Discovery

Geotechnical & Environmental Engineers

GEOTECHNICAL GROUND INVESTIGATION REPORT
PROPOSED SHOP REDEVELOPMENT
HOLMER ROAD PETROL STATION, HOLMER ROAD, WIDEMARSH, HEREFORD, HEREFORDSHIRE

Carried out for: **AZURE PROPERTY LLP**

March 06

Report No 050046J-007

Discovery
Geotechnical & Environmental Engineers

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HOLMER ROAD PETROL STATION, HOLMER ROAD, WIDEMARSH, HEREFORD, HEREFORDSHIRE

Carried out for: **AZURE PROPERTY LLP**

Discovery GE Limited
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GEOTECHNICAL GROUND INVESTIGATION REPORT
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1 INTRODUCTION

1.1 Engagement of Discovery GE

Discovery GE (DGE) was instructed by AZURE PROPERTY LLP undertake geotechnical assessment works at Holmer Road Petrol Filling Station, Holmer Road, Widemarsh Hereford, in Herefordshire. Following a review of the available environmental data, further investigation was considered necessary in order to retrieve parameters for geotechnical design of the foundation solution for the proposed shop redevelopment at the site.

1.2 Terms of Reference & Methodology

The petrol station site has been the subject of a previous environmental investigation carried out by RSKENSR (RSKENSR report 20954-1 dated Nov 2004 " Environmental Site Assessment Star Holmer Road") The boreholes put down (using a cable percussion drilling rig) as part of the investigation encountered between 0.1 and 0.2 m of tarmac or Concrete overlying Made Ground to depths of between 0.6 and 1.3 m. The Made Ground has been described as a firm red brown sandy CLAY with fragments of brick and concrete. This in turn was found to overlie a firm red brown silty CLAY to a maximum depth of 2.5 m overlying medium dense sand. Groundwater monitoring records indicate standing water levels of between 1.8 and 2.96 m bgl.

The data recovered during the RSKENSR environmental investigation did not include the derivation of any Geotechnical parameters that would allow reliable design of a foundation solution for the shop redevelopment, nor were the exploratory holes put down in close enough proximity to the proposed shop redevelopment. Consequently an additional investigation programme to enable the delivery of the geotechnical requirements was designed which comprised:

- 3 no dynamic continuous sampling exploratory holes put down at the location shown on Drawing No 001.

- 2 no dynamic probe test holes carried out using the "Heavy" dynamic probe configuration at the locations shown on Drawing No 001.
- Installation of gas and groundwater monitoring wells in two of the exploratory holes.
- Geotechnical Laboratory testing (to BS1377:1990 "Method of test for soils for Civil Engineering Purposes") on samples recovered from the exploratory holes.
- Two return visits to site to monitor gas concentrations, flow rates and groundwater levels.

The fieldwork was carried out in accordance with BS 5930: 1999 "Code of Practice for Site Investigations". The findings of the investigation are presented factually in this report together with an interpretation of the findings in terms of identifying foundation solutions for the proposed shop redevelopment. Gas concentration data is also presented factually which may be used for subsequent gas protection design by others.

2 SITE DESCRIPTION PROPOSED REDEVELOPMENT WORKS

2.1 Site Description

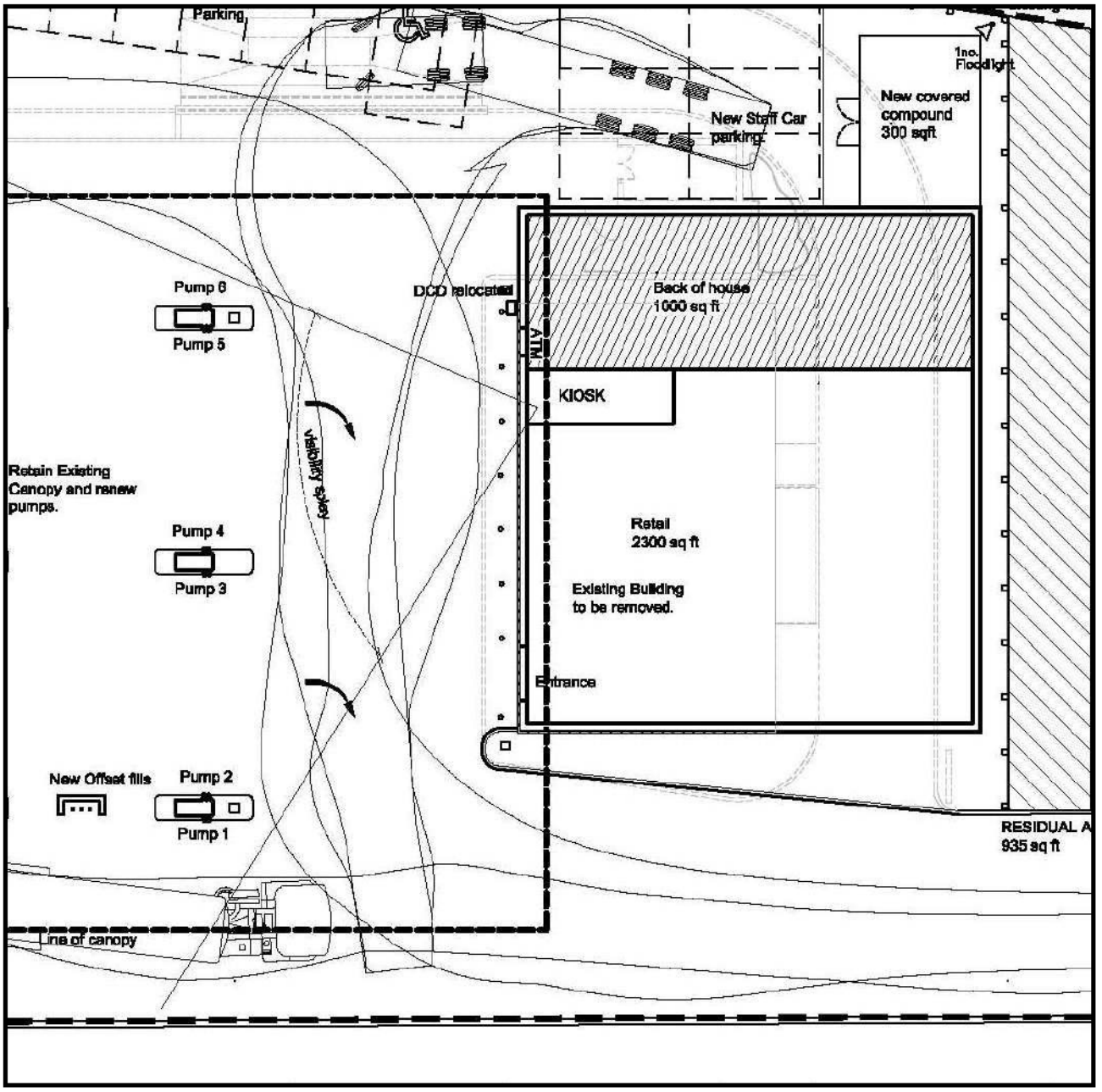
The site is located on Holmer Road, Widemarsh Hereford, in Herefordshire at approximate National Grid Reference SO505411. The whole site occupies an area of about 0.25 Hectares (new shop area approx 300 m^2). The proposed shop re-development area occupies the existing building footprint and the access road to the car wash. At the time of the fieldwork the site was in use as an operational petrol filling station.

Plates 1: View of Investigation area

2.2 Proposed Shop Redevelopment

The proposed redevelopment works for the forecourt shop comprise the demolition of the existing shop unit and the construction of a new unit which partially covers the footprint of the existing shop. (see Figure 1). The exploratory hole locations were positioned (so far as site restraints would allow) to provide data across the proposed redevelopment footprint at the locations shown on Drawing 001.

Figure 1: Proposed Shop Layout



3 GEOLOGY & GROUND CONDITIONS

3.1 Geology

Reference to British Geological Survey Sheet no 198 of Hereford (1:50 000 scale, solid and drift edition) indicates that the site is directly underlain by Fluvio-glacial deposits overlying Raglan Mudstone Formation. Alluvial deposits are indicated approximately 300 m north, east and south of the site.

3.1.1 Ground Conditions as reported by RSKENSR

The site has been the subject of a previous environmental investigation carried out by RSKENSR RSKENSR report 20954-1 dated Nov 2004 " Environmental Site Assessment Star Holmer Road") The boreholes put down (using a cable percussion drilling rig) as part of the investigation encountered between 0.1 and 0.2 m of tarmac or Concrete overlying Made Ground to depths of between 0.6 and 1.3 m. The made ground has been described as a firm red brown sandy CLAY with fragments of brick and concrete. This in turn was found to overlie a firm red brown silty CLAY to a maximum depth of 2.5 m overlying medium dense sand. Groundwater monitoring records indicate standing water levels of between 1.8 and 2.96 m bgl.

3.1.2 Ground Conditions from DGE Investigation

The ground conditions encountered during the DGE investigation comprised Made Ground to depths of between 1.0 and 1.4 m bgl overlying Fluvio-glacial deposits to the base of the exploratory holes.

.Table 1: Summary of Ground Conditions

Strata	Typical Description	Thickness (m)	Depth to Base (m bgl)	Notes
Made Ground	Sandy GRAVEL (roadstone) to between 0.5 and 0.6 m depth overlying firm or stiff gravely CLAY.	1.0 to 1.4 m	1 to 1.4 m	Locally soft clay noted in the Made Ground
Fluvio-glacial	Generally reddish brown medium dense SAND or sandy GRAVEL. Locally with layers of Firm or stiff red brown sandy slightly gravelly CLAY	NP	> 4 m	NP – represents full thickness of stratum not proven

A single Standard Penetration Test (SPT) carried out in the Made ground resulted in an SPT "N" value of 16 indicating that the materials are stiff (locally soft from field descriptions). The materials are indicated as being non frost susceptible based on field descriptions.

SPTs carried out in the underlying natural Fluvio-glacial Deposits resulted in SPT 'N' values of between 12 and 26 for the cohesive materials (indicating firm and stiff shear strengths). Two Atterberg limit determinations resulted in plasticity index of values of 9 an 10 indicating that the materials are of low volume change potential but are frost susceptible. The plastic limit was recorded at 14 % with liquid limits of 23 and 24 %. Natural moisture content was measured at 11 and 13 %.

SPTs carried out in the granular Fluvio-glacial Materials resulted in SPT "N" values of between 13 and 52 for the granular materials (indicating them to be medium dense to very dense). Particle size distribution testing carried out in the granular Fluvio-glacial materials indicate it to be a very gravelly SAND or SAND and GRAVEL with between 9 and 15 % silt and clay content.

Interpretation of the dynamic probing also carried out at the site confirms the strength profiles indicated by the SPT testing.

3.2 Gas and Groundwater Monitoring

Gas concentrations and groundwater levels were recorded on two return visits to site. The monitoring results are summarised in Table 2.

Table 2: Summary of gas and groundwater monitoring.

Borehole	WS101 (min)	WS101 (max)	WS103 (min)	WS103 (max)
Methane (%)	0.0	0.0	0.0	0.0
Carbon dioxide (%)	0.0	0.2	0.0	2.1
Oxygen (%)	21.2	21.4	20.5	21.2
Flow rate (l/s)	0.0	0.0	0.0	0.0
Groundwater (mbgl)	2.1	2.33	2.1	2.27

4 DISCUSSION

4.1 Conventional Spread Foundations

Conventional strip or pad foundations could be adopted at the site with foundations extending into the Fluvio-glacial materials at a depth of around 1.5 m bgl. At this depth an allowable bearing pressure of 175 kN/m^2 for foundations up to 1 m wide would limit total settlements to 25 mm. Foundation excavations should be inspected by competent personnel prior to blinding of the excavation to ensure that any soft spots are removed and that the formation is suitable to receive the applied loads.

Should conventional spread foundations be used, a suspended floor slab is recommended due to the thickness of Made Ground at the site.

4.2 Raft Foundations

As an alternative to conventional spread foundations, a raft foundation solution may be adopted at the site. The follow preparations are considered appropriate:

- The formation should be proof rolled and any soft spots removed and replaced with suitably compacted granular materials.

- The formation should be inspected and any degradable or organic materials should be removed.

Provided these preparations are adopted the anticipated loading of 25 kN/m^2 across the raft will result in total settlements of no more than 25 mm and differential movement will not exceed 15 mm.

Following proof rolling (and removal and replacement of soft spots) a design CBR of 15 % (modulus of Subgrade Reaction of approximately 62 MN/m^3) may be adopted for the granular Made Ground encountered at the site whereas a design CBR of 5% (modulus of Subgrade Reaction of approximately 38 MN/m^3) would be considered appropriate for the cohesive Made Ground (if encountered at formation level).

4.3 Buried Concrete

Testing for pH and water soluble sulphate content of the Made Ground materials at the site have revealed pH to range between 7.8 and 8.9 with a water soluble sulphate concentration of between 0.02 and 0.04 g/l. The results indicate a design sulphate class of DS-1 for the site and an Aggressive Chemical Environment for Concrete (ACEC) site classification of AC-1s

For **Discovery GE**

[redacted]

Cathal Gillespie
BSc(Hons) MSc(Eng)
Principal Engineer

[redacted]

Peter Smith
BSc(Hons) MSc CEng MICE
Director

5 REFERENCES

5.1 British Standards and Codes of Practice

British Standards and Codes of Practice
BS 5930 : 1999: Code of Practice for Site Investigations. British Standards Institution.

BS1377: 1990: Method of tests for soils for Civil Engineering Purposes

5.2 Reports and Publications

British Geological Survey Sheet no 198 “Hereford ”. 1:50 000 Scale Solid & Drift Edition

FIGURES & TABLES

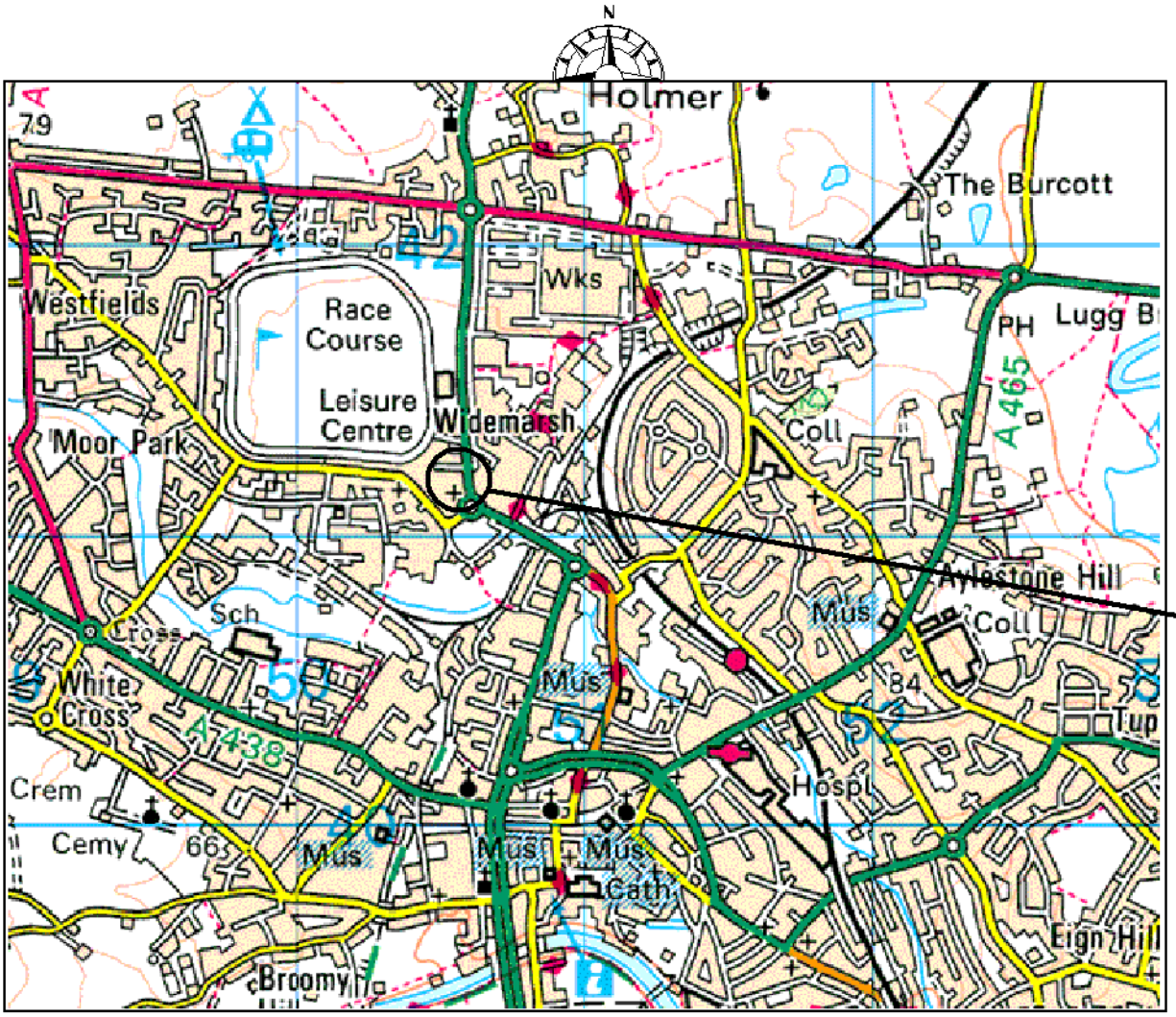


Figure 1
Key Plan
Report No: 05046J/007
Site Name: Holmer Road
Client: Azure Property LLP

Table 1 GAS & GROUNDWATER MONITORING DATA

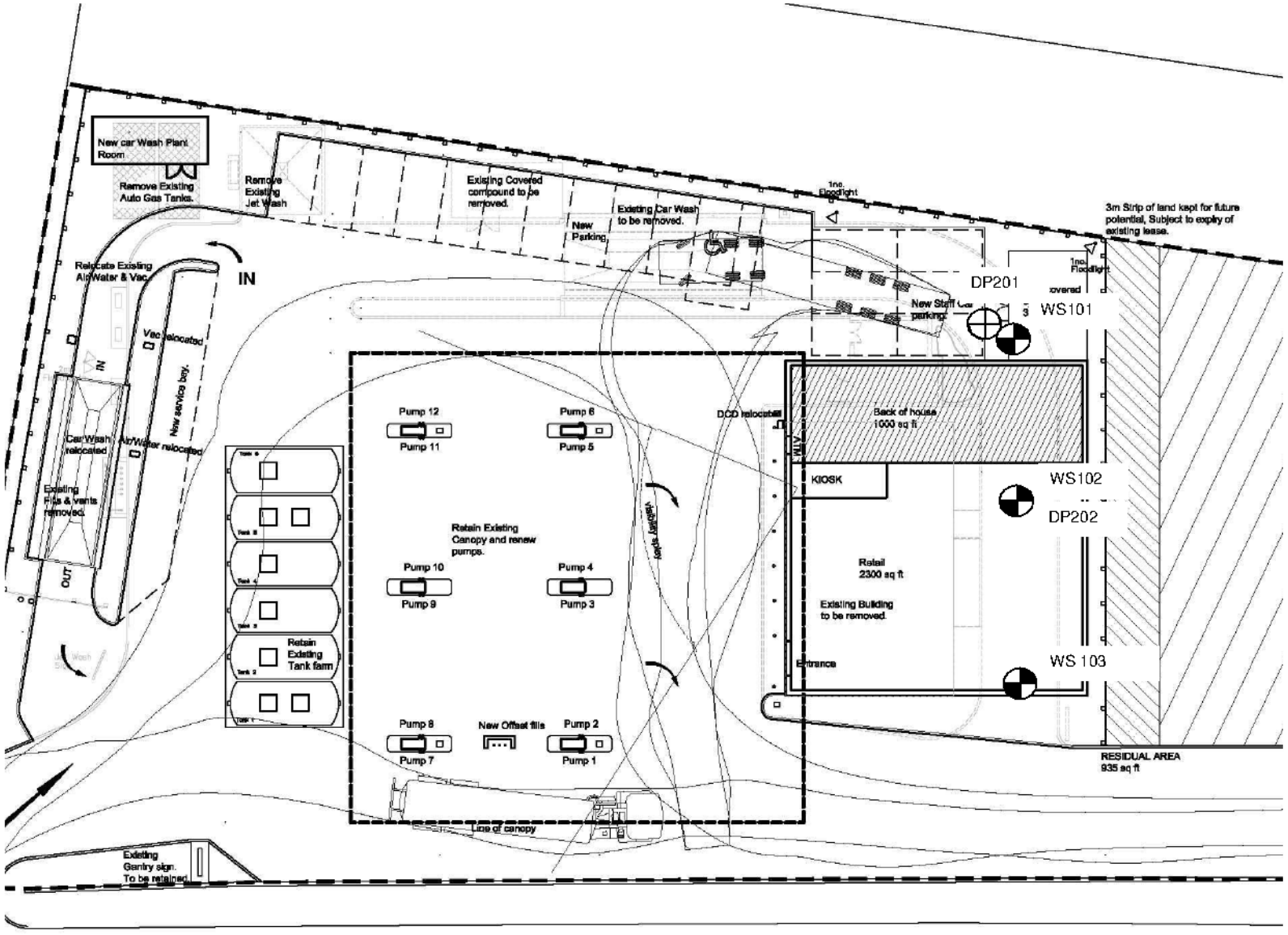
Site: HOLMER ROAD
Project : 05046J/007

Location	Standpipe diameter (mm)	CH_4 (% v/v)	CO_2 (% v/v)	O_2 (% v/v)	H_2S (ppm)	Flow Rate (litres/hr)	Atmospheric Pressure (mb)	Measurement Duration (s)	Standpipe Depth (m bgl)	Water Level (m bgl)	PID ppm (if used)	Date
WS101	19	0.0	0.0	21.2		0.0	1019	120	0.88	Dry	N/A	17-Mar-06
WS101	19								2.50	2.33	N/A	17-Mar-06
WS103	19	0.0	0.0	21.2		0.0	1018	120	1.00	Dry	N/A	17-Mar-06
WS103	19								2.50	2.20	N/A	17-Mar-06
WS101	19	0.0	0.2	21.4		0.0	995	120	0.88	Dry	N/A	31-Mar-06
WS101	19								2.50	2.10	N/A	31-Mar-06
WS103	19	0.0	2.1	20.5		0.0	995	120	1.00	Dry	N/A	31-Mar-06
WS103	19								2.50	2.27	N/A	31-Mar-06

Monitored by Tristan Hughes
Equipment LMSxi Multifunction Gas Analyser

DRAWINGS

TITLE	DRAWING
Exploratory Hole Location plan	001



GENERAL NOTES

1 WS 102 completed by dynamic probing from 3 m to base of hole

Legend

Window Sample Location

WS102 Dynamic Probe Location

Revision	Description

Client

AZURE LLP

Title

HOLMER ROAD EXPLORATORY HOLE LOCATION PLAN

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Date	Drawing No	Scale
28/03/06	05046J-007-001	Unknown
Drawn By	Checked By	Sheet Size
CG	PDS	A3

APPENDIX

TITLE	APPENDIX
Exploratory Hole Logs	A
Geotechnical Laboratory Testing	B

APPENDIX A

Exploratory Hole Logs

Discovery Discovery GE Ltd
The Granary, Broadwell House Farm,
Broadwell, Warks, CV23 8HF

Geotechnical & Environmental Engineers

Borehole No **WS101**
Sheet 1 of 1

Project Name	Project No.	Co-ords: -	Hole Type
Holmer Road	05046J/007		WS
Location: Holmer Road		Level: -	Scale 1:50
Client: Azure Property LLP		Dates: 03/03/2006	Logged By TH

Samples & In Situ Testing

Depth (m)	Type	Results
0.80	ES	
1.00	SPT	N=20 (2,2/ 4,4,5,7)
1.00	D	
1.30-1.40	D	
1.80	ES	
1.90	D	
2.00	SPT	N=22 (3,3/ 4,6,6,6)
2.00	D	
2.30	D	
2.60	D	

Water Strikes: ∇ at 2.60 m

Depth (m)	Level (m AOD)	Stratum Description
0.12		MADE GROUND: Coarse Grained tarmac.
0.55		MADE GROUND: Grey silty sandy GRAVEL. Gravel is angular and subangular fine and medium of limestone. (Roadstone)
1.00		MADE GROUND: Firm grey brown slightly sandy slightly gravelly CLAY with frequent rootlets. Gravel is angular fine of quartz. From 0.90m becoming brown and more gravelly.
1.50		MADE GROUND: Medium dense friable red brown mottled grey red very slightly sandy slightly gravelly SAND. Gravel is angular to rounded fine and medium of quartz and siltstone. (PROBABLY MADE GROUND)
2.50		Medium dense red brown slightly clayey slightly gravelly fine to coarse SAND. Gravel is angular to rounded fine and medium of quartz and siltstone. (FLUVIO-GLACIAL DEPOSITS)
3.00		Firm red brown sandy slightly gravelly CLAY. Gravel is subangular to rounded fine and medium of quartz. (FLUVIO-GLACIAL DEPOSITS)

End of Borehole at 3.00 m

Remarks: Borehole completed at 3.00m due to sides collapsing. Groundwater encountered at 2.60m.

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Discovery Geotechnical & Environmental Engineers

Project Name: Holmer Road	Project No.: 05046J/007	Co-ords: -	Borehole No: **WS102** Sheet 1 of 1
Location: Holmer Road		Level: -	Hole Type: WS
Client: Azure Property LLP		Dates: 03/03/2006	Scale: 1:50
			Logged By

Samples & In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m AOD)	Stratum Description
			0.13		MADE GROUND: Coarse grained tarmac
			0.60		MADE GROUND: Grey silty sandy GRAVEL. Gravel is angular and subangular fine and medium of limestone. (Roadstone)
0.80	ES		0.80		MADE GROUND: Soft black slightly sandy gravelly SILT with cobble sized brick fragments.
1.00 1.00 1.30-1.40	SPT D D	N=13 (2,2/ 2,3,3,5)	1.00		MADE GROUND: Firm brown mottled grey red slightly sandy slightly gravelly clay. Gravel is angular to rounded fine of quartz and coal.
1.80	ES		1.70		Firm friable red brown and light grey slightly clayey slightly gravelly SAND. Gravel is angular and subangular fine and medium of quartz, limestone and siltstone. (PROBABLY MADE GROUND)
2.00 2.00 2.30-2.40	SPT D D	N=32 (5,4/ 7,8,8,9)	2.00		Red brown slightly clayey slightly gravelly fine and medium SAND. Gravel is subangular to rounded fine and medium of limestone and quartz. (FLUVIO-GLACIAL DEPOSITS) Becoming a gravelly sand from 1.80m.
			2.50		Very Stiff red brown slightly sandy gravelly CLAY. Gravel is subangular to rounded fine and medium of quartz and limestone.
2.90 3.00 3.00	D SPT D	N=12 (1,1/ 2,2,4,4)	2.80		Medium dense red brown clayey slightly sandy GRAVEL. Gravel is subangular to rounded fine and medium of quartz and limestone.(FLUVIO-GLACIAL DEPOSITS)
			3.00		Firm red brown sandy gravelly CLAY. Gravel is subangular to rounded fine and medium of quartz and limestone. (FLUVIO-GLACIAL DEPOSITS)

End of Borehole at 3.00 m

Remarks: Borehole completed at 3.00m due to the sides collapsing.
Standard Penetration Test undertaken at 3.00m may be unrepresentative as equipment had to be pushed from 2.50m to test depth through material which had collapsed into the hole.
Groundwater encountered at 2.60m

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The Granary, Broadwell House Farm,
Broadwell, Warks, CV23 8HF

Project Name Holmer Road	Project No. 05046J/007	Co-ords: -	Borehole No **WS103** Sheet 1 of 1
Location: Holmer Road		Level: -	Hole Type WS
			Scale 1:50
Client: Azure Property LLP		Dates: 03/03/2006	Logged By

Samples & In Situ Testing

Depth (m)	Type	Results
0.70	ES	
1.00	SPT	N=16 (1,1/ 2,3,5,6)
1.00	D	
1.60	ES	
1.70-2.00	B	
2.00	SPT	N=26 (4,5/ 4,6,8,8)
2.00	D	
2.20-2.40	D	
2.70-2.80	D	
2.90-3.00	D	
3.00	SPT	N=12 (1,2/ 3,3,2,4)
3.00	D	
3.10-3.30	D	
3.70-3.90	D	
4.00	CPT	N=27 (8,8/ 8,7,7,5)
4.00	D	
4.45	CPT	N=52 (10,10/ 11,12,15,14)
4.45	D	

Water Strikes: ▽ at 2.60 m

Stratum Description

Depth (m)	Level (m AOD)	Stratum Description
0.12		MADE GROUND: Coarse grained tarmac.
0.50		MADE GROUND: Grey silty sandy GRAVEL. gravel is angular and subangular fine and medium of limestone. (Roadstone)
1.40		MADE GROUND: Stiff red brown sandy gravelly CLAY. Gravel is angular and subangular fine to coarse of brick, coal, quartz and limestone.
2.00		Firm friable red brown mottled grey red slightly clayey slightly gravelly SAND. Gravel is subangular to rounded fine and medium of limestone, quartz and very rare pieces of coal. (PROBABLY MADE GROUND)
2.60		Stiff red brown very sandy gravelly CLAY. Gravel is angular to subangular fine of limestone and quartz. (FLUVIO-GLACIAL DEPOSITS)
2.80		Red brown clayey slightly sandy GRAVEL. Gravel is angular and subangular fine and medium of limestone and quartz. (FLUVIO-GLACIAL DEPOSITS)
3.00		Firm red brown slightly sandy slightly gravelly CLAY. Gravel is subrounded medium of siltstone. (FLUVIO-GLACIAL DEPOSITS)
3.60		Medium dense red brown slightly silty fine and medium SAND and GRAVEL. Gravel is angular to subrounded fine of quartz and limestone. (FLUVIO-GLACIAL DEPOSITS)
4.00		Medium dense red brown silty slightly gravelly fine and medium SAND. Gravel is angular to subrounded fine and medium of quartz and limestone. (FLUVIO-GLACIAL DEPOSITS)

End of Borehole at 4.50 m

Depth scale: 1 2 3 4 5 6 7 8 9 10

Remarks: Groundwater encountered at 2.60m.

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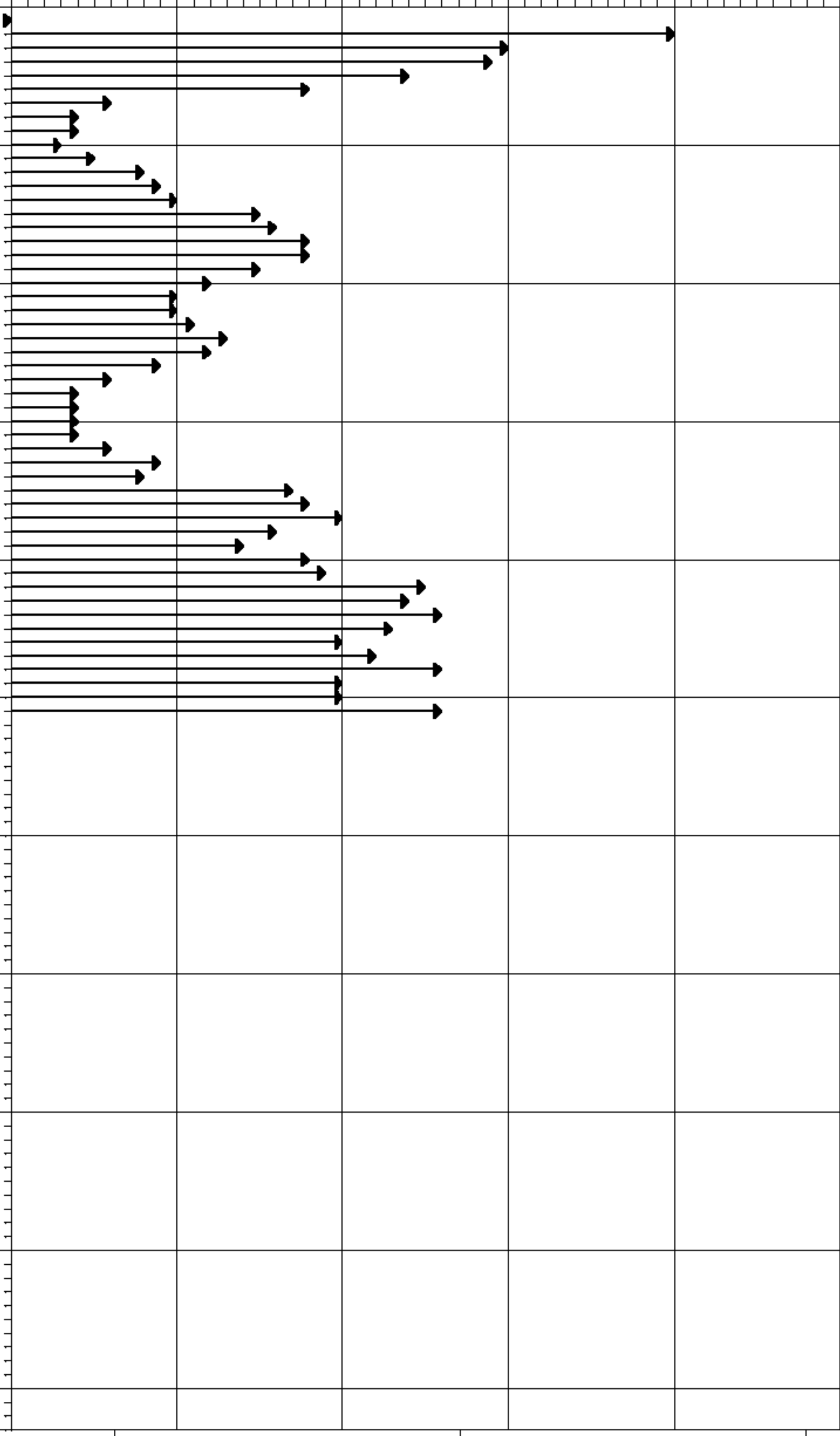
DYNAMIC PROBING

Probe No	**DP101**		
Client	Azure Property LLP	Sheet 1 of 1	
Site	Holmer Road	Project No	05046J/007
E -	N -	Level -	
Date	03/03/2006	Logged by	

Readings Blows/100mm

Depth (m)					
0.0	0	40	30	29	24
	18	6	4	4	3
1.0	5	8	9	10	15
	16	18	18	15	12
2.0	10	10	11	13	12
	9	6	4	4	4
3.0	4	6	9	8	17
	18	20	16	14	18
4.0	19	25	24	26	23
	20	22	26	20	20
5.0	26				

Diagram (N100 Values)



Torque (Nm)

Depth (m): 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0

Fall Height	750	Cone Base Diameter	50
Hammer Wt	65.50	Final Depth	5.30
Probe Type	DPSH	Log Scale	1:50

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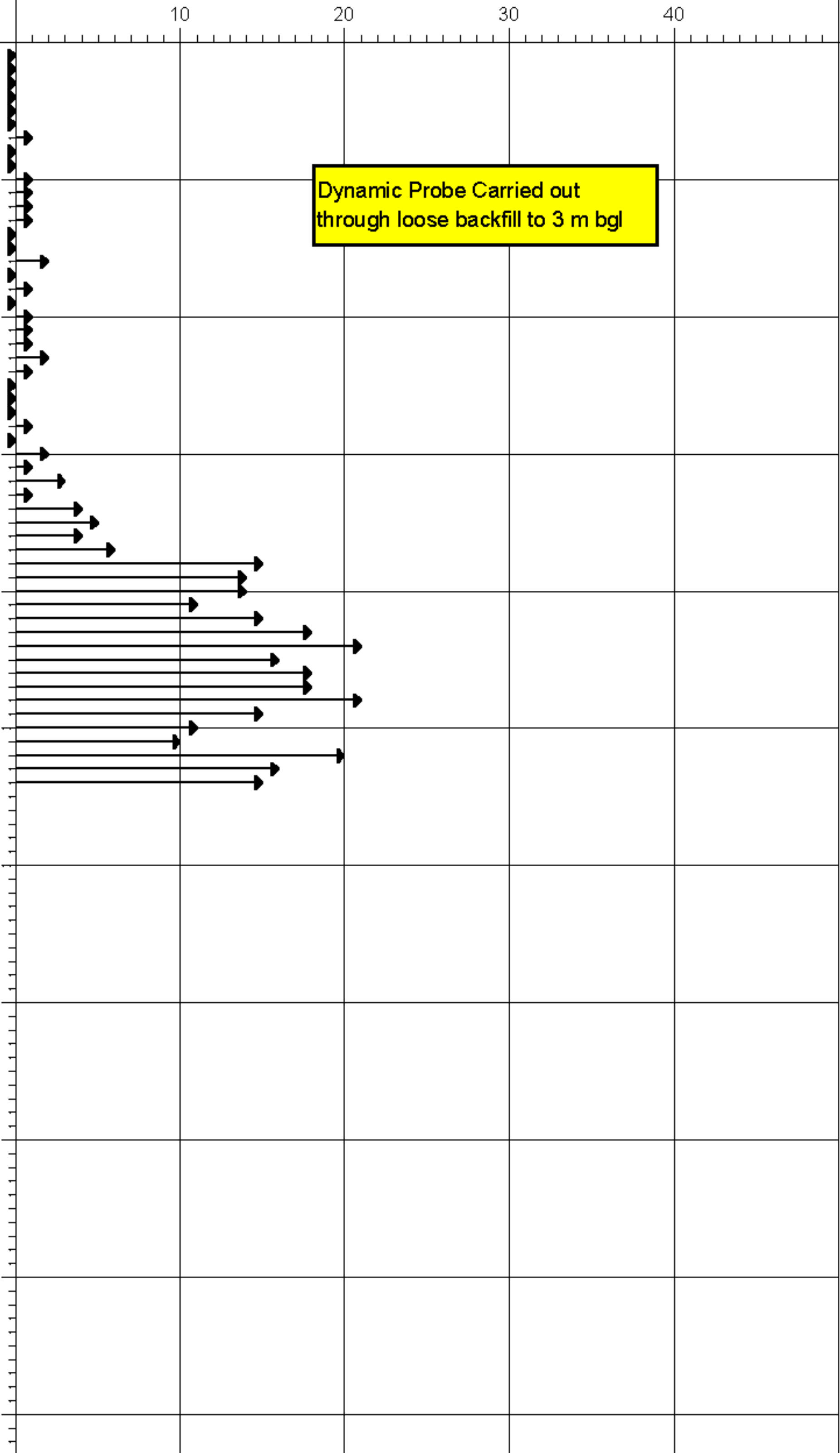
DYNAMIC PROBING

Probe No	**DP102**
Client: **Azure Property LLP**	Sheet 1 of 1
Site: **Holmer Road**	Project No: **05046J/007**
E - / N - / Level -	Date: **03/03/2006** / Logged by

Depth (m)	Readings Blows/100mm				
0.0–0.5	0	0	0	0	0
0.5–1.0	0	1	0	0	1
1.0–1.5	1	1	1	0	0
1.5–2.0	2	0	1	0	1
2.0–2.5	1	1	2	1	0
2.5–3.0	0	0	1	0	2
3.0–3.5	1	3	1	4	5
3.5–4.0	4	6	15	14	14
4.0–4.5	11	15	18	21	16
4.5–5.0	18	18	21	15	11
5.0–5.3	10	20	16	15	

Diagram (N100 Values) — Torque (Nm)



Depth scale: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0

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Fall Height	750	Cone Base Diameter	50
Hammer Wt	63.50	Final Depth	5.30
Probe Type	DPSH	Log Scale	1:50

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APPENDIX B

Geotechnical Laboratory Testing

BUREAU VERITAS LABORATORIES LIMITED
2 Newton Close
Drayton Fields Industrial Estate
Daventry
Northants NN11 8RR
Telephone: + 44 (0) 1327 703828
Facsimile: + 44 (0) 1327 300154
daventry@uk.bureauveritas.com

0199

TEST REPORT

Report No: 50012185/06/1
Our Ref: DAM0004384

Client

Cathal Gillespie
Discovery GE Ltd
The Granary
Broadwell House Farm
Broadwell
Warks
CV23 8HF

Test Report

Site: Holmer Road

Test Requested: Determination of Moisture Content, Atterberg Limits and Particle Size Distribution

Test Method: BS 1377-2: 1990: Method 3.2, 4.4, 5 and 9.2

Sample Details:
Supplied By: Client
Date Received: 17.03.06
Tested From: 17.03.06 to 23.03.06

Results: See attached sheets

Date: 23.03.06

Signed: [redacted]

[✓] D. Berrill - Section Manager
[ ] D. Goddard - Laboratory Manager

For and on behalf of **Bureau Veritas Laboratories Limited**

BUREAU VERITAS LABORATORIES LIMITED
2 Newton Close
Drayton Fields Industrial Estate
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Northants NN11 8RR
Telephone: + 44 (0) 1327 705528
Facsimile: + 44 (0) 1327 300154
daventry@uk.bureauveritas.com

0199

TEST REPORT

Determination of Moisture Content and Atterberg Limits

Client: Discovery GE Ltd
Site: Holmer Road

Report No: 50012185/06/1

Laboratory Reference	Location	Depth (m)	Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Retained 425µm BS Test Sieve (Estimated)
45021131	WS102	2.30-2.40	13	24	14	10	61
45021134	WS103	2.20-2.40	11	23	14	9	58

Comments: Sample Type: Disturbed

Sample Preparation: Washed over 425µm BS Test Sieve

Descriptions:

45021131 Soft red brown very gravelly CLAY
45021134 Soft red brown very gravelly CLAY

Certified that the laboratory testing was carried out in accordance with BS 1377-2: 1990: Method 3.2, 4.4 and 5

Date: 23.03.06

Signed: [redacted]

[✓] D. Berrill - Section Manager
[ ] D. Goddard - Laboratory Manager

For and on behalf of **Bureau Veritas Laboratories Limited**

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BUREAU VERITAS

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TEST REPORT

Determination of Particle Size Distribution

Client: Discovery GE Ltd
Site: Holmer Road

Report No: 50012185/06/1
Location: WS103
Lab Ref: 45021133
Depth (m): 1.70-2.00

Sampled from: Site
Sampled by: Client
Supplier: Client
Source: Site

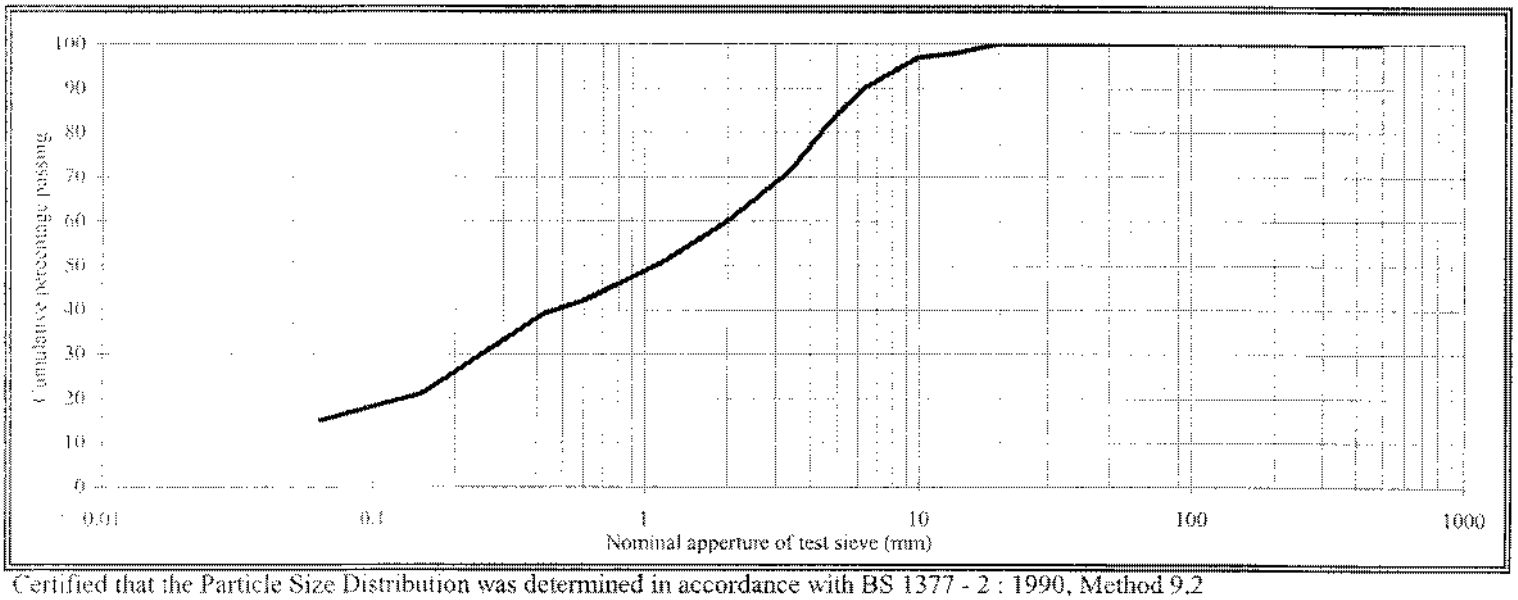
Date Sampled: Not Advised
Date Received: 17.03.06
Sample Type: Disturbed
Mass (kg): 1.7

Description: Red brown slightly clayey SAND & gravel

Specification: Not Required

Comments:

SIEVE ANALYSIS		
BS Sieve (mm)	Passing (%)	Material Specification
500	100	
300	100	
125	100	
100	100	
90	100	
75	100	
63	100	
50	100	
37.5	100	
28	100	
20	100	
14	98	
10	97	
6.3	90	
5	84	
3.35	71	
2	60	
1.18	51	
0.600	42	
0.425	39	
0.300	33	
0.212	27	
0.150	21	
0.063	15	



Certified that the Particle Size Distribution was determined in accordance with BS 1377 - 2 : 1990, Method 9.2
Method of Preparation: BS 1377 - 1 & 2 : 1990

Date: 23.03.06

Signed: [redacted]

[✓] D. Berrill - Section Manager
[ ] D.Goddard - Laboratory Manager
For and on behalf of Bureau Veritas Laboratories Limited

BUREAU VERITAS LABORATORIES LIMITED
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BUREAU VERITAS

0199

TEST REPORT

Determination of Particle Size Distribution

Client: Discovery GE Ltd
Site: Holmer Road

Report No: 50012185/06/1
Lab Ref: 45021135

Location: WS103
Depth (m): 3.10-3.30

Sampled from: Site
Sampled by: Client
Supplier: Client
Source: Site

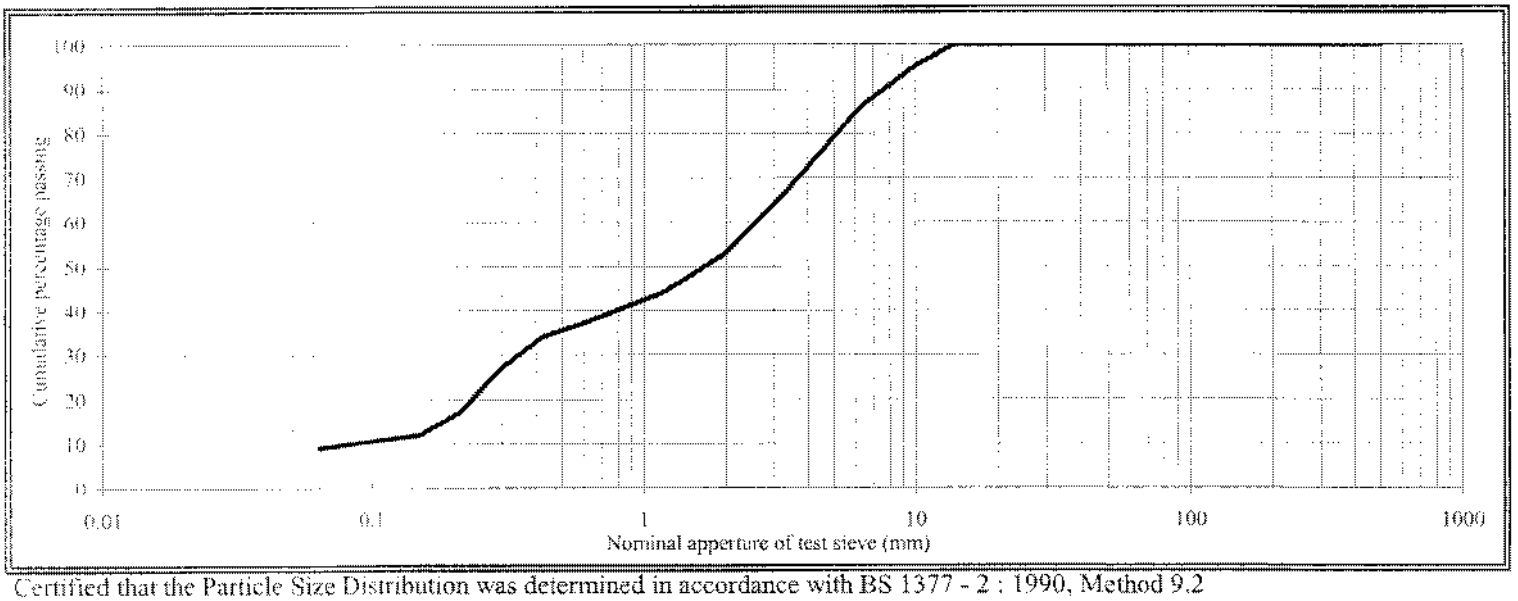
Date Sampled: Not Advised
Date Received: 17.03.06
Sample Type: Disturbed
Mass (kg): 0.9

Description: Red brown clayey SAND & gravel

Specification: Not Required

Comments:

SIEVE ANALYSIS		
BS Sieve (mm)	Passing (%)	Material Specification
500	100	
300	100	
125	100	
100	100	
90	100	
75	100	
63	100	
50	100	
37.5	100	
28	100	
20	100	
14	100	
10	95	
6.3	86	
5	79	
3.35	67	
2	53	
1.18	44	
0.600	37	
0.425	34	
0.300	27	
0.212	17	
0.150	12	
0.063	9	



Certified that the Particle Size Distribution was determined in accordance with BS 1377 - 2 : 1990, Method 9.2
Method of Preparation: BS 1377 - 1 & 2 : 1990

Date: 23.03.06

Signed: [redacted]

[✓] D. Berrill - Section Manager
[ ] D.Goddard - Laboratory Manager

For and on behalf of Bureau Veritas Laboratories Limited

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Glasgow G33 4DB
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glasgow@uk.bureauveritas.com

0451

TEST REPORT

Report No: DAM0004384
Your Ref: GT-001
Date: 28 March 2006

ANALYTICAL CHEMISTRY TEST REPORT

Client: Discovery GE Limited

Address: The Granary
Broadwell House Farm
Broadwell
Rugby
Warks

Contact: Cathal Gillespie
Site: Holmer Road

Test Method: In accordance with BS 1377-3: 1990 and In house methods (available on request)

Sample Details: 2 No Disturbed samples submitted by our Daventry laboratory
Sampled by Client

Date sampled	-	Not given
Date received	-	21 March 2006
Date prepared	-	22 March 2006
Date tested	-	22 March 2006 - 28 March 2006
Clients ref	-	see attached
BV Ref.	-	see attached
Contract no	-	50012185

Results: see attached results summary sheet

Comments: See Appendix A for list of determinands tested under UKAS or MCERTS accreditation and the methods used.

SIGNED
for and on behalf of Bureau Veritas Laboratories Ltd

[redacted]

James White
Senior Analytical Chemist

Report No: DAM0004384

Date: 28 March 2006

Client: Discovery GE Limited

Site: Holmer Road

Bureau Veritas Laboratories Ref (Daventry)		45021130	45021132
Client Reference		WS101	WS103
Depth		0.80	1.00
pH value		7.8	8.9
Water Soluble Sulphate	g/l	0.02	0.04
Grading 2mm	%	100	98

Signed: [redacted]

Date: 28/03/06