OVG Manchester:

Appendix 7.2 – Coal Mining Assessment

BUROHAPPOLD ENGINEERING

OVG Manchester

Coal Mining Risk Assessment

BRA-BHE-XX-XX-RP-CG-0005

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31 January 2020

Revision P03

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1 Introduction

1.1 General

A Coal Mining Risk Assessment (CMRA) has been conducted for the OVG Manchester site. BuroHappold has been appointed by OVG Manchester Limited to undertake the for planning purposes as required by Manchester City Council (MCC). The site boundary is marked on the existing site layout plan included as Figure 2-1 (within in Section 2).

This report has been prepared in accordance with the requirements of the MCC and identifies the risks that coal mining poses to the Proposed Development, how these risks influence the Proposed Development and what mitigation measures are likely to be required.

1.2 Proposed Development

At present, the proposals for development are indicative only and being at an early stage will naturally develop further during the design process.

The proposed redevelopment is a large-scale arena structure with associated service yards. As proposed the footprint of the arena will take up most of the site. The current scheme requires significant earthworks operations to level the site and retaining solutions will be required around the perimeter. The proposed development plans are included in Appendix A.

1.3 Structure of this report

Following on from this introduction:

- Chapter 2 describes the existing site and site history;
- Chapter 3 describes the local geology, hydrogeology and hydrology;
- Chapter 4 records evidence of coal mining;
- Chapter 5 summarises the risk posed by coal mining to the site;
- Chapter 6 outlines the potential mitigation measures to reduce risk to the site;
- Chapter 7 provides a summary and conclusion to the report.

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2 The Site

2.1 Site Location and Description

The Site is centred at National Grid Reference SJ 86841, 98878, located off Sportcity Way, Manchester M11 3DU. It is located to the north east of Manchester City Centre, approximately 2.1km north east of Manchester Piccadilly Rail Station. The ground levels at the south of the site lie at approximately +60.6mOD and they fall towards the north with the lowest level at approximately +56.8mOD. The Site is approximately 4.46ha and located within Etihad Campus. It is bound by Sportcity Way to the north, Alan Turing Way to the east, Ashton Canal to the south, and Joe Mercer Way to the west, in the ward of Ancoats and Beswick, Manchester. Its boundary is shown in Figure 2-1.

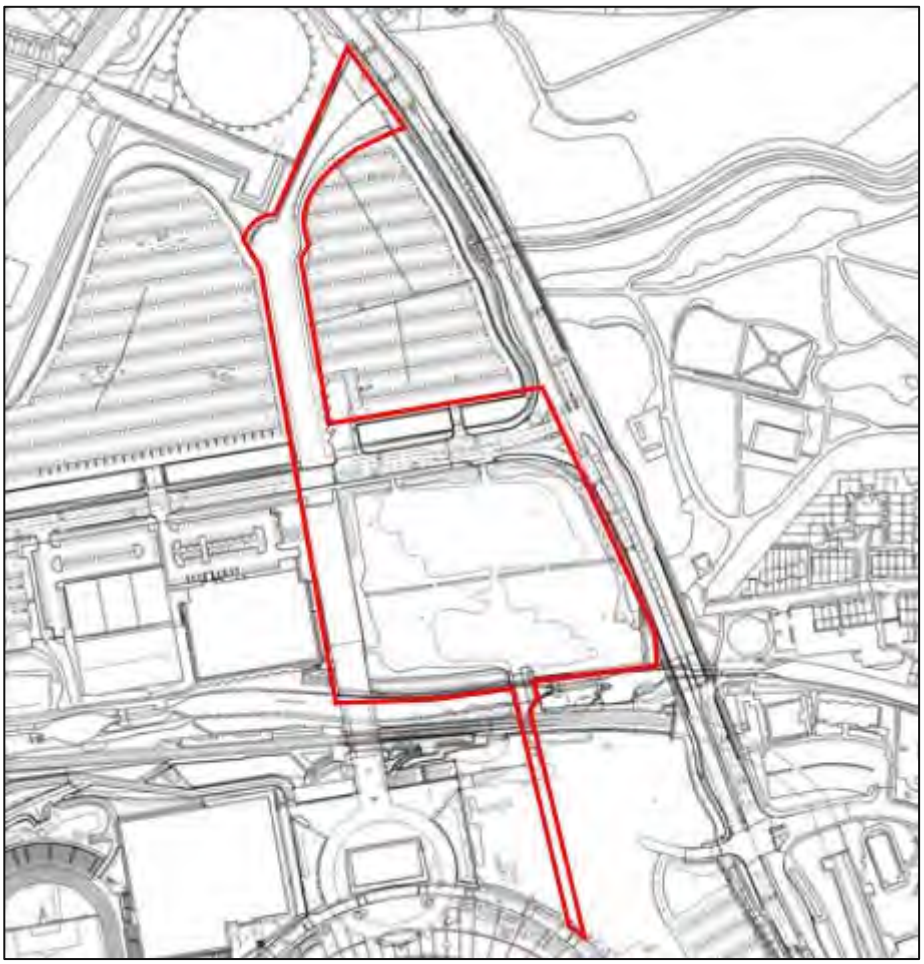


Figure 2-1 Red line boundary

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2.2 Current Activities on Site

The site is currently vacant occupied only by vegetation. Occasionally it is used for car parking when events are held at the Etihad Stadium. The most recent site activity was the site investigation carried out by Structural Soils which took place between 9th September and 29th October 2019. This was followed by the post-site investigation monitoring programme which was completed by December 7th 2019. Further trial pitting took place 17th December 2019 by Provectus, this was to obtain suitable material for a bioremediation on trial.

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2.3 Site History

The following summary of the site history has been derived from the previous desk study [1] and the GroundSure historical maps.

Until the mid-1800s, the site was occupied by agricultural land with the River Medlock meandering through the northwest corner. The Ashton canal and lock formed the southern boundary and Mill Lane the eastern boundary. Victoria Gardens were located to the north and in part occupied some of the Site.

By the early 1890s, the River Medlock had been straightened and diverted further north. A large cutting occupied the site and a small unknown structure was present within this cutting (see Figure 2-2). This structure is possibly a mine shaft, or a structure associated with the mining activities. These features (cutting and unknown structure) are not shown after 1908 (see dwg. BRA-BHE-XX-XX-DR-GE-0102). Industrial works occupied the land to the south of the canal during this time and some residential development occupied the eastern part of the site.



Figure 2-2 Extract from 1893 GroundSure historical map. River has been diverted north, cutting and small structure present, residential development east.

During the early 1900s the River Medlock was diverted into a culvert and Forge Lane and Forge Lane Bridge were constructed. West of Forge lane several cutting slopes are shown in the central and southern part of the site (refer to Figure 2-3), which suggests the site levels in the northern section have been significantly reduced, in order to construct the later factories and rail sidings. The largest change at this time was the development of Bradford Road Gas Works, which included tanks, gas holders, tramways and large buildings (some within the Site boundary).

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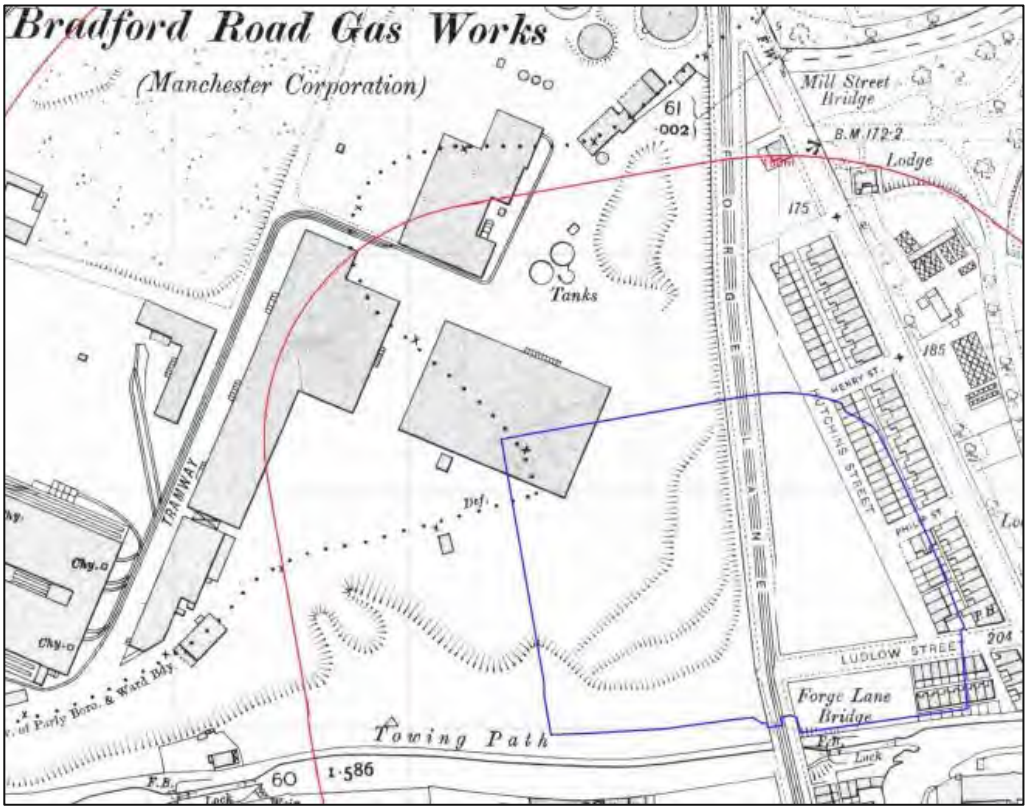


Figure 2-3 Extract from 1908 GroundSure historical map. River culverted beneath Gas Works, cuttings and Gas Works buildings present on site.

An additional feature within these cuttings was noted on the 1922-1923 maps, see Figure 2-4. This feature could potentially be attributed to a water feature on site associated with the cuttings. There is no further evidence of this feature in later historical maps. Residential development occupied the entire area to the east of Forge Lane.



Figure 2-4 Extract of 1922 GroundSure historical map. Note feature within cuttings central to the site.

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By the early 1930s, there was further development to the gas works including tramlines within the site and further development to the industrial works south, beyond the canal. Historical photographs from this period show how large the cutting slopes were within the site (see below, Figure 2-5).

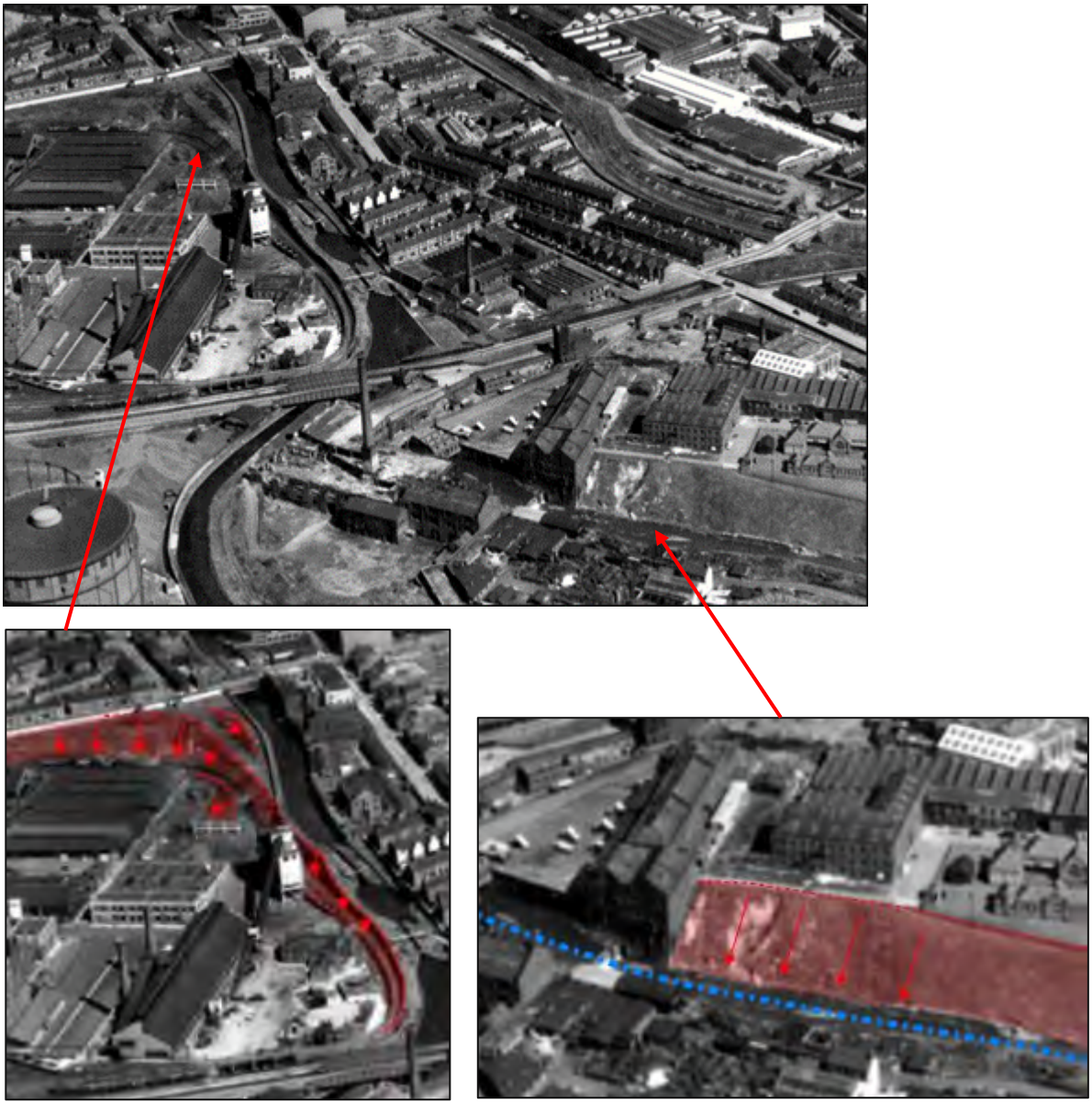


Figure 2-5 Historical image assumed to be around 1930-1940s. Note large cut slopes to the south of the site an also the large depth of the River Medlock south-west of site.

There were no further significant changes to the site (aside from an Electricity Substation being developed in the 1940s and moved further south in late 1970s) and its surroundings until late 1970s whereby the majority of these works were cleared including buildings associated with the gas works. Between the late 1980s and late 1990s there were changes to the land use in the eastern part of the site and by 1995 Mill Lane developed into Alan Turing Way. By 2002, construction of the Etihad Stadium to the south was completed and road layouts in the surrounding area developed. In 2009, a BMX track occupied the western part of the Site and by 2010 the site was cleared.

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The historical features across the site have been shown on the historical features drawing (BRA-BHE-XX-XX-DR-GE-0102) included in Appendix A.

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3 Environmental Setting

3.1 Published geology

The 1:50 000 geological map Sheet 85 [2] and 1:10 000 geological map Sheet SJ89NE [3] together with the boreholes made available from the site investigation (undertaken in late 2019) indicate the geology to be the Pennine Upper Coal Measures of the Upper Carboniferous, overlain by Quaternary deposits. The map shows the site to be underlain by the following:

- Made Ground
- Alluvium and River Terrace Deposits (north-western area) – Soft grey clay and unconsolidated orange-brown clayey sands and gravels.
- Glacial Till – Firm becoming very stiff reddish-brown clay and silty clay with gravels and pebbles.
- Pennine Upper and Middle Coal Measures – Mudstones, siltstones and sandstones with beds of coal, fireclay and ironstone within the upper parts.

The BGS geological maps indicate four coal seams sub-crop across the site. These include the Bradford Four Foot, Bradford Three Quarters and Charlotte Mine. A further 2 seams, the Yard Mine (NE) and the 18 Inch seam sub-crop to the north east, up dip of the site, and these seams are anticipated to be present beneath the site due to the dip orientation of the seam (all seams generally dip south-west). The maps indicate that the strata dips between 15° (inclined strata measured underground) and 25° (inclined strata) SW.

3.2 Encountered geology

The geology below the site has been further defined using recent and historic ground investigations [4] and [5] respectively. The ground investigation location plan is shown in dwg. BRA-BHE-XX-XX-DR-GE-0200 and cross sections across the site in dwgs. BRA-BHE-XX-XX-DR-GE-0201-0203 (Appendix A).

Table 3-1 Summary of geology encountered below the site

Strata	Description	Top of Strata *(average)*		Thickness *(average)* (m)
		m bgl	m OD	
Made Ground	Soft to firm brown black sandy gravelly CLAY. Locally sandy clayey GRAVEL and occasionally fine to coarse SAND. Constituents include ash, coal, clinker, brick, sandstone, limestone, pottery, concrete, rootlets, wood, plastic, rebar.	0 *(0)*	60.8 – 56.9 *(59.1)*	1.3 – 17.2 *(8.1)*
Alluvium	Soft to firm orangish brown slightly gravelly sand CLAY	7.4 – 12.6 *(9.8)*	52.8 – 44.8 *(49.0)*	0.3 – 2.0 *(1.3)*
River Terrace Gravels	Medium dense to very dense orangish brown slightly gravelly to gravelly clayey fine to coarse SAND	9.0 – 13.9 *(10.8)*	51.4 – 43.5 *(48.4)*	0.6 – 3.0 *(1.7)*

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Strata	Description	Top of Strata *(average)*		Thickness *(average)* (m)
		m bgl	m OD	
Glacial Till	Soft to very stiff brown gravelly CLAY	1.3 – 14.5 *(7.8)*	59.2 – 42.9 *(51.6)*	0.9 – 12.0 *(5.6)*
Coal Measures (interbedded layers of predominantly mudstone, with sandstone, siltstone and coal)	Very weak to weak grey MUDSTONE with locally thin to thickly laminations of light grey siltstone and/or fine grained sandstone Discontinuities are extremely closely to closely spaced planar smooth or undulating rough clean locally polished or clay smeared. SEATEARTH generally found below coal seams and consists of extremely weak grey MUDSTONE with gravel-sized fragments of black organic matter/fossilised plant remains and gravel-sized ironstone nodules. Very weak to moderately weak light grey fine to medium grained SANDSTONE with localised thin laminations of mudstone and/or siltstone. Discontinuities are extremely closely to medium spaced undulating rough clean. Very weak to weak grey SILTSTONE with localised thin to thick laminations of mudstone and/or sandstone. Discontinuities are very closely to medium spaced planar smooth or undulating rough clean or stained. Very weak black COAL.	11.5 – 18.0 *(13.8)*	48.5 – 39.9 *(45.0)*	Base not proven

The Made Ground and superficial deposits are reasonably thick across the site, a contour plot showing the base of the Made ground is shown in dwg. BRA-BHE-XX-XX-DR-GE-0300 (Appendix A). In general, there is between 13-14m of superficial deposits above the top of the rockhead, except in the far north-west corner where there is between 16-17m. A rockhead contour plot showing the top of the Coal Measures is shown in dwg. BRA-BHE-XX-XX-DR-GE-0301 (Appendix A).

3.1 Hydrogeology

The superficial deposits have been classified as Secondary (undifferentiated) Aquifer. Secondary (undifferentiated) Aquifer is assigned where it is not possible to attribute either category (Secondary A or Secondary B) to the rock type. In general, these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type. In this instance reflective of the variable nature of the Glacial Till.

The Coal Measures are classified as Secondary (A) Aquifer, defined as permeable layers capable of supporting water supplies at a local rather than strategic scale and in some cases forming an important source of base flow to rivers.

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There are five active groundwater abstraction located within 1km of the site. However, the site is not within a groundwater source protection zone. The abstractions are relating to the following:

- Borehole at Norton Street, Miles Platting, Manchester (611m north)
- Two boreholes at Openshaw, West Ashton, Manchester (971m south-east)
- Two boreholes at Premises at Croft Street, Clayton, Manchester (982m east)

3.2 Hydrology

The River Medlock is located 24m to the north-west of the site and flows south and west toward the River Irwell in Manchester city centre. The downstream water level of the River Medlock (recorded on 1st July 2008, at the New Viaduct street culvert) is +41.7mOD and the upstream water level recorded on the same day at the Sportcity culvert is +42.9mOD. The course of the River Medlock meandered through the north-western part of the site during the late 1840s. By the early 1890s it had been diverted away from the main site area and re-aligned. By 1905, the River was contained within a 600m-long culvert below the former Bradford Road Gas Works, north of the main site area.

The Ashton Canal is located along the southern boundary of the site (8m south). The canal climbs for 10.8km through 18 locks toward Ashton-under-Lyne. Lock No.9 is located adjacent to the site resulting in approximately 3.5m ground level change. According to the topographical survey the east side of Lock No. 9 (SE of the site) is at approximately +60.4mOD and west of the lock (SW of the site) the ground drops to +56.7mOD. A steep embankment up to the site is present on the south-west side with the site at approximately +59.0mOD.

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4 Coal Mining

4.1 Information Sources

The principal sources of historic mining information relied upon are the following:

- Groundsure report
- 1986 Norwest Holst Soil Engineering Ltd, Site Investigation Report (Bradford Gasworks) [6]
- 1986 Ward, Ashcroft and Parkman Consulting Engineers, Report on location of mineshafts and shallow mine workings (Bradford Road Gas Works Site) [7]
- 1998 Arup, Interim Geotechnical Desk Study (Draft 1) [8]
- 2001 Arup, Remediation and Enabling Works Methodology Statement (Sportcity Eastlands - Enabling Works Phase 1) [9]
- 2002 Parkman Ltd, Validation Report for Sportcity (Enabling Works Phase 1) [Annotated as superseded] [10]
- 2002 Drilltec Northern, Metrolink Advanced Works, Drilling and Grouting
- 2004 Arup, Validation Report (Sportcity Phase 3 Enabling Works) [11]
- 2008 Arup, Sportcity Constraints Establishment, Context Report [12]
- 2010 May Gurney Geotechnical, Site Investigation Report (Sportcity Remediation and Servicing Contract) [13]
- 2010 Arup, Geotechnical Interpretative Report (Sportcity Remediation and Servicing Works) [14]
- 2010 Arup, Outline Remediation Strategy (Sportcity Remediation and Servicing Works) [15]
- 2010 Buckingham Group Ltd, Remediation Strategy [16]
- 2011 Buckingham Group Ltd, Verification Report [17]
- 2011 BWB Consulting, Master Mine Stabilisation Works Validation Report (Sportcity Remediation and Servicing Works) [18]
- 2011 BWB Consulting, Area C Mine Stabilisation Works Validation Report (Sportcity Remediation and Servicing Works) [19]
- 2011 BWB Consulting, Removal of Constraints for New Developments over the Existing Mine Shafts at Sportcity Manchester [20]
- 2011 BWB Consulting, Area C Earthworks Validation Report (Sportcity Remediation and Servicing Works) [21]

4.2 Coal Seams Beneath the Site

From the geological maps there are three coal seams that sub-crop within the site: Bradford Four Foot, Bradford Three Quarters and Charlotte. A further two or three seams were encountered beneath the site within 60m depth; the Yard Mine seam, the 18 Inch seam, and possibly the Smut seam which sub-crop to the north east. The geological maps indicate that all the seams dip between 15° (inclined strata measured underground) and 25° (inclined strata) SW.

The coal seams were found in historic ground investigations carried out in 2010 by May Gurney for the Sportcity remediation project and in the recent site-specific ground investigation carried out in 2019 by Structural Soils Ltd. The maximum borehole depth in these investigations was 60.5m. The Charlotte seam was previously recorded as divided into three thin seams (A, B & C) in the Arup Report [14] for the Sportcity Development. Thin Coal 'C' was encountered within the boreholes beneath the site. There was also an additional unknown seam encountered between the Bradford ¾ and Bradford Four Foot seams.

The seam details from the borehole information is as follows:

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Seam Name	Depth range (mOD)	Estimated Thickness range (m)[1] [average}
Thin Coal 'C' (recorded in 3 BH's)	+45.5 to +38.0	0.70 – 0.80
Bradford ¾	+45.0 to +25.8	0.08 – 1.15 [0.71]
Unknown Seam	+44.2 to +17.2	0.14 – 2.30 [0.91] (up to 4.5m thick void recorded, presumed to be workings)
Bradford Four Foot	+43.4 to +10.1	0.01 – 1.62 [0.89]
18 Inch	+36.8 to +6.1	0.10 – 1.50 [0.55] (up to 3.1m thick void recorded, presumed to be workings)
Yard (recorded in 3 BH's)	<-5.0 to +25.8	0.25 – 1.10
Smut? (recorded in 1 BH)	~+10.0	0.17

[1] The coal seam thicknesses have been estimated from the borehole information based on the encountered coal and/or voids due to workings or poor recovery.

The locations of the seams can be seen in the geological sections included in Appendix A.

4.3 Historic Workings and Mine Shafts

4.3.1 Coal Authority Mining Report

The Coal Authority Report (Appendix C) which covers the site is summarised as follows:

- The site is in the likely zone of influence from workings in 11 seams of coal at shallow to 1040m depth, and last worked in 1961
- The site is not in the likely zone of influence of any present underground coal workings
- The site is not within an area for which the CA is determining whether to grant a licence to remove coal using underground methods.
- The site is not in an area that is likely to be affected at the surface from any planned future workings
- Reserves of coal exist in the local area which could be worked 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
- At the surface, there are no known faults or other lines of weakness due to coal mining that have made the site unstable
- The site is not within a boundary of an opencast site from which coal has been removed
- The site does not lie within 200m of an opencast site from which coal is being removed
- The site is not within 800m of an opencast site for which the CA is determining whether to grant a licence to remove coal
- The CA has not received a damage notice or claim for the site since 1 January 1984
- There is no record of mine gas emission require action by the CA within the site
- The site has not been subject to remedial works, by or on behalf of the CA, under its Emergency Surface Hazard Call Out procedures.

4.3.2 Coal Abandonment Plans

Coal abandonment plans have been obtained for the site for three seams (Bradford Four Foot, Roger & Crombouke), with a further plan with no reference to which seam it relates to (see Appendix B).

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Abandonment Plan NW643, date of construction August 1962 shows that workings have been carried out beneath the site within the Bradford Four Foot Seam from the No.1, No.2 and Forge (Little Pit) shafts associated with the Bradford Colliery which lie to the south of the site. The seam is shown to be divided into two parts, 9'' (0.23m) and 3'6'' (1.07m), respectively. There is no guidance on the type of mining that was carried out, although it is assumed to be long wall, or another similar method, based on the works commencing from the shafts to a reasonable distance. The area of workings is shown across the site except the north-east corner, where presumably the seam sub-crops.

Abandonment Plan NW645, date of construction May 1954, shows workings within the Roger seam carried out beneath the site, commencing from the No.1 and No.2 shafts of the Bradford Colliery. The section shows the seam as being 7' thick (2.13m). The plan indicates the seam is >700m below ground level and is located 26yards (23.8m) below the Crombouke seam. The seam is shown to have been worked using long wall method. The area of workings is across most of the site that is shown on the plan.

Abandonment Plan NW644, date of construction May 1954, shows workings within the Crombouke seam beneath the site, commencing from the No.1 and No.2 shafts of the Bradford Colliery. The section shows the seam as being 4'1'' thick (1.24m). The plan indicates the seam is >700m below ground level. The method of working is not clearly shown but is assumed to be long wall, as per the Roger seam, beneath the entire site. There are two tunnels shown beneath the site going from south-west to north-east. One connects the Parker seam in the south-west to the Roger seam. The other connects the Roger seam to the West Lateral route.

Parker Mine Abandonment Plan shows workings beneath the site carried out between 1903 and 1907. The depth of the workings or which seam they were targeted within is not specified. The area of workings is under most of the site, generally working in a north-west direction towards the River Medlock.

Unknown abandonment (14917?), dated 1949, shows a series of workings beneath the site with two shafts located on the site (these roughly correlate to Shaft 386398-003 and 386398-010). The depth of the workings or which seam they were targeted is not specified. The method of working is not clear. There is feature shown connecting the workings to the River Medlock which is possibly an adit.

4.3.3 Mine Shaft Records

There are several mine shafts within the site confines. The Coal Authority report (Appendix C) references three shafts and Historic Mine Shaft Plans (Appendix B) all show three shafts. The shaft references are as follows:

- **386398-004** (also referred to as Shaft A or Shaft 12, and possibly Shaft 21). Drilled, grouted and capped in 1986 by Ward Ashcroft and Parkman.
- **386398-003** (also referred to as Shaft B, 11/13 and possibly 22). Drilled, grouted and capped in 1986 by Ward Ashcroft and Parkman. Further grouted in October 2010 using 55 tonnes of cement-based mix. Capping was estimated as being 300mm thick and positioned some 11mbgl.
- **386398-010** (also referred to as Shaft C and possibly shaft 23). Shaft searched for in 1977 but not located. Searched and located in 2010 using a series of probe holes. The shaft was pressure grouted using 5.5 tonnes of pulverised fly ash (PFA) / cement mix grout. A grout plug using a 5:1 mix of PFA / cement was installed above the shaft.

The shaft cap and plug details are provided in the BWB Mine Stabilisation Works Validation Report [19] and summarised here in Table 4-1.

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Table 4-1 Details on shafts

Coal Auth. Ref.	Other Shaft Ref.	Co-ordinates	NHSE – 1986	Ove Arup & Partners Ltd		BWB Consulting Ltd - 2011	
				2004 Phase 3 Enabling Works	**2008** Constraints Drawing	Description of works	Approx. base of shaft (mOD)
386398-004	A / 12 / 21	Anticipated co-ordinates: 386744, 398844. Actual position was 10m west of the western site boundary.	Located. 2m diameter. Base proved to 54m. Drilled grouted and capped.	N/A	Shaft referred to on drawing as 12	A total of 88 holes drilled at 1m centres (in an arc within 15m radius of anticipated location). Bedrock encountered at 12mbgl. Shaft not identified in any holes. Shaft not present on site, believed to be located below Joe Mercer Way.	N/A
386398-003	B / 13 / 22	Cap location centred at 386818, 398904 Cap extents: NW – 386815.2, 398905.3 NE – 386818.7, 398906.2 SW – 386826.5, 398901.0 SE – 386819.9, 398901.8	Located. 2m diameter. Base proved to 25.5m. Drilled grouted and capped.	N/A	Shaft referred to on drawing as 11	New grouting work commenced from base of shaft, at 33mbgl where a total of 55 tonne of 10:1 ration PFA to OPC grout was injected into the shaft up to surface. Grout tubes were pulled back at 2m intervals where backpressure was identified. Majority of grout was taken at or near the base of the shaft. Grout cubes taken to prove compliance strength of 1.0N/mm2.	+25.5, +46.3 to top of cap
386398-010	C / 23	387876.9, 398906.5	Searched and not found	173 probe holes sunk to depths up to 15m. A square spiral search pattern with probes at 1.1m centres. Shaft not found.	Shaft referred to on drawing as C	227 holes drilled to bedrock, identified at 11mbgl. Base of shaft located and proved to 22mbgl. Shaft was approximately 1m in diameter. Shaft grouted at a pressure of 70PSI with grout tubes pulled back at 2m intervals where backpressure was identified. A total of 5.5 tonne of 10:1 ratio PFA to OPC grout was injected into the shaft.	+35.2

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Coal Auth. Ref.	Other Shaft Ref.	Co-ordinates	NHSE – 1986	Ove Arup & Partners Ltd		BWB Consulting Ltd - 2011	
				2004 Phase 3 Enabling Works	**2008** Constraints Drawing	Description of works	Approx. base of shaft (mOD)
						Due to 9m of Made Ground present at this location it was deemed impractical to install a concrete cap within the Glacial Till. A grout plug was installed to mitigate any risk of further subsidence in the area of the shaft. 25 holes at 2m spacing centred at the shaft were drilled 12m into the bedrock. These were then injected with 5:1 ratio PFA to OPC grout mix. A total of 6 tonnes of grout was used in the grout plug. Grout cubes taken to prove compliance strength of 1.0N/mm2.	
-	11 / 13 / Little Shaft No. 10	Unknown	Believed to be a duplicate of Shaft B / 11 / 13.	N/A	Shaft referred to on drawing as 13	No treatment works carried out to date.	

There is potentially an additional shaft on the site, previously referred to as Shaft 11/13 by Arup [14]. However, Arup state that they believe this shaft to be a duplicate of Shaft 386398-003. There is also historic evidence that there is a duplicate shaft on site, Shaft No.22 (Shaft 386398-003) and Little Shaft No. 10 (no coal authority reference for this shaft). Appendix D includes copies of the historic correspondence from the Manchester City Council in 1989 and regarding the site sale in 1971, which both mention the possible duplication. There have been attempts to locate the shaft previously, although there is no evidence of the shaft.

There is an adit shown on the historic drawings from the Groundsure report which is to the north of the site and connects to the river in the north-west corner of the site. The location of the adit is shown on the constraints plan included in Appendix A.

There may be unrecorded mine entries in the local area that do not appear on the Coal Authority records.

All references to the shaft locations on the site have been plotted onto a site plan, shown on dwg. BRA-BHE-XX-XX-DR-GE-0105. Many plans do not include co-ordinated positions of the shaft locations and therefore have been inferred based on unchanged features i.e. Ashton Canal. The precise location of these inferred positions can not be relied upon and should be treated as approximations.

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4.4 Previous Mine Treatment Works

As mentioned above, three shafts that have been located within the site have been treated by infilling with grout and a cap or grout plug constructed over the shafts. On top these treatment works, there has been some grout treatment to the coal seams carried out in 2004 and in 2011. These treatment works were predominantly focused on workings within the Bradford Four Foot and Bradford ¾ Seams, although based on a review of the borehole data it is also appears to have been carried out in the Unknown Seam. The treatment areas do not cover the whole site and can be seen on the constraints plan (dwg. BRA-BHE-XX-XX-DR-GE-0101) in Appendix A.

The recent ground investigations carried out in 2019 did not find any evidence of grout and did encounter voids which appear to be mine workings.

The coal seam treatment works based on historical review of the available information is presented below in Table 4-2.

Table 4-2 Summary of coal seam treatment works

Treatment Works	Seams	Treatment Depth	Details
2004 (Phase 3 Enabling Works)	Bradford ¾ Bradford Four Foot	Up to 30m	Treatment undertaken on a 6m grid. Holes sunk using rotary percussive method to depths of up to 30m. Bradford Four Foot: Located between 16 and 25m, dipped SW. Intact 1.1m thick. Bradford Three Quarters: Located between 14.5 and 25.5m, dipped SW. Recorded as 0.7m thick. No loose or voided ground associated with historic shallow mine working beneath Hotel footprint (SE). No treatment was undertaken to car park (central area), highway (Forge Lane) or the Budget Hotel (NE).
2011 BWB	Bradford ¾ Bradford Four Foot (Unknown seam?)	Between 25 – 30m	**Validation Area A** Validation of historical works (Validation Area A) included drilling and grouting on a 12m grid with grout take being assessed at completion of each hole. Where grout take was more than 5 tonnes / group in a group of four adjacent holes then additional holes were drilled on a reduced grid spacing until grout take on average was less than 1 tonne / hole. Validation area approximately 3100m^2. Involved grouting of 41 holes, where possible, on a 12m grid to depths of between 25m and 30mbgl, to identify any possible voids or broken ground beneath the site. Holes were grout injected with 10:1 ratio, PFA to OPC, grout. Holes B5 and C7 took 6 tonnes and 2 tonnes respectively. The combined grout take of these locations exceeded the 5 tonne limit per group of four holes specified. Additional 8 boreholes were drilled and grout injected. Grout takes of between 0.3tonnes and 0.6 tonnes per hole were recorded. Meaning the voided ground has been sufficiently treated. Total volume of grout take from 41 holes: 17.6tonne.
	Bradford Four Foot	Between 25 – 33m	**Treatment Area A** Holes pressure grouted. Drilling works ensured a minimum of 10 times seam thickness of competent rock above the worked seam. Treated typically to depth of 30mbgl. Where 10m of competent rock cover was not achieved, treatment depths were extended. New grouting works were carried out (Treatment Area A and B) on a 6m grid. Pressure grouted with 10:1 ratio PFA to OPC grout, at a pressure of 70PSI. Where grout take exceeded 5 tonnes per hole, spacing was reduced to 3m. Works on voids present on worked Bradford 4' seam located in north eastern part of Area C. Approximate area of 3800m^2 including drilling and grouting of 156 holes on a primary 6m grid to a depth of 25m to 33mbgl.

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Treatment Works	Seams	Treatment Depth	Details
			Drilling holes encountered soft / broken ground (predominantly in Bradford 4' seam). However, grout takes were generally not elevated. Only 5 holes had a grout take of >1tonne of grout. Majority of holes had 0.3-0.4 tonnes. Combined grout take for an area where broken ground was recorded (G47 and G45 at 25mbgl) was 29.5 tonnes. These holes are located at the southern edge. Further holes and grout was injected. This area is now recorded as suitably treated. Where services/utilities were present grout holes we're drilled on an inclination to pass the services. The zones of inclined grout information are shown on dwg. BRA-BHE-XX-XX-DR-GE-0105.
	Bradford ¾	Between 30 – 36m	**Treatment Area B** Holes pressure grouted. Drilling works ensured a minimum of 10 times seam thickness of competent rock above the worked seam. Treated typically to depth of 30mbgl. Where 10m of competent rock cover was not achieved, treatment depths were extended. New grouting works were carried out (Treatment Area A and B) on a 6m grid. Pressure grouted with 10:1 ratio PFA to OPC grout, at a pressure of 70PSI. Where grout take exceeded 5 tonnes per hole, spacing was reduced to 3m. Approximate area 4500m$^{2.}$ 194 holes on a 6m grid to depths of between 30mbgl and 36mbgl. 12 holes on a secondary 3m grid were drilled in areas of high grout take. Five boreholes recorded grout take above 1 tonne. Most boreholes were recorded to have grout take of between 0.3tonne and 0.5tonne. Where services/utilities were present grout holes we're drilled on an inclination to pass the services. The zones of inclined grout information are shown on dwg. BRA-BHE-XX-XX-DR-GE-0105.

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5 Coal Mining Risk Assessment

The potential coal mining risks associated with the site have been assessed below with respect of the following considerations:

- The spatial distribution of shafts and/or coal mining features (including possible structures, see dwg. BRA-BHE-XX-XX-DR-GE-0102)
- The spatial distribution of coal seams based on ground investigation data
- The spatial distribution of broken ground and voids based on ground investigation data
- The spatial distribution of the proposed development
- The spatial distribution of proposed earthworks – cut/fill distribution
- The proposed foundation strategy envisaged – deep piling (CFA or rotary bored and shallow raft)

Given the foregoing considerations, the whole site is considered to be at potential risk from former coal mining activities.

The potential risks include the following considerations:

- Migration of voids and adverse settlement from shafts or other coal mining features
- Collapse of deep workings beneath deep foundations
- Subsidence due to shallow workings
- Migration of mine gas into the development
- Mobilisation and migration of mine gas through the ground
- Spontaneous combustion of coal / potential for underground fires

The identified risks based on these constraints are summarised in Table 5-1.

Table 5-1: Coal Mining Risk Assessment

Source	Hazard	Occurrence	Risk
Shafts and/or other coal mining features / structures	Untreated Mine Shaft (hasn't been located)	1 No. mine shaft not located thought to be a duplicate on site	Migration of voids, crown holes, collapse of ground, etc. Investigation to locate shaft should be considered.
	Treated mine shaft	3No. mine shafts treated on site	None envisaged – treatment work was carried out in 2011. Building to span over treated mine shafts with foundations located suitable distance away
	Historic adit	1No. historic adit crosses north-west corner of site	Potential for adverse settlement and distress of structures.
	Historical unknown structures	1 unknown structure present between mid 1800s and early 1900s	Potentially unstable ground, void if associated with a shaft, crown holes, collapse of ground, etc. Or potential existing deep foundation forming an obstruction. Further detailed investigation within the area should be considered.
Historic workings within coal seams	Deep Untreated mine workings	Voids found in recent ground investigation below the site. Several seams located beneath the site. West side of site has not been treated.	Collapse of ground beneath deep foundations

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Source	Hazard	Occurrence	Risk
	Deep Treated mine workings	Significant grouting regime taken place across the centre and east parts of the site within the Bradford ¾ and Bradford Four Foot seams. Grout take was low, and voids located within the ground	Collapse of ground beneath deep foundations
Mine gas	Coal seams/ mine workings	Coal seams beneath the site. Previous occurrence of mine gas during drilling noted to the north of the site. No evidence of mine gas issues during recent ground investigation.	Migration of gas into buildings above and through the ground
Combustion	Coal seams	Coal seams unlikely to exposed by excavation. Coal seams will be penetrated with deep pile foundations	Spontaneous combustion of coal / potential for underground fires when constructing foundations through coal seams

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6 Mitigation of Risks related to Coal Mining

6.1 Risk Avoidance

Due to the extent of historical coal mining activities on the site, and the findings in the recent ground investigation, there is still a risk for the site. Risks associated with mine entries and former workings are present and the requirements for further investigation and treatment should be considered prior to developing the site.

6.2 Risk Reduction

The current development proposals and the nature of the site means that total risk avoidance is not a feasible option. Therefore, the coal mining risks will need to be managed through targeted investigation and application of suitably engineered design solutions. The process is likely to include one or more of the following:

- Intrusive investigation to locate the missing shaft
- Proving absence of missing shaft as far as reasonably practicable, if location not possible
- Probing and potential treatment of coal workings (particularly in the west of the site)
- Engineered solution to manage any residual risk

6.2.1 Shafts and Other Coal Mining Features

6.2.1.1 Untreated/ Unlocated Mine Shaft

There is potentially a shaft on site (Shaft 11) that hasn't been located previously and has not been treated. In previous reports concerning the site, the view was held that this shaft could be a duplicate, i.e. one shaft plotted in 2 different locations.

To prove the absence of the missing shaft as far as reasonably practicable, further investigation should be carried out on site with a probing and grouting regime to see if the shaft can be located. The locations of investigation should be around the unknown structure shown on the historic maps in 1893, and between the two treatment areas A and B near to where the shaft is thought to be located.

6.2.1.2 Treated Mine Shafts

There are three treated mine shafts located across the site. These were treated and capped/plugged relatively recently in 2011. It is proposed to span over the treated shafts founding buildings on piles, with the piles set a suitable distance from the shaft. Considering that the shafts have been backfilled with grout it is recommended that the piles are spaced at a minimum of 3 times their diameter from the edge of the shaft to prevent the pile friction force from overloading the shaft.

6.2.1.3 Historic Adit

There is an adit shown on the historic maps which crosses the north-west corner of the site. The depth of the adit is not known, although it will have connected to the River Medlock. If the adit is exposed during the earthworks it is recommended that it is backfilled with grout. However, if this is not the case, the adit should be grouted via a probing operation and pile foundations founded within the rock below the adit and no contribution of pile capacity from the soil above the rock.

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6.2.1.4 Unknown Historical Structures

Between 1891 and 1893 there is a small structural feature located within the former cutting on site. This is located directly south of the proposed and recorded shaft locations. It is also potentially within an area not previously covered within the 2011 grout treatment works (see dwg. BRA-BHE-XX-XX-DR-GE-0105) therefore further investigation of possible existing structure and possible voids below ground is recommended.

6.2.2 Deep Historic Mine Workings

There are at least six coal seams that are located within 50m below ground level beneath the site. Abandonment plans show that workings were carried out in the Bradford Four Foot seam. No abandonment plans are available for the other shallow seams, but there is evidence of voids in the borehole data, which suggests the presence of untreated workings. All the seams are of a reasonable thickness to have been worked, refer to section 4.2.

Previous treatment has focussed on the Bradford ¾ and Bradford Four Foot seams, and possibly also within the unknown seam between these two. However, this treatment does not cover the whole site footprint and, in particular, the west of the site. Therefore, it is assumed that that there are still untreated mine workings within these seems in that area. It cannot be ruled out that workings have been carried out within the other seam (Thin Coal 'C', 18 Inch & Yard).

Based on the risk of untreated mine workings in the site, the design of the pile foundations and embedded retaining walls which are proposed to be rock socketed within the coal measures will need to consider the potential influence of these seams. The recommended minimum pile toe level above the coal measures is 10 times the seam thickness. Regarding constructing the piles, bored or CFA piles should be considered. The cover thickness has been determined in accordance with CIRIA C758D based on the rock properties.

As the coal seams dip beneath the site the toe of the piles will be near to different seams across the site. Consequently, the influence of the seams should be considered in the pile design by zoning the site based on seam/pile toe depth. It is recommended that the seam and rock cover is proved prior to construction the piles. Where this is greater than 10 times the seam thickness no grouting works will be required. Where it is less than 10 times the seam thickness, the seam should be grouted. Probing should be carried out at each pile location.

Due to the voids encountered in the treated areas during the recent 2019 investigation, it is recommended that validation of the treatment works is carried out prior to piling.

6.2.3 Ground Gas Protection

Ground gas protection is anticipated to be required due to the presence of contaminants within the Made Ground/Fill materials.

6.2.4 Coal Combustion

Coal will not be exposed in excavations due to the significant thickness of Made Ground and Superficial Deposits.

All investigations, probe drilling and drilling for pile foundations should be carried out to HSE and Coal Authority guidance to minimise the risk of coal combustion and potential for migration of mine gases into neighbouring properties. Permits for the work should be obtained prior to construction.

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7 Summary and Conclusions

7.1 Summary

- The depth of made ground in the north west corner of the site extends all the way to the coal measures strata, at a depth of approximately 17m below ground level. Across the remainder of the site the rockhead lie at around 13-14m below existing levels
- There are 3 treated mine shafts on the site
- There is a conjected 4th or duplicate shaft, however all the historical plans only ever show 3 shafts on the site
- There was an adit which ran north east south west beneath the north west corner of the site which connected to the river. The workings that are connected to this are not labelled on the relevant abandonment plan, so the depth of the adit and workings is unknown.
- Presence of unknown structures (between mid 1800s and early 1900s) in the area of the former mine workings.
- There is evidence of voids beneath the site
- Extensive treatment has been carried out to a maximum depth of 36m.

7.2 Conclusions

- Further detailed investigations required to prove as far as reasonably practical that the 4th shaft is a duplicate and presence of other unknown structures / possible voids.
- Structures will be piled foundation founded with the coal measure between the coals
- Investigations will be required below the design toe depth of the piles to determine the depth of coals seams/cover above the seams. Where this is greater than 10 times the seam thickness no grouting works will be required. Where it is less than 10 times the seam thickness, the seam should be grouted. Probing should be carried out at each pile location.
- The 2019 investigation found voids beneath the site in areas that had previously been treated. Therefore, validation of the grouted areas should be undertaken.

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Appendix A Drawings

Drawing Reference	Drawing content
BRA-BHE-XX-XX-DR-GE-0101	Constraints Plan
BRA-BHE-XX-XX-DR-GE-0102	Historical site features
BRA-BHE-XX-XX-DR-GE-0104	Site location and abandonment plans
BRA-BHE-XX-XX-DR-GE-0105	Base of drill & grout and shaft locations
BRA-BHE-XX-XX-DR-GE-0200	Cross Section Location Plan
BRA-BHE-XX-XX-DR-GE-0201	Geological Cross Section Sheet 1 (A-A' and B-B')
BRA-BHE-XX-XX-DR-GE-0202	Geological Cross Section Sheet 2 (C-C' and D-D')
BRA-BHE-XX-XX-DR-GE-0203	Geological Cross Section Sheet 3 (E-E' and F-F')
BRA-BHE-XX-XX-DR-GE-0300	Contour Plan – base of Made Ground
BRA-BHE-XX-XX-DR-GE-0301	Contour Plan – top of Coal Measures

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CONSTRUCTION.

MAINTENANCE/CLEANING/OPERATION.

DECOMMISSIONING/DEMOLITION.

Notes

1848 RIVER MEDLOCK POSITION, SUBSTATION & TANKS LOCATIONS - GROUNDSURE.

SHAFT A - ARUP, MINESHAFT AND MINE WORKINGS, FIGURE 14, 15.10.08.

SHAFTS B & C - BWB CONSULTING, AS BUILT MINESHAFT POSITIONS, DRAWING NO. NTH/185/201, REVISION P1, 14.03.11.

SHAFT 13 - ARUP, MINESHAFTS AND MINE WORKINGS, FIGURE 14, 15.10.08.

COAL SEAMS AND FAULTS - ARUP, COAL SEAMS AND MINESHAFT DETAILS, DRAWING NO., ARP-LAY-CG-132, REVISION C, 01.03.10.

COAL PROBE BOREHOLE LOCATIONS - NORWEST HOLST ENGINEERING, MINE SHAFTS LOCATION SITE PLAN, DRAWING NO. 14/6873/AO, AUGUST 1986.

BASE OF MADE GROUND/TOP OF NATURAL GROUND - ARUP, BASE OF MADE GROUND CONTOURS, DRAWING NO. ARP-LAY-CE-242, REVISION C, 01.03.10

CONTAMINATION HOTSPOTS, HISTORICAL TANK & SUMP - ARUP, EARTHWORKS VALIDATION PLAN, DRAWING NO. CLC060405, 23.01.04.

2004 SITE TREATMENT WORKS - ARUP, DRILLING AND GROUTING TREATMENT LOCATION PLAN, DRAWING NO. CLC060403, 23.01.04.

2011 SHAFT A - C TREATMENT - BWB CONSULTING, FIGURE 2 AREA C MINESHAFT INVESTIGATION, VALIDATION AND TREATMENT WORKS, DRAWING NO. NTN185/03/AREAC/F2, FEBRUARY 2011.

TREATMENT AREA A - BWB CONSULTING, FIGURE 5 TREATMENT AREA A MINE STABILISATION WORKS, DRAWING NO. NTH185/03/AREAC/F5, JANUARY 2011.

TREATMENT AREA B - BWB CONSULTING, FIGURE 6 TREATMENT AREA B MINE STABILISATION WORKS, DRAWING NO. NTH185/03/AREAC/F6, JANUARY 2011.

VALIDATION AREA - BWB CONSULTING, FIGURE 4 VALIDATION AREA A MINE STABILISATION WORKS, DRAWING NO. NTH185/03/AREAC/F4, FEBRUARY 2011.

BURIED OBSTRUCTIONS - BUCKINGHAM GROUP CONTRACTING, SURVEYED OBSTRUCTIONS, DRAWING NO. 005, REVISION A, 11.02.11.

HISTORICAL REMEDIATION - ARUP, PREVIOUS ENABLING AND REMEDIAL WORKS, FIGURE 15, 25.09.08.

RESIDUAL CONTAMINATION - ARUP, POTENTIAL RESIDUAL CONTAMINATION, FIGURE 16, 15.10.08.

SITE BOUNDARY

SITE CONSTRAINTS

HISTORICAL FEATURES

EXISTING Ø375 SEWER

EASEMENT - 3M FROM SEWER EXTENTS

BURIED OBSTRUCTIONS (SURVEYED 2011)

C — APPROX. SHAFT LOCATION

COAL SEAM

FAULT

COAL PROBE - NORWEST HOLST 1986

BOREHOLE - BURO HAPPOLD 2019

BOREHOLE - MAY GURNEY 2009

TRIAL PIT - BURO HAPPOLD 2019

BASE OF MADE GROUND/TOP OF NATURAL GROUND - 1M INTERVALS (mOD)

CONTAMINATION HOTSPOT

SITE TREATMENT

GROUT TREATMENT WORKS - 2004

SHAFTS A - C EXTENTS OF PROBING - 2011

ENCOUNTERED SHAFT AND EXTENT OF PLUG/CAP - 2011

GROUT TREATMENT WORKS - 2011

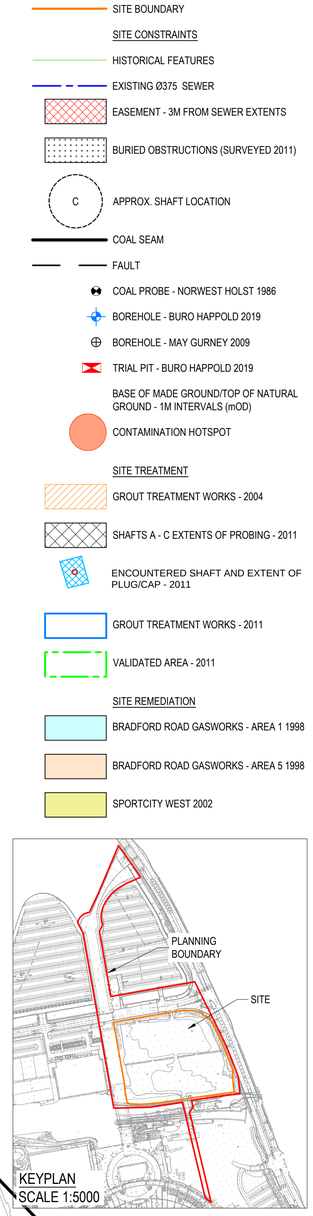
VALIDATED AREA - 2011

SITE REMEDIATION

BRADFORD ROAD GASWORKS - AREA 1 1998

BRADFORD ROAD GASWORKS - AREA 5 1998

SPORTCITY WEST 2002



Rev	Description	Date	Drn	Ch'd
P03	PLANNING	31.01.20	NG	FG
P02	DRAFT PLANNING	20.12.19	NG	FG
P01	DRAFT STAGE 3	27.11.19	NG	FG

PLANNING

Status of drawing

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Architect *POPULOUS*

Project **OVG MANCHESTER**

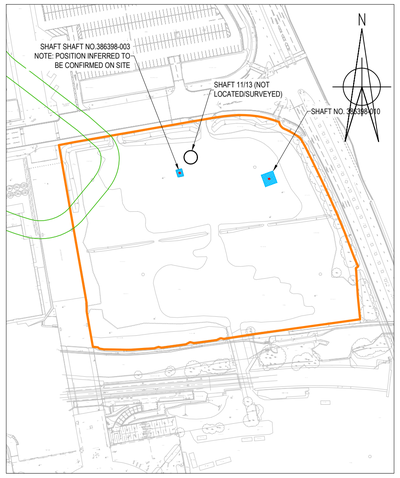
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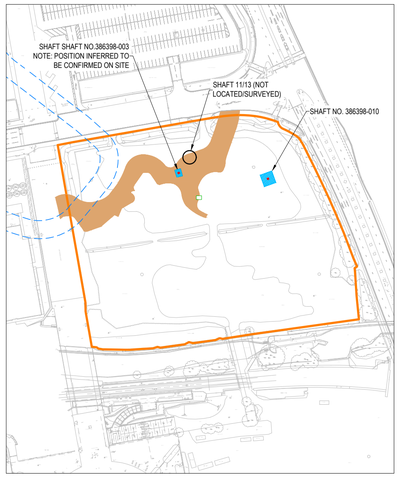
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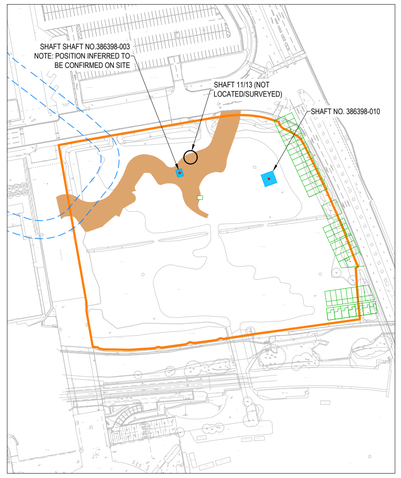
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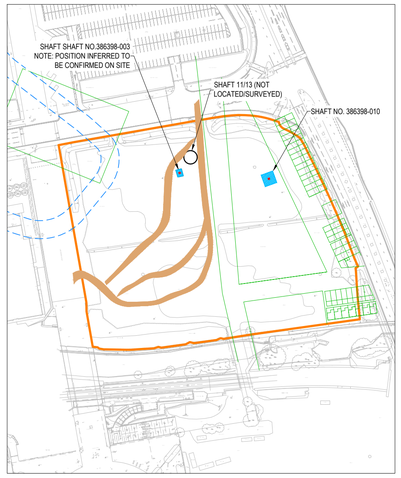
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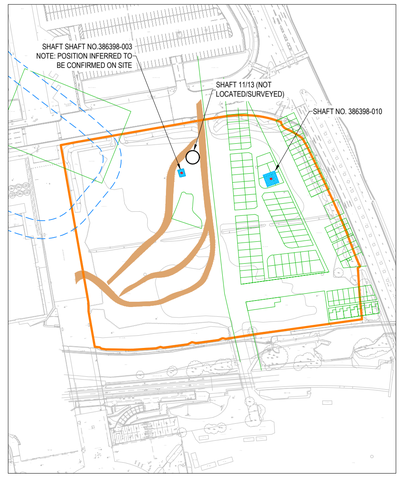
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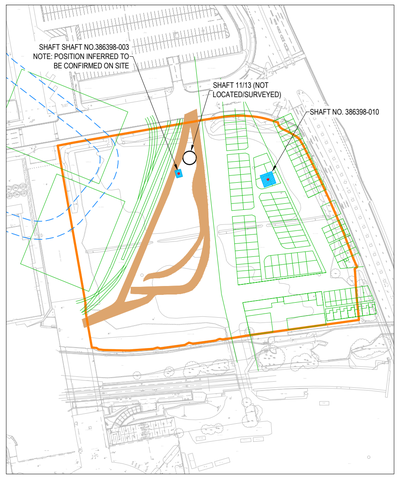
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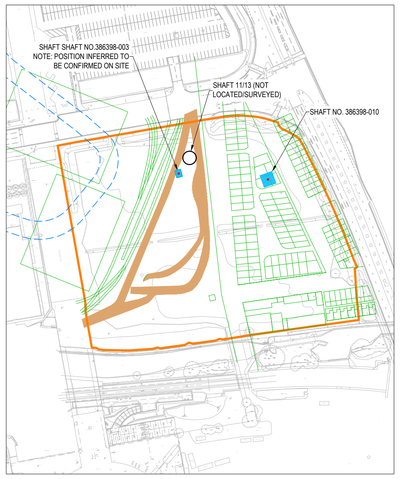
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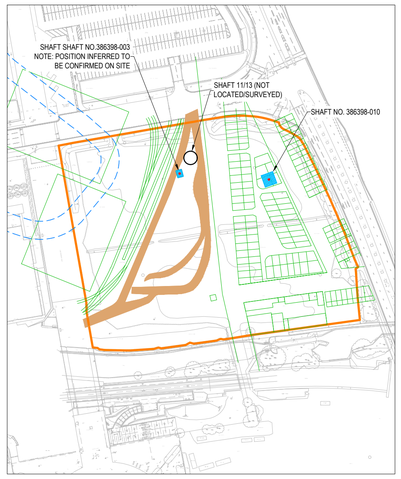
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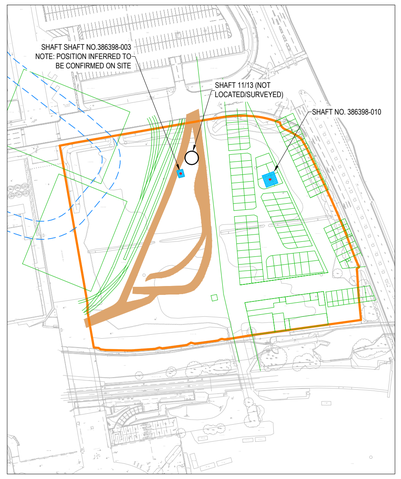
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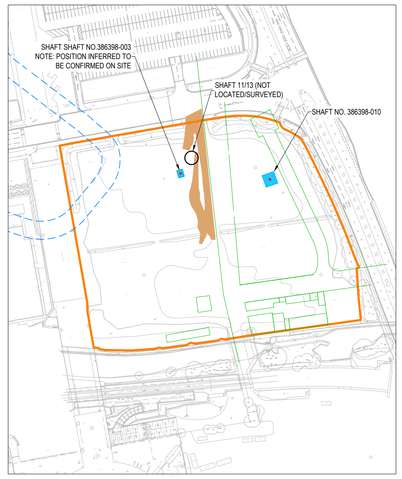
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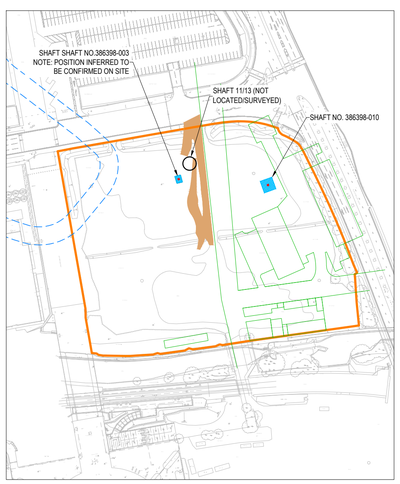
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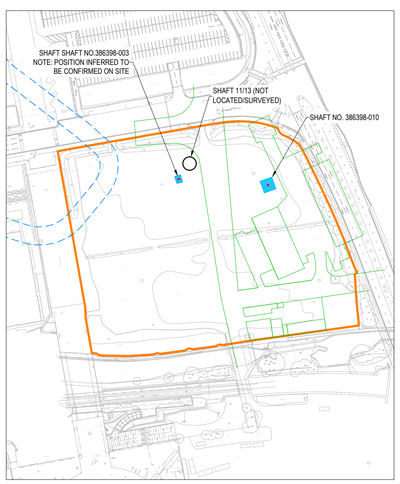
1953 - 1958



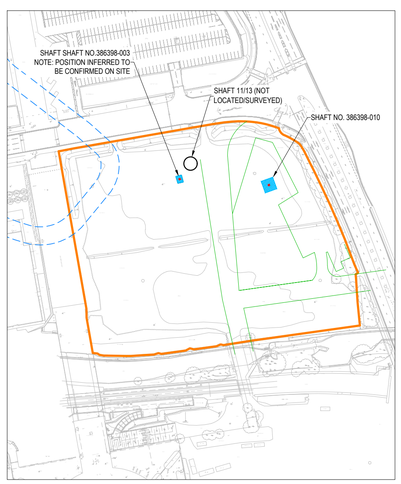
1979



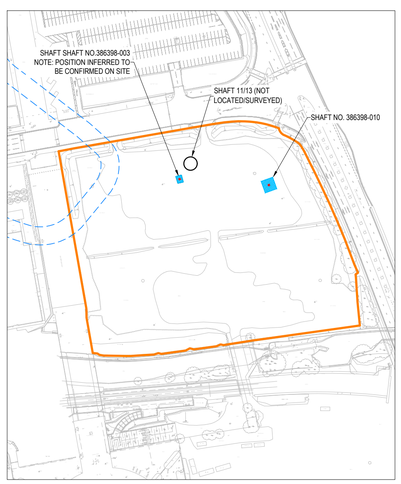
1984 - 1987



1989 - 1995



2002



CURRENT

SITE BOUNDARY
HISTORICAL STRUCTURES
HISTORICAL CUTTING
POSITION OF RIVER MEDLOCK (1848 MAPPING)

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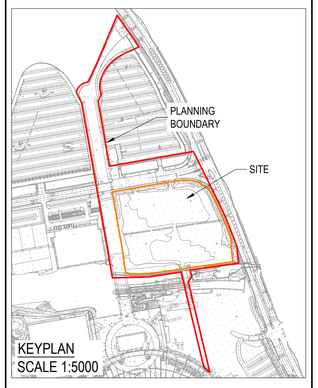
IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING

CONSTRUCTION.

MAINTENANCE/CLEANING/OPERATION.

DECOMMISSIONING/DEMOLITION.

Notes



Rev	Description	Date	Drn	Ch'd
P02	PLANNING	31.01.20	NG	FG
P01	DRAFT PLANNING	20.12.19	NG	FG

PLANNING

Status of drawing

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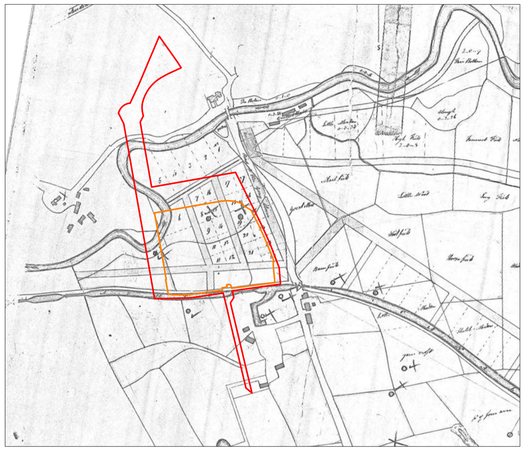
Architect *POPULOUS*
Project **OVG MANCHESTER**
Drg Title HISTORIAL SITE FEATURES

Scales@A1 1:500
Drawn by NG
Checked by FG

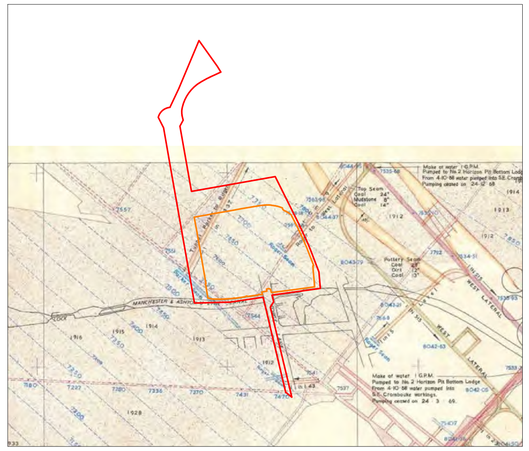
Job No. 0042841
Date NOV 2019
Rev P02

Drawing No. BRA-BHE-XX-XX-DR-GE-0102

Richard.Lanham:\\bh-bath\project vol\0042841 Project Bedford\09 Ground Eng_Site Inv\Revit\BRA-BHE-XX-XX-DR-GE-0102.dwg



MINE ABANDONMENT PLAN 1



MINE ABANDONMENT PLAN 2



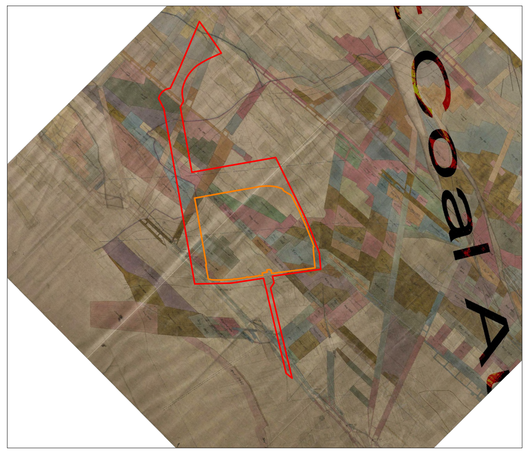
MINE ABANDONMENT PLAN 3



MINE ABANDONMENT PLAN 4



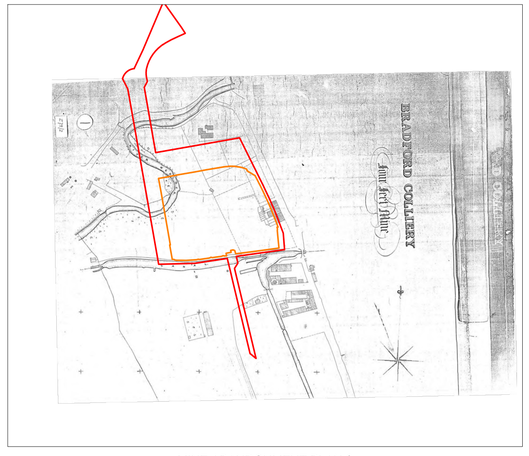
MINE ABANDONMENT PLAN 5



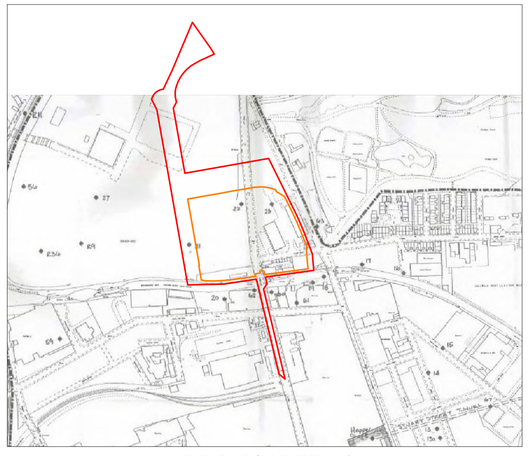
MINE ABANDONMENT PLAN 6



MINE ABANDONMENT PLAN 7



MINE ABANDONMENT PLAN 8



MINE ABANDONMENT PLAN 9

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DECOMMISSIONING/DEMOLITION.

Notes

1. WHERE SHAFT COORDINATES ARE NOT AVAILABLE, PLANS HAVE BEEN OVERLAID AS ACCURATELY AS POSSIBLE, REFERENCE SHOULD BE MADE TO ORIGINAL PLANS AND EXACT LOCATIONS PN THIS PLAN CAN NOT BE RELIED UPON.

DEVELOPMENT BOUNDARY

PLANNING BOUNDARY

Rev	Description	Date	Drn	Ch'd
P01	PLANNING	31.01.20	NG	AKS

PLANNING

Status of drawing

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Architect *POPULOUS*

Project **OVG MANCHESTER**

Drg Title SITE LOCATION & MINE ABANDONMENT PLANS

Scales@A1 1:500
Drawn by NG
Checked by FG

Job No. 0042841
Date JAN 2020
Rev P01

Drawing No. BRA-BHE-XX-XX-DR-GE-0104

Richard Latham:S3-Jobs:0 Current Jobs:0042841 Project Bradford for Council:4 cfg Site In:Sheet:BRA-BHE-XX-XX-DR-GE-0104.dwg

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SHAFT 11/13 NOT LOCATED/SURVEYED

TREATMENT AREA A

TREATMENT AREA B

VALIDATION AREA A

SHAFT B

386398-003

SHAFT 13

SHAFT B

SHAFT 11

SHAFT NO. 386398-003. NOTE: POSITION INFERRED TO BE CONFIRMED ON SITE.

386398-010

SHAFT 8

SHAFT NO. 386398-010

SHAFT 12

SHAFT A

SHAFT 12

386398-004

SHAFT A

SITE BOUNDARY

INFERRED COAL SEAM

TREATMENT AREAS

VALIDATION AREA

30.000 BASE OF DRILL & GROUT PROBE (mBGL)

MINE SHAFT LOCATION - COAL AUTHORITY

AREA NOT COVERED BY DRILL & GROUT WORKS

INCLINED GROUT ZONES

SHAFTS A - C EXTENT OF PROBING - 2011

ENCOUNTERED SHAFT EXTENT OF PLUG/CAP

HISTORICAL MINE SHAFT LOCATIONS - REFER TO DRAWING NO. BRA-BHE-XX-XX-DR-GE-0104

MINE ABANDONMENT PLAN 1

MINE ABANDONMENT PLAN 7

MINE ABANDONMENT PLAN 7

386398-??? MINE SHAFT - COAL AUTHORITY

SHAFT REFERENCE TAKEN FROM ARUP (2008). 'SPORTCITY CONSTRAINTS ESTABLISHMENT: CONTEXT REPORT ISSUE 1.

SHAFT REFERENCE TAKEN FROM ARUP (2019). 'EXTENT OF PREVIOUS REMEDIATION AND RESIDUAL CONSTRAINTS'. ECS-ARP-SW-DR-CG-0002, REV F1.

SHAFT REFERENCE TAKEN FROM OVE ARUP & PARTNERS (1998). 'MANCHESTER STADIUM, EASTLANDS; INTERIM GEOTECHNICAL DESK STUDY'. DRAFT 1.

Norwest Holst investigation (1998)

Soil Mechanics mine shaft search extents (2000)

Approximate extent of Van Elle search (2003) - 173 probes

HEALTH AND SAFETY INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING

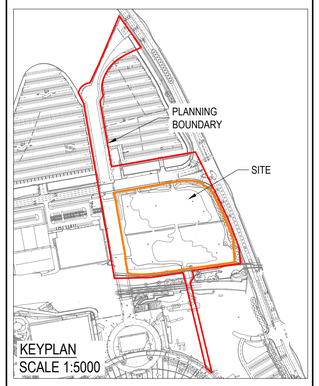
CONSTRUCTION.

MAINTENANCE/CLEANING/OPERATION.

DECOMMISSIONING/DEMOLITION.

Notes

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Rev	Description	Date	Drn	Ch'd
P01	PLANNING	31.01.20	NG	AKS

PLANNING

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Architect *POPULOUS*

Project **OVG MANCHESTER**

Drg Title BASE OF DRILL & GROUT HOLES (mBGL) AND HISTORICAL SHAFT LOCATIONS

Scales@A1 1:500	Job No. 0042841
Drawn by NG	Date JAN 2020
Checked by AKS	Rev P01

Drawing No. BRA-BHE-XX-XX-DR-GE-0105

Jonathan Howe I:\0-cadd\0project cad\0042841 Project Brooks\BIM\0 Ground Eng-Site Inv\Sheets\BRA-BHE-XX-XX-DR-GE-0105.dwg



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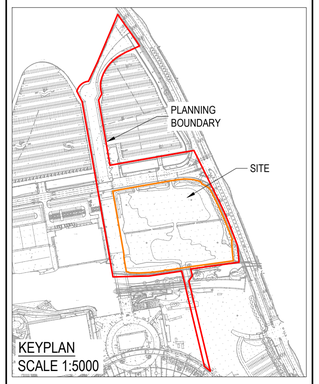
CONSTRUCTION.

MAINTENANCE/CLEANING/OPERATION.

DECOMMISSIONING/DEMOLITION.

Notes

SEE DRAWING NO. 0042841-BHE-XX-XX-DR-GE-0101 FOR CROSS SECTIONS.



Rev	Description	Date	Drn	Ch'd
P03	PLANNING	31.01.20	NG	FG
P02	DRAFT FOR PLANNING	20.12.19	NG	FG
P01	DRAFT STAGE 3	27.11.19	NG	FG

PLANNING

Status of drawing

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Architect *POPULOUS*

Project **OVG MANCHESTER**

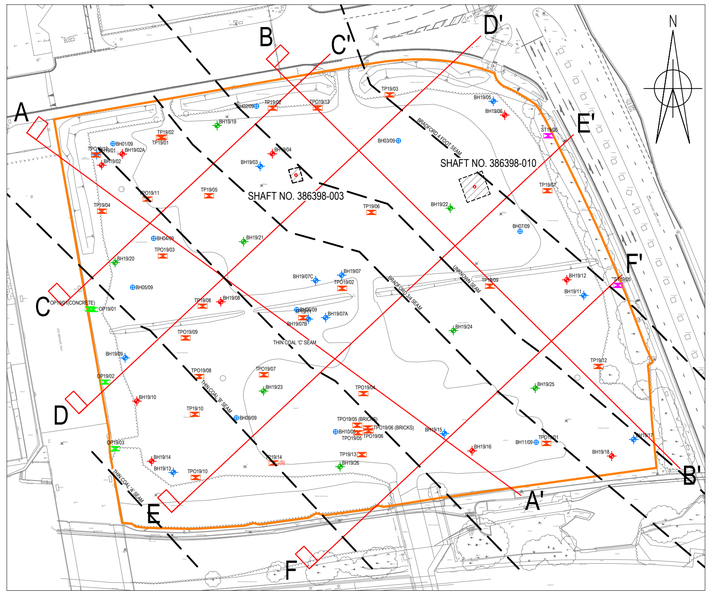
Drg Title CROSS SECTION LOCATION PLAN

Scales@A1 1:500
Drawn by NG
Checked by FG

Job No. 0042841
Date NOV 2019
Rev P03

Drawing No. BRA-BHE-XX-XX-DR-GE-0200

Saved Landmark 10/2-draft@project set/0042841 Project Bradford/09 Ground Eng - Site Inv/Sheet/0200-BHE-XX-XX-DR-GE-0200.dwg



INFERRED COAL SEAM

MG MADE GROUND

ALV ALLUVIUM

RTG RIVER TERRACE DEPOSITS

GT GLACIAL TILL

CM COAL MEASURES

COAL SEAM FROM GROUND INVESTIGATION DATA

ASSUMED ZONE OF CORE LOSS

51.85 GROUNDWATER TABLE (mOD)

44.74 GROUNDWATER - PERCHED (mOD)

DRILL & GROUT LEVELS

TOP OF COAL SEAM

BASE OF COAL SEAM

TOP OF SHALE & COAL ZONE

BASE OF SHALE & COAL ZONE

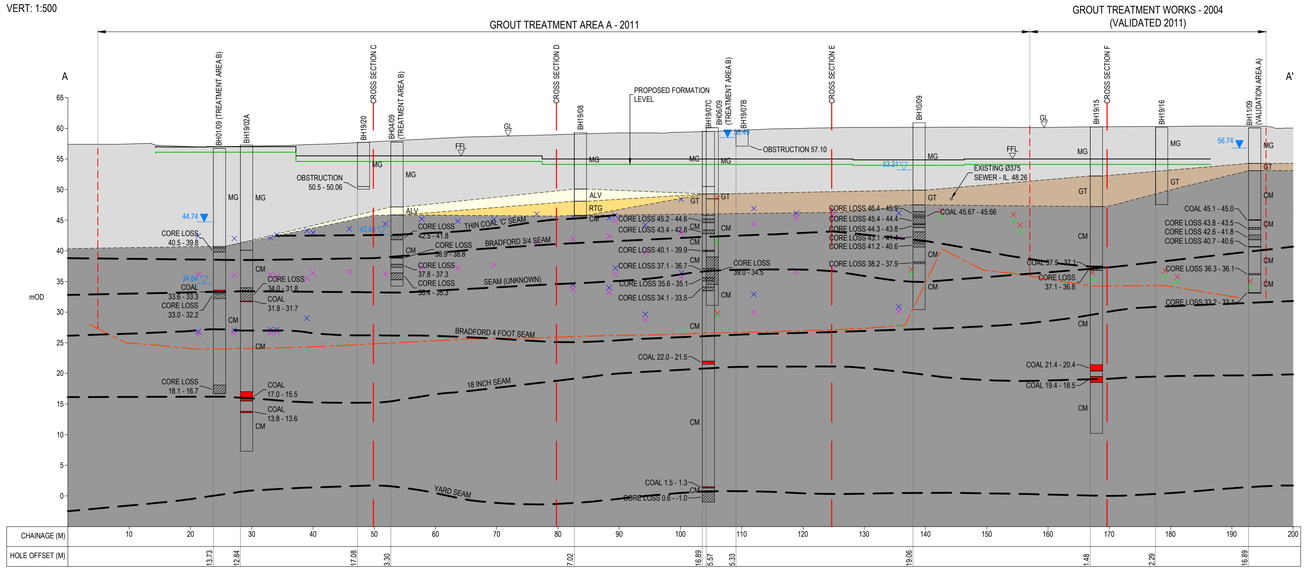
BASE OF DRILL & GROUT TREATMENT

NOTE

HOLES MARKED TREATMENT AREAS A & B WERE LOCATED WITHIN TREATMENT AREAS FROM THE 2011 BWB REPORT. WITHIN THESE AREAS GLACIAL TILL WAS ENCOUNTRED AT APPROX. 11 mBGL AND 14 mBGL FOLLOWED BY GREY MUDSTONE OF THE COAL MEASURES.

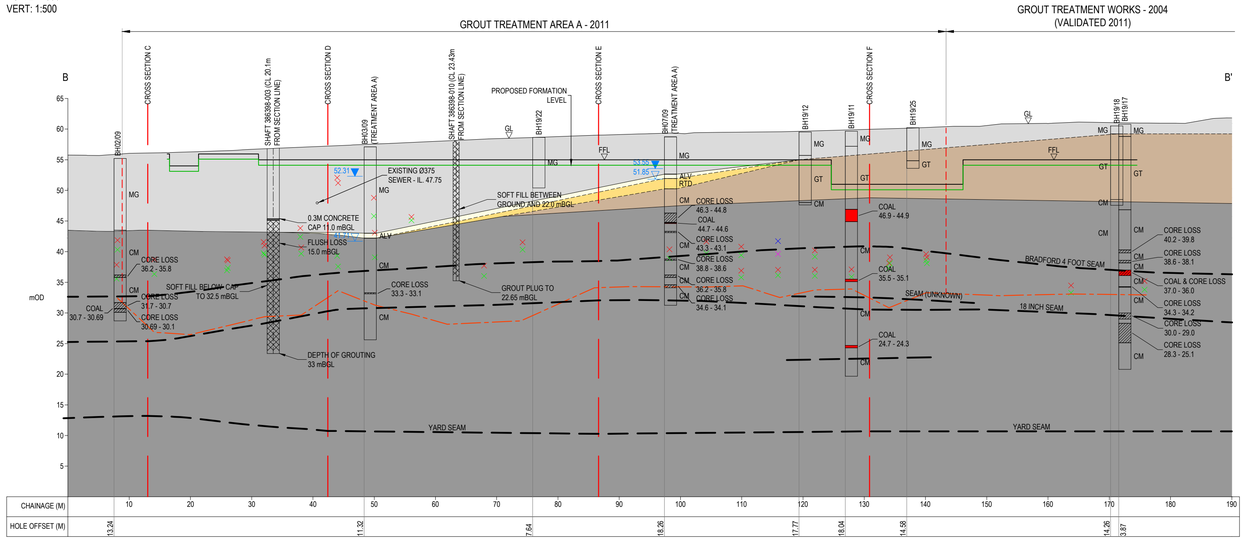
SECTION A - A'

SCALES
HORIZ. 1:500
VERT: 1:500



SECTION B - B'

SCALES
HORIZ. 1:500
VERT: 1:500



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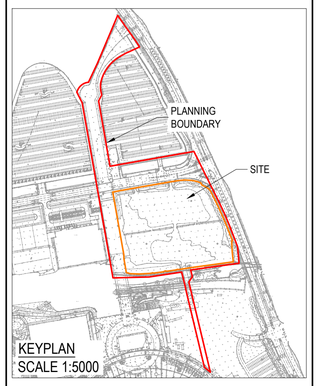
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CONSTRUCTION.

MAINTENANCE/CLEANING/OPERATION.

DECOMMISSIONING/DEMOLITION.

Notes
SEE DRAWING NO. 0042841-BHE-XX-XX-DR-GE-0101 FOR CROSS SECTIONS.



Rev	Description	Date	Drn	Ch'd
P03	PLANNING	31.01.20	NG	FG
P02	DRAFT FOR PLANNING	20.12.19	NG	FG
P01	DRAFT STAGE 3	27.11.19	NG	FG

PLANNING

Status of drawing

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Architect *POPULOUS*

Project **OVG MANCHESTER**

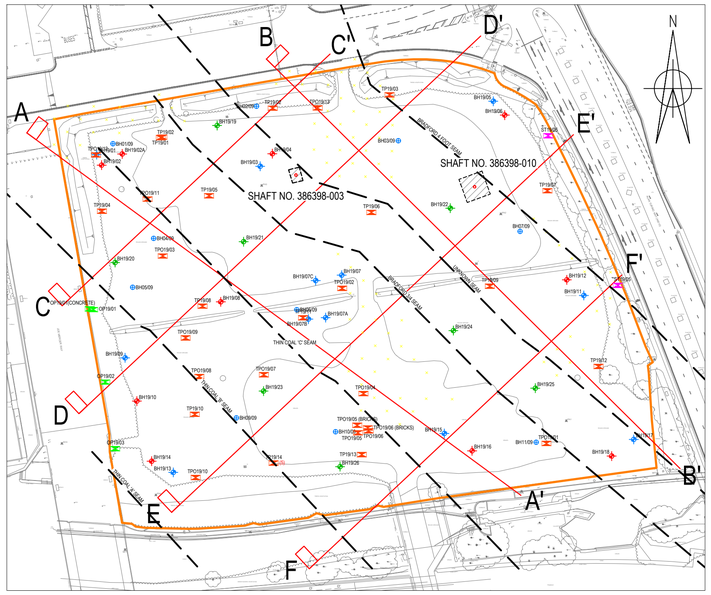
Drg Title GEOLOGICAL CROSS SECTIONS SHEET 1

Scales@A1 1:500
Drawn by NG
Checked by FG

Job No. 0042841
Date NOV 2019
Rev P03

Drawing No. BRA-BHE-XX-XX-DR-GE-0201

Richard Lanham \\bh-bathfp\project vol\0042841 Project Battersea\99 Ground Eng\3 Site Inv\Revit\BRA-BHE-XX-XX-DR-GE-0201.dwg



- INFERRED COAL SEAM
- MG MADE GROUND
- ALV ALLUVIUM
- RTG RIVER TERRACE DEPOSITS
- GT GLACIAL TILL
- CM COAL MEASURES
- COAL SEAM FROM GROUND INVESTIGATION DATA
- ASSUMED ZONE OF CORE LOSS
- 51.85 GROUNDWATER TABLE (mOD)
- 44.74 GROUNDWATER - PERCHED (mOD)

DRILL & GROUT LEVELS

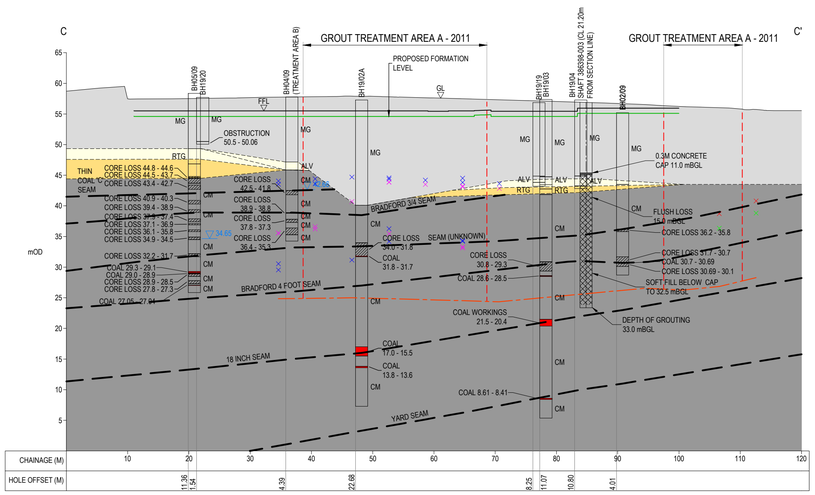
- TOP OF COAL SEAM
- BASE OF COAL SEAM
- TOP OF SHALE & COAL ZONE
- BASE OF SHALE & COAL ZONE
- BASE OF DRILL & GROUT TREATMENT

NOTE

HOLES MARKED TREATMENT AREAS A & B WERE LOCATED WITHIN TREATMENT AREAS FROM THE 2011 BWB REPORT. WITHIN THESE AREAS GLACIAL TILL WAS ENCOUNTRED AT APPROX. 11 mBGL AND 14 mBGL FOLLOWED BY GREY MUDSTONE OF THE COAL MEASURES.

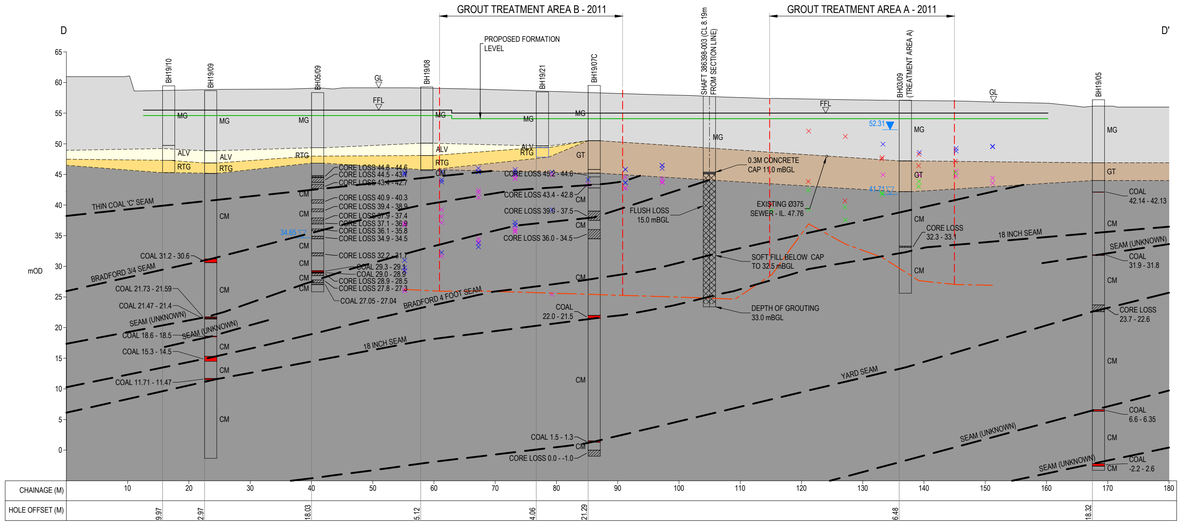
SECTION C - C'

SCALES
HORIZ. 1:500
VERT: 1:500



SECTION D - D'

SCALES
HORIZ. 1:500
VERT: 1:500



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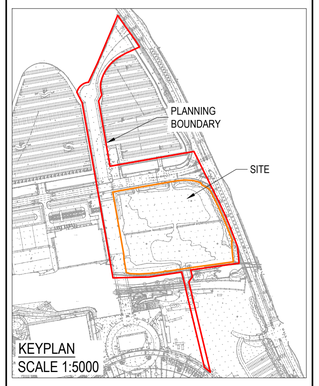
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MAINTENANCE/CLEANING/OPERATION.

DECOMMISSIONING/DEMOLITION.

Notes
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Rev	Description	Date	Drn	Ch'd
P03	PLANNING	31.01.20	NG	FG
P02	DRAFT FOR PLANNING	20.12.19	NG	FG
P01	DRAFT STAGE 3	27.11.19	NG	FG

PLANNING

Status of drawing

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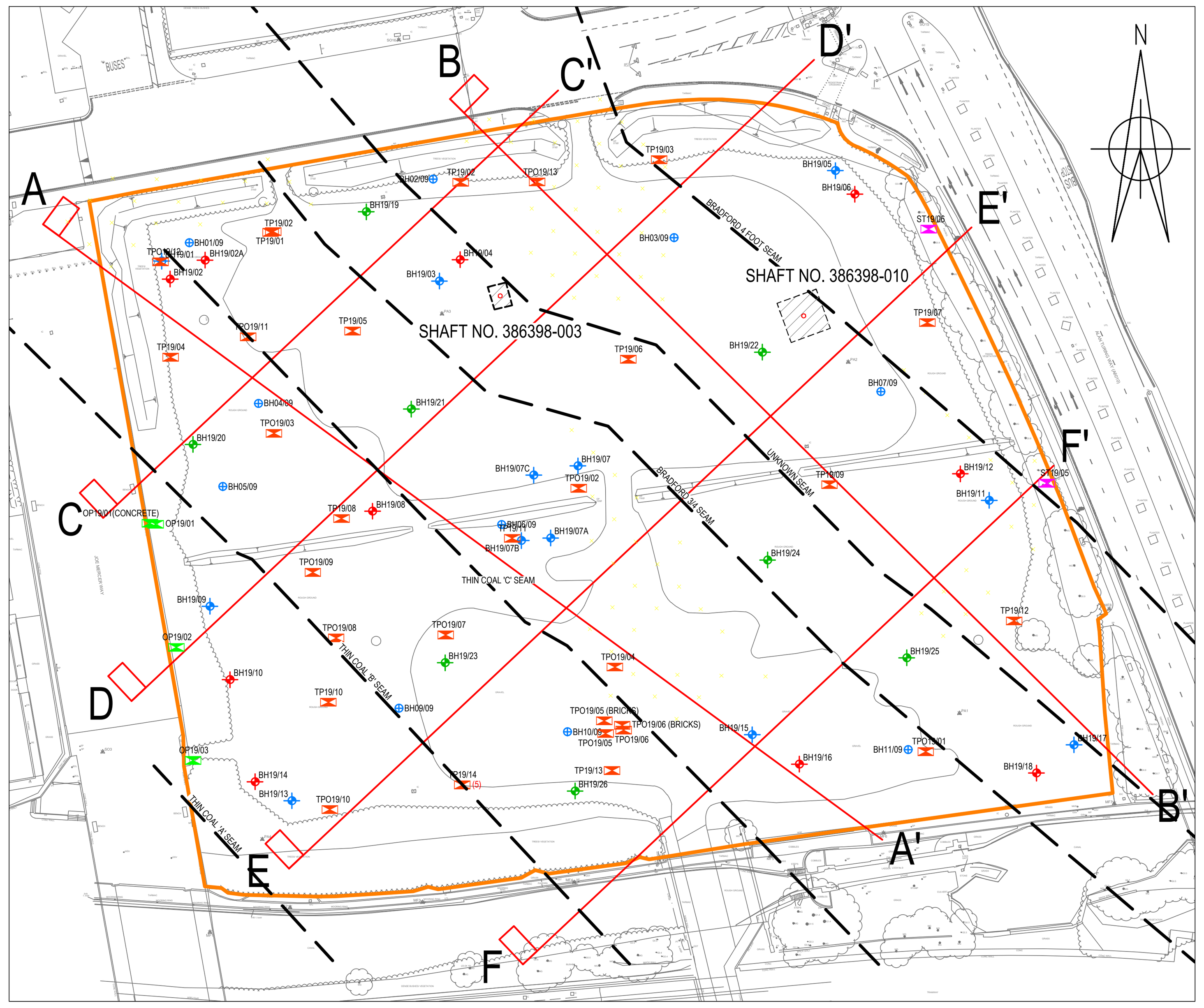
Architect *POPULOUS*
Project **OVG MANCHESTER**
Drg Title GEOLOGICAL CROSS SECTIONS SHEET 2

Scales@A1 1:500
Drawn by NG
Checked by FG

Job No. 0042841
Date NOV 2019
Rev P03

Drawing No. BRA-BHE-XX-XX-DR-GE-0202

Richard.Latcham:\\bh-bdt\project vol\0042841 Project Bedford\99 Ground Eng\Site Inv\Revit\BRA-BHE-XX-XX-DR-GE-0202.rvt



INFERRED COAL SEAM

MG MADE GROUND

ALV ALLUVIUM

RTG RIVER TERRACE DEPOSITS

GT GLACIAL TILL

CM COAL MEASURES

COAL SEAM FROM GROUND INVESTIGATION DATA

ASSUMED ZONE OF CORE LOSS

51.85 GROUNDWATER TABLE (mOD)

44.74 GROUNDWATER - PERCHED (mOD)

DRILL & GROUT LEVELS

TOP OF COAL SEAM

BASE OF COAL SEAM

TOP OF SHALE & COAL ZONE

BASE OF SHALE & COAL ZONE

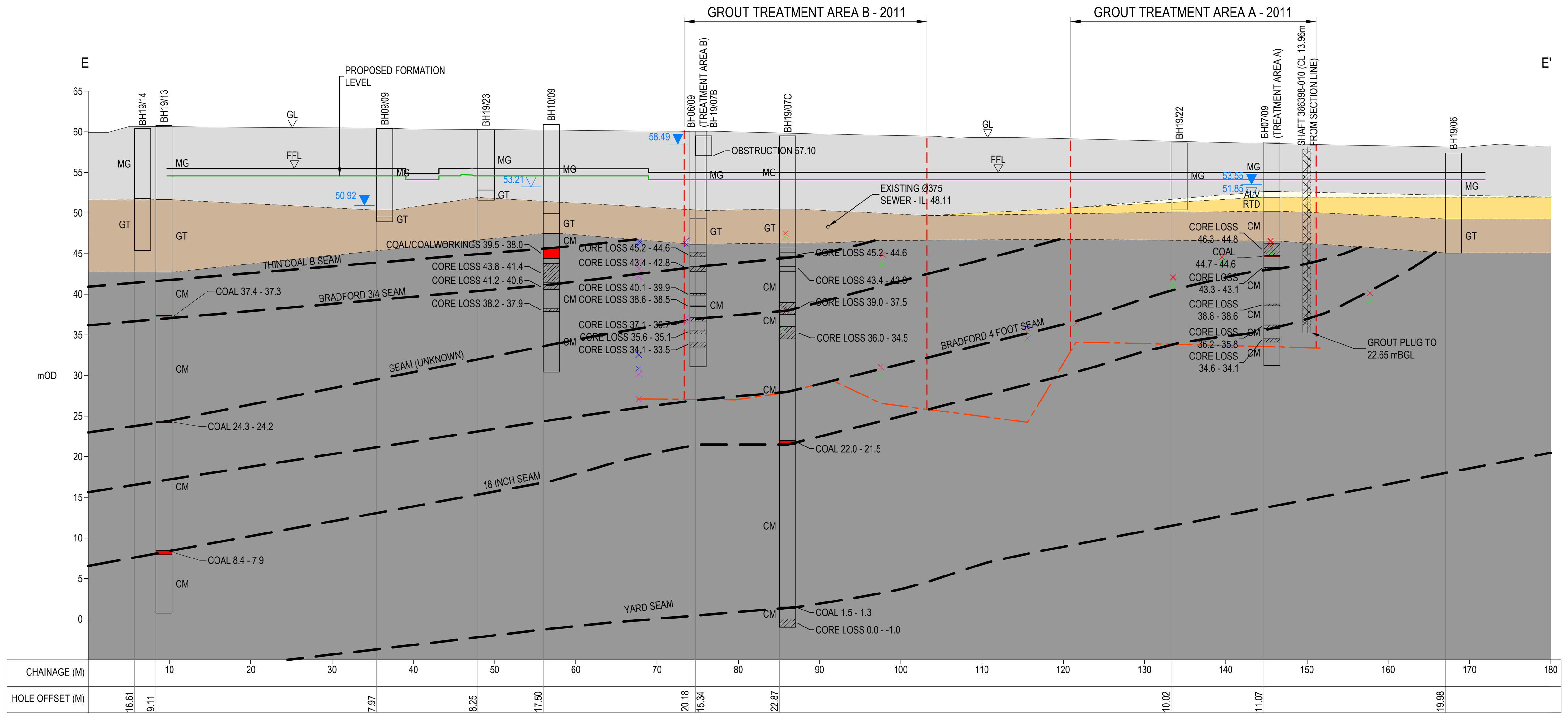
BASE OF DRILL & GROUT TREATMENT

NOTE

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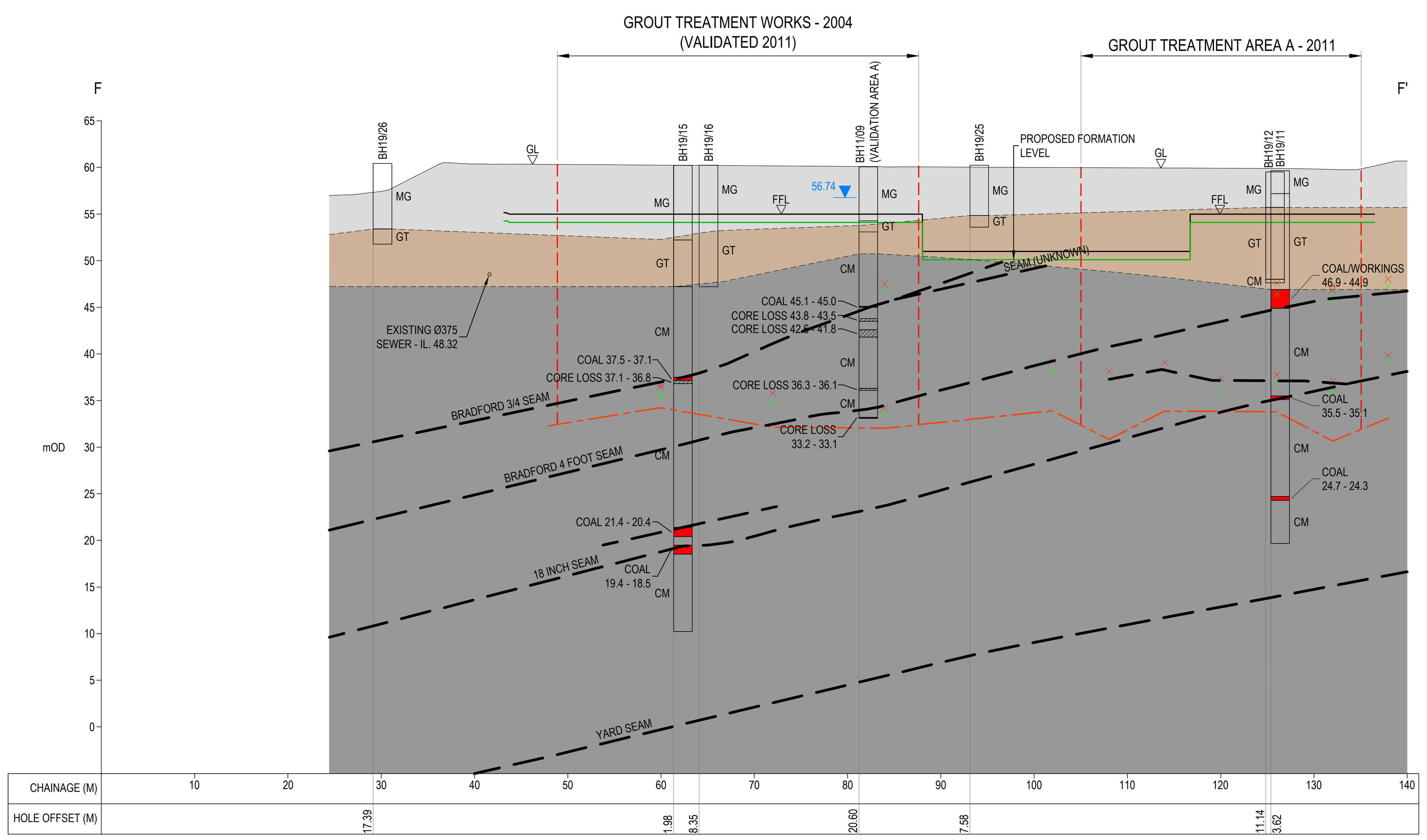
SECTION E - E'

SCALES
HORIZ. 1:500
VERT: 1:500



SECTION F - F'

SCALES
HORIZ. 1:500
VERT: 1:500



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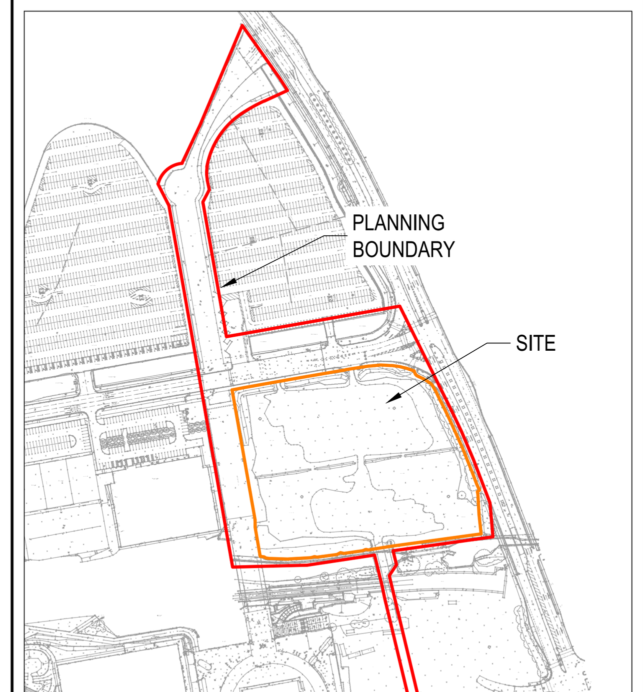
CONSTRUCTION.

MAINTENANCE/CLEANING/OPERATION.

DECOMMISSIONING/DEMOLITION.

Notes

SEE DRAWING NO. 0042841-BHE-XX-XX-DR-GE-0101 FOR CROSS SECTIONS.



KEYPLAN
SCALE 1:5000

Rev	Description	Date	Drn	Ch'd
P03	PLANNING	31.01.20	NG	FG
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P01	DRAFT STAGE 3	27.11.19	NG	FG

PLANNING

Status of drawing

BUROHAPPOLD ENGINEERING

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Architect *POPULOUS*

Project **OVG MANCHESTER**

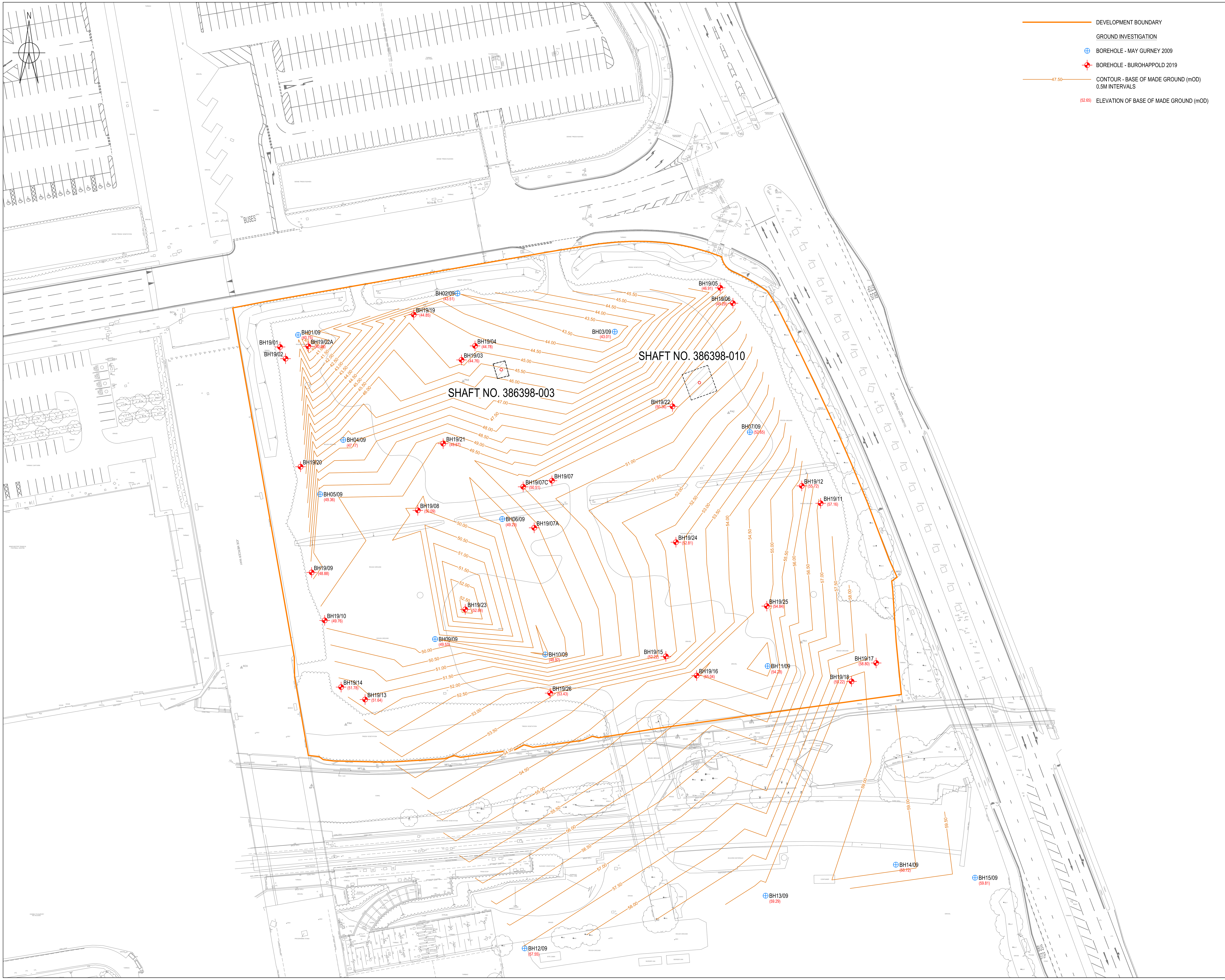
Drg Title GEOLOGICAL CROSS SECTIONS SHEET 3

Scales@A1 1:500
Drawn by NG
Checked by FG

Job No. 0042841
Date NOV 2019
Rev P03

Drawing No. BRA-BHE-XX-XX-DR-GE-0203

Richard Larkham \\Srv-bath05\project cad\0042841 Project Bradford\F09 Ground Eng- Site Inv\Sheet\BRA-BHE-XX-XX-DR-GE-0203.dwg



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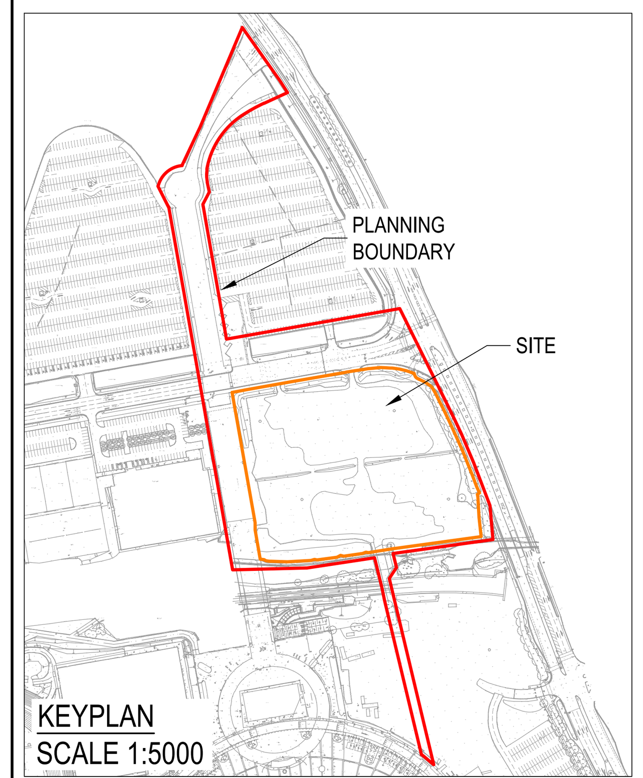
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CONSTRUCTION.

MAINTENANCE/CLEANING/OPERATION.

DECOMMISSIONING/DEMOLITION.

Notes



KEYPLAN
SCALE 1:5000

Rev	Description	Date	Drn	Ch'd
P02	PLANNING	31.01.20	NG	FG
P01	DRAFT STAGE 3	27.11.19	NG	FG

PLANNING

Status of drawing

BUROHAPPOLD ENGINEERING

Camden Mill
Lower Bristol Road
Bath BA2 3DQ
UK

Tel: +44 (0)1225 320600
Fax: +44 (0)870 787 4148
Email: 0042841@burohappold.com
Web: www.burohappold.com

Architect: *POPULOUS*

Project: **OVG MANCHESTER**

Drg Title: CONTOUR PLOT BASE OF MADE GROUND

Scales@A1: 1:500
Drawn by: NG
Checked by: FG

Job No. 0042841
Date: NOVEMBER 2019
Rev: P02

Drawing No. BRA-BHE-XX-XX-DR-GE-0300

Richard Larkham \\Srv-bath05\project cad\0042841 Project Bradford\F09 Ground Eng- Site Inv\Sheet\BRA-BHE-XX-XX-DR-GE-0300.dwg



DEVELOPMENT BOUNDARY

GROUND INVESTIGATION

BOREHOLE - MAY GURNEY 2009

BOREHOLE - BUROHAPPOLD 2019

DRILL & GROUT POINT - 2011

43.50 CONTOUR - TOP OF COAL MEASURES (mOD) 0.5M INTERVALS

48.31 ELEVATION OF TOP OF COAL MEASURES (mOD) RECORDED IN EXPLORATORY HOLES AND FROM DRILL & GROUT RECORDS

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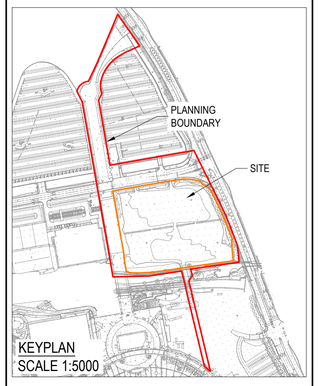
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DECOMMISSIONING/DEMOLITION.

Notes



Rev	Description	Date	Drn	Ch'd
P03	PLANNING	31.01.20	NG	FG
P02	DRAFT FOR PLANNING	20.12.19	NG	FG
P01	DRAFT STAGE 3	27.11.19	NG	FG

PLANNING

Status of drawing

BUROHAPPOLD ENGINEERING

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Email: 0042841@burohappold.com
Web: www.burohappold.com

Architect *POPULOUS*

Project **OVG MANCHESTER**

Drg Title CONTOUR PLOT
TOP OF COAL MEASURES

Scales@A1 1:500
Drawn by NG
Checked by FG

Job No. 0042841
Date NOVEMBER 2019
Rev P03

Drawing No. BRA-BHE-XX-XX-DR-GE-0301

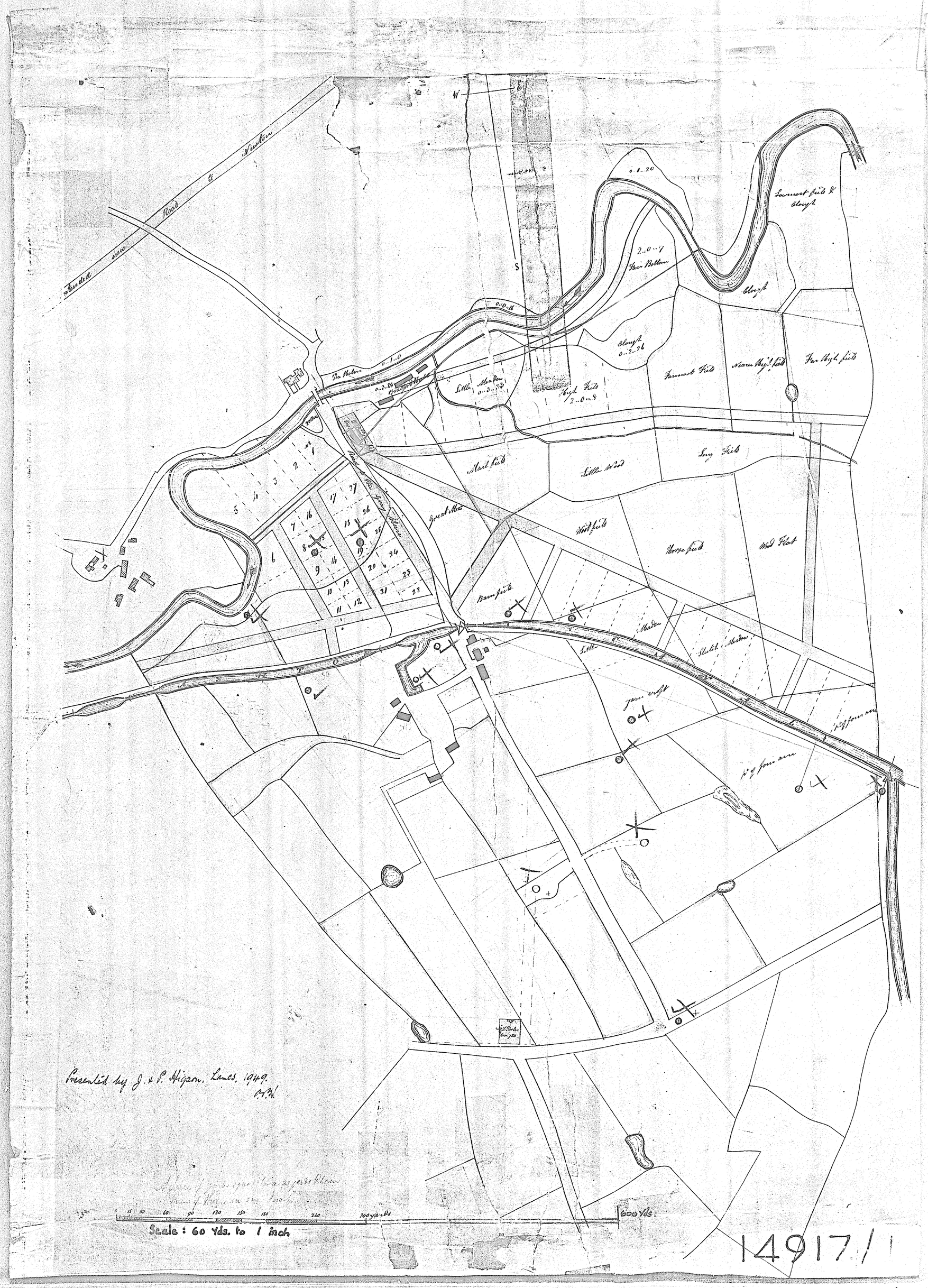
Richard Latham 10n.latham@project.ae\0042841 Project Stratford\09 General Engr Site Inv\Revit\BRA-BHE-XX-XX-DR-GE-0301.dwg

Appendix B Historic Mine Abandonment Plans and Shaft Plans

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SCALE 1/2500



Presented by J. & P. Hilpern. Lancs. 1949.

14917/1

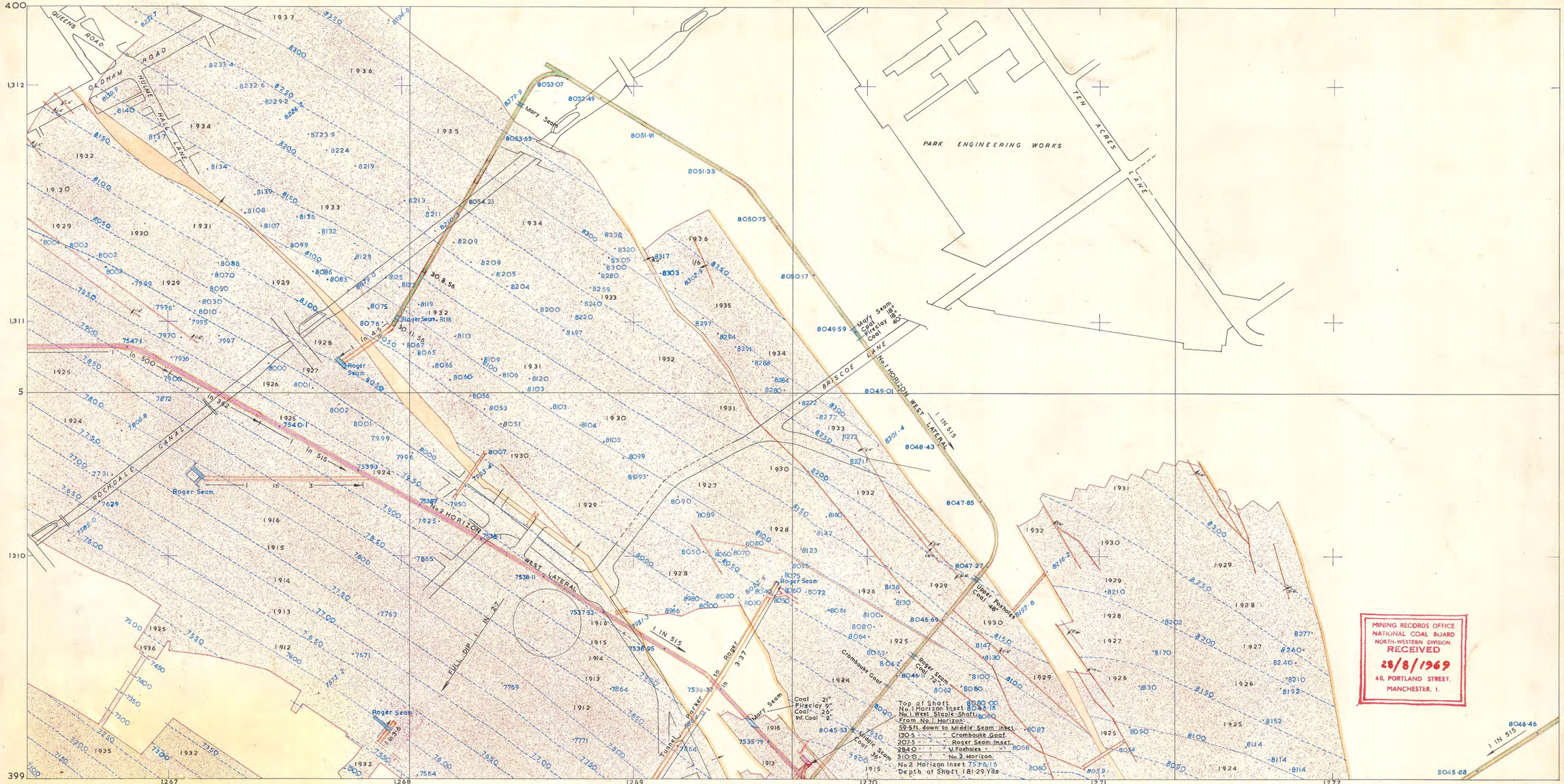
Late · 18/4 Cent
Early 19/4 Cent

1 IN 2500 — 600M

17.36
60 yds
1 IN 2160

No. 9

CULL– BIRKENHEAD



— BRADFORD COLLIERY —

No. 1 SHAFT 33/8798/062422		No. 2 SHAFT 33/8798/058448	
SURFACE LEVEL	10,205·74	SURFACE LEVEL	10,207·84
No. 1 HORIZON INSET	8,042·00	No. 1 HORIZON INSET	8,041·28
No. 2 HORIZON INSET	7,532·44	No. 2 HORIZON INSET	7,530·57
DEPTH OF SHAFT	923·25yds.	DEPTH OF SHAFT	955·81yds.

16 YDS

NOTE

WHEN THIS PLAN IS REFERRED TO REFERENCE MUST ALSO BE MADE TO THE OVERLAY TRACING OF THE ROGER SEAM. NOTE MUST ALSO BE TAKEN THAT WORKINGS IN THE ROGER SEAM MAY ALSO AT SOME TIME CONTAIN AN ACCUMULATION OF WATER WHICH MAY BE DANGEROUS TO WORKINGS TO WHICH THIS PLAN RELATES.

— SCALE — 1/2500 —

DATUM FOR LEVELS
10,000 feet below ORDNANCE DATUM

— SECTION OF SEAM —

GREY BIND
SOFT STREAKY BIND 2'0"
COAL 4'-1"
FIRECLAY

CROMBOUKE SEAM

N.W. 644/7

DATE OF CONSTRUCTION 27·5·54

33/8699

N.W. 644

The Coal Authority
IFTS accredited

Catalogue No.: NW644 Sheet Info:

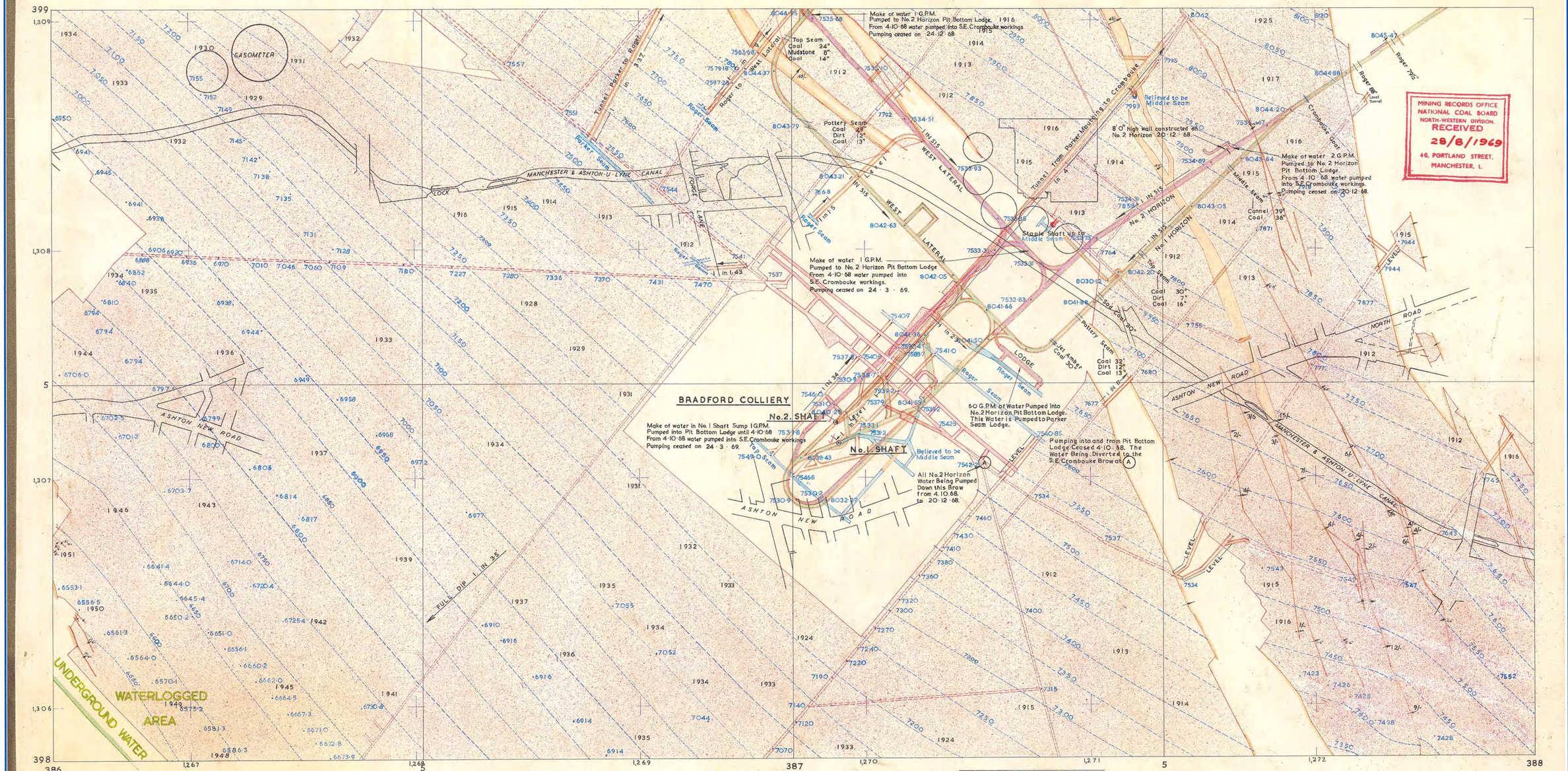
Date: 01/09/2010 | Scale: 1 TO 2500

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Matthew Carr - Buckingham group contracting ltd,Black pitt farm,stowe,Buckinghamshire,MK18 5LJ,UK

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BRADFORD COLLIERY

No.1 SHAFT 33/8798/062422		No.2 SHAFT 33/8798/058448	
SURFACE LEVEL	10205·74	SURFACE LEVEL	10207·84
FORGE INSET	9774·00	FORGE INSET	9755·92
RED ROCK INSET	8909·67	RED ROCK INSET	8938·00
PARKER INSET	8577·92	PARKER INSET	8574·81
No.1 HORIZON INSET	8042·00	No.1 HORIZON INSET	8041·28
No.2 HORIZON INSET	7532·44	PARKER NEW RETURN INSET	7588·67
SUMP TUNNEL INSET	7486·86	No.2 HORIZON INSET	7530·57
TOP OF SPILLAGE	7480·28	SKIP POCKET INSET	7475·57
CROMBOUKE SEAM AT BOTTOM OF SHAFT	7435·99	ROGER SEAM INSET	7369·40
DEPTH OF SHAFT	923·25 Yds	TOP OF SPILLAGE	7369·40
		BOTTOM OF SHAFT	7340 40
		DEPTH OF SHAFT	955·81 Yds

33/8698

NOTE

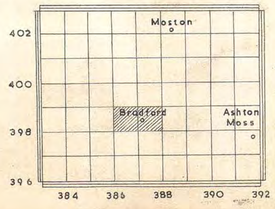
CROMBOUKE — 26 YDS — ROGER

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N.W.644

— SCALE - 1/2500 —

DATUM FOR LEVELS
10,000 feet below ORDNANCE DATUM



— SECTION OF SEAM —



CROMBOUKE SEAM

N.W.644/6

DATE OF CONSTRUCTION 13 - 5 - 54

The Coal Authority

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Catalogue No.: NW644 Sheet Info:

Date: 01/09/2010

Scale: 1 TO 2500

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399

Make of water 1 G.P.M.
Pumped to No.2 Horizon Pit Bottom Lodge.
From 4·10·68 water pumped into S.E. Crombouke workings.
Pumping ceased on 24·12·68 ·

Make of water 2 G.P.M.
Pumped to No. 2 Horizon
Pit Bottom Lodge.
From 4 · 10 · 68 water pumped
into S.E. Crombouke workings.
Pumping ceased on 20 · 12 · 68.

8'0" high wall constructed on
No. 2 Horizon 20 · 12 · 68.

Make of water 1 G.P.M.
Pumped to No. 2 Horizon Pit Bottom Lodge
From 4·10·68 water pumped into S.E. Crombouke workings.
Pumping ceased on 24·3 – 69.

No. 2 HORIZON PIT BOTTOM LODGE
60 G.P.M. Pumped up No. 1 Shaft to
Parker Seam Lodge.
Pumping into and from Pit
Bottom Lodge ceased 4·10·68

Make of water in No. 1 Shaft Sump 1 G.P.M.
Pumped into Pit Bottom Lodge until 4·10·68.
From 4·10·68 water pumped into S.E. Crombouke workings
Pumping ceased on 24 · 3 · 69.

BRADFORD COLLIERY

No. 2. SHAFT

No. 1. SHAFT

Believed to be Middle Seam

ELECTRICITY GENERATING STATION.

WEST LATERAL

MANCHESTER & ASHTON-U-LYNE CANAL

No. 2 HORIZON

No. 1 HORIZON

CROMBOUKE

NORTH ROAD

ASHTON NEW ROAD

CLAYTON LANE

MINING RECORDS OFFICE
NATIONAL COAL BOARD
NORTH-WESTERN DIVISION.
RECEIVED
28/8/1969
40, PORTLAND STREET,
MANCHESTER, 1.

— BRADFORD COLLIERY —

No.1. SHAFT 33/8798/062422		No.2. SHAFT 33/8798/058448	
SURFACE LEVEL	10205·74	SURFACE LEVEL	10207·84
FORGE INSET	9774·00	FORGE INSET	9755·92
RED ROCK INSET	8909·67	RED ROCK INSET	8938·00
PARKER INSET	8577·92	PARKER INSET	8574·81
No. 1 HORIZON INSET	8042·00	No. 1 HORIZON INSET	8041·28
No. 2 HORIZON INSET	7532·44	PARKER NEW RETURN INSET	7588·67
SUMP ACCESS TUNNEL INSET	7486·86	No. 2 HORIZON INSET	7530·57
DEPTH OF SHAFT	923·25 Yards	ROGER SEAM INSET	7369·40
		DEPTH OF SHAFT	955·81 Yards

33/8698

CROMBOUKE
26 YDS
ROGER

NOTE

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— SCALE – 1/2500 —

DATUM FOR LEVELS
10,000 feet below ORDNANCE DATUM

N.W. 645

— SECTION OF SEAM —

GREY ROCK WITH BLACK PARTINGS
FOLLOWING DIRT 1'3"
COAL 7'0"
GREY BIND

ROGER SEAM

N.W. 645/5

DATE OF CONSTRUCTION 27 · 5 · 54

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Catalogue No.: NW645 Sheet Info:

Date: 01/09/2010 | Scale: 1 TO 2500

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399

5

398

386 5 387 5 388

Gasholder.

Gasholder.

Manchester & Ashton Under Lyne Canal.

Printing Works

Bradford Wire Works.

Bradford Wire Works.

Electricity Generating Station.

Cooling Towers

Iron Works.

Clayton Aniline Chemical Works.

Park Road

Phillips

Ashton New Road

Brow in Yard Mine

1 in 29

Level

Level

Three Quarters Seam

British

WORKINGS FROM BRADFORD COLLIERY
ABANDONED 17th OCTOBER 1891
CATALOGUE No. 2655.

BRADFORD COLLIERY
FORGE SHAFT (LITTLE PIT)
FORGE SHAFT (11 yds to Four Feet Mine)
No.2 SHAFT
No.1 SHAFT

CLAYTON COLLIERY
No.1 SHAFT
No.2 SHAFT

Approximate Limit of Four Feet Working

8044·37 7786·21 7535·10 1 IN 515 7534·51 8043·79 7533·93 8043·21 1 IN 515 8042·63 7533·35 7533·31 8042·05 7532·83 7589·6 7538·6 7530·9 7541·7 7539·2 8044·2 7531·8 7544·5 7530·2 8032·27

7534·31 No.2 HORIZON 1 IN 515 8043·05 7533·73 7533·31 8042·47 8030·12 No.1 HORIZON 8042·20 8041·88 8045·47 8044·88 8044·20 7535·47 7534·89 3043·64

— BRADFORD COLLIERY. —

No.1. SHAFT. 33/8798/062422		No.2. SHAFT. 33/8798/058448	
SURFACE LEVEL	10205·74	SURFACE LEVEL	10207·50
No.1. HORIZON INSET	8042·00	No.1. HORIZON INSET	8041·28
No.2. HORIZON INSET	7532·44	No.2 HORIZON INSET.	7530·57
DEPTH OF SHAFT.	923·25yds	DEPTH OF SHAFT.	955·70yds

FORGE SHAFT (LITTLE PIT) 33/8798/026495

SURFACE LEVEL	10,208·77
DEPTH OF SHAFT	150·89 yds

33/8698

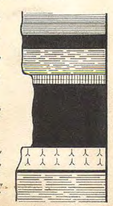
N.W.643

— SCALE:- 1/2500 —

DATUM FOR LEVELS
10000 feet below ORDNANCE DATUM.

— SECTION OF SEAM. —

GREY METAL	12'- 0"
COAL	9"
FOLL: DIRT.	1'- 6"
CANNEL	6"
COAL	3'- 6"
FIRECLAY.	1'- 3"
COAL	2"
SOFT METAL.	35'- 0"



BRADFORD FOUR FEET SEAM

MINING RECORDS OFFICE
NATIONAL COAL BOARD
NORTH-WESTERN DIVISION.
RECEIVED
28 AUG 1969
49, PORTLAND STREET,
MANCHESTER, 1.

DATE OF CONSTRUCTION. AUGUST 1962

N.W. 643/2

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Catalogue No.: NW643 Sheet Info:

Date: 01/09/2010 | Scale: 1 TO 2500

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Bradford Colliery - Manchester December 1891

Memorandum in regard to the Four Feet Mine

The part colored red shews the extreme limit to which the workings in this Mine have been carried. All the Coal under the part So Colored has not been extracted, the extent of such being marked on the tracings of working plans sent herewith and this map goes a birds-eye view of the boundaries within which the Four Feet Mine has been more or less worked during the last hundred years.

The Bradford Colliery Co
Thomas Livesey
Agent

2655

2655/1

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Catalogue No.: 2655 Sheet Info: 1 OF 4 KEY PLAN

Date: 16/02/2011

Scale: 1 TO 10560 (6 INCH TO 1 MILE)

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Bouziane Boukhateb - BWB Consulting,3-4 Kayes Walk,The Lace Market,Nottingham,NG1 1PY,UK

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Beaufort Colliery

PARKER MINE

Scales: 6 inches to 1 mile

The Coal Authority

Catalogue No.: NW1170 Sheet Info: PART A

Date: 16/02/2011

Scale: 20 YARDS TO 1 INCH (1 TO 720)

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Boundaries - BWB Consulting 5-9 Hunters Walk The Lace Market Nottingham NG1 1PJ UK

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SCALE : 1/2500

1 IN 2500 = 600M

593

6

T H E

C A N A L

T O W N S H I P

O F

MANCH

BRAI

O

T H E

O F

B R A D F O R D

W I C K

SCALE : 1/1250

THIS PLAN IS PRODUCED FROM A MICROFILM OF THE ORIGINAL ABANDONED MINE PLAN. THE COAL AUTHORITY CANNOT GUARANTEE THE ACCURACY OF THE REPRODUCTION OR SCALE.

BRADFORD COLLIERY

Four Feet Mine

D COLLIERY

CANAL

RIVER MEDLOCK

1

279/2

(B56)

R11
56
27
22
23
63
Phillips Park
Phillips Park
BRADFORD
R36
R9
21
17
16
19
18
100
61
20
62
BESWICK AND CLAYTON WARD
59
15
14
67
24
STUART STREET TUNNEL
Hoppet Shaft
13
13a
X
53
3
4
2
1
9
FORMER SITE OF BEADFORD COLLERY
46

Appendix C Coal Authority Report

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The Coal Authority

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On-Line Service: www.coalminingreports.co.uk - Phone: 0845 762 6848 - DX 716176 MANSFIELD 5

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Our reference:	**00071303-08**
Your reference:	26711041
Electronic Ref:	EME_00010624550002_005
RRUID:	005.00010624550002
Date of your enquiry:	**06 November 2008**
Date we received your enquiry:	**06 November 2008**
Date of issue:	

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

Coal and Brine Report

Site Surrounding Superstore Including Stadium, Man City Fc A, Manchester, Lancashire

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 extraction	No

Information from the Coal Authority

Underground Coal Mining

12 NOV 2008

Past

The property is in the likely zone of influence from workings in 11 seams of coal at shallow to 1040m depth, and last worked in 1961.

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 are 63 mine entries, the approximate positions of which are shown on the attached plan.

Coal Authority records disclose the following information:

386398-009. No treatment details.

387398-001. No treatment details.

387398-014. No treatment details.

386398-023. This shaft was drilled grouted and capped in 1986 by Ward Ashcroft and Parkman .

386398-024. This shaft was drilled grouted and capped in 1986 by Ward Ashcroft and Parkman .

386398-004. This shaft was drilled grouted and capped in 1986 by Ward Ashcroft and Parkman .

386398-006. This shaft was pressure grouted to a depth of 40m with 25.5 tonnes of grout by conttactors acting on behlaf of AMEC Captial Projects Ltd .

386398-007. No treatment details.

386398-008. This shaft was drilled grouted and capped in 1986 by Ward Ashcroft @ Parkman .

386398-013. No treatment details.

387398-007. No treatment details.

386398-014. This adit was located in 1976. It was dug out to give 50m of cover to the surface. The inbye end was then sealed with a 4.5m thick stopping. The excavation was then back filled. .

386398-015. No treatment details.

386398-017. No treatment details.

386398-016. No treatment details.

387398-029. No treatment details.

386398-012. This shaft was pressure grouted in October 2001 to a depth of 40m with 31 tonnes of grout the works having being carried out by Contractors acting for AMEC Capital Projects Ltd .

386398-003. This shaft was driiled grouted and capped in 1986 by Ward Ashcroft and Parkman. .

386398-005. The shaft fill was pressure grouted to a depth of 40m. The total grout take for the shaft being 23 tonnes. The works were carried out by contractors acting for Amec Capital Projects Ltd. .

387398-019. No treatment details.

387397-004. No treatment details.

387397-005. No treatment details.

387398-030. This shaft was searched for in 1992 by Wardell Armstrong @ Partners acti ng on behalf of Manchester City Council Major Highways Consortium - no trace of the shaft was found. .

387398-028. This shaft was searched for in 1992 by Wardell Armstrong acting on behal f of Manchester City Council but no trace of the shaft was found .

387398-032. This shaft was located during investigation works carried out in September 2001. The shaft was pressure grouted to a depth of 25m. The total grout take for the shaft being 10 tonnes. These works were undertaken by Contractors acting for AMEC Capital Projects Ltd. .

387398-006. This shaft was exposed in December 2005 during site investigations and found to be filled. The fill material was drilled to the full depth of the shaft and consolidated by injecting 2.5 tonnes of cement grout. These works were carried out by contractors Van Elle on behalf of Morrison

Construction Services Ltd .

387398-005. This shaft was exposed in December 2005 during site investigations and found to be filled. The fill material was drilled to the full depth of the shaft and consolidated by injecting 3.75 tonnes of cement grout. These works were carried out by contractors Van Elle on behalf of Morrison Construction Services Ltd .

386398-021. This shaft was drilled grouted and capped in 1986 by Ward Ashcroft @ Parkman .

387398-003. No treatment details.

387398-004. No treatment details.

387398-026. No treatment details.

386398-029. No treatment details.

387398-011. This shaft was treated by the formation of a truncated concrete cone over the shaft 4m below the surface. .

387398-012. No treatment details.

387398-013. No treatment details.

386398-010. This shaft was searched for in 1977 but was not found .

387398-025. No treatment details.

387398-027. No treatment details.

386398-011. No treatment details.

387397-006. No treatment details.

387398-016. No treatment details.

387398-015. This shaft was filled in 1958 and was treated in 1976 by a truncated concrete cone being formed over the shaft . The cone is 7.6 metres diameter at the top 4.6 metres diameter at the bottom by 2.4 metres thick and the top of the cone was sited at ground level .

387398-017. No treatment details.

387398-018. No treatment details.

387398-020. This shaft was plugged with concrete 30m below ground level in 1975. The plug measures 5.5 metres diameter by 2 metres thick .

387398-010. No treatment details.

386398-022. This shaft was drilled grouted and capped in 1986 by Ward Ashcroft @ Parkman .

386398-025. This shaft was drilled grouted and capped in 1986 by Ward Ashcroft and Parkman .

387398-031. This shaft has been filled with demolition material at some time in the past .

387398-021. This shaft was plugged 27m below ground level in 1975. The concrete plug measures 5.5 metres diameter by 2 metres thick .

387398-022. No treatment details.

387398-023. This shaft has been filled at some time in the past and was drilled grouted and plugged in 1976. The concrete plug is 6 metres diameter at the top 4.5 metres diameter at the bottom by 1.8 metres thick .

387398-008. No treatment details.

387398-024. No treatment details.

387398-009. No treatment details.

386398-019. This shaft was drilled grouted and capped in 1986 by Ward Ashcroft and Parkman .

386398-001. This shaft has been searched for in the past but was not located. .

386398-002. This shaft was drilled grouted and capped in 1986 by Ward Ashroft and Parkman .

387398-002. No treatment details.

386398-020. No treatment details.

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386399-015. No treatment details.

387397-011. No treatment details.

387398-033. This shaft is 15.5 metres deep and once provided hopper access to the "Stuart Street Tunnel". In 1978 the tunnel was sealed with a 1.02 metres thick brick wall built 4.5 metres inbye of the shaft bottom and subsequently the shaft was filled with demolition material .

Mine entry 386398-014 was conveyed to Johnson @ Nephew in 1976.

Mine entry 387398-011 was conveyed to Johnson @ Nephew in 1976.

Mine entry 387398-015 was conveyed to Johnson @ Nephew in 1976.

Mine entry 387398-020 was conveyed to Johnson @ Nephew in 1976.

Mine entry 387398-031 was conveyed to Johnson @ Nephew in 1976.

Mine entry 387398-021 was conveyed to Johnson @ Nephew in 1976.

Mine entry 387398-033 was conveyed to Johnson and Nephew Steelworks in 1976.

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

At the surface, there are no known faults or other lines of weakness due to coal mining that have made the property unstable.

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 Coal Authority has not received a request to carry out preventive work 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 a notice of entitlement to withdraw support was published in 1955.

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 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.

A site investigation was carried out in 2005 by Van Elle Contractors Windsor Road, Springwell, Gateshead, Tyne & Wear, NE9 7QN on behalf of Morrison Construction Ltd .

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

Disused Adit or Mineshaft



Mapping sourced from Ordnance Survey

RRUID: 005.0001624650002

Appendix D Historic Duplicate Shaft Correspondence

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89NE

MANCHESTER
City Council
Defending Jobs - Improving Services

Planning Department
P O Box 488
Town Hall
Manchester M60 2JT
Telephone 061-234 4690

Brian Parnell
City Planning Officer

010244

Your reference 89NESR001464-89
Our reference RJL/SAB
Date 1st February 1989

If telephoning or calling
ask for Mr. Leyshon
Direct Line 061-234 4579

British Coal Corporation
Headquarters Technical Department
Ashby Road,
Burton-on-Trent, DE15 0QD.

For the attention of Mr. K. Rowe

Dear Sirs,

COAL MINING REPORT : CENTRAL BRADFORD AREA, EAST MANCHESTER

Thank you for your letter of 16th January 1989 and subsequent literature including plans identifying the location of mineshafts in the Central Bradford area.

It is apparent that the area has been subject to significant mining activity in the past and I am concerned that this might prejudice any redevelopment proposals. It is also apparent that a number of the shafts have had buildings or roads constructed over them.

I would, therefore, be most grateful, for any further information you might be able to provide concerning the status of specific shafts in the area and, in particular which ones have been treated, which one if any may be built over and which must be left free from development (with as I understand it, no building within 2 metres of the excavation made to carry out the treatment of any disused mineshaft). In the case of those shafts which must not be built over, what can their sites be used for e.g., car parking and landscaping?

I enclose an Ordnance Survey 1:2500 scale plan of the area should you wish to show any plan information.

Further to your letter I have ordered a copy of "The Treatment of Disused Mineshafts and Adits" from your Purchasing and Stores Department.

Please contact my assistant, Mr. Leyshon, if you should wish to discuss this matter further.

Yours faithfully,

Brian Parnell

City Planning Officer

W05RJL.25

Area Surveyor and Minerals Manager

1st July, 1975

R. Thorneycroft, Mining Engineer Special Duties,
Staffordshire House, Stoke.

SME.3200 (1156)
SME.3585 (574)

PROPOSED SALE OF BRADFORD COLLIERY SITE

At the present time negotiations are proceeding for the sale of the above site to the City of Manchester. The basis of thesale is that a basic price per acre has been agreed, but the site contains mine shafts and it has been agreed that cost of locating,treating and making them structurally safe should be deducted from the global sum. A deduction is also to be made in respect of possible heavy foundations which have been left untouched.

The Bradford Colliery site consists of five disused mine shafts, but there is a possibility that one shaft is the alternative position for another shaft.

The Nos.1 & 2 shafts have been filled and plugged approximately 100 ft. below the surface and these require no work doing to them.

The details of the remaining four/three shafts is as follows:-

Little Shaft No.10 151 yards deep. No information on diameter but presumed to be 10 feet.

Shaft No.22 which is presumed to be an alternative position for the Little Shaft so it is assumed that the same details would apply to this shaft.

Forge Shaft No.11 - 111 yards deep. Oval section 8' x 12'.

Shaft No.9 which is shown on the 1848 Edition of the Geological Map with no information. For this purpose of the exercise it is presumed to be 10'-0" diam. and 150 yards deep. All these shafts are presumed filled.

The drift in this area is approximately 50 feet so that the method of treatment would be grouting and plugging. I would be obliged if you could supply me with an estimated cost of locating, drilling, grouting and plugging the four shafts, so that the negotiations on the sale of the site can continue. There is some urgency in this matter as the sale must be completed by October, 1975.

for O. GREGORY

Copy to:-

P. Langton, Estates Dept.
Staffordshire House.

Area Surveyor and Minerals Manager

SME.3200(1156)

Area Estates Manager

22nd January, 1971

Sale of part of Bradford Colliery surface
to the C.E.G.B.

I refer to your conversation on the question of the possible shaft numbered 22 on plan reference 3200(1156) dated 18th November 1969, a copy of which is attached hereto.

Whilst this shaft may possibly be an alternative position for that numbered 10 on the above plan, both are shown on abandonment plans, although different ones, and cannot, therefore, be disregarded.

As the Board has been using the surface overlying the possible shaft No. 22 without trouble for many years, it would seem only reasonable to continue this use after, of course, advising the purchaser of the complete situation and providing any information required.

As to future development of the area in the vicinity of this shaft, i.e. assuming the area to be sold to the C.E.G.B. is affected only by the one shaft, a restriction on all new development ought to be made within a radius of 60 feet of its recorded position unless the shaft is first located and treated according to my directions.

for O. GREGORY

Reply agreed with OG 22/1

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