LADYBRIDGE FARM, NOSTERFIELD.

REVISED PLANNING APPLICATION
SUPPORTING ARCHAEOLOGICAL INFORMATION.

JUNE 2006

MGA

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Introduction

In February 2006 planning permission was refused for the extraction of sand and gravel at Ladybridge Farm, North Yorkshire by North Yorkshire County Council. The planning committee's decision was made primarily on the grounds that the proposed development would have an adverse impact on nationally important archaeological deposits (Mineral Plan Policy 4/8). An assessment of the archaeology on the site using the non statutory criteria set out on PPG16 concluded that these deposits were regionally important (MGA 2005). The archaeological investigations had established that the deposits in question were limited to an area in the southwest quarter of the Ladybridge farm, in an area of archaeological potential which was defined by a promontory of marginally higher ground.

Following the refusal of the planning application in February a revised extraction area has been defined in consultation between Tarmac, English Heritage and North Yorkshire County Council. The new extraction area has been revised to omit the area of archaeological potential and an additional buffer zone. This has removed all of the significant archaeological deposits from the area of proposed mineral extraction and it will form the basis of the revised planning application. This document serves to provide supporting archaeological information for a revised planning application for the extraction of mineral at Ladybridge Farm, North Yorkshire

Location and Land Use

Ladybridge Farm (NGR: SE 293 806 centred) is located 1.2Km to the east of the village of Nosterfield and 0.4km to the north of the village of Thornborough (Figure 1). The revised extraction area comprises a series of arable fields, still under cultivation to the north of the B6267 and east of Moor Lane which cover an area of 26.8ha and two fields of pasture to the west of Moor Lane which cover 4ha (Figure 2).

In the larger area to the east the revised extraction area is bounded on its northern side by Ings Goit and on its eastern side by a deep ditch. The boundary of the extraction area to the south and west are arbitrary and are not marked by a physical boundary.

The southern and western edges of the revised extraction have been drawn to ensure that the significant archaeological deposits on Ladybridge Farm are not affected by the mineral extraction. The limits of the revised extraction area have therefore been drawn to respect the area of *archaeological potential* that was defined during the Additional Investigation on the site (MGA 2005) along with the addition of a buffer zone.

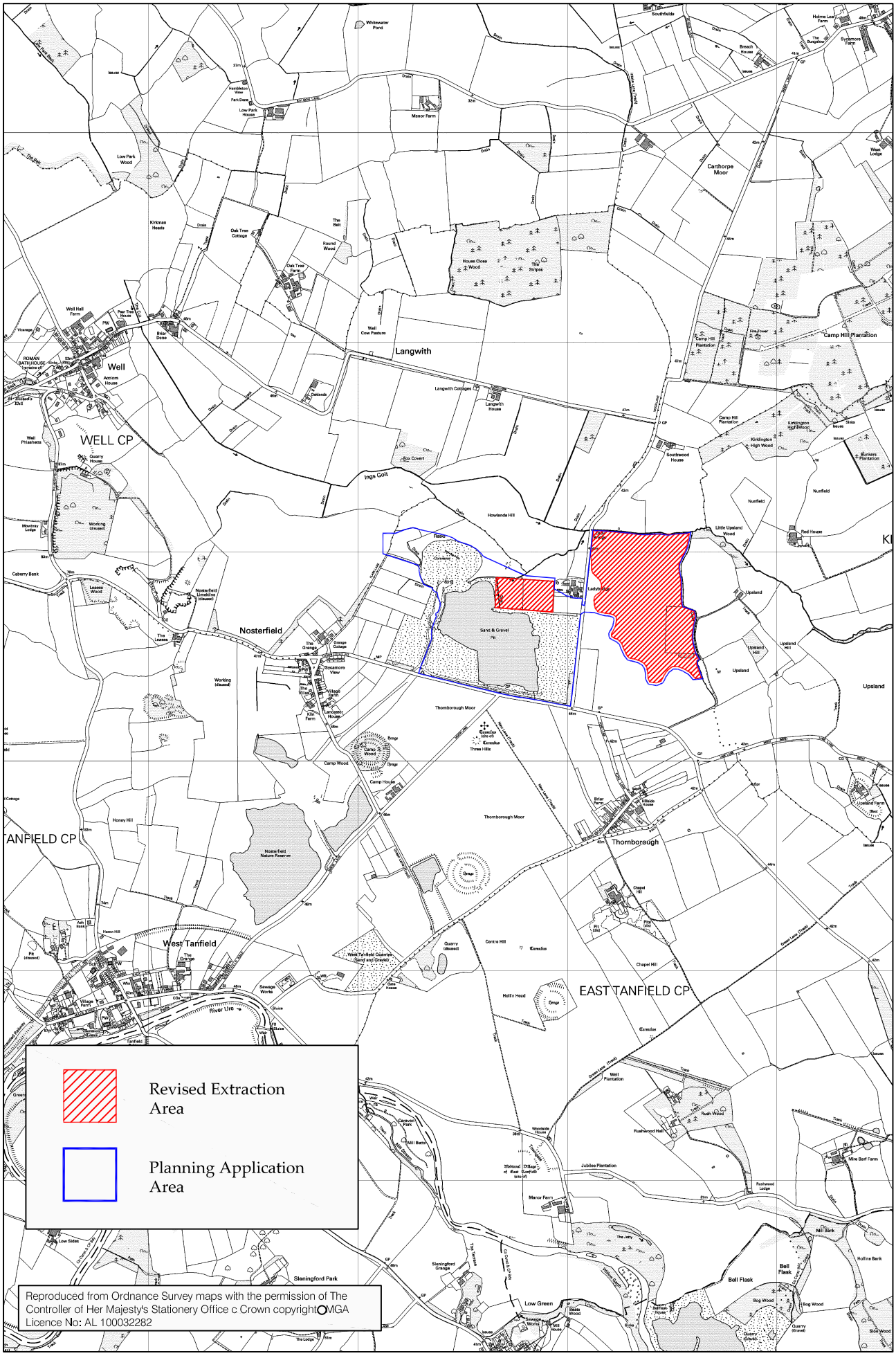

Figure 1 - Site Location Scale 1:25000

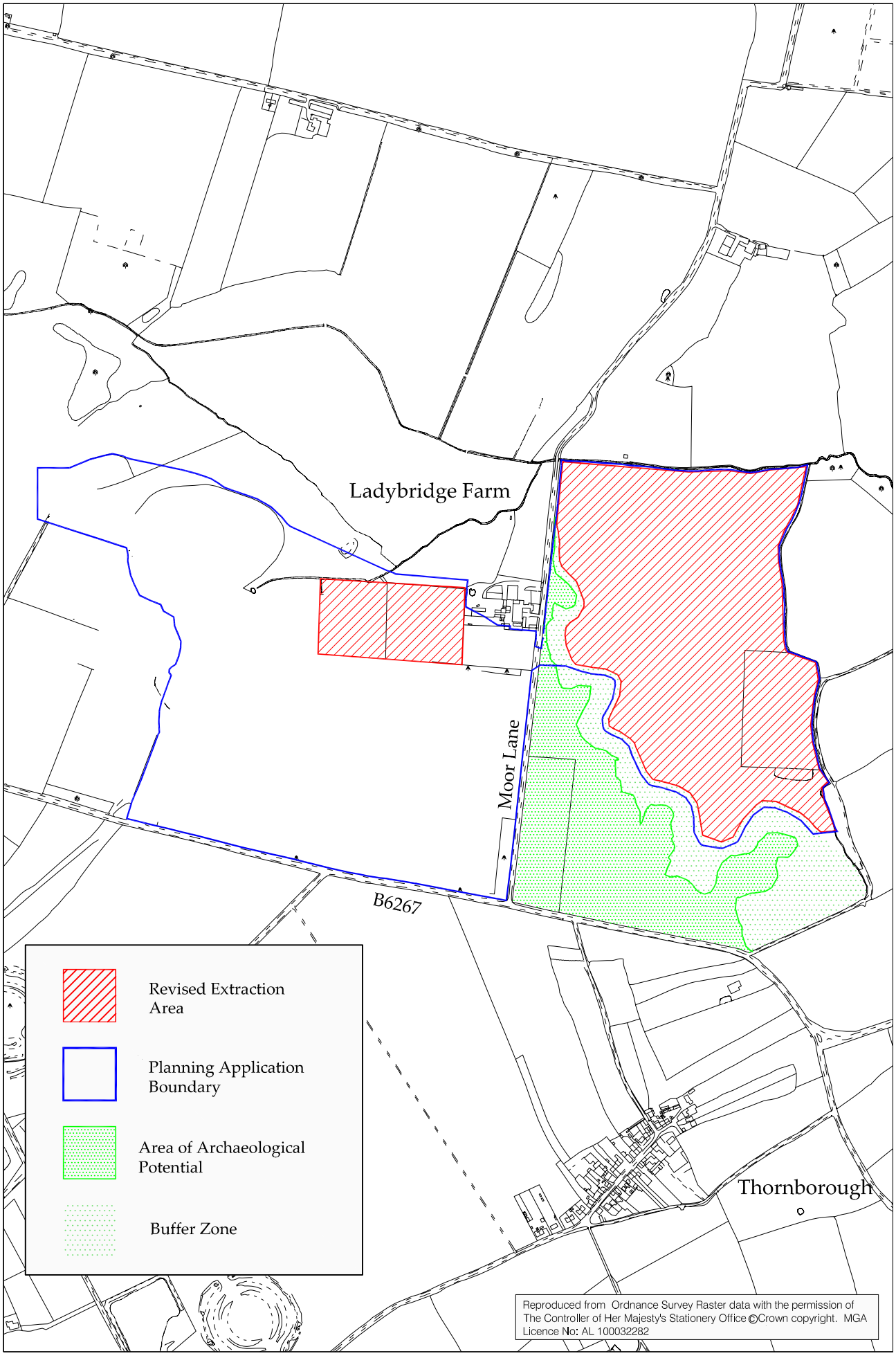

Figure 2 - Ladybridge Farm - revised extraction area, planning application boundary and area of archaeological potential

Scale 1:10000

Summary of Archaeology at Ladybridge Farm Site

Ladybridge Farm lies approximately 1km from the Thornborough Henges and related prehistoric monuments. Between 2003 and 2005 the site was subject to extensive evaluation and archaeological investigation. This work has, in the words of both NYCC and English Heritage successfully characterised the archaeology on the site.

Table of interventions and reports

Title	Unit/Author	Date	Description
Desk Based Assessment.	FAS	2003	Desk based assessment covering of extensive study area
Archaeological Evaluation. Ladybridge Farm, Nosterfield, North Yorkshire.	FAS	2003-2005	Report on the phased archaeological evaluation of Ladybridge Farm - total collection fieldwalking, geophysical survey, topographic survey, auger survey, test pits and 2% trial trenching
Nosterfield Quarry, Interim Report	FAS	2005	Summary on archaeology recorded during the archaeological investigation on the current quarry at Nosterfield
An Archaeological Assessment of Nosterfield, Ladybridge and The Thornborough Plain.	MGA	2005	Assessment of the archaeology at Ladybridge Farm in relation to the archaeology and monuments of the Thornborough area
Ladybridge Farm, Nosterfield. Report on an Archaeological Investigation	OSA/MGA	2005	Report on the results of an additional 4% trench investigation and the assessment of the importance of the archaeological deposits on the Ladybridge Farm Site

As the archaeology on the site has been sufficiently characterised further archaeological investigation has not been necessary for this revised application. It is not the purpose of this report to reproduce all the existing information. All the archaeological reports are in the public domain and copies are held at the Heritage Unit at North Yorkshire County Council. In addition all the documents are freely available online and can be accessed and downloaded at;

http://www.archaeologicalplanningconsultancy.co.uk/mga/projects/noster/pages/ladydocs.html

The following section presents a summary of the results.

The archaeology of Ladybridge Farm

The archaeological evaluation at Ladybridge Farm (Figure 3) succeeded in characterising the extent and nature of archaeological deposits on the site. The evaluation was undertaken in the context of knowledge derived from the archaeological investigation of 56ha at Nosterfield Quarry and by research of the wider area undertaken by Newcastle University.

In total 6% (2.515ha) of the Ladybridge Farm site has been physically sampled by two phases archaeological evaluation and additional investigation (MGA 2005). This followed a phased scheme of non intrusive investigation, which included total collection fieldwalking,

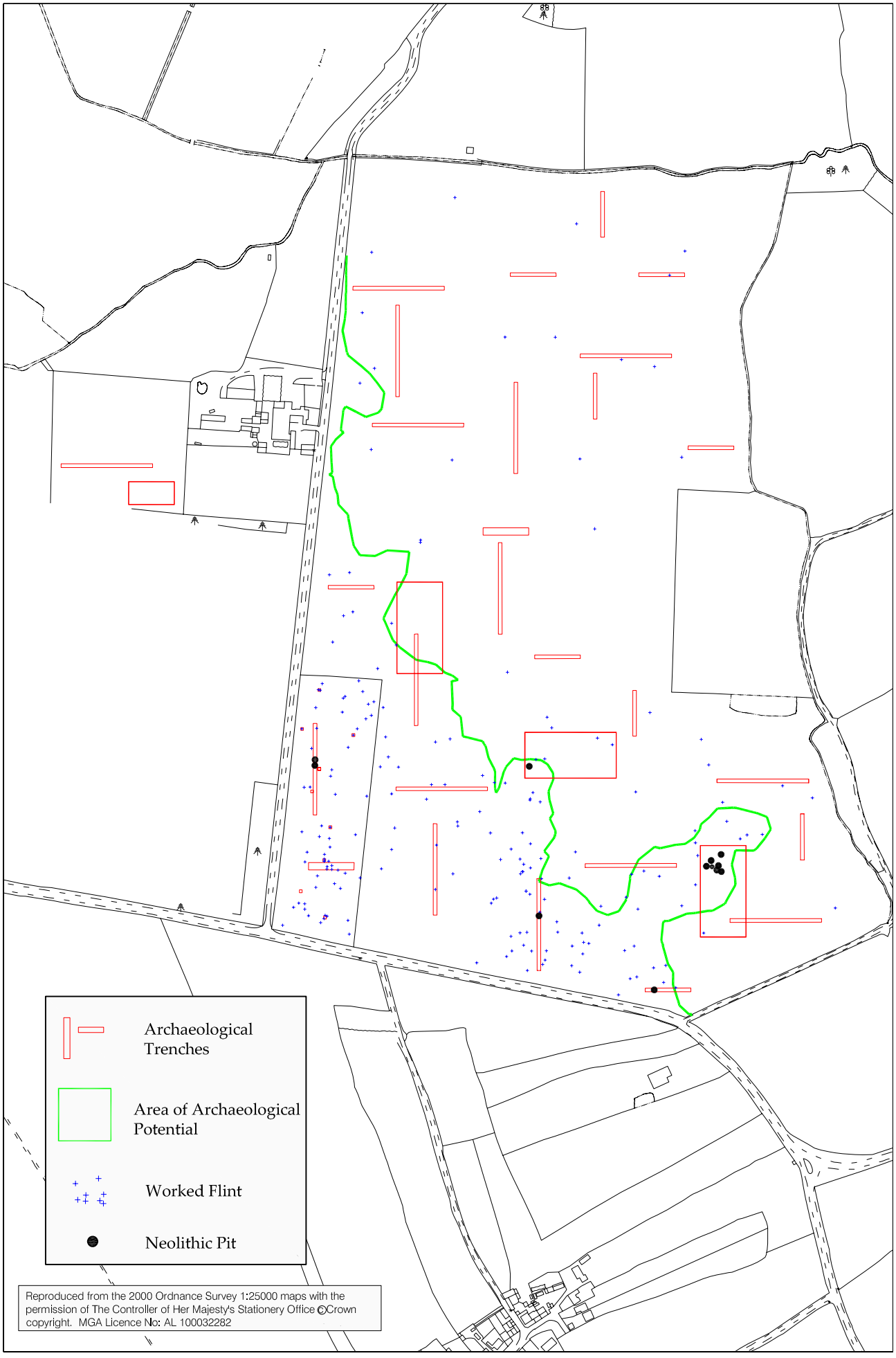

Figure 3 - Ladybridge Farm- archaeological investigations Not to scale

topographic survey and geophysical survey in addition to a series of sieved test pits and an augur survey (FAS 2005). The results of this work combined with the continuing investigation of Nosterfield Quarry has allowed a definitive model of past land use and activity to be produced.

The evaluation identified and recorded a thin scatter of archaeological remains dating to the early prehistoric period which were located in the southwestern quarter of the Ladybridge Farm site. These were first defined by a scatter of lithics recovered during the total coverage fieldwalking. Subsequent phases of trenching in this area recorded the presence of a small number of heavily truncated pits and scoops which contained fragments of Neolithic pottery and flint. These pits were extensively sampled and with the exception of a very small assemblage of charcoal flecks and rare grains of charred cereal in three pits their contents were found to be sterile. In total, twelve Neolithic pits have been recorded on Ladybridge Farm in this area. Of these one contained Grimston Ware pottery, nine contained Grooved Ware and two contained other fabrics

The pits identified in the latest phase of work at Ladybridge Farm appeared to form a loose cluster of features lacking any spatial integrity which could identify their purpose of form. It is estimated that as much as 60% of each the pits may have been lost through plough truncation, a process which recent experiments have shown is still continuing today (Dickson et al. 2005, Hopkins and Timms 2006). The agricultural activity on the site will already have destroyed any shallower features (hearths, floors, occupation deposits), if ever present, and will have removed any important contextual information in which the features could be understood.

Following the additional work three samples of charred material from features containing Neolithic pottery were sent for radiocarbon dating. Doubts remain over the provenance of the material due to the high level of disturbance and bioturbation in the pits fills. The results of the radio carbon dating are given in Appendix 1. Whilst two of the dates superficially concur with the expected date range of the pottery the third appears to be much later. The reliability of all three must therefore be brought into question until a complimentary method can be used to establish which, if any, are correct. Currently the issue of lipid analysis/dating of pottery concretions is being considered to act as a control.

If the dates are correct then they would have two main implications. Firstly they would indicate that the features within the apparent cluster are in fact not contemporary but separated by several hundred years. Secondly, the date of the Grooved Ware pottery at Ladybridge is much later than that recorded at Marton le Moor some (12Km away).

Consequently, aside from a general date little can be said with certainty to the function or context of these features except that they appear to be related to human activity on marginally higher ground on the site during the Neolithic period.

In contrast, the central and northeastern portion of Ladybridge Farm was characterised by a series of natural features and peat deposits that were indicative of a previously wet

environment. The natural features comprised tree boles sometimes filled with peat or characterised by a dark mineralised shoulder, sink holes or gley filled depressions and scoops. The fag ends of peat indicating that at one time the whole area was originally covered with a blanket of the material which has since been exploited or ploughed out (Carter 2005). Similar conditions have been recorded on Nosterfield Quarry to the west where deposits relating to an extensive marsh or bog have also been identified and excavated as part of the ongoing investigation.

What is clear from the results from Nosterfield Quarry and Ladybridge Farm is that these areas would have been unsuitable for occupation, settlement or burial during the prehistoric period. Indeed it is not until the post medieval period that the land was drained and made suitable for cultivation.

Topographically the transition between these zones of formerly dry and wet land on Ladybridge Farm was determined to lie at or around the 41.5m contour. Projecting this information a model of past land use for the site was developed (Figure 4).

From Figure 4 it can be seen that the western edge of Ladybridge farm comprises the eastern edge of promontory of marginally higher ground which extends northwards from the main gravel terrace of Thornborough Moor into an area of what would have been extensive peat and bog. The environmental evidence suggests that the margins of the wet area would have been heavily wooded with Alder and scrub (Long pers com). The drier area appears to have been the location of scattered and intermittent clusters of early prehistoric archaeology both on Ladybridge Farm and Nosterfield Quarry. It should be noted that the distribution and density of the archaeology in this area is not uniform and appears to disappear a third of the way along the promontory. Whilst the northern extent of these pits is limited by a natural boundary their southern extent is not known.

It has been stated elsewhere (Harding 2004) that the early prehistoric activity on the Ladybridge site is a reflection of a wider zonation of the landscape associated with the major monuments on Thornborough Moor. There is, however, little reliable evidence to support this. Until outstanding questions relating to the distribution and collection of lithics in the wider area can be satisfactorily answered and a comprehensive assessment of the below ground archaeology undertaken on Thornborough Moor this interpretation must be approached with caution. Indeed there is an urgent need to establish what impact current and past agricultural land use has had on patterning in the archaeological resource and how this has affected the interpenetration of landscape.

What is clear, however, is that extensive areas to the north of Thornborough Moor comprised tracts of wet, bog and marsh which would have been unsuitable for habitation, burial and settlement until recent times. The revised area of mineral extraction is located in one such area.

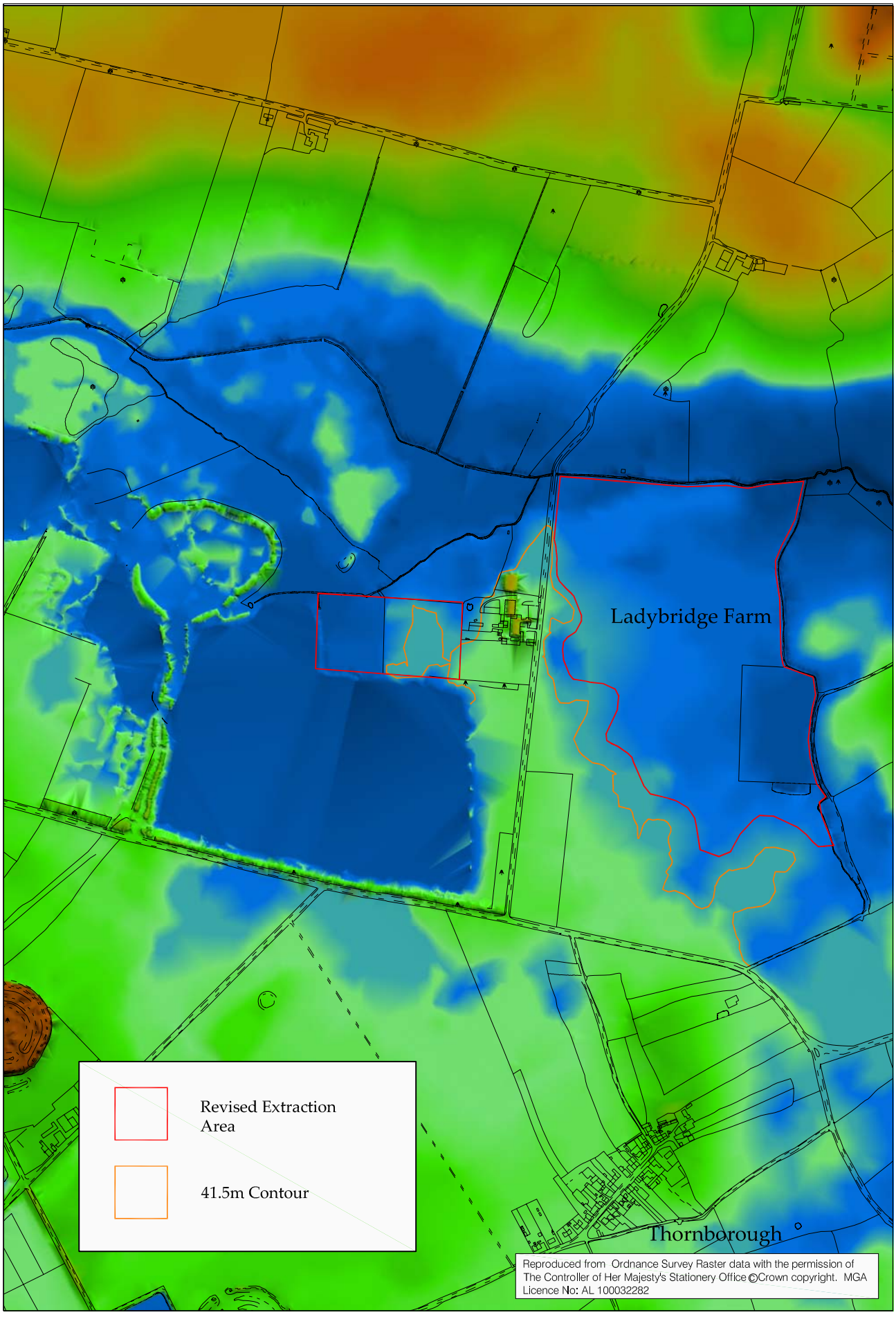

Figure 4 - Ladybridge Farm - topographic model Scale 1:10000

The archaeology of the Revised Application area

The eastern part of the revised extraction area measures 720m by 460m and covers 26.8ha. As part of the evaluation this area has been subject to total collection fieldwalking, geophysical survey, test pit excavation and auger survey. The results are included in the evaluation reports (FAS 2005) and a summary is presented below.

Cropmarks

A series of cropmarks were identified within the revised application area. Although targeted in both the geophysical survey and evaluation trenching none were identified as surviving archaeological features.

Ridge and furrow

Both the northern fields are shown in the most recent AP transcription as containing ridge and furrow earthworks. There was no evidence for these as either extant earthworks or cut features on the site indicating that they had been completely ploughed away within the last 50 years. The levelling of these features and complete eradication of the furrows as cut features would suggest that subsoil deposits have been truncated by at least 0.4m across this area.

The NMR (WYAS 2005) plot also recorded the location of the eastern side of a possible enclosure. This measured 135m long and 90m wide. Subsequent targeted evaluation on Ladybridge Farm failed to identify the cropmark as a cut archaeological feature. Its alignment and shape suggest that it may be associated with previous drainage on the site.

The Desk Based Assessment (FAS 2003) identified a series of linear and curvilinear cropmarks. These features included a series of three, concentric, sub-oval features to the west of Ladybridge Farm which were considered to be geological in origin. A large curvilinear cropmark in the northwestern corner of the main area of investigation, and a further curvilinear feature in the northern part of the area in addition to very ephemeral circular and curvilinear features located in the centre of the site. Prior to the trenching it was considered that these features may be archaeological in origin. Subsequent investigation failed to identify any as cut archaeological features indicating that they were a result of geological variation and land drainage.

Geophysical survey

The geophysical survey that was undertaken in the revised application area identified a number of anomalies across the area. None however proved to be archaeological in origin when tested by excavation.

Fieldwalking

With the exception of the small field on the eastern side of the site the entire area was subject to total coverage fieldwalking (Figure 5). In total twenty three pieces of struck flint were

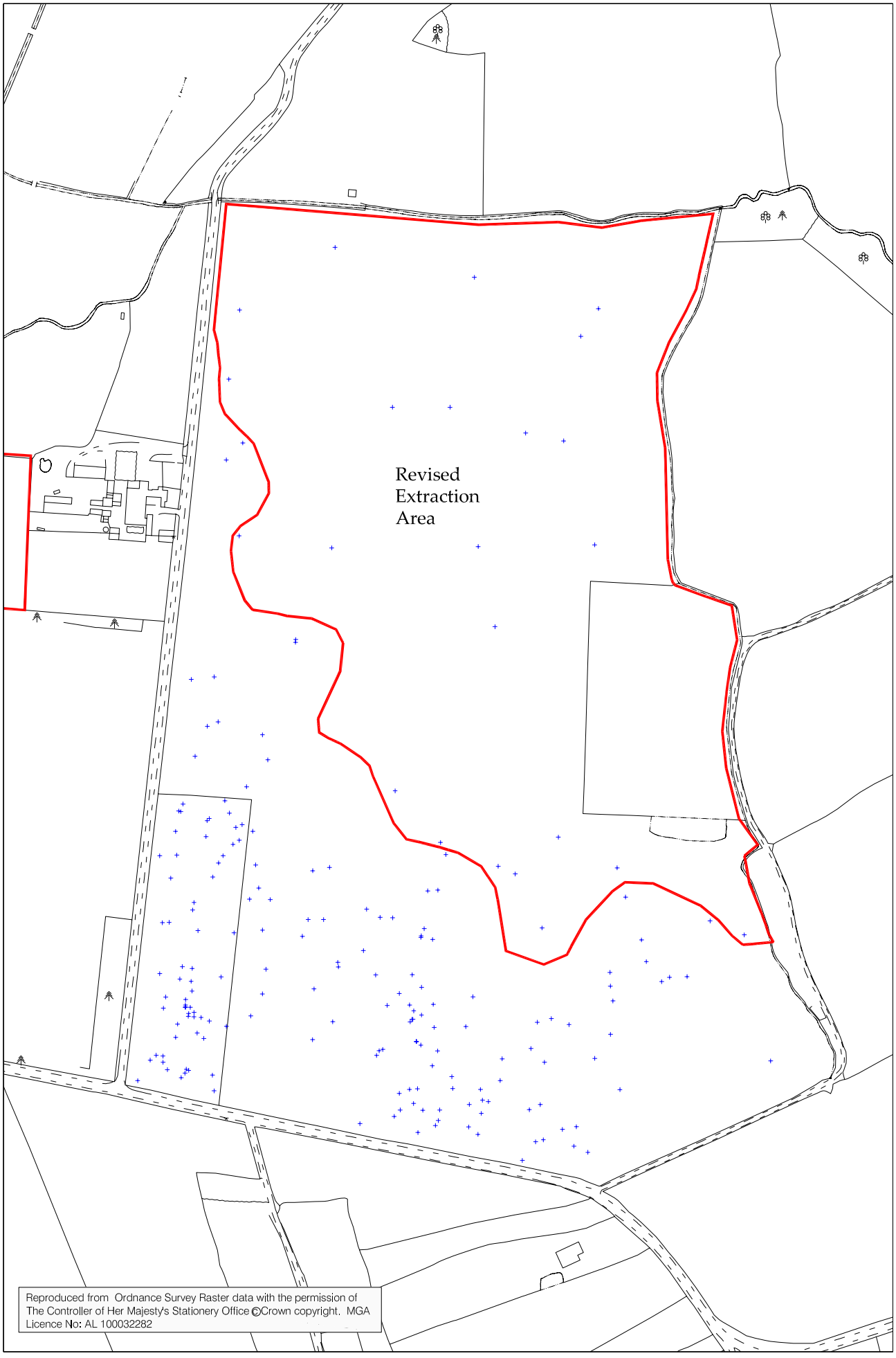

Figure 5 - Ladybridge Farm - distribution of worked flint (blue) Scale 1:5000

recovered from an area of 23.43ha. The concentration (0.98 lithics per ha) and distribution of the material is not meaningful in the context of the intensive agricultural use of the site and can been seen as nothing more than background noise. Eight pieces were recovered along the southern margin of the revised extraction area. Recent experimental work on the site has shown that subsoil deposits are still being disturbed by ploughing and material within the ploughsoil can be moved as much as 7m in a single ploughing episode.

Trenching

Within the main part of the revised extraction area a total of 15 trenches covering 0.46ha have been excavated (Figure 6). These are summarised in Table 2. A total of 25 features were recorded these are summarised in Table 3.

Table 2

Intervention	Length (m)	Width (m)
8	50	4
13	100	4
28	50	4
29	100	4
30	50	4
32	100	4
33	100	4
34	100	4
35	100	4
36	50	4
37	50	4
38	100	4
39	50	4
40	50	4
41	50	4

Of the 25 features recorded within the evaluation only ten were man made. These comprised a series of land drains, a historic field boundary, a modern dog burial and an undated post hole (F32). The remaining features comprised a series of sink holes, tree boles and natural channels and depressions. Three features proved to be less than 0.1m deep and may have been nothing more than shallow depressions in the subsoil. Four features which had provisionally interpreted as pits/scoops within the original evaluation have been reinterpreted on the basis of further information from the additional investigation. These features (F31, F35, F36 and F40) appear to be the result of tree boles/root disturbance and share the

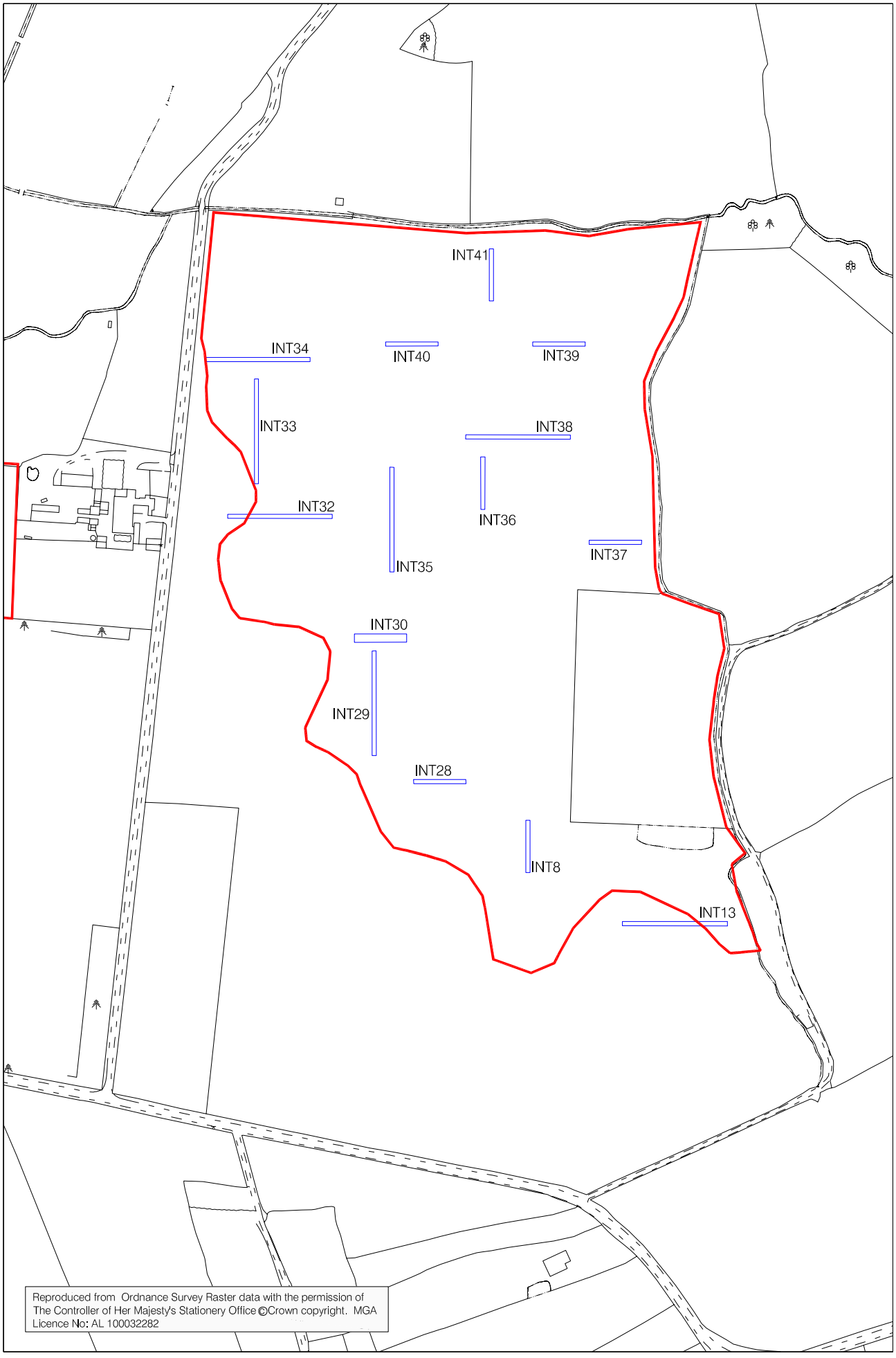

Figure 6 - Revised extraction area and archaeological interventions Scale 1:5000

characteristics of features identified and recorded as such in Trenches A, B and C in the additional investigation and on Nosterfield Quarry (Plates 1 and 2).

Table 3

Int	Feature	Identity	Dimensions (m)	Profile	Origin
8	4	natural feature	3.0 x 1.0 x 0.35	u-shaped	Natural
29	34	gully	3.93 x 0.7 x 0.29	u-shaped	post med
33	39	grave	0.68 x 1.10 x 0.13	u-shaped	mod/post med
33	41	gully	4.05 x 0.65 x 0.24	u-shaped	mod/post med
34	48	furrow	2.00 x 1.00 x 0.14	u-shaped	mod/post med
36	43	field drain	10.35 x 0.44	not seen	mod/post med
36	44	field drain	27.98 x 0.45	not seen	mod/post med
36	45	ditch	4.15 x 4.07 x 0.59	u-shaped	mod/post med
37	54	field drain	31.02 x 0.52	not seen	mod/post med
38	55	field drain	4.14 x 0.57	not seen	mod/post med
29	21	sink hole	3.00 x 2.00 x 1.20	not seen	Natural
29	35	tree bole	0.70 x 0.35 x 0.10	u-shaped	Natural
29	36	pit	0.90 x 0.60 x 0.21	u-shaped	Natural
30	31	pit	1.21 x 0.60 x 0.27	u-shaped	Natural
33	40	pit	2.14 x 0.68 x 0.16	u-shaped	Natural
33	47	channel	9.00 x 3.9 x 0.30	scoop	Natural
36	37	scoop	2.00 x 2.50 x 0.10	scoop	Natural
36	38	pit	0.77 x 1.82 x 0.43	u-shaped	Natural – sink hole
36	46	channel	6.89 x 4.18 x 0.43	u-shaped	Natural
37	42	scoop	1.00 x 0.45 x 0.08	scoop	Natural
28	32	posthole	0.25 x 0.60 x 0.16	not seen	undated
34	50	pit	1.40 x 1.44 x 0.19	u-shaped	Natural
38	49	pit	0.30 x 0.25 x 0.07	u-shaped	undated
39	52	scoop	0.22 x 0.18 x 0.09	u-shaped	Natural
40	51	scoop	0.33 x 0.31 x 0.03	scoop	Natural

Plate 1
Ladybridge Farm, F36, natural feature

Plate 2
Nosterfield Quarry, F378, natural feature

The western part of the revised application are comprises two fields and covers 275m by 145m. The western most field is characterised by a sharp drop in levels which marks the edge of a former post glacial lake.

The topographical model produced for the site identified a small area measuring 115m x 75m in the field to the west of Ladybridge Farm which lies above the 41.5m contour. This small area is connected to the main area of archaeological potential by a narrow bridge of high ground only 4m across. The area in effect represents a small island of higher ground within the bog. Previous work undertaken during the evaluation (Intervention 42) and the additional investigation (Trench D) sampled 9% of this higher area and recorded no archaeological features or deposits of any date. This area also lies to the north of Area 3 of Nosterfield Quarry. The nearest features of prehistoric date had petered out approximately 120m to the southeast of this area. Whilst above the 41.5m contour, its isolated position and the results from the fieldwork undertaken to date indicate that it is unlikely to contain archaeological deposits. The excavation of similar landforms on Nosterfield Quarry above the 41.5m contour did not contain any archaeological deposits.

Summary of revised area

In summary, the revised area of mineral extraction is characterised by an area of marginally low lying land which would have been wet, boggy and unsuitable for occupation, settlement or burial until the post medieval period. This model of the site is supported from the archaeological and environmental evidence from Ladybridge Farm and Nosterfield Quarry

and has, in principle, been accepted both by English Heritage and North Yorkshire County Council.

Significances and Potential

On the basis of the evaluation and accepted characterisation of Ladybridge Farm it is highly unlikely that early prehistoric archaeological remains will be present in the area of mineral extraction. It is anticipated that the area will contain features of a natural origin and those archaeological features associated with the post medieval drainage, division and cultivation of the land.

The natural features will comprise tree boles, root disturbance, sink holes and geological depressions filled with naturally derived material. The potential of these deposits to add greatly to our knowledge is severely limited. The extent of the wet area has already been modelled and its edges lie outside the boundaries of the extraction area.

Where peat exists on the site it has been severely truncated by ploughing and degraded by drainage. On Nosterfield Quarry the upper horizon of surviving peat in The Flasks, an area which has not been subjective to intensive cultivation, has been sampled and dated to circa7500 BC. Even in these well preserved deposits there is no surviving information for later periods. On Ladybridge Farm, the majority of the site has been subject to arable cultivation for the last fifty years and peat only survives at two locations within the revised extraction area. These deposits are likely to have suffered the same effects from drainage etc..

Sink holes are formed when underlying deposits of gypsum are dissolved by groundwater and collapse to create a shaft or fissure. This effectively causes surfaces deposits to drop into the hole. In the wet conditions on Nosterfield Quarry conditions within the sink holes have been suitable for the formation of peat. The peat which forms in these features is often protected from the effects of later truncation and drainage and acts as a pollen trap, recording the vegetational history of the immediate area, in some cases for thousands of years.

The value of the sink holes to answer questions relating to the history of the site and the wider area will be limited by their size, date and location. It is clear from the archaeological and environmental indicators already present that much of the site was a marsh throughout prehistory. The study of pollen which was recovered from sink holes in the centre of this would only confirm what is already known about the extent and nature of the bog. Sink holes that were located on the periphery of the marsh would be far more likely to capture pollen derived from changes in vegetation cover on the drier land, the subject of human activity from the Mesolithic onwards.

The position of the revised extraction area to avoid the drier areas, however, will significantly affect the potential of any sink holes discovered during the work to answer questions relating to the human exploitation of the drier areas.

Sink holes located within 60m of the southern and western boundary of the extraction area will have the most potential to capture pollen from vegetation on the higher ground. Beyond

that to the north and east the ability of sink holes to capture meaningful data for the wider area must be questioned.

Later features on the site will comprise the plough truncated remains of historic field boundaries and agricultural features of a late date. Many of the field boundaries are recorded on the 1st edition Ordnance Survey map and were only removed in the late 20th century. The significance of these deposits does not merit their preservation in situ.

The Development Proposal

Main Area of Extraction

Should planning permission be granted, the area defined in Figure 7 will be subject to mineral extraction. By virtue of this operation any archaeological deposits within the area will be destroyed.

In the revised planning application the limits of the extraction area has been devised with English Heritage and North Yorkshire County Council to omit the area of Ladybridge Farm which contains significant archaeological deposits. The revised extraction area is separated from this area by a buffer zone of between 30m and 90m wide. It is envisaged that there will, therefore, be no impact on the significant early prehistoric archaeology at Ladybridge Farm.

This having been stated, the applicant does not concede that the significant deposits referred to above are nationally important and stands by the assessment of the deposits that was made in the previous application.

On the western side of Ladybridge Farm an area of 0.9ha in one field has been identified as lying above the 41.5m contour. Its isolated position and peripheral nature indicates that it is highly unlikely to contain early prehistoric archaeological deposits. The mitigation for this area is discussed below.

The evaluation has shown that the revised extraction area will contain natural features such as sink holes and tree boles in addition to features relating to post medieval land use. In mitigation it is proposed that these are preserved by record as part of an archaeological investigation. The details of this investigation are presented below.

Mitigation Measures

It has been suggested that rather than there being a definitive edge to the early prehistoric activity on the site, there may be a transitional zone where the archaeology fades out. In order to mitigate against this a buffer zone around the 41.5m contour has been excluded from the area of mineral extraction. In addition to this an enhanced level of archaeological investigation has been proposed for the western half of the revised extraction area. The extent of this is shown in Figure 7. The area to the north and east of this will be approached with a standard strip, map and sample investigation. A summary of the main points is presented below. A full account of the mitigation strategy is included as Appendix B.

Enhanced Archaeological Investigation

An enhanced level of archaeological investigation will be employed in the western zone of the revised extraction area (14.65ha) and will include the field to the west of Ladybridge Farm (2.17ha).

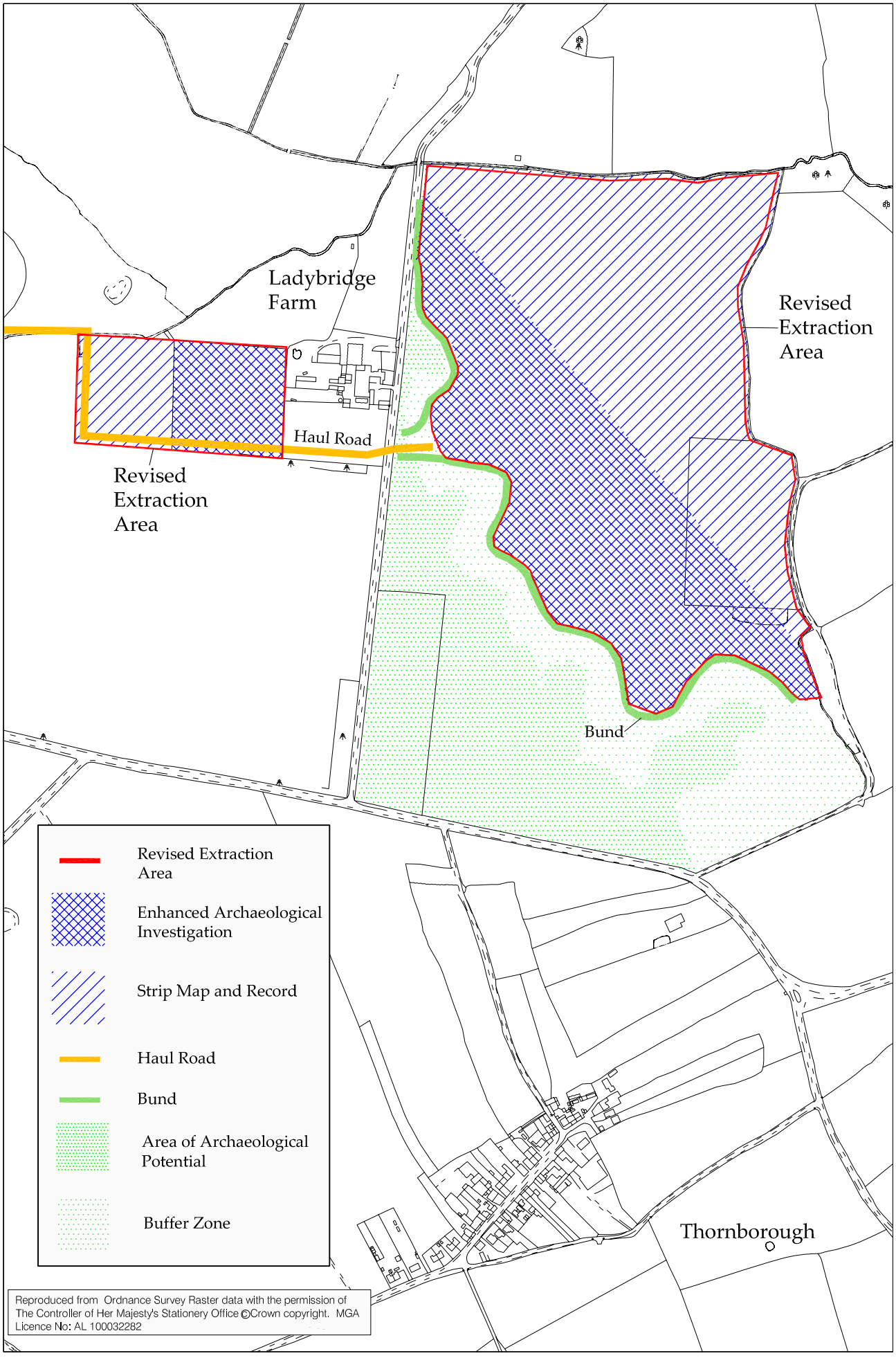

Figure 7 -Ladybridge Farm - revised extraction mitigation areas not to scale

Prior to mineral extraction these areas there will be:

- Subject to total coverage fieldwalking (where possible)
- Topsoil stripped as an archaeological investigation.
- Exposed soil features will be cleaned by hand
- All soil features will be planned pre-excavation

Further investigation would then be carried out in accordance with a comprehensive sampling strategy. This will basically involve the hand excavation of soil features to the following standards:

- Linear features Field boundaries/land divisions - 20% by length, recorded sections to include all terminals, intersections and other relationships.
- Structural components -100% excavation, recorded sections to include all terminals, intersections and other relationships.
- Discrete features - Pits 100% excavation. Running sections to be employed where appropriate to ensure placed deposits are identified.
- Post-holes - 100% by number, recorded in half section.
- Horizontal deposits Layers/spreads/ stratified deposits - 100% excavation, recorded in running sections, half sections or on a grid system and excavated in spits, as appropriate.
- Tree throws -100% mapped with 20% excavated and recorded in half section.
- Swallow Holes – 100% excavated by number, recorded in half section.

Where appropriate sink holes will be assessed for further sampling and analysis.

Each area will be signed off prior to being handed over to the quarry for extraction.

Strip Map and Sample

For the area to the north of the hatched zone (13.8ha), up to the northern limit of extraction, archaeological deposits would be dealt with in a strip, map record and sample exercise undertaken during the works. All topsoil stripping will be undertaken with a toothless bucket and monitored by an attendant archaeologist. Archaeological deposits exposed during this operation would be cleaned by hand, recorded in plan and sample excavated to the following standards.

- Linear features Field boundaries/land divisions - 10% by length, recorded sections to include all terminals, intersections and other relationships.
- Structural components -100% excavation, recorded sections to include all terminals, intersections and other relationships.
- Discrete archaeological features – 100% by number, 50% excavation.
- Post-holes - 100% by number, recorded in half section.

- Horizontal deposits Layers/spreads/ stratified deposits - 100% excavation, recorded in running sections, half sections or on a grid system and excavated in spits, as appropriate.
- Tree throws -100% mapped with 10% excavated and recorded in half section.
- Swallow Holes – 100% mapped 10% excavated by number, recorded in half section.

In addition to the mineral extraction three other areas of possible impact have been identified:

Haul road

It is proposed that gravel from the extraction area will be transported to the existing plant at Nosterfield Quarry by lorry. This will require the construction of a new haul road the location of which is shown in Figure 7. The road will be between 8m and 10m wide and will be formed by stripping off overlying deposits onto natural gravel. The construction of the road and ensuing traffic will have an adverse affect on any deposits if present along its route.

The haul road is the only element of the revised proposal which will have a possible impact on deposits lying outside the area of extraction. It will leave through the western edge of the proposal area and cross Moor Lane. On the western side of Moor Lane the haul road will run to the south of Ladybridge Farm before turning north and then west into the plant.

In order to minimise any potential impact the haul road will follow the shortest possible route across these areas unless it is diverted to avoid archaeological deposits.

Between the main extraction area and Moor Lane the road will have to cross 35m of the buffer zone and 35m of the area of archaeological potential. On the western side of Moor Lane the haul road will run the full width of the field to the south of Ladybridge Farm, some 135m, before crossing through to the area of extraction on the western side.

Although the haul road will traverse the area of archaeological potential the results of the archaeological investigations on Nosterfield Quarry and Ladybridge Farm suggest that the early prehistoric deposit on the site fade out between 120m and 150m to the south of this area.

It is proposed that prior to mineral extraction, a sufficient area will be stripped along the line of the haul road under archaeological direction to ensure that a lorry route can determined which will have no impact on any potential early prehistoric features. Following stripping the soil features area will be cleaned and recorded as part of an archaeological investigation. Where likely prehistoric features are identified they will fenced off and omitted from the line of the road.

In the unlikely event that a route for the haul road cannot be found which does not impact on early prehistoric archaeological deposits then it is proposed that the route with the least impact is chosen. Any features which would affected by the construction of the haul road would be preserved by record as part of the enhanced archaeological investigation.

Where natural features or features of a later date are identified along the line of the haul road these will be preserved by record as above.

Bund

The construction of bunds along the periphery of the construction area would normally involve the stripping of topsoil at these locations. This activity and subsequent traffic movement could have an adverse affect on archaeological deposits if present in this area.

As part of this revised application it is proposed to construct a temporary bund along the southern edge of the extraction area. The purpose of the bund will to minimise the visual impact of the quarry workings from the south and reduce noise levels. This bund will be constructed on existing topsoil and will not involve topsoil stripping. This will negate any impact on archaeological deposits if present. Where necessary an appropriate membrane will put placed to separate soils in accordance with the relevant MAFF regulations.

Whilst the bund will be immediately outside the area of mineral extraction it will be located within the buffer zone and outside the area of archaeological potential defined by the 41.5m contour.

Planting

The current application does not propose any scheme of planting within the buffer zone or area of archaeological potential. There therefore will be no impact from the activity.

Setting

An assessment of the impact of the development proposal on the setting of the scheduled ancient monuments and listed buildings in the immediate area was undertaken as part of the original application for mineral extraction at Ladybridge Farm (MGA 2005). This exercise concluded that the original scheme would not have a significant impact on the setting of the monuments. A series of views were identified using LSS software to and from the monuments and site. These were then tested in the field.

The issue of setting was not raised by the Heritage Unit at North Yorkshire County Council in their recommendations to the committee.

In the original scheme the most significant view to the monuments was from the southwest corner of the extraction area. This area has now been removed from the development proposal and there is now no point within the extraction area from which a line of sight to the monuments can be made.

Only a very small portion of the revised area is visible from the highest point of the central henge. The majority of the site is blocked from view by existing topography, tree and hedge lines.

The revised extraction area is smaller and further away from the scheduled monuments than that of the original planning application. Furthermore the area to be removed by extraction is that of predominantly lower topography and follows the margins of what in the past would

have been a marsh. On this basis there will be a negligible impact on the setting of the scheduled ancient monuments on Thornborough Moor, even less than the previous scheme.

Due to the fact that the revised scheme will follow the edge of the natural contours the restoration of the site will accentuate the original extent of what was previously drier land in the area.

The construction of a temporary bund, 2.0 to 3m high along the southern and western edges of the extraction area will mitigate the impact of the quarry workings during the extraction process during which time there will be no view into the site from any of the scheduled monuments. The bund will screen machine and traffic movement from viewpoints to the south in addition to reducing the noise levels from the quarry. Following mineral extraction on the site the bund will be removed and site restored.

The revised application will therefore not have a significant impact on the setting of the Thornborough Henges or other scheduled monuments and listed buildings in the area.

OFF SITE MEASURES

In addition to the on site measures proposed for the development the applicant also proposes the following;

The applicant will use its best endeavours to facilitate discussions relating to protecting the archaeological resource from current damage by ploughing.

Conclusion

In consultation with English Heritage and NYCC a revised planning application for Ladybridge Farm has been devised which will omit any significant deposits from the extraction area. The new extraction area covers a part of the site which would have been predominantly bog or marsh until the post medieval period and, as such would have been unsuitable for settlement, occupation or burial throughout the Neolithic. Measures have been put in place to preserve by record any archaeological and significant natural features which are present on the site or which would be affected by the development.

References

Copp, A & Toop, N. 2005. Nosterfield Quarry, Interim Report. (FAS)

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Harding, J. and Johnson, B. 2004. 'Fieldwalking at the Thornborough monument complex, North Yorkshire' (unpublished report, University of Newcastle, February 2004)

Roe, A. 2003. Draft Desk Based Assessment. (FAS)

Timms, S. & Dickson, A. 2005. Ladybridge Farm, Nosterfield. Report on an Archaeological Investigation. (MG&A)

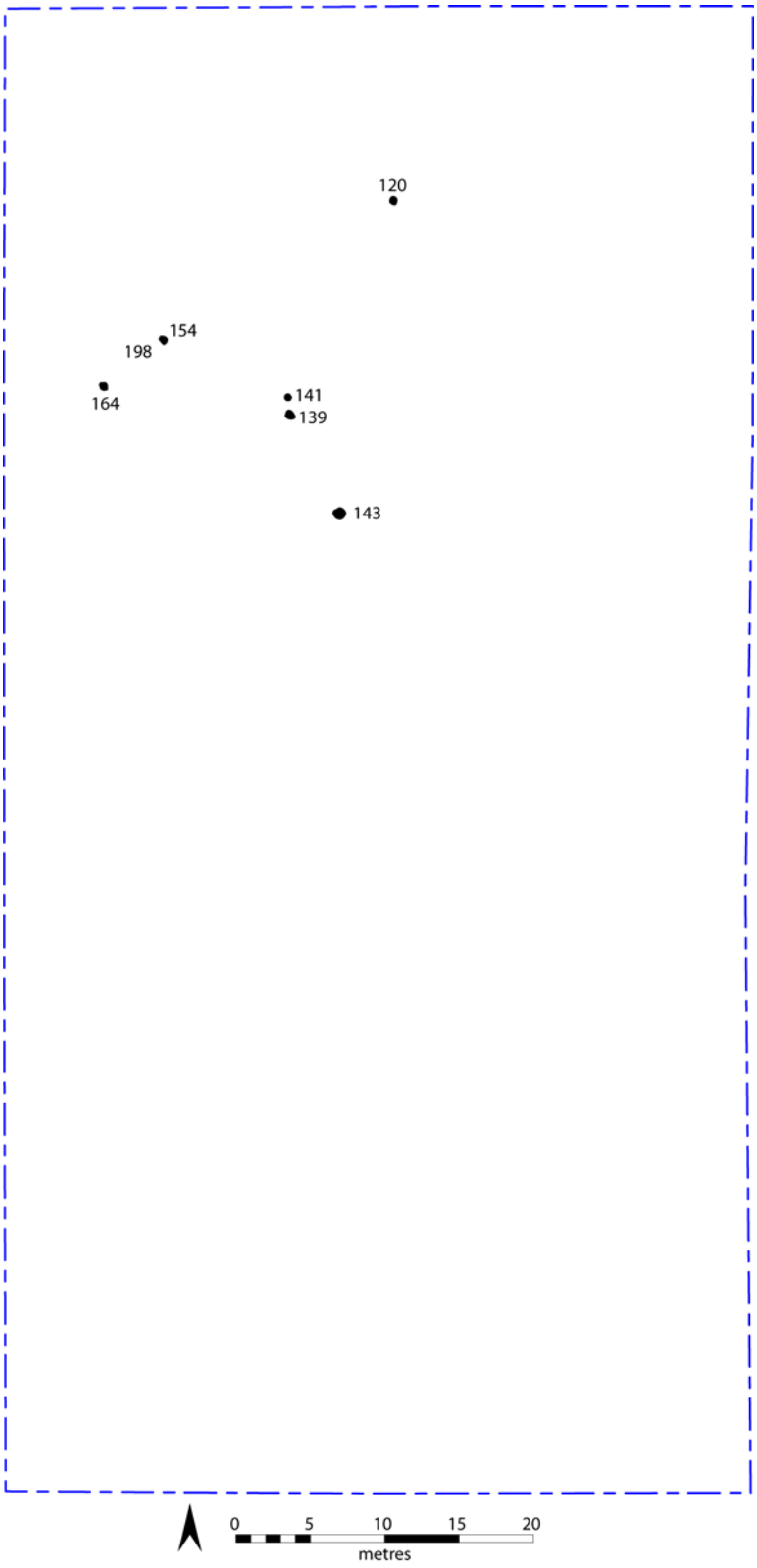
Appendix A Radiocarbon Dates

The full radio carbon results and calibration curves will be available to download at

http://www.archaeologicalplanningconsultancy.co.uk/mga/projects/noster/pages/ladydocs.html

Results of radio-carbon dating of features from Trench A

Cut	*Context*	*Feature*	*Measured Age*	*Ratio*	*Conventional Age*	*2 Sigma Calibration*
198	*155*	*post hole*	*3840+/-40BP*	*-26.8*	*3810+/-40BP*	***CAL BC 2400 to 2380 and CAL BC 2360 to 2140***
143	*202*	*pit*	*3410+/-50BP*	*-24.1*	*3420+/-50BP*	***CAL BC 1880 to 1610***
139	*203*	*pit*	*4200+/-40BP*	*-25.2*	*4200+/-40BP*	***CAL BC 2900 to 2830 and CAL BC 2830 to 2650***



Ladybridge Farm Additional Investigation Trench A – Location of early prehistoric pits

Appendix B Detailed Mitigation Strategy

The extent of the revised mineral extraction area has been drawn in conjunction with English Heritage and North Yorkshire County Council. The limits of the revised extraction area have been determined to omit the area of archaeological potential (as determined in the archaeological evaluation of the site in the previous planning application) from being impacted by the development.

For the purpose of mitigating the affects of mineral extraction on the site two levels of archaeological recording have been proposed.

An **Enhanced Archaeological Investigation** is to be applied to the western half of the Ladybridge Farm, the haul road and the eastern field to the west of the farm (Figure 7). These areas will be treated as archaeological excavations and undertaken in advance of groundworks associated with the development. On completion of the archaeological work each section will be signed off by a representative of NYCC prior to being released.

A **Strip Map and Sample Investigation** will be undertaken in the eastern half of Ladybridge Farm and the western field to the west of the farm. This will be undertaken during topsoil stripping prior to mineral extraction on the site.

The detailed Mitigation strategy should be read in conjunction with the relevant section of this report and Figure 7. The information below sets the levels of sampling appropriate to each level of mitigation.

A full Written Scheme of Investigation will be prepared and submitted to NYCC prior to the beginning of work.

Fieldwalking

Where appropriate the revised extraction area will be fieldwalked using total coverage technique. The location of all finds will be recorded three dimensionally using a total station theodolite or GPS system. The results will then be compared with those from the previous total coverage field walking undertaken by FAS in addition to the results from the widespread fieldwalking undertaken by Dr. Harding of Newcastle University.

Mechanical excavation

In each area of excavation topsoil and overburden will be removed using a 360º excavator fitted with a toothless bucket, working under the continuous direct supervision of a suitably experienced archaeologist. In the area of **enhanced archaeological investigation** this will be undertaken in advance of works as part of the archaeological excavation.

Spoil will be removed from the site by dump truck to stockpile locations identified by the quarry. Plant will not be permitted to track across stripped areas unless these have been declared clear of archaeological remains. Dump trucks will operate in defined and clearly

marked haul routes that have either been declared clear of archaeological remains or where archaeological remains have been appropriately protected from damage.

Topsoil and modern overburden will be removed in a series of level spits down to the top of the first significant archaeological horizon.

Mapping

Prior to hand excavation of archaeological features the stripped area will be mapped using a total station theodolite to create a comprehensive pre-excavation plan of the site. This will be used to identify areas of potential, target resources and prioritise work.

Hand Excavation

All features of whatever origin requiring clarification will be cleaned by hand and recorded in plan at an appropriate scale. In the **area of enhanced investigation** all soil features will be investigated by hand in accordance with the following outline sampling strategy.

- Linear features Field boundaries/land divisions - 20% by length, recorded sections to include all terminals, intersections and other relationships. 100% excavation of selected lengths for finds recovery may subsequently be undertaken.
- Structural components -100% excavation, recorded sections to include all terminals, intersections and other relationships.
- Discrete features - Pits 100% excavation. Running sections to be employed where appropriate to ensure placed deposits are identified.
- Post-holes - 100% by number, recorded in half section with further sampling for palaeo-environmental evidence.
- Horizontal deposits Layers/spreads/ stratified deposits - 100% excavation, recorded in running sections, half sections or on a grid system and excavated in spits, as appropriate.
- Tree throws -100% mapped with 20% excavated and recorded in half section.
- Swallow Holes – 100% excavated by number, recorded in half section. Appropriate environmental sampling undertaken.

In the **area of strip map and sample** the following sampling strategy will be employed:

- Linear features Field boundaries/land divisions - 10% by length, recorded sections to include all terminals, intersections and other relationships.
- Structural components -100% excavation, recorded sections to include all terminals, intersections and other relationships.
- Discrete archaeological features – 100% by number, 50% excavation.
- Post-holes - 100% by number, recorded in half section.
- Horizontal deposits Layers/spreads/ stratified deposits - 100% excavation, recorded in running sections, half sections or on a grid system and excavated in spits, as appropriate.
- Tree throws -100% mapped with 10% excavated and recorded in half section.

- Swallow Holes – 100% mapped 10% excavated by number, recorded in half section.

Recording

All archaeological features and deposits encountered during the evaluation will be recorded using pro forma recording sheets and a continuous unique numbering system. Plans at appropriate scales will be prepared, showing the areas investigated and their relation to more permanent topographical features. The plans will show the location of contexts observed and recorded in the course of the investigation. Other plans, sections and elevations of archaeological features and deposits will be drawn as necessary at scales of 1:10, 1:20 and 1:50 as appropriate.

The spot height of all principal features and levels will be calculated in metres relative to Ordnance Datum, correct to two decimal places. Plans, sections and elevations will be annotated with spot heights as appropriate.

Photographs will be taken as necessary to produce a photographic record consisting of monochrome prints and colour transparencies. Digital images will be taken to support report preparation but will not replace archive standard material.

Finds Collection

Objects relating to human exploitation of the area that are exposed in the course of excavation will be recovered or, where recovery is impracticable, recorded. All finds will be recorded by context and significant objects will be recorded in three dimensions. All recovered objects will be retained unless they are undoubtedly of modern or recent origin. The presence of modern objects will, however, be noted on context records. In these circumstances sufficient material will be retained to elucidate the date and function of the deposit from which it was recovered. Animal bone samples will be recovered by hand during excavation and processed as part of the finds assemblage. Animal bone recovered from bulk samples will also be retained for analysis.

Finds treatment

All finds will be processed to current best practice. All artefacts will, as a minimum, be washed, marked, counted, weighed and identified. Spot dating of finds will be undertaken during the course of the fieldwork in order to inform excavation strategy. Provision will be made for liaison with external finds specialists, including site visits, as appropriate.

Objects that require immediate conservation treatment to prevent deterioration will be treated according to guidelines laid down in First Aid for Finds (Watkinson and Neal, 1998). Full records will be made of any conservation treatment; these records will form part of the archive. Provision will be made for the on-site conservation of particularly fragile or unstable materials, including attendance by a specialist conservator, as appropriate. Specialist work on any metalwork, bone (including worked bone, human remains and other organic remains), industrial waste, ceramic material, glass and lithic material will be carried out as necessary.

All metalwork will be X-rayed and stored in a stable condition along with other fragile and delicate material.

Environmental sampling

Provision will be made for the bulk sampling of appropriate archaeological deposits recorded during the investigation for artefactual, economic and environmental data. The environmental sampling strategy will take account of the publication Environmental Archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation (English Heritage 2002) and the recommendations contained in Environmental archaeology and archaeological evaluations (Association for Environmental Archaeology 1995). Bulk environmental soil samples of 30 litres will be taken from appropriate sealed archaeological features for plant macrofossils, small animal bones and small artefacts. Where the complete context volume is less than 30 litres, a 100% sample will be taken. Where appropriate, column and or spot samples for analysis of molluscan, pollen and other microfloral/faunal remains will be taken.

Additional bulk samples will be retained for long term storage for future assessment/analysis.

A high priority will be given to the sampling of anaerobic deposits where organic materials may be preserved. Bulk environmental samples will be collected from any peat or organic deposits present.

Bulk samples (including artefact samples) will be processed by standard flotation methods. Flots will be retained on a 0.5 mm mesh and the residues fractionated into 4 mm, 2 mm and 1 mm fractions and dried. The coarse fractions (>4 mm) will be sorted, weighed and discarded; any artefacts or animal bone will be extracted and retained. The flots will be scanned under a x10 - x30 stereo-binocular microscope and the presence of charred remains quantified, to record the preservation and nature of the charred plant and charcoal remains.

Recognised specialists will assess the survival and potential of palaeo-environmental evidence. The same specialists will also be retained to undertake further analysis, where relevant. Provision will be made for the processing and assessment of environmental samples during the course of the fieldwork, in order to inform the excavation strategy.

For environmental samples, assessment will aim to provide a record of the presence and quantity of remains (microflora, faunal or charred), which will allow identification of potential for further analysis where relevant.

Samples for dating

A suitable specialist will make provision for archaeomagnetic dating of suitable deposits. Samples of suitable material will be retained for radiocarbon dating where contexts cannot be closely dated by artefactual or other means. Analysis of finds and environmental samples will be undertaken to a level commensurate with the aims and objectives of the investigation as set out in this document and in the WSI.

Reporting

The progress and results of the excavation will be presented at regular intervals on a custom designed website. Following completion of the fieldwork an assessment report will be prepared within six months. This document will be submitted to NYCC on completion and published on the website. Following the completion of all fieldwork a final assessment report will be submitted within 6 months. This will be followed by a final publication once appropriate analysis had been undertaken. This will incorporate the results from all the phases of archaeological work undertaken on Ladybridge Farm and present them within their wider context.

Assessment Reports

The assessment report(s) will be prepared in accordance with the standards set out in Appendices 4 and 5 of the document Management of Archaeological Projects (English Heritage 1991). The assessment report(s) will present detailed proposals for further analysis, report production, publication and archiving, along with the strategies, resources and programme necessary to carry out such work.

An assessment of the potential of the archive (including, where appropriate, the archive from earlier stages of fieldwork) for further analysis will be undertaken. The assessment phase may include the following elements:

• the conservation of appropriate materials, including the X-raying of metalwork

• the spot-dating of all pottery from excavated contexts: this will be corroborated by scanning of other categories of material

• the preparation of site matrices with supporting lists of contexts by type (ditch fill, pit fill etc.), by spot-dated phase (Late Bronze Age, Roman, Saxon etc.) and by structural grouping (contexts by pit, by ditch etc.), supported by appropriate scaled plans

• an assessment statement will be prepared for each category of material, including reference to quantity, provenance, range and variety, condition and existence of other primary sources

• the selection and prioritisation of bulk soil samples taken for artefactual, economic, environmental and dating purposes in the light of preliminary phasing: sieving, processing and scanning of selected soil samples will be undertaken and an assessment statement will be prepared by appointed specialists, and

• a statement of potential for each material category and for the dataset as a whole will be prepared, including specific questions that can be answered and the potential value of the data to local, regional and national investigation priorities

The assessment reports will contain, as a minimum:

• a non-technical summary

• a discussion of the archaeological and planning background to the project

• an outline description of the aims of the excavation and the methodology used in order to achieve these aims

• specialist assessment reports

• a summary of the archive contents

• a site location plan at an appropriate scale, and

The results will be presented in such a way that there will be no need for recourse to the archive.

Fieldwork

All fieldwork will be undertaken under the overall project supervision and management of Mike Griffiths and Associates. All fieldwork will be directed by a suitably experienced Project Officer. The workforce will be demonstrably capable of carrying out the work required. A representative of North Yorkshire County Council will be invited to monitor the work at weekly intervals. Following fieldwork, the areas of enhanced archaeological investigation, such as the haul road, western field and western zone of mineral extraction will be required to be signed off by a representative of NYCC prior to the areas being handed over.

Publication, Dissemination and Access

In addition to a regularly updated website the dissemination of results will also be achieved through the provision of displays, presentations and materials at Nosterfield Quarry Information Centre. If Health and Safety matters can be satisfactorily addressed there may be scope for organised site tours and public involvement in the archaeological excavation in the south-western corner of the Ladybridge Farm site.

Archive

An agreement is being sought between Tarmac Ltd and the appropriate museum to arrange the deposition of artefacts and all other archival material. Some material will be retained for display at the Nosterfield Quarry Information Centre as part of a permanent exhibition.

The archive will be prepared to the standards set out in Management of Archaeological Projects (English Heritage 1991). The written archive will be prepared on clean, stable materials, and will be suitable for photocopying. The materials used will be of the standard recommended in Guidelines for the Preparation of Excavation Archives for Long-term Storage (Walker 1990). The archive will be prepared in accordance with procedures outlined in Standards in the Museum Care of Archaeological Collections (Museum and Galleries Commission, 1992) and in accordance with the requirements of the appropriate museum.

The written, drawn and photographic archive will be compiled to a standard that allows for the publication of a summary report. Digital data will be generated as part of the project archive. The digital archive will be prepared in accordance with nationally recommended guidelines.

Health and Safety

All work will be undertaken within the terms of the Health and Safety at Work etc. Act 1974 and the Health and Safety Management Regulations 1992 and in accordance with the SCAUM (Standing Conference of Archaeological Unit Managers) health and safety manual Health and Safety in Field Archaeology (1997). Copies of Health and Safety Policies and Risk Assessments will be supplied to the Tarmac Ltd. All archaeological fieldworkers will be required to possess a Contractor's Safety Passport (Extractives/Quarry Products/Mineral Processing) in line with current protocol of Tarmac Ltd.