phase 2.2 contexts apart from three possible grog-tempered sherds in Phase 2.1 ditch 2193. The ware is mainly mid-1st century in date and is therefore residual in the Phase 2.2 contexts.

## Fine wares

B.1.11 The fine wares comprise regionally-traded LNV CC and OXF RS, together with sherds which might be LNV CC and OXF RS. The LNV CC vessels are a beaker, a flanged bowl, a plain-rimmed dish and a plain rim which might be from an imitation samian ware Dr. 38 bowl. Those in possible LNV CC are another beaker with over slip white-painted decoration and a vessel which might be an imitation samian ware Dr. 31 bowl. All of the LNV CC and LNV CC? is from Phase 2.2 features, including Phase 2.2 pit 2110. The few sherds of OXF RS and OXF RS? are also from Phase 2.2 pit 2110. A mid-3rd to 4th century date is probable for these fine wares.

## Samian wares

B.1.12 The LEZ SA 2 vessels are Dr. 18/31 dishes and that in EG SA? Is a Dr. 31 bowl.

## White and other oxidised wares

B.1.13 The buff sherds are all in a gritty fabric and, apart from one sherd in a Phase 2.1 context, are all Phase 2.2. The reddish-yellow sherds occur in 18 different contexts, all Phase 2.2, other than two in Phase 2.1 and one in Phase 3. The vessels are a jar a jar or beaker and a flanged bowl, possibly an imitation samian ware Dr. 38 bowl. The buff and reddish-yellow ware sherds are probably of late 1st to 2nd century date. Regionally-traded white wares comprise MAH WH and possible MAH WH and sherds which might be MAH WH or LNV WH. The vessels in these fabrics are all mortaria, including one grooved, hammer-head type in MAH WH, and the sherds are all from Phase 2.2 contexts and are probably mid-3rd to 4th century in date.

## Reduced wares

B.1.14 The reduced wares are various grey and dark grey wares, together with some DOR BB 1. The DOR BB 1 vessels are three flanged bowls, two with burnished acute intersecting arc decoration and a plain-rimmed dish, all likely to be mid-3rd to 4th century in date. The grey and dark grey fabrics vary in coarseness and cores also vary with some sherds having reddish-brown or pale grey cores. Jars account for 20 of the 21 grey ware vessels and one of those in dark grey ware. The others are a grey ware jar or bowl and there dark grey flanged bowls, similar to DOR BB 1 types. Grey wares were produced and used throughout the Roman period. Of those in this assemblage, the plain-rimmed dishes and flanged bowls are later 2nd to 4th century types.

Phase 2.1
B.1.15 The pottery attributed to this phase comprises a single reddish-yellow ware sherd (3g) from Area B ditch 3029 (context 3030), two possible grog-tempered sherds (3g) from Area C ditch 2193 (context 2195), the reddish-yellow ware rim sherd from a possible imitation samian ware Dr. 38 bowl (11g, 0.06 EVE) from Area C ditch 2329 (context 2330) and a possible East Gaulish samian ware sherd (19g) from the surface near Area C ditch 2260 (context 2246).

## Phase 2.2

B.1.16 The only pottery of this phase in Area B is a single reddish-yellow ware sherd ( 2 g ) from pit 3082 (context 3099). Area $C$ has numerous features with pottery relating to and associated with three enclosures.

## Enclosure 1

B.1.17 Ditches 2091 and 2149 (contexts 2092, 2151) together contain 11 sherds ( 247 g ) of grog-tempered, grey and buff wares including a grey ware jar (rim EVE 0.19). Context 2169 (ditch 2167) has three sherds (113g) from two mortaria in LNV WH/MAH WH and MAH WH and a grey ware jar (rim EVE 0.1). Ditches 2170, 2186 (contexts 2171, 2187) contain three sherds ( $114 \mathrm{~g}, 0.17$ EVE) from a grey ware jar and a LEZ SA 2 rim sherd ( $8 \mathrm{~g}, 0.06$ EVE) from a Dr. 18/31 dish while pit 2266 (context 2267) has two grey and reddish-yellow sherds ( 7 g ) and pit 2268 (context 2269) one grey ware sherd ( 16 g ).
B.1.18 Eleven contexts relating to the large pit or well/watering hole located in the northwestern corner of the enclosure (2110) contain pottery. Fourteen sherds of grey ware ( $248 \mathrm{~g}, 0.54 \mathrm{EVE}$ ) including two jars occur in three layers towards the base, 2323, 2324 and 2328. The probable backfill layers (2113-9, 2121) contain 91 sherds in various fabrics (Table 6). The vessels in shell-gritted and grey ware are all jars and there are flanged bowls and plain-rimmed dishes in LNV CC and DOR BB1 and a possible EG SA Dr. 31 bowl. The LNV CC and DOR BB1 forms are suggestive of a late date, probably 4th century, for the infilling of the feature.

| OAU Fabric | Leics. Fabric | Description | NoSh | Wgt (g) | Rim EVE | Vessels |
| :--- | :--- | :--- | ---: | ---: | ---: | ---: |
| F | FL | Flint? | 4 | 35 |  |  |
| G | GT | Grog | 2 | 37 |  |  |
| C10 | CG | Shell | 24 | 218 | 0.47 | 3 |
| R30 | GW | Grey | 33 | 400 | 0.37 | 3 |


| OAU Fabric | Leics. Fabric | Description | NoSh | Wgt (g) | Rim EVE | Vessels |
| :--- | :--- | :--- | ---: | ---: | ---: | ---: |
| R30 | GW | Dark grey | 3 | 19 |  |  |
| O10 | OW | Reddish-yellow | 7 | 73 |  |  |
| LGF SA | LGF SA | La Graufesenque samian | 1 | 13 |  |  |
| LEZ SA 2 | LEZ SA 2 | Lezoux samian | 1 | 12 |  |  |
| EG SA? | EG SA? | East Gaulish samian ? | 1 | 71 |  | 1 |
| LNV CC | LNV CC | Lower Nene Valley colour-coat | 6 | 165 | 0.23 | 2 |
| OXF RS | OXF RS | Oxfordshire red-slipped | 2 | 52 |  |  |
| OXF RS? | OXF RS? | Oxfordshire red-slipped? | 3 | 26 |  |  |
| DOR BB 1 | DOR BB 1 | Dorset black-burnished 1 | 4 | 67 | 0.11 | 2 |
| Total |  |  | $\mathbf{9 1}$ | $\mathbf{1 1 8 8}$ | $\mathbf{1 . 1 8}$ | $\mathbf{1 1}$ |

Table 6. Pit/Well 2110 Fabric/vessel quantification
B.1.19 Buried soils 2042 and 2270 contain nine sherds ( 47 g ) of grey, dark grey, buff, reddishyellow and LNVCC wares, including a grey ware jar (rim EVE 0.05) and a LNV CC plainrimmed dish (rim EVE 0.06).

## Enclosure 2

B.1.20 Pottery from the Enclosure 2 ditches 2097, context 2099 and 2062, context 2069, comprises single sherds of grog-tempered ware $(24 \mathrm{~g})$ and grey ware $(18 \mathrm{~g})$. Within the enclosure, fills of some of the two ditches/gullies, 2205 (context 2206) and 2207 (context 2208) and six pits/postholes 2211, 2218, 2220, 2222 and 2225 (contexts 2213, 2219, 2221, 2223, 2226) contain one possible flint-gritted sherd (5g), 22 grey ware sherds ( 258 g ) including two jars (rim EVE 0.19), five dark grey ware sherds (95g) and four reddish-yellow ware sherds (13g) from a jar or beaker (rim EVE 0.11). Pit 2278 (context 2279) has a grey ware sherd ( 6 g ) and a DOR BB 1 flanged bowl rim ( $68 \mathrm{~g}, 0.17$ EVE) and Pit 2282 (context 2283) four grey ware jar sherds (22g, 0.09 EVE), four dark grey ware sherds ( 86 g ) from two flanged bowls (). 18 EVE) and five LNV CC beaker sherds (25g).

## Enclosure 3

B.1.21 Ditch 2011, context 2012, contains a single reddish-yellow ware jar rim (10g, 0.06 EVE) and ditch 2003, context 2004, a single buff ware sherd ( 8 g ).

Features to the west of Enclosures 1-3
B.1.22 Pit 2026, context 2027, contains one grey ware sherd ( 4 g ) and pit 2038, context 2039, contains an almost complete small grey ware everted rim jar (214g, 0.49 EVE); only half its rim is missing.

## Site type

B.1.23 The relatively low mean sherd weight and rim percentage, and the abraded nature of some of the pottery suggests a somewhat fragmented assemblage where the material has been disturbed before deposition. The fact that two-thirds of the vessels are jars of various types suggests that much of the activity on the site from which the pottery derived was of a fairly basic utilitarian nature, although fine wares, represented mainly
by later LNV CC and OXF RS, account for around 10\% of the total assemblage and, together with, the occurrence of some bowls or dishes, beakers and mortaria hint at more domestic aspects, particularly in the later period.

## Pottery use and manufacture

B.1.24 There are a number of known and possible Roman pottery kilns in the area to the west and southwest of Leicester (Pollard 2005, 151-3; Swan 1984, 141; https://romankilns.net), a little way to the north and northeast of the site. These appear to have been producing mainly grey wares in the late 1st to 3rd centuries and it is therefore possible that some of the Sapcote grey wares could be from these sources, although their main focus was probably Roman Leicester. Otherwise, it is likely that much of the other pottery was obtained from the Mancetter-Hartshill potteries some 15 kilometres to the west.

## B. 2 Flint

## By Michael Donnelley

B.2.1 The excavations brought to light a small assemblage of just 17 struck flints and eight fragments of burnt unworked material weighing 337 g (Table 7). The flints were scattered across many contexts with no more than three flints in any feature. They included a number of blade forms, a combination end scraper-awl on a blade, a retouched blade and a bladelet core indicating an early prehistoric assemblage but this cannot be dated any more accurately than that. A very small number of typically later prehistoric flake debitage were also present alongside a quite basic side and end scraper that may also be late in date. Several large chunks of burnt unworked material were also recovered and very likely represent later prehistoric use of flint pebbles and nodules as material in heating water/cooking or other domestic activities. Overall, the site had very low levels of flint use.
B.2.2 The only material which can be considered to be broadly contemporary with the feature from which it derived were two undiagnostic flakes from Period 1 pit 3040, with the vast majority of the flint deriving from Period 2 (Roman) features. The bulk of the assemblage was undiagnostic and only a few pieces could be broadly assigned to either early or later prehistory. Early prehistoric material was recovered from several contexts. This included a very fine end scraper with parallel retouch combined with an awl at the proximal end of the blade on which it was formed. This piece was found in the subsoil, had very parallel negative scars and was clearly part of a blade production industry. A retouched blade with a modified distal end and side serrations was recovered from the fill of Period 2.2 pit $\mathbf{3 0 4 9}$ (context 3052) while a single platform core that had produced a few bladelet scars alongside several flake scars was found in Period 2.2 ditch 2229 (context 2230). Blades were also present in buried soil deposit 2042, Period 2.2 ditch 2091 (context 2093) and Period 2.2 pit 2110 (context 2118).
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| CATEGORY TYPE | Number |
| :--- | :---: |
| Flake | 7 |
| Blade | 3 |
| Blade index | $30 \%(3 / 10)$ |
| Janus flake | 1 |
| Core single platform bladelets | 1 |
| Core on a flake | 1 |
| Scraper side and end | 1 |
| Retouched blade | 1 |
| Retouched flake | 1 |
| Retouch other | 1 |
| Total |  |
| Burnt unworked (representative total) | 17 |
| No. burnt (\%) | $18 / 337 \mathrm{~g}$ |
| No. broken (\%) | $0 / 17$ |
| No cores and core dressing (\%) | $4 / 17(23.53 \%)$ |
| No. retouched (\%) | $2 / 17(11.76 \%)$ |

Table 7. Quantification of the flint assemblage
B.2.3 Probable later activity included a squat hard-hammer flake of probable Bronze Age or later date from Period 2.2 pit 2110 (context 2117), and retouched flake from Period 2.2 ditch 2108 (context 2109), found alongside a quite small and crude D-shaped side-and-end scraper of Neolithic or Bronze Age date. Many of the undiagnostic flakes recovered may also belong in the later prehistoric assemblage but it is impossible to be certain.
B.2.4 Overall, the assemblage was highly dispersed and in mixed condition indicating a largely disturbed collection. The early forms have a broad date range that could span the upper Palaeolithic through to the early Neolithic, but the former date is very unlikely due to the overall rarity of such material. Moreover, it is possible that the early forms relate to a range of periods, but all would be at home in an early Neolithic context and this is perhaps the most likely option. Later prehistoric flint use appears to have been on a very occasional basis and included the use of flints as pot boilers in heating/cooking activities.

## Method

B.2.5 The artefacts were catalogued according to OA South's standard system of broad artefact/debitage type (Anderson-Whymark 2013; Bradley 1999), general condition noted and dating was attempted where possible. The assemblage was catalogued directly onto an Open Office spreadsheet. During the assessment additional information on condition (rolled, abraded, fresh and degree of cortication), and state of the artefact (burnt, broken, or visibly utilised) was also recorded. Retouched pieces were classified according to standard morphological descriptions (e.g. Bamford 1985, 72-77; Healy 1988, 48-9; Bradley 1999). Technological attribute analysis was initially undertaken and included the recording of butt and termination type (Inizan et al. 1999), flake type (Harding 1990), hammer mode (Onhuma and Bergman 1982), and the presence of platform edge abrasion.
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## B. 3 Ceramic building material and fired clay

By Cynthia Poole

## Introduction

B.3.1 A modest assemblage of ceramic building material (CBM) amounting to 107 fragments weighing 7240 g , and fired clay totalling 155 fragments weighing 1054 g was recovered predominantly from pits and ditches of Roman date in Area C and a small quantity from two Roman pits and several post-medieval furrows in Area B. All the CBM is of Roman date and comprises standard forms of tegula, imbrex, brick and flue tile. The condition of the material is relatively poor and fragmentary: the CBM assemblage has a low mean fragment weight (MFW) of 68 g , abrasion is predominantly moderate to heavy, no complete tiles survived and a large number of fragments do not have even one complete dimension. The fired clay comprised structural material and portable furniture, but included a large number of indeterminate fragments recovered from sieved samples. As a result, the fired clay also had a fairly low mean fragment weight of 7 g .

## Methodology

B.3.2 The assemblages have been fully recorded on separate Excel spreadsheets in accordance with guidelines set out by the Archaeological Ceramic Building Materials Group (ACBMG 2007). The record includes quantification, and details of fabric, form, surface finish, dimensions and other significant features. The terminology for Roman tile follows Brodribb (1987); coding for markings, tegula flanges, etc. follows that established by OA for the recording of CBM and tegula cutaway types are linked to those classified by Warry (2006). Fabrics were characterised on the basis of macroscopic features supplemented by the use of x 20 hand lens for finer constituents.
B.3.3 Summary catalogues of the CBM and fired clay are provided in Tables 8 and 9 respectively.

| Area | Context | Cut | Ctx type | Phase | No. | Wt <br> $\mathbf{( g )}$ | Spot Date | Class | Form |
| :--- | :--- | :--- | :--- | :--- | ---: | ---: | :--- | :--- | :--- |
| C | 1038 | 1037 | ditch | 2.1 | 1 | 51 | RB | Indeterminate | Indeterminate |
| C | 2100 | 2097 | ditch | 2.2 | 2 | 55 | RB: AD160-260 | Tegula | Tegula |
| C | 2114 | 2110 | pit | 2.2 | 1 | 263 | RB | Brick RB | Pedalis? |
| C | 2117 | 2110 | pit | 2.2 | 2 | 295 | RB | Flue | Tubulus |
| C | 2118 | 2110 | pit | 2.2 | 1 | 109 | RB | Flat tile | Flat |
| C | 2125 | 2122 | ditch | 2.2 | 1 | 221 | RB | Tegula | Tegula |
| C | 2154 | 2152 | ditch | 2.2 | 1 | 814 | RB | Brick RB | Brick RB |
| C | 2169 | 2167 | ditch | 2.2 | 2 | 55 | RB | Flat tile | Flat |
| C | 2171 | 2170 | ditch | 2.2 | 2 | 19 | RB | Flat tile | Flat |
| C | 2174 | 2173 | ditch | 2.2 | 1 | 38 | RB | Flat tile | Flat |
| C | 2180 | 2179 | ditch | 2.2 | 4 | 99 | RB | Flat tile | Flat/Brick |
| C | 2182 | 2181 | ditch | 2.1 | 1 | 82 | RB | Flat tile | Flat |
| C | 2187 | 2186 | ditch | 2.2 | 1 | 144 | RB | Tegula | Tegula |
| C | 2199 | 2198 | ditch | 2.2 | 4 | 150 | RB | Flat tile | Flat |
| C | 2202 | 2201 | gully | 2.2 | 1 | 27 | RB | Flat tile | Flat |
| C | 2213 | 2211 | pit | 2.2 | 2 | 512 | RB | Tegula | Tegula |

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| Area | Context | Cut | Ctx type | Phase | No. | Wt <br> (g) | Spot Date | Class | Form |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| C | 2213 | 2211 | pit | 2.2 | 20 | 60 | RB | Indeterminate | Indeterminate |
| C | 2219 | 2218 | pit | 2.2 | 7 | 225 | RB | Tegula | Tegula |
| C | 2221 | 2220 | pit | 2.2 | 5 | 497 | RB: AD160-380 | Tegula | Tegula |
| C | 2221 | 2220 | pit | 2.2 | 1 | 1434 | RB | Brick RB | Brick RB |
| C | 2221 | 2220 | pit | 2.2 | 7 | 107 | RB | Flat tile | Flat |
| C | 2221 | 2220 | pit | 2.2 | 1 | 85 | RB | Flat tile | Flat |
| C | 2221 | 2220 | pit | 2.2 | 1 | 31 | RB | Flat tile | Flat |
| C | 2221 | 2220 | pit | 2.2 | 15 | 25 | RB | Indeterminate | Indeterminate |
| C | 2226 | 2225 | pit | 2.2 | 1 | 19 | RB | Flat tile | Flat |
| C | 2230 | 2229 | ditch | 2.2 | 1 | 176 | RB | Flat tile | Flat |
| C | 2230 | 2229 | ditch | 2.2 | 1 | 69 | RB | Flat tile | Flat/Imbx? |
| C | 2242 | 2229 | ditch | 2.2 | 1 | 171 | RB | Tegula | Tegula |
| C | 2243 | 2227 | ditch | 2.2 | 1 | 75 | RB | Flat tile | Flat/tegula |
| C | 2243 | 2227 | ditch | 2.2 | 1 | 53 | RB | Flat tile | Flat/tegula |
| C | 2245 | 2244 | pit | 2.2 | 1 | 35 | RB | Brick RB | Brick RB |
| C | 2247 | 2161 | ditch | 2.2 | 1 | 11 | RB | Flat tile | Flat/Imbx? |
| C | 2250 | 2198 | ditch | 2.2 | 2 | 483 | RB | Tegula | Tegula |
| C | 2253 | 2128 | ditch | 2.2 | 1 | 293 | RB | Flat tile | Flat |
| C | 2158 | 2156 | ditch | 2.2 | 1 | 13 | RB | Indeterminate | Indeterminate |
| C | 2270 | 0 | layer | 2.2 | 2 | 36 | RB | Flat tile | Flat |
| C | 2285 | 2284 | pit | 2.2 | 1 | 59 | RB | Flat tile | Flat |
| B | 3020 | 3019 | furrow | 4 | 1 | 56 | RB | Flat tile | Flat/Brick |
| B | 3022 | 3021 | furrow | 4 | 1 | 24 | RB | Flat tile | Flat |
| B | 3038 | 3037 | furrow | 4 | 2 | 57 | RB | Flat tile | Flat |
| B | 3038 | 3037 | furrow | 4 | 1 | 124 | RB | Brick RB | Brick RB |
| B | 3038 | 3037 | furrow | 4 | 1 | 3 | RB | Indeterminate | Indeterminate |
| B | 3044 | 3043 | furrow | 4 | 1 | 7 | RB | Flat tile | Flat |
| B | 3053 | 3049 | pit | 2.2 | 1 | 78 | RB | Brick RB | Brick RB |

Table 8. Catalogue of ceramic building material

| Area | Context | Phase | Cut | Ctxt type | Sample <br> No | Nos | Wt (g) | Class |
| :--- | ---: | ---: | ---: | :--- | :--- | ---: | :--- | :--- |
| C | 2046 | 2.2 | 2041 | pit | $<2011>$ | 1 | 2 | Indeterminate |
| C | 2121 | 2.2 | 2110 | pit | $\sim$ | 2 | 139 | Portable furniture? |
| C | 2212 | 2.2 | 2211 | pit/oven | $<2001>$ | 9 | 25 | Indeterminate |
| C | 2213 | 2.2 | 2211 | pit/oven | $<2004>$ | 13 | 39 | Indeterminate |
| C | 2219 | 2.2 | 2218 | pit/oven | $<2002>$ | 43 | 123 | Structural |
| C | 2219 | 2.2 | 2218 | pit/oven | $<2002>$ | 76 | 36 | Indeterminate |
| C | 2221 | 2.2 | 2220 | pit/oven | $\sim$ | 6 | 621 | Indeterminate |
| C | 2309 | 2.2 | 2308 | pit | $<2005>$ | 2 | 2 | Indeterminate |
| B | 3099 | 2.2 | 3082 | pit | $\sim$ | 3 | 67 | Portable furniture |

Table 9. Catalogue of fired clay

## Roman tile

## Fabrics and tile production

B.3.4 The tile was all made in sandy fabrics, which are all broadly similar in character. These range from a very fine smooth micaceous fine sandy clay containing sparse coarser quartz sand inclusions to varieties containing increasing concentrations of medium and coarse sand, predominantly quartz, to very high densities. In general, the sand content is subangular - sub-rounded and poorly sorted. Coarser inclusions are rare and when present include small sandstone grits, red ferruginous grits and cream calcareous pellets, the latter often partly leached out. The variations observed are recorded in the archive record, but it is possible all reflect the broad spectrum of a single fabric group. The relative uniformity and sandy character of the tile fabrics suggests the Quaternary Diamicton may have been the main clay source utilised during the Roman period. It is probable that the tile originated from one of these regional production centres.
B.3.5 A variety of clay sources are available in the region within Leicestershire and neighbouring Warwickshire. Superficial deposits of Quaternary Diamicton and glacigenic clays form extensive deposits in the region. However, a variety of older mudstones underly these superficial deposits and may also have been a source of raw material. A Roman tile kiln is recorded from Ravenstone, Leics (Lucas 1980-1, 104-7) 21 km to the northwest of Sapcote and just a couple of kilometres beyond the present day Ibstock brickworks, which utilise the Triassic Radcliffe member mudstone. Kilns also occur $13-15 \mathrm{~km}$ to the west in Warwickshire at Arbury, Chilvers Coton and Mancetter-Hartshill (Scott 1971; 1975), where there are both superficial Quaternary clay deposits and earlier Carboniferous and Triassic mudstones, that could have been exploited.
B.3.6 In relation to production it is interesting to note that no markings relating to manufacture, such as signatures, impressions or tally marks were encountered. The absence of tally marks is not unexpected in a civilian settlement, as these usually occur under military production, but the lack of signature marks is more surprising as most assemblages of any size produce some evidence for them. It is uncertain whether this is a feature of tile production in the local region or merely a result of the relatively small size of the assemblage.

## Forms

Brick (6 fragments, 2748g)
B.3.7 Brick formed $38 \%$ of assemblage by weight but only $6 \%$ by count. The clay fabric frequently contained marl/clay pellets up to 10 mm , sandstone grits and small ferruginous grits. In general, the surfaces were evenly finished with knife trimming of rough base and edge surfaces. Most pieces measured $42-44 \mathrm{~mm}$ thick with one thicker at $c .49 \mathrm{~mm}$. One very thin corner fragment measuring 31 mm is most likely to be a fragment of pedalis type. All fragments had evidence of burning or heat discolouration. Most commonly this occurred on one surface sometimes extending to adjacent edges and varying from fairly superficial to pieces with heat discolouration extending partly or wholly through the whole thickness of the tile.

Tegulae (21 fragments, 2308g)
B.3.8 Tegulae formed $20 \%$ (by count) or $32 \%$ (by weight) of the assemblage. The clay fabric was sandy, only rarely containing any inclusions coarser than sand in the form of small cream marl pellets or red ferruginous clay grits <5mm size. They have smooth evenly moulded surface with extensive knife trimming of base and edge surfaces. Thickness ranged from $22-30 \mathrm{~mm}$ and the largest surviving fragment was 170 mm long. All had flanges surviving with four different profiles present. The most common profile was type B , which was quite squat and angular in form with a sloping inner edge so that the flange base is noticeably wider than the top. These ranged from $12-23 \mathrm{~mm}$ wide at the top increasing to $18-37 \mathrm{~mm}$ at the base and had heights of $41-52 \mathrm{~mm}$. Other flange profiles were rounded (types A4, D and F2) and measured $24-33 \mathrm{~mm}$ wide and 46 58 mm high. All had a curved inner base angle sometimes accompanied by a shallow finger groove running alongside the flange. Two pieces had upper corners surviving with standard upper cutaways of rectangular form. These measured 26 and 52 mm long and were cut to a depth of 23 mm . Two had lower corners surviving, though one was poorly preserved. The latter was probably of Warry's type C4, though it could possibly be his later type D15 as its width is borderline between the two types and it is insufficiently preserved to assess other features. As a result, this can only be broadly dated as mid-2nd - 4th century. The second cutaway was also incomplete but can be more confidently identified as type C5, which Warry dates to AD 160-260. This measured 40 mm long and the cut lower section had a series of cut facets along its surface.
B.3.9 All but two of the tegulae had evidence of burning or heat discolouration to varying degrees ranging from small black patches, the whole of one surface to all surfaces and heat discolouration throughout the thickness of the tile.

Flue tile (2 fragments, 295g)
B.3.10 A single example of box flue tile (tubulus) was recovered from pit 2110. It had a smooth outer surface, an even sanded inner surface and a knife cut edge with a cut bevel along the inner arris. The two pieces measured 24 and 29 mm thick and could be part of the same tile, but only one had evidence of keying. This consisted of two bands of combed keying running at diagonal and crossing probably forming a series of crosses running down centre of tile face. A coarse comb was used measuring 36 mm wide with five teeth each $3-5 \mathrm{~mm}$ wide and set $2-4 \mathrm{~mm}$ apart. Both fragments were heavily burnt, both on the outer surface and the keyed piece on all surfaces and heat discoloured throughout its thickness.
Flat tile (40 fragments, 1737g)
B.3.11 Flat tile, which could not be assigned to a specific form, formed $37 \%$ (by count, $24 \%$ by weight) of the assemblage. Just over half of the fragments had a complete thickness, which measured from 13 to 37 mm thick. Fabrics varied from finer sandy fabrics to those containing coarser sandstone and grog grits. Two fragments measuring 13 and 23 mm thick may have been imbrex, but insufficient survived to be certain. Three thicker pieces over 35 mm thick are likely to be brick. The majority of those measuring $20-30 \mathrm{~mm}$ thick are likely to be parts of the plain central sections of tegulae. Roughly three quarters had evidence of burning or heat discolouration, most
commonly burning across one surface only, either top or base, but in several cases with heat discolouration penetrating partly or wholly through the thickness of the tile.

## Fired clay

B.3.12 The fired clay was nearly all made in the same fabric $Q$, which was a pinkish red, orange red or red fired micaceous clay containing moderate to abundant poorly sorted medium and coarse quartz sand. There was only one exception to this of pieces of portable furniture made in fabric QV, which had a similar matrix of orange-red fine sandy silty micaceous clay containing a low density of medium quartz sand, occasional iron oxide grits up to 4 mm and with the deliberate addition of organic inclusions up to 12 mm long. These left fine thin longitudinal organic impressions, probably some form of chaff, though seemingly much finer than the standard impressions from wheat or barley, normally found. The fired clay fabric is consistent with the locally available clay readily available as the natural substrate underlying the site.
B.3.13 The majority of fragments from the sieved samples were largely of indeterminate amorphous form consisting of fragments $8-50 \mathrm{~mm}$ in size though amongst these were a small number of fragments with generally roughly moulded, flat, slightly convex or undulating surface. Most of these are probably structural deriving from collapsed oven walls or lining. All of the sieved material derived from charcoal rich fills in small shallow pits (2041, 2211, 2218, 2220, 2308).
B.3.14 In additional to the structural material were two examples of portable furniture. One (fill 2121, pit 2110) was of uncertain form having only a single rough moulded undulating surface, but identified as a portable item on the basis of the chaff tempering, which is more commonly used for items of furniture and the pattern of firing resulting in a black core and oxidised exterior. The second example (fill 3099, pit 3082) consisting of three fragments could be more positively identified as a triangular perforated brick. The fragments had a smooth flat moulded surface, which on one piece was pierced at an angle by a perforation 17 mm in diameter.

## Discussion

B.3.15 The tile no doubt had originally been used in masonry buildings for roofing and other structural elements with the flue tile indicative of a heated room. It is clear that such a building was not in evidence on the site and the quantity of tile does not indicate any such building in the immediate vicinity. Moreover, tile was an expensive commodity and a rural agricultural settlement of the type exposed in the excavation is unlikely to have been able to afford such material brand new. It is probable that such material was acquired second-hand from a more affluent settlement, perhaps one with which the site had some link. The closest source from which the tile may have originated is Sapcote villa, situated a little over a kilometre from the site on the east side of Sapcote village. Surplus tile from construction work or more likely discarded materials during periods of alteration or rebuilding of the villa may have become available for reuse and taken to the Hinckley Road site for re-use, though to demonstrate such a link a detailed comparison with tile from the villa would be necessary.
B.3.16 The majority of the tile cannot be dated more closely than Roman. Only the two tegulae fragments point to a Middle or Late Roman date. The flue tile is also likely to be of 2 nd century or later date. This is consistent with the phasing as nearly all the tile was found in features of Period 2.2, apart from a small quantity of residual material in post-medieval furrows accounting for almost all the tile from Area B. Most of the fired clay is not intrinsically dateable except for certain diagnostic forms, and is reliant on other dateable artefacts for its phasing. Of the fired clay the only diagnostic item is the triangular brick, which is a form that originated in the Iron Age, but continued in use into the Early Roman period on native settlements. This was the only fired clay found in Area B, in pit 3082, some distance to the southeast of the main area of enclosures and possibly earlier in date as the fired clay is the only material recovered from the pit. All the fired clay from Area C was found in deposits assigned to Period 2.2.
B.3.17 The tile assemblage is characterised by the high proportion of burnt and heat discoloured tile accounting for half of the fragments ( $84 \%$ by weight) and an emphasis on flat forms of tile, in particular brick and tegulae. This indicates a high degree of deliberate selection presumably for reuse. The frequent incidence of burning and heating suggests most of the tile was used for the construction of hearths or used within ovens especially when burning occurred on both sides or was heat affected throughout the thickness of the tile. There is little evidence for the tile being used in the construction of oven walls as this usually results in burning only of the tile edge, usually the only part of the tile exposed in the wall face. However, if a lining of clay coated any tile used in the superstructure it is possible no evidence of burning or heating would occur and could account for the proportion without signs of burning.
B.3.18 The majority of the tile and fired clay was found in Area C, virtually all associated with Enclosure 2, occurring either within the enclosure ditch itself (2062) or in features in the interior of the enclosure. The largest group of CBM occurred within a conglomeration of intercutting pits (2211, 2218, 2220), in association with the majority of the fired clay recovered from the site. The character of the fired clay suggests the ovens had nothing more complex than a simple domed superstructure. The association of a significant quantity of tile with evidence of burning with these features confirms that the tile was being brought onto the site for use in ovens and hearths.

## B. 4 Stone

## By Ruth Shaffrey

B.4.1 The stone assemblage was scanned for signs of use or modification and details were entered into an Excel spreadsheet, available in the archive. Burnt stone was weighed and counted and type of burning was recorded, whilst worked stone was fully recorded.
B.4.2 A total of 23 fragments of burnt stone ( 1.7 kg ) were recovered from seven contexts (Table 10). This stone is mostly heat cracked from heating and then rapid cooling.
B.4.3 Two probable objects were recovered from Period 2.2 features. Some tiny fragments of degraded flat shale were retrieved from pit 3058 (3059). These are too degraded to
determine original function, but they were certainly imported to the site and almost certainly represent an object of some sort.
B.4.4 A single large segment of upper rotary quern was found in Period 2.2 ditch boundary ditch 2198 (2199, SF 2002) in Area C. At 51cm diameter, this is either a large hand powered quern or a small millstone. It is decorated with two circular grooves - one around the eye and one around the circumference, and on this surviving fragment, three parallel straight grooves running between the two circular grooves (Fig. 19). The quern is made from a medium to coarse-grained poorly-sorted, heavily feldspathic and micaceous sandstone from the Millstone Grit, which was the most commonly quern lithology during the Roman period in this area.
B.4.5 Decoration is extremely unusual on Roman rotary querns in central and southern England and there is very little uniformity to it. Occasionally it can be classified as pictorial, for example there are leaves on a quern from Verulamium and a phallus on a quern from Winchester (Corder 1943, 158; Williams 2012). A small number of disc type querns or millstones are decorated with a circular groove around the eye and sometimes also around the circumference, for example at Chedworth villa, Glos; Linton, Cambs and Vindolanda, Northumberland (Goodburn 1976, 32; Shaffrey pers obs). Only very rarely are there additional decorative grooves. No exact parallels for this example could be found, but there are comparable examples from Southampton (Shaffrey and Allum 2011) and Bryn Howel, Carmarthenshire (Griffiths 1951, fig. 7.8). The decoration implies a higher status object or perhaps, a gift or dowry item.

## Catalogue of worked stone

B.4.6 Unworked. Tiny degraded and dried out fragments of flat shale. Could have been an object but impossible to now tell. Weighs 20g. Ctx 3059. Fill of pit 3058. Period 2.2
B.4.7 Upper rotary quern. Millstone Grit. Large segment of thick flat-topped quern with profile that tapers in thickness towards the centre. The top is flat and the grinding surface is concave and curved. The quern is finished all over with very neat pecking. The upper surface is decorated with a simple groove around the eye, a groove close to the circumference and the surviving fragment has three parallel lines that run between the two lines. Some rotational wear to grinding surface. Measures 510 mm diameter $x$ 90 mm thick at centre to 110 mm thick on edge and 125 mm high at centre. SF 2002. Ctx 2199. Fill of boundary ditch 2198. Period 2.2

## Catalogue of stone

| Context | Cut | Type | Period | Area | No | Weight | Type |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :--- |
| 2046 | 2041 | Pit | 2.2 | C | 2 | 22 | Burnt, reddened |
| 2219 | 2218 | Pit | 2.2 | C | 4 | 69 | Burnt, heat cracked |
| 2219 | 2218 | Pit | 2.2 | C | 2 | 630 | Burnt, slightly blackened sandstone |
| 2220 | 2220 | Pit | 2.2 | C | 1 | 239 | Burnt, reddened and heat cracked |
| 2221 | 2220 | Pit | 2.2 | C | 6 | 133 | Burnt, reddened |
| 2221 | 2220 | Pit | 2.2 | C | 3 | 504 | Burnt, reddened sandstone |
| 2230 | 2229 | Ditch | 2.2 | C | 1 | 28 | Burnt, reddened sandstone |
| 2279 | 2278 | Pit | 2.2 | C | 1 | 21 | Burnt, heat cracked quartzite |

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| Context | Cut | Type | Period | Area | No | Weight | Type |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :--- |
| 2309 | 2308 | Pit | 2.2 | C | 3 | 53 | Burnt, heat cracked |

Table 10. Catalogue of burnt stone

## B. 5 Metals

## By Ian R Scott

B.5.1 The metals from the site are limited in range. Excluding hammerscale the assemblage comprises 27 iron objects and 12 pieces of slag. No copper alloy or lead was recovered. In addition to objects, a few pieces of slag were recovered and some hammerscale was identified from soil samples (Table 11). The metals assemblage has been identified and quantified, and the data has been recorded using an MS Excel spreadsheet.
B.5.2 The iron objects comprise one nail tip (context 3024, furrow 3033, Phase 4) and one possible knife or tool tang fragment (context 2113, pit 2110, Phase 2.2). The latter comprises a rod or tang of circular cross section pointed at one end and with the remains a possible narrow blade at the other end (extant L: 112 mm .). The remaining finds are 25 hobnails from Phase 2.2 pit 2220, context 2221.
B.5.3 Most of the slag consists of small pieces that are not readily identifiable to type. However, the presence of hammerscale, which is a by-product of blacksmithing, suggest that smithing was possibly the source of the slag, although only in pit 2211 were hammerscale and slag directly associated. Both flake and spherical hammerscale was recovered from soil samples from Phase 2.2 pits 2041, 2211 and 2220 (see Table $11)$. The hammerscale may have been dumped in the pits with other debris.

| Area | Phase | Feature | Context | Tool? | Footwear | Nails | Waste | Hammer -scale | Totals |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| C | 2.2 | 2041 | 2046 |  |  |  |  | * |  |
|  |  | 2110 | 2113 | 1 |  |  |  |  | 1 |
|  |  |  | 2328 |  |  |  | 1 |  | 1 |
|  |  | 2211 | 2212 |  |  |  | 1 | * | 1 |
|  |  |  | 2213 |  |  |  |  | * |  |
|  |  | 2218 | 2219 |  |  |  | 10 |  | 10 |
|  |  | 2220 | 2221 |  | 25 |  |  | * | 25 |
|  |  |  | Totals | 1 | 25 |  | 12 |  | 38 |
| B | 4 | 3033 | 3034 |  |  | 1 |  |  | 1 |
|  |  |  | Totals | 1 | 25 | 1 | 12 |  | 39 |

Table 11: Summary of metals by phase, feature and object type (object count)

* Numerous pieces of hammerscale both spherical and plate.


## APPENDIX C ENVIRONMENTAL REPORTS

## C. 1 Environmental samples

By Sharon Cook

## Introduction

C.1.1 Twenty-eight bulk samples ranging in size from 8-40 litres and representing the range of feature types and phases across the excavated area were processed primarily for the retrieval of charred plant remains (CPR), small bones and artefacts. Typically, samples were 30-40 litres, with smaller samples usually coming from small features such as postholes.
C.1.2 Four subsamples were also processed for the recovery of waterlogged plant remains (WPR) and to assess the potential for insects and other ecofacts.
C.1.3 After assessment (the tabulated results of which are available in the site archive), four CPR flots were selected for analysis, all from features dating to the Roman period.

## Method

C.1.4 The bulk samples were processed in their entirety using a modified Siraf-type water flotation machine to $250 \mu \mathrm{~m}$ (flot) and $500 \mu \mathrm{~m}$ mesh (residue). The residue fractions were sorted by eye and all bone and artefacts removed while the flot material was sorted using a low power (x10) binocular microscope to extract cereal grains and chaff, smaller seeds and other quantifiable remains.
C.1.5 In addition, four samples were taken for the purpose of examining the waterlogged plant material (WPR) from a well/waterhole (2110) on the site. For these samples a 1 litre subsample was processed by hand using the wash over method with the flot and residue being kept wet to facilitate preservation. These were also scanned during assessment using a low power (x10) binocular microscope to identify potential for further analysis but although waterlogged plant material was present it was not abundant, and no further work has been undertaken.
C.1.6 Identifications were carried out using standard morphological criteria for the cereals (Jacomet 2006) and with reference to the Digital Seed Atlas of the Netherlands (Cappers et al. 2006) for identification of wild plant remains, as well as comparison with modern reference material. Classification and nomenclature of plant material follows Stace (2010).
C.1.7 Quantification of remains is as follows; cereal grains and the seeds of wild plants were only quantified for items of which more than half was observed, this means that all cereal and seed counts may be used to reach an MNI (Minimum Number of Individuals). Seeds of vetches (Vicia/Lathyrus) are the exception in that their easily recognisable structures have enabled fragments to be quantified although these are always recorded as such. For chaff, awns and nutshell fragments the count is for all observed fragments, this means these figures are not suitable for use in calculating MNI.
C.1.8 Several flots were riffled prior to analysis due to their size and relative richness, following van der Veen and Fieller (1982) to produce a more manageable assemblage. Where riffling has occurred, this is stated in the relevant table, all values given are for the analysed portion of the flot only.

## The assemblages

C.1.9 The condition of the charred material on the site proved to be variable; most samples produced only small quantities of charred material. Many of the samples included charcoal and other charred remains with a vitrified, glassy appearance and in some cases, this made it difficult to separate the vitrified charcoal from anthracite, which was also present within many of the samples in small quantities.
C.1.10 Most of the phased samples have been dated to the Roman period, mostly from Period 2.2, and these proved to be the most productive in terms of charred remains. Both barley (Hordeum sp.) and wheat (Triticum sp.) as well as small quantities of oat (Avena sp .) occurred in features from across the site but much of the grain is highly fragmentary and has a very clinkered appearance. Consequently, a large proportion of the cereal is indeterminate although the general size and shape of the grains is suggestive of wheat or barley.
C.1.11 Chaff and wild plant seeds are uncommon and are generally represented by only a small number of individual fragments.

Phase 1 - Late Bronze Age - Early Iron Age
C.1.12 Two samples from the upper and basal fills of pit $\mathbf{3 0 4 0}$ produced only a small quantity of charred material and a small quantity of small-sized charcoal: two cereal grains in the upper fill include one possible barley, whilst a single poppy seed (Papaver sp.) was identified from the lower fill (sample 3002).

Phase 2.1 and 2.2 - Romano-British
C.1.13 The features sampled came from Area C as well as Area B. The frequency of charred plant material is generally low, except for a small number of samples which produced a good quantity of remains.
C.1.14 Sample 3016, from the terminus of boundary ditch $\mathbf{3 0 8 1}$ in Area B, has been attributed to Period 2.1 and contained only small quantities of vitrified charcoal and a single fragment of legume. The remaining samples from Area B all came from pit fills (Samples 3012, 3013, 3014 and 3015 from pits 3058, 3082 and 3089) but produced very small flots with rare charred plant remains.
C.1.15 All four samples that were considered suitable for analysis came from Area C. Samples 2000 (pit 2026), 2003 (pit 2220), 2004 (pit 2211) and 2011 (2041) all contained quantities of cereal grain, chaff and wild taxa and are discussed in more detail below.
C.1.16 Of the remaining samples from Area 1, the flots from samples 2001 (pit 2211) and 2005 (pit 2308) contained a good quantity of vitrified and mineral-encrusted charcoal but very little other material. Charcoal was also relatively frequent in sample 2002 from pit $\mathbf{2 2 1 8}$ which also included a small amount of glume wheat chaff and a mixture
of wheat and barley grains as well as a few wild plant seeds of similar in types to those recorded in the analysed samples. Sample 2010 from posthole $\mathbf{2 2 8 7}$ contained almost no charred material at all, as was the case for samples from several undated postholes elsewhere on the site.
C.1.17 The samples from waterhole $\mathbf{2 1 1 0}$ produced very little charred material of any kind. The waterlogged component comprised seeds of plants that are common in areas of disturbed ground which are generally associated with human activity including chickweed (Stellaria media), bulbous chervil (Chaerophyllum bulbosum), bramble (Rubus fruticosus), nettle (Urtica dioica), goosefoot (Chenopodium sp.), buttercup (Ranunculus acris/repens/bulbosus), knapweed (Centaurea sp.) and dead nettle family (Lamiaceae). Insects, including mites, were also present. Plants of damp ground include sedge (Carex sp.) and the presence of Daphnia ephippera indicates that the feature held water at some point.

## Phase 4 - Post-Medieval - Modern

C.1.18 Sample 3010, from posthole 3013, produced only small flecks of unidentifiable charred material.

## Undated

C.1.19 Eight samples are unphased, from fills of postholes (3015, 3009, 3007, 3011, 3055, 3070, 3003) and a single pit (3017). None of the samples produced more than occasional wheat grains (Triticum sp.) and rare charred weed seeds, the majority of which are generally identified as crop contaminants. These include vetches (Vicia/Lathyrus), corncockle (Agrostemma githago) and chickweed (Stellaria media).

Samples 2000 (pit 2026), 2003 (pit 2220), 2004 (pit 2211) and 2011 (2041)
C.1.20 The four samples fully analysed were all from pit fills (Table 12 and Graphs 1 and 2). Samples 2003 (pit 2220) and 2004 (pit 2211) were taken from a small cluster of intercutting pits south of the main enclosure group in Area C.
C.1.21 All the samples include wheat (Triticum sp.) and barley (Hordeum sp.) grain. While many of the barley grains have been damaged and distorted by charring, those grains in good condition include a small number with the twisted appearance associated with the lateral grains of six row barley (Hordeum vulgare). Glume bases in samples 2003, 2004 and 2011 indicate that spelt (Triticum spelta) is the main, or perhaps the only, wheat type present. While the wheat grains show some variation in size and shape, they do not appear to include the compact form typical of free threshing varieties. Small grains are present within the samples, but these appear to be tail grains rather than mature examples.
C.1.22 Oats (Avena sp.) and oat/brome (Avena/Bromus) are present in all four samples in generally small quantities. No floret bases were observed so it is not possible to tell if these are from wild or domesticated varieties, but the small quantities make the latter option more likely.
C.1.23 While the pits intercut, the contents of the two flots vary considerably: sample 2003 includes an extremely rich assemblage of glume wheat chaff, where identified of spelt and including complete spikelets, which was not the case in sample 2004 from the intercutting feature. Sample 2003 also includes barley rachis fragments and a significantly larger component of wild plant seeds.
C.1.24 The proportions of the two grain types also varies between samples 2003 and 2004, with sample 2003 containing a larger proportion of wheat than barley, perhaps unsurprisingly in a deposit so rich in glume wheat chaff. Spelt wheat is generally the most common cereal in deposits from this period, with barley usually present as a secondary crop (Lodwick 2017), however sample 2004 contains a larger quantity of barley albeit within an assemblage that is much smaller in size. Barley is generally present in charred assemblages from the Roman period; however as the grains are free threshing, they are less likely to encounter heat and are less likely as a result to become charred (ibid.).
C.1.25 It would seem likely, therefore, that despite their proximity the contents of these two pits represent different episodes of deposition. The large quantity of chaff within sample 2003 is undoubtedly crop processing waste, with the chaff either used as fuel in a structure such as a corndryer or oven or burnt as waste. No evidence of a corndryer was found during the excavation, but one may have been located close by. The presence of large numbers of mayweed (Tripleurospermum sp.) and smaller quantities of stinking chamomile (Anthemis cotula) and corncockle (Agrostemma githago) point to most of the seeds within this sample being crop contaminants separated from the crop along with the chaff.
C.1.26 The low quantity of charred grain in sample 2004 is accompanied by a small seed and chaff assemblage and so the assemblage may just represent the general background level of charred remains in an area utilised for crop processing or other food preparation. The condition of the charred material in this sample has, unfortunately, resulted in a large proportion of the grain being unidentified to genus although there is no doubt that the majority of these cereal grains are either wheat or barley,
C.1.27 Samples 2000 (pit 2026) and 2011 (pit 2041) were taken from pits in the southwestern part of Area C. Sample 2000 at the southwestern periphery of the excavation contains a larger quantity of identifiable barley than wheat although most of the grain is too damaged to securely identify. The almost total lack of chaff indicates that this is likely to be a cleaned crop and may indicate waste from cooking although a single barley grain is present within this sample still held in the spikelet fork. The small numbers of wild seeds present are generally those species which are associated with disturbed ground.
C.1.28 Sample 2011 slightly to the southwest and at the edge of the excavation area is richer in wheat but still contains a good quantity of barley. As with the other analysed samples (other than 2003) there is only a small quantity of cereal chaff and wild taxa are dominated by plants associated with disturbed ground and agricultural activity, this particular sample being rich in knotweed (Persicaria sp.).
C.1.29 Generally, the quantity of wild plant seeds is small and is likely to reflect seeds of plants that were accidentally harvested with the cereals. The small quantity could be a result
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of crop cleaning taking place elsewhere, either on or off site, with only occasional seeds being carried through to a point where they would become charred. It is interesting that while sample 2003 is dominated by members of the Asteraceae family, sample 2011 which is also possibly richer in wheat than barley, contains fewer from this family but is rich in knotweeds (Persicaria sp.), which may indicate that different fields, perhaps on different soil types, were cultivated.
C.1.30 Two undated samples from the evaluation (OA 2017) also contained barley grains, with one of them, Sample 1 from pit E2207 (Trench 22), situated close to the current samples 2000 and 2011, also containing a good quantity of wheat grain and glume wheat chaff although as with the current samples much of the grain was not identifiable. Superficially this sample seems similar in composition to 2003, which may indicate a second potential grain processing area.


Graph 1. Proportions of cereal grains across analysed samples.

## Discussion

C.1.31 Archaeobotanical assemblages on British rural sites are typically charred and are often dominated by the by-products of grain de-husking and cleaning, which are deliberately burnt as either fuel or waste (van der Veen 2014). This generally results in assemblages of chaff and weed seeds, with only little grain. The analysed assemblages from this site by contrast contain only small quantities of chaff with the notable exception of sample 2003. Spelt wheat (Triticum spelta) is considered generally to be the main crop during this period with the archaeobotanical evidence for most sites being rich in the waste products of its use (van der Veen 2014; Lodwick 2017) while hulled barley has long been assumed to be a secondary crop.
C.1.32 Graph 2 shows the approximate proportions of chaff to grain and wild seeds. Unfortunately, the degree of fragmentation makes exact quantities impossible to
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calculate but even when unquantifiable fragments of grain and chaff are excluded the difference in content of the four samples is obvious.
C.1.33 Although low levels of glume wheat chaff are present across the site, it is only common in sample 2003, suggesting that this feature held a dump of material from a specific crop processing activity relating to the dehusking of wheat. The relative scarcity of chaff across the rest of the sites perhaps indicates that the area of intercutting pits which includes pits $\mathbf{2 2 1 1}$ and $\mathbf{2 2 2 0}$ is located near to an area of wheat processing and crop drying, but that this is fairly localised and potentially small-scale.


Graph 2. Proportions of grain, quantifiable chaff (glume bases and spikelet forks) and weed seeds
C.1.34 Other samples include grain with very little accompanying cereal waste. The fragmented condition of the grain has hampered identification but if all of the grain was grown nearby, bearing in mind the fact that barley has been identified on the site in good quantities, it is perhaps possible that barley was grown as a main crop with wheat as a secondary crop.
C.1.35 Barley, as a free-threshing grain, requires a very different process to become usable than that required for the glume wheats. The grain is separated more easily, and the ear does not require parching in order to separate the grain from the glume. Apart from occasional rachis fragments, processing of barley rarely leaves much evidence archaeologically, so it is possible that the significance of barley as a crop has been underestimated.
C.1.36 High proportions of barley have been found in other sites in the county with samples from sites in Desford and Ashby de la Zouch including barley as well as possible free threshing wheat, with barley apparently forming a significant proportion of the crop (Lodwick 2017; Carruthers and Hunter Dowse 2019).
C.1.37 As discussed by Riehl (2019), domesticated barley has a shorter growing cycle than wheat and is more stress tolerant. The crop is heat-tolerant in a dry climate and moisture-tolerant in a cool one. Statistical data on traditional farming in Greece between 1931 and 1960 showed that wheat failure was more than five times more frequent than barley failures, and, barley has also been found to compete more efficiently with weeds than wheat species, due to a greater tillering ability and its below-ground root system. This all makes barley a very efficient crop which grows well in the cool, moist British climate.
C.1.38 It is of course possible that the grain does not derive from crops grown at or close to the site. Grain may have been imported in a mostly cleaned condition and, in the case of spelt, in spikelets. However, importation of grain is commonly found at urban and military sites, or at sites where a specialised pastoral strategy was practised, which seems unlikely in this case. There also does not appear to be any evidence for grain storage structures.
C.1.39 Barley is referred to by a number of Roman writers as being used as a fodder crop for animals and slaves (Cato, Varro, Columella etc) although the frequency of finds within the British Isles has largely been assumed to indicate that it was also used as a food crop in Britain and barley bran fragments have been recorded in human faecal waste (Lodwick 2017).
C.1.40 Fodder crops are less likely to need de-husking and their chances of becoming charred are smaller (Carruthers and Hunter Dowse 2019). If barley was largely grown for fodder it could explain the lack of a general spread of processed material across the site. There is little evidence of sprouting within the assemblages and while embryos are present coleoptiles overall are absent so it would seem unlikely that either the barley or the wheat was used for brewing.
C.1.41 The presence of two deposits on site containing large quantities of chaff (from the excavation and the evaluation) may indicate a centralised approach to the disposal of crop processing waste, this can only be conjecture. Settlement activity continues beyond the excavation area, so it is possible that further areas related to crop processing and disposal are located beyond the edge of this excavation.
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| Sample No |  | 2000 | 2003 | 2004 | 2011 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Context No |  | 2027 | 2221 | 2213 | 2046 |
| Feature |  | 2026 | 2220 | 2211 | 2041 |
| 듳 |  |  |  |  |  |
| Date/Phase |  | 2.2 | 2.2 | 2.2 | 2.2 |
| Volume (L) |  | 20 | 40 | 20 | 10 |
| Flot Volume (ml) |  | 450 | 100 | 170 | 30 |
| Proportion of flot sorted |  | 25\% | 50\% | 50\% | 100\% |
| Cereal grain |  |  |  |  |  |
| Triticum sp. | wheat | 11 | 100 | 4 | 69 |
| cf Triticum sp. |  | 5\# | 47\# | 2\# | 54\# |
| Hordeum sp. | barley | 49 |  | 6 | 32 |
| Hordeum sp. | barley in glume | 1 |  |  |  |
| cf Hordeum sp. |  | 22\# | 3\# | 6\# | 22\# |
| Avena sp. | oat | 11 | 5 | 3 | 2 |
| Avena/Bromus | oat/brome | 15\# | 16\# | 2\# | 2\# |
| Cerealia | indet cereal | 219\# | 152\# | 14\# | 216\# |
| Chaff |  |  |  |  |  |
| Triticum spelta L. | spelt glume base |  | 411 | 3 | 1 |
| Triticum dicoccum/spelta | emmer/spelt glume base fragments |  | 2814\# | 4\# | 3\# |
| Triticum spelta L. | spikelet fork |  | 11\# |  |  |
| Triticum dicoccum/spelta | emmer/spelt spikelet fork |  | 6\# |  |  |
| Hordeum sp. | spikelet fork | 1\# |  |  |  |
| Hordeum sp. | rachis internode | 1\# |  |  |  |
| Triticum/Hordeum | rachis internode | 2\# |  |  |  |
| Triticum/Hordeum | rachis node | 1\# | 49\# | 1\# | 3\# |
| Cerealia | coleoptile |  | 1 f |  |  |
| Avena sp. | oat awns | *** | ** | * | * |
| Cerealia | detached embryos | 2 | 85 |  | 2 |
| Nuts/Fruit etc. |  |  |  |  |  |
| Corylus avellana L. | hazelnut shell |  | $2 f$ |  |  |
| Wild Species |  |  |  |  |  |
| cf Ranunculus acris/repens/bulbosis | buttercup |  |  |  | 1\# |
| cf Fabaceae | pea family, small, Lotus type |  | 4\# | 2\# | 3\# |
| Vicia/Lathyrus sp. <2 mm | vetch/vetchling/tare, etc. |  |  |  | $1+2(1 / 2)$ |
| Persicaria maculosa/lapathifolia | redshank/pale persicaria |  | 1 | 3 | 17 |

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| Sample No |  | 2000 | 2003 | 2004 | 2011 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Fallopia convolvulus (L.) A. Love | black bindweed |  |  | 1 |  |
| cf Fallopia convolvulus | black bindweed |  | 1\# |  |  |
| Rumex sp. | docks (3 sided) | 6 | 3 |  | 1 |
| Rumex acetosella L. | sheep's sorrel |  | 1 |  | 1 |
| Agrostemma githago L. | corncockle |  | 2 |  |  |
| Montia fontana L. | blinks |  |  | 1 |  |
| Chenopodium sp. | goosefoots | 4 ? | $5 ?$ | 1 | 2 |
| Veronica hederifolia L. | ivy-leaved speedwell |  |  |  | 1? |
| Asteraceae | daisy family, $2-3 \mathrm{~mm}$ |  | 2\# |  |  |
| Asteraceae | daisy family, 1-2mm | 1\# | 12\# |  |  |
| cf Cirsium/Carduus | thistle |  |  | 1\# |  |
| Anthemis cotula L. | stinking chamomile |  | 6 |  |  |
| cf Anthemis cotula L. | stinking chamomile | 1\# |  |  |  |
| Tripleurospermum cf inodorum (L.) Sch. Bip | scentless mayweed |  | 44 |  |  |
| cf Tripleurospermum sp | mayweed |  | 6\# |  |  |
| Carex sp. | sedges (3 sided) | 1 | 1 |  | 1 |
| Poaceae | grass seeds (various) |  | 10 | 1 | 1 |
| Other |  |  |  |  |  |
| Indet. | seed/fruit | 2\# | 6\# | 1\# | 9\# |
| Raphanus raphanistrum | wild radish seed capsule | $3+5 f$ |  |  |  |
| Key: \# item is very damaged $f=$ fragment only $\quad *$ fragments rare half only present $s=$ silicified $\quad ?=$ unclear if charred |  | ** fragments occasional | *** fragments common (1/2) |  |  |

Table 12. The charred plant remains

## C. 2 Animal bone

## By Lee G. Broderick

C.2.1 A total of 53 specimens were recovered from the site, all of them from Romano-British pits - specifically cuts 2110 and $\mathbf{3 0 4 9}$ (Period 2.2). Both of these contained large mammal specimens and domestic cattle (Bos taurus taurus) specimens (Error! Reference source not found.3) with all material in a very poor state of preservation. In particular, each specimen showed extensive weathering (Behrensmeyer 1978, weathering stage 5) as well as water erosion.
C.2.2 The specimens recovered included a fused proximal left metacarpal and right humerus shaft from pit 2110, as well as a loose mandibular molar from pit 3051. These specimens appear to be roughly of the size expected of the Romano-British period, but it was not possible to take any measurements from them and the poor state of preservation precludes observing any other taphonomic modifications (such as butchery marks or damage by gnawing).
C.2.3 In summary, it is not possible to conclude anything more insightful from the assemblage than that there were domestic cattle present on the site during the Romano-British period.

| Taxa | NISP |
| :--- | ---: |
| domestic cattle | $\mathbf{3}$ |
| large mammal | 50 |
| Total NISP | 53 |
| Total NSP | 53 |

Table 13. Summary quantification of the animal bone assemblage

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## APPENDIX E SIte Summary Details / OASIS Report Form

Site name:
Site code:
Grid Reference
Type:
Date:
Area of Site
Location of archive:
Summary of Results:

Site name:
Hinckley Road, Sapcote, Leicestershire
X.A7.2019

SP 48309343
Excavation
Jan-Jun 2019
1.7ha

The site archive is currently held by OA and will be deposited with the appropriate county stores under the Site Code X.A7. 2019 in due course. Between January and June of 2019 Oxford Archaeology carried out archaeological excavations to the south of Hinckley Road in Sapcote, Leicestershire (SP 4830 9343), with three separate areas covering a total of 1.7 ha. Evidence for prehistoric activity was restricted to a single pit associated with Late Bronze Age/Early Iron Age pottery, and most of the features revealed by the excavations related to Romano-British activity, with a set of conjoined rectangular enclosures representing a long-lived, relatively low-status Romano-British farmstead. Although no structural remains were found, a small ditched enclosure may have represented a building compound, and the enclosures were associated with a relatively large number of discrete pits, including a large well. The finds assemblages from the enclosure ditches and associated features were relatively modest but included over 300 sherds of Roman pottery dating from the mid 1st century to 4th century AD. The fills of several pits within and around the enclosures produced evidence for crop processing and metalworking (smithing) as well as assemblages of fired clay and reused ceramic building material probably representing the remains of ovens. The most notable individual find was a large fragment of quern stone bearing unusual grooved decoration, recovered form on the enclosure ditches. Activity at the site seems to have ended in the 4th century, and later activity is represented by a single pit associated with a small quantity if Anglo-Saxon pottery and by the remains of extensive medieval to post-medieval ridge and furrow.
The Roman activity recorded at Hinckley Road represents an important addition to the corpus of excavated Roman rural settlements in this part of Leicestershire and is also significant in terms of its proximity to a major, but poorly understood, villa complex located little over 1 km to the east at Calver Hill.

Project Details
OASIS Number
Project Name
oxfordar3-388449
Hinckley Road, Sapcote, Leicestershire

| Start of Fieldwork | 2nd January 2019 | End of Fieldwork | 28th June 2019 |
| :---: | :---: | :---: | :---: |
| Previous Work | Yes | Future Work | No |

## Project Reference Codes

Site Code
X.A7.2019

| Planning App. No. | 17/0247/OUT |
| :--- | :--- |
|  | Related Numbers |
|  | X.A50.2017 |

HER Number

| NPPF |
| :--- |
| Residential |
| After full determination (eg. As a condition) |

## Techniques used (tick all that apply)

| $\square$ | Aerial Photography interpretation | 区 | Open-area excavation | $\square$ | Salvage Record |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\square$ | Aerial Photography - new | $\square$ | Part Excavation | $\square$ | Systematic Field Walking |
| $\square$ | Field Observation | $\square$ | Part Survey | $\square$ | Systematic Metal Detector Survey |
| $\square$ | Full Excavation | $\square$ | Recorded Observation | $\square$ | Test-pit Survey |
| $\square$ | Full Survey | $\square$ | Remote Operated Vehicle Survey | $\square$ | Watching Brief |
| $\square$ | Geophysical Survey | $\square$ | Salvage Excavation |  |  |


| Monument | Period | Object | Period |
| :---: | :---: | :---: | :---: |
| Pit | Late Bronze Age ( $1000 \text { to }-700 \text { ) }$ | Pottery | $\begin{aligned} & \text { Late Bronze Age ( }-1000 \\ & \text { to }-700 \text { ) } \end{aligned}$ |
| Ditch | Roman (43 to 410) | Pottery | Roman (43 to 410) |
| Pit | Roman (43 to 410) | Worked flint | Early Medieval (410 to 1066) |
| Pit | Early Medieval (410 to 1066) | Quern stone | Roman (43 to 410) |
|  |  | CBM | Roman (43 to 410) |
|  |  | Animal bone | Roman (43 to 410) |
|  |  | Metalworking residues | Roman (43 to 410) |
|  |  | Nails | Roman (43 to 410) |

Insert more lines as appropriate.

## Project Location

County
District
Parish
HER office
Size of Study Area
National Grid Ref

| Leicestershire |
| :--- |
| Blaby |
| Sapcote |
| Leicestershire |
| 1.7ha |
| SP 48309343 |

Address (including Postcode)
Hinckley Road,
Sapcote,
Leicestershire
LE9 4LG

## Project Originators

Organisation
Project Brief Originator
Project Design Originator
Project Manager
Project Supervisor

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| :--- |
| Richard Clark (Leicestershire CC) |
| John Boothroyd (OA) |
| John Boothroyd/Tom Phillips (OA) |
| Tom Black, Diana Chard, Berna Rzadek and Lawrence Billington (OA) |

oxford

## Project Archives

| Physical Archive（Finds） Digital Archive | Location ID |  |
| :---: | :---: | :---: |
|  | Leics County Council Museums | X．A7．2019 |
|  | OAE | X．A7．2019 |
|  | Leics County Council Museums | X．A7． 2019 |

Physical Contents
Present？

『
Animal Bones
Ceramics
Environmental
Glass
Human Remains
Industrial
Leather
Metal

## $\boxtimes$

Stratigraphic
Survey
Textiles
Wood
Worked Bone
Worked Stone／Lithic

## 区

Other

## Digital Media

Database

## 区

GIS
Geophysics
Images（Digital photos）
Illustrations（Figures／Plates）
Moving Image
Spreadsheets
Survey
Text
Virtual Reality

## Digital files associated with

 Finds$\boxtimes$ $\boxtimes$

区
$\boxtimes$

区
$\boxtimes$

Paper Media
Aerial Photos
Context Sheets
Correspondence $\boxtimes$

Diary
Drawing
Manuscript
Map
Matrices
Microfiche
Miscellaneous
Research／Notes
Photos（negatives／prints／slides）
Plans
区
Report $\boxtimes$
Sections区

Survey

## Further Comments


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Figure 1: Site location showing archaeological excavation areas and evaluation trenches (black) in development area (red)

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Figure 3: Area A all features
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Figure 4: Area B all features



Figure 7: Period 1 phase plan, Area B


Figure 8: Period 2.1 phase plan, Area A


Figure 9: Period 2.1 phase plan, Area B


Figure 11: Period 2.2 phase plan, Area B


Figure 12: Period 2.2 phase plan, Area C


Figure 13: Period 4 phase plan, Area A (also showing undated features)



$-293250$



Figure 14: Period 4 phase plan, Area B (also showing undated features)

Figure 16: Selected section (sheet 1 of 2)
© Oxford Archaeology East
Phase 2.2
Section 2046 Area C ssw
Section 2046 Area C
NNE

Phase 2.2
Phase 2.2

흗
$1{ }^{1} 8$ 昜 32.26 m OD Level
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Figure 19: Quern stone


Plate 1: South facing section (S. 3016) of Period 1 pit 3040, Area B. 1 m scale


Plate 2: North facing section (S. 1002) of Period 2.1 ditch 1021. 2 m scale
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Plate 3: Southwest facing section (S. 2073) of Period 2.1 ditches 2305 and 2307, Area C. 2 m scale


Plate 4: South facing section (S. 2043) of Period 2.2 ditch 2091, Area C. 2 m scale


Plate 5: Period 2.2 gully 2201, looking north, Area C. 0.5 m scale


Plate 6: Period 2.2 pit 2110 under excavation, looking northeast, Area C


Plate 7: South facing section (S. 2033) of upper part of Period 2.2 pit 2110, Area C. 2 m scale


Plate 8: Period 2.2 pit 2110, Area C, looking north following mechanical excavation of the upper part of the feature. 1 m scale


Plate 9: South facing section (S. 2033) of lower part of Period 2.2 pit 2110, Area C. 2 m scale


Plate 10: Period 2.2 pit cluster (2222, 2211, 2220, 2214; S. 2050), Area C, looking west


Plate 11: Period 2.2 pit 2271, Area C, under excavation, looking north


Plate 12: Period 2.2 pit 2271, Area C, with posthole 2287 exposed in base of feature, looking north


Plate 13: Northeast facing section (S. 2003) of ditch 2011, Area C. 1m scale

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