

BoydCockburn Ltd

Geologists & Mining Engineers

Woodside Farmhouse

West Woodside

Wigton

Cumbria

CA7 0UW

Capping of Hope Pit Shaft at Mill Hill Cleator Moor Cumbria

July 2015

**Capping of Hope Pit Shaft
at
Mill Hill
Cleator Moor
Cumbria**

Project no. 15-108

Client High Grange Homes

Date July 2015

**Report
Status** Final

Copy no 1

Written by Alexander B M Boyd
MSc., MIMM., EurGeol., C.Geol., MIEnvSc., FGS

Signature

BoydCockburn Ltd
Geologists & Mining Engineers

Tel : 01697 345035

info@boydcockburn.com

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Appendix 2 Hope Pit Shaft Capping Detail

Appendix 3 References

1 Introduction

1.1 AUTHORISATION

Boydcockburn Ltd was commissioned by High Grange Homes Ltd of Cleator Moor to undertake the design and supervision of the capping of the Hope Pit Shaft at Mill Hill Cleator Moor Cumbria.

The initial investigation was undertaken by Northwest Drilling Services and to the instructions of High Grange Homes.

The exact location of the shaft depicted on the Coal Authority Report was established by using the co-ordinates provided by the Coal Authority and published information, all of which refer to the Hope Pit shaft.

Fieldwork (drilling) was undertaken during May 2015 and the capping of the shaft was undertaken in June 2015. This report presents factual records, interpretation based on the field information and capping supervision.

There may, however, be particular, unexpected ground conditions relevant to the site, which have not been disclosed by the investigation, or taken into account in the report.

If this report requires peer reviewing, it will be necessary to seek agreement from Boydcockburn Ltd that the peer review may be carried out. Prior to the peer review Boydcockburn Ltd will require to know the name of the company carrying out the review and also the name and qualifications of the reviewer.

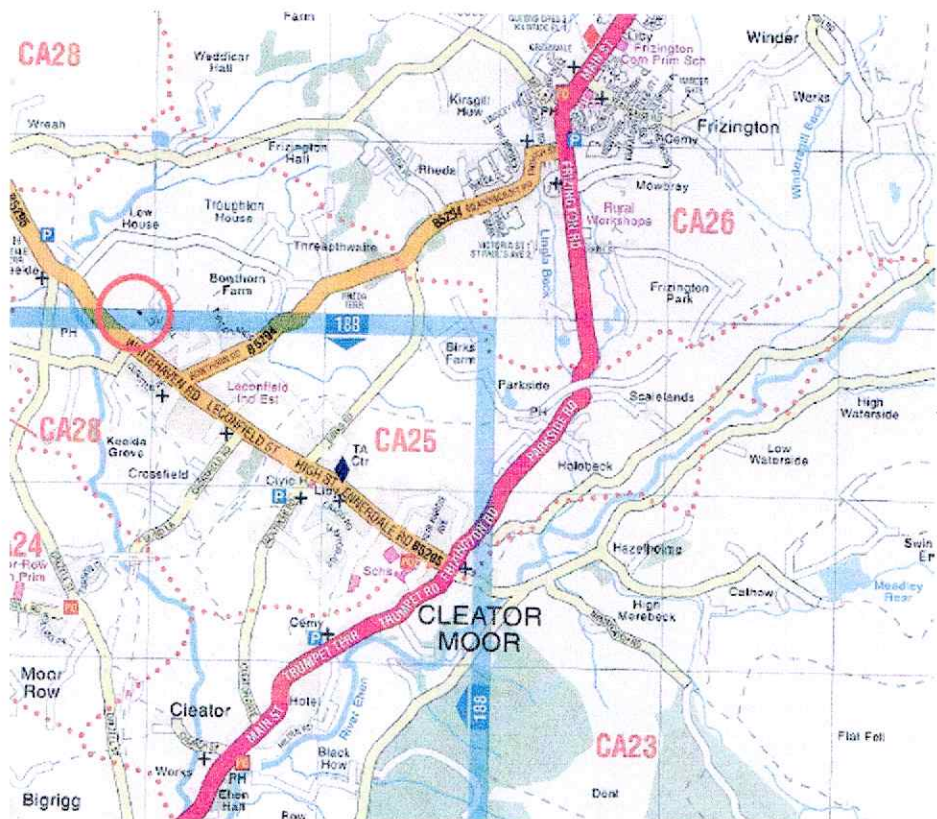
2 Site Location

2.1 MILL HILL (Description taken from CEGS report)

The site is located on the north-western outskirts of Cleator Moor, and is approximately 4km south east of Whitehaven.

The national grid reference of the site is NY 010 162 and the postcode of nearby property of Hope Pit Cottage is CS25 5ST.

The location of the Mill Hill, Cleator Moor is highlighted as shown below. It comprises two distinct parcels of land. The westernmost part is Greenfield area of approximately 3.7 hectares (Keekle Field) and the easternmost part is a developable brownfield site of 2.0 hectares (Hope Pit Site).



3 Geology

3.1 ANTICIPATED GROUND CONDITIONS

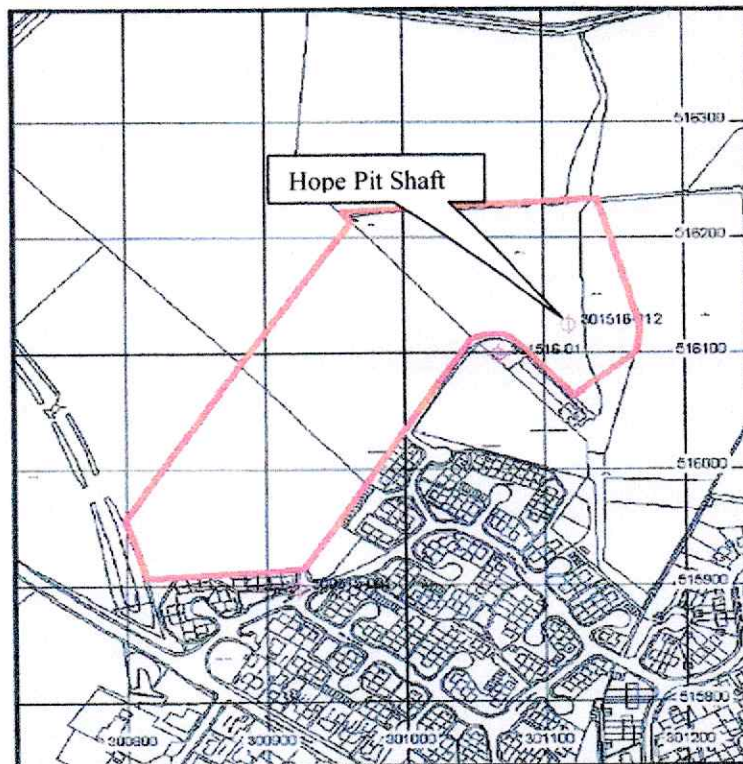
The underlying geology is described by CEGS as belonging to the Brockram of Perm-Trias age and goes on to identify the strata as a coarse textured breccia with clasts of limestone and volcanic rocks with some haematite and barite mineralization. The Brockham is underlain by the Whithaven Sandstone Formation and the Middle Coal Measures.

Superficial Deposits

The superficial soils consist of glacial till with some coarse gravel and boulders through out and the eastern part of the site in the vicinity of the Hope Pit is indicated to be made ground.

4 Mineshaft Location

The abandonment plan for the Bowthorn Colliery shows the extent of the workings associated with the Hope Pit Colliery.



Extract from the Coal Authority report showing the location of the Hope Pit shaft

5 Mineshaft Investigation

5.1 BOREHOLE RESULTS

The Coal Authority report provided a grid reference for the Hope Pit Shaft at 301119E, 516126N and this was set out as the target location for the shaft investigation.

High Grange Homes supervised the shaft drilling undertaken by Northwest Drilling Services Ltd (NDS) of Carlisle.

NDS firstly constructed a 12.00m safety platform around the area of the shaft location prior to commencing the probing exercise.

Probe Hole P1 found 3.50m of fill and overburden overlying wood and ash to 10.00m below existing site level.

Probe Hole P2 again found 3.50m of overburden with traces of wood and ash to 4.00m whereupon bedrock was encountered and proved to 6.00m.

Probe Hole P3 position 1.00m left of P1 found fill and clay overburden to 4.30m and sandstone to 8.00m

Probe Hole P4 located 1.50m to the rear of P1 found 4.00m of fill and overburden soils and proved bedrock to 8.00m below the existing site level.

Probe Hole P5 positioned 1.00m in front of P1 encountered ash and timber fill to 10.50m

Probe Hole P6 was positioned 1.50m in front of P5 and found 8.00m of ash and timber fill.

Probe Hole P7 was moved 1.70m directly ahead of P6 and encountered fill and overburden soils to 3.00m and proved the rock to 4.00m.

The location of the probe holes together with the logs are contained in **appendix 1** of this report.

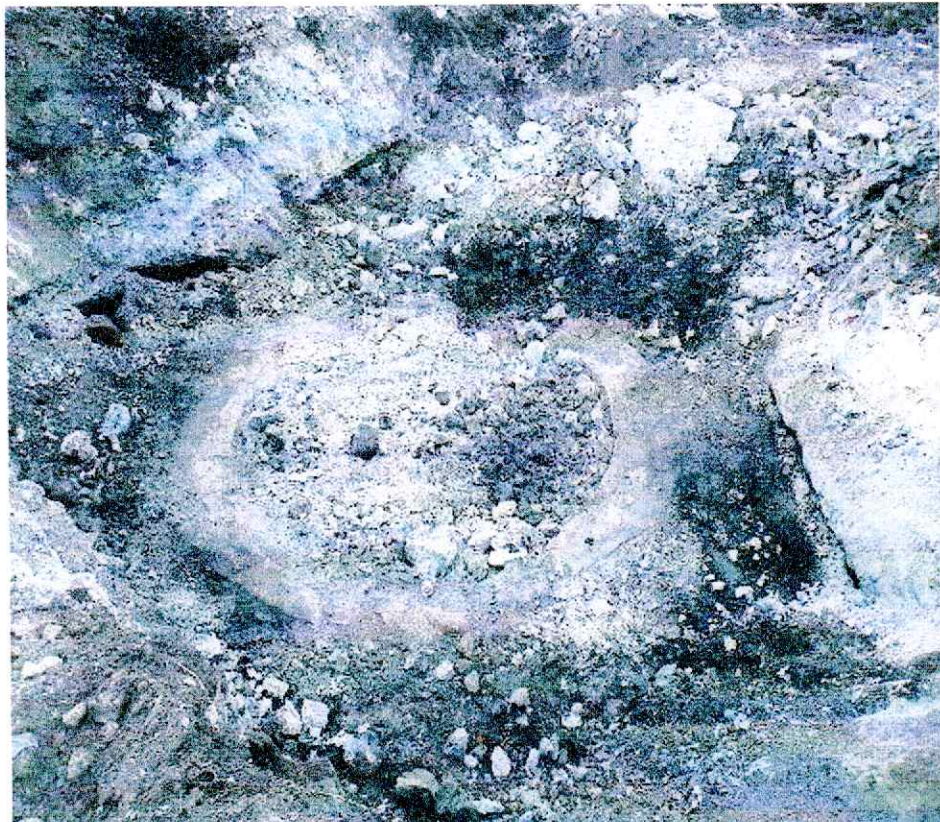
Probe Hole P1 was located in exactly the grid position given by the Coal Authority and it is believed that this probe hole located the Hope Pit shaft at the first attempt.

Probe holes P2, P3 and P4 looked to have encountered the natural bedrock and landed outside the confines of the shaft.

Probe Holes P5 and P6 also looked to have found the shaft and P7 appears to have landed just outside the limits of the pit shaft.

A large tracked excavator with a long reaching arm was brought on site to undertake an excavation of the area thought to be the shaft located by probe holes P1, P5 and P6.

A large volume of the surface fill was removed before deepening the excavation and the Hope Pit's circular shaft was located at around 3.20m.



Hope Pit Shaft with circular stone lining

6 Shaft Capping Details

6.1 DESIGN & CONSTRUCTION

The photograph depicted on the previous page appears to be the shaft lining to rockhead.

The overall dimensions of this circular shaft is shown on the engineering drawing is measured at 3.40m to the outer limits of the lining and 2.70m within the former operational shaft.

Rockhead was exposed in the excavation and the area cleaned and made ready for the concrete capping slab. A thin layer of granular material was then spread over the proposed slab area to provide a uniform base for the concrete slab construction.

The design of the concrete slab is based on the specifications outlined in CIRIA SP32D as shown below.

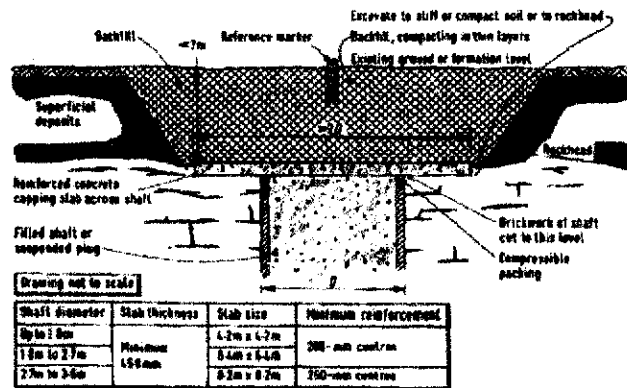


Figure 35
General
arrangements and
recommended
design for a
capped shaft

- Notes:
1. Reinforcement - Use a minimum of 40mm diameter in both directions at top and bottom of slab.
 2. Cap should be a minimum of 5m below any adjacent building foundations level or 1m below ground level, and not be less than 250mm depth.
 3. Cap should be founded on rockhead, if possible, or alternatively on a grouted base.
 4. Vent pipes may be incorporated if the slab is placed on fill.
 5. Extra precautions may be required where circumstances dictate that a building must be constructed over a shaft.

Extract from CIRIA SP32D

The detailed design of the concrete capping slab as provided to the construction team on site is given in **appendix 2** of the report.

7 Recommendations

On completion of the capping of the shaft, approximately 1.5m of soils has been used to cover the shaft area which will impose a surcharge load of only around 20kNm² to 25kN/m².

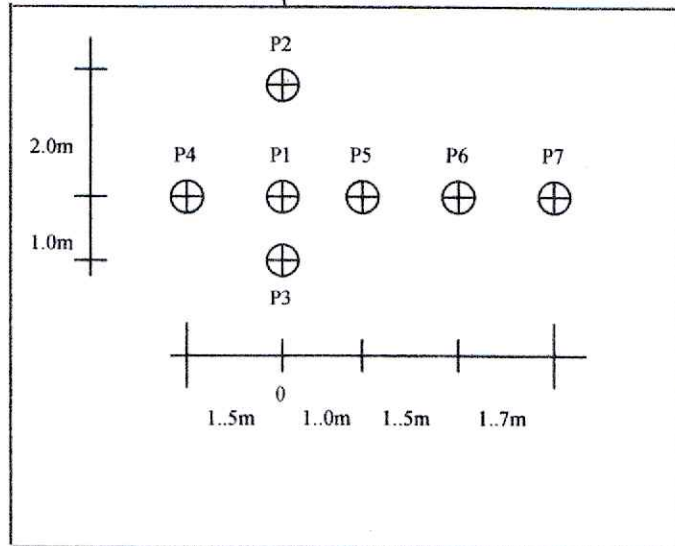
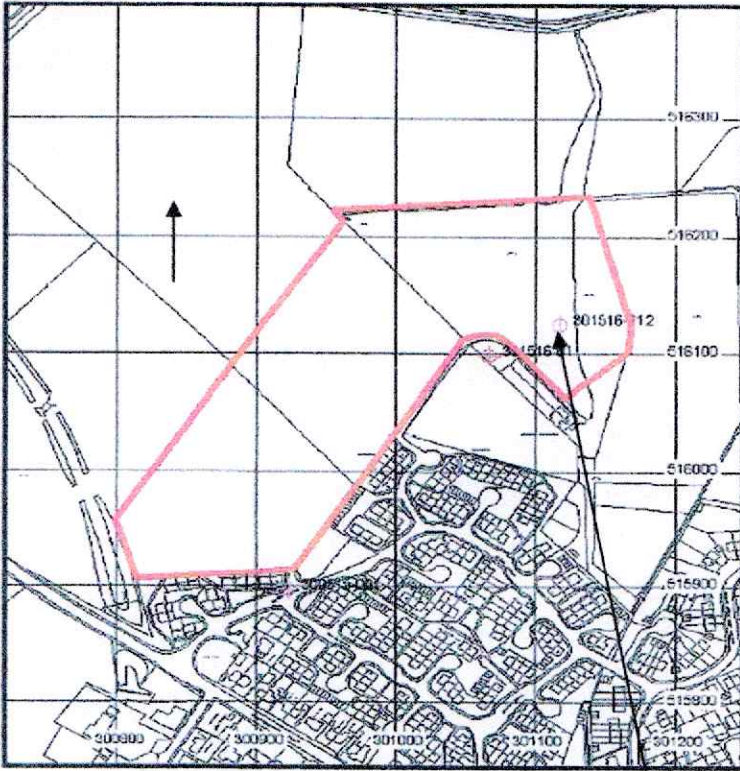
It is anticipated that the finished surface level is expected to be between 1.50m and 2.00m above rockhead level. No markers have been placed at the surface as yet until the final levels have been established. It should be noted however that the surveyed position of the shaft has been established on a site drawing for future surface identification.

It should also be noted that no gas emissions were recorded within the rotary borehole penetrating the shaft or from the gas probe installed during the preparation and installation of the reinforced concrete capping slab.

Finally, if the finished surface level is to be maintained at 2.00m above rockhead, then it is recommend that no development should take place within a radius of 12.00m of the former and now capped, Hope pit shaft.

APPENDIX 1

Rotary Borehole Records and Location Plan



Borehole Location Plan

**PROJECT
15-108**

Mill Hill, Cleator Moor

**July
2015**

BoydCockburn Ltd

ROTARY BOREHOLE RECORD

Borehole Number

Site
Mill Hill, Cleator Moor


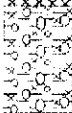
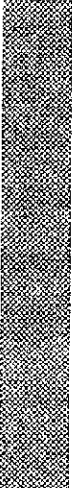
Engineer
BoydCockburn Ltd

P1

Client
High Grange Homes Ltd

Contract No.
15-108

Scale
1:100

DRILLING			CORE SAMPLES			STRATA RECORD		
Casing (m)	Water	Recovery (%)	RQD (%)	Level (m AOD)	Depth (m)	Key	Description	
							MADE GROUND	
					2.10		Silty sandy bouldery CLAY (reworked clay)	
					3.50		Wood and Ash Fill	
					10.00		<i>End of Borehole at 10.00 m</i>	
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								

Remarks and Water Observations

BoydCockburn Ltd

ROTARY BOREHOLE RECORD

Borehole Number

Site
Mill Hill, Cleator Moor


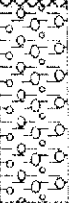

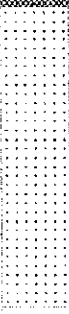
Engineer
BoydCockburn Ltd

P2

Client
High Grange Homes Ltd

Contract No.
15-108

Scale
1:50

DRILLING			CORE SAMPLES				STRATA RECORD	
Casing (m)	Water	Recovery (%)	ROD (%)	Level (m AOD)	Depth (m)	Key	Description	
							MADE GROUND	
1								
2					2.20		Bouldery CLAY	
3								
4					3.50		Traces of ash through the Boulder clay	
5					4.00		SANDSTONE	
6					6.00		<i>End of Borehole at 6.00 m</i>	
7								
8								
9								

Remarks and Water Observations

BoydCockburn Ltd

ROTARY BOREHOLE RECORD

Borehole Number

Site
Mill Hill, Cleator Moor


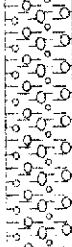

Engineer
BoydCockburn Ltd

P3

Client
High Grange Homes Ltd

Contract No.
15-108

Scale
1:50

DRILLING			CORE SAMPLES				STRATA RECORD	
Casing (m)	Water	Recovery (%)	RQD (%)	Level (m AOD)	Depth (m)	Key	Description	
							MADE GROUND	
					2.60		Bouldery CLAY	
					4.30		SANDSTONE	
					8.00		End of Borehole at 8.00 m	
1								
2								
3								
4								
5								
6								
7								
8								
9								

Remarks and Water Observations

BoydCockburn Ltd

ROTARY BOREHOLE RECORD

Borehole Number

Site
Mill Hill, Cleator Moor

Engineer
BoydCockburn Ltd

P4

Client
High Grange Homes Ltd

Contract No.
15-108

Scale
1:50

DRILLING		CORE SAMPLES				STRATA RECORD	
Casing (m)	Water	Recovery (%)	RQD (%)	Level (m AOD)	Depth (m)	Key	Description
							MADE GROUND
1							
2							
					2.60		Bouldery CLAY
3							
4					4.00		SANDSTONE
5							
6							
7							
8					8.00		<i>End of Borehole at 8.00 m</i>
9							

Remarks and Water Observations

BoydCockburn Ltd

ROTARY BOREHOLE RECORD

Borehole Number

P5

Site
Mill Hill, Cleator Moor

Engineer
BoydCockburn Ltd

Client
High Grange Homes Ltd


Contract No.
15-108

Scale
1:100

DRILLING

CORE SAMPLES

STRATA RECORD

	DRILLING		CORE SAMPLES				Key	Description
	Casing (m)	Water	Recovery (%)	RQD (%)	Level (m AOD)	Depth (m)		
1								Mixed ash wood and Clay fill
2								
3								
4								
5								
6								
7								
8								
9								
10								
11						10.50		<i>End of Borehole at 10.50 m</i>
12								
13								
14								
15								
16								
17								
18								
19								

Remarks and Water Observations

BoydCockburn Ltd

ROTARY BOREHOLE RECORD

Borehole
Number

Site
Mill Hill, Cleator Moor


Engineer
BoydCockburn Ltd

P6

Client
High Grange Homes Ltd

Contract No.
15-108

Scale
1:100

DRILLING			CORE SAMPLES			STRATA RECORD	
Casing (m)	Water	Recovery (%)	RQD (%)	Level (m AOD)	Depth (m)	Key	Description
1							Ah and Timber Fill
2							
3							
4							
5							
6							
7							
8					8.00		
9							<i>End of Borehole at 8.00 m</i>
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							

Remarks and Water Observations

BoydCockburn Ltd

ROTARY BOREHOLE RECORD

Borehole Number

Site
Mill Hill, Cleator Moor

Engineer
BoydCockburn Ltd

P7

Client
High Grange Homes Ltd

Contract No.
15-108

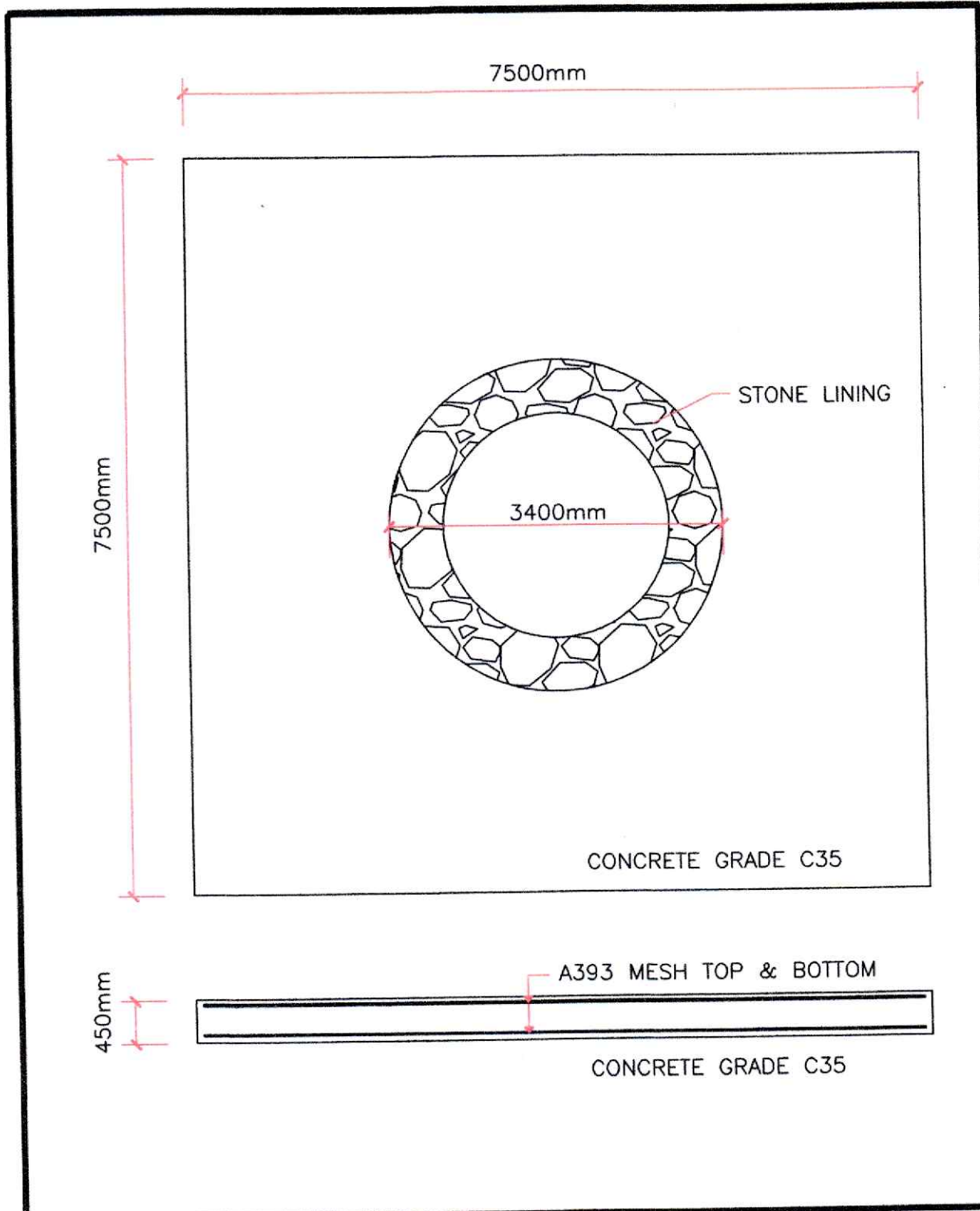
Scale
1:100

DRILLING		CORE SAMPLES			STRATA RECORD	
Casing (m)	Water	Recovery (%)	RQD (%)	Level (m AOD)	Depth (m)	Description
1						MADE GROUND
2					1.65	Bouldery CLAY
3					3.00	SANDSTONE
4					4.00	<i>End of Borehole at 4.00 m</i>
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						

Remarks and Water Observations

APPENDIX 2

Hope Pit Shaft Capping Detail



CLIENT: HIGH GRANGE HOMES			
TITLE: MILL HILL, CLEATOR MOOR HOPE PIT SHAFT : CAPPING DETAIL.			
REV	DESCRIPTION	DATE	SIGNED

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SHEET NO.	
JOB No.	AB-CAP-01A

APPENDIX 3

References

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