

SYPTE

Elsecar Rail Station

Outline Geotechnical
Desk Study Report

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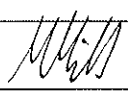
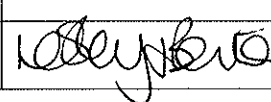
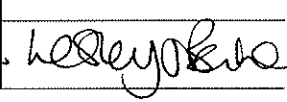
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1 Introduction

1.1 Commission

Arup has been commissioned by the South Yorkshire Passenger Transport Executive (SYPTE) to produce a proposal for surveys on land adjacent to Elsecar station. The objective of this piece of work is to provide an up date on specific site issues and constraints to inform SYPTE in the respect of a potential option to pursue a future land purchase.

1.2 Purpose of Report

This report summarises the desk based study of the site, including historical, geological and environmental and mining information, to assess potential risks or abnormals which may affect the value of the land.

This report has been prepared by Ove Arup and Partners Ltd on behalf of the client, SYPTE, and takes into account their particular instructions and requirements. It is not intended for and should not be relied upon by any third party and no responsibility or warranty is undertaken to any third party.

1.3 Site Layout

The site of interest is located adjacent to Elsecar Railway Station, to the north-west of Elsecar, National Grid Reference SE380 003, approximately 10km north of Sheffield (see figure 1).

The site is an area of land between the A6057 (going on to Millhouses Street) and the railway boundary. There are shops and residential developments which impinge the site boundary to the north-east and west, respectively, and allotment gardens create the western-most extent. There is a tennis court and bowling green to the north-west of the site. The two areas of access to the site are to the north next to the bowling green and to the east next to the train station. Although the general topography of the site is an incline from north-west to south-east, sloping down towards the railway, there is a shallow, man made valley with steep slopes on the western boundary (see figure 2).

Kings Street Primary School, to the north of the site, was demolished between 1991 and 2009. No other recent works or site investigations have been identified by this desk study.

2 Sources of Study

2.1 Envirocheck

An Envirocheck was purchased to supply information on the groundwater conditions, geology, historical mining activities and contamination issues.

2.2 Coal Authority Report

A Coal and Brine Report was obtained from the Coal Authority which provides information on land affected by mining, within and close to the site.

2.3 Historical maps

A number of historical maps have been purchased from Landmark, dating back to 1855 at 1:10,560. First, second and third edition OS maps were provided at a scale of 1:2,500, with more recent maps provided at 1:1,250 and 1:10,000.

2.4 Geological maps

Wombwell – SE30SE (1980)	1:10,000
BGS Digital Geological map of Great Britain (2005)	1:10,000
Huddersfield Solid & Drift Geology Map – Sheet 77	1:50,000
Geological Memoirs – Geology of the country around BARNSELY (1948)	

2.5 Ordnance Survey maps

A range of Ordnance Survey maps were obtained with scales between 1:10,000 and 1:50,000.

2.6 Department of Environment (DoE)

The DoE - Iron and Steel Industry Profile was obtained through the environment agency.

2.7 BGS boreholes

A number of records were requested from the British Geological Survey. The list below provides the depth and national grid reference of each of the records, which have been renumbered for ease of presentation within the report.

BH 1	SE30SE225, 10m borehole record
BH 2	SE30SE226, 10m borehole record
BH 3	SE30SE3, 39.01m borehole record (prospecting hole)
BH 4	SE30SE23, 38.71m borehole record (prospecting hole)
BH 5	SK39NE29, 46.18m borehole record (prospecting hole)
BH 6	SK39NE30, 41.23m borehole record (prospecting hole)
BH 7	SK39NE308, 31m borehole record
BH 8	SK39NE318, 31m borehole record
BH 9	SK39NE314, 31m borehole record
BH 10	SK39NE317, 31m borehole record

2.8 Site walkover

A site walkover survey was carried out on the 2nd February 2010.

3 Historical Development

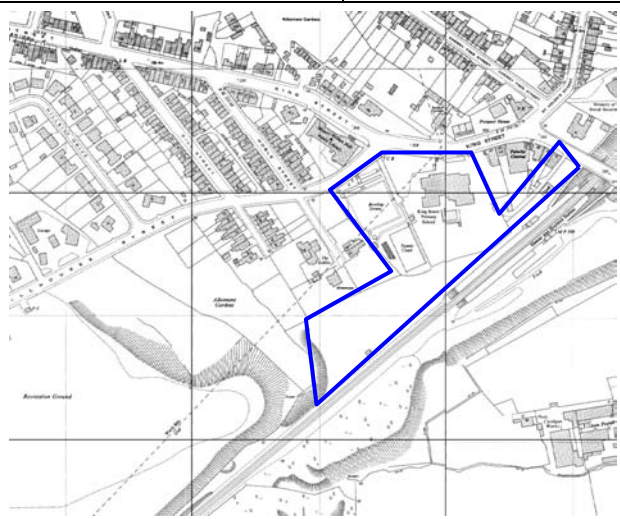
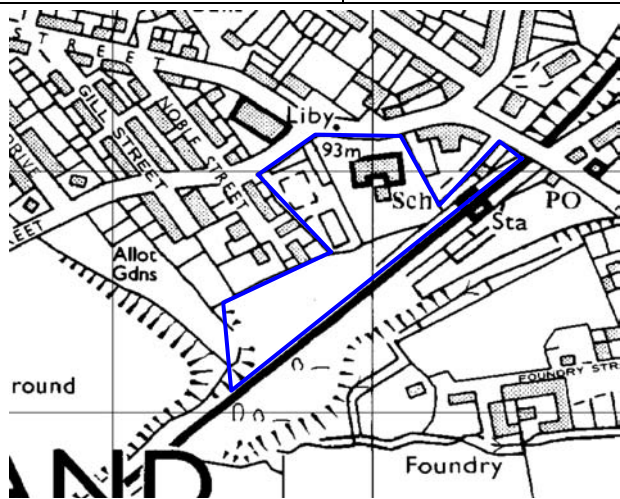
The relevant County Series have been obtained from Landmark at scales of 1:1,250, 1:2,500 and 1:10,000 (Appendix A). These were reviewed to identify the historic and potentially contaminative uses of the site.

A discussion of the principal features shown on the maps, along with extracts from the maps, is presented in Table 1 below.

Table 1 Summary of Site History and Land-use

Features Shown	Extract Date	Original Scale
No structures exist on the site at this time and it appears to be farmland and is split into several fields. There is a road which runs on the same general alignment as the A6057, named "Stubbin Lane". The area is known as "Stubbin" at this time and consists of only a few buildings, to the east of the site. To the north of the site there is an old sandstone quarry. An Iron Works is marked to the west of the site. To the north and south of the site there is a well and to the east of the site, a spring. There are also 3 shafts (2No "Air Shafts" and 1No "Old Shaft") to the south. These are associated with mining activities. A valley is shown to the west of the site and a small watercourse runs from west to east. The railway line, to the south west of the site, does not exist at this time.	1855	1:10,560
There is no significant change to the site. Elsecar is now marked on the map. A foundry (a factory which produces metal castings from either ferrous or non-ferrous alloys) and a Gas Works have been built to the south and south-east of the site, respectively. A large spoil heap can be seen to the south-west of the site, which is likely to be connected to the Iron Works. There are now 4 air shafts marked to the south of the site (one of which is the "Old Shaft") Stubbin Lane has now been renamed as "King Street"	1892	1:2,500

Features Shown	Extract Date	Original Scale
The railway line, know as the “Chapeltown Branch” and station are now shown on the map. There is also a small structure on the site, to the east, close to the railway line. It is assumed to be connected with the building of the railway and station. The spoil appears to have been used to as part of the embankment construction for the new railway line. The railway also is shown to be cut into the ground, to the north-east of the site, which may have provided some of the fill.	1903	1:2,500
There has been significant development of the site. Both, the bowling green and tennis courts have been constructed along with a large school next to them, to the east. The shops and residential buildings (described in section 1.3) have also been constructed. There is a “Gravel Pit” shown to the south of the site. There have also been some more significant earthworks to the south and west of the site. The allotment garden to the west of the site is now marked on the map, along with 6 others around the site. Millhouses Street is now shown to the north of the site, coming off King Street.	1930	1:2,500
The small structure (1903) is now labelled as a “Tank” and there is a glass roofed structure shown next to the tennis courts, to the west. More earthworks to the west of the site have created the valley, described in section 1.3, showing it to be man made. Issues have been marked at the bottom of it, close to the railway.	1956	1:1,250

	Extract Date	Original Scale
There has been no significant change to the site. Off the site area, to the west, some significant earthworks appear to have been created to provide an area of flat land for recreational use. This platform has side slopes that extend parallel to the railway.	1968-76	1:1,250
		
No significant change to the site.	1989-1991	1:10,000
		

4 Site Description

4.1 Topography

The topography has been described by a review of the 1:25,000 Sheffield & Barnsley–Explorer 278 map and larger scale maps available on Promap (online) up to 1:10,000 (see figure 2 and 3).

To the north of the free standing wall (marked on figure 3) the site has a gradual gradient sloping high to low from north to south. However, the ground has been landscaped to provide level platforms for the bowling green and tennis court, creating a two tier effect. To the south and south-west of the free standing wall the ground is relatively flat. The lowest point on the site is approximately 80mAOD, beside the railway, sloping up to the north to a height of 92mAOD. There is a small, steep valley on the western boundary sloping down to below 70mAOD, where a small watercourse is shown flowing into a culvert under the railway in a north-west to south-easterly direction.

The surrounding topography tends to slope up away from the site, reaching 150mAOD one kilometre from the site in the centre of Hoyland. However, the ground continues to slope down towards the Elsecar Reservoir (55mAOD), located approximately 700m to the south of the site. To the north of the site is a large valley called “Jump Valley”.

4.2 Observations from site walkover

Field studies to date include a walkover survey and a topographical study (undertaken by others and not reported here). A walkover survey was undertaken on 2nd February 2010 to establish any geotechnical issues that could be interpreted from a visual inspection of the site (see figure 3 for walkover notes and position of photographs)

Access to the site is obtained, either, via a path to the north of the site, next to the bowling green or an access road to the east next to the train station. The site was walked in a generally anti-clockwise direction starting from the east although some areas were inaccessible due to the overgrown vegetation.

4.2.1 Made Ground

It was noted on the site walkover that the bowling green and tennis court were both on very level ground which did not reflect the natural slope of the site. The bowling green had a three tier retaining wall (see photograph 2) up to Millhouses Street, to the north, and a relatively steep embankment to the south, down to the tennis courts. It is assumed that a cut and fill exercise was carried out here to form the level areas. The fill is likely to mostly comprise the cut material, waste material from part of the works prior to 1930 to construct the school or the spoil material described in section 3 (1903).

Photograph 1 was taken from the north access path looking down to the bowling green and tennis court.

Photograph 1 Level ground (see figure 3)



4.2.2 Structures

Since the demolition of the primary school there are no buildings on the site. The remaining structures comprise the aforementioned tennis court and access paths, along with several retaining structures and a free-standing brick wall.

Retaining Walls

Most of the brick and concrete used in the retaining structures showed signs of poor maintenance, particularly, the concrete retaining wall at the top of the bowling green. The two lower walls of the retaining structure were noted to have no significant signs of leaning or cracking. However, the top wall had several large cracks throughout its length, some of which had been filled with fresh concrete, indicating a deterioration in the condition of this structure.

Although there were significant signs of deterioration in some of the retaining structures, there did not appear to be any signs of overall failures.

Photograph 2 Three tier retaining structure - with detail of cracking in concrete (see figure 3)



Free standing wall

The free-standing wall which extends to the south and east of the pre-existing school showed the most significant signs of disrepair. The northern section of the wall was heavily vegetated and some of the length of this section could not be seen, however, no signs of cracking or leaning were noted. The middle and southern section of the wall have buckled and broken apart (see photograph 3), with large vertical cracks visible along its length.

Photograph 3 Buckled free standing wall – middle and southern section (see figure 3)



4.2.3 Man made valley

Photograph 3 is taken from the bottom of the valley on the western boundary. The valley is shallow, approximately 10m deep, and has steep sides, $>25^\circ$. No signs of slope instability were noted on valley sides. The photograph also shows the small watercourse and the culvert under the railway embankment. The watercourse also runs into a culvert immediately to the right hand side of the picture (westwards), under the recreational grounds. It was also noted on the site walkover that the recreational grounds were very level, indicating that some major earthworks have been carried out on the western side of the valley.

Photograph 4 Man made valley (see figure 3)



4.2.4 Additional observations

- A derelict, empty structure in the approximate position of the “tank” noted in the observations from historic maps (1903, 1956).
- A disused underpass, which protrudes under Millhouses Street, next to the north site access path. The underpass has been blocked off, rather than filled. This is assumed to have been access for the demolished school or tennis court and bowling green.
- There was sporadic littering observed throughout the site walkover comprising general refuse.

4.3 Land uses

The land is owned by a private developer and is currently disused.

Historically the land was first used as farm land. Some of the land, to the east, may have been used in connection with the station and a tank is shown to be on the site in some of the historical maps. The land was later used as the site for Kings Street Primary School with a bowling green and tennis court adjacent to it. The primary school was demolished between 1991 and 2009. The tennis court and bowling green are disused.

The surrounding land use consists of housing developments and shops to the north and east. To the east is Elsecar Station and railway line, which forms the southern site boundary. To the west are recreational grounds.

5 Geological Setting

5.1 Geology

Reference has been made to the relevant, Wombwell – SE30SE 1:10,000, geological map (1980) and the BGS Digital 1:10,000 Geological map of Great Britain (2005). An extract from the Wombwell map, marked with the site, is shown in figure 4 and figure 5 shows the BGS artificial ground and landslip map extract.

5.1.1 Drift geology

Although no drift deposits are indicated on the geological maps, both show a significant portion of the site, to the south-west, is underlain by Made Ground. The pre-existing primary school, along with the bowling green and tennis court indicate that cut and fill exercises have been carried out to create level areas of ground (as shown on the 1903 – 1930 historical maps). It is therefore assumed that the majority of the site is underlain by Made Ground, although not all of it will have been imported.

Surrounding the site, the map shows large areas of Made and Worked Ground around the site, underlying the recreational grounds to the west and the railway embankment to the east and south. It is also noted on the Wombwell map that the made ground underlying the recreational ground comprises domestic and industrial refuse from 3mbgl – 15mbgl.

5.1.2 Solid geology

The solid geology underlying the site comprises the Pennine Middle Coal Measures (PMCM) from the Upper Carboniferous (Westphalian B) period. The PMCM underlying the site comprises mostly of undivided mudstones, siltstones and sandstones with coal seams, however, to northern and southern extremities of the site there is an unnamed sandstone underlying the site. The geological maps show two coal bands, stretching from east to west through the site, of Kent's Thick (KK) and a band of Thin Coal. It is also noted on the Wombwell map that grey shale and ironstone have been formerly seen overlying the Thin Coal.

The surrounding solid geology of the site comprises two faults, running north-west to south east, which downthrow either side of the site to the east and west. There are outcrops of Kent's Rock (KNR) to the north, east and west and Barnsley Rock to the south.

5.1.3 British Geological Survey (BGS) Records

The existing ground investigation data has been acquired through the BGS records and comprises six borehole records and four prospecting hole records (proving the depth of the Thornccliffe Coal seam) and are shown in Appendix B. Figure 6 shows the position of the BGS borehole locations. The records are historic and not to current logging standards. They indicate that the solid geology is fairly consistent around the site and is in concordance with the geology derived above.

The following strata can be interpreted from the review:-

Table 2 Summary of borehole descriptions

Description of strata	Depth (mbgl) to top of strata	Thickness of strata (m)	Notes on Strata
Topsoil / Made Ground	0	0.3	
Firm to stiff Clay	0.3	1.7	
Middle Coal Measures comprising weak to strong MUDSTONE interbedded with sandstones, siltstones, shales, ironstones and bands of coal.	2.0	36-40	Ironstone was only found in BH 3 – BH 6, below 193m.

5.2 Mining

5.2.1 Coal Authority

A Coal and Brine Report ^[7] was obtained from the Coal Authority which provides information on land affected by mining, within and close to the site (see Appendix C). The following summarises the findings of the report.

The site is in a likely past zone of influence from workings of 11 coal seams at 70m to 390mbgl, which were last worked in 1979. However any ground movement from these should have stopped by now. The report also states that there is coal at or close to the surface which may have been worked at some time.

A damage notice or claim for alleged subsidence damage was given, made or pursued in August 1978. The claim was filed for the bowling green site and was discharged by repair.

The report has found none of the following as present or future hazards, within or close to the site:

- Influence from underground mining
- Lines of weaknesses that have been affected by coal mining
- Opencast coal mining
- Mine gas emissions

5.2.2 1:10,000 Wombwell geological map

It can be seen from the map that two bands of coal run through the site, as mentioned in section 5.1.2, Kent's Thick (KK) and Thin Coal. KK is noted on the map to be between 0.86 and 2.26m thick.

Table 3 below shows the coal seams underlying the site, as indicated by the generalized section from the Wombwell geological map.

Table 3 Coal seams underlying the site

Coal seam	Thickness of seam (m)	Depth of seam (mbgl)
Kent's Thick	0.86-2.26	0
Thin Coal	-	2
Thin Coal	-	4
Barnsley Rider	0.36-1.38	27
Barnsley	2.39-2.64	42
Dunsil	2.24-2.87	57
Swallow Wood	0.89-3.68	78
Lidget	0.89-1.24	114

The map also has notes from the Elsecar Main Colliery shaft, which is located approximately 900m to the east of the site. Table 4 shows a summary of the coal seams found. It should be noted that there is a large fault between the two sites, running from north to south and downthrown to the east.

Table 4 Elsecar Main Colliery coal seams

Coal seam	Thickness of seam (m)	Depth of seam (mbgl)
Kent's Thick	1.09	27.31
Barnsley	2.44	88.09
Swallow Wood	1.14	139.22
Lidget	0.66	181.97
Joan	0.30	220.45
Flockton Thick	1.07	245.46
Flockton Thin	1.65	272.82
Fenton	2.84	288.82
Parkgate	2.95	317.96
Thornccliffe	0.51	334.09
Silkstone	2.21	413.19
Whinmoor	0.61	461.98

5.3 Iron Works

The Iron Works, seen on the 1855 historical map, is likely to have been an excavated open pit. This is evident as a note on the Wombwell geological map states a shallow seam of ironstone (see figure 4) as being present above the Thin Coal outcropping along the south of the site.

5.4 Geomorphology

The Envirocheck Report states the potential for compressible ground stability hazards to be 'very low', the potential for collapsible ground stability hazards as 'no hazard' and the potential for landslide ground stability hazards as 'very low-moderate'. These are noted to be generalized statements for a large area encompassing the site.

5.5 Hydrology

There is a small open watercourse to the west of the site, at the bottom of the valley. There is approximately 3m of open water as it enters culverts to the south, under the railway, and the west, under the recreational grounds. The flow is in a north-west to south-easterly direction.

The surrounding hydrology comprises a disused canal, 700m to the east of the site, Elsecar Reservoir (Local Nature Reserve), 700m to the south of the site and two ponds, 500m to the west of the site.

5.6 Hydrogeology

The site is underlain by Made Ground underlain by the unnamed sandstones, mudstones, siltstones and shales of the PMCM. The Made Ground is likely to be highly variable in permeability, ranging from sands and gravels possibly forming significant water-bearing units, to low permeability clays. The underlying bedrock is likely to have variable permeability, from the water bearing unit of the sandstones to the low permeability of the undivided rock.

From the Envirocheck Report covering the site area, the Environment Agency's classification of the groundwater conditions is a 'minor aquifer' (see figure 7). The soils have been classified as soils of high leaching potential (U) as soil information in urban areas are based on fewer observations than elsewhere. A worst case vulnerability classification (H) is assumed.

6 Geo-environmental and contamination issues

The Envirocheck Report and site walkover identified several geo-environmental and contamination issues of relevance for this project.

6.1.1 Iron Works and Foundry [8]

The Department of Environment - Iron and Steel Industry Profile states the waste materials associated with early days of iron working:

- Blast furnace slag. This does not contain and iron oxide or phosphorous, but does contain very small amounts of iron physically entrapped in its structure.
- Dry dust from gas cleaning.
- Wet solids from gas cleaning. Usually kept in large lagoons or disposed of as site backfill.
- Refractory waste from ladles and runners.

Table 5, below, shows a list of potential contaminants associated with the above waste materials. It should be noted that it is highly unlikely that any one site will have all of the contaminants listed.

Table 5 Contaminants associated with iron making

Main groups	Individual compounds
Metal and metalloids	Iron
	Lead
	Vanadium
	Zinc
Inorganic compounds	Fluoride
	Cyanide
	Sulphates
Asbestos	
Organic compounds	PCBs

6.1.2 Made Ground / Spoil

From the review of the historical and current maps, a large area of the site – and surrounding site – has been part of extensive earthworks construction for the railway line.

The man made valley and corresponding level land to the west of the site is shown as Made Ground on the BGS geological map and in the historical maps this area is shown to be spoil. The spoil is assumed to be connected to, either, the activity in the Iron Works (1855), to the west of the site, or the Iron Foundry (1892 – present) to the south of the site. It is likely that some of this spoil was used in the fill exercises carried out during the embankment construction.

6.1.3 Historic or current landfills.

Although there are no landfills within the site extent, there are two large historic and recorded landfill sites underlying the recreational grounds to the west. The closest section of these landfills is less than 50m from the site boundary (see figure 8). The Wombwell geological map also states that the underlying the Recreational Grounds, from 3mbgl – 15mbgl, is Made Ground comprising domestic and industrial refuse.

However, the site is approximately level with the area of interest, as well as being separated by a valley and therefore the migration of any contaminants from the recreational grounds to the site is unlikely.

6.1.4 Sensitive land uses

The site has been classified as a Nitrate Vulnerable Zone (NVZ). Nitrate pollution is of concern because it has to be removed before water can be supplied to consumers, and it can harm the water environment. ^[4]

There is an area of adopted green belt immediately to west north, east and south of the site.

6.1.5 Discharge consents

There are two Discharge Consents in place within 250m of the site, the closest being 21m. These permit discharge of sewage discharges, consisting of storm overflow.

6.1.6 Additional issues

The Envirocheck Report has found none of the following within 250m of the site:

- Pollution incidents to controlled waters
- Water abstractions. Although a draw well can be seen on the 1855 historical map to the north of the site, within 250m.
- Local authority pollution prevention and controls.
- Groundwater abstractions.
- Source protection zones.
- Historic or existing quarrying activities.

7 Discussion

7.1 Made Ground / Spoil

The site is in an area of ground that has been historically filled. From the historical maps, it can be seen that the initial earthworks were likely to be associated with the railway. Just to the north of the site the railway is in cutting and it is possible that this material could have been used in the railway embankment works. Next to the railway there is an extended area of level ground, part of a possible infilling of the natural valley. The source of this fill material is not known, however, there were many spoil heaps nearby, associated with the Iron Works. Therefore, this readily available source of material may have been used as general fill. During the later stages of construction the fill used is unclear and could have also been imported.

One of the waste materials produced in the iron making process is slag, which may be present on the site. When there are significant quantities and within the right environment, some types of slag can trigger an expansion. This can have an impact structures.

Another issue associated with the earthworks on the site is that they were completed over several decades and may have involved several different types of fill material. The variable nature of fill can have an impact on structures and needs to be considered when looking at development on this fill.

Terracing of bowling green and tennis court

From the site walkover, it was noted that the tennis court and bowling green have been cut into the original slope. There is likely to have been a cut and fill exercise, with the fill retained by the low height retaining walls.

There is a three tier retaining structure between the bowling green and Millhouses Road. The upper wall of this structure was noted to have significant cracking and deterioration of the condition of the wall. However, this did not appear to be due to soil movement and no signs of overall failure were observed. It is more likely that the damage has arisen from a combination of: old structures coming to the end of their design life, the mature trees' extensive root networks and a general lack of maintenance.

Free standing wall

The free standing wall to the south of the site has been described as showing signs of undergoing significant movement, causing the wall to buckle and break apart. The movement appears to be vertical in direction, with either the southern section sinking, the middle section rising or a combination of both actions. As the wall is close to the railway, it is likely that it was founded on fill material, therefore, the vertical action may have been caused by the associated issues described above. However, this type of damage could also be due to several other unrelated reasons: poor foundations, damaged sustained during the demolition of the school or an old structure at the end of its design life.

7.2 Mining

It can be seen from the historical maps that there has been extensive working of the underlying coal seams around the site. This is evident from the air and old shafts noted on the maps.

One issue directly arising from the mining activity within the site boundary is the subsidence damage claim filed in 1978. The claim was discharged by repair, suggesting that the damage was found to be due to coal workings. No information on which coal seam caused this subsidence was provided, however, it is likely to have been due to the working of the Barnsley Coal seam. The geological memoirs for the area state that this is the most important seam in the area and the seam is shallow enough to have caused some minor subsidence. Although this suggests that there are ground instability issues with the site, both the Envirocheck Report and the Coal Authority Report have found no significant issues for the past 30 years.

7.3 Contamination

This desk study has uncovered the following contamination issues within the site boundaries.

- The material used for the construction of the railway embankment is unknown but is likely to comprise some spoil material relating to the shallow Iron Works and may contain contaminants.
- More information is also needed with regards to the old tank described in section 3 (1956) to determine if any contaminants were present during its use.

8 Recommendations

8.1 Phase 1 – Preliminary Investigation

It is recommended that a preliminary ground investigation is undertaken, which could include a combination of trial pits, window samples and dynamic probes, carried out with the associated chemical testing. This should provide an initial view of the likelihood of contamination and the nature of the material on the site.

8.2 Phase 2 – Further Investigation

Should a land purchase be successful, a further, more comprehensive, investigation should be carried out to provide design information for the further development on the site. The following indicates the scope of these works:

- Phase two of this investigation should be defined in accordance with both the National House-Building Council (NHBC) "Guidance for the Safe Development of Housing on Land Affected by Contamination" [5] and the Yorkshire and Humberside Pollution Advisory Council "Development on Land Affected by Contamination.
- A suitable ground investigation, including a physical borehole and trial pit investigation within and close to the site boundary, should be completed to determine the site's specific geology and geotechnical properties of the underlying material. Normally boreholes are placed between 40m – 80m apart, depending on the potential variation of the ground conditions. Based on the geology described in this desk study it is recommended that the investigation consists of at least 5 No boreholes and 3 No trial pits. However, the number of exploratory holes will be determined by the extent of the development on the site. It is also recommended that exploratory holes are focused, although not exclusively, on the area of made ground.

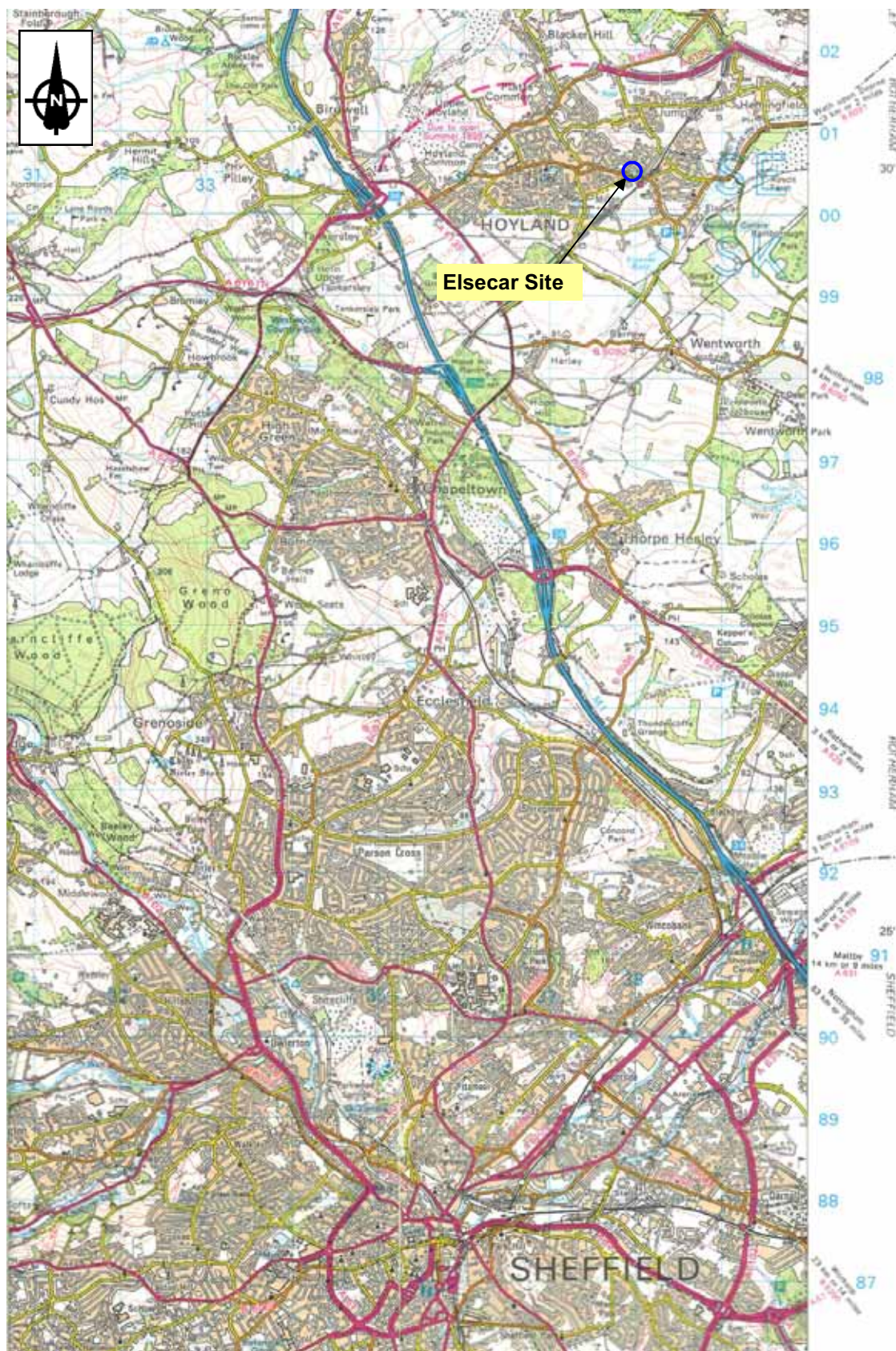
Boreholes, at a minimum, should be extended to a depth that will allow design of the foundations. Trial pits should be excavated to a minimum depth to supply suitable information for the design of car parks and access roads. Samples should be taken and tested for any potential contaminants present in the underlying soils.

- Groundwater and gas installations, in the proposed boreholes, to assess the groundwater and gas levels within the site boundaries. Monitoring should be completed throughout the site but more specifically close to the location of the spring noted on the site walkover. Groundwater monitoring should also be carried out to identify any potential contaminants dissolved in the groundwater.
- Laboratory testing to determine design parameters as well as any potential contaminants present within the site boundaries. Specific testing should be carried out for the contaminants listed in Table 5.
- Any further information on mining activities within or close to the site boundaries should be obtained. More abandonment plans should be obtained if they are available.

References

- [1] 2009 NERC - Centre for Ecology & Hydrology. Accessed online 20/1/10.
<http://www.ceh.ac.uk/data/nrfa/index.html>
- [2] 2009 Landfill Leachate Treatment. Accessed online 15/1/10.
<http://www.leachate.co.uk/>
- [3] Environment Agency - *Nitrate Pollution Prevention Regulations 2008 - Nitrate Vulnerable Zones (NVZs)*
- [4] DEFRA - *Nitrates: Reducing water pollution from agriculture* Accessed online 20/1/10.
<http://www.defra.gov.uk/environment/quality/water/waterquality/diffuse/nitrate/index.htm>
- [5] National House-Building Council (NHBC) *Guidance for the Safe Development of Housing on Land Affected by Contamination*
- [6] Bernd G. Lottermoser (2007) *Mine wastes: characterization, treatment and environmental impacts*
- [7] Coal Authority – Coal and Brine Report
- [8] DoE – Steel and Iron Industry Profile
- [9] Ordnance Survey data
- [10] Landmark Maps Accessed online 03/1/10.
<http://www.promap.co.uk/promap/index.jsp>
- [11] BGS maps
- [12] Historical County Series maps
- [13] Historical Ordnance Survey maps

Figures



Based on the Ordnance Survey map with the permission of the Controller of her Majesty's Stationery Office, (c) Crown Copyright. AL 100039628.

Not to scale

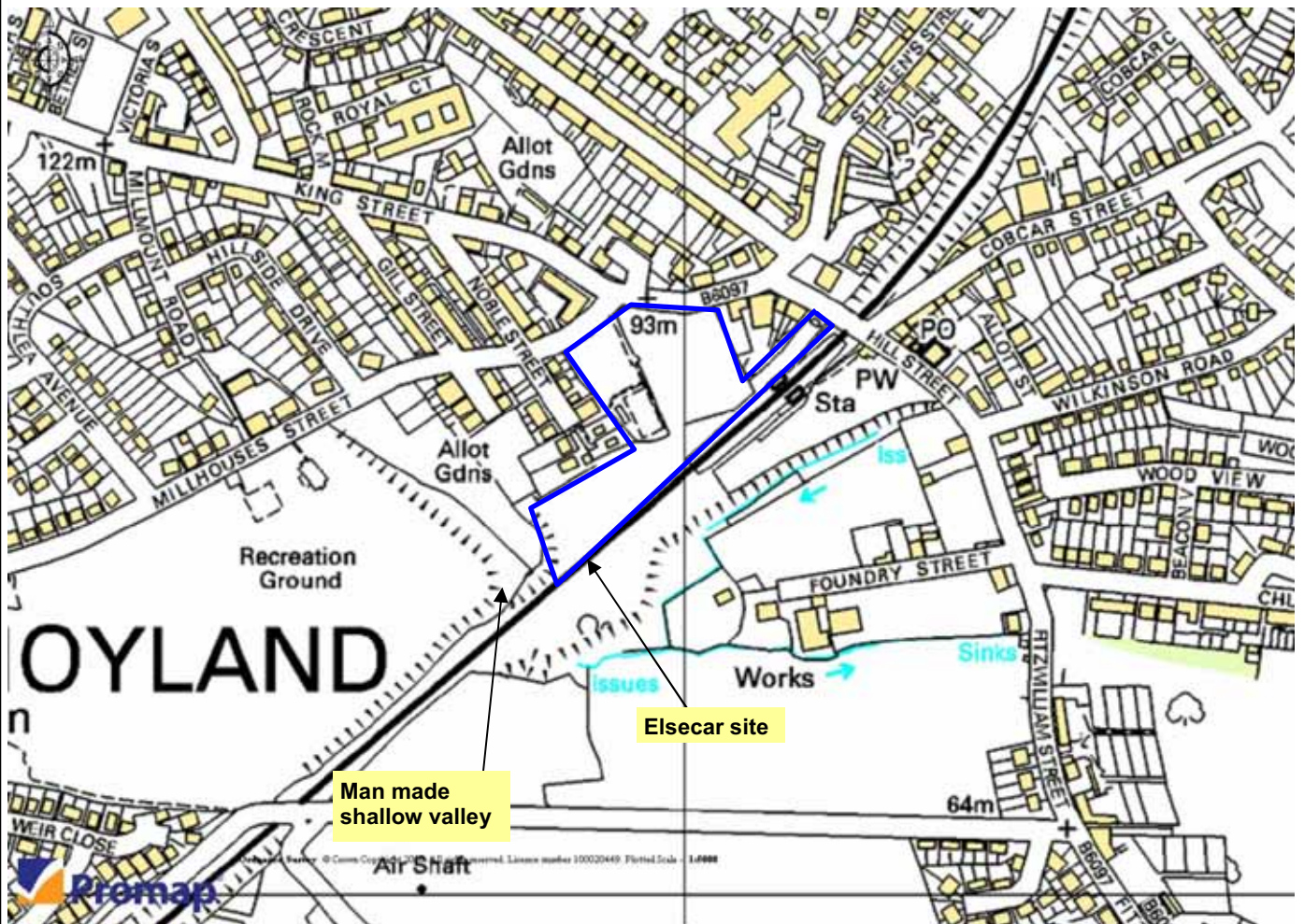
Elsecar Station

Site Location Plan

ARUP

120788-47

Figure 1



Based on the Ordnance Survey map with the permission of the Controller of her Majesty's Stationery Office, (c) Crown Copyright. AL 100039628.

Not to scale

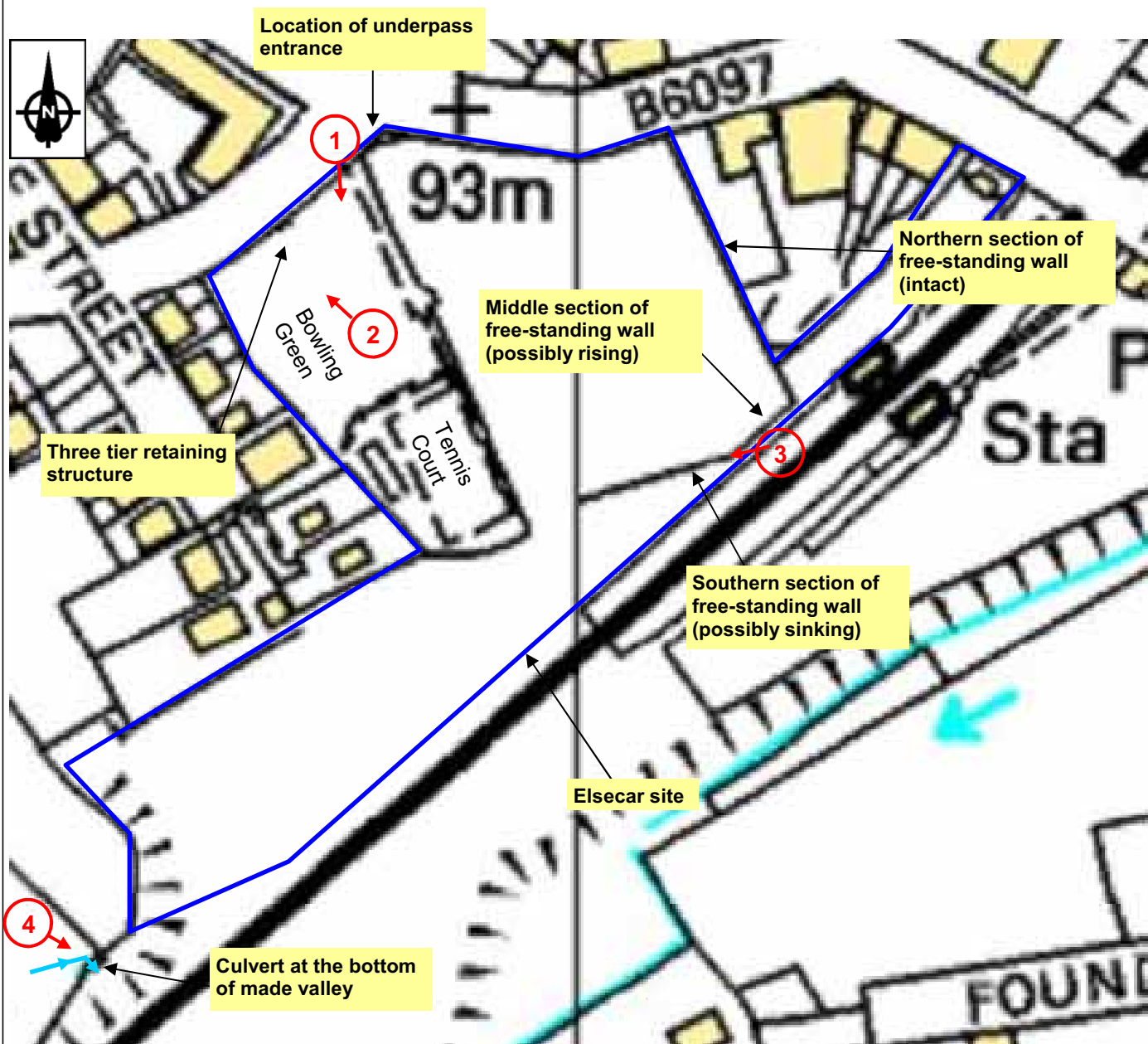
Elsecar Station

1:10,000 Map Extract

ARUP

120788-47

Figure 2



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Not to scale



- Photograph number, location and direction



- Direction and location of issue

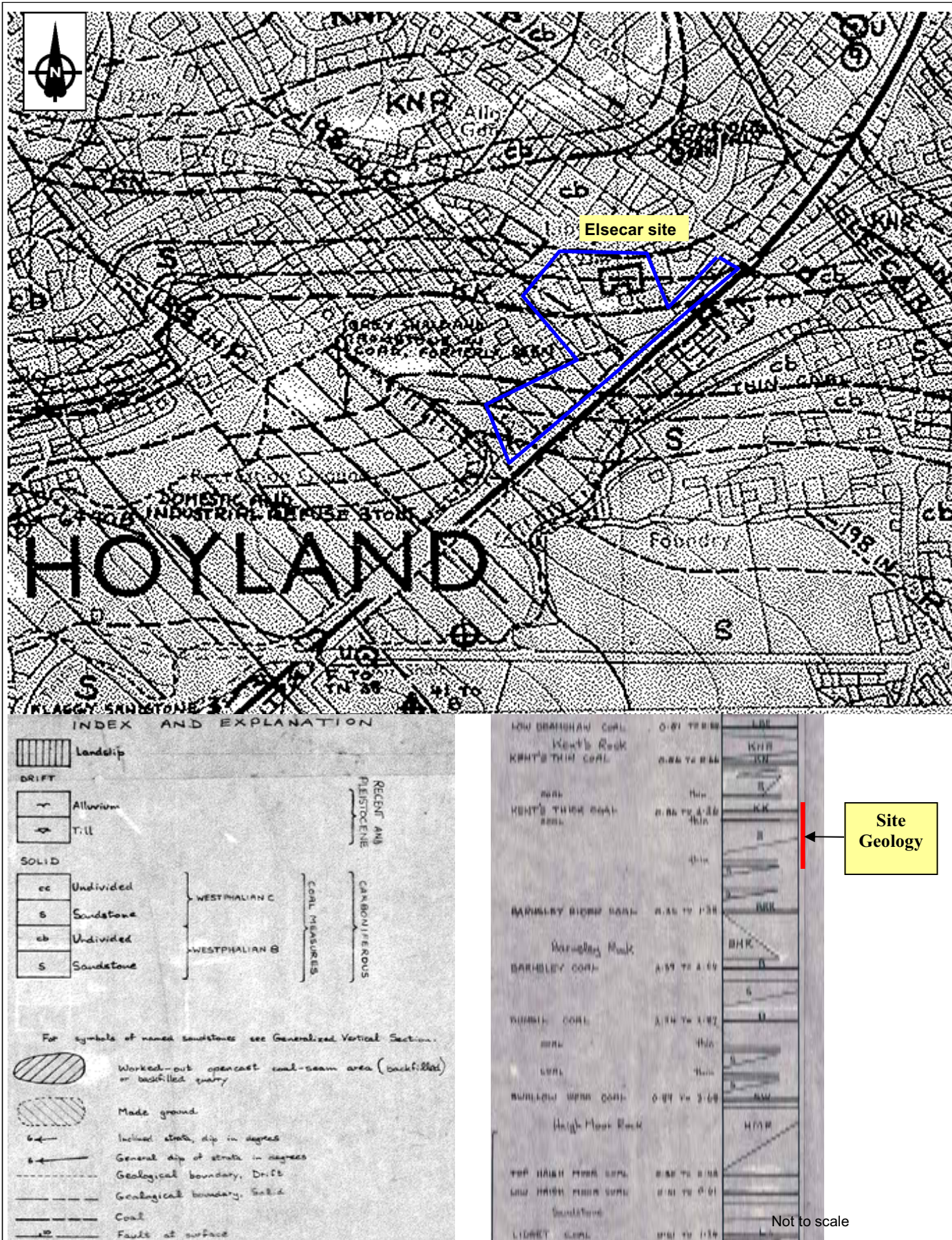
Elsecar Station

Site Walkover Notes

ARUP

120788-47

Figure 3



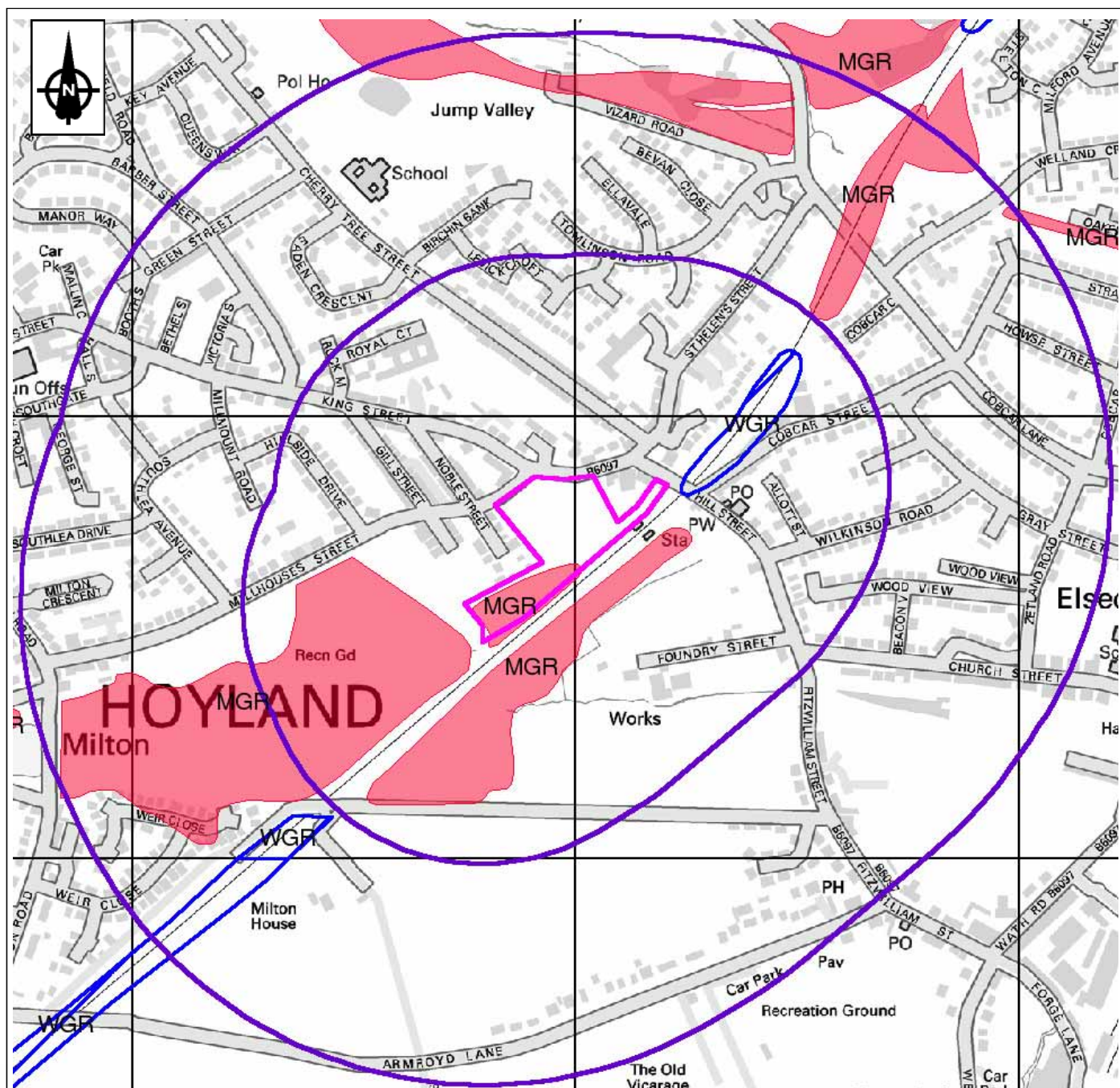
Elsecar Station

1:10,000 Geological Map Extract

ARUP

120788-47

Figure 4



Artificial Ground and Landslip

Not to scale

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	MGR	Made Ground (Undivided)	Artificial Deposit	Present Day - Present Day
	WGR	Worked Ground (Undivided)	Void	Present Day - Present Day
	WMGR	Infilled Ground	Artificial Deposit	Present Day - Present Day

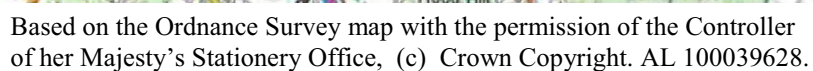
Elsecar Station

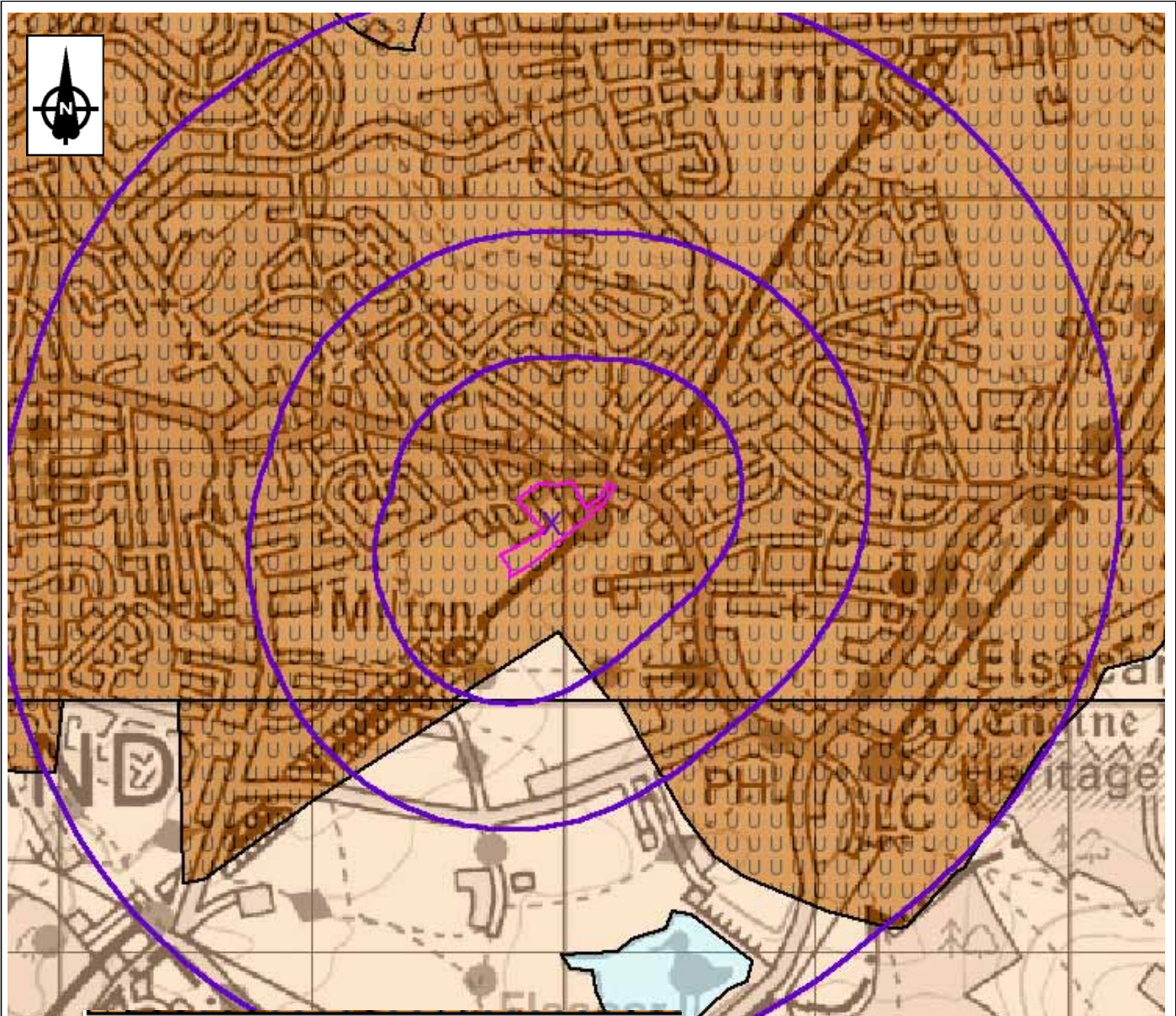
Artificial Ground and Landslip Map Extract

ARUP

120788-47

Figure 5





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Not to scale

General

-  Specified Site
-  Specified Buffer(s)
-  Slice
-  Map ID

Agency and Hydrological

Geological Classes

**Major Aquifer
(Highly Permeable)**

**Minor Aquifer
(Variably Permeable)**

**Non Aquifer
(Negligibly Permeable)**

Soil Classes

-  High (H) 1, 2, 3, U
-  Intermediate (I) 1, 2
-  Low
-  High (H) 1, 2, 3, U
-  Intermediate (I) 1, 2
-  Low
- 

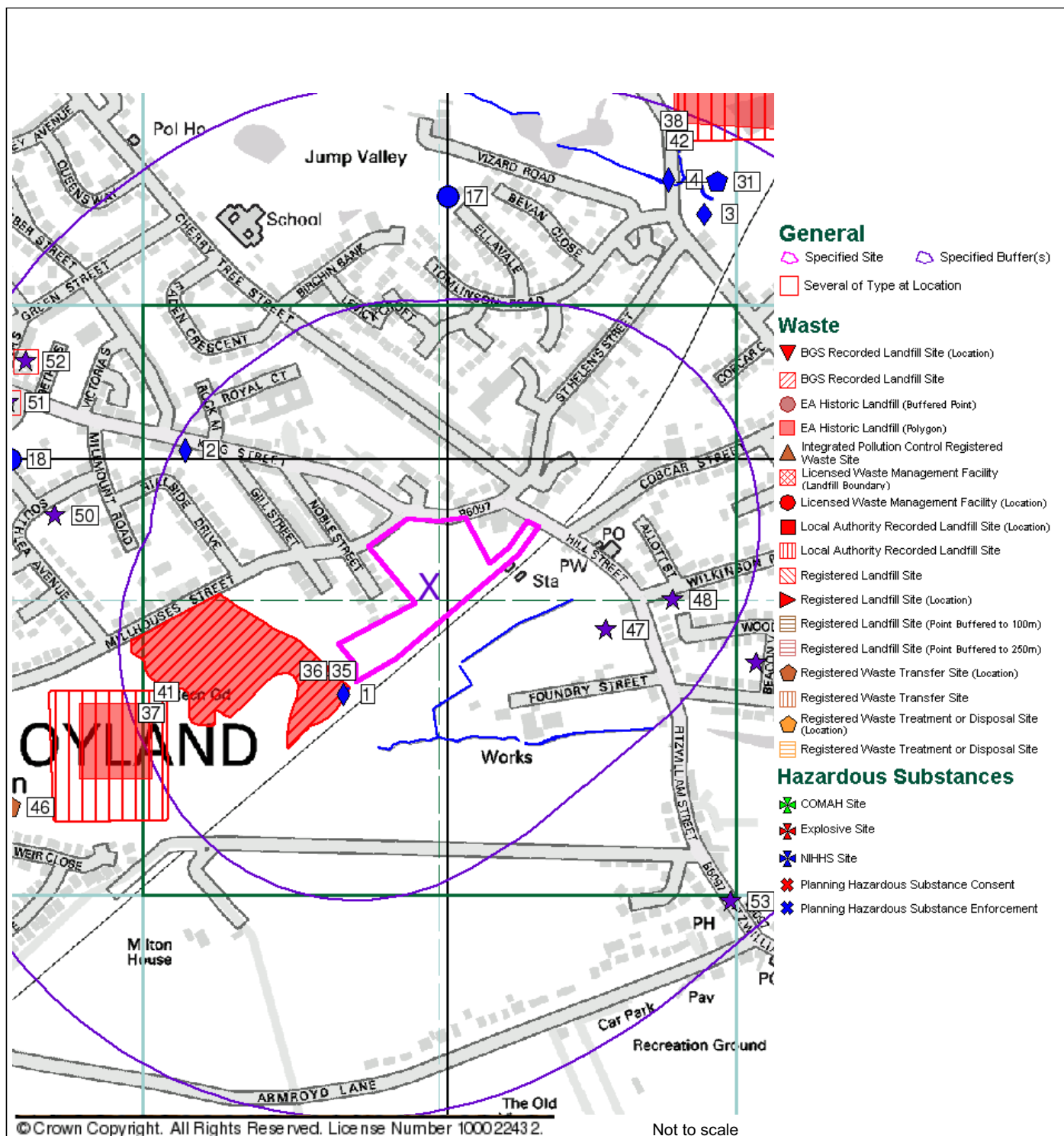
Elsecar Station

Groundwater Classification Map

ARUP

120788-47

Figure 7



Elsacar Station

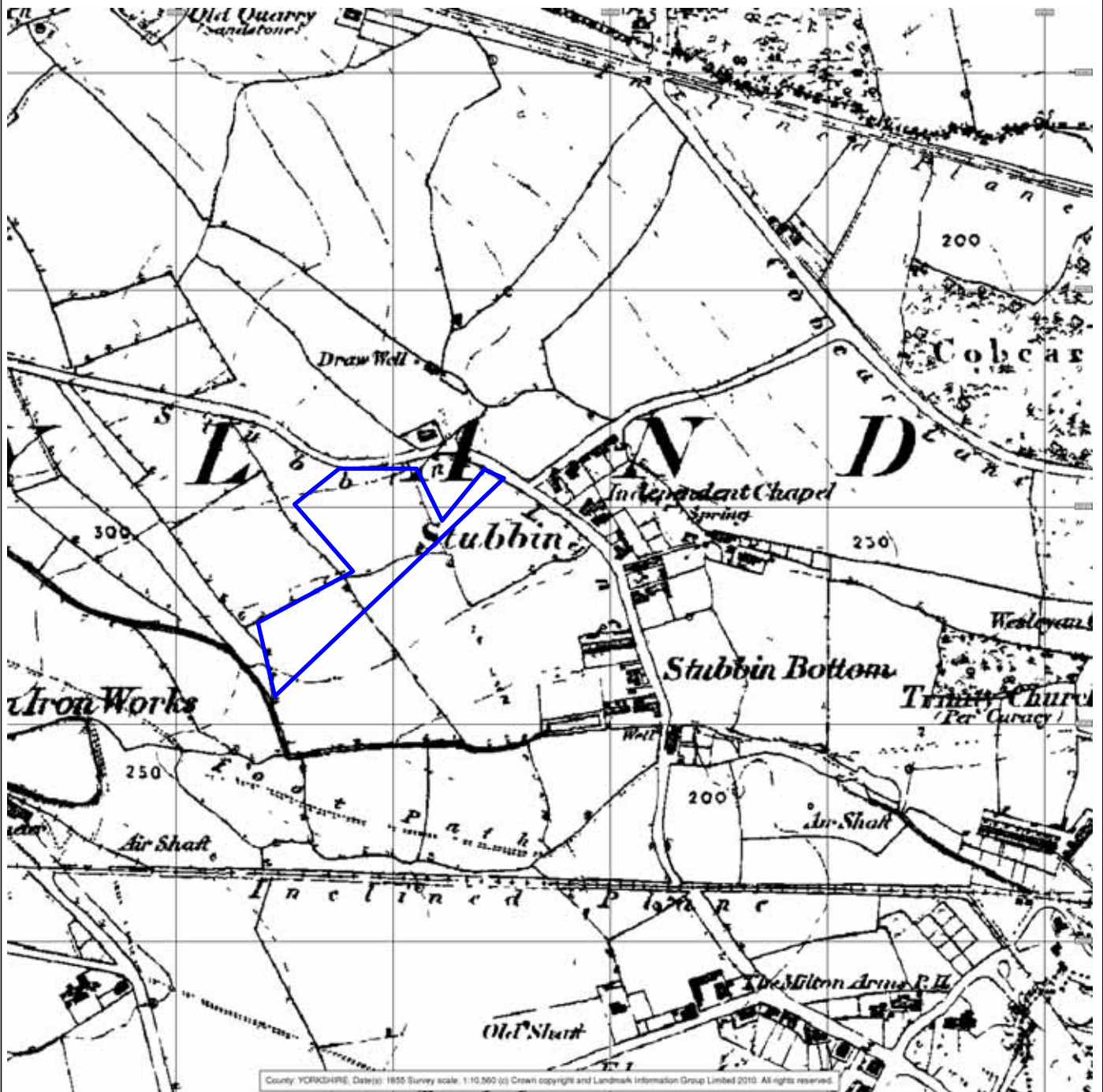
Historic and Registered Landfills

ARUP

120788-47

Figure 8

Appendix A



Notes:
Map not to scale.
Original scale - 1:10,560.

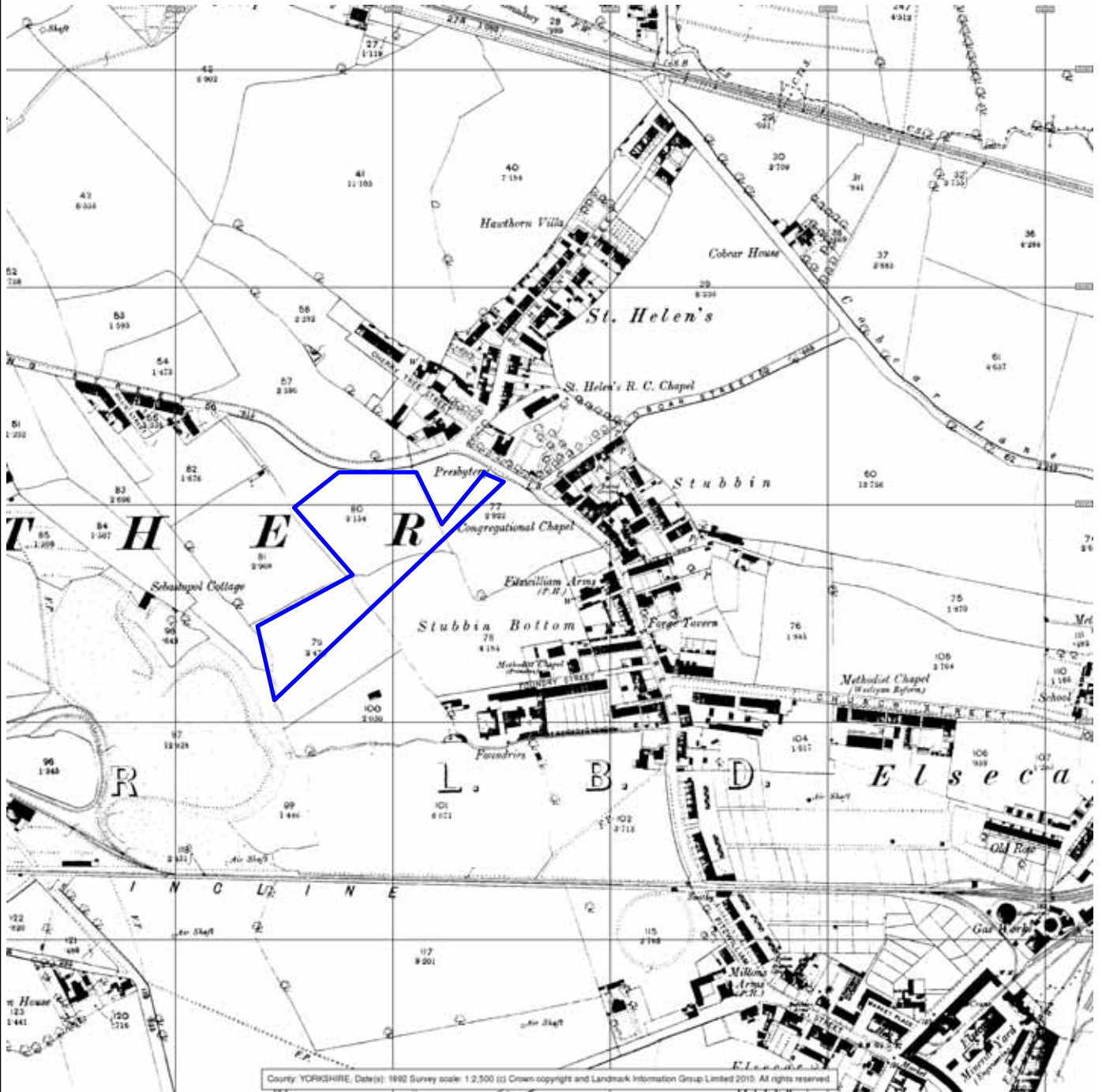
Elsecar Station

1855—Historical Map

ARUP

120788

1892—Historical Map



Notes:
Map not to scale.
Original scale - 1:2,500.

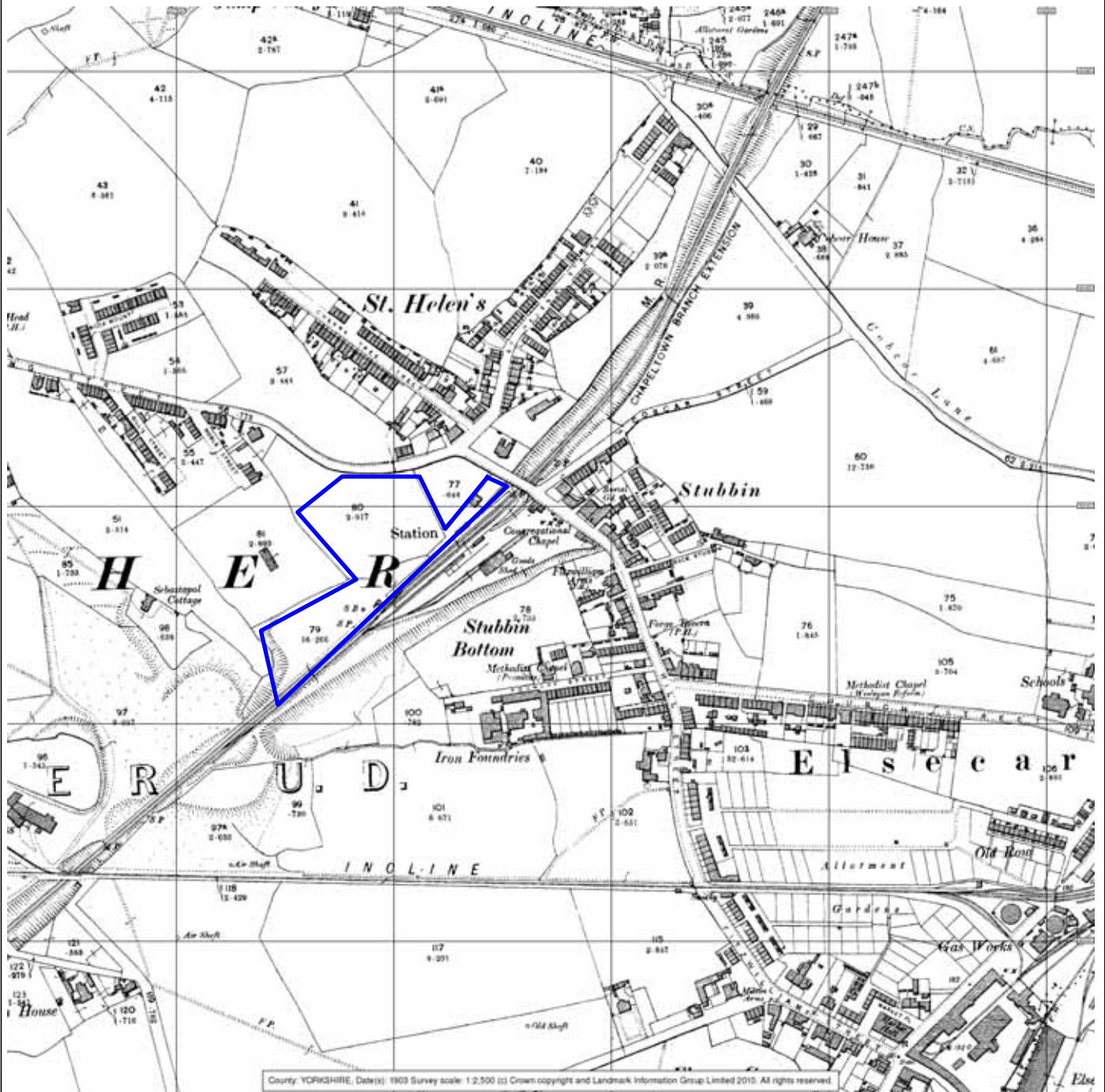
Elsecar Station

1892—Historical Map

120788

ARUP

1903—Historical Map



Notes:
Map not to scale.
Original scale - 1:2,500.

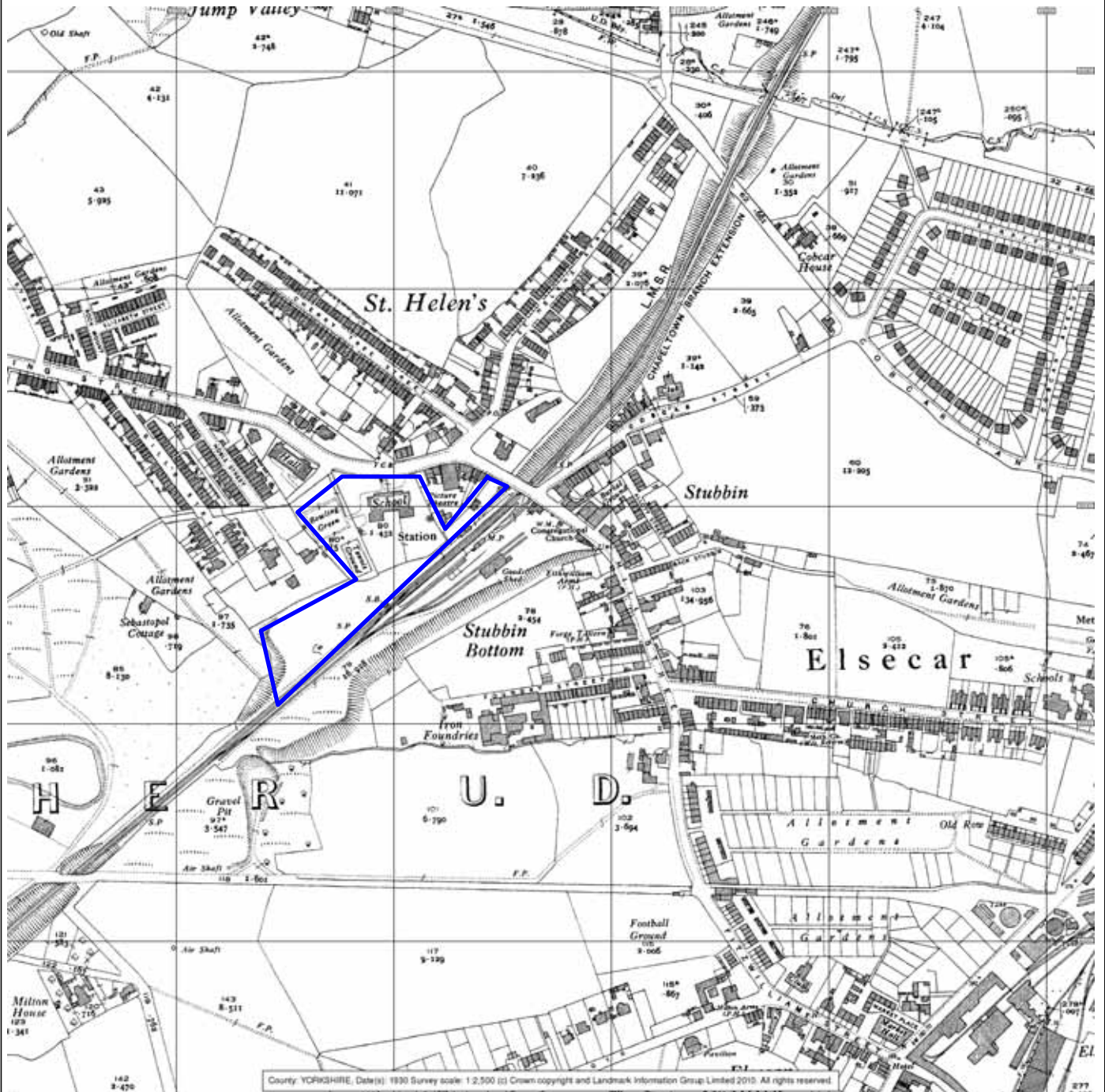
Elsecar Station

1903—Historical Map

ARUP

120788

1930—Historical Map



Notes:
Map not to scale.
Original scale - 1:2,500.

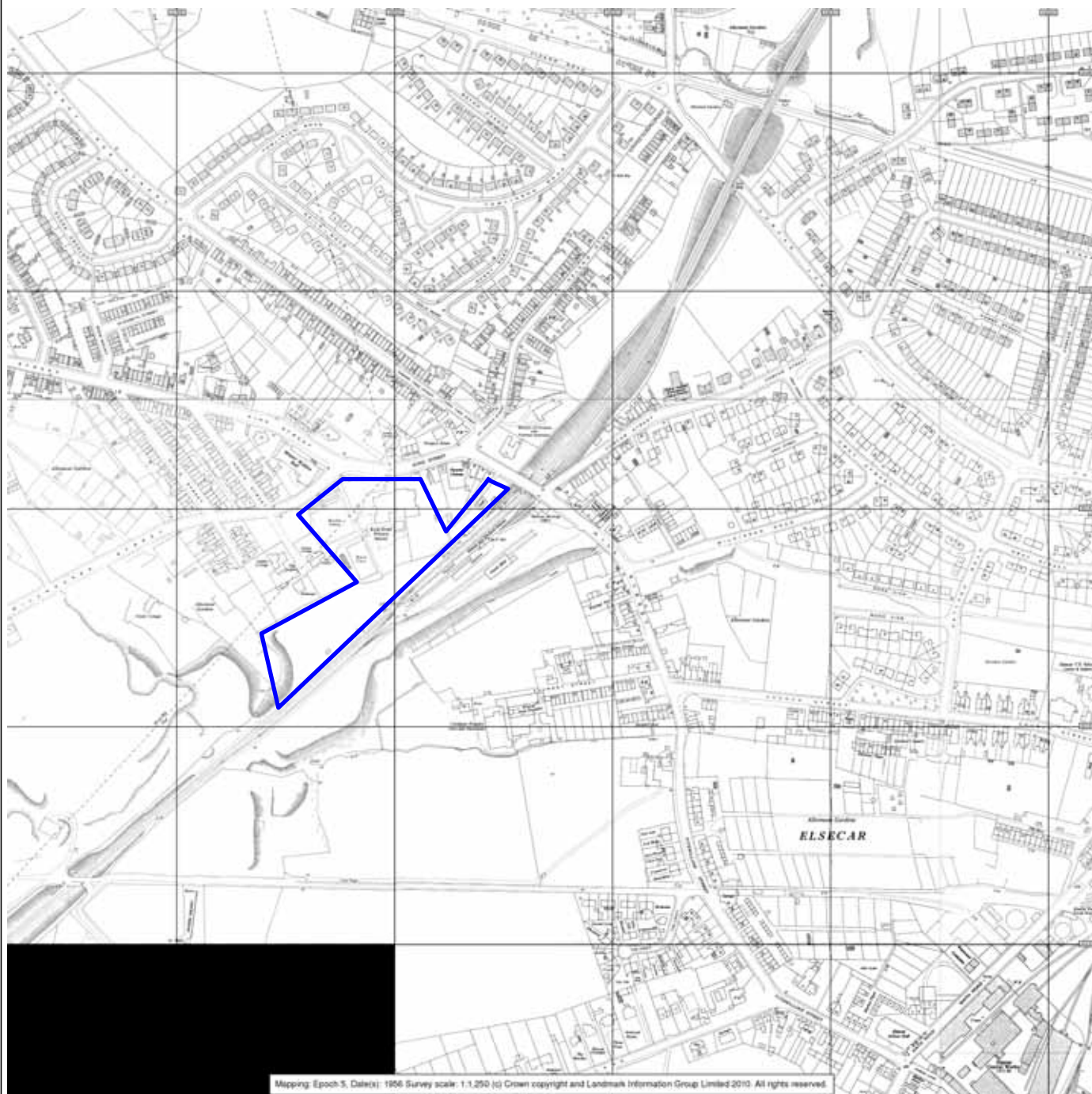
Elsecar Station

1930—Historical Map

ARUP

120788

1956—Historical Map



Notes:
Map not to scale.
Original scale - 1:1,250.

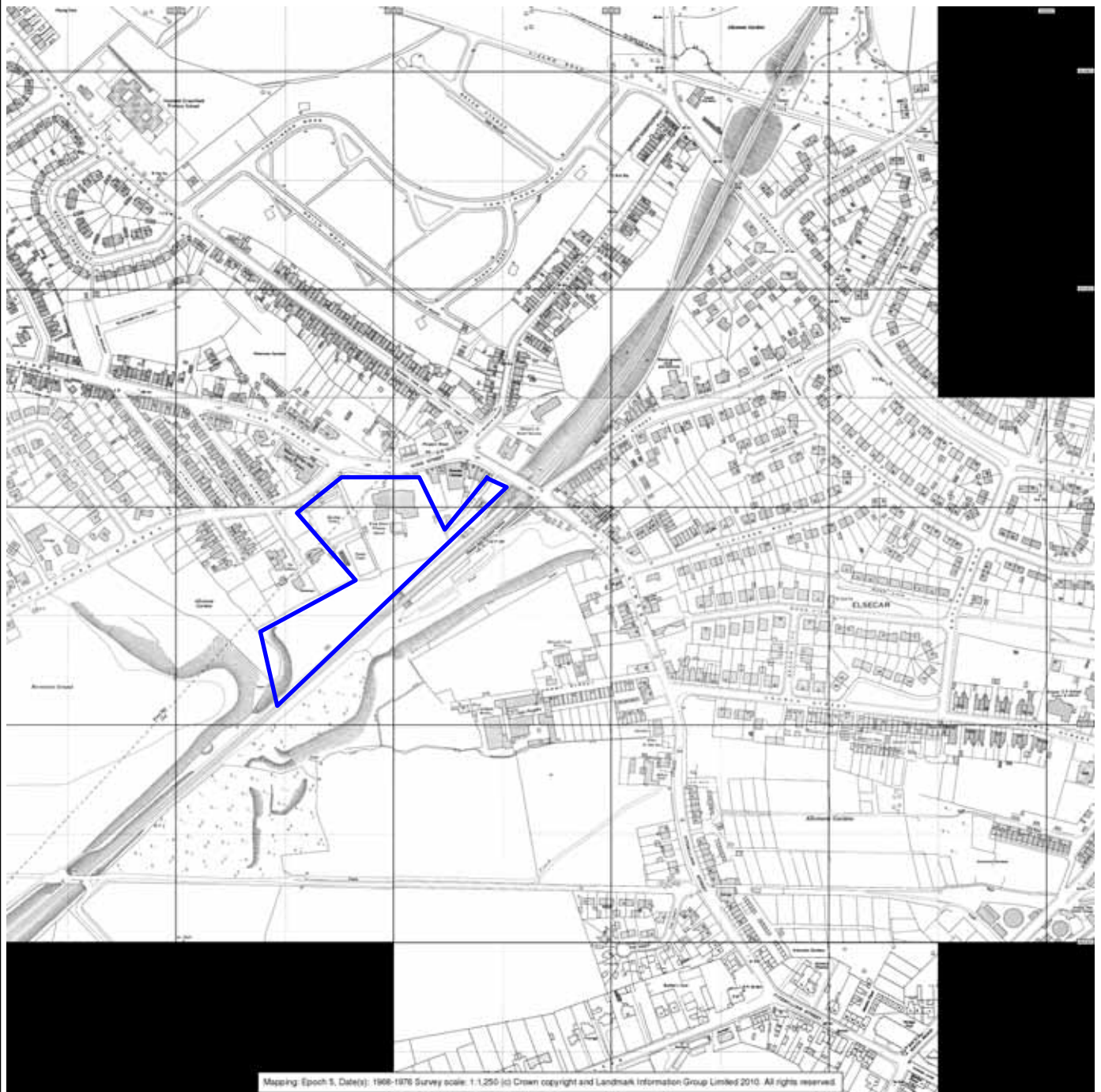
Elsecar Station

1956—Historical Map

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1968-76 —Historical Map



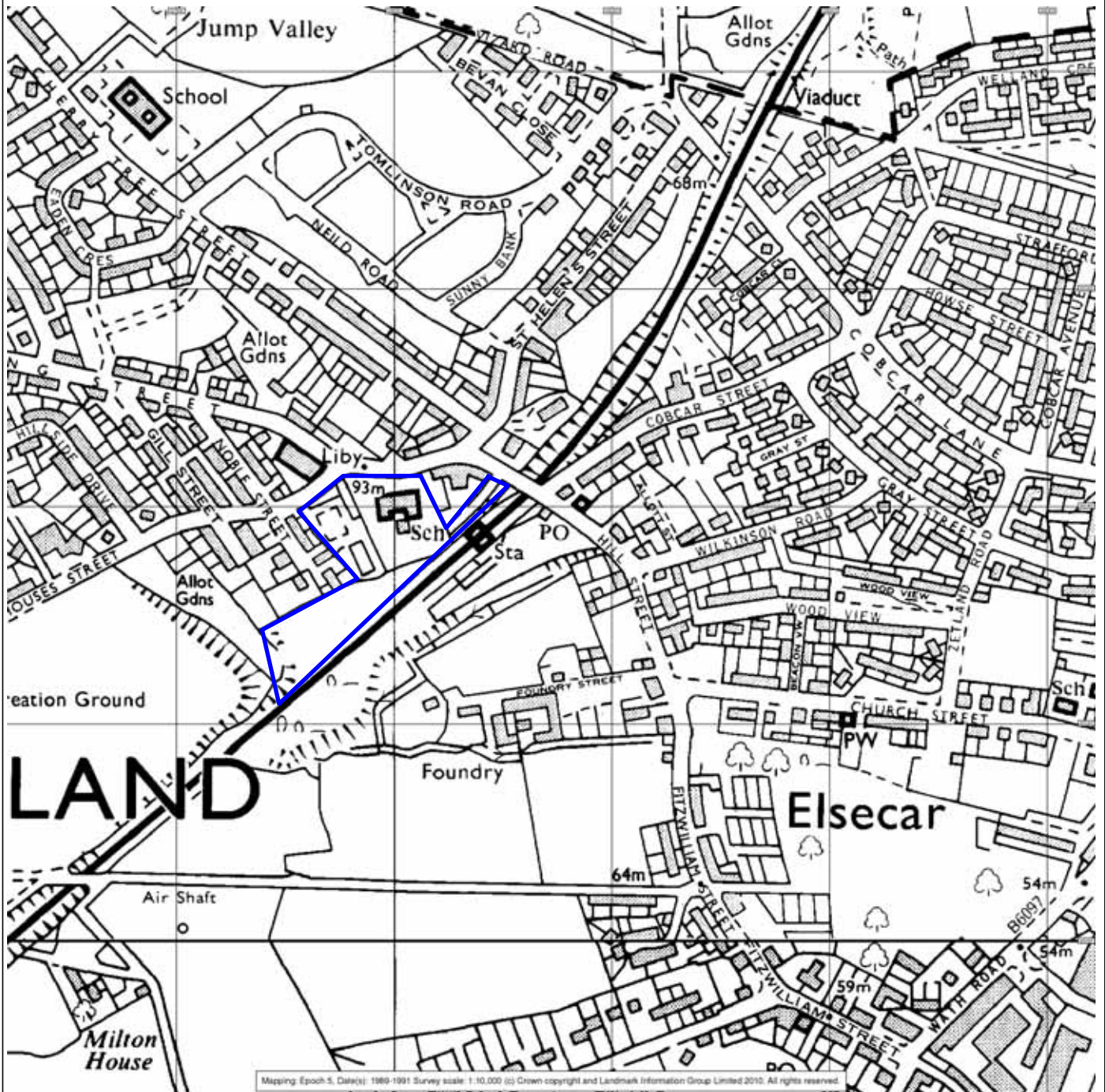
Notes:
Map not to scale.
Original scale - 1:1,250.

Elsecar Station

1968-76 —**Historical Map**

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Notes:
Map not to scale.
Original scale - 1:10,000.

Elsecar Station

1989-91—Historical Map

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Appendix B

Parkside Lane, Dewsbury Road, Leeds LS11 5SX
Telephone Leeds (0532) 711111 Telex 557357

SOFT GROUND DAILY RECORD

DATE + TIME OF START/FINISH 12/16/88

TOWN DARNSLEY
SITE NAME MILTON PONDS
JOB No.
BOREHOLE No. 2
EQUIPMENT IN USE
VEHICLE No.

DESCRIPTION OF STRATA					DEPTH to base of STRATA m	SAMPLES											REMARKS		
Soft/Firm/ Stiff	Colour	Clayey Silty Sandy etc.	SOIL TYPE	Sand bands Silty Cobbles etc.		No. Type	Penetration m		u blows	S.P.T./C.P.T. mms.									
							From	To		0 to 75	75 to 150	150 to 225	225 to 300	300 to 375	375 to 450	450 to 500			
Start of days drilling					GL	S	1.05	2.0		1									
Tuffaceous					0.05	H	2.55	3.0	20										
						D	3.2	5.0											
Loose SAND and crystalline ROCK						W	3.15	4.0	42										
					0.40	D	4.55												
						S	5.05	5.5		7	8	10	18	20	24				
ASH, STONES and COLUMBIAN WASTE						D	6.0												
						S	6.55	7.0		6	8	14	19	23	26				
						D	7.5												
						S	8.05	8.5		8	12	14	13	17	23				
					2.30	D	9.0												
						S	9.55	10.0		6	12	22	30	42	50			20m below	
Firm orangey brown and grey mottled CLAY						W	3.14	Water											
					3.55														
Weak to Moderate weathered grey MUDSTONE																			
					9.20														
Hard black SLATE																			
SHOW SAMPLES THUS :					10.00														
End of days drilling																			

U Undisturbed; D Disturbed; B Bulk; W Water; S Standard Penetration Test; C Cone Penetration Test

CASING		
SIZE (mm)	FROM (m)	TO (m)
1.50	GL	7.80

Cause	From (m)	To (m)	Time (hr)
Bagged Spoil from BH/3 and clean up.			3/4.

WATER					
OBSERVATION	DATE	TIME	DEPTH	INFLOW	CASING
Struck			14.00		3.0
Standing level. (after 20 mins)			3.40	Fast.	
Sealed.					4.70
Water seaped back into B/H SPT				5.05	5.5m
Standing level. after SPT.				3.55.	
FSL.			3.40		7.50
STAND PIPE/PIEZOMETER	Time taken (hr)	Depth	Depth of Top	Seals (m) Bottom	Reading

OBSERVATIONS : e.g, Struck, Rate of flow, Sealed, Final standing level, Dry

OBSERVATIONS : e.g. Struck, Rate of flow, Sealed, Final standing level, Dry

WEATHER : ~~Fine / Drizzling / Rainy / Stormy / Snow / Freezing~~

SIGNATURES
DRILLER

CLIENT

Norwest Holst Soil Engineering Ltd.

Parkside Lane, Dewsbury Road, Leeds LS11 5SX
Telephone Leeds (0532) 711111 Telex 557357

SOFT GROUND DAILY RECORD

DATE + TIME OF START/FINISH 15/6/88

TOWN BARNLEY
SITE NAME MILTON PONDS
JOB No.
BOREHOLE No. 3
EQUIPMENT IN USE
VEHICLE No.

DESCRIPTION OF STRATA					DEPTH to base of STRATA m	SAMPLES												REMARKS
Soft/Firm/ Stiff	Colour	Clayey Silty Sandy etc.	SOIL TYPE	Sand bands Cobbles etc.		No. Type	Penetration m From To	u blows	S.P.T./C.P.T mms.									
Loose/Dense	Fine - Coarse Medium								0 to 75	75 to 150	150 to 225	225 to 300	300 to 375	375 to 450	450 to 500			
Start of days drilling					GL	B	GL	1.55										
<u>TARMAC</u>					0.05	S	1.55	2.0		1	1							
						W	2.05	3.0	36									
<u>Loose SAND and</u>						D	3.0	3.85										
<u>CRUSHED ROCK</u>					0.40	S	3.4	3.85		9	11	8	8	8	9			
						S	4.05	5.0		4	6	9	11	13	14			
						D	5.5											
<u>ASH, STONES AND</u>						S	6.05	6.5		8	15	17	17	16	14			
<u>COLLIERY WASTE</u>					2.40	D	7.0											
						S	7.55	8.0		7	11	12	16	13	13			
						D	8.5											
<u>Firm grey and pale</u>						S	9.05	9.5		5	8	17	24	31	50	42	SMALL PEN.	
<u>BROWN MOTTLED CLAY</u>					3.40	W	3.40	Water										
<u>Weak to Moderate</u>																		
<u>Weathered grey Mudstone</u>					8.40													
<u>Hard grey shale</u>					8.50													
<u>Alternating bands of</u>																		
<u>Weak, moderate and</u>																		
<u>Strong Mudstone</u>																		
SHOW SAMPLES THUS :					End of days drilling	10.00												

U Undisturbed; D Disturbed; B Bulk; W Water; S Standard Penetration Test; C Cone Penetration Test

CASING		
SIZE (mm)	FROM (m)	TO (m)
130	GL	8.60

DELAYS/BAD ACCESS/PITS/HARD STRATA etc.			
Cause	From (m)	To (m)	Time (hr)
Chisel hard layer	8.40	8.50	1/4

WATER					
OBSERVATION	DATE	TIME	DEPTH	INFLOW	CASING
Struck			4.25		3.60
Standing level after 20 min			3.40		
SL			4.30		8.60
STAND PIPE/PIEZOMETER					
Time taken (hr)	Depth	Depth of Seals (m) Top Bottom	Reading		

SIGNATURES
DRILLER M. Shore CLIENT

OBSERVATIONS : e.g. Struck, Rate of flow, Sealed, Final standing level, Dry

WEATHER : Fine / Drizzling / Rainy / Stormy / Snow / Frosting

SE 30 SE / 3

Section of ROCKINGHAM COLLIERY -
No. 5 Underground Borehole
 Purpose To prove the Thorncliffe Seam
 Exact Site O.S. N.G.R. SE/38220/00626

Level at which ^{shaft} ~~bore~~ commenced relative to O.D. 685 ^{below O.D.}
 (Floor of Top Fenton)

Date of sinking or boring May 1974

Sinker or borer N.C.B. (Barnsley Area)

Cores, other than coal, examined by P. Hirst.

6-INCH MAP	R/W REF. NO.
Yorks. 283 NW (County, Sheet and Qtr.)	
SE 30 SE (Nat. Grid, Sheet & Qtr.)	
Attach tracing from a map or sketch map if possible	

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS		DEPTH	
		2-02 (1)	0-01 (1)	2-02 (1)	0-01 (1)
	OPEN HOLE - NO CORE	28.092	0	92.38	0.00
	Grey silty mudstone with ironstone nodules	10.33	1	93.38	0.37
	Grey mudstone with mussels and gullermites	20.41	0	95.38	0.12
	Dark grey silty shale with mussels	0.03	1	95.39	0.12
	COAL	0.08	3	95.39	0.85
	Shaly mudstone-seatearth	0.15	0.06	95.39	2.41
	COAL	0.08	3	95.39	3.12
	Mudstone-seatearth	0.05	2	95.39	3.64
	Silty mudstone-seatearth with rootlets and ironstone nodules	10.41	4	97.29	7.78
	OPEN HOLE - NO CORE	134.11	6	111.33	28.2
	Pale grey laminated sandstone with carbonaceous micaceous partings and comminuted plants	0.10	4	111.33	9.96
	Grey siltstone with carbonaceous micaceous partings and comminuted plants	0.28	11	112.34	2.65
	Grey siltstone with micaceous partings and occasional plant fossils	10.48	7	114.34	7.50
	Ironstone	0.03	1	114.34	7.71
	Fine grey siltstone with micaceous partings, occasional plants and sandy laminae	0.23	9	114.35	0.90
	Coarse grey siltstone with comminuted plants	0.10	4	115.35	10.2
	Grey siltstone with plants and micaceous partings	10.48	7	116.35	5.93
	Coarse grey siltstone with comminuted plants	0.08	3	117.35	0.00
	Grey siltstone with sandy laminae and occasional plants	10.51	8	118.36	17.8
	Grey silty mudstone with occasional siltstone partings	0.10	4	119.36	27.0
	Ironstone	0.05	2	119.36	33.2
	Grey silty mudstone	0.13	5	119.36	45.7
	Grey slightly silty mudstone	10.51	8	121.36	96.3
	Grey mudstone with mussels	10.42	4	122.37	38.7
	Ironstone	0.05	2	122.37	43.9
	Smooth grey mudstone	0.03	1	122.37	45.10
	Ironstone	0.05	2	123.37	50.0
	Very smooth grey mudstone	0.13	5	123.37	63.72
	Dark grey, silty carbonaceous mudstone with occasional ironstone patches	0.10	4	123.37	73.22
	Dark grey shaly mudstone	0.16	6	124.37	90.4
	Ironstone with pyritised mussels	0.05	2	124.37	95.6
	COAL	20.72	4	126.38	67.0
	Immature mudstone-seatearth with plant fossils and occasional roots and coaly threads	0.20	8	127.38	88.6
	Compact fine grained siltstone-seatearth with rootlets	10.40	3	128.38	27.0

THORNCLIFFE

SE 30 SE 3
May 1974
685' B.O.D.
Floor of Top Fenton

3 British Geological Survey

50 OCT 1974
MINERAL INVESTIGATION

SE 30 SE 123

Section of ROCKINGHAM COLLIERY -
No. 4 Underground Benchols
Purpose To prove the Thoraliffe Seam
Exact Site O.S. N.C.R. SE/3765/00055

6-INCH MAP	6-IN. RES. MAP
Yorks. 283 NW (County, Sheet and Qtr.)	
SE 30 SE 123 (Nat. Grid, Sheet & Qtr.)	
Attach tracing from a map or sketch map if possible	

Level at which shaft
bore commenced relative to O.D. 522 m or ft
drift B.O.D.
(Floor of Top Fenton Seam)
Date of sinking or boring January/March 1974

Sinker or borer National Coal Board
Cores, other than coal, examined by P. Hirst.

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS		DEPTH	
		m or ft	m or ft	m or ft	m or ft
	Floor of TOP FENTON SEAM				
	OPEN HOLE to 100'-2" - No cores taken	100	2	100	33.2
	Pale grey cemented sandstone with comminuted plants and small <i>Stigmaria</i> sp. at 100'-8"	0.43	1	101	36.7
	Grey sandstone with carbonaceous micaceous partings	0.15	6	102	38.1
	Grey siltstone/sandstone with occasional carbonaceous micaceous partings, contorted bedding and rippling and comminuted plants	1.45	4	103	38.5
	Grey slightly silty mudstone with occasional silty patches	0.10	4	107	36.2
	Grey siltstone with rippling and micaceous partings	0.16	6 1/2	107	38.8
	Grey laminated siltstone/sandstone with carbonaceous micaceous partings, diastems and occasional comminuted plants	0.42	1 1/2	109	33.48
	Laminated siltstone with numerous carbonaceous micaceous partings, planty horizons and sandstone layers	0.21	8 1/2	110	38.49
	Coarse micaceous siltstone with comminuted plants	0.08	3	110	33.72
	Grey siltstone with carbonaceous micaceous partings, sandy laminae and comminuted plants	0.25	10	111	34.92
	Grey silty mudstone	0.09	3 1/2	111	34.11
	Laminated siltstone with carbonaceous micaceous partings, fossil plant horizons etc.	0.30	1	112	34.42
	Grey fine grained siltstone	0.15	6	113	34.57
	Grey rather micaceous siltstone	0.20	8	114	34.77
	Grey siltstone with carbonaceous micaceous partings and planty horizons	0.05	2	114	34.82
	Grey silty mudstone, occasional siltstone horizons containing carbonaceous micaceous partings, ferruginous patches etc.	0.56	1	116	35.38
	Ironstone	0.08	3	116	35.44
	Grey silty mudstone with trace fossils	0.23	9	117	35.69
	Ironstone	0.05	2	117	35.74
	Grey mudstone with trace fossils	0.53	1	119	36.27
	Smooth grey mudstone with trace fossils	0.23	9	119	36.65
	Ironstone	0.05	2	119	36.55
	Smooth darkish grey shale with <i>guillemites</i>	0.08	3	120	36.63
	Smooth darkish grey shaly mudstone	0.08	3	120	36.7
	Dark grey, slightly silty shaly mudstone, <i>guillemites</i> near the base	0.32	1	121	37.02

Section of BOSKINSTEAD COLLIERY - No. 4 W/G Barshole

5-INCH MLP

5/14

Yorke. 283 NW

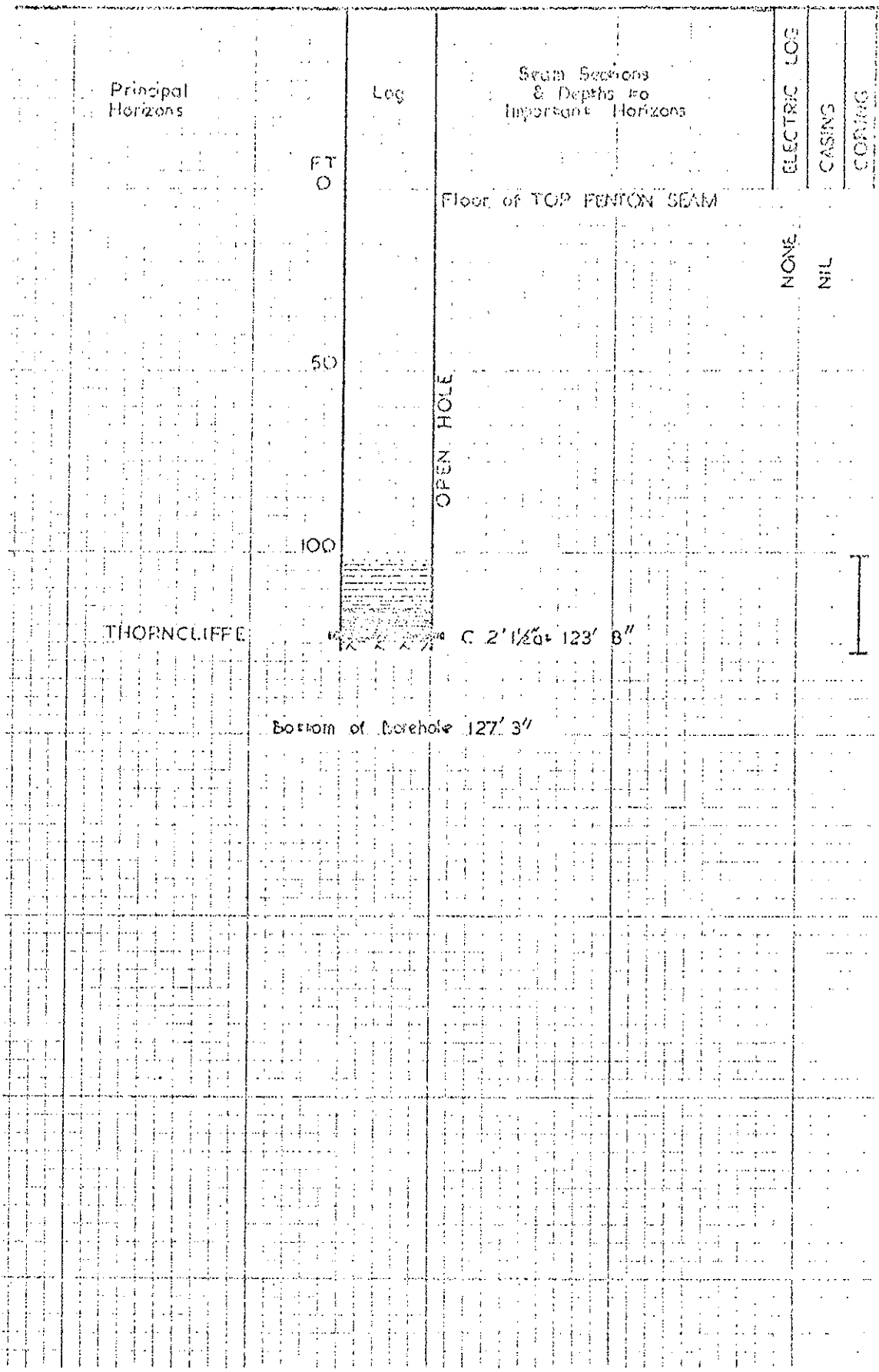
518 50 519

23

*Delete as appropriate

[illegible]

YORKSHIRE ~~COMMERCIAL IN CONFIDENCE~~ NO 30 SE / 23
 ROCKINGHAM COLLIERY Jan/March 1974
 No 4 U.G.D.M. 522' B.O.D.



SK 39 NE / 29

7

Section of ROCKINGHAM COLLIERY
No. 8 Underground Borehole
Purpose To prove the Thorncliffe Seam
Exact Site O.S. N.G.R. SK/38294/99986
Level at which shaft commenced relative to O.D. 570 173.74
drift B.O.D.
(Floor of Low Fenton Seam)
Date of sinking or boring November 1974
Sinker or borer National Coal Board
Cores, other than coal, examined by S. Graham.

6-INCH MAP
Yorks. 283 NW
(County, Sheet and Qtr.)
SK 39 NE
(Nat. Grid, Sheet & Qtr.)

Attach tracing from a map or sketch map if possible

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS		DEPTH	
		Feet	Meters	Feet	Meters
	Coring started at 115'-0" <u>173.74</u>	0.35	0.115	0	0
	Broken or missing core (broken by pilot bit)	0.38	1	3	3
	Grey silty mudstone with ironstone bands.				
	Burrows at 117'-6" <u>35.82</u>	0.61	2	3	3
	Grey mudstone with ironstone bands. Mussels below 118'-9" becoming abundant below				
36.4	0 119'-5". Occasional burrows, listricated surfaces and ironstone nodules throughout	0.53	1	0	0
	Dark grey mudstone with mussels	0.05	2	2	2
	COAL	0.05	2	4	4
	Dark grey listricated mudstone with coalified plant remains and coal streaks	0.13	5	9	9
	COAL.	0.13	5	0	0
	Grey/brown immature mudstone-seatearth with plant remains	0.38	1	3	3
	Grey/brown mudstone with coalified plant remains becoming more abundant in lower				
	3". Ironstone nodules and lenses 37.48 throughout. Listricated below 122'-11"	0.28	11	2	2
	Complexly interbedded silt/sands, slumping structures throughout. Roots abundant	0.38	1	5	5
	Complexly bedded pale grey sandstone with finely comminuted plant debris on bedding	1.14	3	2	2
	Massive pale grey sandstone	0.99	3	5	5
	Interlaminated silt/sand, plants throughout, and occasional finely comminuted plant debris on bedding	1.52	5	5	5
	Complexly bedded pale grey sandstone with finely comminuted plant debris on bedding	2.44	8	1	1
	Grey silty mudstone, ferruginous in part. Occasional plant remains and occasional fine sandstone laminations. (Compressive strength 5,760 - 9,000 lbs/sq.in. - variable)	0.58	1	11	11
	Grey slightly silty mudstone	0.18	7	6	6
	Ironstone	0.05	2	8	8
	Grey shaly mudstone with occasional ironstone bands	0.61	2	8	8
	Grey/brown ferruginous mudstone	0.08	3	11	11
	Dark grey shaly mudstone with mussels above 142'-1". Ironstone lenses throughout.				
	Listricated surfaces below 142'-3"	0.38	1	2	2
	Ironstone	0.05	2	4	4
	Dark grey shaly mudstone with abundant mussels, listricated surfaces and ironstone lenses throughout	0.15	6	10	10

SPU.917

Section of ROCKINGHAM COLLIERY - No. 8 U/G Borehole

6-INCH MAP

B. H.

Yorks. 283 NW

SK 39 NE

20

*Delete as appropriate.

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS		DEPTH	
		ft-in	ft-in	ft-in	ft-in
THORNCVILLE	Black carbonaceous mudstone with ostracods and fish teeth above 144'-0". 43.89				
	Guillilemites abundant below 144'-8" 44.09	10-33	1	144	1144.18
	Ironstone	0.05	2	145	144.22
	COAL 0.48 1'-7"	0.57	10 1/2	146	11 1/2 44.80
	Dirt 0.05 2"				
	COAL 0.04 1 1/2"				
	Grey immature mudstone-seatearth with roots. Occasional listrics. Ironstone nodules below 148'-3" 45.19	20-88 2 1/2	149	245.47	
	Grey slightly silty mudstone with roots. Ironstone nodules throughout. (Compressive strength 6,840 lbs/sq.in.)	0.08	3	149	545.54
	Grey/brown ferruginous mudstone with roots (Compressive strength 11,700 lbs/sq.in.)	0.08	3	149	845.62
	Grey silty mudstone with roots	0.18	7	150	345.80
	Grey mudstone with roots and ironstone nodules	0.20	8	150	1146.01
	Grey siltstone with roots	0.08	3	151	246.08
	Unrecovered core	0.10	4	151	646.19
	BOTTOM OF BOREHOLE			151	646.19

SK 39 NE
Nov. 1974
570' B.O.D.
(Floor of Low
Fenton Seam)

29

THORNCLIFFE

B-INCH MAP	B/H REGD. No.
Yorks. 283 NW (County, Sheet and Qtr.)	
~~SE 30 SE~~ (Nat. Grid, Sheet & Qtr.)	

Attach tracing from a map or sketch map if possible

(Nat. Grid, Sheet & Qtr.)

Attach tracing from a map or sketch map if possible

*Delete as appropriate

[illegible]

SK39NE/30
SE 30 SE

SE 30 SE

June/July 1974

509' B.O.D.

(Floor of Top Fenton Seam)



TRIAL HOLE LOG

LAND OFF CLOUGHFIELD ROAD, HOYLAND, S. YORKS

<u>Trial Hole No.</u>	<u>Comments</u>
1.	Trenching Operation - fault located at Position B A/B: 0 - 150mm Topsoil 150 - 300mm Soil/Clay mix 300 - 2500mm Stiff Yellow Clay with sandstone fragments increasing with depth 2500 - 3500mm Sandstone B/C: 0 - 300mm Topsoil 300 - 600mm Yellow Clay 600 - 2500mm Stiff Blue Clay, coal traces, ironstone fragments, mudstone predominating with depth 2500 - 3500mm Very difficult to excavate Blue mudstones
2.	0 - 250mm Topsoil 250 - 900mm Yellow Clay 900 - 3500mm Stiff Blue Clay becoming mudstone with depth
3, 4, 5, 6.	As 2 above
7.	0 - 200mm Topsoil 200 - 750mm Brownish Yellow Clay - stiff 750 - 1100mm Stiff Blue Clay 1100 - 2500mm Mudstone
8.	0 - 200mm Topsoil 200 - 1100mm Mixed Yellow/Blue stiff clay 1100 - 2500mm Mudstone
9.	0 - 300mm Topsoil 300 - 900mm Yellow clay - stiff 900 - 3000mm Shaley mudstone and shale
10.	0 - 150mm Topsoil 150 - 750mm Brown and Yellow Clay - stiff 750 - 1250mm Stiff Blue clay 1250 - 2500mm Mudstone
11.	As 10 above
12.	0 - 150mm Topsoil 150 - 2500mm Stiff Yellow Clay with sandstone fragments increasing with depth (similar to A/B trench Hole No.1.)

GENERAL: All holes dry and remained dry throughout the day (some 4-5 hours).

DRILLING LOG

LAND OFF CLOUGHFIELD ROAD, HOYLAND, S. YORKS

<u>Hole No.</u>	<u>Comments</u>
H.1.	0 - 16M Solid (generally mudstone)
H.2.	As H.1.
H.3.	0 - 1.5M Solid (mudstone) 1.5M- 2M Coal
H.4.	0 - 4.1M Solid (mudstone) 4.1M- 5.0M Coal
H.5.	0 - 10M Solid mudstone
H.6.	0 - 3M Solid mudstone 3M - 4M Coal
H.7.	0 - 21M Mudstone 21M - 21.5M Coal 21.5- 23.7M Mudstones 23.7- 24M Coal 24M - 31M Solid mudstones
H.8.	0 - 19.1M Mudstone 19.1- 19.7M Coal 19.7- 20M Coal Traces/Mudstone/Shale 20M - 20.3M Coal 20.3- 21M Mudstone 21M - 21.5M Coal 21.5- 31M Mudstones
H.9.	0 - 19.3M Mudstone 19.3- 19.9M Coal 19.9- 20.2M Mudstone/Coal/Shale 20.2- 20.5M Coal 20.5- 21.2M Mudstone 21.2- 21.7M Coal 21.7- 31M Mudstone
H.10.	0 - 7.5M Mudstone 7.5 - 7.8M Coal 7.8 - 20.7M Mudstone 20.7- 21.2M Coal 21.2- 31M Mudstone
H.11.	0 - 9.9M Mudstone 9.9 - 10.2M Coal 10.2- 27.9M Mudstone 27.9- 28.5M Coal 28.5- 31M Mudstone
H.12.	0 - 7.3M Mudstone 7.3 - 7.6M Coal 7.6 - 25.6M Mudstone 25.6- 26.1M Coal 26.1- 26.9M Mudstone/Shale 26.9- 27.2M Coal 27.2- 31M Mudstone

TRIAL HOLE LOG

LAND OFF CLOUGHFIELD ROAD, HOYLAND, S. YORKS

<u>Trial Hole No.</u>	<u>Comments</u>
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2.	0 - 250mm Topsoil 250 - 900mm Yellow Clay 900 - 3500mm Stiff Blue Clay becoming mudstone with depth
3, 4, 5, 6.	As 2 above
7.	0 - 200mm Topsoil 200 - 750mm Brownish Yellow Clay - stiff 750 - 1100mm Stiff Blue Clay 1100 - 2500mm Mudstone
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10.	0 - 150mm Topsoil 150 - 750mm Brown and Yellow Clay - stiff 750 - 1250mm Stiff Blue clay 1250 - 2500mm Mudstone
11.	As 10 above
12.	0 - 150mm Topsoil 150 - 2500mm Stiff Yellow Clay with sandstone fragments increasing with depth (similar to A/B trench Hole No.1.)

GENERAL: All holes dry and remained dry throughout the day (some 4-5 hours).

DRILLING LOG

LAND OFF CLOUGHFIELD ROAD, HOYLAND, S. YORKS

<u>Hole No.</u>	<u>Comments</u>
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TRIAL HOLE LOG

LAND OFF CLOUGHFIELD ROAD, HOYLAND, S. YORKS

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TRIAL HOLE LOG

LAND OFF CLOUGHFIELD ROAD, HOYLAND, S. YORKS

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Appendix C

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

Person dealing with this matter:	Darren Moody
Our reference:	00004093-10
Your reference:	30013114
Electronic Ref:	EME_00013149660002_005
RRUID:	005.00013149660002
Date of your enquiry:	01 February 2010
Date we received your enquiry:	01 February 2010
Date of issue:	01 February 2010

CUSTOMER SERVICES,
LANDMARK INFORMATION GROUP LIMITED,
ABBAY COURT UNIT 5/7,
EAGLE WAY,
SOWTON INDUSTRIAL ESTATE,
EXETER,
DEVON,
EX2 7HY

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

Coal and Brine Report

Site At, Elsecar Reservoir, 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 11 seams of coal at 70m to 390m depth, and last worked in 1979.

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

In addition the property is in an area where the Coal Authority believe there is coal at or close to the surface. This coal may have been worked at some time in the past.

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.

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

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

Records may be incomplete. Consequently, there may exist in the local area mine entries of which the Coal Authority has no knowledge.

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

A damage notice or claim for alleged subsidence damage was given, made or pursued in August 1978. The claim was discharged by repair.

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 not in an area for which a notice of entitlement to withdraw support has been published.

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.

Working Facilities Orders

The property is in an area for which the Earl Fitzwilliam Order dated 1939 has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification.

The property is in an area for which the Newton Chambers Order dated 1936 has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification.

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.

Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

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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Location map



Approximate
position
of property



Enquiry boundary

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Key

Approximate position of enquiry boundary shown



Coal Authority mining subsidence claim boundary shown

