PHASE I
SITE INVESTIGATION

AT

MIXED USE DEVELOPMENT
WEST ROAD
SITE B.

Ashton Bennett

ENGINEERING GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS



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PHASE I
SITE INVESTIGATION

AT

PLOT 1, LAND OFF WEST ROAD
POGMOOR, BARNSLEY

FOR

TREVOR SIMPSON

ASHTON BENNETT CONSULTANCY

Engineering Geologists & Environmental Scientists

NOVEMBER 2010

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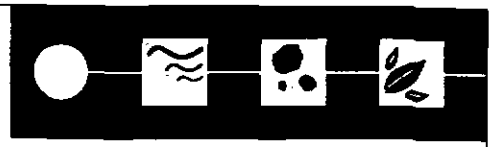
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PHASE I DESK STUDY
PLOT 1, LAND OFF WEST ROAD, POGMOOR
Trevor Simpson
TSI 2902

EXECUTIVE SUMMARY

- OS maps indicate the site was previously occupied by open ground, filled ground and buildings – some of which have since been demolished.
- Due to the presence of filled ground on the site, the unknown past uses of the site, the present usage of the site as a vehicle repair centre, the presence of nearby contaminative sources and pollution incidents there is a high potential for the site to be contaminated.
- The site is underlain by mudstone of the Middle Coal Measures, probably with a covering of clay derived from weathering of the mudstone. Made ground is known to be present.
- Made ground is an unsuitable bearing strata. Sandstone and mudstone of the Middle Coal Measures generally provide good bearing strata for low rise development.
- The site lies on a minor aquifer overlain by soils of high leaching potential.
- According to the Environment Agency the site does not lie in a fluvial or pluvial floodplain.
- The Coal Authority Report states that the site according to their records is within the zone of influence from 5 seams of coal mined at 180-370m depth. An abandoned mine shaft is present on the site, which will require investigation and treatment.
- Shallow unrecorded mining in the Barnsley Rider Coal seam may underlie the site at <30mbgl. Voids within shallow mining may migrate to the ground surface and cause ground subsidence.
- There are eight recorded landfills within 250m and infilled ground is present on the site.
- A potable water abstraction is located within 848m of the site. The nearest surface water is 400m from the site.
- Radon protection is not required.
- Soakaways are unlikely to be viable and are not recommended if contamination is present.
- Intrusive ground investigation is required to assess foundation design and to monitor for gas and test made ground and groundwater (if present) for contamination.
- Intrusive ground investigation is required to assess the potential for voids in potentially shallow mined ground.

RECOMMENDATIONS

Investigation	Nature of Investigation	Details
Intrusive	Window sampling	To determine ground conditions and collect soil samples for both strength tests for foundation design and for contamination testing.
	Rotary Drilling	Drilling to assess dimensions and condition of mine shaft, potential for voids in shallow mined coal & ground instability
Non-Intrusive	Geophysics	To ascertain location of mine shaft.
Monitoring	Standpipe installation in window sampler boreholes	To monitor for toxic gases and collect groundwater samples for testing
Laboratory Testing	Geotechnical Environmental	Plasticity if clay encountered. Testing for contamination in made ground and in any proposed landscaped areas. Testing of groundwater if encountered.



1. INTRODUCTION

This report describes the results of a Phase I Desk Study undertaken at Plot 1, Land off West Road, Pogmoor, Barnsley. The work was undertaken on behalf of Trevor Simpson and was carried out by this Consultancy, the Ashton Bennett Consultancy.

The purpose of this Phase I Study was to collate and assess information on the site including geological, hydrogeological and mining information, archival maps and historical review to determine past use, a database review, environmental data on water and soil, and to undertake a site reconnaissance to enable a desk top assessment to determine the likely presence and areas of environmental concerns on the site and the presence of pathways of migration and potentially sensitive receptors, and to determine solutions to any geotechnical, environmental and mining concerns to the proposed change of use of the site for residential development.

This report describes the research work carried out, presents the results of the desk study and from the conceptual model of the site makes recommendations regarding solutions to environmental, geotechnical and mining risks to the site being redeveloped for residential housing.

2. THE SITE

A walk over survey of the site was undertaken on 3rd November 2010. The site has an area of approximately 0.5ha and is situated just to the south of West Road, Barnsley, South Yorkshire. Access to the site was directly from West Road. The site was relatively flat with the majority bounded by a galvanised steel palisade fence. A 2m high brick wall and gate formed the northern site boundary and a 2m to 3m high concrete wall was present along the north west site boundary. The site boundary also encompassed an area of scrub land and a mobile telephone mast to the south west of the palisade fence. The site enveloped a driving test centre, which was also accessed from West Road.

The majority of the site was currently occupied by a large flat area covered with broken asphalt and hardcore. Buildings on the site comprised of a steel frame / concrete block building adjacent to the western boundary which was used in part for vehicle repairs (part of the building was not open / accessible during the walk over); a two story brick built office block located at the northern end, a portocabin used as a cafe located in the north west corner and a smaller brick built garage located in the north east corner. Two steel containers were present towards the western site boundary and another was present on the eastern site boundary.

Vegetation on the site comprised of a number of semi-mature deciduous trees present on the eastern boundary, a mature deciduous tree on the south west boundary and shrubs and bushes present in the vicinity of the phone mast in the south west corner of the site.

The majority of the site was occupied by "Garage-R" with the north east portion occupied by "Harrison and Richardson Property Repairs". Access to the portion of the site occupied by "Harrison and Richardson Property Repairs" was not possible during the walk over survey.

Points of note on the site include:

- A drum labelled "Corrosive" and "Heavy Duty Vehicle Cleaner Concentrate" located toward the western site boundary.
- An old "Oil Drum" and a pile of old tyres are located adjacent to the western site boundary.
- An un-marked blue drum filled with soil and general waste.
- A modern electricity fuse box was located on the western boundary.
- A number of crash-damaged cars were present towards the western site boundary.
- Burnt ground indicating fires had previously taken place was observed adjacent to the north western boundary.

Observations of the land immediately surrounding the site were as follows:

- West Road was present immediately beyond the north eastern site boundary.
- Flat scrub land was present immediately beyond the north west boundary.

- An un-named un-surfaced access track was present immediately beyond the eastern boundary.
- A circa 30° vegetated slope with a maximum height of 4m to 5m was present immediately beyond the south eastern and south western boundaries with open scrubland at the toe of the slope.

The surrounding land uses comprise of residential properties to the north, light industrial units and derelict buildings to east, a railway to the south and a sports field to the west.

The site lies around National Grid Reference SE 3297 0655 at a height of 137m above Ordnance Datum. A site location plan is presented as Drg No TSI 2902/1 and a site plan is presented as Drg No TSI 2902/2. A Conceptual Model is presented as Drg No TSI 2902/3. Archival maps are presented in Appendix A. The Coal Authority Report is presented in Appendix B and photographs are presented in Appendix C.

3. REPORT OBJECTIVE AND REPORT SCOPE

3.1 Report Objective

The objective of the desk study is to determine the environmental nature of the site and to establish any environmental concerns and liabilities with particular reference to past contaminative uses of the site as far as is possible from historical and database review. Contaminative use is defined as "any use of land which may cause it to be contaminated by toxic substances" (Section 143 of the Environmental Protection Act 1990). The report undertaken is a Phase I Desk Study and Risk Assessment taking into account the possible contamination, the migration pathways and the presence of potentially sensitive receptors and the engineering properties of the strata and the mining history of the site.

3.2 Report Scope

The information for this report is from sources recommended by the Institute of Civil Engineers (ICE), the Association of Geotechnical and Geoenvironmental Specialists (AGS), Construction Industry Research and Information Association (CIRIA) and the Department of the Environment Transport and the Regions (DETR). The report has been compiled in accordance with the latest ICE, DETR, Department of Environment, Food and Rural Affairs (DEFRA) and British Standard Draft Documents and British Standards, and Contaminated Land Reports.

In addition the scope of the investigation has used the extensive knowledge and experience of the staff of Ashton Bennett Consultancy to assess the data and to interpret the data findings.

4. SITE HISTORY

The following maps and plans were inspected to assess the history of the site and its past environments. The maps are presented in Appendix A.

TABLE 1
Historical Maps Inspected

DATE	SCALE	DESCRIPTION	
		SITE	SURROUNDING AREA
1850	Plotted at 1:10,560	The map shows the site to be occupied by open land.	An unoccupied linear easement is present approximately 40m to the south of the site. A footpath runs along the northern boundary of the site. The site surroundings generally comprise of farm land with a number of sandstone quarries and wells within a 500m radius.
1855	Not to Scale	No change to the site.	The easement to the south of the site is occupied by a railway line. The footpath forming the northern site boundary is now shown as a road.
1893	1:2,500	A building, possibly associated with the neighbouring Old Clay Pit is present on the southern boundary of the site.	An Old Clay Pit is present immediately to the south east of the site. Slackhills Colliery and two Shafts are present approximately 320m to the east of the site. An Old Shaft is present approximately 90m to the south of the site. A Clay Pit is present approximately 130m to the south of the site. A Brick Works and two Old Shafts are present 350m to the south west of the site.
1906	1:2,500	No change to the site.	The Old Clay Pit to the south east of the site is now Summer Lane Brickworks.
1929	1:10,560	The site is shown as raised ground.	An area of raised ground is present immediately to the west of the site. Summer Lane Brickworks is now shown as Refuse Destructor (Barnsley corpn). Old Shafts are shown approximately 250m to the south of the site. The Old Shaft approximately 90m to the south west of the site is no longer shown. Farm House Colliery and a Drift mine are shown approximately 500m to the west of the site. A large area of excavated ground is shown approximately 70m to the east of the site (beyond the road). A Brickworks with associated chimneys is shown approximately 230m to the east of the site.
1932	1:2,500	No change to the site.	A Chimney is shown as part of the Refuse Destructor site, immediately to the south east of the site.

DATE	SCALE	DESCRIPTION	
		SITE	SURROUNDING AREA
1956	1:10,560	No change to the site.	Farm House Colliery is shown as disused. A building (Factory) is shown approximately 20m to the west of the site.
1961	1:2,500	The buildings on the southern boundary of the site are shown as Brickyard Cottages.	The Refuse Destructor to the west of the site is now shown as Works and there has been significant earthworks undertaken. A large pond is present approximately 80m to the east of the site occupying the majority of the excavated ground. The remainder of the excavated ground is shown as a Spoil Heap. The Brickworks and Old Clay Pits to the south and south west of the site are no longer shown and have been part replaced by residential housing.
1966	1:10,560	No change to the site.	No significant change.
1973	1:10,000	An elongated building is shown on the northern portion of the site.	The Pond and Spoil Heap to the east of the site are no longer shown.
1979	1:10,000	The buildings on the southern boundary of the site have been demolished.	No significant change.
1993	1:10,000	The site is now shown to be part of an industrial estate.	A building is now present adjacent to the north east boundary of the site.

In summary, the site was open ground prior to 1893 when some small buildings, later referred to as Brickyard Cottages were built on the southern boundary of the site. In 1929 the site was shown as raised ground. Around 1973, another building in the northern corner of the site was built. Around 1979, the buildings on the southern boundary were demolished. In the surrounding area, clay pits and brick works have been present from the late 1800s to the 1960s and significant spoil heaps, excavations and subsequent land filling has occurred.

5. POTENTIAL CONTAMINATION

The site has harboured significant imported material (possibly colliery spoil), now demolished buildings at the southern end and an existing building at the northern end. Potential contamination may arise from the made ground that may have been imported and from the operations carried out within the buildings. Asbestos materials may have been used as part of the former buildings. Furthermore, the usage of the buildings on the site is unknown therefore the potential for low-level contamination associated with these former usages exists. Potential off-site sources of contamination comprise of the clay pits, collieries, brick works, the refuse destructor and landfill operations that occurred in close vicinity to the site.

6. SITE GEOLOGY

6.1 Geology

The published British Geological Survey (BGS) maps at scales of 1:50,000 (Sheet 87 "Barnsley") & 1:10,000 (Sheet SE30NE "Barnsley") show the site area to be underlain by mudstone of the Carboniferous Pennine Middle Coal Measures. The Pennine Middle Coal Measures comprises an alternating sequence of mudstone, siltstone and sandstone with coal seams. The Barnsley Rider Coal (0.16m to 0.61m) is shown to outcrop approximately 100m to the west of the site. The general dip of the strata in the area is gently towards the north east.

The presence of an old clay pit adjacent to the site suggests that a covering of clay (weathered mudstone) is present on site overlying the rock.

The north east portion of the site is shown to comprise of Made Ground.

An abandoned mine shaft is shown in the centre of the site.

Adits are shown 250m to the south east of the site and 250m to the west of the site.

6.2 Geological Faults

The BGS maps indicate the presence of a NE-SW trending geological fault with down throw to the south east running approximately along the north west boundary of the site. The 1:10,000 BGS map shows the Barnsley Coal Seam underlying the site downthrown by 10m to the south east.

Another fault trending NW-SE with down throw to the north east outcrops approximately 50m to the south west of the site.

As tectonic activity is not active at the present time it is unlikely that the fault will detrimentally affect the stability of the site unless in association with shallow mined ground.

6.3 Engineering Geology

The Pennine Middle Coal Measures sandstone and mudstone strata provide good bearing strata where unweathered and unfaulted for carrying the bearing pressures imposed by low rise development without undue settlement. There is a very low risk of the site being detrimentally affected by shrinkable clays, landslides, compressible ground and running sand. There is a negligible risk of the site being affected ground dissolution and collapsible deposits.

6.4 Previous Ground Investigation

A ground investigation comprising the drilling of 2No. boreholes using cable percussive methods was undertaken by Ashton Bennett in August 2007. The boreholes revealed a ground profile comprising 4.5m to 6.0m of made ground overlying firm to stiff clay with mudstone encountered between 5.0m.bgl and 6.3m.bgl. The locations of the boreholes are shown on the site plan (Drg No TSI 2902/2).

7. SITE HYDROLOGY AND HYDROGEOLOGY

7.1 Hydrology

The rainfall over the area of the site will drain into town drains and open ground on or adjacent to the site.

The site is shown by the Environment Agency not to lie within a fluvial flood risk area. The site is shown not to lie within a pluvial or surface water flood area. There are no available river quality assessments within 500m of the site. It is important that any contamination found on site is not allowed to detrimentally affect any watercourses. There are no surface water abstractions within 1000m of the site.

A small un-named stream is present approximately 400m to the south east of the site. The small stream appears to be in culvert for some distance and it is understood that it runs parallel with the railway to the south of the site. The next closest surface water course to the site is a tributary of the River Dearne, located approximately 1km to the north of the site.

7.2 Hydrogeology

The previously referenced BGS geological maps of the area indicate the site to be underlain by low-permeability mudstones overlying permeable sandstones. The sandstone bedrock will have moderate permeability through fractures in the rock.

Groundwater is not expected to lie at shallow depths below ground level. Groundwater is expected to be present at depth in the unweathered sandstone bedrock.

The Environment Agency Groundwater Vulnerability map indicates the site to lie on an area of a minor aquifer with high leaching potential. These are formations, which have a low permeability and may provide base flow to some rivers.

The Groundwater Vulnerability map indicates the minor aquifer is overlain by soils of high leaching potential which readily transmit liquid discharges because they are shallow or susceptible to rapid flow directly to rock, gravel or groundwater, and are soils with little ability to attenuate diffuse source pollutants in which non absorbed diffuse source pollutants and liquid discharges have the potential to move rapidly to underlying strata or

shallow groundwater. Care should be taken not to intrude into any aquifer and cause pollution to enter the aquifer.

The Environment Agency holds details of four potable groundwater abstractions within 1000m of the site. Two are situated 848m to the south east of the site and use water from a groundwater spring from the Middle Coal Measures sandstone for water bottling. Two are situated 883m to the south east of the site and use groundwater from a spring from the Middle Coal Measures sandstone for water bottling. The local groundwater may also be utilised for abstraction from old unlicensed wells. It is thus important that it is protected from pollution. It is an offence to pollute the groundwater, whether or not it is used for abstraction.

The Environment Agency holds no records of authorisation issued by the Environment Agency to discharge to watercourses in accordance with the Water Resources Act 1991, within 250m of the site.

8. QUARRYING AND MINING

8.1 Quarrying

Old clay pits were present immediately to the south east of the site, approximately 130m to the south of the site and to the east of the site beyond West Road. A number of small old sandstone quarries are present within 500m of the site.

8.2 The Coal Authority Report

The Coal Mining Report obtained from The Coal Authority for the site states that according to their records the property is in the likely zone of influence from 5 seams of coal mined at 180-370m depth, and last worked in 1978. Any ground movement associated with these workings should have stopped by now. The property is not in the likely zone of influence of any present underground coal workings. The property is not in an area for which the Coal Authority is determining whether to grant a license to remove coal using underground methods. Reserves of Coal do exist in the local area which could be worked at some time in the future. The property is in an area for which notices of entitlement to withdraw support were published in 1944 and 1948. Details of The Coal Authority Report are presented as Appendix B and should be read in full.

8.3 Shallow Mining

The geological maps indicate the possible presence of the Barnsley Rider Coal at shallow depth beneath the site (<30 mbgl). It is possible that these coal seams were worked before the requirement in 1872 to deposit abandonment plans with the Ministry of Power and as such may not be recorded by the Coal Authority. If voids are present in shallow mined coal

seams they can migrate by successive roof collapse over the years and cause ground subsidence and structural damage to overlying structures.

8.4 Mine Shafts

The Coal Authority report indicates the presence of an abandoned mine shaft on the site. It is not known as to what measures have been taken to backfill the shaft.

9. REGULATED INDUSTRIES

Results of searches for regulated industries are presented in Table 2.

TABLE 2
Authorisations, Incidents and Registers

	ON SITE	WITHIN 250m	DETAILS
Historic Ground Workings	-	3	Old clay pits were present immediately to the south east of the site, approximately 130m to the south of the site and to the east of the site beyond West Road.
Landfill Sites (within 250m)	-	8	45m east of site: Allotment Gardens. 73m west of site: Recreation Ground, Pogmoor Road. 96m south east of site: Land north of Dodsworth Road. Inert, Industrial and Commercial Waste Type. 136m south east of site: Land west of Summer Lane. Inert, Industrial and Commercial Waste Type. License 18/11/82 – 03/06/88(Co-op Retail Services) 146m east of site: West Road. Inert and Commercial Waste Type. License 15/07/87 – 31/12/90 (Barnsley Metropolitan Council) 165m south west of site: Quarry at Higher Spring Head Farm. Inert and Commercial Waste Type. 171m east of site: West Road. Inert Landfill – no waste restrictions. 188m south east of site: West Road. Inert Landfill – no waste restrictions.
Treatment & Transfer Sites	-	1	133m south east of site. Haulage Yard off West Road. Non hazardous Waste Type.
Waste Management Sites	-	2	65m south east of site. Haulage Yard. Off West Road. Household, Commercial & Industrial Waste 133m south east of site. Haulage Yard, Off

	ON SITE	WITHIN 250m	DETAILS
			West Road. Household, Commercial & Industrial Waste
Radioactive Consents	-	-	-
Dangerous Substance Inventory	-	-	-
Control of Major Accident Hazards Regs and NIHHS	-	-	-
Prosecutions or Enforcement Action	-	4	47m south east of site. S J Autowelding, West Road-Waste Oil Burning Process (Current Permit). No Enforcement notified 101m north west of site. Intake 1 Service Station, Pogmoor Road-Petrol Vapour Recovery Process. (Current Permit) No Enforcement Notified. 136m north west of site. Crows Garage, Pogmoor Road – Waste Oil Burning Process. (Current Permit) No Enforcement Notified. 176m south east of site. Polar Motor Co Ltd, Dodsworth Road – Vehicle Re-spray Process. (Current Permit) No Enforcement Notified.
Hazardous Substances Consents	-	-	-
Integrated Pollution Control (IPC)	-	-	-
Integrated Pollution Prevention and Control (IPPC)	-	-	-
Local Authority Pollution Prevention and Control	-	-	-
Pollution Incidents	-	2	45m south east of the site. 06/02/2003 General Biodegradable Materials and Wastes (oils and Fuels, Natural organic & unidentified oils) Category 4 Water & Air Impact. Category 3 Land Impact. 47m north east of site. 09/09/2002. General Biodegradable Materials and Waste (General) Category 4 Water Impact. Category 3 Land & Air Impact.
Fuel Stations (within 250m)	-	2	110m north west of the site. Jet Intake 1, Pogmoor Road. 184m south of the site. Obsolete, Polar Motor Company Ltd, Dodsworth Road.
Designated Environmentally Sensitive Sites (SSSI, NNR, LNR, SAC, SPA, RAMSAR, AONB, Nat Parks)	-	1	Nitrate Vulnerable Zone
Radon Affected Area	NO		Property in area where less than 1% of properties are above the Action Level.
Discharge Consents	-	-	-

	ON SITE	WITHIN 250m	DETAILS
Red List Discharges to Controlled Water	-	-	-
Adjacent Potentially Contaminative Sites	1	16	On site, 58m & 114m south east of site – Industrial Estate. 39m south east of site – Tanks 47m south east of site – S J Auto Welding – Cutting, drilling and welding Services. 59m north west of site - Tanks 65m south east of site – Hiltons Electrical Services Ltd. 98m north west of site – Barnsley Computers – Electrical Equipment Repair and Servicing 102m north west of site – Jet Intake 1 & Car Wash. Petrol and Fuel Station. 114m north west of site – Discontinued Bathrooms. Industrial Coatings and Finishings 136m north west of site-Crows Garage. Vehicle Repair and Servicing. 166m north east of site-Easy Life Mobility 189m south east & 246m east of site-Works 208m east & 232m north of site-Electricity Sub Station.
Site Determined as Contaminated Land Part IIA EPA 1990	NO		-
Residential Property (within 250m)	YES		To the immediate north and west of site.

Results of searches for regulated industries are presented in Table 2 above and indicate that a number of potentially contaminative off-site past and present activities could have affected the site.

10. ENVIRONMENTAL RISK ASSESSMENT

10.1 Introduction

It is proposed to change the site use from industrial land use to residential housing with hard cover and potentially landscaped ground and gardens. The environmental liabilities of the site and risk assessments have been undertaken for this potential future use. If the proposed site use changes then a further risk assessment will be required.

Environmental risk considerations on the site have been assessed by adopting a site specific qualitative approach to identify the risk, if any, of environmental harm. In accordance with the DETR Draft Statutory Guidance on Contaminated Land the approach is by identifying a

hazardous source and establishing possible links between the source via exposure pathways to a potential receptor.

The hazard is a contaminant or potentially polluting substance that is in, on or under the land and which has the potential to cause harm or to cause pollution to controlled waters. The receptor is a living organism or organisms, an ecological system or piece of property, which is being harmed, interfered with or polluted by the contaminant. The pollutant linkage is by means of the pathway which is one or more routes by or through which that receptor is being, or could be, exposed to, or affected by, that contaminant. Thus the presence of a hazard on a site does not necessarily mean that there are risks unless pathways and receptors are present and are receptive to being affected by that specific hazard or contaminant.

SOURCE	release of pollutant	PATHWAY	route to receptor	RECEPTOR
eg. oil spills		eg. permeable strata		eg. River

The likelihood of contamination affecting the environment depends on the migration and persistence of contaminants which varies with the nature of the contaminant and the ground and groundwater conditions, and the presence of sensitive receptors.

The likelihood or risk of sensitive receptors being affected is based on a very low/low/medium/high/very high risk rating.

Very Low	=	It is very unlikely that an environmental risk exists, no remediation
Low	=	It is unlikely that an environmental risk exists, remediation unlikely
Medium	=	It is possible that an environmental risk exists, remediation possible
High	=	It is likely that an environmental risk exists, remediation probable
Very High	=	It is very likely that an environmental risk exists, remediation certain

Any category which shows as medium risk or above may require investigation and if high risk is proven, remediation may be required following investigation.

10.2 Potential Sources of Contamination, Pathways and Receptors

10.2.1 Potential Sources of Contamination

Potential sources and areas of contamination were investigated through archival maps, an environmental database search and a site reconnaissance. In summary, the site was open ground prior to 1893 when some small buildings, later referred to as Brickyard Cottages were built on the southern boundary of the site. In 1929 the site was shown as raised ground. Around 1973, another building in the northern corner of the site was built. Around 1979, the buildings on the southern boundary were demolished. In the surrounding area, clay pits and brick works have been present from the late 1800s to the 1960s and significant spoil heaps, excavations and subsequent land filling has occurred. Current activities on the site comprise of a vehicle repairs business and a number of potential sources of contamination were observed during the site walk over, such as storage of broken vehicles and the presence of discarded oil drums. Off site sources of contamination exist including

landfill sites, the backfilled clay pits, nearby industrial land uses and recorded pollution incidents.

There is thus a potential for contamination to exist on the site, either from past or present on-site and off-site activities.

10.2.2 Potential Pathways for Migration

The potential pathways for carrying any contamination present on the site to reach sensitive receptors may include:

a) *Ingestion of and/or skin contact with contamination in the soil*
High – the site has harboured imported material and potentially contaminative land uses since the 1920s. There is therefore a high risk to future occupants of houses which should be assessed by intrusive investigation and testing. There will be risk to workmen which may be partly mitigated by appropriate use of Personal Protective Equipment. There is a low risk of contamination in the soil migrating off site due to low permeability of expected clay soil underlying the site.

b) *Ingestion of contamination and uptake of contamination in plants/vegetables/animals*
High – vegetables may be grown in proposed residential gardens on the site, presenting a risk to occupants of the proposed houses and this risk requires investigating with suitable remediation or mitigating measures deployed as necessary. It is considered that animals in the food chain are unlikely to be present on site.

c) *Ingestion of contaminated drinking water through leaching of contamination into groundwater flowing to underlying aquifers/water abstractions*
Low to Medium – leaching of any contamination may detrimentally affect shallow groundwater if present beneath the site. The site lies on a minor aquifer with soils of a high leaching potential and it is important that it is not contaminated. The site is not within a Source Protection Zone and known groundwater abstractions are distant (two recorded potable water abstraction located 848m to the south east and a further two located 883m to the south east). It is recommended that any groundwater encountered during ground investigation is tested for contamination.

d) *Inhalation of vapours produced by landfill/radon/hydrocarbons/old mines*
High – It is known that material has been imported on to the site since the 1920s. Also, there are eight recoded landfill sites within 250m of the site. The site does not lie in a radon protection area. Ground gas may be produced by any organic materials or contamination present in any made ground that may be present on the site. Hydrocarbons may be present in the ground from previous and existing land use and mine gas may be present from shallow mining. Monitoring is required to assess risk.

e) *Inhalation of contaminated airborne dust*

Low – The appropriate safety measures must be exercised to protect both the workers and the local residents from dust during construction. Provided this work is carried out diligently, the ongoing risk is low.

f) *Contamination of controlled surface waters*
Low - Leaching of contamination into surface water is unlikely as surface water is distant.

10.2.3 Potential Sensitive Receptors

By considering where a viable pathway exists which connects a source to a receptor, this assessment will identify where pollutant linkages may exist. If there is no pollutant linkage, then theoretically there is no risk. Therefore only where a viable pollutant linkage is established does this assessment go on to consider the level of risk. On this site there is a medium to high potential for contamination to exist and viable pathways are present for distribution of contamination to sensitive receptors.

TABLE 3
Risk Assessment for Residential With Plant Uptake

Pathways	Receptors	Risk	Probability of Risk	Severity of Risk Risk Reduction
Inhalation of vapours such as methane from landfill and radon, hydrocarbons and mine gas.	Existing/future occupants of the proposed development and workmen. Neighbouring land use.	High – Infilled ground on and within 250m of the site. Made ground known to be present on site. Potential for mine gas. Radon protective measures not required.	High	High. Methane can be explosive in air. Risk reduction required by monitoring for toxic gases and mine gas and adopting appropriate mitigation.
Ingestion of and/or skin contact from contaminated soil.	Existing/future occupants of the proposed development and workmen.	High – Made ground known to be present beneath the site. Potentially contaminative existing and former usage of buildings on the site.	High	High. Risk reduction required by testing soil for contamination and adopting appropriate mitigation measures.
Ingestion of contaminated drinking water.	Local abstraction wells	Low to Medium – Site on minor aquifer. Closest registered potable boreholes 848m from the site.	Low	High. Severe consequences if potable water is contaminated. Risk reduced by testing for contamination, testing any groundwater encountered and adopting suitable mitigation measures.
Transportation by surface and/or groundwater.	Groundwater. (Surface 400m to the south east).	Low to Medium – Shallow groundwater is not expected, surface water is distant.	Low	High. Prosecution can occur if site is affecting controlled waters.

Pathways	Receptors	Risk	Probability of Risk	Severity of Risk / Risk Reduction
		However, site is on a minor aquifer and groundwater should be tested if encountered.		
Ingestion and uptake of contamination in plants/animals/ vegetables	Existing/future occupants of the proposed development.	High - Gardens may be included as part of the proposed development.	Medium to High	Medium to high. Risk reduction required by testing soil, remediating any contamination and sealing and / or importing clean materials if necessary.
Inhalation of airborne dust	Workmen & future occupants of the site. Neighbouring land use.	Low – Provided dust suppression during construction and any asbestos (if present) removed according to government regulations	Low	Low. Provided recommendations undertaken.

The potential sensitive receptors on the site, once the site is changed for residential use with plant uptake, which could be detrimentally affected by any contamination and the likelihood of them being affected, are identified in Table 3.

10.3 Risk Assessment

The risks have been assessed purely on the Phase I Desk Study undertaken and on the assumption that the site will in the future be used for residential dwellings with hard cover, landscaped ground and gardens.

The potential contamination, pathways and receptors were taken into account during the Desk Study. The assessment of the likelihood of receptors being affected detrimentally is that it is a low likelihood that groundwater, potable water or surface water is being polluted due to the distance to potable abstractions and surface water. It is considered that there is a high likelihood that land or humans on and / or adjacent to the site are being detrimentally affected by any contamination on the site. Without remediation, there is a high risk that future occupants of the site could be detrimentally affected by inhalation/ingestion or skin contact with contamination in the ground, landfill and mine gas. Workmen may be detrimentally affected by contamination and ground gas.

It is considered high risk that contamination exists on the site and a low / low to medium risk that contamination could migrate and detrimentally affect surface / ground water. There is a high risk that contamination may detrimentally affect site users or workman by ingestion/skin contact. There is a high risk that contamination may detrimentally affect site users, adjacent land uses and workmen by inhalation. These preliminary risk assessments

require quantifying by ground investigation and soil / groundwater testing and gas monitoring on the site.

Radon protection is not required.

There is a risk that voids may be present in shallow mined coal seams (<30m bgl) which requires investigation to assess ground stability for the proposed development.

11. RECOMMENDATIONS

Based on the Desk Study undertaken it is concluded that there is a high risk of contamination detrimentally affecting sensitive receptors adjacent to and on the site. However, provided investigation, soil and groundwater testing and gas monitoring is undertaken to assess the potential for contamination and provided suitable precautions are undertaken to prevent any detected gas or contamination reaching sensitive receptors then the risks can be reduced to acceptable limits. There is a high risk of contamination being present on the site in the form of heavy metals, organic compounds, landfill and mine gas and detrimentally affecting future occupants, workmen and users of the site. A Phase II Investigation is recommended for assessment of load bearing strata, for foundation design, for undertaking tests for the presence of contamination in soil and groundwater and for ground gas monitoring. On completion of the Phase II the risks can be re-assessed and a remediation plan can be designed if significant contamination is found to be present at the site.

Soakaways are unlikely to be viable due to underlying clay soils and mudstone and are not recommended if contamination is present on the site.

Ground stability requires investigation to assess the potential for voids in shallow mined coal seams detrimentally affecting the proposed development. If voids are present at shallow depth ground investigation and stabilisation may be required beneath selected house plots. Additionally the abandoned mine shaft on the site needs to be located, investigated and stabilised.

Provided the investigation and any necessary remediation to residential use standards and ground stabilisation is undertaken then the site would be suitable for residential development with gardens.

12. GENERAL REMARKS

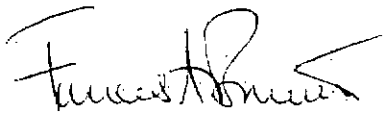
This report truly reflects the conditions found during the desk study. Whilst the desk study was undertaken in a professional manner taking due regard of additional information which became available as a result of ongoing research, the results portrayed only pertain to the information attained, and the ground and gas conditions, mining conditions and

contamination expected and it is possible that other undetected information and undetected ground and gas conditions, undetected mining conditions and undetected contamination may exist. The desk study was only undertaken within the site boundaries and should not be used for interpretation purposes elsewhere. These conclusions are only a brief summary of the report, and it is recommended that the report is read in full to ensure that all recommendations have been understood.

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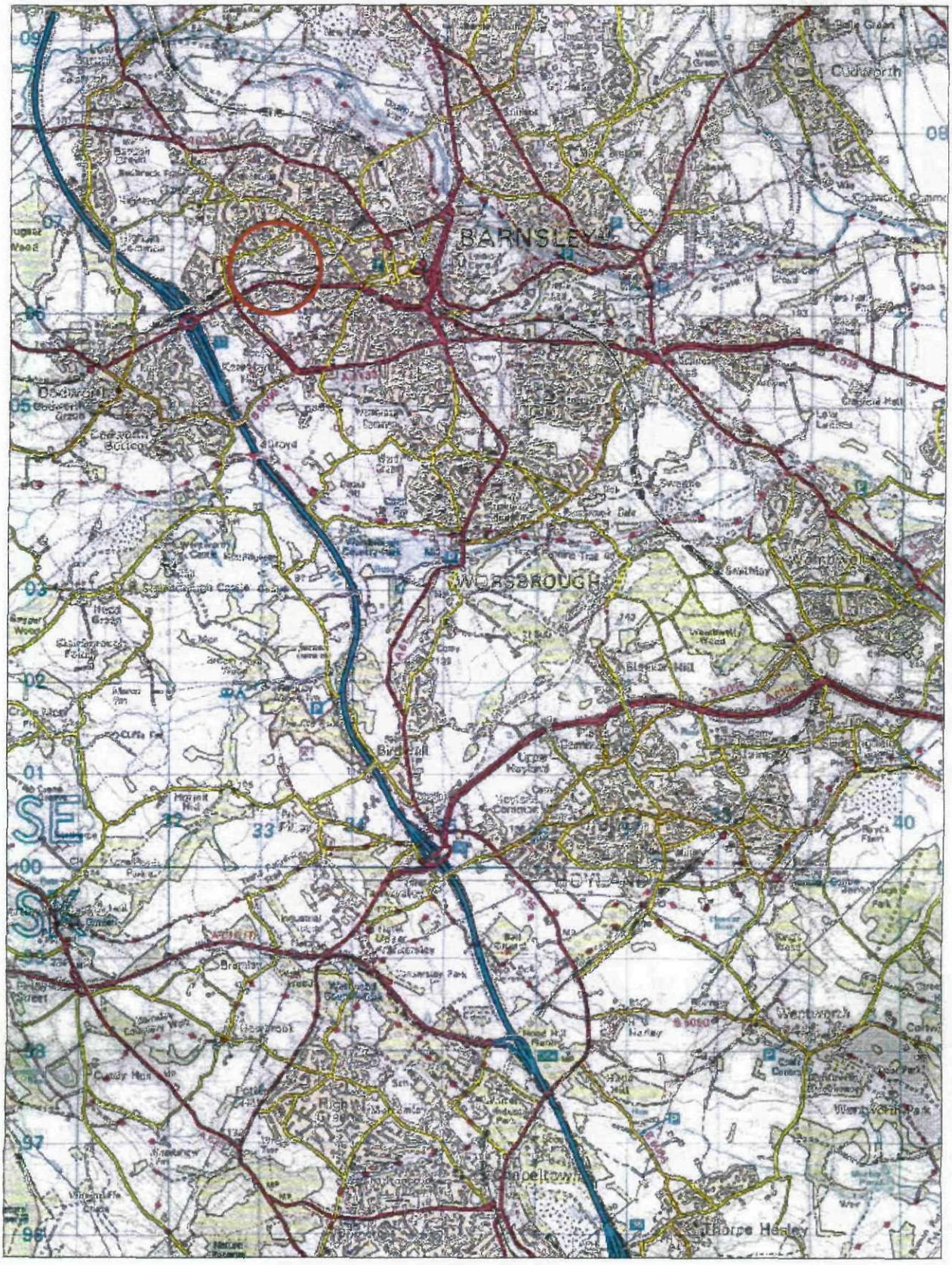
Jim Dennis
BSc, MSc, FGS, DIC



Frances A Bennett
BSc, CGeol, FGS, FIMMM, CEnv, MCIWEM, AIEMA, MIEnvSci.

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Plot 1, Land off West Road, Pogmoor, Barnsley – SITE LOCATION PLAN

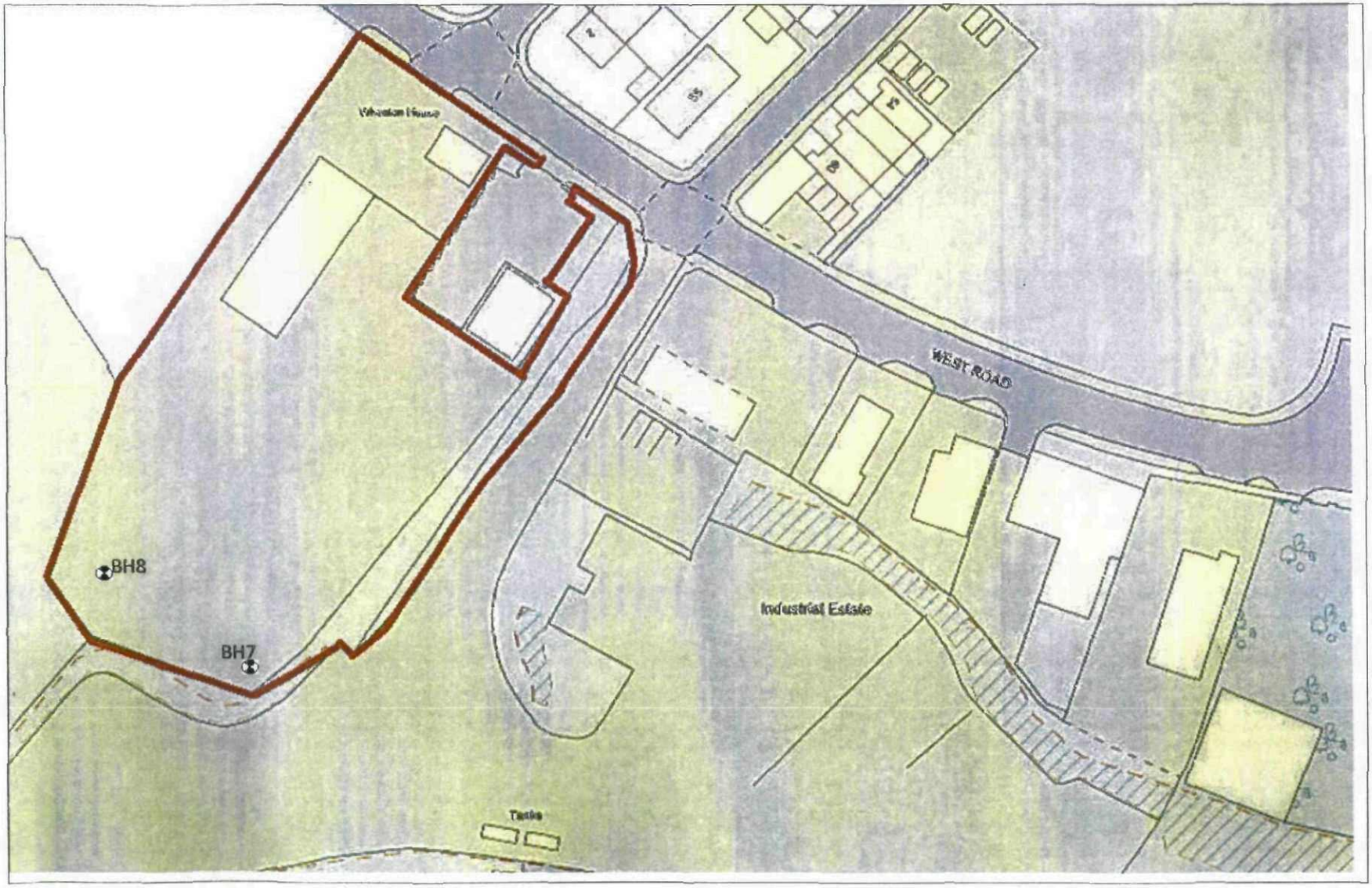


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Drg. No. TSI 2902/1

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Plot 1, Land off West Road, Pogmoor, Barnsley– SITE PLAN



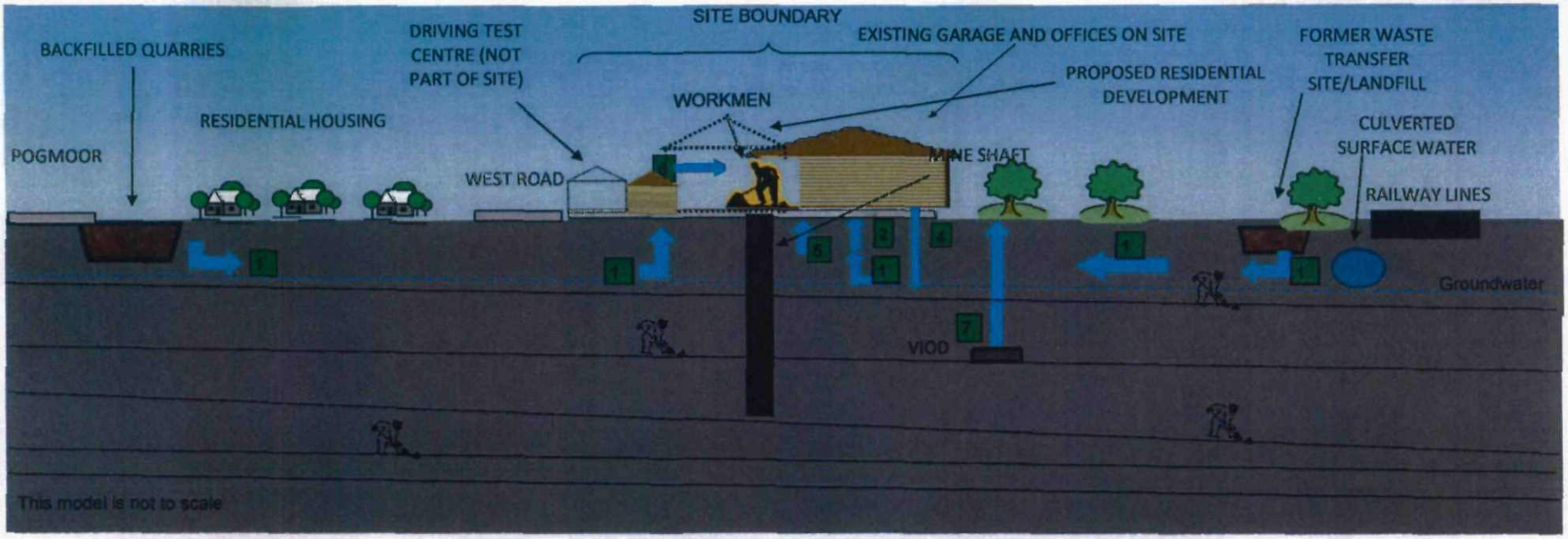
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PLOT 1, LAND OFF WEST ROAD, POGMOOR, BARNSLEY



SOURCES	PATHWAYS	RECEPTORS	RISK
HISTORICAL USE AS INFILLED GROUND BUILDINGS REFUSE DESTRUCTOR REFUSE TIP MINING NEIGHBOURING ACTIVITIES LANDFILL POLLUTION INCIDENTS MINING & QUARRYING	1 Inhalation of vapours	Workmen/future occupants of residential house Neighbouring land use	High.Ground gas from backfilled quarries, underground mining and made ground.
	2 Ingestion and or skin contact	Workmen/future occupants of residential houses	High. Possible soil and groundwater contamination.
	3 Ingestion of drinking water	Potable borehole 848m from the site	Low-due to distance to potable boreholes
	4 Leaching to surface/groundwater	Groundwater and surface water	Low - due to distance to surface water and groundwater abstractions
	5 Ingestion of plants/ animals/ veg	Future site occupants of residential houses	High. Gardens and landscaped ground may be proposed
	6 Inhalation of dust	Workmen & neighbouring land use	Low - provided precautions taken during construction.
	7 Ground subsidence	Possible shallow mining and mine *shafts*.	High - coal could have been *mined locally at <30m bgl.*

GEOLOGY
INFILLED GROUND
MIDDLE COAL MEASURES
COAL SEAM

Drg. No. TSI 2902/3

Appendix A

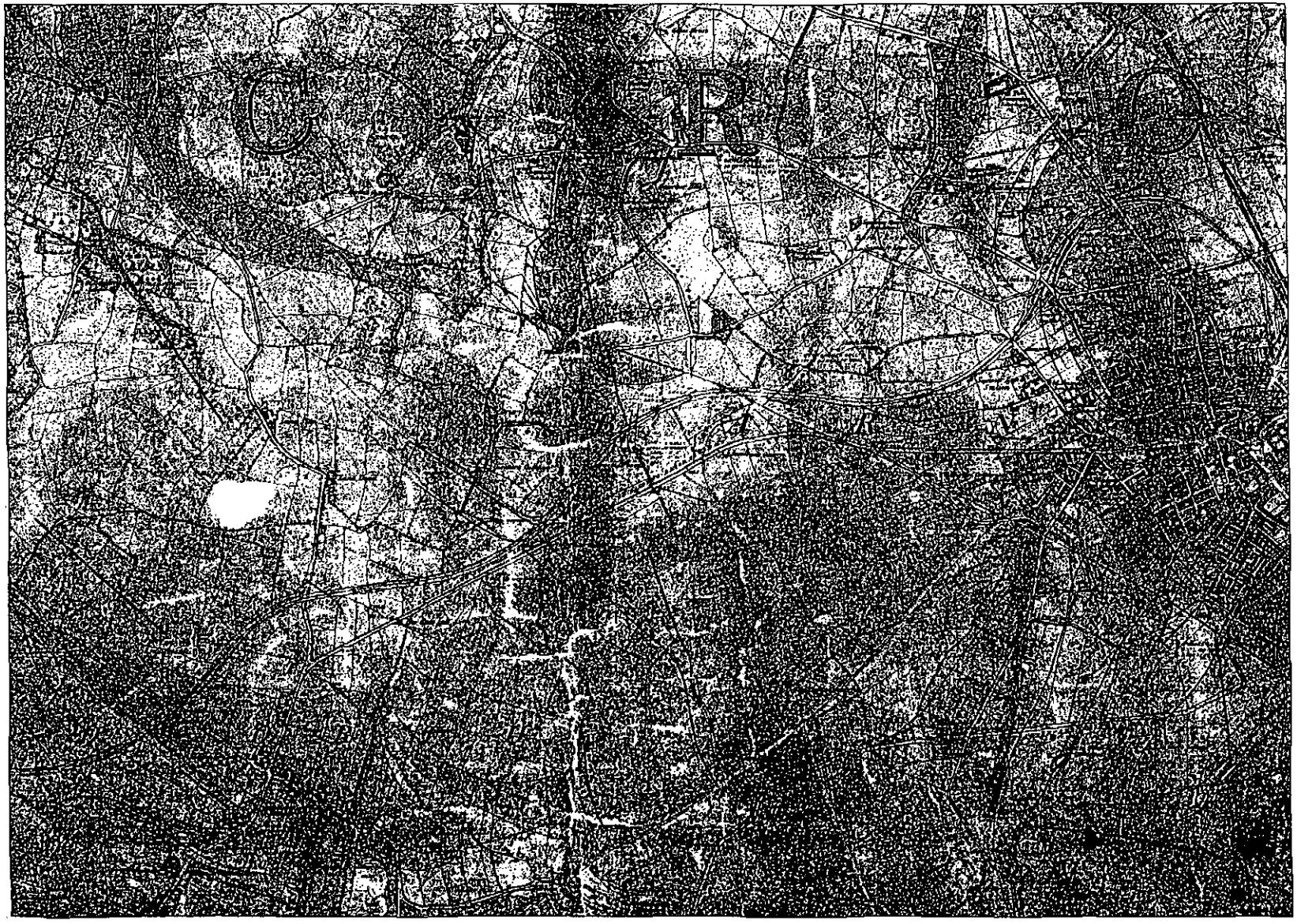
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Land off West Road, Pogmoor, Barnsley – OS MAP 1850



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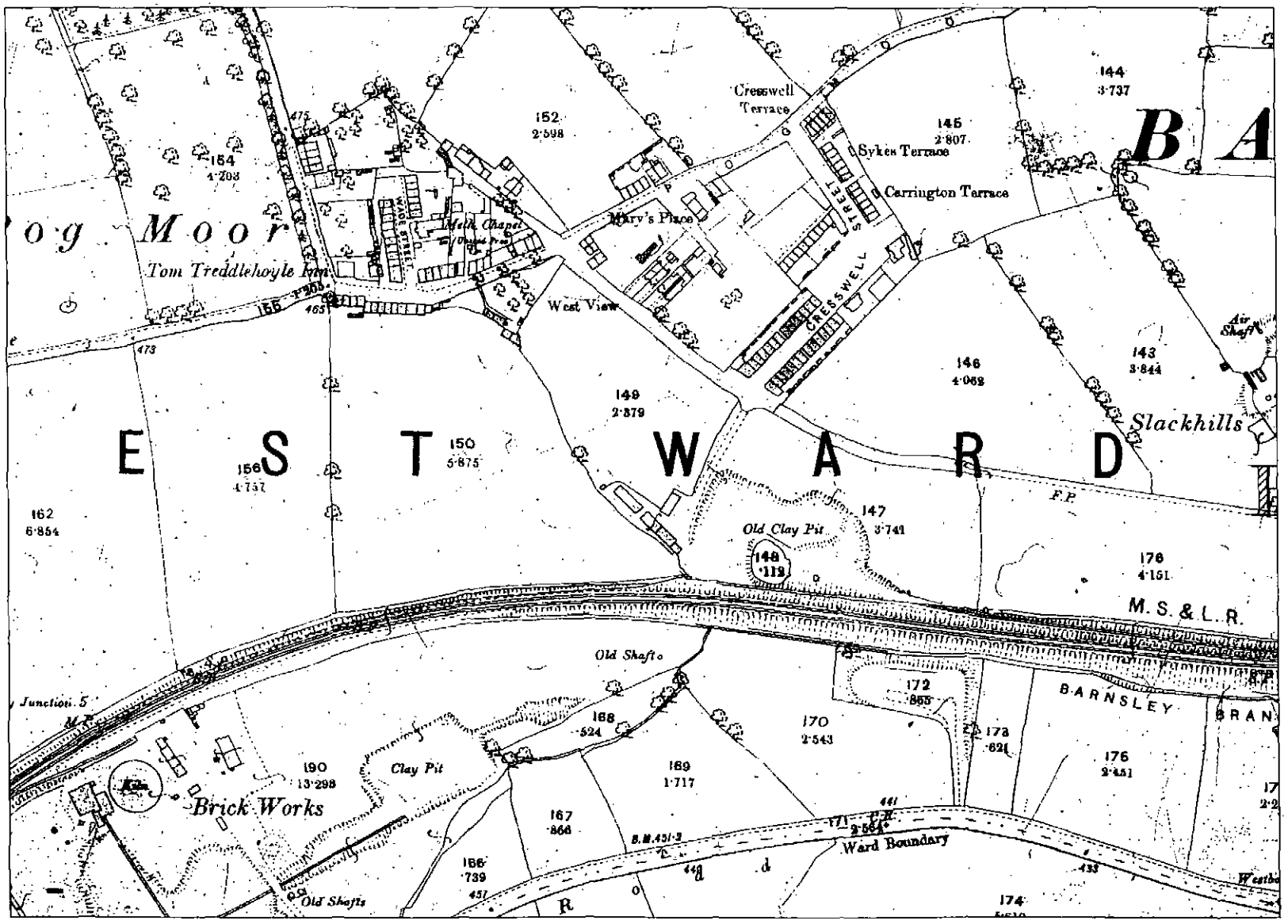
Land off West Road, Pogmoor, Barnsley– OS MAP 1855



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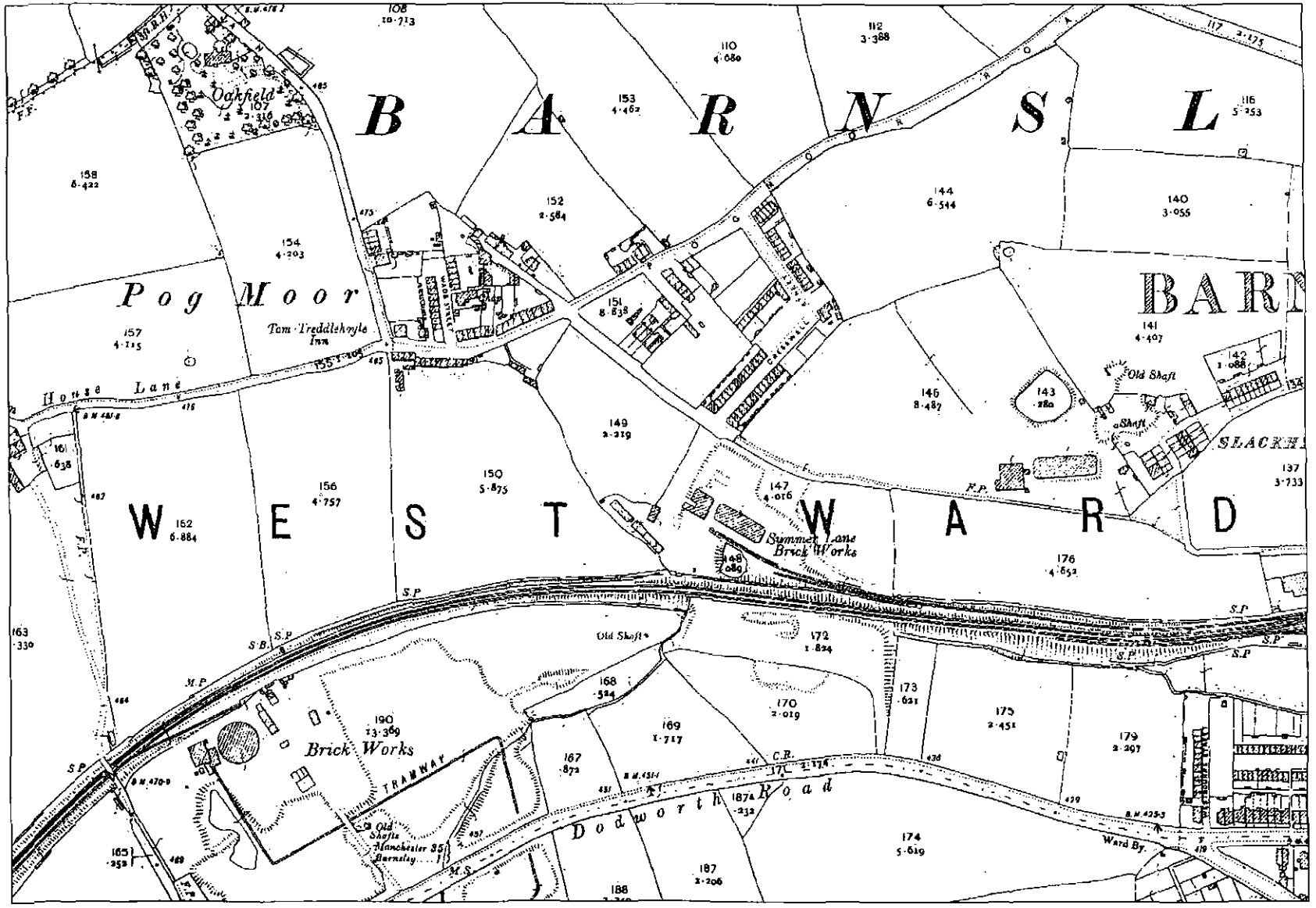
Land off West Road, Pogmoor, Barnsley – OS MAP 1893



Scale: 1:2,500 Reduced

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Land off West Road, Pogmoor– OS MAP 1906



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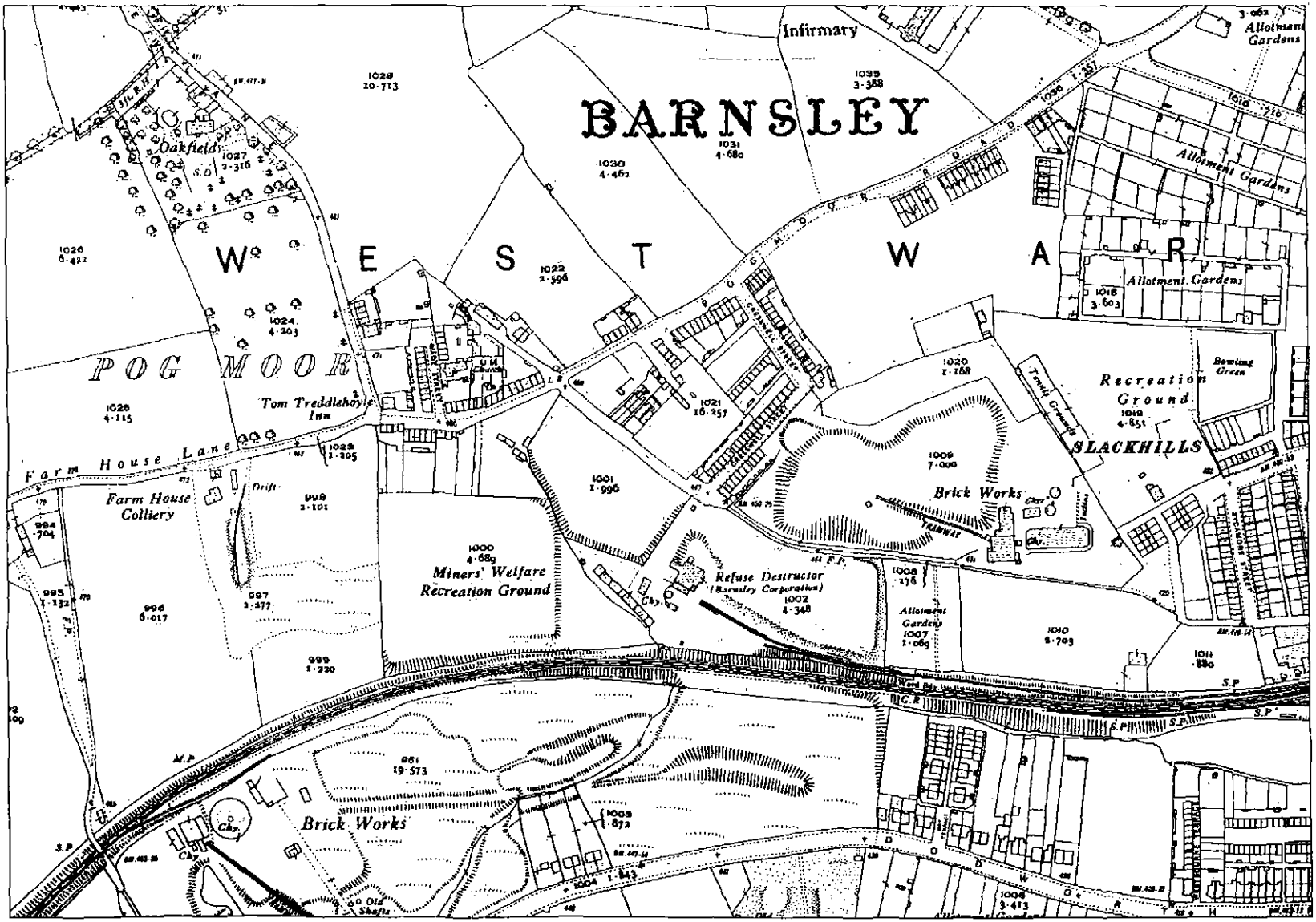
Land off West Road, Pogmoor, Barnsley – OS MAP 1929



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Land off West Road, Pogmoor, Barnsley – OS MAP 1932



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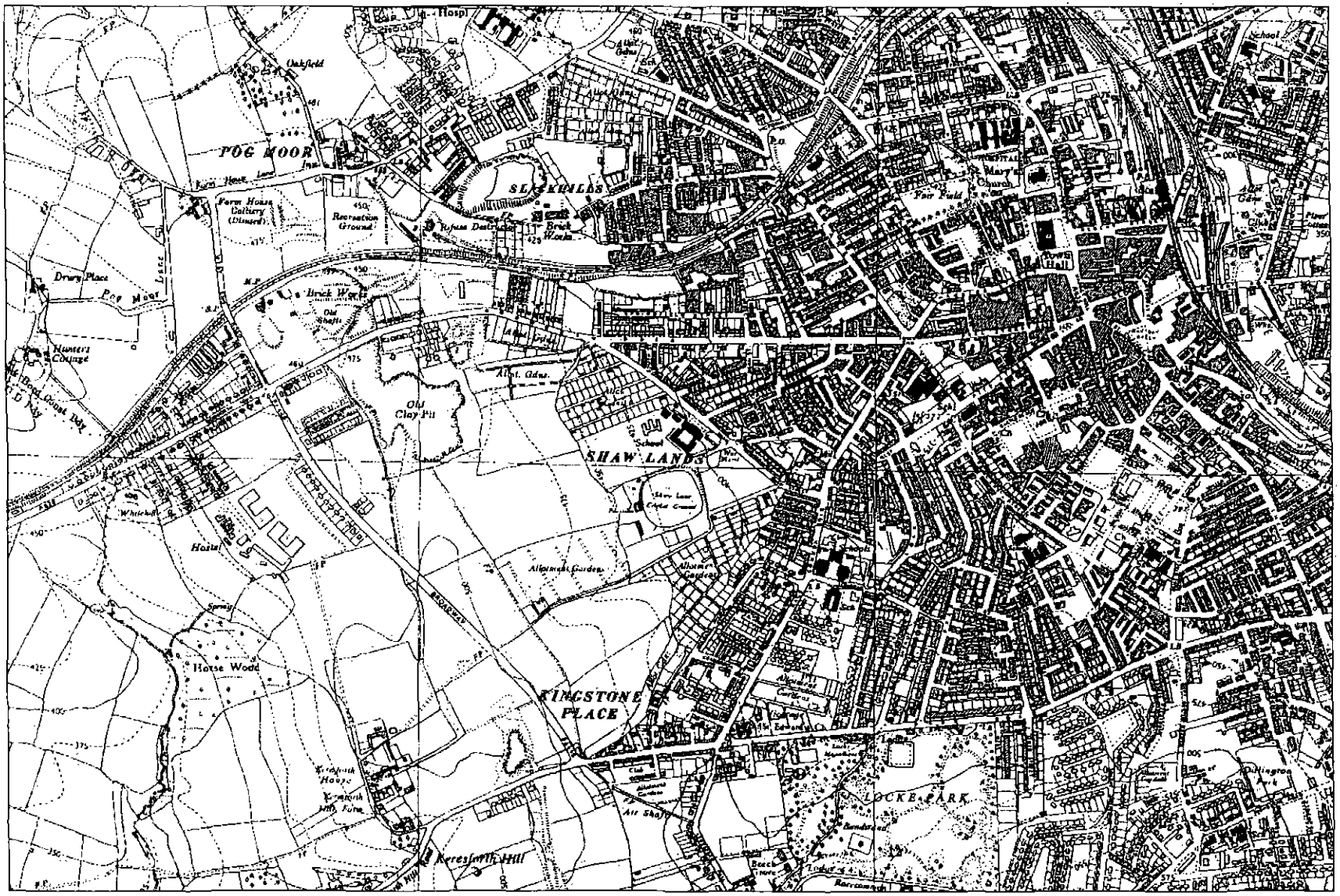
Land off West Road, Pogmoor, Barnsley – OS MAP 1929



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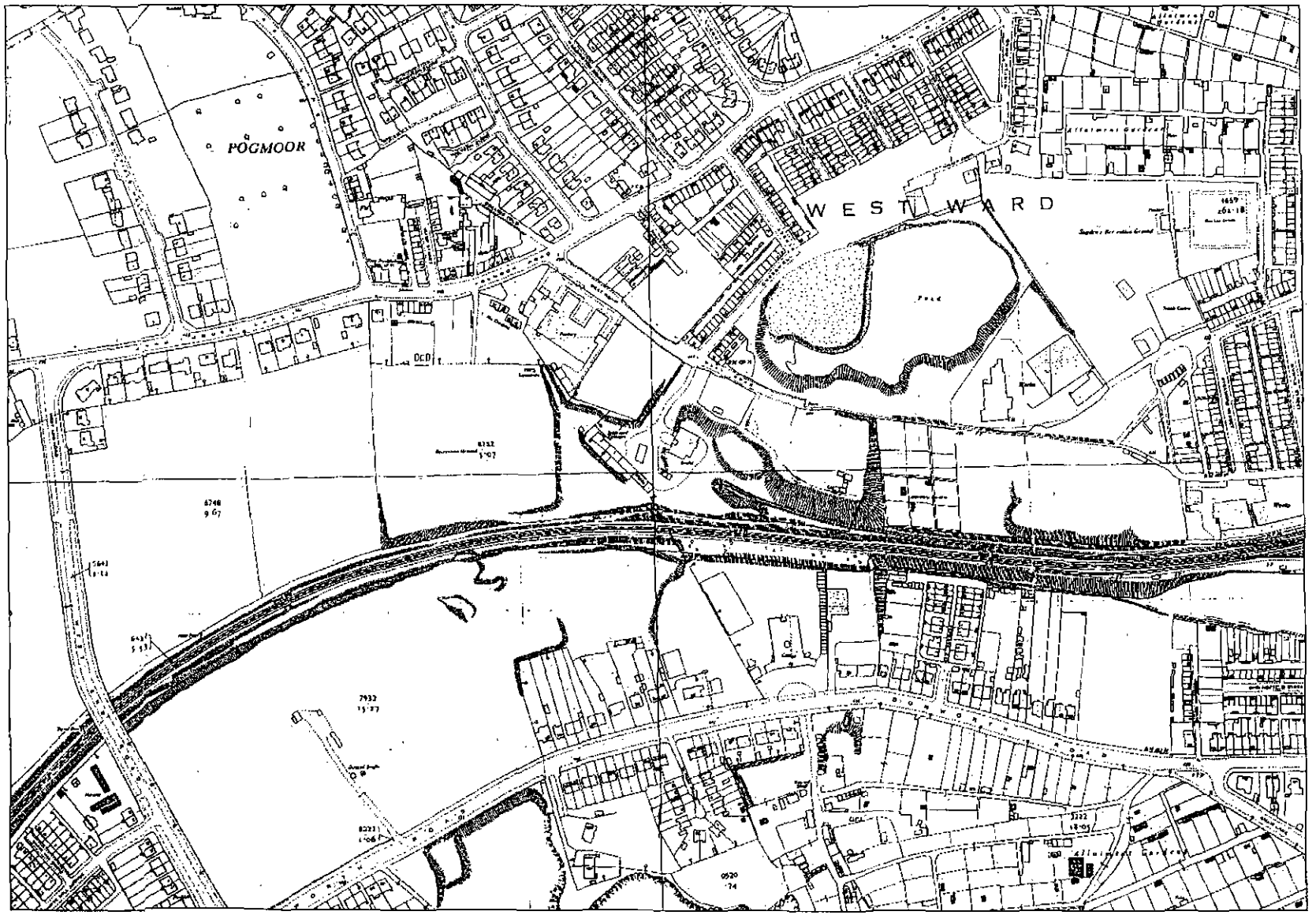
Land off West Road, Pogmoor, Barnsley – OS MAP 1956



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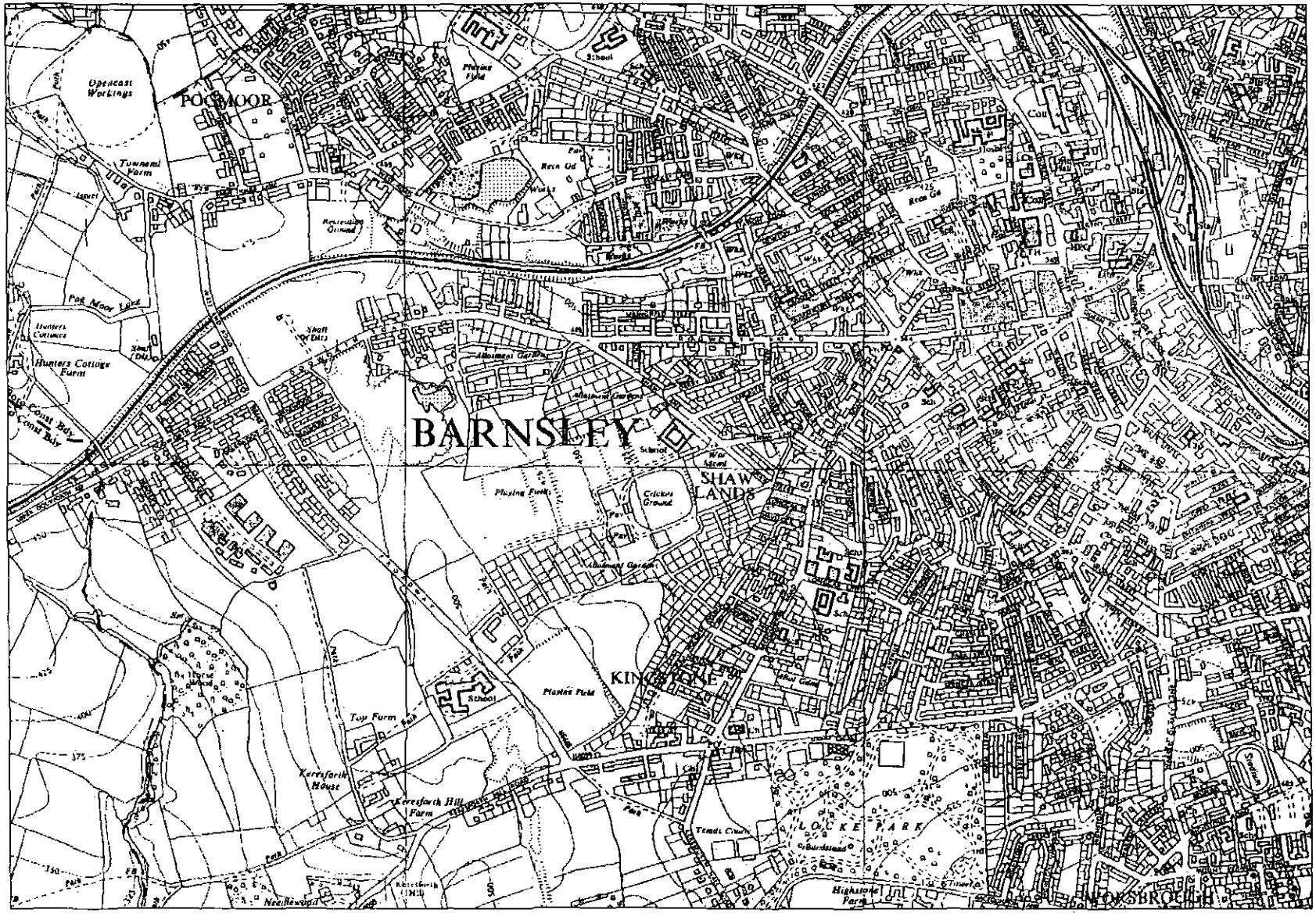
Land off West Road, Pogmoor, Barnsley – OS MAP 1961



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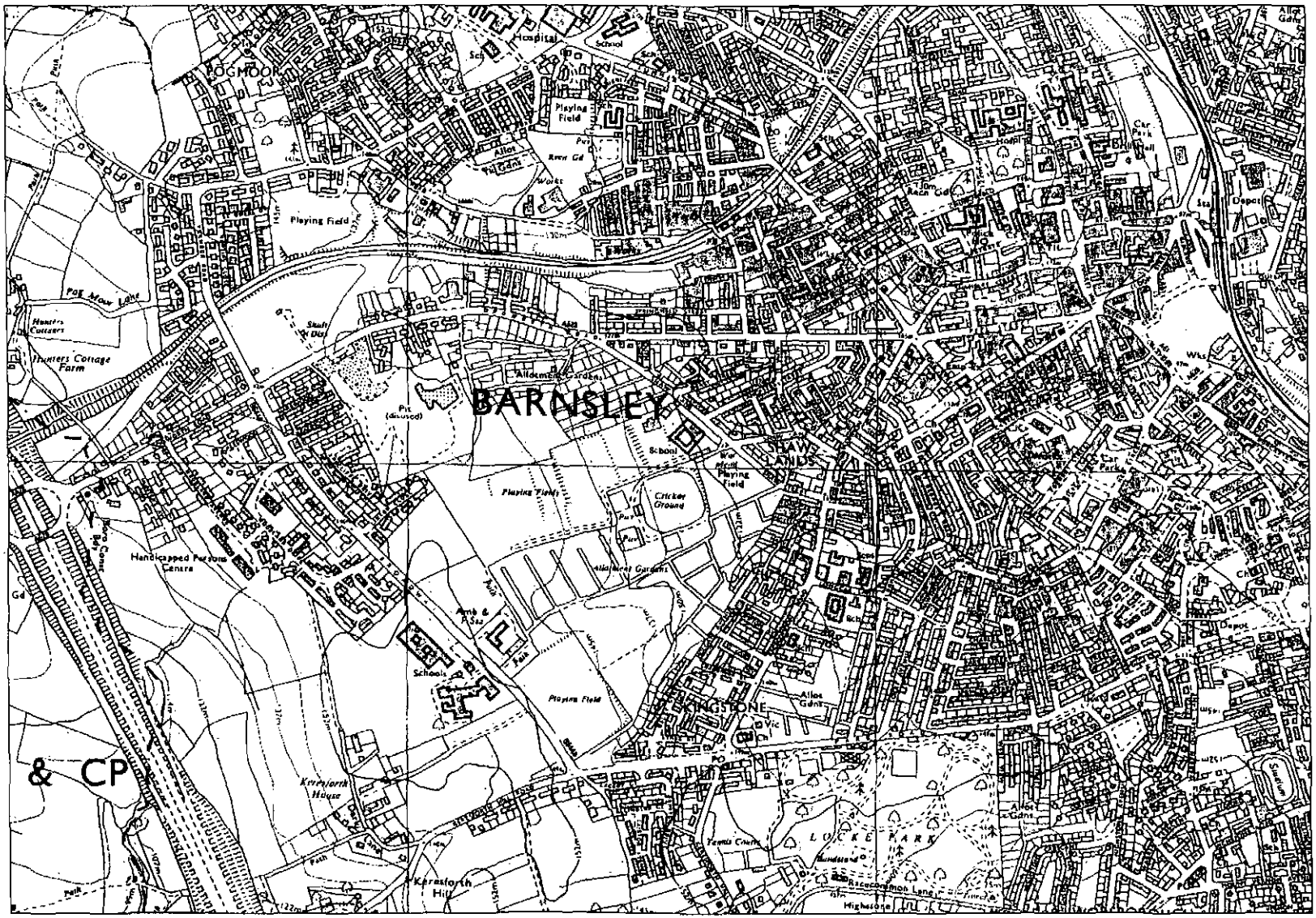
Land off West Road, Pogmoor, Barnsley – OS MAP 1966



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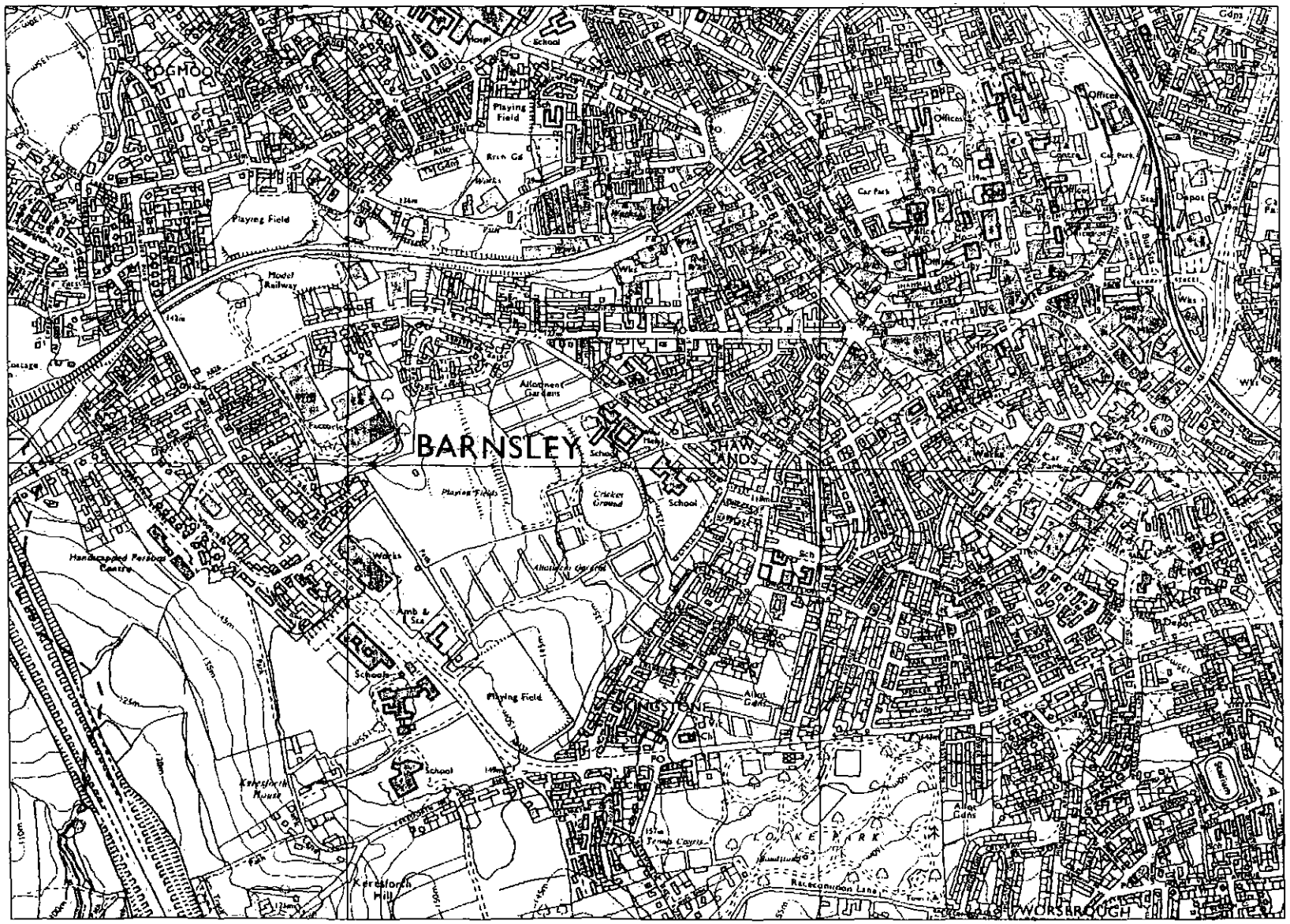
Land off West Road, Pogmoor, Barnsley – OS MAP 1973



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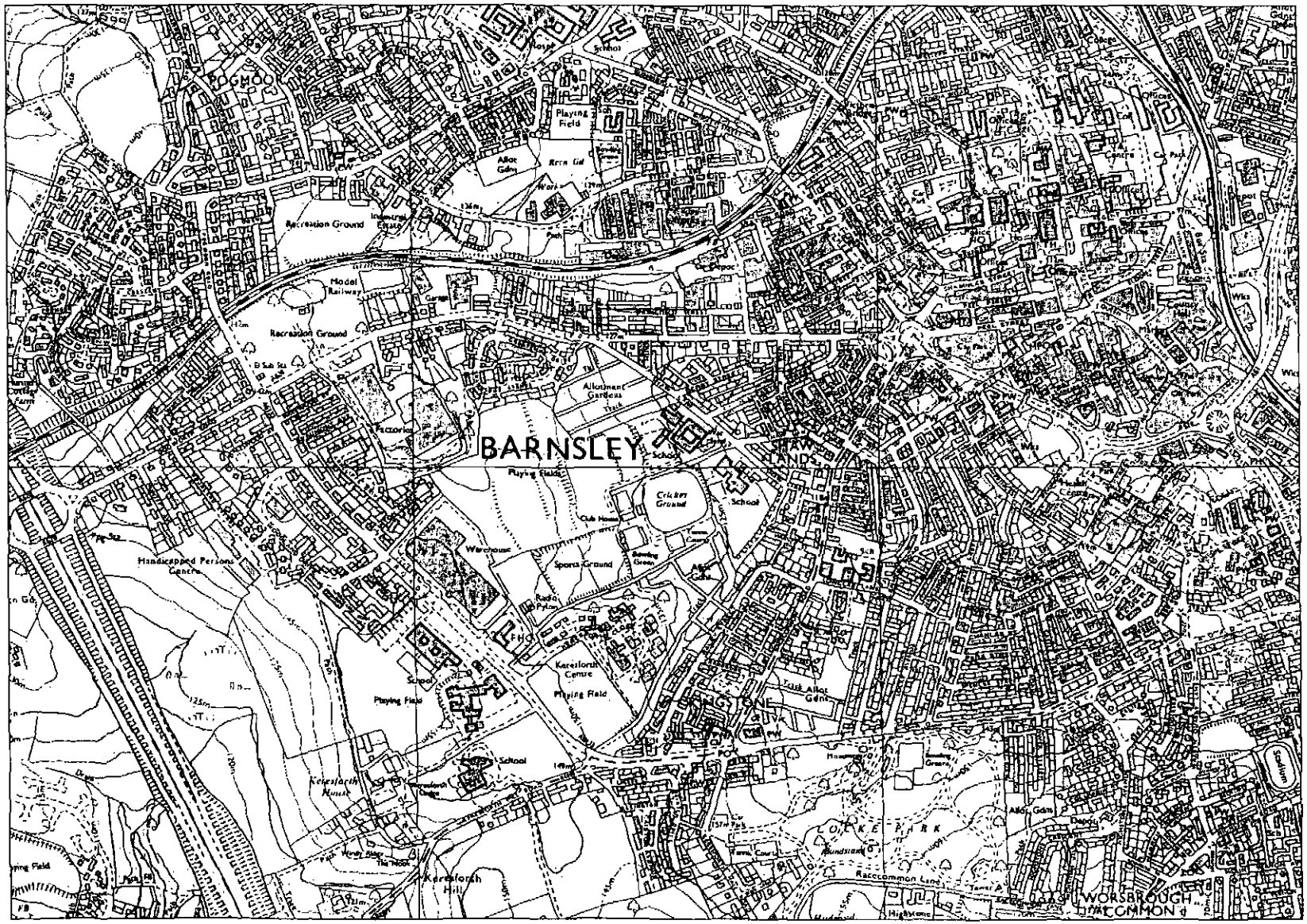
Land off West Road, Pogmoor, Barnsley – OS MAP 1979



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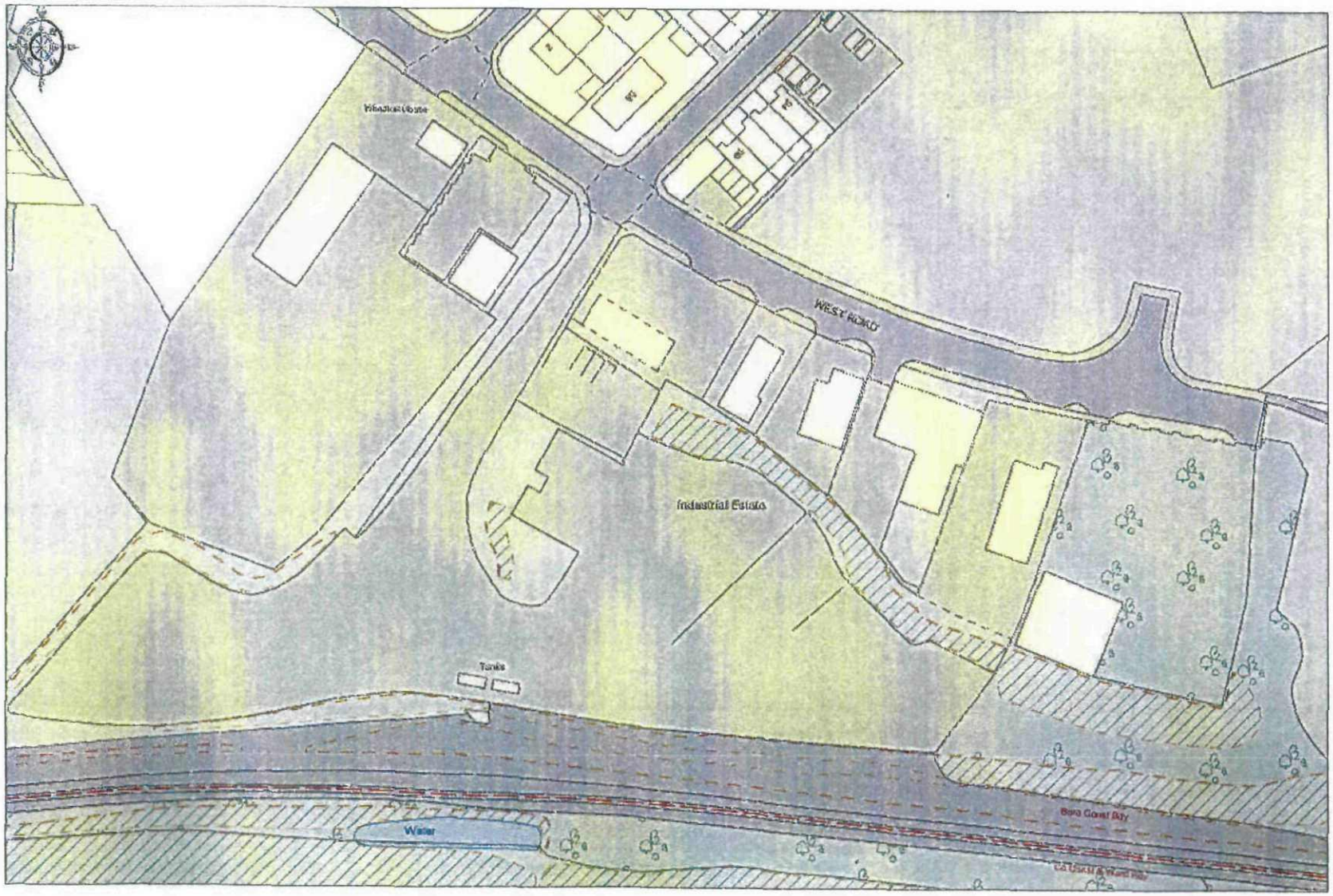
Land off West Road, Pogmoor, Barnsley – OS MAP 1993



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Land off West Road, Pogmoor, Barnsley – MAP 2009



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Appendix B

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PLOT 1, LAND OFF WEST ROAD, POGMOOR, BARNSLEY – PHOTOGRAPHS



Large warehouse/garage in north west of site



Small two storey offices in north of site



Entrance to site from West Road



View over site from the south west corner



Small storage garage on east boundary of site.



View over site from the south east corner

Appendix C

The Coal Authority

Issued by:
The Coal Authority, Mining Reports Office, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire NG18 4RG
ON-Line Service: www.groundstability.com - Phone: 0845 762 6848 - DX 716176 MANSFIELD 5

ASHTON BENNETT CONSULTANCY,
BRIDGE MILLS,
HOLMFIRTH,
WEST YORKSHIRE,
HD9 3TW

Person dealing with this matter:	**Darren Moody**
Our reference:	**00048282-10**
Your reference:	2902
Electronic Ref:	
RRUID:	007.00029105320001
Date of your enquiry:	**29 October 2010**
Date we received your enquiry:	**29 October 2010**
Date of issue:	**01 November 2010**

This report is for the property described in the address below and the attached plan.

Non-Residential Coal and Brine Report

Site At, West Road, Barnsley, South Yorkshire

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	Yes
Brine Compensation District	No

Information from the Coal Authority

Underground Coal Mining

Past

The property is in the likely zone of influence from workings in 5 seams of coal at 180m to 370m depth, and last worked in 1978.

Any ground movement from these coal workings should have stopped by now.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove coal using underground methods.

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The property is not in an area that is likely to be affected at the surface from any planned future workings.

However reserves of coal exist in the local area which could be worked at some time in the future.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

Within, or within 20 metres of, the boundary of the property there is 1 mine entry, the approximate position of which is shown on the attached plan.

There is no record of what steps, if any, have been taken to treat the mine entry.

Coal-mining geology

The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

Opencast Coal Mining

Past

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

Present

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

Coal-mining subsidence

The Coal Authority has not received a damage notice or claim for the property since 1 January 1984. There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of Support

The property is in an area for which notices of entitlement to withdraw support were published in 1944,1948;1944.

The property is not in an area for which a notice has been given under section 41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

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Working Facilities Orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to Owners of Former Copyhold Land

The property is not in an area for which a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Comments on Coal Authority information

In view of the mining circumstances a prudent developer would seek appropriate technical advice before any works are undertaken.

Therefore if development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply good engineering practice developed for mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. Developers should be aware that the investigation of coal seams/ former mines of coal may have the potential to generate and/or displace underground gases and these risks both under and adjacent to the development should be fully considered in developing any proposals. The need for effective measures to prevent gases entering into public properties either during investigation or after development also needs to be assessed and properly addressed. This is necessary due to the public safety implications of any development in these circumstances.

The attached plan shows the approximate location of the disused mine entry/entries referred to in this report. For reasons of clarity, mine entry symbols may not be drawn to the same scale as the plan. Property owners have the benefit of statutory protection (under the Coal Mining Subsidence act 1991*). *This contains provision for the making good, to the reasonable satisfaction of the owner, of physical* damage from disused coal mine workings including disused coal mine entries. A leaflet setting out the rights and the obligations of either the Coal Authority or other responsible persons under the 1991 Act can be obtained by telephoning 0845 762 6848 or online at www.coal.gov.uk/services/subsidence.
If you wish to discuss the relevance of any of the information contained in this report you should seek the advice of a qualified mining engineer or surveyor. If you or your adviser wish to examine the source plans from which the information has been taken these are normally available at our Mansfield office, free of charge, by prior appointment, telephone 01623 637233. Should you or your adviser wish to carry out any physical investigations that may enter, disturb or interfere with any disused mine entry the prior permission of the owner must be sought. For coal mine entries the owner will normally be the Coal Authority.
The Coal Authority, regardless of responsibility and in conjunction with other public bodies, provide an emergency call out facility in coalfield areas to assess the public safety implications of mining features (including disused mine entries). Our emergency telephone number at all times is 01623 646333.

*Note, this Act does not apply where coal was worked or gotten by virtue of the grant of a gale in the Forest of Dean, or any other part of the Hundred of St. Briavels in the county of Gloucester.

Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

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Additional remarks

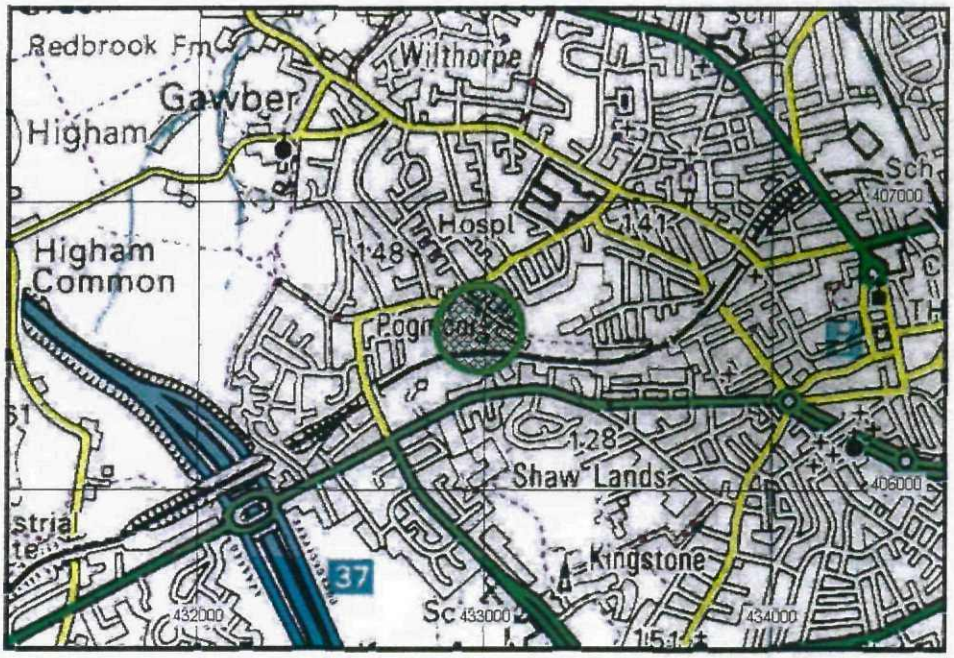
This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions 2006. The report is compliant with Home Information Pack requirements.

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Date:	01 Nov 2010
Coal and Brine Report at:	Site At, West Road, Barnsley, South Yorkshire
Reference number:	00048282-10
Cost:	£64.00
Plus VAT:	£11.20
Total received:	£75.20
VAT registration number:	598 5850 68

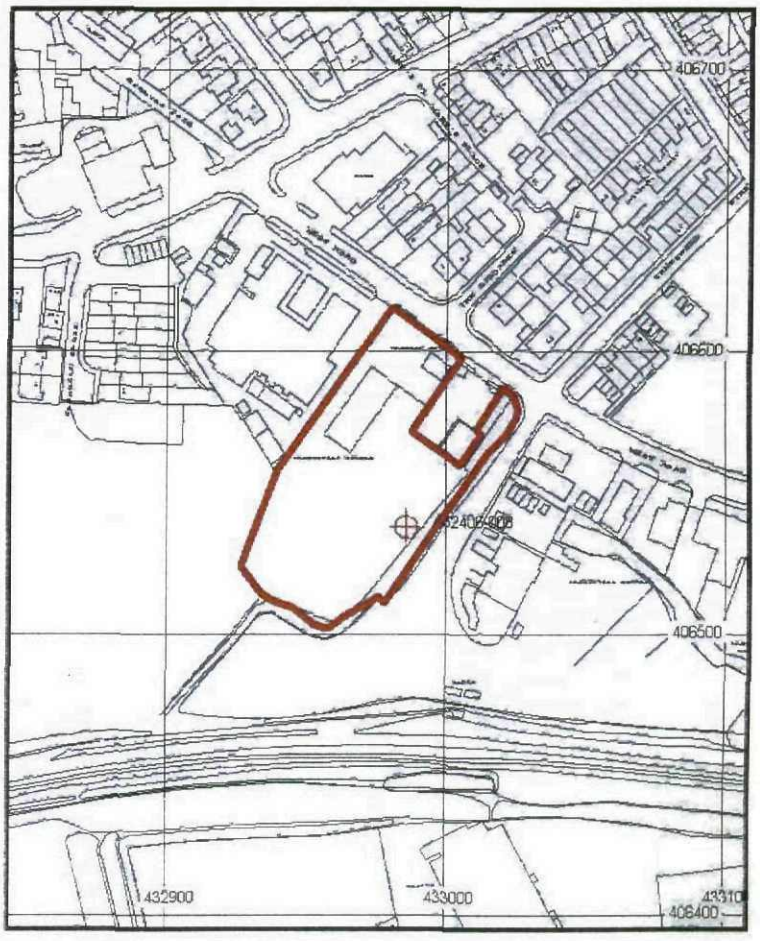
Location map

Approximate position of property



Enquiry boundary

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Key

Approximate position of enquiry boundary shown

Disused Adit or Mineshaft

Mapping supplied from Ordnance Survey

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