

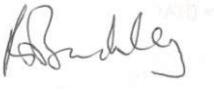
**An Archaeological Fieldwalking Survey
On 'Minorca' Land to the east of,
Measham, Leicestershire.**

NGR: SP 350 114

David Parker

For: UK Coal Ltd

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An Archaeological Fieldwalking Survey on ‘Minorca’ Land, Measham, Leicestershire.

David Parker

Summary

An archaeological fieldwalking survey was carried out by the University of Leicester Archaeological Services (ULAS) on ‘Minorca’ Land, Measham, Leicestershire, on behalf of UK Coal Ltd. The fieldwalking survey revealed a very dispersed scatter of post-medieval pottery and areas of brick and tile concentrations across the survey area. No significant concentrations of other material was located. The archive will be deposited with Leicestershire County Council Accession no. X.A158.2008.

1. Introduction

University of Leicester Archaeological Services (ULAS) were commissioned by UK Coal to carry out a fieldwalking survey on ‘Minorca’ Land, Measham, Leicestershire (NGR: SP 350 114). The work was undertaken as part of an archaeological impact assessment in advance of proposed minerals extraction. It was commissioned following recommendations from the Senior Planning Archaeologist at Leicestershire County Council as adviser to the planning authority. All work followed the *Project Design for Fieldwalking and Geophysical Survey (Appendix 2)*.

2. Site Description

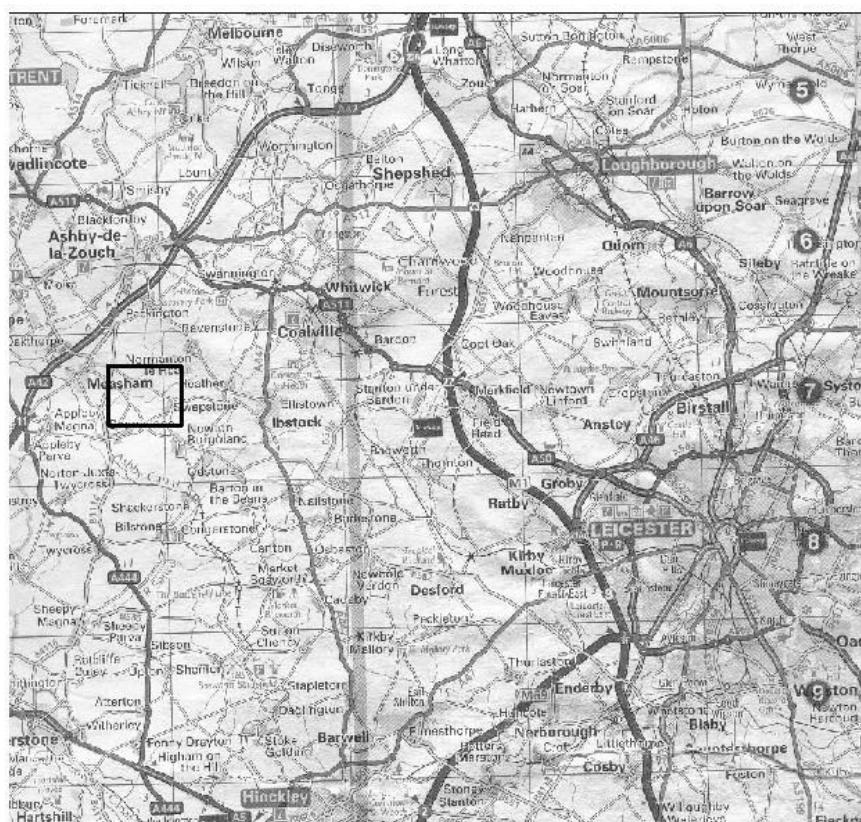


Figure 1. Site location Scale 1:25000

The proposed development area lies to the south of the Swithland Road, immediately south-east of Measham. Measham Fields Farm is situated south of this road (subtracted from the site area). To the west is the B4116 Gallows Lane and the south, Bosworth Road. The site consists of a series of arable fields sloping gently down to the south. These fields surround the now-wooded or rough grown spoil heaps and opencast pit of the former Measham colliery. The area is bisected east-west, by the Gilwiskaw Brook.

The Ordnance Survey Geological Survey of Great Britain Sheet Loughborough 141 indicates that the underlying geology of the site is likely to consist of drift Lacustrian deposits.

3. Archaeological Background

The proposed development area is located in the parish of Measham (SK 350 114; figs.1 and 2). It covers an area of c. 120 ha currently used as agricultural land or covered by spoil heaps. A fieldwalking survey was undertaken of much of the area, north-west of Minorca Farm, by Leicestershire Museums Archaeological survey team in 1994 (Liddle 1995). This located a general background scatter of worked flint in all the fields walked including blade types (Mesolithic – Neolithic). Although no dense concentrations were identified some areas of potential, based on the presence of cores and implements, can be identified (Liddle 1995, Fig.3). A small assemblage of Roman pottery was located in the north-western part of the area. A general spread of medieval and post-medieval pottery was located in all areas walked and probably represents a manuring scatter.

The Historic Environment Record (HER) for Leicestershire and Rutland shows that there are two known archaeological sites within the application area itself. A scatter of Roman pottery has been found in the westernmost field close to Gallows Lane (**MLE8996**) and there is a cropmark showing a pit alignment in the field to the east of Measham Fields Farm (**MLE4760**). Although not included on the HER there is evidence of the former mine and associated industrial railway within the application

A geophysical survey comprising magnetic susceptibility followed by targeted detailed magnetometry was undertaken of the area prior to the fieldwalking (Butler 2008).

4. Aims and Objectives

The principal aims of the archaeological fieldwalking survey were:

- To identify possible areas of archaeological potential liable to be threatened by the proposed development.
- To establish the location, extent, date, and significance of any archaeological material located.
- To produce an archive and report of any results.

The objective is to gain an indication of the nature, extent, date and significance of any archaeological material in order that decisions on whether further evaluation or an appropriate mitigation strategy may be adopted for remains that may be affected by the development proposals.

5. Methodology

The fields were walked between the 16th and 22nd October 2008. The fields were walked in transects 20 metres apart (with the exception of shaded areas in fig 2. which were walked at 10m intervals to target areas of higher potential) and all finds were marked *in situ*. Five of the fields were suitable for fieldwalking (Fields 1-3,5 and 7). Fields 4 and 6 were under crop. The other fields had been recently sown but were still suitable for fieldwalking. Fig. 2 shows the field numbers and direction of transects walked.

Generally the visibility was poor with a combination of low sunlight, strong shadow and recently sown crop. Despite this surface material was visible and recordable.

Finds were recorded using a Garmin Global Positional System (GPS) 12 parallel channel receiver. The GPS accuracy was generally 95% although variations can occur within a range of between two to 10 metres. This methodology is appropriate to this type of survey bearing in mind the dispersion and drag factor which occurs in clayland plough zone areas such as this (Yorston *et al* 1990; Schofield and Clarke 1991). Each find was recorded with the GPS and given a unique find number, bagged, and removed from the find spot. All finds were recorded, apart from obvious modern material. For post-medieval and modern brick, slate and tile the location was recorded but the fragments were not collected. The finds were later processed and examined by the appropriate specialists. All archaeological work adhered to the Institute for Archaeologist’s (IfA) *Code of Conduct and Standard and Guidance for Archaeological Evaluations*.

Artefact	Collected	Recorded
Modern pottery	N	N
Modern glass	N	N
Brick	N	Y
Tile	N	Y
Post-Medieval pottery	N	Y
Roman and Medieval pottery	Y	Y
Flint	Y	Y

Table 1 Collection and Recording Policies



Figure 2. Field numbers and direction walked

6. Results

A total of 735 finds was recorded, consisting of 659 pieces of coarse building material fragments, 72 sherds of post-medieval pottery and four fragments of undated clay pipe. The post-medieval pottery was examined on site and discarded. Plots of the finds can be seen in Figures 3-8.



Figure 3. Distribution of the Pottery

Pottery

A total of 9.8 percent (72 pieces) of the assemblage was post-medieval pottery. These pieces were thinly scattered over the whole site (Fig 3).



Figure 4. Distribution of the Brick/Tile

Brick and tile

The majority (90 percent) of the total finds assemblage consists of post-medieval/modern flat roof tile and brick fragments (659 fragments). As stated in the methodology, the location of all of the brick/tile was recorded. Figure 4 shows the distribution of brick/tile across the fieldwalked areas. These can be seen as mostly a general scatter across the whole of the survey however some concentrations can be seen in fields 2 and 3. These are confirmations of the anomalies seen in the geophysical survey. The concentrations seen in field 2 can be explained as the remains of agricultural buildings and an unknown building in the middle of field 2 seen on a map of the area dated c. 1750. The concentrations in fields 3 and 5 are generally around the edges of the fields and can be seen as material being ploughed down the slopes to the edges of the field.

7. Conclusion

The fieldwalking survey recovered a relatively dispersed surface assemblage over the fields examined with the most significant items being ceramic building material. The majority of this comprised brick and pipe fragments. A small amount of post-medieval pottery was also recorded. The distribution of this material showed a relatively even distribution across the whole site with two areas showing higher density. One of these areas in field 2 can be accounted for by a structure recorded on the map of Measham drawn in 1750 (Hunt 2008, 00). An additional area of higher brick distribution to the north of field 2 his can also be accounted for by the presence of a post medieval/ early modern building set on the edge of the road.

Some areas of the fields were walked at 10m intervals to target areas of high potential identified by the geophysical survey (Butler 2008) and earlier fieldwalking (Liddle 1994). The higher concentration of finds in these areas is only due to the increased sample resolution rather than the presence of a significant amount of archaeological material. No flint or Roman pottery, present in very small quantities during the 1994 survey, was recorded. This is probably indicative of the different visibility conditions.

Small quantities of post-medieval ceramics were recorded probably resulting from manuring scatters.

8. Archive

A full copy of the archive as defined in the Guidelines for the Preparation of Excavation Archives for long-term storage (UKIC 1990), Standards in the Museum: Care of Archaeological Collections (MGC 1992) and Guidelines for the Preparation of Site Archives and Assessments for all Finds (other than fired objects) (Roman finds Group and Finds Research Group AD 700-1700, 1993) will usually be presented within six months of the completion of the fieldwork. This archive will include all written, drawn and photographic records relating to the investigations undertaken.

The archive consists of:

A copy of the report,

Seven field walking record sheets

Field Walking Data (GPS points on CD rom)

The site archive will be held by Leicestershire County Council Museums Services under the accession number X.A158.2008.

9. Oasis Record

INFORMATION REQUIRED	EXAMPLE
Project Name	An Archaeological Fieldwalking survey on ‘Minorca’ Land, Measham, Leicestershire
Project Type	Fieldwalking
Project Manager	Patrick Clay
Project Supervisor	David Parker
Previous/Future work	Geophysical Survey
Current Land Use	Agricultural
Development Type	Minerals Extraction
Reason for Investigation	PPG16
Position in the Planning Process	As a condition
Site Co ordinates	NGR: SP 350 114
Start/end dates of field work	16 th -22 nd October 2008
Archive Recipient	Leicester County Council
Study Area *	120ha

10. Acknowledgements

The fieldwalking survey was carried out by David Parker, Steve Baker, Dan Stone and Lara Callaghan. The project was managed by Dr Patrick Clay.

11. Bibliography

Butler, A 2008, *Archaeological Geophysical Survey on ‘Minorca’ Land, Measham, Leicestershire*. NA Report 08/149

Clark, R.H., and Schofield, A.J., 1991 By experiment and calibration: an integrated approach to archaeology of the ploughsoil. In A.J.Schofield (ed), *Interpreting Artefact Scatters: Contributions to ploughzone archaeology*: 93-106. Oxford: Oxbow Books

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18.11.2008

Appendix 1: Catalogue of Finds

Find No.	Find ID	Zn	East	North	Object	Alt(m)
1	001C	SK	35124	10987	Post Med Ceramic	92.7
2	002C	SK	35127	10956	Post Med Ceramic	92.7
3	003C	SK	35151	10973	Post Med Ceramic	93.4
4	004C	SK	35270	10959	Post Med Ceramic	85.7
5	005C	SK	35260	10989	Post Med Ceramic	85
6	006C	SK	35217	11020	Post Med Ceramic	86.4
7	007C	SK	35199	11084	Post Med Ceramic	82.8
8	008C	SK	35201	11089	Post Med Ceramic	83.3
9	009C	SK	35220	11052	Post Med Ceramic	89.3
10	010C	SK	35445	10977	Post Med Ceramic	86.2
11	011C	SK	35570	10829	Post Med Ceramic	97.5
12	012C	SK	35640	10884	Post Med Ceramic	94.1
13	013C	SK	35628	10979	Post Med Ceramic	89
14	014CL	SK	35721	10904	Clay Pipe	90.2
15	015C	SK	35737	10892	Post Med Ceramic	90
16	016C	SK	35981	10872	Post Med Ceramic	97.9
17	017C	SK	36114	11032	Post Med Ceramic	102.5
18	018C	SK	36174	11118	Post Med Ceramic	101.8
19	019C	SK	36158	11157	Post Med Ceramic	101.5
20	020C	SK	36066	11227	Post Med Ceramic	100.8
21	021CL	SK	36056	11083	Clay Pipe	104.2
22	022C	SK	36115	11207	Post Med Ceramic	102.5
23	023C	SK	35988	10964	Post Med Ceramic	100.6
24	024C	SK	35927	10882	Post Med Ceramic	92.9
25	025C	SK	35730	11387	Post Med Ceramic	95.3
26	026C	SK	35704	11190	Post Med Ceramic	93.1
27	052C	SK	35773	11226	Post Med Ceramic	95.3
28	053C	SK	35754	10997	Post Med Ceramic	86.9
29	054C	SK	35843	11062	Post Med Ceramic	94.3
30	055C	SK	35943	11273	Post Med Ceramic	102
31	056CL	SK	34649	11502	Clay Pipe	90
32	058C	SK	34761	11750	Post Med Ceramic	94.3
33	059C	SK	34804	11860	Post Med Ceramic	97
34	060C	SK	34627	11545	Post Med Ceramic	99.4
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36	062C	SK	34672	11684	Post Med Ceramic	98.7

37	064C	SK	34681	11725	Post Med Ceramic	96.7
38	065C	SK	34581	11587	Post Med Ceramic	95.5
39	066C	SK	34606	11632	Post Med Ceramic	97.5
40	067C	SK	34660	11723	Post Med Ceramic	96.3
41	068C	SK	34574	11797	Post Med Ceramic	98.9
42	X001	SK	34967	11090	Brick/Tile	90.2
43	X002	SK	35022	11015	Brick/Tile	89
44	X003	SK	35077	11071	Brick/Tile	92.7
45	X004	SK	35085	10987	Brick/Tile	92.7
46	X005	SK	35095	10958	Brick/Tile	92.9
47	X006	SK	35127	10951	Brick/Tile	94.1
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53	X012	SK	35300	10930	Brick/Tile	83
54	X013	SK	35270	10960	Brick/Tile	87.1
55	X014	SK	35247	11005	Brick/Tile	86.4
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219	X178	SK	36012	11064	Brick/Tile	102
220	X179	SK	36070	11110	Brick/Tile	103.7
221	X180	SK	36114	11158	Brick/Tile	103.9
222	X181	SK	36081	11110	Brick/Tile	102.7
223	X182	SK	36034	11035	Brick/Tile	98.7
224	X183	SK	36030	11030	Brick/Tile	98.2
225	X184	SK	36027	11024	Brick/Tile	97.2
226	X185	SK	36024	11020	Brick/Tile	96.7
227	X186	SK	36018	11027	Brick/Tile	97
228	X187	SK	36020	11011	Brick/Tile	98.7
229	X188	SK	36010	10997	Brick/Tile	97.2
230	X189	SK	36007	10994	Brick/Tile	97
231	X190	SK	35993	10995	Brick/Tile	95.8
232	X191	SK	36002	10984	Brick/Tile	97.7
233	X192	SK	35997	10978	Brick/Tile	97.7
234	X193	SK	35983	10982	Brick/Tile	98.9
235	X194	SK	35976	10973	Brick/Tile	97.9
236	X195	SK	35991	10969	Brick/Tile	99.4
237	X196	SK	35982	10957	Brick/Tile	98.7
238	X197	SK	35981	10955	Brick/Tile	98.4
239	X198	SK	35978	10952	Brick/Tile	98.9
240	X199	SK	35972	10945	Brick/Tile	98.2
241	X200	SK	35935	10895	Brick/Tile	95.8
242	X201	SK	35891	10843	Brick/Tile	92.7
243	X202	SK	35883	10833	Brick/Tile	96.3
244	X203	SK	35880	10828	Brick/Tile	95.1
245	X204	SK	35905	10822	Brick/Tile	96.5
246	X205	SK	35581	11329	Brick/Tile	91.5
247	X206	SK	35605	11391	Brick/Tile	94.3
248	X207	SK	35616	11436	Brick/Tile	94.3
249	X208	SK	35627	11481	Brick/Tile	93.1
250	X209	SK	35654	11425	Brick/Tile	96.3
251	X210	SK	35670	11326	Brick/Tile	95.5
252	X211	SK	35675	11353	Brick/Tile	95.8
253	X212	SK	35703	11304	Brick/Tile	94.1
254	X213	SK	35698	11298	Brick/Tile	93.4
255	X214	SK	35692	11273	Brick/Tile	95.1
256	X215	SK	35671	11197	Brick/Tile	92.7
257	X216	SK	35646	11128	Brick/Tile	89.3
258	X217	SK	35671	11103	Brick/Tile	91
259	X218	SK	35686	11131	Brick/Tile	91.9
260	X219	SK	35695	11164	Brick/Tile	92.7
261	X220	SK	35708	11203	Brick/Tile	93.1

262	X221	SK	35742	11309	Brick/Tile	95.1
263	X222	SK	35767	11320	Brick/Tile	93.1
264	X223	SK	35758	11289	Brick/Tile	92.4
265	X224	SK	35736	11236	Brick/Tile	90.5
266	X225	SK	35727	11215	Brick/Tile	90.2
267	X226	SK	35674	11065	Brick/Tile	86.6
268	X227	SK	35673	11062	Brick/Tile	87.1
269	X228	SK	35670	11056	Brick/Tile	87.4
270	X229	SK	35669	11053	Brick/Tile	87.4
271	X230	SK	35667	11050	Brick/Tile	90
272	X231	SK	35666	11044	Brick/Tile	91.2
273	X232	SK	35664	11031	Brick/Tile	90.5
274	X233	SK	35665	11026	Brick/Tile	88.3
275	X234	SK	35661	11018	Brick/Tile	89
276	X235	SK	35689	11002	Brick/Tile	90.5
277	X236	SK	35693	11010	Brick/Tile	92.7
278	X237	SK	35696	11017	Brick/Tile	92.2
279	X238	SK	35698	11022	Brick/Tile	92.2
280	X239	SK	35700	11026	Brick/Tile	92.2
281	X240	SK	35703	11034	Brick/Tile	92.9
282	X241	SK	35709	11053	Brick/Tile	93.6
283	X242	SK	35714	11067	Brick/Tile	94.3
284	X243	SK	35718	11082	Brick/Tile	95.8
285	X244	SK	35735	11130	Brick/Tile	96
286	X245	SK	35759	11190	Brick/Tile	95.1
287	X246	SK	35823	11234	Brick/Tile	94.3
288	X247	SK	35814	11201	Brick/Tile	93.9
289	X248	SK	35809	11182	Brick/Tile	93.9
290	X249	SK	35798	11139	Brick/Tile	92.9
291	X250	SK	35768	11036	Brick/Tile	89.8
292	X251	SK	35754	11001	Brick/Tile	87.6
293	X252	SK	35749	10984	Brick/Tile	87.8
294	X253	SK	35746	10976	Brick/Tile	89.5
295	X254	SK	35743	10966	Brick/Tile	89.5
296	X255	SK	35760	10946	Brick/Tile	84
297	X256	SK	35762	10955	Brick/Tile	87.6
298	X257	SK	35765	10975	Brick/Tile	87.6
299	X258	SK	35770	10988	Brick/Tile	88.8
300	X259	SK	35772	10992	Brick/Tile	89.5
301	X260	SK	35815	11151	Brick/Tile	95.8
302	X261	SK	35821	11170	Brick/Tile	96.5
303	X262	SK	35830	11195	Brick/Tile	98.2
304	X263	SK	35901	11257	Brick/Tile	96.7
305	X264	SK	34839	11770	Brick/Tile	98.9
306	X265	SK	35892	11221	Brick/Tile	98.9

307	X266	SK	35860	11118	Brick/Tile	95.1
308	X267	SK	35898	11093	Brick/Tile	99.1
309	X268	SK	35903	11107	Brick/Tile	99.1
310	X269	SK	35924	11192	Brick/Tile	100.8
311	X270	SK	35926	11204	Brick/Tile	101.3
312	X271	SK	35931	11226	Brick/Tile	102.3
313	X272	SK	35933	11233	Brick/Tile	102.5
314	X273	SK	35935	11241	Brick/Tile	102.3
315	X274	SK	35940	11261	Brick/Tile	100.8
316	X275	SK	35942	11268	Brick/Tile	100.8
317	X276	SK	35999	11250	Brick/Tile	98.9
318	X277	SK	34812	11717	Brick/Tile	97
319	X278	SK	34806	11705	Brick/Tile	97.7
320	X279	SK	34804	11704	Brick/Tile	98.2
321	X280	SK	34801	11700	Brick/Tile	96.5
322	X281	SK	34753	11622	Brick/Tile	92.7
323	X282	SK	34743	11606	Brick/Tile	94.1
324	X283	SK	34727	11573	Brick/Tile	94.1
325	X284	SK	34722	11561	Brick/Tile	92.7
326	X285	SK	34718	11552	Brick/Tile	92.4
327	X286	SK	34679	11449	Brick/Tile	90.5
328	X287	SK	34638	11371	Brick/Tile	92.4
329	X288	SK	34639	11376	Brick/Tile	93.9
330	X289	SK	34652	11412	Brick/Tile	91
331	X290	SK	34673	11500	Brick/Tile	90.7
332	X291	SK	34694	11540	Brick/Tile	92.7
333	X292	SK	34701	11556	Brick/Tile	93.1
334	X293	SK	34703	11560	Brick/Tile	93.4
335	X294	SK	34707	11565	Brick/Tile	93.4
336	X295	SK	34744	11634	Brick/Tile	92.4
337	X296	SK	34757	11658	Brick/Tile	92.9
338	X297	SK	34824	11777	Brick/Tile	96.3
339	X299	SK	34839	11809	Brick/Tile	98.2
340	X300	SK	34848	11824	Brick/Tile	97.9
341	X301	SK	34802	11783	Brick/Tile	93.6
342	X302	SK	34757	11705	Brick/Tile	92.9
343	X303	SK	34594	11448	Brick/Tile	92.2
344	X304	SK	34691	11619	Brick/Tile	93.4
345	X305	SK	34694	11623	Brick/Tile	94.1
346	X306	SK	34698	11632	Brick/Tile	94.3
347	X307	SK	34727	11679	Brick/Tile	92.9
348	X308	SK	34751	11727	Brick/Tile	95.1
349	X309	SK	34756	11739	Brick/Tile	95.5
350	X310	SK	34759	11745	Brick/Tile	94.1
351	X311	SK	34779	11779	Brick/Tile	97.2

352	X312	SK	34813	11836	Brick/Tile	99.4
353	X313	SK	34828	11865	Brick/Tile	97
354	X314	SK	34829	11867	Brick/Tile	94.6
355	X315	SK	34833	11870	Brick/Tile	95.1
356	X316	SK	34792	11828	Brick/Tile	97.9
357	X317	SK	34775	11808	Brick/Tile	97.9
358	X318	SK	34767	11794	Brick/Tile	97.9
359	X319	SK	34734	11736	Brick/Tile	96
360	X320	SK	34728	11724	Brick/Tile	97.2
361	X321	SK	34723	11715	Brick/Tile	96.5
362	X322	SK	34620	11534	Brick/Tile	98.9
363	X323	SK	34594	11490	Brick/Tile	97.7
364	X324	SK	34558	11460	Brick/Tile	97.9
365	X325	SK	34607	11557	Brick/Tile	98.2
366	X326	SK	34608	11561	Brick/Tile	98.7
367	X327	SK	34610	11567	Brick/Tile	98.7
368	X328	SK	34617	11578	Brick/Tile	98.9
369	X329	SK	34699	11716	Brick/Tile	96.7
370	X330	SK	34705	11723	Brick/Tile	95.8
371	X331	SK	34738	11817	Brick/Tile	98.9
372	X332	SK	34695	11751	Brick/Tile	95.1
373	X333	SK	34664	11699	Brick/Tile	95.8
374	X334	SK	34606	11596	Brick/Tile	93.4
375	X335	SK	34586	11561	Brick/Tile	88.6
376	X336	SK	34582	11554	Brick/Tile	88.6
377	X337	SK	34549	11500	Brick/Tile	94.3
378	X338	SK	34569	11564	Brick/Tile	95.5
379	X339	SK	34592	11605	Brick/Tile	96.5
380	X340	SK	34612	11640	Brick/Tile	97.9
381	X341	SK	34689	11773	Brick/Tile	94.1
382	X342	SK	34729	11843	Brick/Tile	97.2
383	X343	SK	34642	11924	Brick/Tile	97.9
384	X344	SK	34609	11835	Brick/Tile	98.7
385	X346	SK	34716	11869	Brick/Tile	100.1
386	002X	SK	35230	10734	Brick/Tile	91.5
387	003X	SK	35214	10745	Brick/Tile	93.9
388	004X	SK	35219	10752	Brick/Tile	95.8
389	005X	SK	35211	10761	Brick/Tile	96.5
390	006X	SK	35215	10771	Brick/Tile	94.1
391	007X	SK	35234	10748	Brick/Tile	94.1
392	008X	SK	35251	10750	Brick/Tile	95.3
393	009X	SK	35287	10816	Brick/Tile	90.7
394	010X	SK	35257	10819	Brick/Tile	89.3
395	011X	SK	35293	10824	Brick/Tile	90.7
396	012X	SK	35302	10822	Brick/Tile	88.1

397	013X	SK	35301	10841	Brick/Tile	92.7
398	014X	SK	35315	10842	Brick/Tile	94.8
399	015X	SK	35316	10845	Brick/Tile	94.8
400	016X	SK	35286	10854	Brick/Tile	91.7
401	017X	SK	35284	10891	Brick/Tile	94.3
402	018X	SK	35258	10870	Brick/Tile	92.4
403	019X	SK	35252	10864	Brick/Tile	91.7
404	01X	SK	35228	10735	Brick/Tile	92.7
405	020X	SK	35251	10911	Brick/Tile	92.9
406	021X	SK	35211	10877	Brick/Tile	95.8
407	022X	SK	35183	10826	Brick/Tile	97.7
408	023X	SK	35154	10852	Brick/Tile	95.8
409	024X	SK	35146	10843	Brick/Tile	95.1
410	025X	SK	35146	10842	Brick/Tile	96
411	026C	SK	35239	10708	Post Med Ceramic	95.5
412	026X	SK	35140	10847	Brick/Tile	97.5
413	027C	SK	35226	10731	Post Med Ceramic	96.3
414	027X	SK	35128	10847	Brick/Tile	97.2
415	028S	SK	35254	10756	Brick/Tile	95.3
416	028X	SK	35208	10805	Brick/Tile	93.6
417	029C	SK	35244	10768	Post Med Ceramic	94.1
418	029X	SK	35210	10792	Brick/Tile	94.6
419	030B	SK	35266	10776	Brick/Tile	89
420	030X	SK	35337	10883	Brick/Tile	86.6
421	031X	SK	35339	10884	Brick/Tile	85
422	032X	SK	35347	10897	Brick/Tile	88.6
423	033C	SK	35373	10990	Post Med Ceramic	86.9
424	033X	SK	35353	10904	Brick/Tile	89.8
425	034G	SK	35239	11093	Brick/Tile	84
426	034X	SK	35355	10907	Brick/Tile	90.7
427	035C	SK	36180	10990	Post Med Ceramic	103
428	035X	SK	35360	10915	Brick/Tile	91.2
429	036C	SK	36229	11050	Post Med Ceramic	103.9
430	036X	SK	35364	10922	Brick/Tile	91.7
431	037C	SK	36229	10980	Post Med Ceramic	99.9
432	038C	SK	36203	11100	Post Med Ceramic	104.2
433	038X	SK	35375	10941	Brick/Tile	91.2
434	039C	SK	36186	11078	Post Med Ceramic	103.9
435	039X	SK	35388	10969	Brick/Tile	87.6
436	040C	SK	36135	11165	Post Med Ceramic	106.1
437	040X	SK	35390	10972	Brick/Tile	85.2
438	041C	SK	36132	11159	Post Med Ceramic	104.2
439	041X	SK	35396	10990	Brick/Tile	84.5
440	042C	SK	36142	11140	Post Med Ceramic	100.6
441	042X	SK	35397	10993	Brick/Tile	84

442	043C	SK	36140	11135	Post Med Ceramic	102.7
443	043X	SK	35398	10995	Brick/Tile	84.2
444	044C	SK	36016	10953	Post Med Ceramic	96.7
445	044X	SK	35399	10999	Brick/Tile	85.2
446	045C	SK	35596	11331	Post Med Ceramic	87.8
447	045X	SK	35399	11001	Brick/Tile	85.7
448	046C	SK	35724	11299	Post Med Ceramic	91.7
449	046X	SK	35398	11004	Brick/Tile	85.7
450	047C	SK	35717	11013	Post Med Ceramic	94.3
451	047CL	SK	35627	11413	Clay Pipe	93.6
452	047X	SK	35346	10991	Brick/Tile	85.4
453	048C	SK	35823	11292	Post Med Ceramic	96.3
454	049C	SK	35837	11210	Post Med Ceramic	92.2
455	049X	SK	35346	10988	Brick/Tile	88.1
456	050C	SK	35923	11271	Post Med Ceramic	99.9
457	050X	SK	35323	10983	Brick/Tile	89.8
458	051X	SK	35322	10981	Brick/Tile	89.3
459	052X	SK	35325	10980	Brick/Tile	88.8
460	053X	SK	35323	10977	Brick/Tile	87.6
461	054X	SK	35310	10952	Brick/Tile	88.6
462	055X	SK	35281	10991	Brick/Tile	88.3
463	056X	SK	35282	10992	Brick/Tile	87.8
464	057X	SK	35285	10999	Brick/Tile	87.6
465	059X	SK	35417	11109	Brick/Tile	86.4
466	060X	SK	35426	11138	Brick/Tile	87.1
467	061X	SK	35336	11128	Brick/Tile	89.5
468	062X	SK	35284	11054	Brick/Tile	85.9
469	063X	SK	35266	11055	Brick/Tile	87.4
470	064X	SK	35254	11030	Brick/Tile	86.4
471	065X	SK	35252	11024	Brick/Tile	85
472	066X	SK	36201	11063	Brick/Tile	99.9
473	067X	SK	36169	11015	Brick/Tile	96.3
474	068X	SK	36007	10813	Brick/Tile	94.6
475	069X	SK	36163	11007	Brick/Tile	93.6
476	070X	SK	35990	10791	Brick/Tile	98.2
477	071X	SK	35979	10779	Brick/Tile	98.2
478	072X	SK	35958	10736	Brick/Tile	96.7
479	073X	SK	35964	10729	Brick/Tile	95.1
480	074X	SK	35987	10747	Brick/Tile	97.2
481	075X	SK	35996	10754	Brick/Tile	96
482	076C	SK	35863	11049	Post Med Ceramic	92.4
483	076X	SK	36010	10764	Brick/Tile	93.1
484	077C	SK	34413	12046	Post Med Ceramic	104.4
485	077X	SK	36017	10772	Brick/Tile	95.1
486	078C	SK	34359	11662	Post Med Ceramic	94.8

487	078X	SK	36031	10793	Brick/Tile	97.5
488	079C	SK	34366	11663	Post Med Ceramic	96.5
489	079X	SK	36071	10839	Brick/Tile	96
490	080C	SK	34448	12056	Post Med Ceramic	91.5
491	080X	SK	36104	10882	Brick/Tile	98.9
492	081C	SK	34446	12049	Post Med Ceramic	95.5
493	081X	SK	36106	10884	Brick/Tile	98.7
494	082C	SK	34408	11859	Post Med Ceramic	99.4
495	082X	SK	36118	10901	Brick/Tile	98.2
496	083C	SK	34444	11744	Post Med Ceramic	97.7
497	083X	SK	36124	10910	Brick/Tile	98.7
498	084C	SK	34413	11797	Post Med Ceramic	98.2
499	084X	SK	36125	10913	Brick/Tile	98.9
500	085C	SK	34416	11733	Post Med Ceramic	97.5
501	085X	SK	36126	10915	Brick/Tile	97.9
502	086C	SK	34406	11798	Post Med Ceramic	96.3
503	086X	SK	36127	10917	Brick/Tile	97.7
504	087C	SK	34460	11789	Post Med Ceramic	97
505	087X	SK	36129	10918	Brick/Tile	97.9
506	088C	SK	34512	12000	Post Med Ceramic	109
507	088X	SK	36129	10918	Brick/Tile	98.4
508	089C	SK	34502	11957	Post Med Ceramic	104.7
509	089X	SK	36131	10922	Brick/Tile	99.4
510	090C	SK	34516	11925	Post Med Ceramic	102.7
511	090X	SK	36132	10924	Brick/Tile	99.1
512	091X	SK	36135	10925	Brick/Tile	100.3
513	092X	SK	36164	10970	Brick/Tile	101.5
514	093X	SK	36228	11047	Brick/Tile	105.6
515	094X	SK	36255	11060	Brick/Tile	103.7
516	096X	SK	36227	11033	Brick/Tile	104.7
517	097X	SK	36216	11017	Brick/Tile	102.3
518	098X	SK	36176	10958	Brick/Tile	100.6
519	099X	SK	36175	10954	Brick/Tile	98.2
520	100X	SK	36164	10937	Brick/Tile	97.5
521	101X	SK	36132	10903	Brick/Tile	95.5
522	102X	SK	36133	10900	Brick/Tile	97.2
523	103X	SK	36133	10898	Brick/Tile	97
524	104X	SK	36130	10892	Brick/Tile	96.5
525	105X	SK	36129	10886	Brick/Tile	97.9
526	106X	SK	36236	10985	Brick/Tile	101.8
527	107X	SK	36176	10922	Brick/Tile	98.2
528	108X	SK	36255	11016	Brick/Tile	104.2
529	109X	SK	36256	11021	Brick/Tile	103.7
530	110X	SK	36257	11027	Brick/Tile	100.3
531	111X	SK	36265	10982	Brick/Tile	98.9

532	112X	SK	36270	10983	Brick/Tile	98.4
533	113X	SK	36204	11098	Brick/Tile	103.5
534	114X	SK	36149	11152	Brick/Tile	105.6
535	115X	SK	36128	11142	Brick/Tile	103
536	116X	SK	36136	11119	Brick/Tile	105.1
537	117X	SK	36128	11112	Brick/Tile	104.2
538	118X	SK	36102	11122	Brick/Tile	105.1
539	119X	SK	36092	11103	Brick/Tile	103.9
540	120X	SK	36055	11008	Brick/Tile	109.5
541	121X	SK	36050	10998	Brick/Tile	110
542	122X	SK	36034	10979	Brick/Tile	101.8
543	123X	SK	36026	10965	Brick/Tile	99.9
544	124X	SK	36006	10942	Brick/Tile	94.6
545	125X	SK	35565	11342	Brick/Tile	71.5
546	126X	SK	35620	11406	Brick/Tile	93.1
547	127X	SK	35642	11440	Brick/Tile	91
548	128X	SK	35643	11460	Brick/Tile	91.9
549	129X	SK	35663	11414	Brick/Tile	0
550	130X	SK	35664	11380	Brick/Tile	99.6
551	131X	SK	35653	11350	Brick/Tile	99.1
552	132X	SK	35648	11331	Brick/Tile	99.6
553	133X	SK	35691	11353	Brick/Tile	93.4
554	134X	SK	35700	11366	Brick/Tile	93.6
555	135X	SK	35711	11376	Brick/Tile	95.1
556	137X	SK	35715	11403	Brick/Tile	91.5
557	138X	SK	35673	11266	Brick/Tile	91.2
558	139X	SK	35671	11262	Brick/Tile	91.5
559	140X	SK	35666	11254	Brick/Tile	91.7
560	141X	SK	35660	11244	Brick/Tile	91
561	142X	SK	35636	11187	Brick/Tile	90
562	143X	SK	35633	11180	Brick/Tile	89.5
563	144X	SK	35632	11175	Brick/Tile	89
564	145X	SK	35631	11173	Brick/Tile	90.2
565	146X	SK	35648	11128	Brick/Tile	82.8
566	147X	SK	35658	11144	Brick/Tile	82.6
567	148X	SK	35663	11146	Brick/Tile	85.9
568	149X	SK	35668	11150	Brick/Tile	87.8
569	150X	SK	35690	11197	Brick/Tile	90.2
570	151X	SK	35692	11205	Brick/Tile	90.5
571	152X	SK	35698	11218	Brick/Tile	89.3
572	153X	SK	35704	11232	Brick/Tile	92.7
573	154X	SK	35704	11236	Brick/Tile	91.5
574	156X	SK	35708	11242	Brick/Tile	91.5
575	157X	SK	35714	11252	Brick/Tile	91.2
576	158X	SK	35723	11295	Brick/Tile	91.9

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663	252X	SK	34421	11771	Brick/Tile	98.4
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717	308X	SK	34511	11502	Brick/Tile	91.7
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733	326X	SK	34615	11940	Brick/Tile	99.4
734	327X	SK	34474	11956	Brick/Tile	100.6
735	328X	SK	34438	12051	Brick/Tile	99.9

UNIVERSITY OF LEICESTER ARCHAEOLOGICAL SERVICES

Design Specification for archaeological work

Minorca, Measham, Leicestershire (SK 350 114)

Written scheme of investigation for Geophysical and Fieldwalking Surveys

For: UK Coal

1. Introduction

1.1 This document sets out a Written Scheme of Investigation (WSI) to evaluate potential archaeological deposits at Minorca, Measham, Leicestershire in advance of the proposed business park. An Archaeological Desk Based Assessment for the area has been prepared (Hunt & Clay 2008) and an Environmental Statement is in progress.

1.2 The proposed development area is located in the parish of Measham (Grid. Ref. (SK 350 114; figs.1 and 2). It covers an area of c. 120 ha currently used as agricultural land or covered by spoil heaps. A fieldwalking survey was undertaken of much of the area, north-west of Minorca Farm, by Leicestershire Museums Archaeological survey team in 1994 (Liddle 1995). This located a general background scatter of worked flint in all the fields walked including blade types (Mesolithic – Neolithic). Although no dense concentrations were identified some areas of potential, based on the presence of cores and implements, can be identified (Liddle 1995, Fig.3). A small assemblage of Roman pottery was located in the north-western part of the area. A general spread of medieval and post-medieval pottery was located in all areas walked and probably represents a manuring scatter.

1.3 The Historic Environment Record (HER) for Leicestershire and Rutland shows that there are two known archaeological sites within the application area itself. A scatter of Roman pottery has been found in the westernmost field close to Gallows Lane (**MLE8996**) and there is a cropmark showing a pit alignment in the field to the east of Measham Fields Farm (**MLE4760**). Although not included on the HER there is evidence of the former mine and associated industrial railway within the application area.

2. Geology and topography

2.1 The Ordnance Survey Geological Survey of Great Britain Sheet Loughborough 141 indicates that the underlying geology of the site is likely to consist of drift Lacustrine deposits. The land is generally flat at a height of c.39m OD.

3. Aim of the Survey

3.1 The overall aim of the survey is to gather sufficient information to establish the extent, condition, character and date (as far as circumstances permit) of any archaeological features and deposits within the area targeted for evaluation. Magnetic susceptibility survey is proposed to cover the south-eastern area which has not been subject to fieldwalking follow up detailed magnetometry to identify target potential features within the area. Available parts of this area will also be subject to a fieldwalking survey. Detailed gradiometry will be undertaken of areas already identified by fieldwalking as having archaeological potential (Figure 2). To the west detailed gradiometry will target a small Roman pottery scatter (1); to the north-east it will target a lithic scatter and cropmark of a pit alignment (2) while to the south east (3) it will target a further lithic scatter.

4. Survey Methodology

4.1 General Methodology

4.1.1 Geophysical and fieldwalking surveys are required over the areas identified above in order that an assessment can be made of the presence and extent of any archaeology and its influence within the new highway boundary.

4.1.2 The geophysical survey will be sub-contracted to Northamptonshire Archaeology, a registered organisation with the IFA. Suitable equipment will be used by a qualified archaeologist specialising in geophysical survey to cover an area as indicated in Figures 1 and 2. The results will then be interpreted and reported in a way that will give as much clarity as possible to the surveyed results enabling an informed decision on the nature of the archaeology. The specifications of the equipment and detailed methodology are outlined in Appendix 1.

4.1.3 The land for evaluation is mostly farmland. Access will be agreed with the landowner prior to access.

4.1.4 All geophysical survey work will adhere to guidance set out in English Heritage *Research and Professional Services Guideline No.1: Geophysical survey in archaeological field evaluation* (2008) and *Geophysical Data in Archaeology: A Guide to Good Practice* (Archaeology Data Service).

4.1.5 Available ploughed fields within the previously unsurveyed area to the south-east will be walked. The surveys will be committed to the standards and codes of conduct set out by the Institute of Field Archaeologists.

4.2 Setting out of survey grids

4.2.1 The survey grids will be set out using a Global Positioning Satellite receiver. Partial grids shall be avoided wherever possible. Survey pegs will be set out in field boundaries and where possible be left in place. All survey grids will be plotted onto the OS digital base map with National Grid co-ordinates to enable the accurate location of trial trenches over anomalies.

4.3 Specific Methodology: Geophysical survey

4.3.1 The equipment used for the Magnetic Susceptibility Survey will be an MS2 Magnetic Susceptibility meter manufactured by Bartington Instruments Ltd. A field coil known as an MS2D will be used to take field readings assessing the top 200mm or so of topsoil. To overcome the problem of ground contact all readings will be taken 4 – 5 times and an average taken. All obvious localised ‘spikes’ were ignored.

4.3.2 The magnetic survey will be carried out using a dual sensor Grad601-2 Magnetic Gradiometer manufactured by Bartington Instruments Ltd. The Grad601-2 consists of two high stability fluxgate gradiometers suspended on a single frame. Each sensor has a 1m separation between the sensing elements increasing the sensitivity to small changes in the Earth’s magnetic field.

4.3.3 The equipment will be zeroed and balanced at a ‘magnetically quiet’ location with the use of a non-magnetic tripod. The balancing point will be accurately laid out using a compass. The gradiometer will be switched on for a period of at least 30 minutes prior to balancing and placed outside to allow stabilisation of temperature. Metal objects and compasses will be removed to at least 50m from the balancing position. Balancing with the Grad601-2 is an automated process using electronic adjustments and is only required prior to the start of each survey session (usually 2 per day).

4.4 Specific Methodology: Fieldwalking

4.4.1 A programme of fieldwalking will be undertaken over all the available areas within the southeastern section where field conditions are conducive. The fieldwalking is to take place after the fields are ploughed, rolled and weathered for at least 3 weeks.

4.4.2 Pre-modern artefacts will be collected and bagged along 20m transects. The location of the finds will be plotted using hand held GPS loggers.

4.5 Sampling Interval

4.5.1 The magnetic susceptibility and fieldwalking surveys will be carried out on a 20m grid with readings for the MS being taken at the node points.

4.5.2 Magnetometry Readings will be taken at 0.25m centres along traverses 1m apart. This equates to 3600 sampling points in a full 30x30m grid.

4.6 Depth of scan and resolution

4.6.1 Magnetic Susceptibility - the MS2D coil assesses the average MS of the soil within a hemisphere of radius 200mm. This equates to a volume of some 0.016m³ and maximum depth of 200mm. As readings are only at 20m centres this results in a coarse resolution but adequate to pick up trends in MS variations.

4.6.2 Magnetometry - The Grad601-2 has a typical depth penetration of 0.5 – 1.0m. This would be increased in the presence of buried, strongly magnetic objects. The collection of data at 0.5m centres provides an appropriate methodology for balancing cost and time with resolution.

4.7 Data Capture

4.7.1 Magnetic Susceptibility and fieldwalking readings will be logged manually on site, and then transferred to the office where they will be entered into a computer and colour surfer plots produced.

4.7.2 Magnetometry Readings will be logged consecutively into the data logger which in turn is daily downloaded into a portable computer on site. At the end of each job, data will be transferred to the office for processing and presentation. An initial assessment of the data quality will be carried out by the survey team. After each survey session a site record sheet will be completed or updated as appropriate.

4.8 Processing of data

4.8.1 Magnetometry Processing is performed using specialist software (e.g. Geoplot 3). Details of the software used and processing techniques should be provided by the Geophysical Survey Contractor.

4.8.2 Pre-modern artefacts will be collected from the fieldwalking surveys. These will be washed marked and identified.

4.8.3 All survey results will be plotted at an appropriate scale on an OS digital base map.

4.9 Timetabling

4.9.1 It is proposed that the geophysical survey will be undertaken following the harvest of the crop in early August 2008. The fieldwalking will be undertaken following four weeks weathering in September 2008.

5. Liaison/Monitoring

5.1 Unlimited access to monitor the project will be available to the Leicestershire Planning Archaeologists Client and his representatives subject to the health and safety requirements of the site.

5.2 Internal monitoring procedures will be undertaken including visits to the site by the project manager. These will ensure that project targets are met and professional standards are maintained.

6. Report

6.1 A reports on the fieldwork will be provided following analysis of the surveys. It will be distributed to

- The client
- Leicestershire County Council, Planning Archaeologist
- Leicestershire County Council, (HER)

6.2 The reports will contain sufficient detail to enable the results of the evaluation to be interpreted without recourse to the site archive.

6.3 The reports will include the following

- Non-technical summary
- Introduction (Site location and description, archaeological background, nature and location of the survey)
- Method statement detailing methods and equipment used, results and conclusions.
- Summary of results and significance
- Appendices of specialist reports

6.4 The reports will contain an accurate site plan showing the surveyed areas, raw data and interpretation of the principal features revealed. The data will be presented in map form on the OS digital map base, on A3 sheets at an appropriate scale; usually no scale smaller than 1:1000 is used. Maps will be constructed using AutoCAD and contain north arrows, scale-bar, scale, title, figure number, key and date. Adjacent areas must also be included on the plan to allow the site to be accurately located as well as the grid co-ordinates used.

7 Health and Safety

7.1 ULAS is covered by and adheres to the University of Leicester Statement of Safety Policy and uses the ULAS Health and Safety Manual (revised 2007) with appropriate risks assessments for all archaeological work. A draft Health and Safety statement for this project is in the Appendix. The relevant Health and Safety Executive guidelines will be adhered to as appropriate.

8 Insurance

8.1 All ULAS work is covered by the University of Leicester's Public Liability and Professional Indemnity Insurance. The Public Liability Insurance is with St Pauls Travellers Policy No. UCPOP3651237 while the Professional Indemnity Insurance is with Lloyds Underwriters (50%) and Brit Insurances (50%) Policy No. FUNK3605.

9. Bibliography.

ADS	<i>Geophysical Data in Archaeology: A Guide to Good Practice</i> (Archaeology Data Service)
EH, 2008	<i>Geophysical survey in archaeological field evaluation</i> (English Heritage 2008)
Hunt, L., and Clay, P., 2008	<i>An Archaeological Desk-based Assessment for land at Minorca, Measham, Leicestershire (SK 350 114) ULAS report 2008-036</i>
IFA, 2006	<i>Code of Conduct</i>

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Appendix 1: Geophysics-Methodology and Equipment

A detailed magnetometer survey will be carried out along the line of the new road. This measures the changes in the magnetic field resulting from differing features in the soil. Although these are usually weak, changes as small as 0.2 nano Tesla(nT) in an overall field strength of 48,000nT can be accurately detected using an appropriate instrument.

The systematic mapping of these anomalies will allow an estimate of the types of material present beneath the surface. Strong magnetic anomalies will be generated by buried iron-based objects such as kilns or hearths. More subtle features such as pits and ditches may be visible if they contain more humic material which is normally rich in magnetic iron oxides compared to the subsoil. For example the cutting and subsequent silting or backfilling of a ditch may result in a larger volume of weakly magnetic material accumulating in the trench. A weak magnetic anomaly should therefore appear in plan along the line of the ditch.

Setting out of survey grids

The survey grids will be set out using a Global Positioning Satellite receiver. Partial grids shall be avoided wherever possible.

Equipment

The magnetic survey will be carried out using a dual sensor Grad601-2 Magnetic Gradiometer manufactured by Bartington Instruments Ltd. The Grad601-2 consists of two high stability fluxgate gradiometers suspended on a single frame. Each sensor has a 1m separation between the sensing elements increasing the sensitivity to small changes in the Earth’s magnetic field.

The equipment will be zeroed and balanced at a ‘magnetically quiet’ location with the use of a non-magnetic tripod. The balancing point will be accurately laid out using a compass. The gradiometer will be switched on for a period of at least 30 minutes prior to balancing and placed outside to allow stabilisation of temperature. Metal objects and compasses will be removed to at least 50m from the balancing position. Balancing with the Grad601-2 is an automated process using electronic adjustments and is only required prior to the start of each survey session (usually 2 per day).

Sampling Interval

Readings will be taken at 0.25m centres along traverses 1m apart. This equates to 3600 sampling points in a full 30x30m grid. Traverses would be surveyed in zig-zag mode.

Depth of scan and resolution

The Grad601-2 has a typical depth penetration of 0.5 – 1.0m. This would be increased in the presence of buried, strongly magnetic objects.

Data Capture

Readings are logged consecutively into the data logger which in turn is daily downloaded into a portable computer on site. At the end of each job, data is transferred to the office for processing and presentation. An initial assessment of the data quality will be carried out by the survey team. After each survey session a site record sheet will be completed or updated as appropriate.

Grid locations for the survey will be plotted onto the British Ordnance Survey Grid.

Processing of data

Processing is performed using the specialist software *Geoplot 3*. This can emphasise various aspects contained within the data but which are often not easily seen in the raw data. Basic processing of the magnetic data involves ‘flattening’ the background levels with respect to adjacent traverses and adjacent grids. ‘Despiking’ is also performed to remove the anomalies resulting from small iron objects often found on agricultural land. Once the basic processing has flattened the background it is then possible to carry out further processing which may include low pass filtering to reduce ‘noise’ in the data and hence emphasise the archaeological or man-made anomalies. A basic processing sequence for magnetic survey includes despiking

(useful for display and allows further processing functions to be carried out more effectively by removing extreme values), zero mean grid (sets the background mean for each grid to zero and is useful for removing grid edge discontinuities) and zero mean traverse (sets the background mean of each traverse within a grid to zero and is useful for removing striping effects).

The following schedule shows the basic processing carried out on all processed magnetometer data used in this report:

*Zero mean grid Threshold = 0.25 std.dev.
 Zero mean traverse Last mean square fit = off
 Despike X radius = 1 Y radius = 1
 Threshold = 3 std. Dev.
 Spike replacement = mean*

Presentation of data

The presentation of the data for each site involves the print out of the raw data both as grey scale and trace plots together with a grey scale plot of the processed data. Magnetic anomalies have been identified and plotted onto the ‘Abstraction and Interpretation of Anomalies’ drawing for the site.

FIGURES

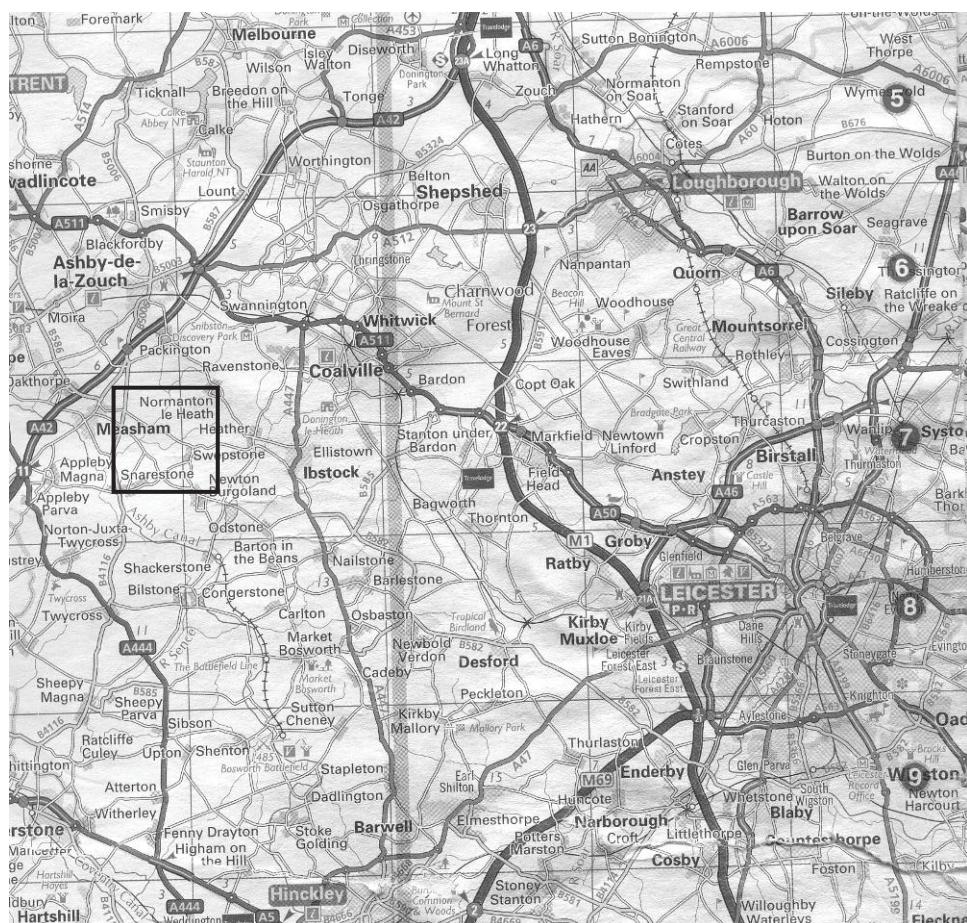


Figure 1 Location plan

