Middleton Park Community Archaeological Survey

MEERSTONE ARCHAEOLOGICAL CONSULTANCY

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Report commissioned
by the
Friends of Middleton Park
(FoMP)

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1.0 Non technical summary

This report provides an account of the Middleton Park Archaeological Survey.

Season one recorded 340 individual features, including 272 shaft mounds, other features include wagon ways, earthworks, and hollow ways defining old trackways. Documentary research has also been undertaken using both primary and secondary resources.

Season two comprised detailed earthwork surveys of key areas to illustrate the main styles of coal mining present in the park. The more detailed survey in season two increased the number of recorded features to 397 including 293 shaft mounds.

Past mining activities have been modelled and tested to aid interpretation.

Features recorded date from the medieval and post medieval periods. Mining remains are all thought to be post medieval.

This report contains a full gazetteer of our findings.

2.0 Project background

The Friends of Middleton Park (FOMP) were formed in 2003 to promote local interest and involvement in the park and its woodland. They identified a need for further understanding of the historic mining remains in the park and proposed a community archaeology project, funded by the Heritage Lottery Fund, to investigate these remains that are little understood by the general public. They also realised that future management of the park would benefit from knowing more about the archaeology. Meerstone Archaeological Consultancy, due to their expertise in historic mining, were contracted to run a project to record and understand the archaeology of the park.

The objectives of the survey was to gather sufficient information to establish presence/absence, character, extent, state of preservation and date of any archaeological features and deposits within the survey areas, as far as possible within the limits of the prepared specification, approved by West Yorkshire Archaeology Advisory Service (Meerstone: June 2006). This focused on archaeological features within the woodland areas and features associated with the woodland itself. The areas outside the woodland have been landscaped, with part used as a golf course and therefore these areas were considered to have a lower archaeological potential.

This project aimed to provide a detailed record and account of the archaeological remains associated with historic mining, located within woodland in Middleton Park. It will increase the public understanding of the site and make a substantial contribution to the local communities' sense of heritage. An indirect benefit of this project is that it also provides a firm basis for future management of the park that will aid future management plans and allow them to consider the possible effects of the management of the park and its woodland on the archaeological field monuments.

2.1 Location and status

Middleton Park is located approximately 5km south of Leeds city centre and covers an area of 254 hectares (figure 1). English Nature has defined woodland in the park as consisting of 82.5 hectares of ancient semi-natural woodland. Two areas of the park have been designated a Scheduled Ancient Monument (ref SA30963) due to the presence of historic coal mining remains.

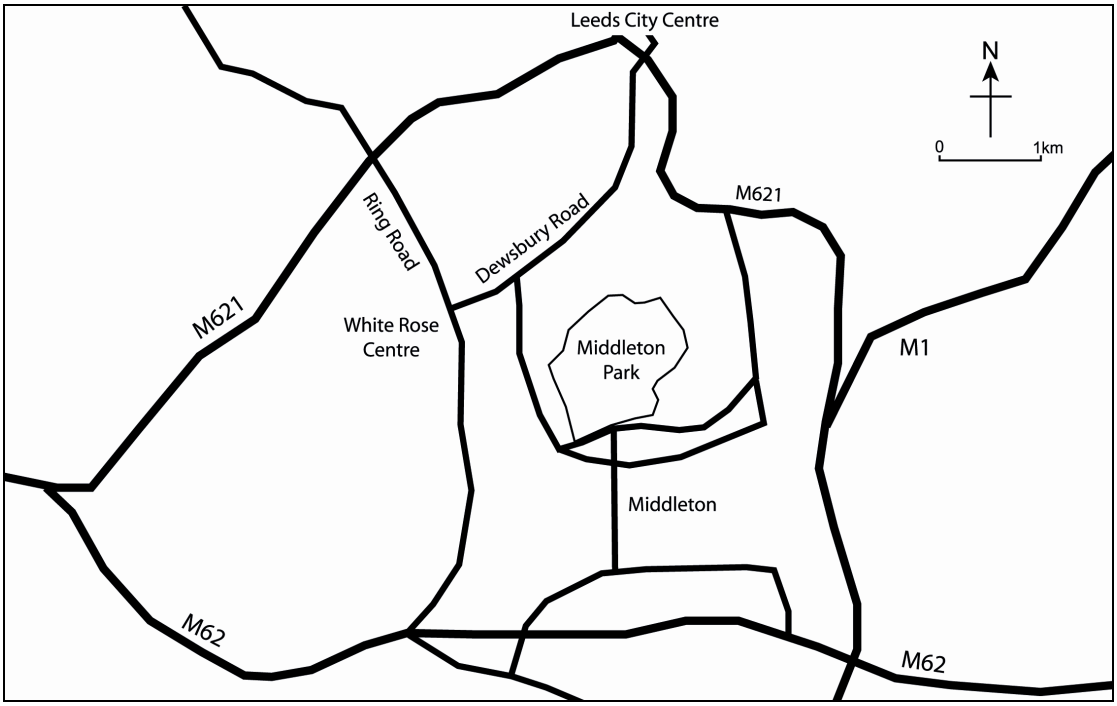

Figure 1. Middleton Park location

2.2 Geological context

The geology underlying Middleton Park consists of the upper part of the lower coal measures. A number of coal seams outcrop in the park. This report will by default use the local names for the seams. The highest in the sequence is the Adwalton Stone Coal followed by the Middleton 40 Yard Coal, which sits above the 1st and 2nd Brown Metal Coals. Below is the Middleton Little Coal. Not outcropping in the park but economically significant is the Middleton Main Coal which outcrops just north of the park boundary; just above this seam is a band of ironstone. Below this is the Middleton 11 Yard Coal, the Beeston Coal, and even deeper the Black Bed and Better Bed coals. The latter coals do not outcrop in this area. Between the coal seams are beds of shale and sandstone.

Structurally the park is split into two by a large fault running south west to north east. Contemporary accounts refer to this as the “great dyke” and it appears that this major disruption of the beds hampered mining across the central part of the park. Published accounts of the geology are, as is often the case, a little too generalised and so to understand which seams have been economically worked under the park requires integration of different sources including contemporary accounts.

On the north side of the fault the 1st and 2nd Brown Metal Coals are the highest outcropping coals and there is little evidence that they have been worked at Middleton. Indeed they are described as being "notable less for their economic value as for their bewildering variations" (Edwards 1940 p.48). Below this is the Middleton Little Coal which is described as between 30 and 40 inches (0.76-1.02m) thick. Some 20m deeper is the Middleton Main Coal which averages 4ft (1.22m). These two seams were the two most economically important seams in the 18th and 19th century (Rimmer 1955). Below are the Middleton 11 yard Coal and the Beeston Coal at a depth of 80m below the Middleton Main Coal. These coals and the underlying Black and Better Beds had little influence on the archaeology of Middleton Park.

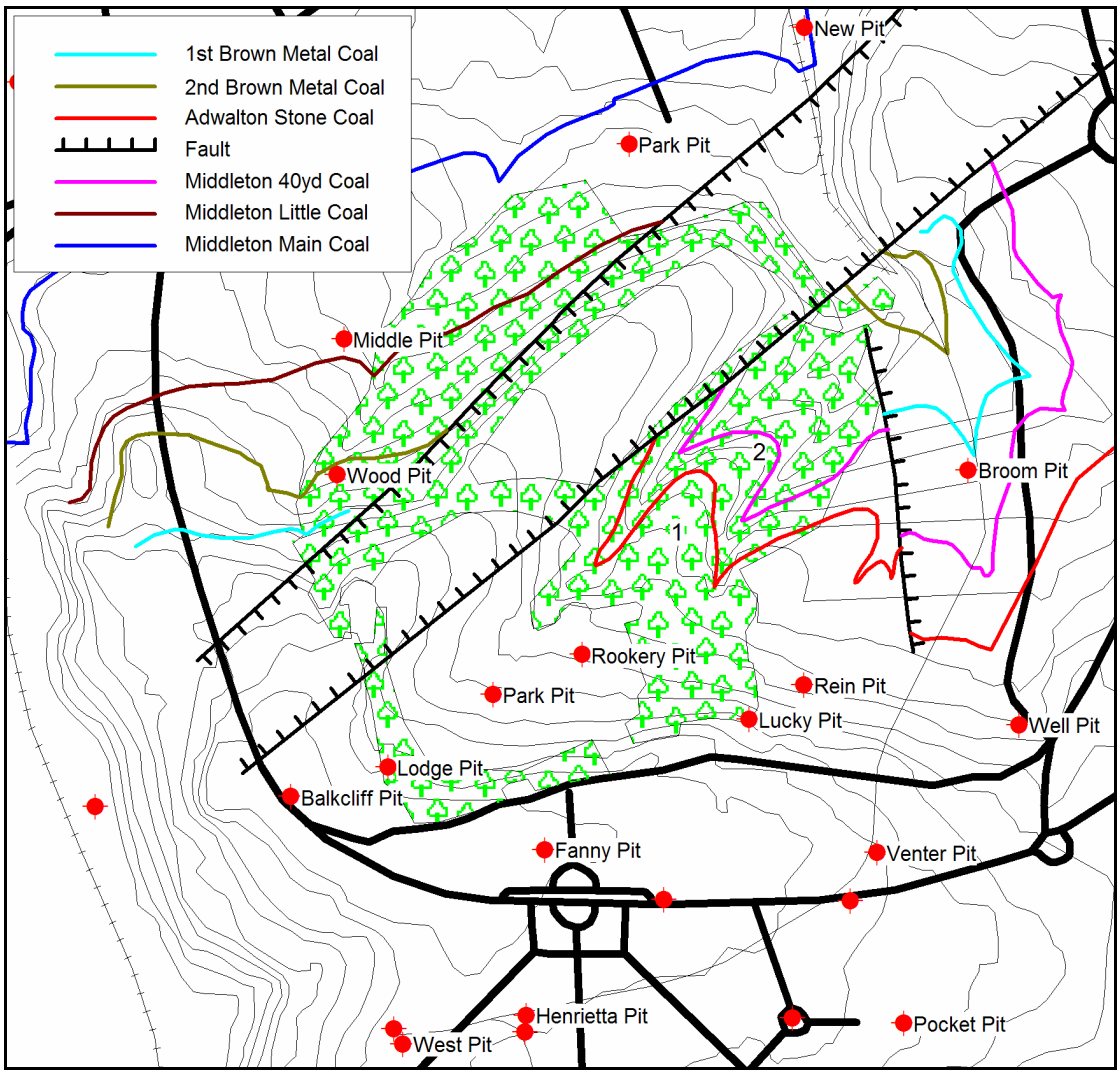

Figure 2. The geology and topography of Middleton Park

South of the fault a higher part of the coal measures outcrop principally the Adwalton Stone Coal, also known as the Flockton Thick Coal, and the Middleton 40 Yard Coal, sometimes known as the Flockton Thin Coal or the Crow Coal. There is no indication that the Adwalton Stone Coal has been worked. It would appear that the Middleton 40 Yard Coal was very sulphurous and therefore inferior to the Middleton Main and Little Coals (NRO962/1a). Just to the east of the park is another fault which shifts the beds so that the

Brown Metal seams outcrop. As on the north of the park below and not outcropping are all the beds mentioned above; with the Middleton Little Coal thought to be at a fairly shallow depth at a depth of less than 50m.

Ironstone
The primary 6" geological mapping of the area shows a number of "old ironstone pits" in Beeston Wood. This is misleading. Ironstone is present on many of the shaft mounds in the park but there is no evidence that it has been worked in those areas. A band of nodular ironstone is found above the Middleton Main Seam (Edwards et al 1940) and to a lesser extent above the Middleton Little Coal. The amount of ironstone found on the shaft mounds suggests that when the shafts were sunk any ironstone encountered has just been discarded. In the late 19th – early 20th century some mining of the deeper Black Bed Ironstone Seam took place: however, the scale of these workings is currently unclear.

2.3 Topographic context
The highest part of the park at a height of 140m AOD is near the boundary at the western end of Middleton Town Street. This represents the highest point of the Middleton plateaux. The lowest points at 60m AOD are along the northern and eastern boundaries. There is therefore a vertical range of 80m. A substantial part of the upper part of the park now used as a golf course is gently sloping, with a long tongue extending through the area known as "The Clearings". This corresponds to the "Great Dyke" fault, therefore suggesting a link between the geology and topography. To the north the ground falls away steeply, with the slope easing before reaching the park boundary and the lowest point. To the south east of The Clearings are two steep sided valleys running in a north-easterly direction separated by a 160m wide tongue of land. These valleys meet close to the park boundary at a height of 60m AOD.

2.4 Methodology

Season One: Landscape level survey of mining remains within Middleton Park
This comprised a GPS survey to record the position and detailed text description of features following a defined term list, based on the English Heritage Thesaurus of Monument Types (see appendix 1). The woodland was subdivided and coded by compartment. The survey consisted of a systematic walk-through of each compartment, noting the presence or absence of archaeological monuments, with each monument located and a brief text description, including a discussion of relationships with associated monuments. Distances between transects were determined by visibility and vegetation and were no more than 50m, less if necessary. The course of the transects was recorded automatically by the GPS and this information has been added to the survey archive. Each monument was given a unique identifier code or number. Circular and sub circular features had their perimeter recorded and linear features had both ends located. Towards the end of the survey basic measurements of the features were recorded and proved to be a useful aid to plotting. Raw GPS data was imported into MapInfo GIS and then used to draw the features and link this to the recorded

text description of the feature. The recorded features have then been plotted against OS mapping of the park. This has effectively provided a landscape level overview of the archaeology present and allowed the identification of areas suitable for more detailed survey.

In anticipation of season two tape surveys of an earthwork MP1-10 and two shaft mounds MP5-5 and MP5-2 have been carried out.

Season Two: Detailed survey of key areas to demonstrate different styles of mining present within Middleton Park.
This second season of survey work involved using total station and more traditional tape survey techniques to produce hachured earthwork surveys.

Surveying in woodland presents problems not found on open ground, mainly a lack of long lines of sight and varying levels of vegetation. Thick undergrowth can mask earthworks, brambles snag tapes and holly trees can confuse total stations. A flexible approach was therefore required.

Hachured earthwork survey is a mainstay of landscape survey and is more effective than contours at depicting archaeological detail (see Bowden 2002). To record the complex earthworks present on mining sites, this methodology was modified by Cornwall Archaeology Unit (CAU) during the recording of Kit Hill (Herring Reprinted 1990) as a sketch and plot system. This method has since been applied by CAU to several landscape projects. Without being aware of this work, an almost identical technique was developed to record complex earthworks at Cononley Mine in 1998 (Roe 2000) and has been applied to this survey. The sketch and plot method involves setting out a network of small triangles across the survey area and then sketching by eye the detail within the triangles, drawing the survey in the field. This is a very effective way to record complex earthwork features and works well with volunteers as they see the survey as it is drawn and are able to spot and correct problems straight away. To maintain accuracy, base lines were set out with a total station, and triangles were developed from these. Surveys were quite compact so any inaccuracy introduced when setting out the triangles with tapes was minimal. In addition it is worth pointing out that by sketching the detail within the triangles, rather than measuring it, there is usually no loss of archaeological detail and as most of the features recorded were earthworks with indistinct edges, the loss of accuracy was negligible when plotted at the chosen scale of 1:500. This system is flexible so if standing structures or hard-edged features were present; their position could be measured within the triangle and plotted, thus increasing the accuracy.

Some individual shaft mounds were recorded using the same tape survey technique but at a scale of 1:200 to record the form of the shaft mound and identify evidence for the use of horse gins.

Total station survey has been used in areas with less intense detail and to tie the tape surveys into the site boundaries. As well as recording the form and position of larger shaft mounds, additional points were recorded to produce a contour survey of the landscape beneath and around the features. Contours

were produced with Surfer8 software and exported as a dxf file. This was then added to the total station survey in AutoCad 2002. Plot and sketch tape surveys were scanned, redrawn in Adobe Illustrator then exported in a dxf format and added to the total station survey in AutoCad 2002. The composite drawings have then been imported into Mapinfo GIS. Understanding the relationship between the shaft mounds, the topography and the underlying geology was a key to understanding the site, and this has been achieved by managing the survey data in a GIS environment.

The more accurate season two survey results have been used to correct the season one GPS survey. In most cases the features were found to be very close to the size and shape recorded with the total station. The location of the features was also fairly close and mainly comparable to the positional accuracy quoted by the GPS receiver. In one part of compartment MP1 it was found that due to the complexity and ephemeral nature of the features more shafts were recorded in season two. This partly demonstrates the improved skill level of the volunteers by the second season. These additional features have been added to the season one records and differentiated as recorded with a total station.

2.5 Limitations

A number of limitations apply to the season one survey. Firstly it has to be pointed out that navigation grade GPS receivers are not designed as surveying tools. They will quote an accuracy of 5-6m in open country but this will rapidly reduce to 10m or more under tree cover. This effect is greater when there are leaves on the trees. The survey used Garmin Geko navigation grade GPS receivers and the accuracy varied between 6m and 20m. Generally readings with an accuracy above 15m were discarded and retaken when the satellite geometry improved. In practice the results are better than the quoted accuracy which is a statistical estimate based on a 98.8% probability that the point is within an error circle of that size. A 5m accuracy often means +/- 2.5m. By recording a series of points it is possible to produce a reasonable record of the size and shape of features and their location. Making a sketch of the shape of a feature and taking basic measurements such as the diameter of a shaft mound aids plotting in MapInfo. Due to the limitations of the equipment, stray, out of position, points can be encountered and so the sketch and measurements aid interpolation. Even with the reduction of accuracy in woodland this method provided a similar level of accuracy and detail as air photo transcription, a technique that would naturally not work in woodland. The written descriptions provide a higher level of record and overall the technique is superior to traditional evaluation techniques used in woodland such as pace and sketch surveys.

Correcting the GPS survey results in areas where more detailed survey was carried out has improved the season one results.

This survey was carried out by volunteers who began with little or no experience of archaeology or surveying. After initial training survey work was carried out by small teams who were shadowed and supervised by the project

archaeologist. This was particularly important in season two where more technical methods of survey were used.

Features were recorded to a suitable standard but it is possible that subtle earthwork features may not have been recognised either due to the experience of the surveyors or because of the presence of undergrowth.

3.0 Research

3.1 Archaeological background

Due to the presence of historic mining remains, in 1998, two adjacent areas of Middleton Park were designated as a Scheduled Ancient Monuments (ref SA30963). These are described as including the earthworks and buried remains of colliery workings, including shaft mounds and waggonways. It has been suggested that the area was mined for coal from at least the 18th century, a period for which mining activity in the area is well documented, and that the remains of medieval monastic coal working may be preserved as buried features. There has been no detailed survey and analysis of these areas although a very basic, unpublished, survey of the whole park has been carried out by a local historian Stephen Newbould. This recorded the location of 120 shafts and has demonstrated that the scheduled areas form a small part of a much bigger mining landscape. There is a suggestion from map evidence that ironstone may have been worked in the area but as mentioned above this appears unlikely.

3.2 Material in West Yorkshire HER

As part of the research element of this project the West Yorkshire HER was visited to examine what was known about the general archaeology around Middleton Park, within an area approximately bounded by Dewsbury Road to the north, The Leeds-Wakefield Railway line to the west, Thorpe Lane to the south, and Bell Isle Road to the east. It would be fair to say that the area did not prove to be an archaeological hot spot.

Most of the entries in the HER related to map evidence; principally colliery locations and associated railways extracted from the 1st edition OS 6" mapping. Other information based on field names has been extracted from 19th century tithe awards from the townships of Beeston and Middleton / Rothwell. These latter records highlight two possible early iron working sites, one in Beeston and one in Middleton both identified by the name "Cinder Hill". Both sites are now built on. A Roman coin hoard found in the garden of 37 Thorpe Road in 1924 was the only recorded archaeological find. The majority of other entries are entirely based on place name evidence and as these are pre GIS records they are simply point locations, of varying accuracy, which therefore give little indication of the scale of the activities.

Other than a copy of Stephen Newboulds survey of mining remains mentioned above; within the park boundary, two areas are listed. The first is the township boundary between Middleton and Beeston known to survive as an earthwork dating from the 13th century. The second is an area, composed of two parts, that was scheduled in 1998. This is described as "extensive remains of bell pits, waggonway routes and other features associated with Medieval to Early Industrial coal mining in Middleton Park Wood and Middleton Wood". It continues to suggest that the "core area" that has been scheduled "contains the most complete remains, with some shaft mounds even showing evidence of pit head features". As will be demonstrated the findings of this survey would challenge this suggestion.

Coal and ironstone mining sites are not well represented in the West Yorkshire HER and the level of record is in most cases a very basic location for sites that no longer exist. This is an unfortunate situation given the historic importance of mining in the growth and development of the area. In order to assess the local / regional context of the mining remains in the park records of sites across the county were examined.

Other than information extracted from historic maps the majority of other site records have been created by developer funded projects or occasionally as a result of evaluations for management purposes. It would be fair to say that many if not all of these records are let down to a greater or lesser extent by the knowledge of the writers. Mining is a technical subject and a wide range of specialist knowledge is required to effectively examine the physical remains of historic mining; that said some of the records were useful enough to help interpret the remains in Middleton Park and are mentioned below. Few of the records were of landscape level surveys, two exceptions were a survey of part of the area of ironstone workings near Emley and a rapid survey of coal mining remains on Baildon Moor. The latter was carried out to define the archaeological resource prior to scheduling and represented the most extensive survey of a mining landscape carried out in West Yorkshire prior to the start of the Middleton Park Archaeological Survey.

3.3 Setting the project in a local, regional, and national framework

Other than Stephen Newbould's survey of mining remains in the park there are no known studies of the physical remain of historic mining in Leeds.

It has been recognised that the remains of the historic extractive industries are under represented in the West Yorkshire HER with less than 80 coal mining sites recorded of which 70% are only documented as locations. Most of these locations have been extracted from historic OS mapping. The picture for Ironstone mining is much worse with fewer than ten sites recorded in the HER and little detailed survey work has been undertaken on this type of site even though West Yorkshire contains one of the most recognisable ironstone mining landscapes in the UK near the village of Emley. Work on surviving coal shafts on Baildon Moor has demonstrated that there are distinct groupings and morphological differences that may relate to variations in working methods and period of operation (Gomersall 2005). Similar work on lead mining landscapes in the Yorkshire Dales has demonstrated the benefits of morphological analysis of historic mining landscapes in recognising and defining different phases of activity (Roe 2004).

The general picture from across the UK suggests that with a few rare examples there has been little detailed study of early coal and ironstone mining landscapes. This project provided the opportunity to not only greatly enhance knowledge of this type of site, but to also define effective methodologies for recording, analysing and understanding historic mining landscapes. The approach to both recording and interpretation has been to treat the project as a research exercise and it is hoped that the result will therefore have an importance far beyond the communities of South Leeds.

3.4 Documentary research
The following is a concise review of research carried during the project.

3.4.1 Secondary accounts
There are few published secondary accounts of the history of Middleton. What does exist is almost exclusively locally produced pamphlet style publications and includes two guides produced by Leeds City Council: the Middleton Park History Trail and the South Leeds Heritage Trail. All the publications exhibit similarities in both style and content that suggests little primary research by subsequent authors. These accounts are not referenced and so it is difficult to check and confirm facts and it appears that they are the source of much of the local folklore repeated by Middleton residents; folklore that is easily challenged.

There are accounts of the history of the Middleton Railway that include brief discussions of the history of Middleton and its coal mines. Again, these are not referenced and are difficult sources to use repeating many of the "facts" encountered elsewhere. Many of these facts, including the suggestion that the monks of Kirkstall Abbey mined coal and ironstone in the park, are not correct and it would appear that much of the previously published work is factually weak.

Leeds Central Library contains unpublished and undated manuscripts by two local brothers: "A history of the Township of Middleton in the Parish of Rothwell Part 1 (1066-1750)" by John Newbould and "The Brandlings at Middleton, a brief history of coal mining, the construction and operation of the colliery railway" by Stephen Newbould. These are referenced and provide a good chronological background to the history of the area. Further research notes from the Newbould brothers have been shared with the project and have made a considerable contribution.

Academic work is rare. Gordon Rimmer, a Professor of Economic History at Leeds University, published a history of Middleton Colliery between 1770 – 1830 in 1955. A paper originating from an MPhil undertaken at the University of Leeds by Barbara May (1993) discusses trade both from and to the Middleton Colliery. This contains interesting information about how the mine was supplied with timber and other materials between 1750 and 1800. Both publications focus on the economic history of the mine over a short part of its history and in both cases the author's understanding of mining is limited. The publication West Yorkshire Archaeology: an archaeological survey to A.D. 1500 (Faull and Moorhouse 1981) helped to place the site in a regional context, although similar information is found in the West Yorkshire HER. A later publication, West Yorkshire: "A Noble Scene of Industry": The development of the county 1500-1830 (Thornes 1987), also published by West Yorkshire Archaeology Service, a more concise account, placed later features in a regional context.

Due to the limitations of previously published material this study has heavily relied on consultation of primary sources where available.

3.4.2 Primary records

West Yorkshire Archives, Leeds, holds the records of the Middleton Colliery. This collection is currently only very basically catalogued with over 50 boxes of documents. It was beyond this project to examine all that material but sampling it has brought to light key documents relating to the Middleton manor and estate from the 17th to the 19th century. It is clear that this a major archive source, not just for the study of coal mining at Middleton, but also for the history of the whole of the township and adjacent areas, particularly the industrial development of neighbouring Hunslet. However, with its current level of cataloguing this information is difficult to access.

The project examined archive material in the Northumberland Record Office and in the collection of the North of England Institute of Mining and Mechanical Engineers in Newcastle. Both collections include copies of early 19th century reports on the Middleton Colliery. The Northumberland Record Office collection also includes photocopies of a small collection of correspondence relating to the estate and colliery around 1830.

Leeds Central Library has copies of a run of Middleton Colliery Account Books on Microfilm.

The Thoresby Society, Leeds, holds a small collection of material relating to Middleton. Most useful are copies of estate and colliery accounts from the late 18th century and early 19th century. These are mainly abstracts and it is possible that the full accounts are in the collection of un-catalogued papers at West Yorkshire Archives Leeds.

Other smaller collections of papers have been identified across the UK.

3.4.3 Map evidence

The earliest map located showing Middleton and its woods is in Christopher Saxtons' atlas of England and Wales published 1579. More detailed maps of Middleton are not known until the end of the 18th century and the project has examined copies of estate maps from the 1780s, 1820s, and 1850s as well as later Ordnance Survey maps. Written surveys to accompany the estate plans have also been located and transcribed. These contain little information about the mining in the woods but are useful aids to understanding the development of the form of the current park. It is clear that when Middleton Lodge was built (presumed to be in the 1760s); major changes were made to Middleton Woods. An area in front of the Lodge, which burned down in the 1980s, was known as "the Park". This and the existence of various estate cottages and lodges suggest that the estate was remodelled at this time, with existing footpaths such as Gypsy Lane being diverted. The Lodge replaced Middleton Hall on Town Street as the principal residence of the Middleton estate, giving the Brandling family a residence with private grounds, a modest version of a country estate. As the clearance of parts of the woods appears to coincide with the building of the lodge it is possible to suggest that it represents the creation of a designed landscape, which although it is un-credited, has many of the characteristics of a Capability Brown design. The Middleton area was still fairly rural until the early 20th century.

Abandonment plans of underground workings are held by The Coal Authority in Mansfield. Although these showed varying amounts of detail they proved useful in understanding mining under the park post 1800 and provided clues about earlier workings. These plans demonstrated that an examination of abandonment plans should be an essential part of any project on a historic coal mining landscape.

Figure 3. Part of a plan of the Middleton estate in 1852

4.0 Historical background

The earliest document so far found mentioning coal mining at Middleton is a lease dating from 1632 when the Manor was mortgaged for 999 years to Robert Earl of Kingston by Ferdinand Leigh. This specifically mentions woods and coal mines (WYAS WYL160/21). This has to be read cautiously as there is no proven link between the woods and mining at this time. Remembering that part of the park is historically part of the township of Beeston, here the first known reference to mining occurs after the death of Ralph Beeston in 1549. His lands were listed as including his Coyle Mine in Beeston (Richards n.d.). There is, however, no indication of where this was located, and so again a link to mining within the boundaries of the park cannot be made.

It has been mentioned by several authors that Leonard Scurr managed a coal mine in Beeston Park in the late 17th century and that this was a day hole, or drift mine. Scurr was murdered in 1680 and an account by Thomas Wilson identified as 18th century in the West Yorkshire Archives, Leeds (WYAS WYL483), describes Scurr as being murdered in his home at Cad Beeston. This is now known as Beeston Hill and was historically a separate settlement to Beeston. The link made with Beeston Woods is no doubt because there was a Scurr House located just outside the north western boundary of the park. The idea of a drift mine in the 17th century is also incorrect; these do not appear in Yorkshire until the very end of the 18th century.

From 1640 the occupation of coal miner appears in the Rothwell parish registers (J Newbould n.d.). These entries are few and far between so give no indication of the scale of mining. Entries for "collier" in parish registers must however be used cautiously because a charcoal maker was traditionally also given the same name.

In 1733 four men are reported as: "*slain in the Middleton Woods coal pits*" (Lumb 1909). This is not only the first known mining fatality in the area but it is also the first direct mention of mining in the woods. Fatal accidents like this often provide useful information about mining in the 17th and 18th century.

In 1751 Charles Brandling, aged 18, inherited his family estates including Middleton. Charles was never a permanent resident of Middleton, mainly living at Gosforth House, Newcastle, built for him in 1760. Under Charles mining on the estate began to change and develop. In 1755 a waggonway was constructed to a river staith at Thwaite Gate. This was in use until 1807 and served pits on the high ground to the east of the park. Brandlings 1758 Act of Parliament "*for laying down a wagon-way in order for the better supplying the town and Neighbourhood of Leeds, in the County of York, with coal*" (Act 1758) allowed the construction of a new route. This ran from close to Belle Isle village at the bottom of the park, where several branches running from pits in the park and later across the Middleton plateau, converged.

In 1758 an account of an explosion in a shaft in the woods gives us a glimpse of how mining and traditional woodland activities could operate alongside each other. "*Some miners, being to renew their operations on the shaft of a coal pit, which, in a former year, had been sunk to a depth of fifty yards, in*

order to get through a stratum of hard stone, thought proper to drill holes and fill them with gunpowder. They afterwards, from the top, threw down fire to blast the stone, which made a report little louder than that of a pistol: but the blaze, setting the foul air on fire, produced an effect truly shocking. The whole of the wood was shaken, the works at the mouth of the pit were all blown to pieces, and the explosion was such as cannot be described. The vacuum in the air was so considerable, that oak trees of a load or more each, at a great distance from the pit's mouth, that before stood upright, stopped towards the pit". "The bark pullers, at a quarter of a mile from the pit, were so alarmed by the shaking and explosion, that not one of them would have remained in the woods, had they attempted to blast again" (PTRS 1773). This quote tells us a number of things. Firstly, that mining was taking place in the woods at the time and secondly, that a shaft had to be deeper than 50 yards to reach the coal. The mention of bark pullers, who would have been removing oak bark for the tanning industry, tells us that traditional woodland industries were taking place alongside mining. It also suggests that the mining was taking place within an area of trees, therefore showing that mining in the woods probably did not result in the clearance of trees other than to create space for the shaft mound.

In 1767 Beeston Park was bought by John Thompson acting as a trustee for Charles Brandling. Thompson was Brandlings father in- law. The coal under this area was bought one year earlier (WYAS WYL160/21).

It might be assumed that any shafts working after 1758 would have an identifiable relationship to the waggonway system. This is to some extent confirmed by surviving abandonment plans showing the Middleton Main and Little Coal Seams under the higher park and the plateau. These indicate that the coal was being worked off in blocks of ground or panels with a shaft at each corner. These were spaced every 200-300 yards.

Accounts from the period 1786 - 1831 (LCL MC) show that many shafts were wound by horse gins right into the 1820s, although from 1780 steam engines were being used for pumping, firstly one installed by John Smeaton and then later a Boulton and Watt engine. Steam "*raising*" or winding engines do appear by 1808 on the deeper shafts located on the Middleton plateau. By this time the Little Coal was worked out under the Middleton part of the park, with the exception of a small area at Rookery Pit, near the park lake (NRO 3410/Wat/35/29). Both the Little and Main Coals were still available at Bowcliffe (sic) Pit, which was later being ventilated by "*Lodge Pit Air Tube*" in 1817 (LCL MC) It is noted that at this time that the Beeston Seam was not worked in Middleton (NRO962/1b).

By 1829 the Middleton Little and Main Coals were still the principal seams being worked. These workings appear to be exclusively under the Middleton plateau, south of the park, still accessed by shafts, but also by Day Hole Pit, which appears in accounts from 1816 (LCL-MC). The entrance to this pit was located just south of the site of Broom Colliery. This was an inclined shaft sunk on the outcrop of the 40 Yard Coal, at an inclination of 1:40 and went down to the Middleton Main Seam and connected to Gosforth Pit. In 1850 the dayhole was the main air intake for the colliery (Philips 1850). Gosforth Pit

was the scene of the worst disaster to occur at Middleton when on 12th January 1825 a miner removed the top of his safety lamp to light his pipe. This caused an explosion of firedamp that took twenty four lives (Bushell n.d.). With the exception of this incident Middleton appears to have had a low incidence of fatalities with 14 being recorded between 1871 and 1893 (Wardell 1893).

The development of mining to the north of the Great Dyke after Charles Brandling took over Beeston Manor in 1767 still lacks clarity in some areas. In 1779 he formed a partnership with Joseph Wilkes of Beeston to set up the Beeston New Hold (or Holding) Colliery which they advertised for rent (Leeds Mercury 17th December 1779). Exactly why this was a joint enterprise is unclear and an area where more research is needed. Reports from 1812 suggest that the Middleton Little and Main Coal Seams north of the fault were almost un-worked (NRO962/1c). This is significant as it indicates that the shaft mounds in Beeston Woods must mainly post date 1812. In 1813 a report on Beeston Park Colliery mentions "*Coal in Beeston Wood, west of the pit which is now sinking in the wood, 3a 2r 24p*" (NRO962/1d). Examining the first edition 6" map of the woods and measuring the area to the west of Wood Pit, bounded to the south by the fault, confirms that this is likely to be the shaft mentioned. A published section confirms a sinking date of 1813-14 and that this shaft was sunk to the Beeston Seam, a depth of 140yds (128m) (George 1837).

Charles Brandling donated funds to the new Leeds Infirmary and to Hunslet Workhouse as well as providing a temporary bridge over the River Aire when Leeds Bridge was under repair in the 1760s (Leeds intelligencer 24/06/1768). Although the latter may appear to be an act of charity, it also ensured that Brandling's coal could continue to reach Leeds from his staith in Casson Close while the only bridge into Leeds was out of action. In 1781 he became High Sheriff of Northumberland and then in 1784 he was elected as Member of Parliament for Newcastle. He held the seat until retiring in 1797. It is said that his political career was carried out "*without greatly affecting the course of history*" (Walsh & Forster 1969). His eldest son, Charles John, took over as M.P. for Newcastle and held that office until 1812. From 1820 he returned to Parliament as M.P. for Northumberland. Charles John married Frances Elisabeth Hawksworth, sister of Walter Fawkes of Farnley Hall, Leeds (Mackenzie 1825). When Charles died in 1802, Charles John took over the estates. His brother Ralph Henry was the Vicar of Rothwell between 1796 and 1829.

In 1812 an explosion of firedamp occurred at the Brandling's Colliery at Felling. This disaster killed 92 men and was the catalyst that led to the development of the miners' safety lamp (Galloway 1971 p.422). Although the colliery was being run by a different branch of the family, Charles John Brandling was a supporter of George Stephenson's claim to have invented the miners' safety lamp, a claim still contested to this day by supporters of Sir Humphrey Davy, who designed a rival lamp and whose name has become the generic name for all miners' safety lamps; the "Davy Lamp".

Charles John died in 1826 without leaving a Will and without children. What happened next is a little unclear but his brother Ralph Henry and his son, also called Charles John, took over the running of the estate. Ralph Henry took out a mortgage of £60,000 on the Middleton estate in 1826. This may have been to pay off his brother's debts and to allow him and his son to take over administration of the estate.

In the late 1820s, early 1830s, it is clear that business was not good and that the family were experiencing financial problems both at Middleton and at their Gosforth estate. Both estates relied on income from coal mining and although the price of coal was falling from a peak in 1813-14 this had slowed after the mid 1820s (Flinn 1984 p.310) and so was not to blame. Reading the small amount of surviving correspondence from this period it would appear that the mining operations had reached a point where capital investment for development work was required to reach new reserves of coal. The Brandlings were in the 10-15% of landowners who worked the coal directly (Church 1986 p.12) rather than leasing it to mining companies who would take on the financial risk in return for payment of a rent or royalty. We could speculate that this is the reason that the family ended up in financial crisis. Indeed, by the end of 1831 the development work at West Pit designed to open up the coal reserves under the western part of the Middleton plateau had not advanced well and Ralph Henry was concerned that his creditors might force bankruptcy (NRO 962/2).

In 1836 the estate was put into the hands of trustees with mortgage debts of £95,060. The trustees were to pay "*certain annuities*" to Ralph Henry Brandling, Charles John Brandling and his wife Henrietta, youngest daughter of Sir George Armytage of Kirklees Hall, during their lives. They were also to pay interest on the various mortgages and use any other profits to pay off the principal debts. The trustees had the power to sell off property to pay off the debts, but only with the permission of Ralph Henry and Charles John Brandling (FOMP/1).

In 1844-5 most of the colliers in the area were on strike due to a reduction in wages, but not miners at Middleton. To show his gratitude Ralph Henry Brandling provided a dinner for his employees. Later they presented him with an engraved silver cup (Batty 1877 p.191). This was inscribed "*Presented by the workmen of the Middleton Colliery to the Rev Ralph Henry Brandling, as a small return for the long continued kindness extended towards them by himself and his family*" (NRO3410/ZD/39). This was not the full extent of his philanthropy. Ralph Henry is noted as establishing a school house at Middleton, paying for the school master (BPP 1842) as well as paying the school fees of orphans, and others who required assistance (BPP 1845).

A Chancery Case in 1850 deemed that the Brandlings' estates should be sold to pay off their debtors. Possibly because different parts of Middleton and the adjoining estates were subject to different mortgages, it was to take some years actually to sell the property. In 1851 the estate was put up for sale (Grant 1851) but not sold; later in 1852 it was advertised as for sale by public auction but no sale took place, although their Gosforth estate was sold at this

time (Local Collections 1852). Ralph Henry died in 1853 at the age of 82 and his son Charles John died at Middleton Lodge in 1856 aged 59 (Gentleman's Magazine 1856).

Francis William Tetley, son of Joshua Tetley the brewer, purchased the various parts of the Middleton estates between 1865 and 1867 for £100,000. Part of this was provided through a mortgage of £20,000 which was paid back by 1880. The Middleton Estate and Colliery Company registered as a joint stock company in 1867 and all the property transferred to it in 1868. Shares in the company were allocated as follows:

Francis William Tetley 76 shares
John Rhodes 76 shares
Joseph Ogdin 76 shares
Edmund Maude 76 shares
Charles Ryder 2 shares
Fairfax Rhodes 2 shares
George March 2 shares
William Henry Maude 2 shares

Edmund Maude became the occupier of Middleton Lodge. Later William Henry Maude lived there. His daughter was the last resident and she died in 1933.

The Middleton Estate and Colliery Company brought to Middleton the capital needed to carry out development work and open up previously un-worked seams principally from Broom Colliery and New Pit.

Middleton Broom appears in accounts as early as 1817-18 when it is listed as having a horse gin (LCL MC122-152). Earlier in 1808 details are given of a borehole "*put down in a pit called Broom Pit from the seam of coal called the Main Seam to a seam of coal commonly called the Beeston Coal*" (NRO 3410/Wat/3/65/2). These two references suggest that the pit was working as deep as the Middleton Main Seam early 19th century, but it's absence from the mine accounts between 1786 and 1831 (LCL MC122-152), other than the two years mentioned above, would suggest that it was also known by another name. It appears the pit was not sunk to the Beeston Seam until the Middleton Estate and Colliery Company took over.

Coal seams within the fault trough that crosses the park were worked in the second half of the 19th century and early part of the 20th century. Two pits worked this area. The first was located to the west in the West Wood and worked the Middleton Little and Main Seams, down dip, to a point just east of Middleton Lodge, leaving pillars of coal to support the Lodge. These workings which were abandoned in 1889 were connected by a drift to Balkcliffe Pit, which was probably reopened to act as an upcast ventilation shaft (CA M129). Other workings were developed from New Pit sunk just to the north of Belle Isle village. This worked both up the dip into the park but also in the opposite direction through Hunslet towards the River Aire. This pit is remarkable as it only worked a strip of ground rarely more than 300m wide. New Pit also

worked the seams below the Middleton Main Coal but stopped working during the general strike in 1925: however, it continued to be used as a pumping station from 1927 until 1945 (nmrs.co.uk).

At the beginning of the 20th century the Black Bed Ironstone Seam under this area was being worked by the Low Moor Company, with other seams being reserved for the Middleton Estate and Colliery Company (WYAS WYL160/214). From 1904 the Low Moor Company had to pay a share of the pumping costs from the Beeston Seam as long as the Middleton Estate and Colliery Company were working the New Pit (WYAS WYL160/214).

By 1918 the Beeston seam had been developed under the park and under the plateau (WYAS WYL160/214) from Broom. The Middleton Broom Colliery Ltd took over the pit in 1944, with a nominal capital of £60,000 (Colliery Guardian 06/10/44). This was probably a means of separating the assets of the Estate and Colliery Company from the coal mining operations which would be nationalised within three years.

The shafts at Middleton Broom had been sunk to just below the Low Moor Better Bed Coal at a depth of 270yds 2ft 8in (247m) by 1950 (Wilcockson 1950). This allowed working of the Middleton 11 Yard, Beeston, Crow, Low Moor Black Bed and Low Moor Better Bed seams. Middleton Broom was the last underground mine in the area and closed in 1968. By this point the workings had been extended out of Middleton partly into Rothwell.

5.0 Survey Results

5.1 Season One Results

This section consists of a general account of the archaeological remains found in each woodland compartment. A full gazetteer is included in appendix 3. The boundaries of each area were determined by selecting easily identifiable features such as footpaths. Season one recorded 340 individual features, including 272 shaft mounds, other features include wagon ways, earthworks, and hollow ways defining old trackways.

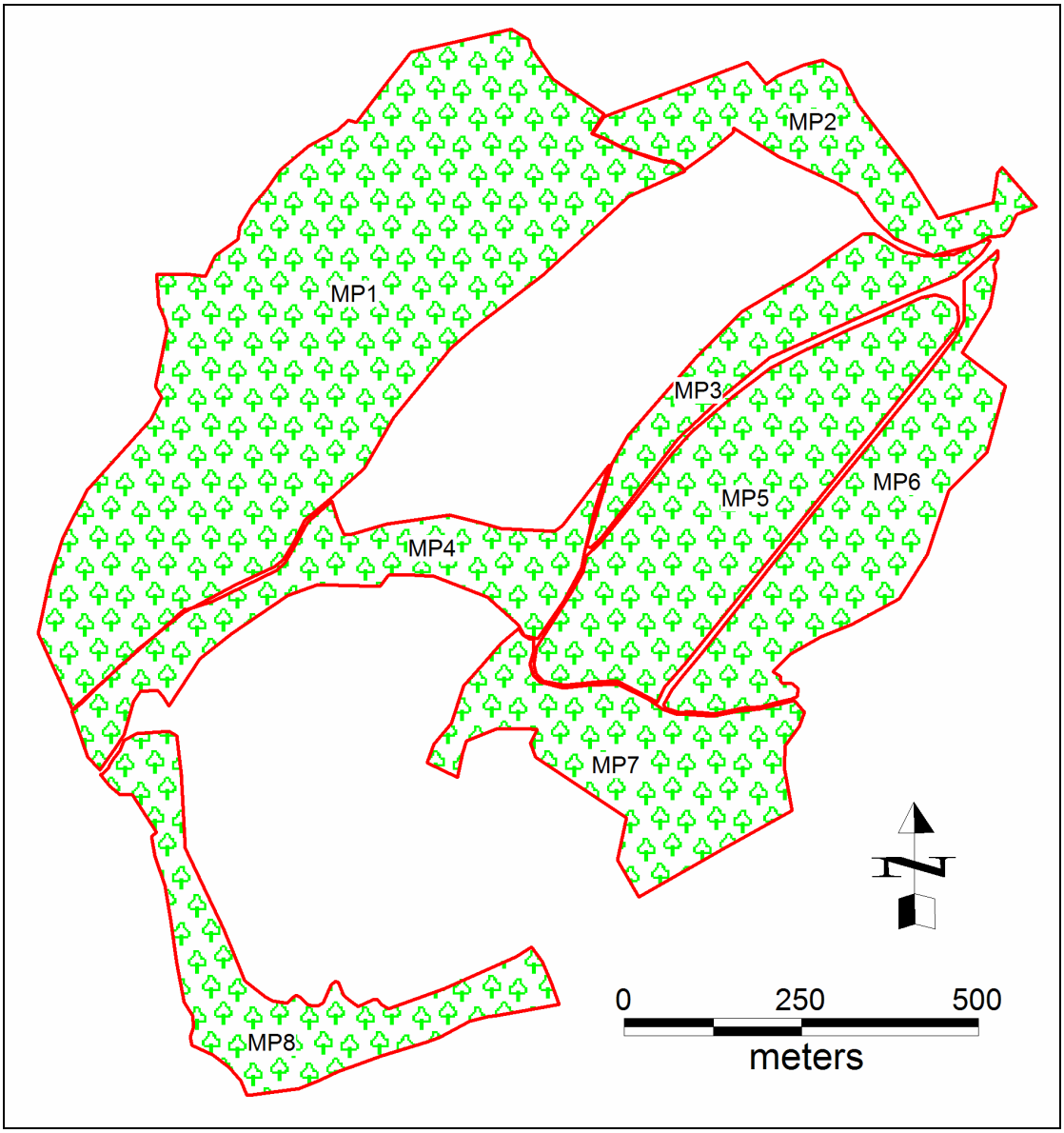

Figure 4. Woodland compartments

MP1 – This is the largest compartment in the park and contains the most archaeology with almost 140 shaft mounds. At just over 1000m long by up to 350m wide this area is split along its length by a tramway dating from the 1920s. To the south east of this feature the ground rises steeply and there are few features. In the opposite direction the ground slopes gently down to the park boundary. At a distance of 60m-90m down slope from the tramway is a

bank and ditch boundary. Over much of its length this is a prominent earthwork, MP1-51, displaying different degrees of complexity along its length. This marks the historic boundary between the townships of Middleton and Beeston and is believed to date from 1204 and is therefore the oldest datable feature recorded by this survey. Other earthworks defining enclosures against this boundary were also identified.

Figure 5. Bank and ditch marking the Middleton – Beeston township boundary

The spacing between the centres of shaft mounds in this area averages 30m; however there are areas where a different pattern is seen. Towards the south west of this area is a dense cluster of small shaft mounds, many less than 10m apart. The significance of this area in understanding the nature of mining in the park will be discussed below. Adjacent to this area of small shaft mounds is one very large and complex shaft mound MP1-93 which has an associated wagon way running to the park boundary. This has been identified from OS mapping as Wood Pit. In other parts of this compartment there appear to be gaps or blank areas between groups of shafts. These were recognised during the survey and checked to ensure that the areas had been walked through and that they did not simple represent holes in the survey data caused by poor traverse spacing.

8.2 MP2 – At the extreme east of the park this compartment contains no archaeological evidence other than at its northern edge where it forms part of the north facing scarp edge that runs along the northern side of the clearings. This area contains three shaft mounds and several hollow ways. It is

understood that a quarry / clay pit occupied the eastern part of this compartment and it has been backfilled.

MP3 - This areas slopes down from The Clearings and is bounded along its south eastern edge by a tarmac path that coincides with a wagon way marked on a map of 1785. This path in places runs in a cutting suggesting either erosion over time producing a hollow way or a cutting dug to grade the wagon way route. The form of the trees on the side of this cutting suggest that it was bounded by a hedge. The compartment contains 31 shaft mounds which are mainly 20m or more apart. A number of hollow ways cut across the area running up to The Clearings. It is possible that one MP3-34 may be part of a coach road marked on an estate map of 1785.

Figure 6. Tarmac path between areas MP3 and MP5 showing cutting with remains of a hedge on each side.

MP4 – This linear compartment running across the line of the great dyke contains little evidence of mining other than four shaft mounds at its eastern end. This would support the idea that the fault disrupted mining across the central part of the park. It is likely that the footpaths running through this compartment partly represent a carriage drive to Middleton Lodge.

MP5 – This compartment contains over 60 shaft mounds which vary greatly in both size and form. This area shows more variation in the shaft mounds than any other part of the park. Topographically this compartment comprises a tongue of land that slopes down to the park boundary. The north western side of this tongue is defined by a steeply sided valley containing a small stream.

The higher ground forms a plateau delineated by this valley on one side with a tarmac path on the other side forming a boundary with compartment MP6. On this area the shaft mounds have a spacing of 50m or more centre to centre. A similar distribution is seen on the north western side of the stream although in one place this reduces to 30m. This distribution is seen on the same contour level in the adjacent compartment MP3.

In the valley bottom are areas where smaller shaft mounds were found with a closer spacing. Towards the head of the valley shafts are around 15m apart. In the central part of the valley is a small group with a spacing between 5m and 20m. At the foot of the valley is an area where the spacing of shafts varies between 10m and 20m. The presence of smaller shaft mounds is likely to be a direct result of the reduced depth to the coal seams in the valley bottom. Logically shallower shafts are likely to be the first to exploit these seams, although caution has to be made before linking individual shafts to individual seams. The economic importance of different seams can change over time and there is no guarantee that the economic significance of the shallowest seam and the date of the shafts are the same. These shafts could just as easily be sunk to a deeper seam. A number of possible adits were also recorded in this valley; however this identification is very tentative and a comparison with the underlying geology suggest that this interpretation is unlikely.

Figure 7. Project volunteers carrying out an earthwork survey of shaft MP5-5

The wider spacing coincides with larger diameter shaft mounds and several of these shaft mounds are complex in form. Shafts such as MP5-2 and MP5-5

consist of a ring mound surrounding a shaft with a flat area of natural ground surface between the shaft and the mound. This may suggest shaft haulage using a cog and rung type of horse gin. MP5-86 is a larger shaft mound and has earthwork evidence of a yard area to both sides of the shaft suggesting a relationship to the adjacent tarmac path, which as has already been pointed out was formerly a wagon way.

MP6 – Forming a boundary to the south east this compartment straddles a valley with a small stream. Containing 22 shaft mounds which display some variation in size, with the largest at the top of the valley and the smallest at the bottom, this is the only part of the park where any clear evidence of adits was observed. Feature MP6-5 is the most obvious example with a well defined cutting running into the bank of the stream below a shaft mound. This will be discussed further below. The spacing between shaft mounds varies with 30m an average at the foot of the valley, whilst at the top the distance between shafts is up to 70m measured centre to centre. Feature MP6-21 is a stone faced bank boundary marking an edge of the older woodland and an area of new planting, believed to be on the margins of a former landfill site.

MP7 – This area which is fairly flat except at the north western edge, where there is a valley formed by a small stream, is partly wooded and partly open ground with trees. The area also contains a lake marked on historic maps as a fish pond. Its topographic position and form suggests that it is an artificial water feature fed by springs. Its current form suggests 20th century modification. To the south west of the lake, between the lake and the park's car park, is a thinly planted area of trees shown as wooded as late as the 1850s, however evidence of undulations indicative of ridge and furrow can be observed.

Further southwest is woodland. This contains no evidence of mining but earthworks suggesting shallow quarrying were observed. These were too complex to record effectively using GPS. To the south is an area thought to be outside the park boundary that contains terraces that would require detailed survey to fully understand, but which may possibly represent a terraced market garden.

To the north west of this compartment is one shaft mound at the edge of the golf course. This partly overlays a linear feature thought to represent a wagon way.

MP8 – Wrapping around the south western edge of the park this area forms a corridor between the main park entrance and the site of the now demolished Middleton Lodge. Little archaeology was found in this area other than two earthworks that may in part represent ditch and bank boundaries for the former driveway to Middleton Lodge. The longer of the two, MP8-2, delineates the current boundary between the woodland and the golf course. Map evidence suggests that this boundary was probably established when woodland was cleared around the site of the Lodge in the mid 18th century.

5.2 Season Two Detailed Survey

The main theme of season two as detailed in the project specification (appendix 1) was to carry out detailed field survey of key areas to illustrate the styles of mining present in the park.

Based on the results of the first seasons work the following work was carried out:

1. Detailed survey of the area in the north west of the park including the group of bell pits adjacent to Wood Pit and its associated wagon way.

2. Detailed survey of part of the scheduled ancient monument area in Middleton Woods to show differences in shaft style and distribution.

3. Individual surveys of a sample of shaft mounds to demonstrate use of horse gins.

5.2.1 Detailed survey of part of Beeston Wood

This area measuring 3.2 hectares is located on to the north west of the park, adjacent to the boundary with South Leeds Golf Club. Work in season one had identified that shaft mounds in this area presented a different pattern to that seen across the rest of the park.

The survey area is bounded on one side by a boundary bank, up to 1.5m high and suggestive of an ancient woodland boundary. Just under 150m away and running parallel is another earthwork in the form of a well defined bank and ditch identified as the boundary between the townships of Middleton and Beeston and constructed in 1204 (Collinson, M 1998). Either side of a small stream are around 40 densely spaced sub circular hollows, some surrounded with slight mounds, often only on the downslope side. These are approximately 6-10m in diameter, closely spaced, in some cases almost touching. This spacing increases as the ground rises away from the stream as does the size of the shaft mounds. Some of these larger shaft mounds cut the township boundary suggesting that the boundary was no longer important when they were sunk.

To the south a much larger shaft mound identified as Wood Pit defines a very different style of mining. This mound is built into the hillside and consists of several different levels suggesting different activity areas. Alongside, to the south, is a boggy sunken area with an earth bank across one end. This is interpreted as a small reservoir suggestive of the use of a steam engine on the site. This is further supported by the presence of brick rubble and coal cinders in the nearby paths, although no definite structures can be identified. It is likely that evidence of the use of a steam engine survives as buried archaeology. The position of the shaft is marked by a large conical sump, but to one side is a flat area of ground that may have housed either a whim gin or a capstan. This is however a little unusual as it is below the top of the shaft mound. On top of the main part of the shaft mound to one side of the shaft are sight earthworks that may suggest the presence of wall footings associated with plant and equipment.

On the north side of the shaft mound is a level area interpreted as a yard. Running north from this is a gently inclined path that suggests that it was once the route of a waggonway. This fades away and its original destination is unclear. Crossing the area are a number of footpaths and holloways. These mainly postdate mining and the use of some is contributing to significant erosion of archaeological features by motorbike, mountain bike and horse riders.

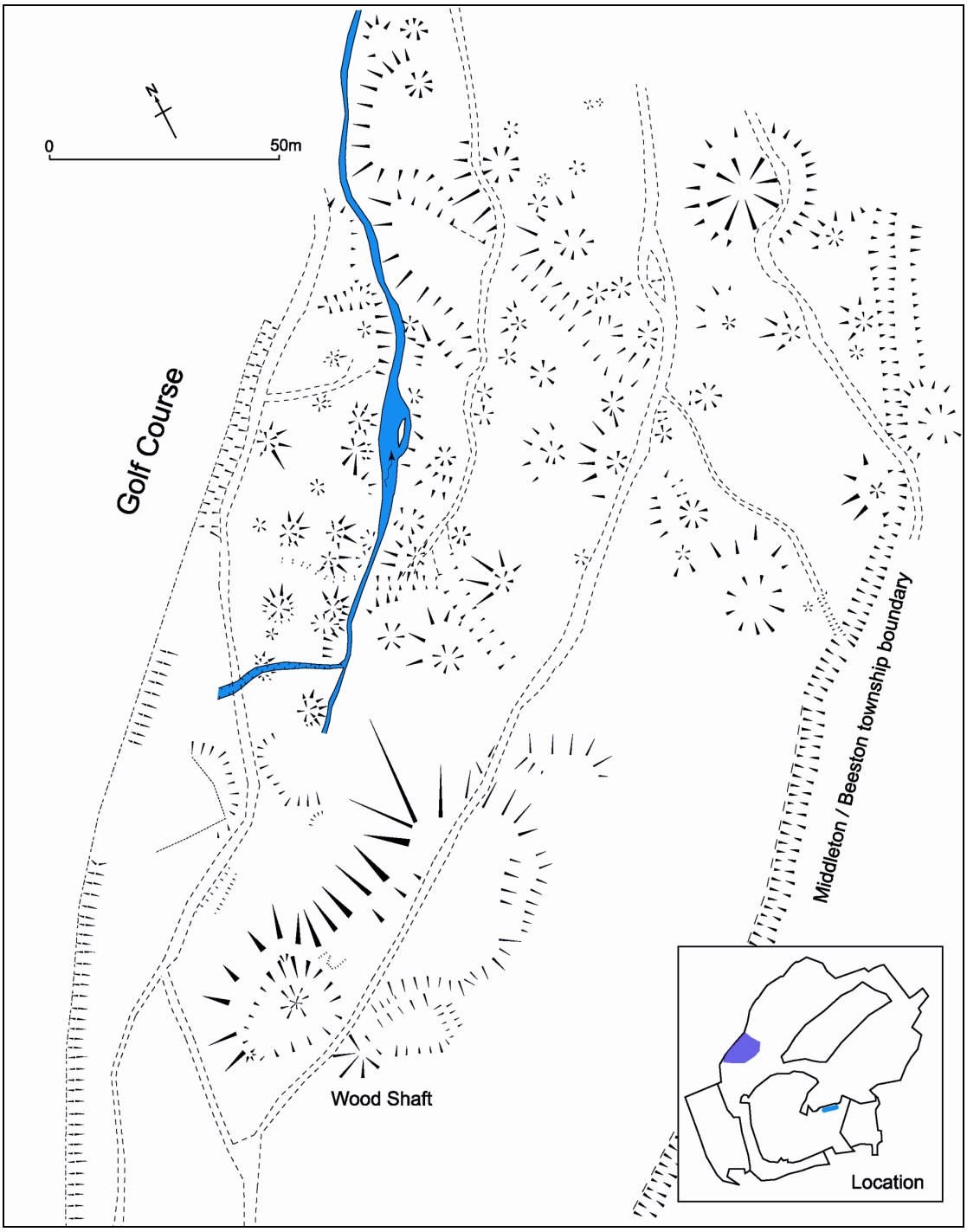

Figure 8. Survey carried out in Beeston woods

5.2.2 Detailed survey of Middleton Woods

This area measuring 7.8 hectares is located to the north east of the park lake. Work in season one had shown that in this area the shaft mounds presented several different patterns of distribution. There were also differences in the size of the shaft mounds which also displayed the clearest evidence of their original form. The area is also bisected by two waggonway routes that now survive mainly as tarmac paths. The area is bounded to the south west by the 100m contour which defines an edge of the main block of mining remains on this part of the park. To the south east it is bounded by a stream that runs to the bottom of the park and to the northwest by a tarmac path that also runs to the bottom of the park.

Shaft mounds are found in three distinct patterns. Firstly are a group of shafts set out in a grid pattern, across a relatively flat area between two steep sided valleys, with an average spacing of 70m. Most of these shafts are of a very distinctive style which will be discussed below. On the edge of this group are two larger shaft mounds, on the 100m contour, one of which has appears to have been affected by the creation of the Middleton Park Golf Course in 1933. The second is located adjacent to a tarmac path that runs from the car park to the bottom of the park. Just outside the boundary of the area surveyed are a further two shaft mounds that are larger than their neighbours. Their location suggests that all these larger shaft mounds are also set out in a grid pattern but his time the spacing is 200-300m.

A final group of shaft mounds is located part way down the side of a valley and form a tight, irregular, cluster of banks and hollows that represents five or six shafts with a spacing of between 8 and 10m.

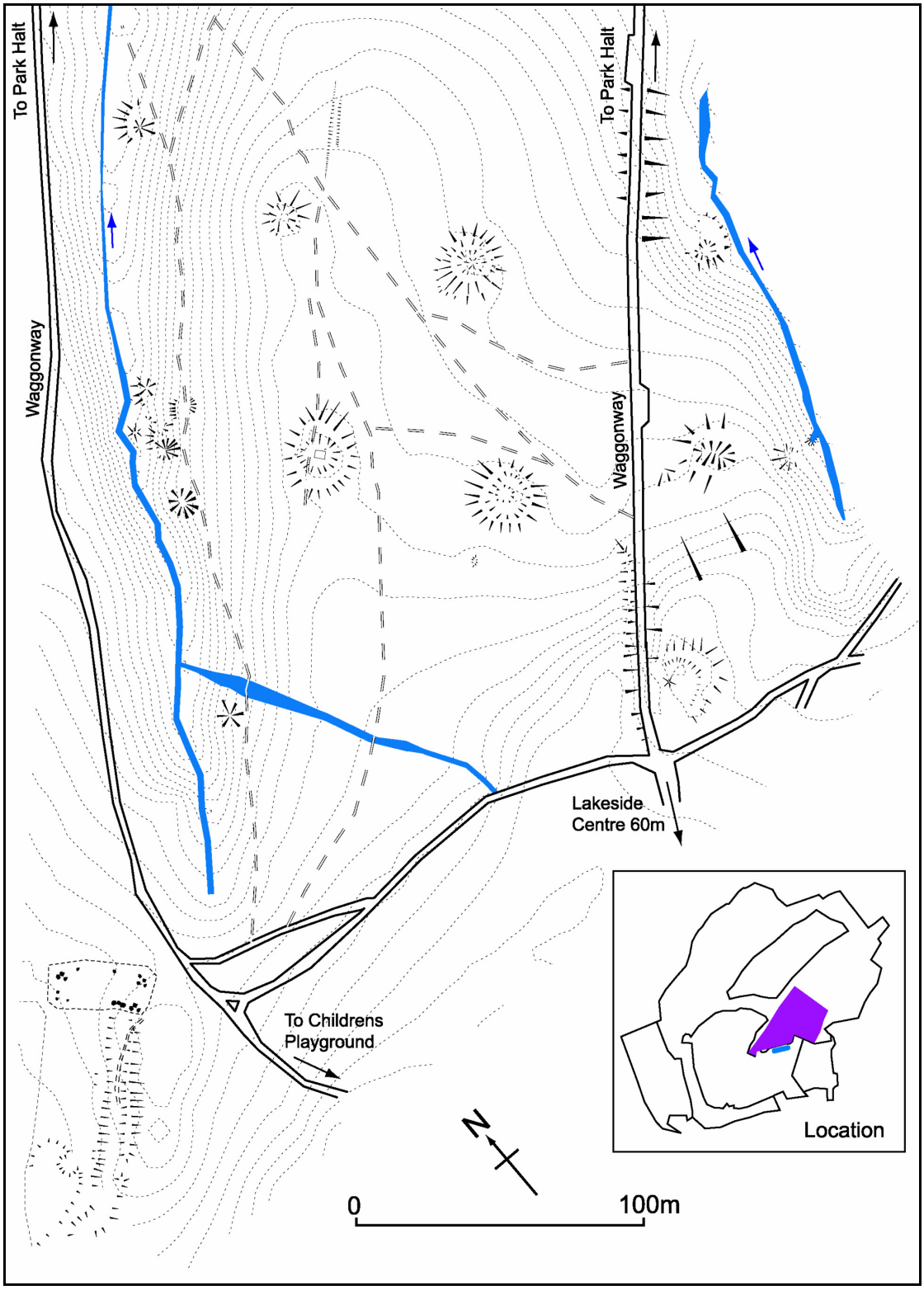

Figure 9. Survey of part of Middleton Woods