



**GROUND INVESTIGATION FOR
YENNADON QUARRY EXTENSION
FACTUAL AND INTERPRETIVE REPORT
FOR
YENNADON STONE LIMITED**

January 2011



Job No: 7397



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Report Status:	FINAL		
Project Number:	7397		
	Engineer	Signature	Date
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1.0 INTRODUCTION

1.1 Terms of Reference

Acting on instructions received from Yennadon Stone Ltd, John Grimes Partnership Ltd has carried out a Ground Investigation at a site to the immediate north of Yennadon Quarry, Dartmoor.

1.2 Purpose of This Report

The purpose of the investigation was to assess ground conditions and rock quality in relation to the extension of the existing Yennadon Quarry. This factual report summarises the scope of investigatory works undertaken and records the ground conditions encountered.

1.3 Scope of Works

The geotechnical investigation took place over three days between the 13th and 16th December 2010 and comprised the drilling of four vertical air flushed rotary open hole boreholes at agreed locations. Both the drilling sub-contractor and an engineer from John Grimes Partnership Ltd took site notes relating to the borehole drilling. Samples of the borehole arisings were collected at 1m intervals. On completion of drilling all boreholes were scanned with a 360^o televiewer to facilitate the accurate assessment of the rock mass.

All samples were returned to the John Grimes Partnership Ltd laboratory where they were viewed in combination with onsite logs and televiewer imagery to produce final borehole logs.

1.4 Third Party Rights and Other Limitations

This report is issued to Yennadon Stone Ltd and does not confer or purport to confer on any third party any benefit or any right pursuant to the Contracts (rights of third parties) Act 1999. Readers of this report should read the report limitations presented in Appendix 1.

1.5 Terminology, Nomenclature and Testing Procedures

Terminology and nomenclature used in this report is that described and generally used in the following British Standard Codes of Practice and technical documents:-

- BS 5930: 1999+A2:2010 Code of Practice for Site Investigations
- BS EN 1997-1: 2004 Eurocode 7: Geotechnical design – Part 1: General rules
- BS EN 1997-2: 2007 Eurocode 7: Geotechnical design – Part 2: Ground investigation and testing
- BS EN ISO 14688-1: 2002 Geotechnical investigation and testing – Identification and classification of soil – Part 1: Identification and description.
- BS EN ISO 14688-2: 2004 Geotechnical investigation and testing – Identification and classification of soil – Part 2: Principles for a classification.
- BS EN ISO 14689-1: 2003 Geotechnical investigation and testing – Identification and classification of rock – Part 1: Identification and description.

1.6 Previous Report

Reference should be made to the John Grimes Partnership Ltd Geotechnical Appraisal Report issued May 2010 as per the requirements of the Quarry Regulations 1999: Approved Code of Practice. The appraisal included the mapping and logging of rock exposures in the existing quarry to the south of the site.

2.0 SITE LOCATION AND DESCRIPTION

The existing Yennadon Quarry is located approximately 300m to the east of Dousland, within the south western confines of Dartmoor National Park, Grid Reference SX 543 688. Access to the existing quarry is gained from Iron Mine Lane via an unmetalled road that runs along the quarry's western edge.

The subject site is located to the immediate north of the existing Yennadon Quarry as shown on Figure 01. The subject site is irregular in shape, occupies an area of approximately 1.8 ha and slopes from the east down towards the west. The site currently comprises open moorland. Access to the subject site is gained from the same unmetalled road that provides access to the existing quarry.

3.0 PUBLISHED GEOLOGY

The 1:50,000 Scale British Geological Survey Sheet 338 Dartmoor Forest indicates that the site and immediate environs is underlain by Upper Devonian Slates within the metamorphic aureole of the Carboniferous Dartmoor Granite.

4.0 SITE INVESTIGATION

Four vertical air flushed rotary open hole boreholes were sunk by Wakehams of Modbury using a Beretta T46 drilling rig at locations shown in Figure 02. Boreholes were drilled using a 200mm diameter rotary percussive hammer to 6.0m below ground level (bgl) prior to the installation of temporary UPVC casing to prevent the inward collapse of superficial material. Boreholes were extended below 6.0m bgl using a 110mm diameter rotary percussive hammer. Borehole numbers and final depths are provided in Table 01.

Borehole ID	Depth of Rotary Boreholes (mbgl)	Reduced Level of Bottom of Boreholes (mAOD)
BH1	18.2	229.90
BH2	23.0	230.20
BH3	36.0	229.40
BH4	36.6	230.60

Table 01: Summary of borehole depths

An engineer from John Grimes Partnership Ltd attended site for most of the drilling time and took notes as appropriate. Samples of borehole arisings were collected at 1m intervals and returned to the John Grimes Partnership Ltd laboratory for reference during the production of final logs.

On completion of drilling, all boreholes were scanned with a 360° televiewer to produce a visual record of the rock mass. Borehole televiewer imagery is provided in Appendix 2.

The colours of the rock mass portrayed in the borehole imagery can vary from the actual colour due to changes in the camera settings used to optimise the image for structural interpretation. In this case it has accentuated the colour differences between boreholes BH1 / BH4 and BH2 / BH3. Examinations of the samples show less pronounced colour differences between these boreholes and as such the colour of the rock mass has been based primarily on the colour of samples from the investigatory drilling.

Final borehole logs have been prepared by John Grimes Partnership Ltd using a combination of site notes, borehole televiewer imagery and samples of arisings. Borehole logs are provided in Appendix 3.

BH1 experienced a minor collapse at approximately 8m bgl and was subsequently flushed with water to clean out any debris prior to being scanned by the televiewer.

On completion, all four boreholes were backfilled by the Client. The Environment Agency does not require groundwater quality monitoring and no standpipes were installed.

5.0 FINDINGS

5.1 Boreholes

Topsoil was encountered in all boreholes to depths of between 0.2m and 0.5m bgl, its thickness increasing towards the east.

Light yellow brown gravelly Clay overburden was encountered in all boreholes immediately beneath the Topsoil and extended down to between 2.5m and 3.5m bgl where weathered Slate bedrock was inferred.

Weathered Slate bedrock arose as light grey and light brown fine and gravel sized material in BH1 and BH4 respectively and fine and gravel sized reddish brown material in BH2 and BH3. Based on drilling behaviour, it was deduced that the rock was highly fractured.

The drilling rate became notably slower in all boreholes from 4.0m - 5.0m bgl indicating less weathered, competent Slate bedrock.

The Slate encountered in BH1 was generally softer than in the other boreholes with occasional harder bands being indicated by a decrease in the drilling rate. The softer strata is likely to relate to the rock mass being more highly fractured and weathered as shown in the borehole imagery. Based on the drilling arisings, the Slate varied in colour from reddish brown to grey. BH1 was terminated at 18.2m bgl in Slate bedrock.

The Slate encountered in BH2 and BH3 was consistent through its thickness, becoming slightly harder with depth indicated by a reduction in drilling rate. Borehole imagery showed the rock mass to be less fractured and tighter than that found in BH1. The colour of arisings varied slightly but generally indicated brownish red and reddish brown Slate bedrock. BH2 and BH3 were terminated in Slate bedrock at 23m and 36m bgl.

The Slate encountered in BH4 to a depth of approximately 19.5m bgl was of similar hardness to that in BH2 and BH3 although slightly more fractured and of a different colour, arisings being yellowish and greyish brown. Below 19.5m bgl the rock mass became harder, indicated by a very slow drilling rate and a change in colour of arisings to grey and then bluish grey ('Janner Blue'). Borehole imagery shows a similar fracture state to a depth of approximately 28m bgl where the rock mass becomes significantly less fractured and tighter. BH4 was terminated at 36.6m bgl in Slate bedrock.

Televiwer imagery from all boreholes, although uncorrected for dip direction, shows the competent Slate bedrock to have a shallow angle of dip comparable to that found in the existing quarry to the south of the site.

The geotechnical appraisal discussed in Section 1.6 reported the Slate bedrock as dipping at approximately 15° towards 240° in the north western side of the quarry and approximately 10° towards 200° in the south eastern side of the existing quarry. The change in dip direction would suggest the presence of a box type fold with an axis orientated approximately southwest to northeast. This box type fold is likely to extend beneath the investigated site and may result in some areas of highly fractured material similar to those found in the existing quarry.

5.2 Groundwater

No notable groundwater strikes were recorded during the drilling works. However, the arisings in BH1 did become progressively damper with depth below 10m bgl. Following the completion of the drilling works, groundwater levels were monitored using a Geosense 50m dip meter with the results shown in Table 02.

Borehole Number	Depth To Groundwater mbgl (mAOD)	
	13/12/2010	16/12/2010
BH1	Borehole Dry	18.20 (229.90)
BH2	Borehole Dry	Borehole Dry
BH3	Borehole Dry	31.61 (233.79)
BH4	31.00 (235.60)	25.40 (241.20)

Table 02: Results of Groundwater Monitoring

The groundwater table across the site appears to slope down towards the northwest.

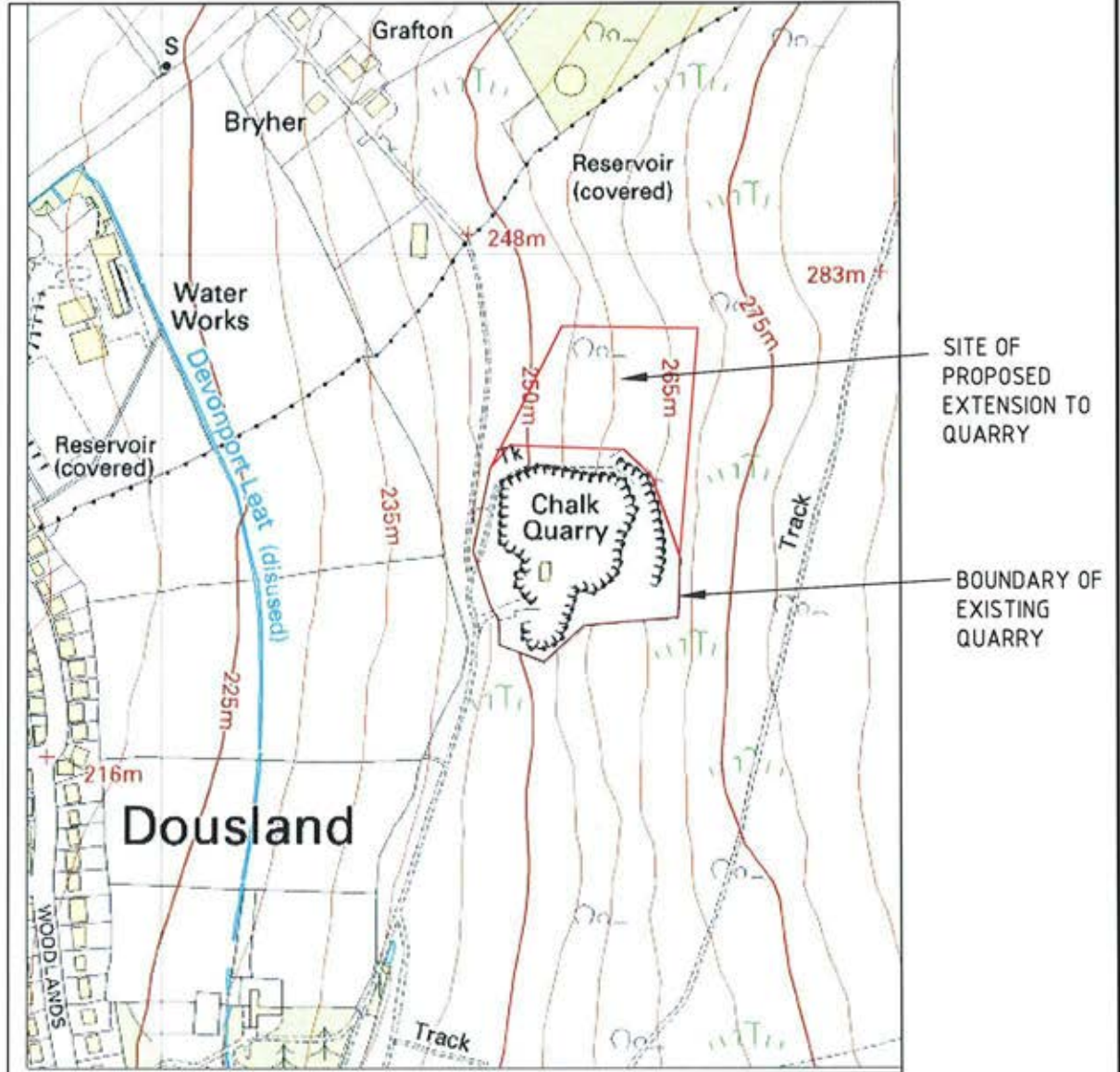
6.0 CONCLUSIONS

The site investigation has demonstrated that the Slate rock mass beneath the site, although variable in colour and structure, has similar characteristics and qualities to that seen in the existing quarry faces south of the subject site.

The current practice of the quarry is to work multiple quarry faces simultaneously in order to satisfy demand for various colours and sizes of stone. It is expected, from the findings of the investigation that this practice can continue on the subject site.

Information from groundwater monitoring suggests that the groundwater table drops towards the northwest. It is likely that groundwater management similar to that in the existing quarry will be required in the extension proposed.

FIGURES




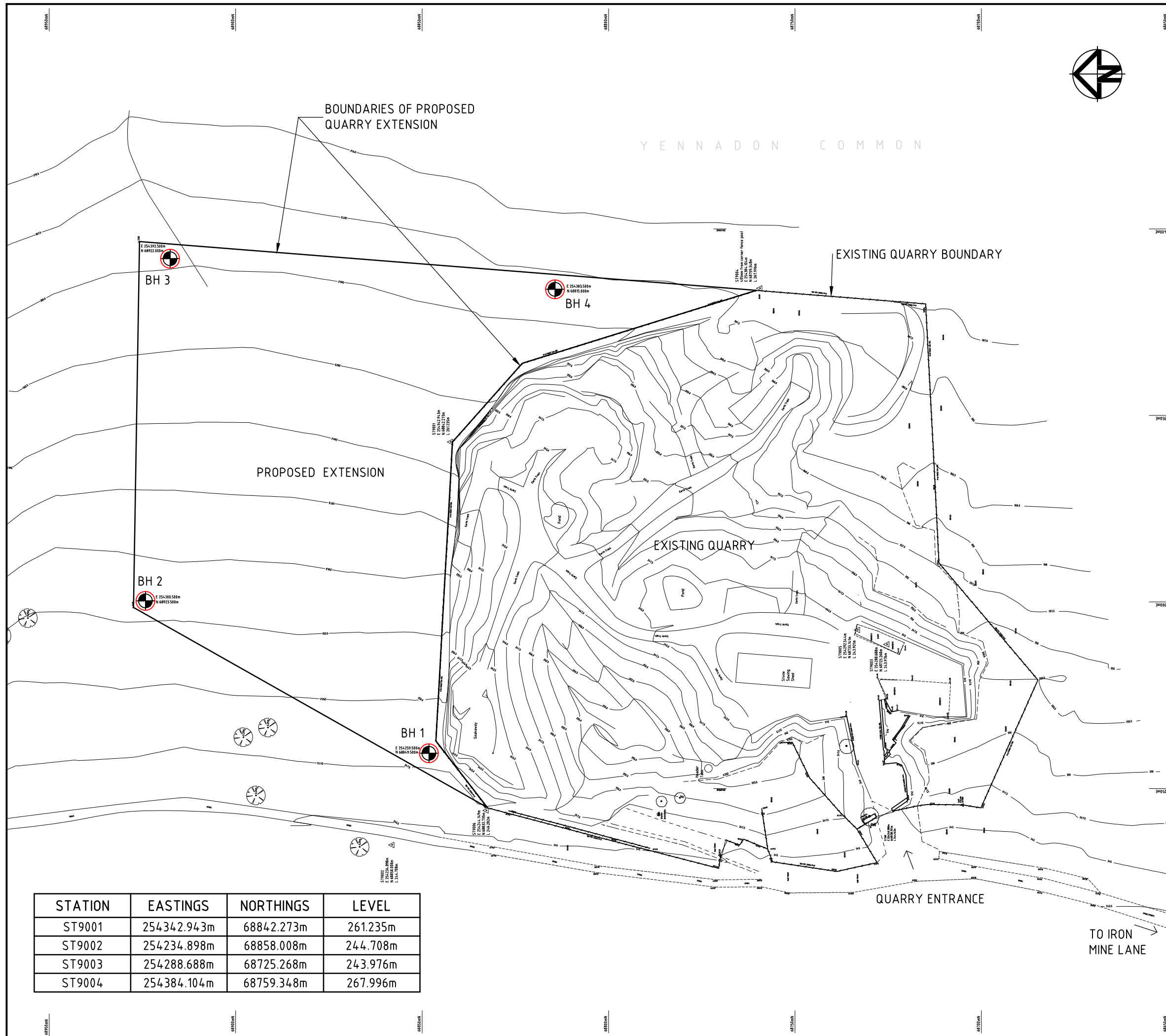
NOTES:

1. NGR OF EXISTING QUARRY IS SX 543 688.
2. POST CODE OF EXISTING QUARRY IS PL20 8BA.
3. THE QUARRY IS NOT "CHALK" BUT SLATE.

EXTRACT FROM OS MAPPING

Reproduced from the 1:50 000 Ordnance Survey map with the permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office, © Crown copyright, John Grimes Partnership Ltd, Leonards Road, Ivybridge, Devon PL21 0RU, Licence No.AL 100002364

Client YENNADON STONE LTD		Project GROUND INVESTIGATION FOR YENNADDON QUARRY EXTENSION		John Grimes Partnership Ltd Consulting Engineers & Engineering Geologists		
Status PRELIMINARY NOT TO BE USED FOR CONSTRUCTION		Title SITE LOCATION MAP		Leonards Road, Ivybridge, Devon, PL21 0RU Tel: +44 (0)1752 690533 Fax: +44 (0)1752 690570 e-mail: post@johngrimes.co.uk		
© Copyright reserved		First Issue Signatures		 www.johngrimes.co.uk		
Scales	1:5000	Author	T.R. SPILLER			
Original Size	A4	Checker	M. OWEN			
				Project No.	Figure	Rev.
				7397	01	R2




- Notes
1. ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.
 2. CONTRACTORS MUST CHECK ALL DIMENSIONS ON SITE. ONLY FIGURED DIMENSIONS ARE TO BE WORKED FROM.
 3. DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE PROCEEDING.
 4. THIS DRAWING IS BASED ON A SURVEY CARRIED OUT BY PRESTON ENGINEERING SURVEY Ltd ON 24th JUNE 2010.
 5. SURVEY SET TO GRID AND DATUM FROM ORIGINAL QUARRY SURVEY CARRIED OUT IN SEPTEMBER 2004 BY PAUL FASSAM GEOMATICS.
 6. NOTE THAT THE ACCURACY OF STN9 IS IN DOUBT.

- LEGEND
- EXISTING FENCE LINE
 - GL GROUND LEVEL
 - SURVEY STATION
 - LOCATION OF EXPLORATORY BOREHOLES

R2	SURVEY DATED 24.06.10	21/01/11	TRS	MO
R1	SURVEY DATED 28.02.08	19/01/11	TRS	MO
Issue	Description	Date	Drwn	Chkd

Status			
REPORT ISSUE			
NOT TO BE USED FOR CONSTRUCTION			
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Original Size	A3	Checker	M. OWEN

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Client **YENNADON STONE LTD**

Project **GROUND INVESTIGATION FOR YENNADON QUARRY EXTENSION**

Title **BOREHOLE LOCATIONS**

STATION	EASTINGS	NORTHINGS	LEVEL
ST9001	254342.943m	68842.273m	261.235m
ST9002	254234.898m	68858.008m	244.708m
ST9003	254288.688m	68725.268m	243.976m
ST9004	254384.104m	68759.348m	267.996m

Project No.	Figure	Rev.
7397	02	R2

APPENDICES

Appendix 1

APPENDIX 1 – REPORT LIMITATIONS

- 1.1.1** The report has been produced in compliance with the agreement between John Grimes Partnership Ltd and Yennadon Stone Ltd.
- 1.1.2** The advice provided is based on current best practice and legislation. John Grimes Partnership accepts no responsibility or liability for any change in best practice advice or statute.
- 1.1.3** Ground conditions can vary considerably and there may be ground conditions not apparent at the time of our inspections and any such undisclosed conditions cannot be taken into account in the assessment presented in this report.
- 1.1.4** There may be manmade and seasonal variations in groundwater and surface water levels that affect the level and rate of flow of ground and surface water.
- 1.1.5** This report has been prepared for the benefit of the client and their advisors in relation to ground conditions at the site to the immediate north of Yennadon Quarry, Dousland, Devon. The report shall not be relied upon for any other situation, neither shall it be transferred to any other party without the written agreement of John Grimes Partnership Ltd.
- 1.1.6** Any conclusions or advice contained within this report are based on sound engineering judgement and assessment of observations undertaken in accordance with the agreed scope of works. They do not take into account the perceptions of other involved and interested parties.

Appendix 2

Borehole imagery produced by Borehole Logging Solutions Ltd.

Borehole BH 1

Depth 6 -12m



Depth 12 -18m



End of hole

Note borehole cased from ground level to 6.0m

Yennadon Quarry 7397

Borehole imagery produced by Borehole Logging Solutions Ltd.

Borehole BH 2

Depth 6 -12m

Depth 12 -18m



Note borehole cased from ground level to 6.0m

Yennadon Quarry 7397

Borehole imagery produced by Borehole Logging Solutions Ltd.

Borehole BH 2
Depth 18 -24m



End of hole

Note borehole cased from ground level to 6.0m

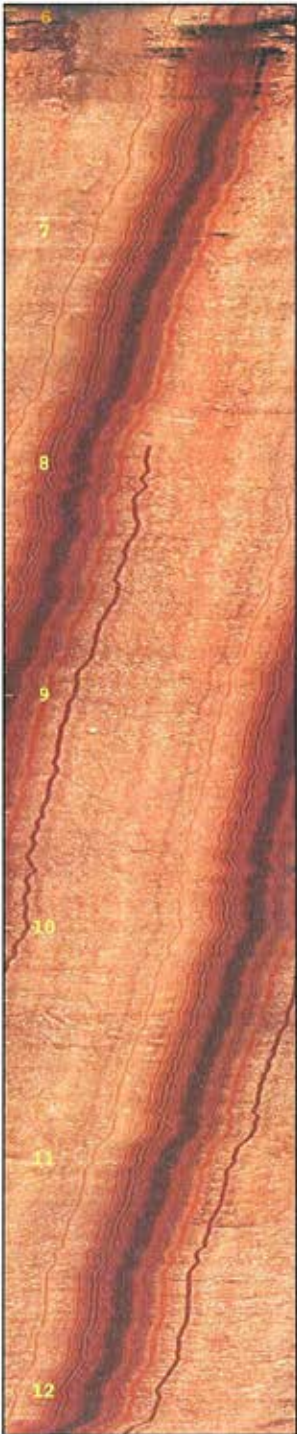
Yennadon Quarry 7397

Borehole imagery produced by Borehole Logging Solutions Ltd.

Borehole BH 3

Depth 6 -12m

Depth 12 -18m

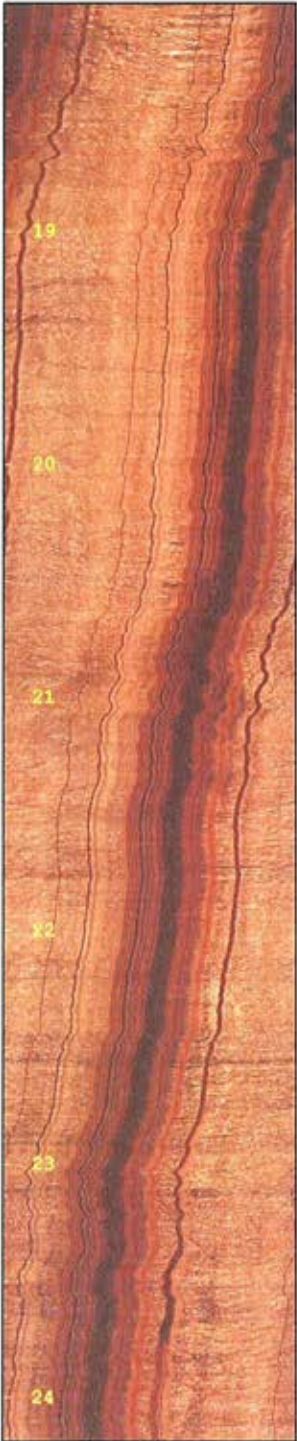


Note borehole cased from ground level to 6.0m

Borehole imagery produced by Borehole Logging Solutions Ltd.

Borehole BH 3

Depth 18 -24m



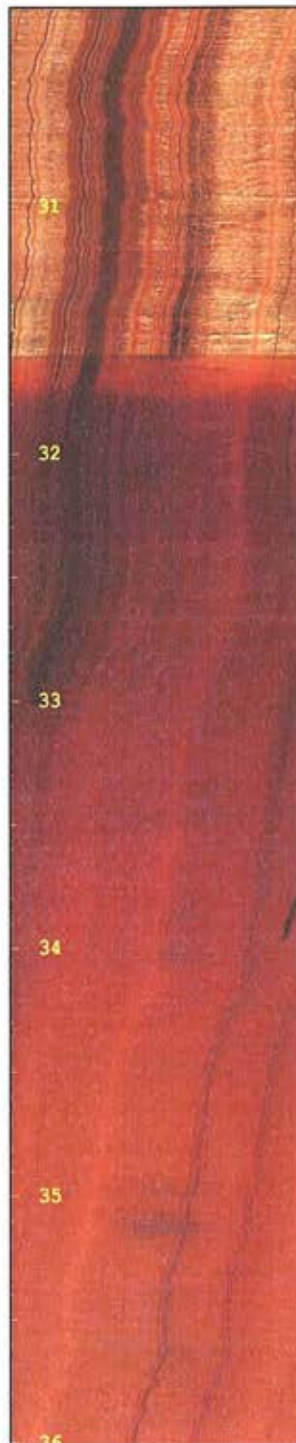
Depth 24 -30m



Note borehole cased from ground level to 6.0m

Borehole imagery produced by Borehole Logging Solutions Ltd.

Borehole BH 3
Depth 30 -36m



End of hole

Note borehole cased from ground level to 6.0m

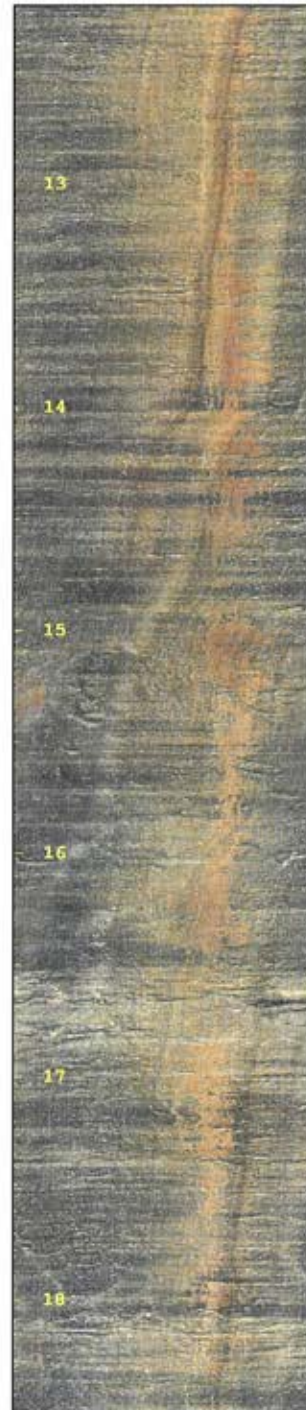
Yennadon Quarry 7397

Borehole imagery produced by Borehole Logging Solutions Ltd.

Borehole BH 4

Depth 6 -12m

Depth 12 -18m



Note borehole cased from ground level to 6.0m

Yennadon Quarry 7397

Borehole imagery produced by Borehole Logging Solutions Ltd.

Borehole BH 4

Depth 18 -24m

Depth 24 -30m



Note borehole cased from ground level to 6.0m

Yennadon Quarry 7397

Borehole imagery produced by Borehole Logging Solutions Ltd.

Borehole BH 4
Depth 30 -36m



End of hole

Note borehole cased from ground level to 6.0m

Yennadon Quarry 7397



Appendix 3

Key To Borehole Logs





Abbreviations

Code	Description
RO	Rotary Open Hole
D	Small Disturbed Sample

Symbols

Symbol	Description
	Recorded Water Level
	Casing

Legend

Hatch	Description
	Topsoil
	Gravelly Clay Overburden Material
	Weathered Slate
	Slate



John Grimes Partnership Ltd
 Consulting Engineers & Engineering Geologists
 Telephone: (01752) 690533

Borehole No

BH1

Hole Type

RO

Project Name

Yennadon Quarry

Co-ords:

254260E - 68850N

Project No.

7397

Location:

Yennadon Quarry

Contractor:

Wakehams of Modbury

Ground level:

248.10 m AOD

Client:

Yennadon Stone Ltd

Dates:

14/12/2010

Orientation:

90

Installation Backfill	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20	247.90		Variable drilling rate. Rods pushed into the ground with infrequent hammer engagement indicating soft strata. Returns of brown clayey Slate gravel. (TOPSOIL)
		1.00	D					Variable drilling rate with infrequent hammer engagement. Gravel sized returns of light yellow brown Slate. (Gravelly CLAY overburden material)
		2.00	D					
					2.50	245.60		Variable to consistent drilling rate with frequent hammer engagement possibly indicating a fractured, weathered rock mass. Fine and gravel sized returns of light grey Slate. (SLATE)
		3.00	D					
		4.00	D		4.00	244.10		Consistent fast drilling with variable hammer engagement, hole occasionally being extended with drill head rotation only indicative of softer strata. Fine returns of light, slightly red, grey Slate. (SLATE)
		5.00	D					
		6.00	D					
					6.50	241.60		Consistent fast drilling with constant hammer engagement. Fine greyish brown returns of Slate with occasional grey Slate gravel. (SLATE)
		7.00	D					
					7.25	240.85		Consistent fast drilling with occasional hammer disengagement possibly indicating fractures. Gravel sized brownish grey returns of Slate. (SLATE)
		8.00	D		8.00	240.10		Consistent fast drilling with constant hammer engagement. Sand and gravel sized returns of reddish brown Slate. (SLATE)
		9.00	D		9.00	239.10		Consistent fast drilling with occasional hammer disengagement possibly indicating fractures. Alternating returns of fine and gravel sized brownish grey Slate and fine red, brown Slate with occasional gravel. (SLATE)

Remarks: Hole terminated at specified depth in competent Slate bedrock. Hole backfilled by client. Groundwater recorded at 18.2m on 16/12/2011

Continued next sheet

Logged By

RS / MO

Checked By

RS

Equipment Used:

Beretta T46

Scale

1:50

Sheet 1 of 2



John Grimes Partnership Ltd
 Consulting Engineers & Engineering Geologists
 Telephone: (01752) 690533

Borehole No
BH1

Hole Type
RO

Project No.
7397

Ground level:
248.10 m AOD

Orientation:
90

Project Name
Yennadon Quarry

Co-ords:
254260E - 68850N

Location:
Yennadon Quarry

Contractor:
Wakehams of Modbury

Client:
Yennadon Stone Ltd

Dates:
14/12/2010

Installation Backfill	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		10.00	D				Consistent fast drilling with occasional hammer disengagement possibly indicating fractures. Alternating returns of fine and gravel sized brownish grey Slate and fine reddy brown Slate with occasional gravel. (SLATE) Arisings become damp		
		11.00	D						11
		12.00	D		11.80	236.30	Drilling rate becomes slower but remains consistent with constant hammer engagement indicating slightly harder strata. Fine grey occasionally reddy grey returns of Slate with frequent grey and brownish grey gravel. (SLATE)		
		13.00	D						12
		14.00	D				Consistent drilling with occasional hammer disengagement. Alternating returns of fine light brownish grey Slate with occasional gravel and fine reddy brown Slate with occasional gravel. (SLATE)		
		15.00	D		14.30	233.80			13
		16.00	D				Drilling rate slows further but remains consistent with constant hammer engagement indicating a further increase in hardness of strata. Fine and gravel sized returns of greyish red Slate. (SLATE)		
		17.00	D		16.70	231.40			14
		18.00	D				End of Borehole at 18.20 m		
		18.20	D		18.20	229.90			15
								16	
								17	
								18	
								19	

Remarks: **Hole terminated at specified depth in competent Slate bedrock. Hole backfilled by client. Groundwater recorded at 18.2m on 16/12/2011**

Logged By **RS / MO** Checked By **RS**

Equipment Used: **Beretta T46** Scale **1:50**

Sheet 2 of 2



John Grimes Partnership Ltd
 Consulting Engineers & Engineering Geologists
 Telephone: (01752) 690533

Borehole No

BH2

Hole Type

RO

Project Name
Yennadon Quarry

Co-ords:
254301E - 68924N

Project No.
7397

Location:
Yennadon Quarry

Contractor:
Wakehams of Modbury

Ground level:
253.20 m AOD

Client:
Yennadon Stone Ltd

Dates:
13/12/2010

Orientation:
90

Installation Backfill	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.30	252.90		Variable drilling rate. Rods pushed into the ground with infrequent hammer engagement indicating soft strata. Returns of reddy brown clayey Slate gravel. (TOPSOIL)	
		1.00	D					Variable drilling rate with infrequent hammer engagement. Fine and gravel sized returns of light yellow brown Slate. (Clayey GRAVEL overburden material)	1
		2.00	D						2
		3.00	D		3.00	250.20		Variable to consistent drilling rate with frequent hammer engagement possibly indicating a fractured rock mass. Fine and gravel sized returns of reddish brown Slate. (SLATE)	3
		4.00	D						4
		5.00	D		4.50	248.70		Drilling rate slows but remains consistent with variable hammer engagement indicative of harder strata, possibly fractured. Fine and gravel sized returns of brownish pink Slate. (SLATE)	5
		6.00	D						6
		7.00	D		6.40	246.80		Drilling rate slows further but remains consistent with constant hammer engagement, strata becomes harder. Fine and gravel sized returns of brownish red Slate with occasional yellowish brown returns. (SLATE)	7
		8.00	D						8
		9.00	D						9

Remarks: **Hole terminated at specified depth in competent Slate bedrock. Hole backfilled by client. No groundwater recorded**

Continued next sheet

Logged By **GW / MO**

Checked By **RS**

Equipment Used:
Beretta T46

Scale **1:50**

Sheet 1 of 3



John Grimes Partnership Ltd
 Consulting Engineers & Engineering Geologists
 Telephone: (01752) 690533

Borehole No
BH2

Hole Type
RO

Project No.
7397

Ground level:
253.20 m AOD

Orientation:
90

Project Name
Yennadon Quarry

Co-ords:
254301E - 68924N

Location:
Yennadon Quarry

Contractor:
Wakehams of Modbury

Client:
Yennadon Stone Ltd

Dates:
13/12/2010

Installation Backfill	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		10.00	D				Drilling rate slows further but remains consistent with constant hammer engagement, strata becomes harder. Fine and gravel sized returns of brownish red Slate with occasional yellowish brown returns. (SLATE)		
		11.00	D		11.00	242.20	Consistent but slow drilling rate with constant hammer engagement. Alternating reddish brown and brownish grey gravel sized returns of Slate with some fines. (SLATE)	11	
		12.00	D					12	
		13.00	D					13	
		14.00	D					14	
		15.00	D		15.00	238.20	Consistent but slow drilling rate with constant hammer engagement. Fine and gravel sized returns of brownish red Slate with occasional yellowish brown returns. (SLATE)	15	
		16.00	D					16	
		17.00	D					17	
		18.00	D					18	
		19.00	D					19	

Remarks: **Hole terminated at specified depth in competent Slate bedrock. Hole backfilled by client. No groundwater recorded**

Continued next sheet

Logged By **GW / MO** Checked By **RS**

Equipment Used: **Beretta T46** Scale **1:50**

Sheet 2 of 3



John Grimes Partnership Ltd
 Consulting Engineers & Engineering Geologists
 Telephone: (01752) 690533

Borehole No	BH2
Hole Type	RO
Project No.	7397
Ground level:	253.20 m AOD
Orientation:	90

Project Name
Yennadon Quarry

Co-ords:
254301E - 68924N

Location:
Yennadon Quarry

Contractor:
Wakehams of Modbury

Client:
Yennadon Stone Ltd

Dates:
13/12/2010

Installation Backfill	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		20.00	D				Consistent but slow drilling rate with constant hammer engagement. Fine and gravel sized returns of brownish red Slate with occasional yellowish brown returns. (SLATE)		
		21.00	D						21
		22.00	D		21.60	231.60	Consistent but slow drilling rate with constant hammer engagement. Fine and gravel sized returns of reddish grey Slate. (SLATE)		
		23.00	D		23.00	230.20			22
							End of Borehole at 23.00 m	23	
								24	
								25	
								26	
								27	
								28	
								29	

Remarks: Hole terminated at specified depth in competent Slate bedrock. Hole backfilled by client. No groundwater recorded

Logged By	GW / MO	Checked By	RS
Equipment Used:	Beretta T46	Scale	1:50
		Sheet 3 of 3	



John Grimes Partnership Ltd
 Consulting Engineers & Engineering Geologists
 Telephone: (01752) 690533

Borehole No
BH3

Hole Type
RO

Project No.
7397

Ground level:
265.40 m AOD

Orientation:
90

Project Name
Yennadon Quarry

Co-ords:
254393E - 68922N

Location:
Yennadon Quarry

Contractor:
Wakehams of Modbury

Client:
Yennadon Stone Ltd

Dates:
13/12/2011

Installation Backfill	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.50	264.90		Variable drilling rate. Rods pushed into the ground with infrequent hammer engagement indicating soft strata. Returns of red-brown clayey Slate gravel. (TOPSOIL)	
		1.00	D					Variable drilling rate with infrequent hammer engagement. Fine and gravel sized returns of light yellow brown Slate. (Clayey GRAVEL overburden material)	1
		2.00	D						2
		3.00	D						3
		4.00	D		3.50	261.90		Variable to consistent drilling rate with frequent hammer engagement possibly indicating a fractured rock mass. Fine and gravel sized returns of reddish brown Slate. (SLATE)	4
		5.00	D		5.00	260.40		Drilling rate slows but remains consistent with variable hammer engagement indicative of harder strata, possibly fractured. Fine and gravel sized returns of brownish pink Slate. (SLATE)	5
		6.00	D						6
		7.00	D		6.40	259.00		Drilling rate slows further but remains consistent with constant hammer engagement, strata becomes harder. Fine and gravel sized returns of brownish red Slate with occasional yellowish brown returns. (SLATE)	7
		8.00	D						8
		9.00	D						9

Remarks: Hole terminated at specified depth in competent Slate bedrock. Hole backfilled by client. Groundwater recorded at 31.61m on 16/12/2011

Continued next sheet

Logged By **GW / MO** Checked By **RS**

Equipment Used: **Beretta T46** Scale **1:50**

Sheet 1 of 4



John Grimes Partnership Ltd
 Consulting Engineers & Engineering Geologists
 Telephone: (01752) 690533

Borehole No
BH3

Hole Type
RO

Project Name
Yennadon Quarry

Co-ords:
254393E - 68922N

Project No.
7397

Location:
Yennadon Quarry

Contractor:
Wakehams of Modbury

Ground level:
265.40 m AOD

Client:
Yennadon Stone Ltd

Dates:
13/12/2011

Orientation:
90

Installation Backfill	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		10.00	D				Drilling rate slows further but remains consistent with constant hammer engagement, strata becomes harder. Fine and gravel sized returns of brownish red Slate with occasional yellowish brown returns. (SLATE)		
		11.00	D					11	
		12.00	D					12	
		13.00	D					13	
		14.00	D					14	
		15.00	D		14.70	250.70		Consistent but slow drilling rate with constant hammer engagement. Fine and gravel sized brownish red returns of Slate with occasional dark red returns. (SLATE)	15
		16.00	D					16	
		17.00	D					17	
		18.00	D					18	
		19.00	D				19		

Remarks: Hole terminated at specified depth in competent Slate bedrock. Hole backfilled by client. Groundwater recorded at 31.61m on 16/12/2011

Continued next sheet
 Logged By

GW / MO

Checked By

RS

Equipment Used:

Beretta T46

Scale

1:50

Sheet 2 of 4



John Grimes Partnership Ltd
 Consulting Engineers & Engineering Geologists
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Borehole No
BH3

Hole Type
RO

Project Name
Yennadon Quarry

Co-ords:
254393E - 68922N

Project No.
7397

Location:
Yennadon Quarry

Contractor:
Wakehams of Modbury

Ground level:
265.40 m AOD

Client:
Yennadon Stone Ltd

Dates:
13/12/2011

Orientation:
90

Installation Backfill	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		20.00	D				Consistent but slow drilling rate with constant hammer engagement. Fine and gravel sized brownish red returns of Slate with occasional dark red returns. (SLATE)		
		21.00	D					21	
		22.00	D				Consistent but slow drilling rate with constant hammer engagement. Fine and gravel sized dark reddish brown returns of Slate. (SLATE)		
		23.00	D		22.50	242.90		22	
		24.00	D						
		25.00	D					23	
		26.00	D						
		27.00	D					24	
		28.00	D						
		29.00	D		28.60	236.80		25	
							Consistent but slow drilling rate with constant hammer engagement. Fine and gravel sized brownish red returns of Slate with occasional yellowish brown returns. (SLATE)		
								26	
								27	
								28	
								29	

Remarks: Hole terminated at specified depth in competent Slate bedrock. Hole backfilled by client. Groundwater recorded at 31.61m on 16/12/2011

Continued next sheet

Logged By
GW / MO

Checked By
RS

Equipment Used:
Beretta T46

Scale
1:50

Sheet 3 of 4



John Grimes Partnership Ltd
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Borehole No
BH3

Hole Type
RO

Project No.
7397

Ground level:
265.40 m AOD

Orientation:
90

Project Name
Yennadon Quarry

Co-ords:
254393E - 68922N

Location:
Yennadon Quarry

Contractor:
Wakehams of Modbury

Client:
Yennadon Stone Ltd

Dates:
13/12/2011

Installation Backfill	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		30.00	D				Consistent but slow drilling rate with constant hammer engagement. Fine and gravel sized brownish red returns of Slate with occasional yellowish brown returns. (SLATE)	
		31.00	D					
	▽	32.00	D					
		33.00	D					
		34.00	D					
		35.00	D					
		36.00	D		36.00	229.40		
End of Borehole at 36.00 m								

Remarks: Hole terminated at specified depth in competent Slate bedrock. Hole backfilled by client. Groundwater recorded at 31.61m on 16/12/2011

Logged By **GW / MO** Checked By **RS**

Equipment Used: **Beretta T46** Scale **1:50**

Sheet 4 of 4



Borehole No	BH4
Hole Type	RO
Project No.	7397
Ground level:	266.60 m AOD
Orientation:	90

Project Name
Yennadon Quarry

Co-ords:
254384E - 68815N

Location:
Yennadon Quarry

Contractor:
Wakehams of Modbury

Client:
Yennadon Stone Ltd

Dates:
13/12/2010

Installation Backfill	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.50	266.10		Variable drilling rate. Rods pushed into the ground with infrequent hammer engagement indicating soft strata. Returns of reddy brown clayey Slate gravel. (TOPSOIL)	
		1.00	D					Variable drilling rate with infrequent hammer engagement. Fine and gravel sized returns of light yellow brown Slate. (Clayey GRAVEL overburden material)	1
		2.00	D						2
		3.00	D						3
		3.50			3.50	263.10		Variable to consistent drilling rate with frequent hammer engagement possibly indicating a fractured rock mass. Fine and gravel sized returns of light brown Slate. (SLATE)	4
		4.00	D						4
		4.50			4.50	262.10		Drilling rate slows but remains consistent with constant hammer engagement indicative of harder strata. Fine and gravel sized brown returns of Slate with occasional orange and yellowish brown returns. (SLATE)	5
		5.00	D						5
		6.00	D						6
		7.00	D						7
		8.00	D						8
		9.00	D						9

Remarks: Hole terminated at specified depth in competent Slate bedrock. Hole backfilled by client. Groundwater recorded at 31m on 13/12/2011 and 25.4m on 16/12/2011

Continued next sheet	
Logged By	Checked By
GW / MO	RS
Equipment Used:	Scale
Beretta T46	1:50
Sheet 1 of 4	



John Grimes Partnership Ltd
 Consulting Engineers & Engineering Geologists
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Borehole No

BH4

Hole Type

RO

Project Name

Yennadon Quarry

Co-ords:

254384E - 68815N

Project No.

7397

Location:

Yennadon Quarry

Contractor:

Wakehams of Modbury

Ground level:

266.60 m AOD

Client:

Yennadon Stone Ltd

Dates:

13/12/2010

Orientation:

90

Installation Backfill	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		10.00	D				Drilling rate slows but remains consistent with constant hammer engagement indicative of harder strata. Fine and gravel sized brown returns of Slate with occasional orange and yellowish brown returns. (SLATE)	
		11.00	D		11.00	255.60	Drilling rate slows significantly but remains consistent with constant hammer engagement indicative of much harder strata. Gravel sized returns of greyish brown Slate with occasional fine material. (SLATE)	
		12.00	D					
		13.00	D					
		14.00	D					
		15.00	D					
		16.00	D					
		17.00	D					
		18.00	D					
		19.00	D					
					19.50	247.10	Very slow but consistent drilling rate with constant hammer engagement indicative of hard strata. Alternating returns of fine	

Remarks: Hole terminated at specified depth in competent Slate bedrock. Hole backfilled by client. Groundwater recorded at 31m on 13/12/2011 and 25.4m on 16/12/2011

Continued next sheet

Logged By

GW / MO

Checked By

RS

Equipment Used:

Beretta T46

Scale

1:50

Sheet 2 of 4



John Grimes Partnership Ltd
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Borehole No
BH4

Hole Type
RO

Project No.
7397

Ground level:
266.60 m AOD

Orientation:
90

Project Name
Yennadon Quarry

Co-ords:
254384E - 68815N

Location:
Yennadon Quarry

Contractor:
Wakehams of Modbury

Client:
Yennadon Stone Ltd

Dates:
13/12/2010

Installation Backfill	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		20.00	D				and gravel sized grey Slate and fine and gravel sized reddish brown Slate. (SLATE)	
		21.00	D					
		22.00	D					
		23.00	D					
		24.00	D					
		25.00	D					
	▼	26.00	D					
		27.00	D					
		28.00	D		28.00	238.60	Very slow but consistent drilling rate with constant hammer engagement indicative of hard strata. Fine and gravel sized returns of dark bluish grey, occasional light grey, Slate. (SLATE)	
		29.00	D					

Remarks: Hole terminated at specified depth in competent Slate bedrock. Hole backfilled by client. Groundwater recorded at 31m on 13/12/2011 and 25.4m on 16/12/2011

Continued next sheet

Logged By	GW / MO	Checked By	RS
Equipment Used:	Beretta T46	Scale	1:50
		Sheet 3 of 4	



Project Name
Yennadon Quarry

Co-ords:
254384E - 68815N

Project No.
7397

Location:
Yennadon Quarry

Contractor:
Wakehams of Modbury

Ground level:
266.60 m AOD

Client:
Yennadon Stone Ltd

Dates:
13/12/2010

Orientation:
90

Installation Backfill	Water Strikes	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
		Depth (m)	Type	Results				
		30.00	D				Very slow but consistent drilling rate with constant hammer engagement indicative of hard strata. Fine and gravel sized returns of dark bluish grey, occasional light grey, Slate. (SLATE)	
	▽	31.00	D					
		32.00	D					
		33.00	D					
		34.00	D					
		35.00	D					
		36.00	D					
				36.60	230.00		End of Borehole at 36.60 m	

Remarks: Hole terminated at specified depth in competent Slate bedrock. Hole backfilled by client. Groundwater recorded at 31m on 13/12/2011 and 25.4m on 16/12/2011

Logged By GW / MO	Checked By RS
Equipment Used: Beretta T46	Scale 1:50
Sheet 4 of 4	