



Abbeydale
Geoscience

DRILLING AND GROUTING STRATEGY

BATLEY SHOPPING CENTRE, ALFREDS WAY,

BATLEY, WEST YORKSHIRE

Report: 487044-DG

Date: July 2024

Client:

Taylor & Brown Investments Ltd
203 Manningham Road
Bradford
West Yorkshire
BD8 7HP

DRILLING AND GROUTING SPECIFICATION
BATLEY SHOPPING CENTRE, ALFREDS WAY, BATLEY

DOCUMENT VERIFICATION SHEET

	Prepared By:	Checked By:
Name:	Glyn Hogg	Richard Saville
Qualifications:	MSci FGS	BSc CGeol FGS
Position:	Geotechnical Engineer	Director

SUMMARY

Grid Ref: 437410(E), 371113(N) **Elevation:** 84.5 mAOD **Site Area:** 0.28 ha

**Ground
Conditions**

Development proposals: Residential dwellings with private amenity areas.

Past site development: Residential garages, terraced housing before garages.

Made Ground: Max. depth of 2.10m bgl across the site from GI.

Natural Soils: Residual clay soils to max. depth of 2.80m bgl.

Bedrock: Mudstone bedrock identified across the site.

Groundwater: No groundwater encountered during GI works.

Shallow mining: Broken ground found between 8.00m - 17.90m bgl.

Ground gases: No significant ground gases identified by monitoring.

Remediation: Drilling and grouting required under footprint of proposed buildings to consolidate shallow workings.

Foundations: Piled foundations being considered.

Geotechnical Considerations: No adoptable highways proposed.

Validation: Drilling & grouting to be supervised by independent Geotechnical Engineer and validation report produced.

DRILLING AND GROUTING SPECIFICATION
BATLEY SHOPPING CENTRE, ALFREDS WAY, BATLEY

TABLE OF CONTENTS

1.	INTRODUCTION	1
2.	OBJECTIVES.....	2
3.	THE Site	2
4.	Previous Investigation.....	3
	4.1. Mining Risk Assessment	
	4.2. Ground Investigation	
	4.3. Ground conditions	
5.	Drilling and grouting strategy	5
	5.1. General principles	
	5.2. Design and validation of drilling and grouting operations	
	5.3. Treatment area	
	5.4. Setting out of grouting grid	
	5.5. Welfare facilities	
	5.6. Storage of materials	
	5.7. Disposal of waste	
	5.8. Services	
6.	Drilling Procedures	8
	6.1. Coal Authority permission to drill	
	6.2. General	
	6.3. Drilling flush medium	
	6.4. Water supply	
	6.5. Temporary casing	
	6.6. Abortive holes	
	6.7. Gas monitoring	
7.	Grouting Procedure	10
	7.1. General	
	7.2. Materials	
	7.3. Water supply	
	7.4. Grout mix	
	7.5. Grout properties and testing	
	7.6. Grout take limits	
8.	Validation Holes	12
9.	Mine Entries	12
10.	Site Records	13
	10.1. Daily drilling records	
	10.2. Daily grouting records	
	10.3. Other daily records	
11.	Validation of drilling & grouting.....	14
12.	Regulatory Approval	14

APPENDICES

APPENDIX A - Proposed Layout Drawings	A
APPENDIX B - Exploratory Hole Logs	B
APPENDIX C - Proposed Drill & Grout Layout Plan	C
APPENDIX D - Drilling & Grouting Schedule Of Rates.....	D

DRILLING AND GROUTING SPECIFICATION

BATLEY SHOPPING CENTRE, ALFREDS WAY, BATLEY

1. INTRODUCTION

On the instruction of Taylor & Brown Investments Ltd, a Remediation Method Statement was carried out by Abbeydale Building Environment Consultants Ltd (Abbeydale BEC) on a site at Batley Shopping Centre, Alfred's Way, Batley, West Yorkshire.

The site is situated near the centre of Batley, centred on National Grid Reference 424400, 424280, with a site area of around 0.64 ha. See Figure 1.

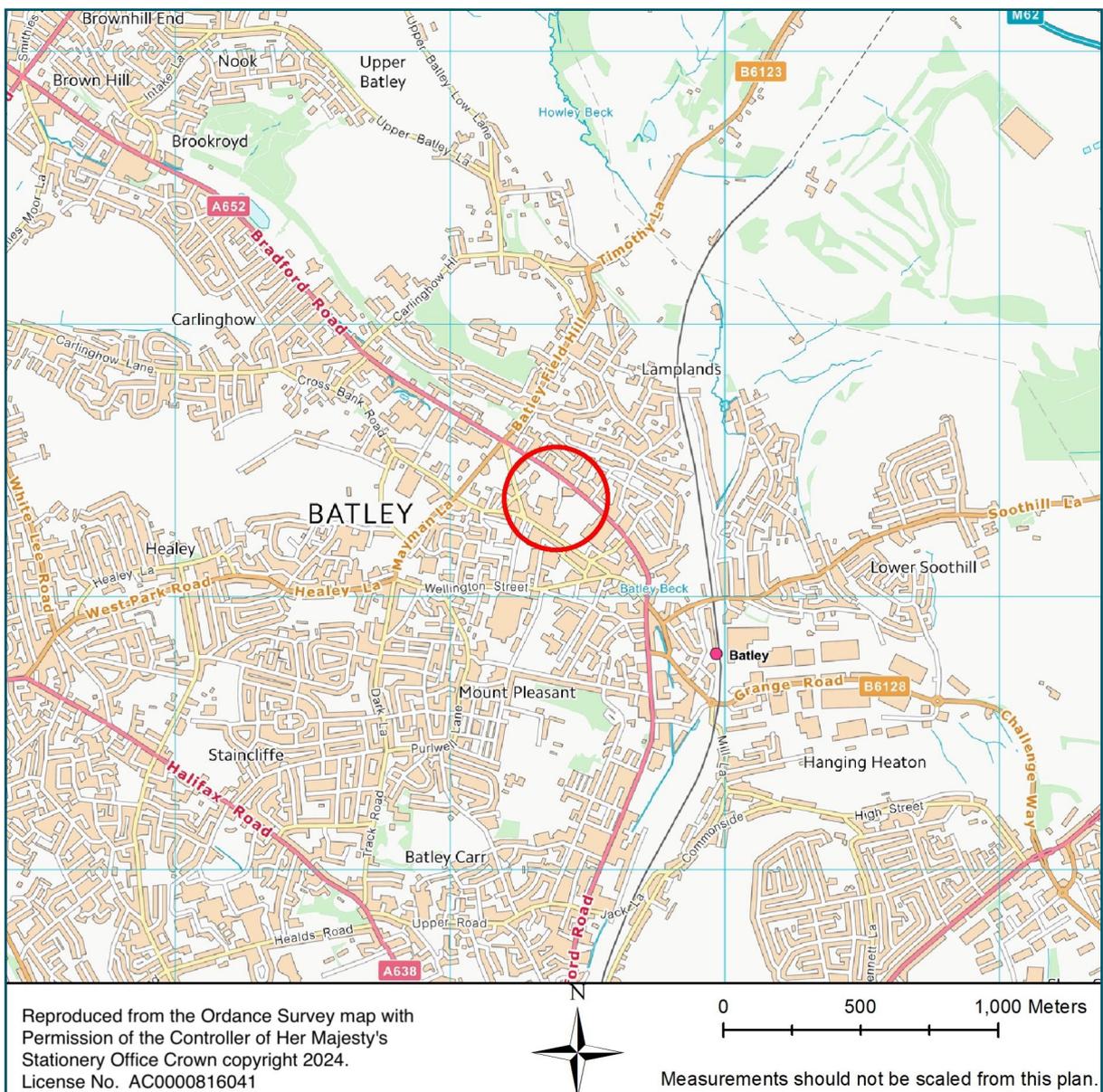


FIGURE 1 - LOCATION PLAN

This report was produced for our client, Taylor & Brown Investments Ltd, and their advisors and financiers; it should not be relied upon or transferred to any other parties without the express written authorisation of Abbeydale BEC and our client. If any other unauthorised third party comes into possession of this report they rely on it at their own risk and the authors owe them no duty of care or skill.

The comments and recommendations presented in this Remediation Method Statement are based on the findings of a review of available information; ground conditions encountered during the intrusive investigation work included in our previous Ground Investigation report (Ref: 487003-GI).

When writing this report the proposed development was for the renovation of part of the existing shopping centre building and the construction of a new two storey retail unit at, or close to, existing ground levels. If there are changes to these proposals then some modification to the comments and recommendations given may be required. The proposed site layout is shown on the site plan in Appendix A.

2. OBJECTIVES

This report has been undertaken to outline the methods and techniques that will be used to stabilise shallow mine workings previously identified beneath the site during the Ground Investigation previously undertaken.

The strategy includes what validation works need to be undertaken as part of the proposed scope of remediation works, to confirm that the works have been undertaken in accordance with this strategy report and implemented successfully.

3. THE SITE

The site is a roughly L-shaped parcel of land, with the northern part comprising an area of open space surfaced with grass and demolition rubble. This part of the site slopes up from the north-western corner adjacent to Alfred's Way, up towards the centre of the site; a brick retaining wall supports the higher ground. A paved ramp runs along the northern boundary of the site, and leads to a paved area which occupies the north-eastern corner of the site.

The southern and south-western part of the site comprises a car park, surfaced with asphalt, used for the adjacent shopping centre. The south-eastern part of the site comprises a vacant retail unit which is part of the Batley Shopping Centre.

There was no visual or olfactory signs of potential contamination at the surface, distressed vegetation or any potentially contaminative sources noted on the site.

Vehicular access to the site is from Alfred's Way in the north-western corner of the site. Pedestrian access is also possible via the north-eastern corner, from the adjacent supermarket car park.

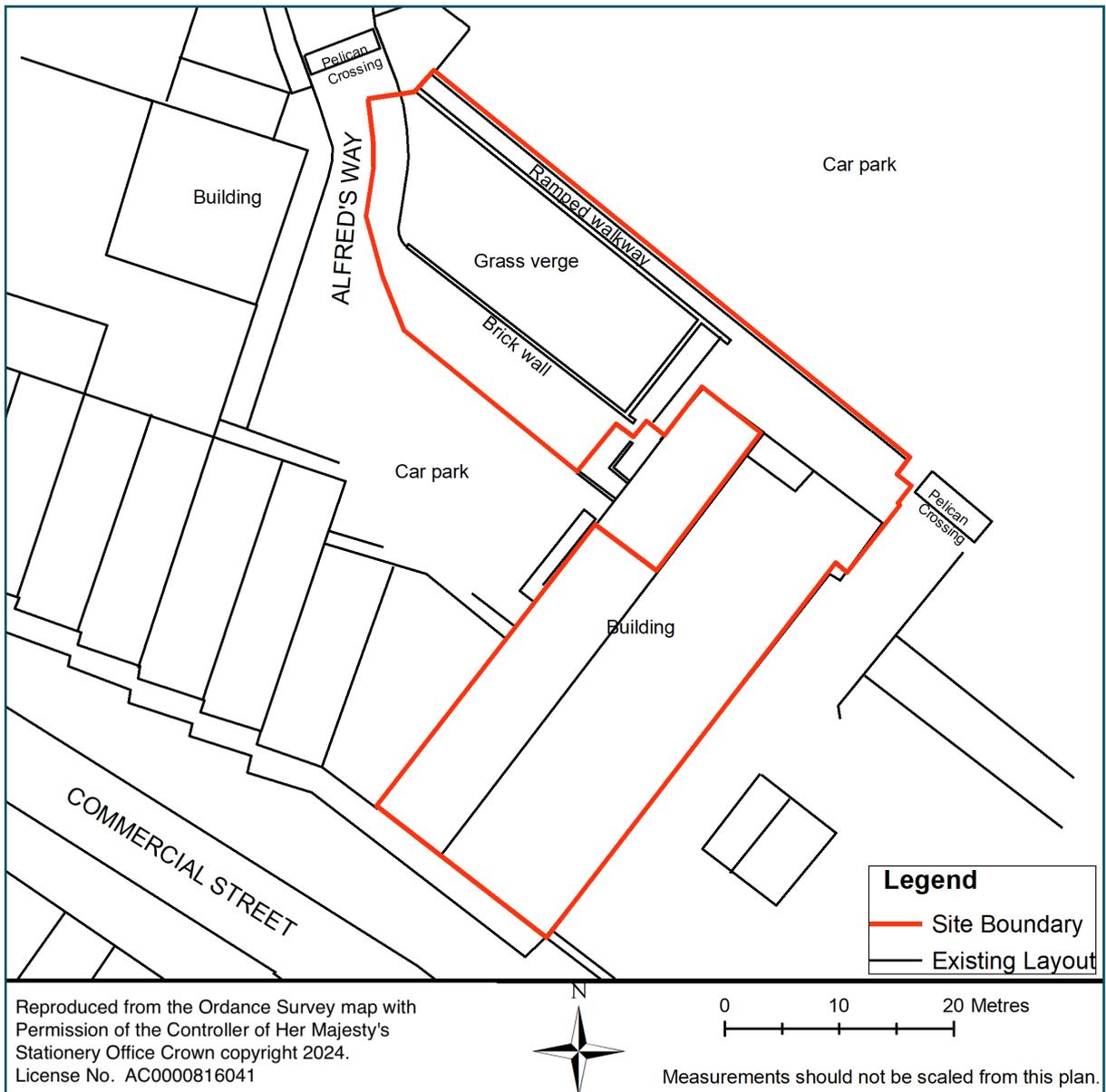


FIGURE 2 - SITE PLAN

The site is bound by a large supermarket car park to the north and east. The south-west corner of the site is bound by a section of Batley Shopping Centre, comprising retail shops and takeaway restaurants. Commercial Street is situated to the south of the site, with more retail shops beyond.

4. PREVIOUS INVESTIGATION

4.1. Mining Risk Assessment

A Mining Risk Assessment report was previously prepared by Abbeydale Building Environment Consultants Limited, dated October 2019. Although no recorded historical shallow mining was identified under the site, the site was shown to be in an area of probable unrecorded shallow mine workings, with the

Flockton Thick Coal outcropping to the north, and dipping under the site at shallow depth. To the west of the site the Flockton Thick Coal outcrop is noted to have been worked by bell pits and adits, with a recorded 1.14m (3' 9").

Approximately 10m below the Flockton Thick Coal is the up to 1.40m thick Flockton Thin Coal, known to have been worked in the Batley area.

It was therefore recommended to undertake an intrusive shallow mining investigation to confirm the depth, thickness and state of the Flockton Thick Coal and Flockton Thin Coal seams.

4.2. Ground Investigation

To confirm the depth, thickness and state of the Flockton Thick Coal and Flockton Thin Coal seams two rotary open hole boreholes (OH1 and OH2) were drilled to 30m below ground level (bgl), in front of the existing retaining wall.

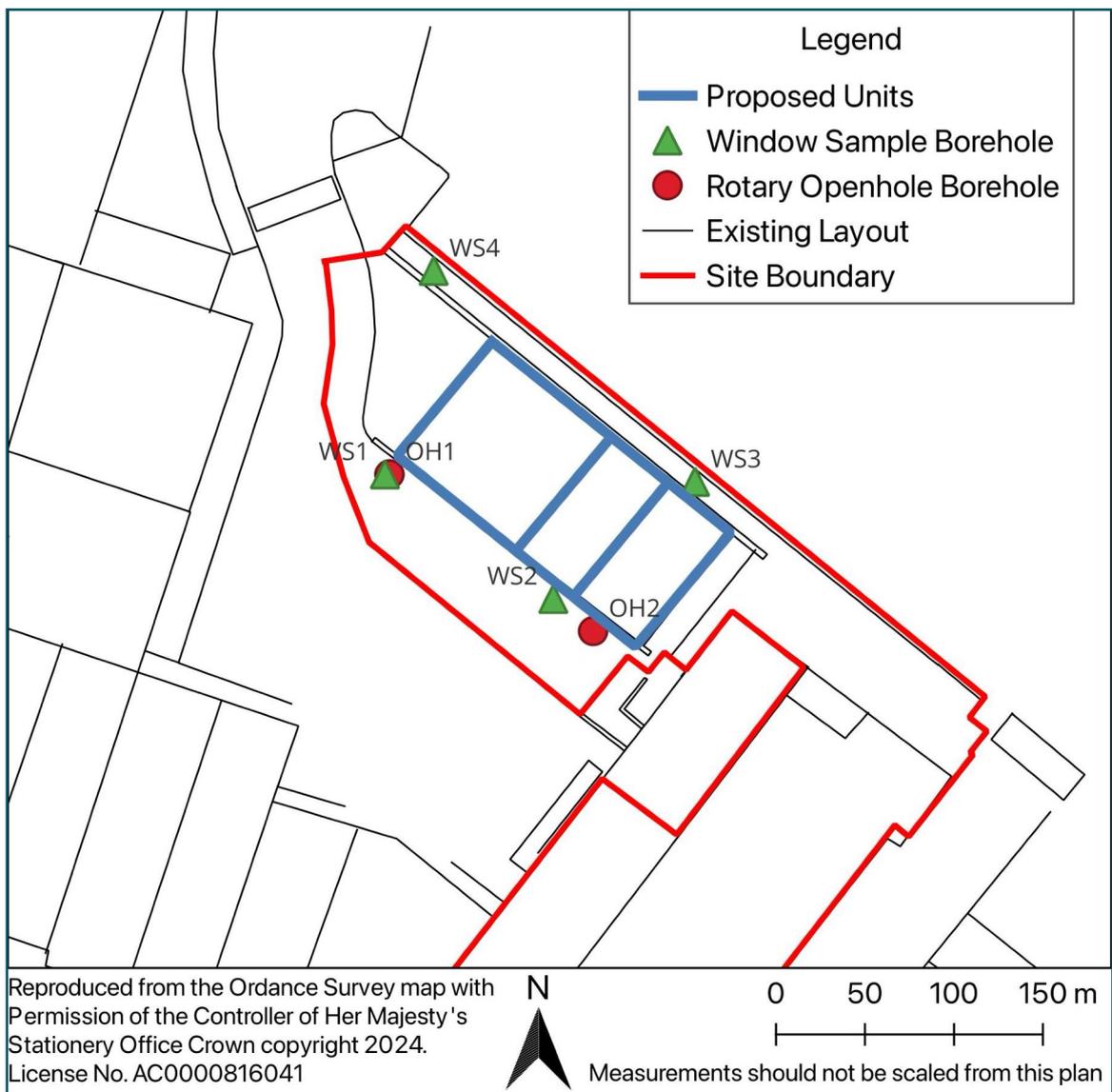


FIGURE 2 - SITE PLAN SHOWING PREVIOUS GI

Archive BGS borehole records were also used to correlate with the findings of the rotary openhole boreholes as coal had previously been identified in some of the archive borehole records.

In addition to the rotary openhole boreholes four window sample holes were also undertaken; WS1 to WS4, ranging in depth from 1.02m bgl to 4.15m bgl, to provide information on the underlying soil profile.

4.3. Ground conditions

The exploratory hole logs from the ground investigation boreholes are included in Appendix B and summarised on a geological section, see Figure 3. It should be noted that the configuration of ground conditions between exploratory holes is conjectured, and given for guidance purposes only. If deemed critical then the intermediate ground conditions should be confirmed.

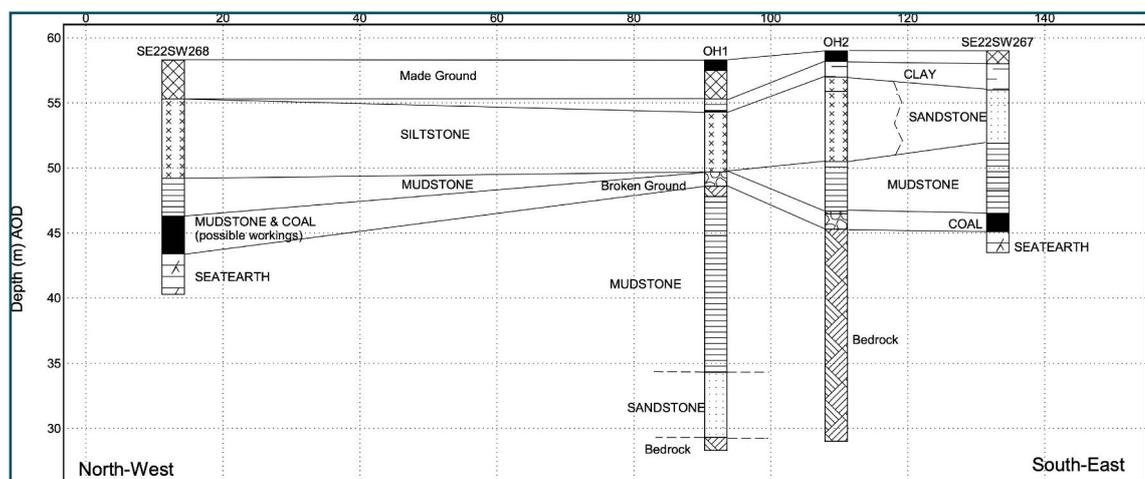


FIGURE 3 - CROSS SECTION

Generally the exploratory holes recorded cohesive soils over mudstone/siltstone bedrock from 2.00m bgl to 3.00m bgl. A coal seam, recorded in places as a worked out void, was encountered between 8.60m and 12.30m across the site. The seam ranged in thickness from 0.90m to 1.40m, and was found to dip generally towards the east. Although flush did not return in OH2 below the zone of broken ground, the hole was probe drilled to 30m bgl and noted the bedrock sequence to be solid to the basal depth of the borehole.

5. DRILLING AND GROUTING STRATEGY

The objective of the grouting works is to substantially fill voids within the coal seam anticipated from depths between 8.60m and 12.30m bgl across the site. All holes will be drilled on a grid at 3m centres to 1m below the base of the coal seam and then grouted. The areas to be grouted are shown on Figure 4.

Working drawings with referenced borehole positions will be provided to the Sub-Contractor.

5.1. General principles

Operations shall not take place on site other than between the hours of 08:00 - 18:00 Monday to Friday and between 09:00 - 13:00 on Saturdays, unless otherwise specifically agreed between the Client and the Drilling and Grouting Contractor. There shall be no working on Sundays or Public Holidays unless approved by the local planning authority. The exact hours of working are to be agreed with The Client or the appointed Main Contractor prior to commencement on site.

Any local residents affected by noise shall be notified as soon as possible of any working on Sundays or Public Holidays. If night time working is required due to health and safety or traffic management risks, then the Local Planning Authority shall be notified at the earliest opportunity of the occurrence of any such works and a schedule of essential work shall be provided. Any local residents affected by noise shall be notified as soon as possible.

5.2. Design and validation of drilling and grouting operations

Design, PI insurance and validation reporting shall be carried out by the Client's appointed Geotechnical Engineer.

The Client will be responsible for the provision of all consents, licenses and permissions required to carry out the proposed work, as well as informing local residents and businesses where necessary.

5.3. Treatment area

The actual extent of drilling and grouting required will be dependent on the findings as works progress, and shall be under review throughout the course of drilling and grouting works by the Abbeydale Geoscience site engineer.

Drilling and grouting shall be undertaken on a 3m x 3m spaced grid unless otherwise agreed with the supervising Geotechnical Engineer, as highlighted on Figure 4. For ease of reference the columns have been assigned a Letter and the rows a Number, creating unique grid references for each drill & grout hole. A printable version of the drilling and grouting grid is provided in Appendix B.

5.4. Setting out of grouting grid

The setting out of all boreholes shall be undertaken by the Drilling and Grouting Contractor. The Client or appointed Geotechnical Engineer shall supply co-ordinates and a plan of the proposed grouting grid. Boreholes shall be drilled to within 100mm of the positions given by the Engineer, having first established that no services are present.

The Sub-Contractor shall ensure that setting out and survey points established by the Engineer or the Employer's representatives are maintained in an undisturbed state.

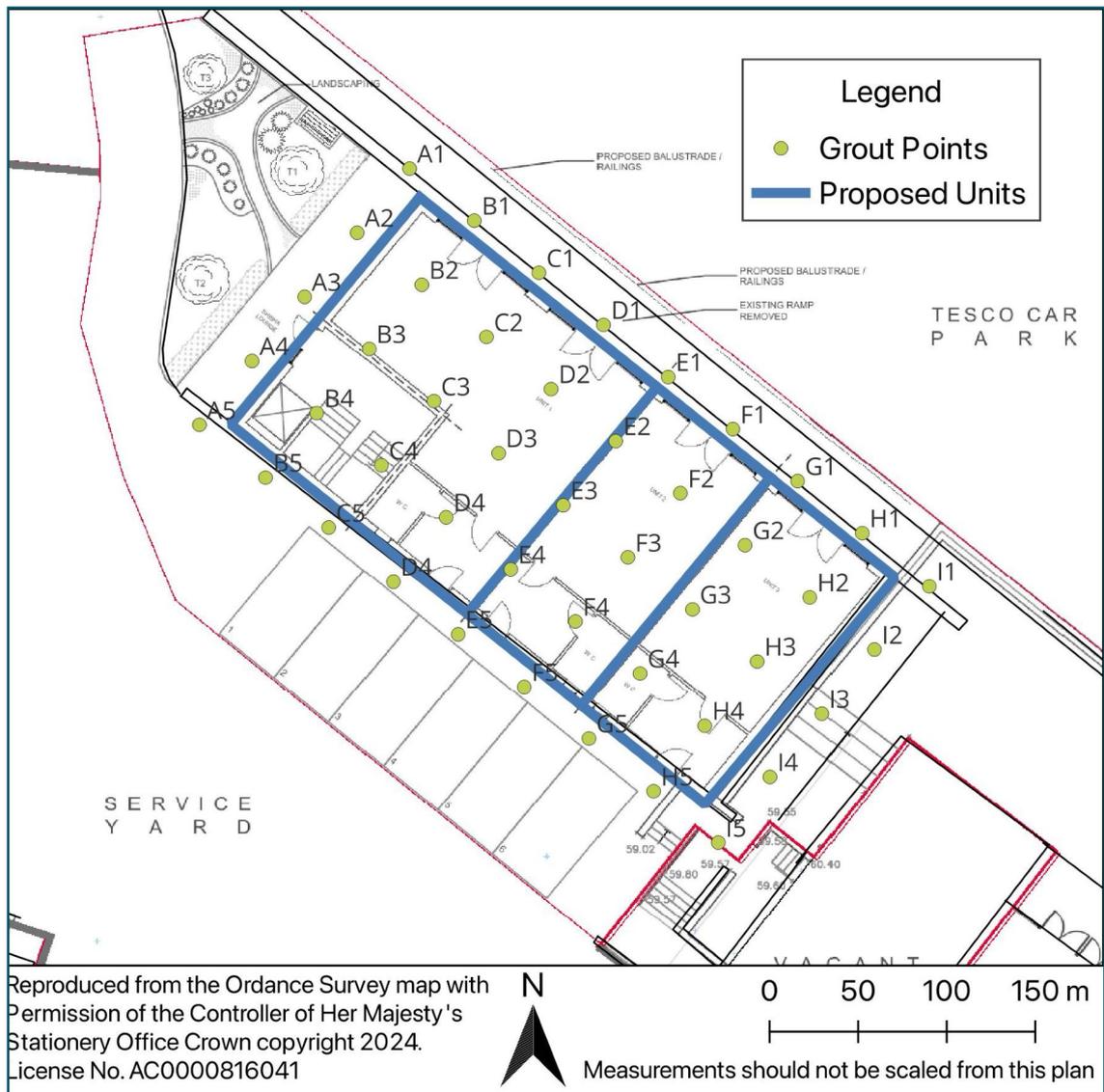


FIGURE 4 - GROUTING PLAN

5.5. Welfare facilities

Unless expressly to be provided by the Client, the Drilling and Grouting Contractor shall allow for providing amenities and welfare facilities, in accordance with any agreement within the Industry, and in accordance with the requirements of any Statutory Order or amendments thereto.

As part of the welfare facilities provision should be included for a desk and chair within the site office that can be used by the supervising Geotechnical Engineer.

5.6. Storage of materials

Any materials brought shall be stored in a manner which prevents deterioration of the materials. This should include rotation of supplies such as cement wherever possible. Any PFA stockpiles shall be stored under impermeable covers wherever practical, and weighted down to prevent nuisance from dust.

Should any materials be deemed to be unsuitable as a result of poor storage or otherwise, shall be removed from site immediately and not used.

5.7. Disposal of waste

Removal of non-drilling waste shall be carried out by the Drilling and Grouting Contractor. A skip shall be provided by the Drilling and Grouting Contractor for this purpose throughout the contract period.

Drilling arisings, surplus PFA and slurries from the works can be left on site after the Sub-Contractor has finished the works. However, this shall be scraped from working areas and stockpiled in an agreed area of the site and left in a safe condition.

5.8. Services

Plans no older than 3 months showing the approximate positions and depth of known services and contact addresses will be supplied to the Sub-Contractor prior to the start of work. See Appendix B (plan for reference only).

All available information, including services drawings and information obtained from on-site surveys shall be provided to the Drilling and Grouting Contractor before works commence. If deemed necessary the Drilling and Grouting Contractor shall make their own enquiries to the statutory undertakers and public authorities, to satisfy themselves as to the exact position of such apparatus and the depth, size and gradient thereof.

Where the presence of underground services is suspected that could be affected by the proposed works, the Drilling and Grouting Contractor shall supply to the Geotechnical Engineer a safe means of working prior to the commencement of that particular part of the works. It is anticipated that where drilling is required close to services inclined holes shall be necessary.

When introducing grout into any borehole, the Drilling and Grouting Contractor shall ensure by regular inspections throughout the day that the grout is not entering adjacent drains, services, culverts or ducts. In the event that any grout leakage is detected the Drilling and Grouting Contractor shall immediately suspend the grouting operations and commence to remove any accumulated grout in the service(s).

6. DRILLING PROCEDURES

6.1. Coal Authority permission to drill

Before undertaking any intrusive works that could intersect coal or associated mine workings, a Permit to Drill shall be obtained from The Coal Authority to give their permission for the proposed drilling and grouting works to proceed.

Once a drilling and grouting contractor has been appointed they should be provided with a copy of The Coal Authority permit to drill, for their records. A

copy of the permit should be maintained on site at all times, should an inspection by undertaken by The Coal Authority.

6.2. General

All boreholes to be used for the injection of grout, including any which strike coal pillars or intact coal, shall be drilled using rotary or rotary percussive techniques, to at least 1.00m below the base of the shallow mine workings or intact coal seam.

6.3. Drilling flush medium

The flush medium to be used for the drilling operations will be water flush, as will be required as part of obtaining a Coal Authority permit for the drilling and grouting operation.

The minimum hole diameter shall be 100mm unless otherwise agreed with the Geotechnical Engineer. When it is impractical to drill at the minimum diameter for the full depth, the diameter in the upper lengths shall be increased.

The sequence of drilling shall be approved by the Geotechnical Engineer. Holes shall not be drilled for a distance of at least 10m from the holes grouted on the same or previous day.

6.4. Water supply

Confirmation should be provided as to whether a suitable water supply is already available on site, or if the Drilling and Grouting Contractor will need to make allowance for providing a source of water for the proposed drilling operation.

6.5. Temporary casing

Rigid steel casing shall be used in all of the injection holes to temporarily case the holes down to rockhead, and extended into rockhead if necessary. This will keep the injection holes open for subsequent grouting operations.

The holes shall be protected using an approved temporary cover and kept open until grout injection into the shallow mine workings is complete.

For any inclined drilling the rig shall be capable of and installing casing at angles of between 25 to 90 degrees to the horizontal. Inclined holes shall be cased to their depth and removed at 0.5m stages during grouting.

If it is found that pea gravel needs to be used alongside the grout, the Geotechnical Engineer may instruct certain boreholes to be re-drilled at 150mm diameter. Grouting strategy.

6.6. Abortive holes

Where a hole proves abortive because it becomes obstructed, or because of the Drill and Grout Contractors failure to progress the hole, it shall be re-drilled at a larger diameter and re-cased, or a new hole drilled and cased at the Drill and Grout Contractor's expense.

6.7. Gas monitoring

As a standard safety precaution gas monitoring emissions should be monitored throughout the course of the drilling operations, for a range of common ground gases and mine gases; methane (CH₄), carbon dioxide (CO₂), hydrogen sulphide (H₂S) and carbon monoxide (CO) as a minimum.

7. GROUTING PROCEDURE

7.1. General

The sequence of grouting must be agreed with the Geotechnical Engineer before commencing. All boreholes shall be injected with grout, irrespective of whether or not broken ground or voids are encountered, unless explicitly directed not to do so by the Geotechnical Engineer.

Wherever possible the perimeter holes shall be grouted first to help contain any grout within the treatment area. If required, any perimeter curtain walls shall be formed by filling boreholes with a viscous grout of appropriate proportions of OPC, PFA and pea gravel / sand.

Immediately prior to grouting each hole the Drill and Grout Contractor shall check it is unobstructed to the required depth to receive the tubing or pipes for grout injection. Obstructions shall be dealt with accordingly to clear the hole.

The grout plant shall be arranged so as to avoid spillage into existing drains or beyond the confines of site fencing.

Care shall be taken to ensure that uplift pressures are not allowed to develop under any adjacent highway, footpath, building, structure, including services, during grout injection. Where nearby building or structures might be affected by the grout operations, the Sub-Contractor shall employ special supervision.

7.2. Materials

Cement shall be Ordinary Portland Cement (OPC) and Pulverised Fuel Ash (PFA) shall be hopper ash, or dry powder ash, or a type suitable for mixing with grout.

If required for bulking, sand shall generally comply with BS882, and be of a grading that is suitable for use with the Drilling and Grouting Contractor's plant.

Should any pea gravel be needed it shall comply with BS882, and be of a grading approved by Abbeydale Geoscience.

7.3. Water supply

Confirmation should be provided as to whether a suitable water supply is already available on site, or if the Drilling and Grouting Contractor will need to make allowance for providing a source of water for the proposed drilling operation.

7.4. Grout mix

Prior to undertaking any works the Drilling and Grouting Contractor shall submit to the Geotechnical Engineer, for approval, the proposed method of mixing, batching and pumping of grout to the injection holes, together with the means of monitoring grouting pressures and the quantities injected.

The raw materials shall be introduced into the mixer via approved weight batching equipment.

The grout should be a mixture of Ordinary Portland Cement (OPC) and pulverised fuel ash (PFA), mixed at a ratio of 1:10 OPC to PFA. The grout shall be mixed using water supplied from a suitable nearby source as agreed between the Main Contractor and Drilling and Grouting Contractor.

The mixer used shall be capable of producing a homogeneous mix, all particles being thoroughly wetted without segregation occurring.

Where excessive lateral flow of grout is anticipated or if voids greater than 500mm are encountered the addition of sand or pea gravel may be considered. This would be especially considered if a grout curtain was deemed to be necessary to confine the spread of grout to within the site or treatment area.

A grout mix of 1:6:1 (OPC : PFA : sand) is likely to be appropriate in this scenario. The grout should be injected whilst simultaneously feeding pea gravel into the borehole through a hopper, to form a cone of side slopes greater than 30 degrees. The ratio of grout constituents to pea gravel shall fall in the range of 1 to 0.5.

7.5. Grout properties and testing

When instructed by the Geotechnical Engineer the Drilling and Grouting Contractor shall make 150mm test cubes according to BS 1881. These shall be tested at an independent testing laboratory and the results forwarded directly to the Geotechnical Engineer. The minimum strength at 28 days should not be less than 0.7N/mm².

As instructed by the Geotechnical Engineer the bleed capacity shall be measured in a clear plastic or glass graduated cylinder with an internal diameter of at least 50mm, with a volume of approximately 1000 ml. After placing the grout, a cover shall be placed over the cylinder to avoid evaporation. Bleed capacity shall be read at hourly intervals for not less than 6 hours.

The Drilling and Grouting Contractor shall keep sufficient equipment for cubes and cylinders to be taken at a rate of 3 cubes and 2 bleed tests per day.

7.6. Grout take limits

The grout shall be injected at the approved rates until either the maximum pressure of 10kN/m² per metre of overburden pressure is reached, or the grout appears near the point of injection. If one of these criteria is reached quickly the grout tube shall be lifted to check that a local obstruction is not preventing flow

of grout into the strata. Where temporary casing has been used it shall be raised in sections and the grouting continued until one of the criteria has been reached.

Only when all the casing has been removed and the hole is filled with solidified grout will the hole be deemed complete.

If pressure is not achieved or grout has not appeared at the point of injection after 10 tonnes of grout have been injected, further injection should be suspended. After a period of at least 12 hours, up to a further 5 tonnes of grout shall be injected. If there is still no result, injection shall again be suspended for at least 12 hours and the process repeated in further 5 tonne intervals. If the hole is still accepting grout after a total of 25 tonnes have been injected without any sign of the hole being completed, the Drilling and Grouting Contractor shall consult the Geotechnical Engineer to determine whether injection is to be continued or other measures, such as secondary or validation holes, are required.

8. VALIDATION HOLES

When directed by the Geotechnical Engineer the Drilling and Grouting Contractor shall test the consolidated ground for permeability and strength.

Permeability by grout acceptance testing shall be checked by drilling validation holes, in position selected by the Geotechnical Engineer, and injecting grout at appropriate pressures for the depth of the validation hole, all in accordance with the requirements for infilling grouting.

If the Geotechnical Engineer considers that the grout take of the validation hole is excessive, further validation holes shall be drilled and grouted as deemed necessary.

At this stage it would be prudent to allow for a minimum of five validation holes, to provide a good spread across the footprint of the proposed retail unit. The actual number of validation holes may vary depending on the grout takes of the boreholes and as directed by the Geotechnical Engineer.

9. MINE ENTRIES

The Drilling and Grouting Contractor should remain vigilant for any signs of potential unrecorded mine shafts across the site. If any mine entries are encountered they will need to be appropriately investigated to confirm their depth and backfill state, and subsequently treated by drilling and grouting before having a concrete cap placed centrally over the mine entry at rockhead. This would effectively stabilise the mine entry against potential future collapse. The shaft cap would need to be designed by a Structural Engineer and approved by The Coal Authority.

10. SITE RECORDS

The Drilling and Grouting Contractor shall prepare and keep available for inspection on site plans showing the position of all holes and sections through the rows of holes, to show the results of the Works, up to and including the previous day's work. The plans and sections shall be updated daily to provide an up-to-date reflection as the Works progress. On completion of the Works the Drilling and Grouting Contractor shall provide the Geotechnical Engineer with fair copies of the plans and sections.

As work proceeds the Drilling and Grouting Contractor shall maintain separate daily records for drilling, for grouting and for materials and plant brought to site, in a form that is approved by the Geotechnical Engineer.

Daily logs / records of drilling and grouting activities shall be made available to the Site Engineer at the start of each day, covering the previous day's activities. These shall be provided for every borehole drilled and/or grouted the previous day, including the total cumulative amount of grout injected where applicable.

Daily records shall be signed by the Drilling and Grouting Contractor's agent and submitted to the Geotechnical Engineer for their agreement. The Drilling and Grouting Contractor shall also keep a copy available on site for inspection.

10.1. Daily drilling records

The Drilling and Grouting Contractor shall include:

- A. Job title and location.
- B. Hole reference number.
- C. Date.
- D. Drilling and Grouting Contractor's name.
- E. Plant in use, crew members & hours worked.
- F. Method of boring or drilling, inclination, flush medium and drill bit used.
- G. Type, diameter and installed depth of casing used.
- H. Diameter and depth of hole at the beginning and end of each working day.
- I. Loss of any flushing medium during drilling.
- J. Standing time, with reason for time lost overcoming obstructions.
- K. Details of any underground services located.
- L. Details of any settlement or ground heave.
- M. Daily and cumulative length drilled.
- N. Depth of each major change of stratum.
- O. Description, with identification, of the stratum and whether intact or broken.
- P. Depth at which groundwater is encountered or state if dry.
- Q. Depths of any samples taken.
- R. Details of any voids or suspected broken ground.
- S. Details of any emissions of gas, water etc.
- T. Depth of completed hole.

10.2. Daily grouting records

The daily grouting logs shall include:

- A. Job title and location.
- B. Hole reference number.
- C. Date.
- D. Drilling and Grouting Contractor's name.
- E. Plant in use, crew members and hours worked.
- F. Details and type of injection and grout line dimensions.
- G. Type of grout mix and volumetric quantity injected.
- H. Grout pressures recorded, with corresponding depth.
- I. Details of casing abandoned.

10.3. Other daily records

Daily records of materials and plant received shall show in particular the day's quantities by weight and each type of materials, and cumulative quantities. With the daily records the Drilling and Grouting Contractor shall submit to the Geotechnical Engineer copies of receipts or invoices for all materials delivered. Copies shall also be maintained on site until the works are completed.

11. VALIDATION OF DRILLING & GROUTING

On completion of the proposed drilling and grouting works a Validation Report shall be prepared by the Geotechnical Engineer.

The Validation Report shall include copies of all daily records provided by the Drilling and Grouting Contractor, a borehole plan showing the extent of drilling and grouting works undertaken, procedures followed and techniques used during the drilling and grouting operations, and the results of in-situ validation boreholes and pressure test recorded, as well as the results of laboratory testing undertaken.

The Validation Report will clearly highlight if any deviations from this Drilling and Grouting Strategy report have occurred and how any non-compliances have been validated to confirm the the underlying shallow mine workings have been stabilised against potential future collapse that may otherwise affect the surface of the site.

Once prepared the validation report shall be submitted to The Coal Authority for closure of the applicable Permit to Drill.

12. REGULATORY APPROVAL

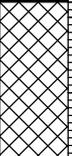
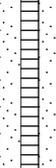
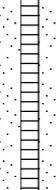
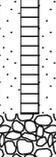
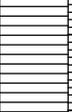
The conclusions and recommendations in this report are based on a review of available information and observations made during the site walkover survey undertaken. The conclusions cannot be guaranteed to gain regulatory approval; this report will be passed to The Coal Authority for their comment and approval, and also to the Client who may wish to forward it on to Chesterfield Borough Council for their reference and comment or approval.

Report 487044-DG | July 2024

APPENDIX A - PROPOSED LAYOUT DRAWINGS

APPENDIX B - EXPLORATORY HOLE LOGS

Project Batley Shopping Centre, Alfreds Way, Batley, West Yorkshire				OPENHOLE No OH1	
Job No 487003	Date 08-06-21	Ground level (m) 58.30	Co-Ordinates () E 424,391.0 N 424,280.0		
Method/Plant Used Beretta T44 tracked rig using water flush					Sheet 1 of 2

RUN DETAILS			STRATA					Geology	Instrument/ Backfill
Depth Date	Rate Min/rod	Flush %	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION			
					Flush	Detail	Main		
0.00			57.50		(0.80) 0.80		Tarmac.		
	21	100 %			(2.20)		Fill (WS1 backfill).		
3.00			55.30		3.00		Dark grey MUDSTONE with coal traces.		
	9	100 %	54.40		(0.90) 3.90		COAL.		
			54.30		4.00		Light grey SILTSTONE.		
6.00					(4.60)				
	22	100 %	49.70		8.60		Broken ground (no returns).		
9.00		0 %	48.60		(1.10) 9.70		Bedrock (no returns).		
	17	0 %	47.80		(0.80) 10.50		Dark grey MUDSTONE.		
12.00		70 %			(3.00)				
	12	70 %	44.80		13.50		Light grey MUDSTONE.		
15.00									

ABEC OPENHOLE 487003.GPJ ABEC TEMPLATE.GDT 15/6/21

Drilling Progress and Water Observations							GENERAL REMARKS
Date	Time	Depth	Casing	WL m	Water Strike	Water Standing	
							CAT used to check for services prior to drilling. Borehole drilled from the surface. Monitoring well installed on completion.

All dimensions in metres Scale 1:100	Client Zaf Properties Ltd	Contractor Info Soil Ltd	Logged By RZ
---	-------------------------------------	------------------------------------	------------------------

Project Batley Shopping Centre, Alfreds Way, Batley, West Yorkshire				OPENHOLE No OH1	
Job No 487003	Date 08-06-21	Ground level (m) 58.30	Co-Ordinates () E 424,391.0 N 424,280.0		
Method/Plant Used Beretta T44 tracked rig using water flush					Sheet 2 of 2

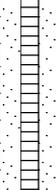
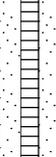
RUN DETAILS			STRATA					Geology	Instrument/ Backfill	
Depth Date	Rate Min/rod	Flush %	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION				
						Flush	Detail	Main		
18.00	13	70 %						Light grey MUDSTONE. (continued)		
21.00	14	70 %			(10.50)					
24.00	12	70 %			24.00					
27.00	18	70 %	34.30		(5.00)			Light grey SANDSTONE.		
30.00	12	70 %	29.30		29.00					
		0 %	28.30		(1.00)			Bedrock (no returns).		
					30.00			Borehole terminated.		

ABEC OPENHOLE 487003.GPJ ABEC TEMPLATE.GDT 15/6/21

Drilling Progress and Water Observations							GENERAL REMARKS	
Date	Time	Depth	Casing	WL m	Strike	Water Standing		
							CAT used to check for services prior to drilling. Borehole drilled from the surface. Monitoring well installed on completion.	

All dimensions in metres Scale 1:100	Client Zaf Properties Ltd	Contractor Info soil Ltd	Logged By RZ
---	-------------------------------------	------------------------------------	------------------------

Project Batley Shopping Centre, Alfreds Way, Batley, West Yorkshire				OPENHOLE No OH2	
Job No 487003	Date 08-06-21 09-06-21	Ground level (m) 58.99	Co-Ordinates () E 424,405.0 N 424,269.0		
Method/Plant Used Beretta T44 tracked rig using water flush					Sheet 1 of 2

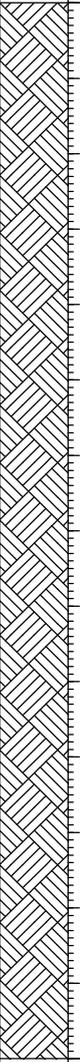
RUN DETAILS			STRATA					Geology	Instrument/ Backfill	
Depth Date	Rate Min/rod	Flush %	Red'cd Level	Legend	Depth (Thick-ness)	DESCRIPTION				
					Flush	Detail	Main			
0.00	9	100 %	58.19		(0.80) 0.80		Tarmac.			
						(1.20)		Light brown CLAY.		
					56.99		2.00		Light brown SILTSTONE.	
3.00	17	100 %	55.89		(1.10)		Light grey SILTSTONE.			
							(5.40)		Light grey SILTSTONE.	
6.00	7	100 %								
					50.49		8.50		Dark grey MUDSTONE.	
9.00	4	100 %			(3.80)					
12.00										
	5	100 %	46.69		12.30					
		0 %		46.49		12.50 (1.20)		Void. Very soft drilling possible broken ground (no returns)		
					45.29		13.70		Bedrock (no returns).	
15.00										

ABEC OPENHOLE 487003.GPJ ABEC TEMPLATE.GDT 15/6/21

Drilling Progress and Water Observations							GENERAL REMARKS
Date	Time	Depth	Casing	WL m	Strike	Water Standing	
							CAT used to check for services prior to drilling. Borehole drilled from the surface. Monitoring well installed on completion.

All dimensions in metres Scale 1:100	Client Zaf Properties Ltd	Contractor Info Soil Ltd	Logged By RZ
---	-------------------------------------	------------------------------------	------------------------

Project Batley Shopping Centre, Alfreds Way, Batley, West Yorkshire				OPENHOLE No OH2	
Job No 487003	Date 08-06-21 09-06-21	Ground level (m) 58.99	Co-Ordinates () E 424,405.0 N 424,269.0		
Method/Plant Used Beretta T44 tracked rig using water flush					Sheet 2 of 2

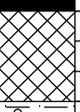
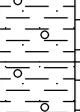
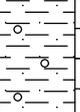
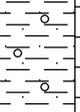
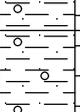
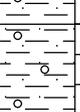
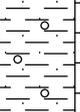
RUN DETAILS			STRATA					Geology	Instrument/ Backfill	
Depth Date	Rate Min/rod	Flush %	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION				
					Flush	Detail	Main			
18.00	18	0 %			(16.30)			Bedrock (no returns). (continued)		
21.00	13	0 %								
24.00	8	0 %								
27.00	13	0 %								
30.00	11	0 %								
			28.99				30.00			
								Borehole terminated.		

ABEC OPENHOLE 487003.GPJ ABEC TEMPLATE.GDT 15/6/21

Drilling Progress and Water Observations							GENERAL REMARKS	
Date	Time	Depth	Casing	WL m	Strike	Water Standing		
							CAT used to check for services prior to drilling. Borehole drilled from the surface. Monitoring well installed on completion.	

All dimensions in metres Scale 1:100	Client Zaf Properties Ltd	Contractor Info Soil Ltd	Logged By RZ
---	-------------------------------------	------------------------------------	------------------------

Project Batley Shopping Centre, Alfreds Way, Batley, West Yorkshire				HOLE No WS1	
Job No 487003	Date 01-06-21	Ground level (m) 58.30	Co-Ordinates () E 424,391.0 N 424,280.0		
Method/Plant Used Global Geo4 Window Sampling Rig					Sheet 1 of 2

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
						58.20	0.10	MADE GROUND: Asphalt.	
0.20	D				(0.30)	57.90	0.40	MADE GROUND: Light grey clayey gravelly coarse SAND. Gravel is subrounded to angular fine to coarse of limestone.	
0.50	D				(0.24)	57.66	0.64	POSSIBLE MADE GROUND: Firm dark orangish-brown mottled black gravelly CLAY. Gravel is subrounded to subangular fine of mudstone.	
0.90 1.00-1.45	D SPT	N8 (2,2/1,2,3)			(1.01)			POSSIBLE MADE GROUND: Firm dark brown mottled black very gravelly CLAY. Gravel is subrounded to subangular fine to medium of coal and mudstone.	
1.90 2.00-2.45	D SPT	N22 (3,3/5,4,6,7)			(0.35)	56.65	1.65	Stiff dark grey slightly sandy very gravelly CLAY. Gravel is subrounded to subangular fine to coarse of mudstone.	
2.80 3.00-3.45	D SPT	N12 (6,5/3,3,3,3)			(1.10)	56.30	2.00	Stiff light grey slightly sandy very gravelly CLAY. Gravel is subrounded to subangular fine to coarse of mudstone.	
3.60	D				(0.39)	55.20	3.10	Black COAL.	
					(0.66)	54.81	3.49	Stiff dark blueish-grey slightly sandy very gravelly CLAY. Gravel is subrounded to subangular fine to coarse of mudstone.	

ABEC WINDOW SAMPLE 487003.GPJ ABEC TEMPLATE.GDT 15/6/21

Boring Progress and Water Observations						GENERAL REMARKS
Date	Time	Depth	Core/casing Depth	Dia. mm	Water Dpth	
						Core of asphalt removed prior to drilling. Groundwater seepage encountered at 3.43m bgl. Borehole backfilled with arisings on completion.

All dimensions in metres Scale 1:25	Client Zaf Properties Ltd	Contractor RP Drilling Ltd	Logged By RZ
--	------------------------------	-------------------------------	-----------------

Project Batley Shopping Centre, Alfreds Way, Batley, West Yorkshire				HOLE No WS1	
Job No 487003	Date 01-06-21	Ground level (m) 58.30	Co-Ordinates () E 424,391.0 N 424,280.0		
Method/Plant Used Global Geo4 Window Sampling Rig					Sheet 2 of 2

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
4.00-4.15	SPT	N50 <small>(17, 8 for 40mm/50 for 30mm)</small>		54.15		4.15	Borehole terminated due to SPT refusal.		

Boring Progress and Water Observations						GENERAL REMARKS
Date	Time	Depth	Core/casing Depth	Dia. mm	Water Dpth	
						Core of asphalt removed prior to drilling. Groundwater seepage encountered at 3.43m bgl. Borehole backfilled with arisings on completion.

All dimensions in metres Scale 1:25	Client Zaf Properties Ltd	Contractor RP Drilling Ltd	Logged By RZ
--	------------------------------	-------------------------------	-----------------

ABEC WINDOW SAMPLE 487003.GPJ ABEC TEMPLATE.GDT 15/6/21

Project Batley Shopping Centre, Alfreds Way, Batley, West Yorkshire				HOLE No WS2	
Job No 487003	Date 01-06-21	Ground level (m) 58.70	Co-Ordinates () E 424,402.0 N 424,271.0		
Method/Plant Used Global Geo4 Window Sampling Rig					Sheet 1 of 1

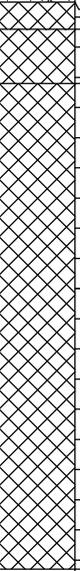
SAMPLES & TESTS			Water	STRATA			Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)		
			58.63		0.07	MADE GROUND: Asphalt.		
0.30	D		58.36		(0.27) 0.34	MADE GROUND: Light grey clayey gravelly coarse SAND. Gravel is subrounded to angular fine to coarse of limestone.		
0.60	SV	48kPa				Firm to stiff dark brown mottled grey slightly gravelly CLAY. Gravel is subrounded fine of mudstone.		
0.70	SV	72kPa						
0.80	SV	81kPa			(1.28)			
0.90	SV	83kPa						
1.00	D	N15						
1.00-1.45	SPT	(6,4/3,3,4,5)						
			57.08		1.62	Stiff light grey very gravelly CLAY. Gravel is subrounded to subangular fine to coarse of mudstone.		
1.80	SV	93kPa						
1.90	D	N16			(1.51)			
2.00-2.45	SPT	(2,2/3,3,5,5)						
2.50	D							
3.00-3.13	SPT	N50				Borehole terminated due to SPT refusal.		
		(25 for 60mm/50 for 70mm)			55.57		3.13	

ABEC WINDOW SAMPLE 487003.GPJ ABEC TEMPLATE.GDT 15/6/21

Boring Progress and Water Observations						GENERAL REMARKS
Date	Time	Depth	Core/casing Depth	Dia. mm	Water Dpth	
						Core of asphalt removed prior to drilling. No groundwater encountered. Monitoring well installed in borehole on completion.

All dimensions in metres Scale 1:25	Client Zaf Properties Ltd	Contractor RP Drilling Ltd	Logged By RZ
--	------------------------------	-------------------------------	-----------------

Project Batley Shopping Centre, Alfreds Way, Batley, West Yorkshire				HOLE No WS3	
Job No 487003	Date 01-06-21	Ground level (m) 59.90	Co-Ordinates () E 424,413.0 N 424,279.0		
Method/Plant Used Global Geo4 Window Sampling Rig					Sheet 1 of 1

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		
0.40	D			59.85		0.05	MADE GROUND: Concrete paving slab.	
				59.76		0.14	MADE GROUND: Dark brown coarse SAND.	
				59.58		0.32	MADE GROUND: Light orangish-brown gravelly coarse SAND. Gravel is subrounded medium to coarse of limestone.	
						(1.61)	MADE GROUND: Dark orangish-brown gravelly coarse SAND. Gravel is rounded to subangular fine to coarse of quartz, concrete and sandstone.	
0.90 1.00-1.45	D SPT	N8 (2,1/2,2,1,3)						
1.80 1.90-1.93	D SPT	N50 (25 for 10mm/50 for 20mm)		57.97		1.93	Borehole terminated due to SPT refusal.	

Boring Progress and Water Observations

Date	Time	Depth	Core/casing Depth	Dia. mm	Water Dpth

GENERAL REMARKS

Core of concrete removed prior to drilling. No groundwater encountered. Monitoring well installed in borehole on completion.

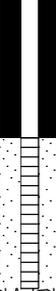
All dimensions in metres
 Scale 1:25

Client
 Zaf Properties Ltd

Contractor
 RP Drilling Ltd

Logged By
 RZ

Project Batley Shopping Centre, Alfreds Way, Batley, West Yorkshire				HOLE No WS4	
Job No 487003	Date 01-06-21	Ground level (m) 58.20	Co-Ordinates () E 424,394.0 N 424,295.0		
Method/Plant Used Global Geo4 Window Sampling Rig					Sheet 1 of 1

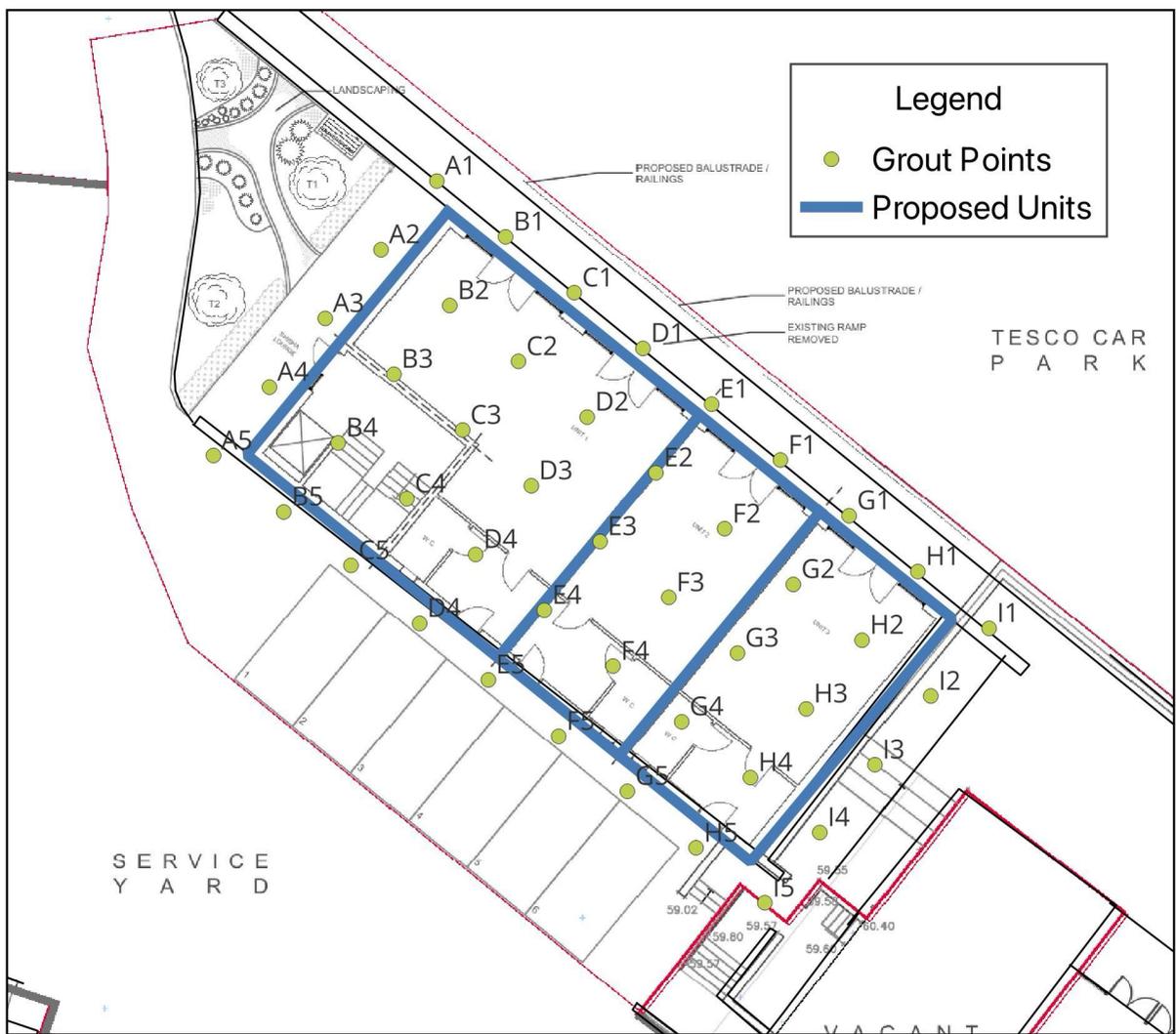
SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.40	D		58.15		0.05	MADE GROUND: Concrete paving slab.			
			58.08		(0.20)	MADE GROUND: Dark brown coarse SAND.			
			57.88		0.32	MADE GROUND: Light orangish-brown gravelly coarse SAND. Gravel is subrounded medium to coarse of limestone.			
					(0.70)	MADE GROUND: Dark orangish-brown gravelly coarse SAND. Gravel is rounded to subangular fine to coarse of quartz, concrete and sandstone.			
0.90	D		57.18		1.02				
1.00-1.02	SPT	N50 <small>(25 for 10mm/50 for 10mm)</small>				Borehole terminated due to SPT refusal.			

ABEC WINDOW SAMPLE 487003.GPJ ABEC TEMPLATE.GDT 15/6/21

Boring Progress and Water Observations						GENERAL REMARKS
Date	Time	Depth	Core/casing Depth	Dia. mm	Water Dpth	
						Core of concrete removed prior to drilling. No groundwater encountered. Monitoring well installed in borehole on completion.

All dimensions in metres Scale 1:25	Client Zaf Properties Ltd	Contractor RP Drilling Ltd	Logged By RZ
--	------------------------------	-------------------------------	-----------------

APPENDIX C - PROPOSED DRILL & GROUT LAYOUT PLAN

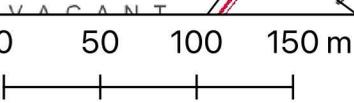


Legend

- Grout Points
- Proposed Units

SERVICE
YARD

TESCO CAR
PARK



Measurements should not be scaled from this plan

Reproduced from the Ordnance Survey map with
Permission of the Controller of Her Majesty's
Stationery Office Crown copyright 2024.
License No. AC0000816041

APPENDIX D - DRILLING & GROUTING SCHEDULE OF RATES

PREAMBLE TO SCHEDULE OF RATES

In the Schedule of Rates the following definitives shall be deemed to apply:

1. Establish drilling plant. The brining to site of the drilling plant and all equipment associated with drilling, setting up and removal at the end of the contract. Also the provision of all site facilities.
2. Establish grouting plant. The brining to site of the grouting plant and all equipment associated with the grouting of, setting up and removal on completion.
3. Boreholes are those which are to be drilled through the hardstanding construction and/or any superficial deposits into the underlying bedrock. Boreholes are vertical unless agreed to be otherwise.
4. All boreholes should be drilled to at least 1m beyond the base of the Sitwell Coal, or associated workings. Drilling depths would not be expected to exceed 25m bgl.
5. Connecting grouting pipe to borehole shall include all works necessary at a borehole to enable grout to be pumped into the borehole in accordance with the specification and dismantling and removal on completion.
6. Supply materials shall include delivery to site, safe storage and removal of used material on completion.
7. Hand dug pits may be required to locate existing services at or close to proposed borehole locations. The rates shall provide for the excavation, supporting and backfilling of pits with arisings.
8. Inclined holes will be required where services prevent vertical drilling at the drill / grout hole locations. The extra over drilling rate shall provide for the drilling and installing and removal of casing during the grouting process. Any extra grouting costs shall also be included in this rate.

The method of measurements for the quantities upon which payment will be made according to the rates in the Schedule of Rates will be as follows:

1. The depth of the borehole will be taken from ground level at the time of drilling to the depth specified or instructed by the Geotechnical Engineer or alternatively the actual depth, whichever is less. For inclined holes the depth shall be the linear metres along the axis of the borehole.
2. The weight of grout injected shall be the dry weight of the material injected into the borehole. The dry weight for sand and PFA shall not include more than 10% of water included in them at delivery.
3. The quantities for supplied materials shall only be for material injected into boreholes.
4. Because on occasions the grout takes may be unexpectedly low or high, the tenderer is given the option of pricing varying quantities of grout injection at different rates. Up to the grout quantity stated in 11.1, the rate will be as inserted in Item 11.1, in the range of 11.2 the rate will be as inserted in Item 11.2, in the range of 11.3 the rate will be as inserted in Item 11.3, in the range of 11.4 the rate will be as inserted in Item 11.4. All further grout injected on the contract will be paid at the rate in Item 11.5. The tenderer is expected to cover in these rates the possibility of grout takes being significantly higher or lower than those given in the Schedule of Rates, together with the longer or shorter retention of associated equipment.

Item No.	Item Description	Units	Quantity	Rate £	Amount £
1	Establish drilling plant	Item	1		
2a	Move drilling plant between boreholes	No.	45		
2b	E/O 2a Test Holes	No.	5		
3a	Drilling of Boreholes (Water Flush)	m	630		
3b	E/O 3a Test Holes (Water Flush)	m	70		
4a	Temporary casing (Primary Holes)	m	180		
4b	E/O 4a Test Holes	m	20		
5	Establish grouting plant	Item	1		
6a	Connect grout pipe to each Borehole	No.	45		
6b	E/O 6a @ Test Holes	No.	5		
7.1	Supply OPC for 0 to 100 tonnes of grout	t	10		
7.2	Supply OPC for 100 to 200 tonnes of grout	t	10		
7.3	Supply OPC for 200 to 300 tonnes of grout	t	10		
7.4	E/O 7.3 for supply of OPC beyond 300 tonnes of grout	t	Rate only		
8.1	Supply PFA for 0 to 100 tonnes of grout	t	90		
8.2	Supply PFA for 100 to 200 tonnes of grout	t	90		
8.3	Supply PFA for 200 to 300 tonnes of grout	t	90		
8.4	E/O 8.3 for supply of PFA beyond 300 tonnes of grout	t	Rate only		
9	Supply Sand	t	10		
10	Supply Pea Gravel	t	10		
11.1	Mix & inject grout 0 to 100 tonnes	t	100		
11.2	100 to 200 tonnes	t	100		
11.3	200 to 300 tonnes	t	100		
11.4	Greater than 300 tonnes	t	Rate only		
12	E/O 3a drilling 150mm dia holes	m	70		
13	Injection of pea gravel	t	10		
14	Standing time when drilling	hrs	10		

Item No.	Item Description	Units	Quantity	Rate £	Amount £
15	Standing time when grouting	hrs	10		
16	Making & testing grout cubes	No.	3x No. Days grouting		
17	Making & testing bleeding cylinder	No.	Rate only		
18	Hand excavate service pit GL to 1.2m	m	No. of holes within 5m of services		
19	Hand excavate service pit 1.2m to 3.0m	m	Rate only		
20	E/O 18-19 breaking out hard standing	m3	Rate only		
21	Provision for locating and marking out of services	Item	1		
22	Provision for wheel and road cleaning as necessary	Item	1		
23	Provision for locating and marking out borehole locations	Item	1		
26	Provision for supplying welfare facilities for use by Sub-Contractor	Item	1		