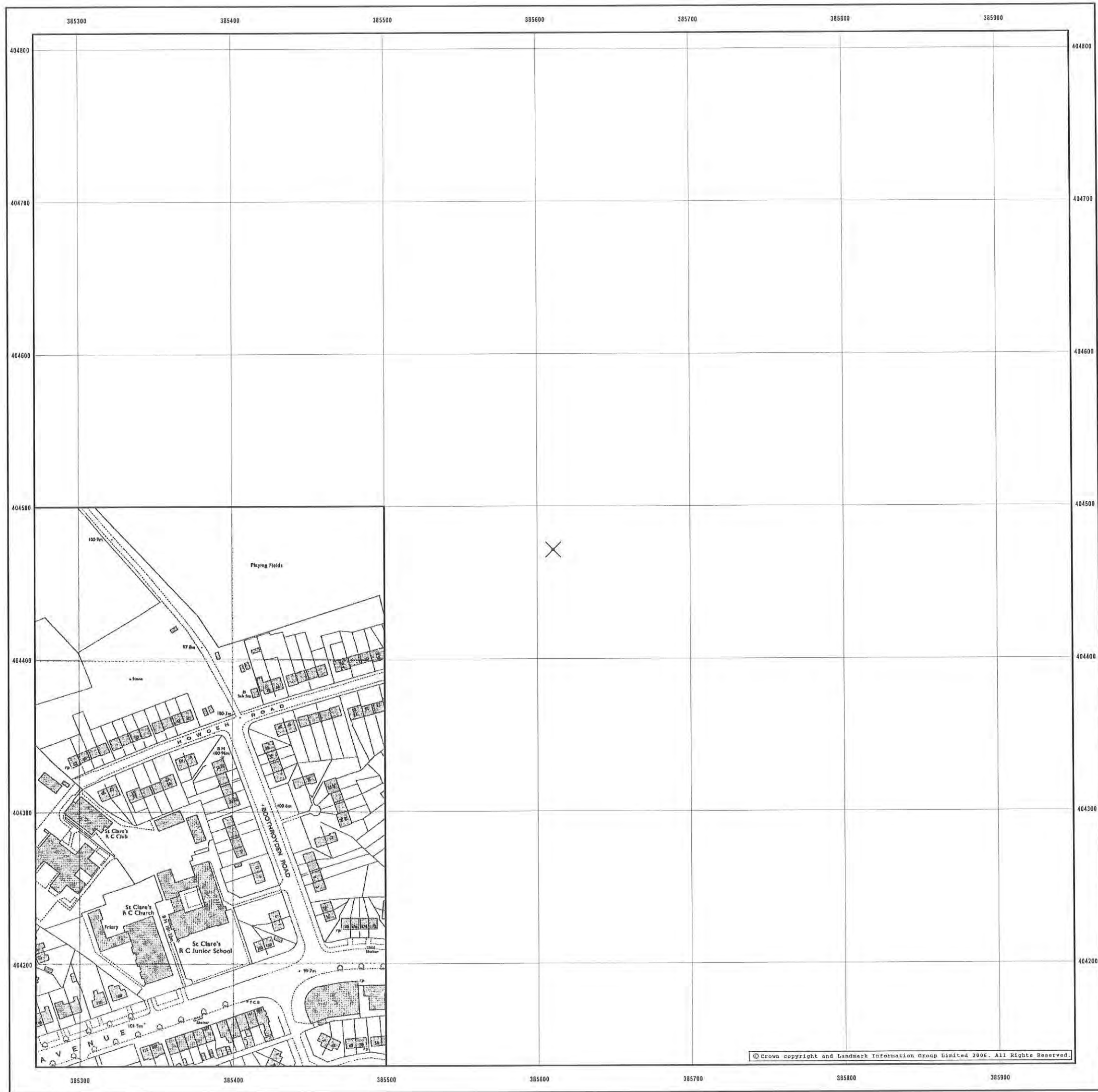




CLIENT DETAILS Envirocheck Order No. EC19993332_1_1
(15-May-2006 15:37)
 Customer Ref: K Nicholls, PN051161
 Geotechnics Ltd
 THE GEOTECHNICAL CENTRE UNIT 1 BORDERS INDUSTRIAL PARK
 SALTNEY
 CH4 8RJ

SITE DETAILS Grid Reference 385610 404470
 Our Lady'S Rc Sports College
 Alworth Road
 Manchester
 M9 0RP

Historical Map Legend

Inactive Quarry, Chalk Pit or Clay Pit	Active Quarry, Chalk Pit or Clay Pit	Culvert
Slope	Slope	
Pylon	Electricity Transmission Line	Direction of Water flow
Marsh	Saltings	Orchard Tree
Rough Grassland	Scrub	Heath
Coniferous Tree (Surveyed)	Coniferous Tree (Not Surveyed)	Non-coniferous Tree (Surveyed)
Non-coniferous Tree (Not Surveyed)		

Ordnance Survey Plan 3
 The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given on the right is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

ORDNANCE SURVEY PLAN
 Published 1982
 Source map scale - 1:1,250

1982

Date(s) of Publication 7 of 22



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 Customer Ref: K Nicholls, PN061161
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 SALTNEY
 CH4 8RJ

SITE DETAILS Grid Reference 385610 404470
 Our Lady's RC Sports College
 Alworth Road
 Manchester
 M9 0RP

Historical Map Legend

- | | | |
|--|--------------------------------------|--------------------------------|
| | | |
| Inactive Quarry, Chalk Pit or Clay Pit | Active Quarry, Chalk Pit or Clay Pit | Culvert |
| | | |
| Slope | Slope | |
| | | |
| Pylon | Electricity Transmission Line | Direction of Water flow |
| | | |
| Marsh | Saltings | Orchard Tree |
| | | |
| Rough Grassland | Scrub | Heath |
| | | |
| Coniferous Tree (Surveyed) | Coniferous Tree (Not Surveyed) | Non-coniferous Tree (Surveyed) |
| | | |
| Coppice, Osier | Reeds | Bracken |

Additional SIMs
 The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1991, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

ORDNANCE SURVEY PLAN
 Published 1978 to 1988
 Source map scale - 1:1,250

1984	1988
1978	1978

Date(s) of Publication 8 of 22

Ordnance Survey
 Licensed Partner

LANDMARK
 Information Group

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(15-May-2006 15:27)

Customer Ref: K Nicholls, PN061161
Geotechnics Ltd
THE GEOTECHNICAL CENTRE UNIT 1 BORDERS INDUSTRIAL PARK
SALTNEY
CH4 8RJ

SITE DETAILS Grid Reference 385610 404470

Our Lady'S Rc Sports College
Alworth Road

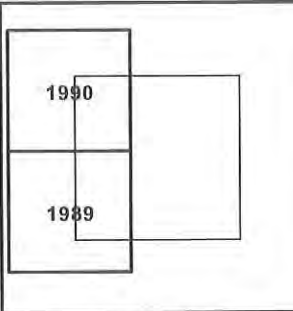
Manchester
M9 0RP

Historical Map Legend

Inactive Quarry, Chalk Pit or Clay Pit	Active Quarry, Chalk Pit or Clay Pit	Culvert
Slope	Slope	
Pylon	Electricity Transmission Line	Direction of Water flow
Marsh	Saltings	Orchard Tree
Rough Grassland	Scrub	Heath
Coniferous Tree (Surveyed)	Coniferous Tree (Not Surveyed)	Non-coniferous Tree (Surveyed)
		Non-coniferous Tree (Not Surveyed)

Additional SIMs 2
The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1991, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

ORDNANCE SURVEY PLAN
Published 1989 to 1990
Source map scale - 1:1,250



Date(s) of Publication 9 of 22



CLIENT DETAILS Envirocheck Order No. EC19993332_1_1
[15-May-2006 10:21]
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 SALTNEY
 CH4 8RJ

SITE DETAILS Grid Reference 385610 404470
 Our Lady's R.C. Sports College
 Alworth Road
 Manchester
 M9 0RP

Historical Map Legend

Inactive Quarry, Chalk Pit or Clay Pit	Active Quarry, Chalk Pit or Clay Pit	Culvert
Slope	Slope	
Pylon	Electricity Transmission Line	Direction of Water flow
Marsh	Saltings	Orchard Tree
Rough Grassland	Scrub	Heath
Coniferous Tree (Surveyed)	Coniferous Tree (Not Surveyed)	Non-coniferous Tree (Surveyed)
Non-coniferous Tree (Not Surveyed)	Non-coniferous Tree (Not Surveyed)	Non-coniferous Tree (Not Surveyed)

Supply of Unpublished Survey Information 1
 SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a 'work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

ORDNANCE SURVEY PLAN
 Published 1974 to 1976
 Source map scale - 1:1,250

1976	1974
1976	1976

Date(s) of Publication 10 of 22



CLIENT DETAILS Envirocheck Order No. EC19993332_1_1
(15-May-2006 15:28)
Customer Ref: K Nicholls, PN061161
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THE GEOTECHNICAL CENTRE UNIT 1 BORDERS INDUSTRIAL PARK
SALTNEY
CH4 8RJ

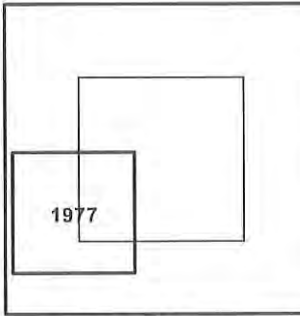
SITE DETAILS Grid Reference 385610 404470
Our Lady'S Rc Sports College
Alworth Road
Manchester
M9 0RP

Historical Map Legend

- | | | |
|--|--------------------------------------|--------------------------------|
| | | |
| Inactive Quarry, Chalk Pit or Clay Pit | Active Quarry, Chalk Pit or Clay Pit | Culvert |
| | | |
| Slope | Slope | |
| | | |
| Pylon | Electricity Transmission Line | Direction of Water flow |
| | | |
| Marsh | Saltings | Orchard Tree |
| | | |
| Rough Grassland | Scrub | Heath |
| | | |
| Coniferous Tree (Surveyed) | Coniferous Tree (Not Surveyed) | Non-coniferous Tree (Surveyed) |
| | | |
| Non-coniferous Tree (Not Surveyed) | | |

Supply of Unpublished Survey Information 2
SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a 'work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

ORDNANCE SURVEY PLAN
Published 1977
Source map scale - 1:1,250



Date(s) of Publication 11 of 22



CLIENT DETAILS Envirocheck Order No. EC19993332_1_1
(15-May-2006 15:28)
 Customer Ref: K Nicholls, PN061101
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 SALTNEY
 CH4 8RJ

SITE DETAILS Grid Reference 385610 404470
 Our Lady's Rc Sports College
 Alworth Road
 Manchester
 M9 0RP

Historical Map Legend

Slope	Slope
Bench Mark	Wells
Direction of Water flow	Pylon
Buildings with Building Seed	Electricity Transmission Line

Administrative Boundaries

	Civil parish/community boundary
	District boundary
	County boundary
	Boundary post/stone
	Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)

Large-Scale National Grid Data 1
 'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the forerunners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

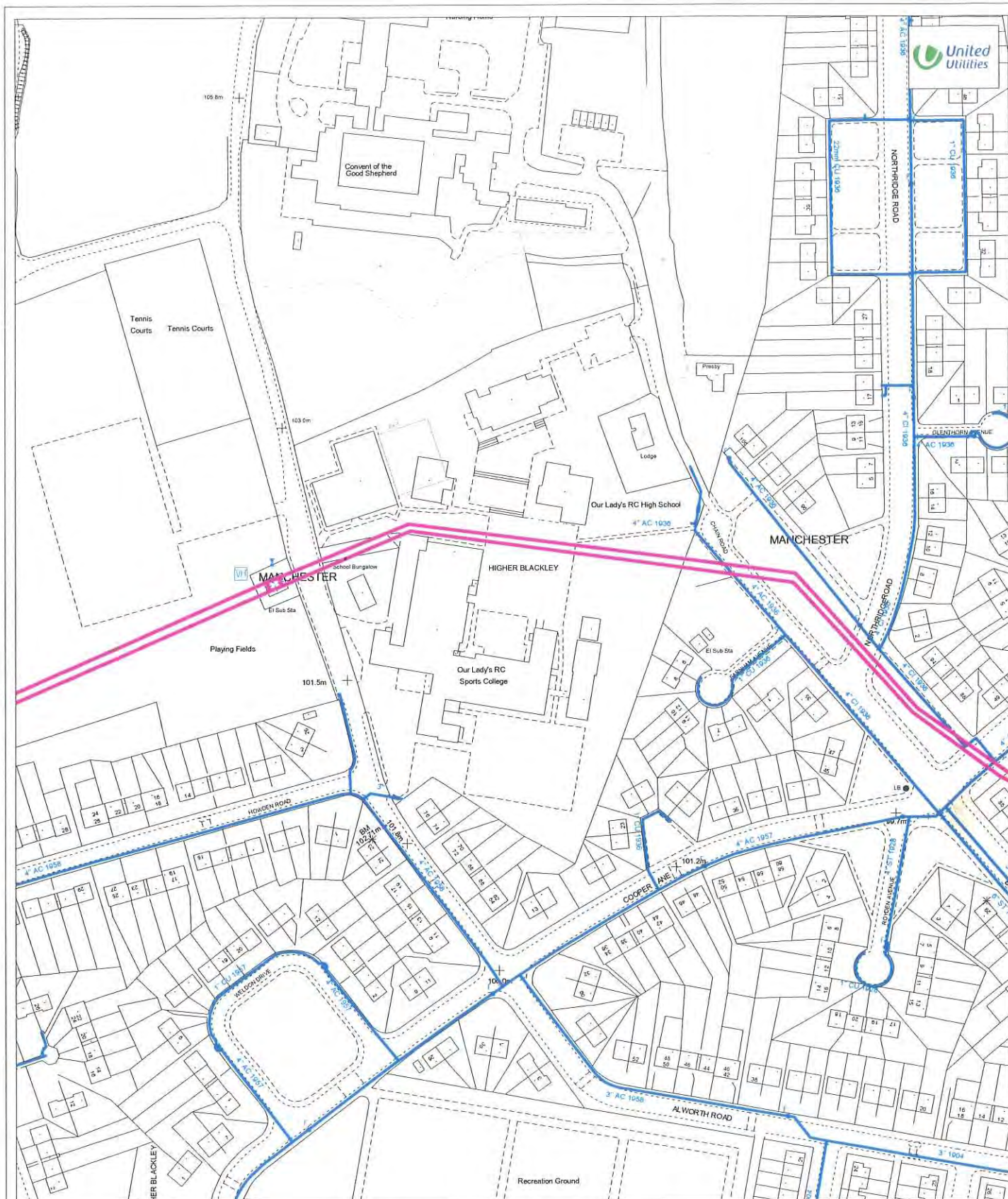
ORDNANCE SURVEY PLAN
 Published 1992
 Source map scale - 1:1,250

1992	1992
1992	1992

Date(s) of Publication 12 of 22

APPENDIX 4

SERVICE LOCATION PLANS



Printed by SW

Date: 18/04/2006

Extract From Map of Water Mains

Area around Our Ladys RC High School.

Blue - Distribution Mains Red or Mauve - Trunk Mains Dark Green - Non Potable Mains Light Green - Proposed Mains
 -----X-----X-----X-----X-----Disused Mains (These may still be live)

The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private service pipes may be shown by a blue broken line. United Utilities will not accept any liability for any damage caused by the actual positions being different from those shown

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Printed By SW

Date: 18/04/2006

Legend

- Abandoned Sewer
- Public Sewer
- Highway Drain
- Private Sewer
- Pumping Main
- Section 104 Sewer

Refer to colour guide for content of pipe

Red or Brown - Foul Sewers

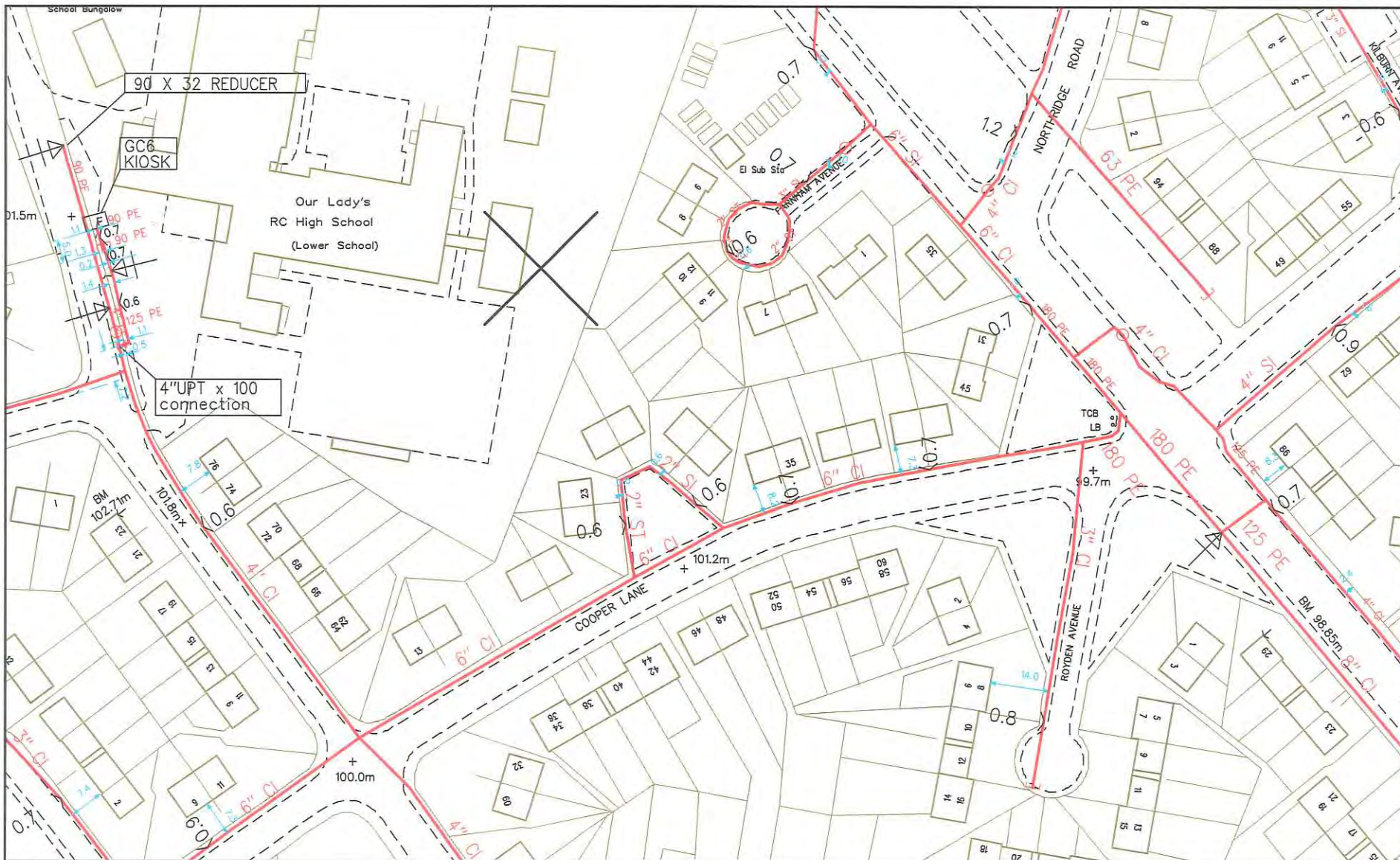
Blue - Surface Water Sewers

Extract From Map of Public Sewers

Area around Our Ladys RC High School.

The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private pipes sewers or drains may not be recorded. United Utilities will not accept any liability for any damage caused by the actual positions being different from those shown.

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SCALE: Not to scale

USER ID: Any authorised user

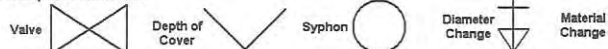
DATE: 18/04/2006

EXTRACT DATE: 12/12/2005

MAP REF: SD8504

CENTRE: 385708, 404405

Some examples of Plant Items:



LP MAINS

MP MAINS

IP MAINS

LHP MAINS

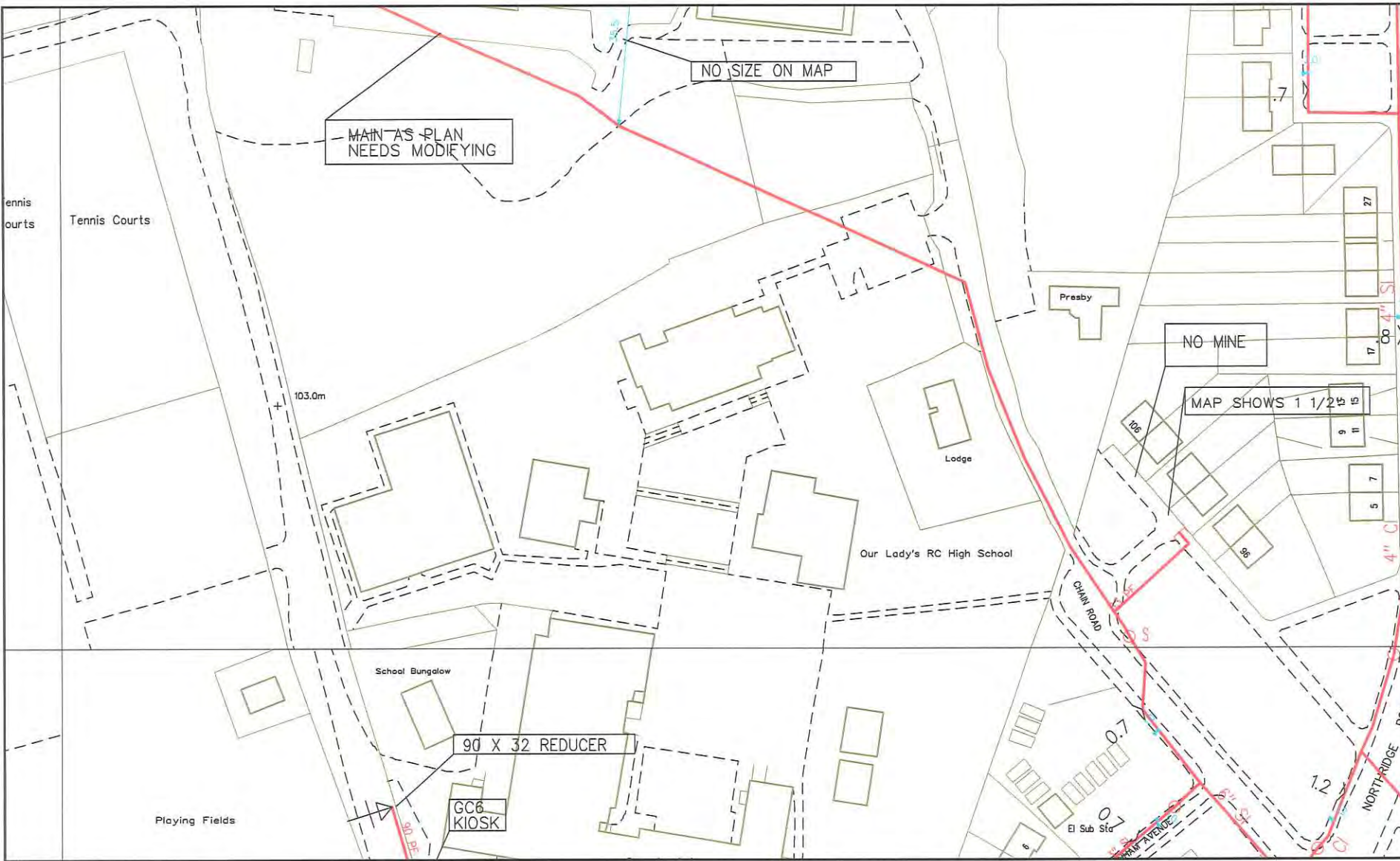
NHP MAINS

This plan shows those pipes owned by National Grid Gas plc or the relevant Gas Distribution Network in their roles as Licensed Gas Transporters (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc. are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by National Grid Gas plc, the relevant Gas Distribution Network, or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue.

MAPS Viewer Version 5.0.10.0

Local Machine

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SCALE: Not to scale

USER ID: Any authorised user

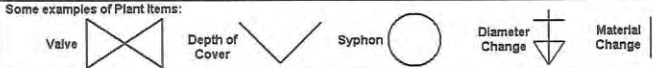
DATE: 18/04/2006

EXTRACT DATE: 12/12/2005

MAP REF: SD8504

CENTRE: 385638, 404546

- LP MAINS
- MP MAINS
- IP MAINS
- LHP MAINS
- NHP MAINS



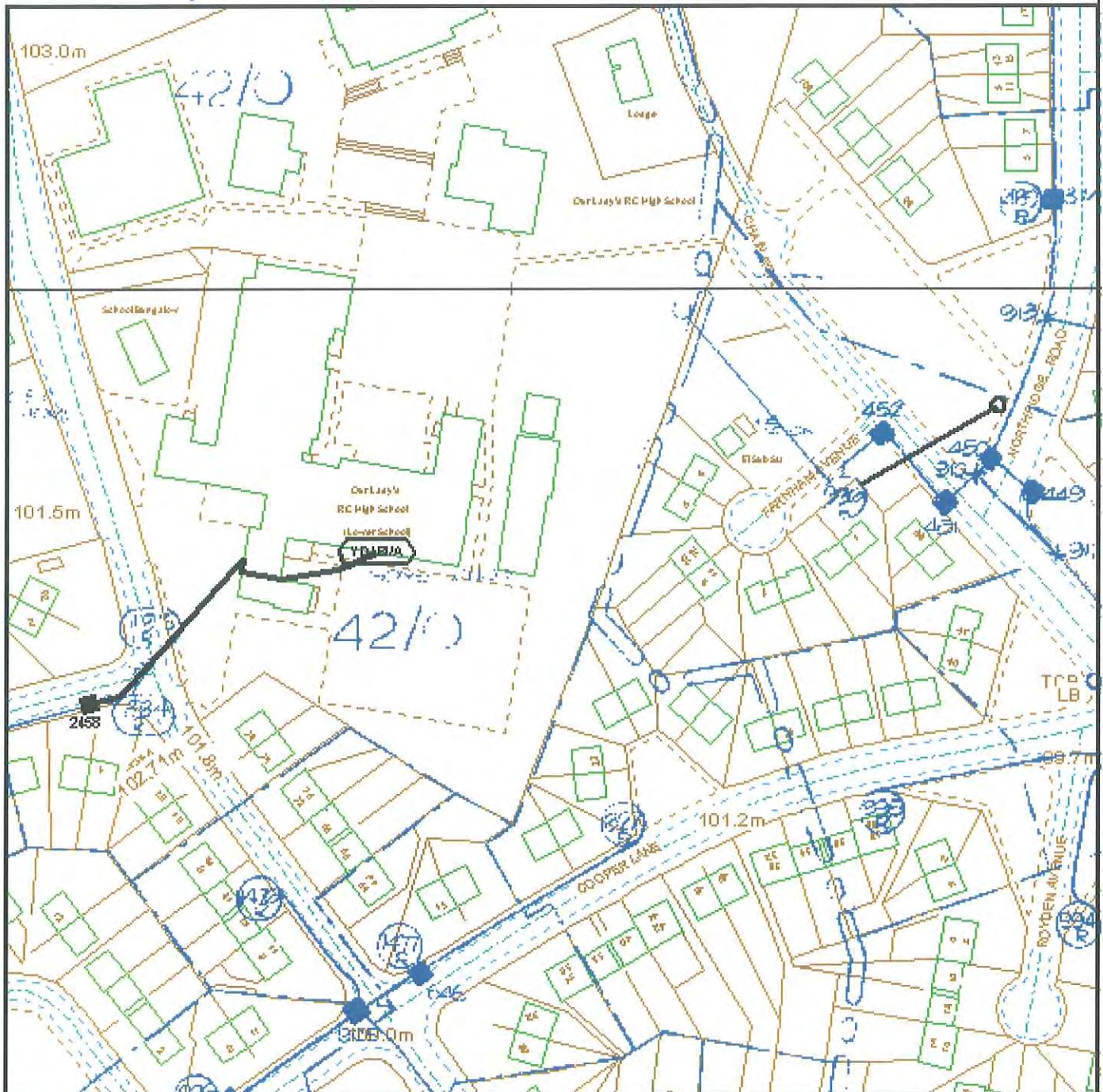
This plan shows those pipes owned by National Grid Gas plc or the relevant Gas Distribution Network in their roles as Licensed Gas Transporters (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc. are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by National Grid Gas plc, the relevant Gas Distribution Network, or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue.

MAPS Viewer Version 5.0.10.0

Local Machine

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BT Maps by email Plant Information Reply



IMPORTANT WARNING:

Information regarding the location of BT apparatus is given for your assistance and is intended for general guidance only. No guarantee is given of its accuracy. It should not be relied upon in the event of excavations or other works being made near to BT apparatus which may exist at various depths and may deviate from the marked route.

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FOR FREE ON SITE LOCATION & MARKING SERVICE
CALL DIAL BEFORE YOU DIG 0800 917 3993

KEY TO BT SYMBOLS

	UNDERGROUND PLANT		CABINET
	OVERHEAD PLANT		BURIED JOINT
	JOINT BOX		JOINTING POST
	DISTRIB'N POINT		PROPOSED U/G
	MANHOLE		PROPOSED O/H
	POLE		PROPOSED BOX

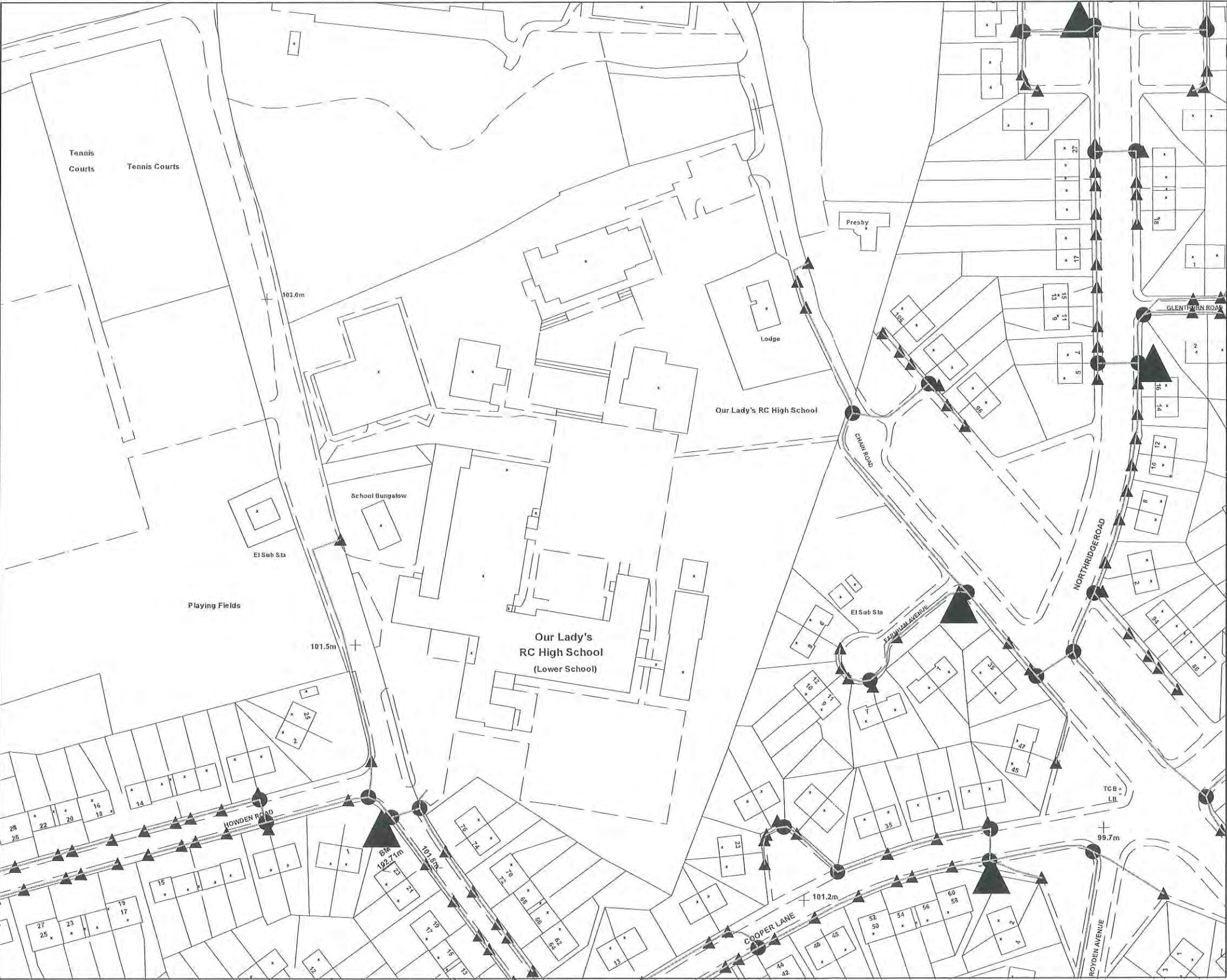
Other proposed plant is shown using dashed lines. BT symbols not listed above may be disregarded. Existing BT plant may not be recorded. Information valid at the time of preparation.



BT ref. UVA12198F

Map reference (centre): SD8567304440

Issued: 18/04/06 11:21:00



Legend

Organisation	Not Set
Department	Not Set
Comments	Not Set
Date	25 April 2006
SLA Number	Not Set



APPENDIX 5
WINDOW SAMPLE HOLE RECORDS

DATA SHEET - Symbols and Abbreviations used on Records

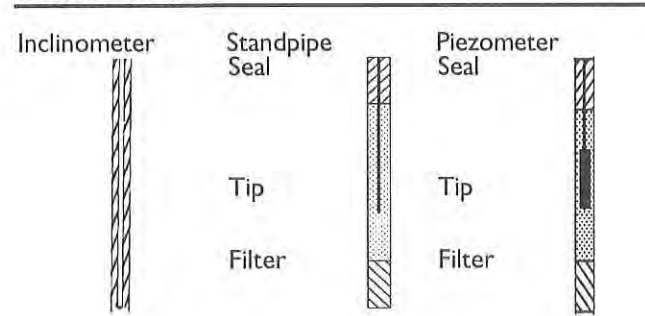
Samples	
B	Bulk disturbed sample
BLK	Block sample
C	Core sample
D	Small disturbed sample (tub/jar)
E	Environmental test sample
ES	Environmental soil sample
EW	Environmental water sample
G	Gas sample
L	Liner sample
P	Piston sample (PF - failed piston sample)
TW	Thin walled push in sample
U -	Open Tube - 102mm diameter with blows to take sample. (UF - failed U sample)
V	Vial sample
W	Water sample

Insitu Testing / Properties	
S	Standard Penetration Test (SPT)
C	SPT with cone
VN	Strength from Insitu Vane
HV	Strength from Hand Vane
PP	Strength from Pocket Penetrometer
(All other strengths from undrained triaxial testing)	
w%	Water content
N	SPT Result
-/-	Blows/penetration (mm) after 150mm seating.
-*/-	Total blows/penetration (mm)
()	Extrapolated value

Rotary Core	
RQD	Rock Quality Designation (% of intact core >100mm)
FRACTURE INDEX	Fractures/metre
FRACTURE SPACING (mm)	Maximum Minimum

Groundwater	
Water Strike	
Highest recorded standing water level	

Instrumentation



Strata	
Made Ground	Type 1
	Type 2
Topsoil	
Cobbles and Boulders	
Gravel	
Sand	
Silt	
Clay	
Peat	

Note: Composite soil types shown by combined symbols	
Chalk	
Limestone	
Sandstone	
Coal	
Mudstone	
Siltstone	
Metamorphic Rock	
Igneous Rock	

BOREHOLE RECORD - Window Sampling

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Engineer

SINCLAIR KNIGHT MERZ

Borehole Project No

WS1
PN061161

Client LAING O'ROURKE NORTHERN

Sampling			Properties		Strata		Scale 1:50	
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	Description	Depth	Legend	
0.20	D				Grass over MADE GROUND: Dark brown slightly clayey gravelly fine to medium sand. Gravel is fine to coarse and subangular to subrounded including brick and glass. Firm to stiff brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium and subangular to subrounded including coal.	G.L.		
0.60	D					0.30		
1.00- 1.30	D							
1.30	ES							
1.80- 2.00	D				Yellow brown clayey fine to medium SAND locally very clayey. At 2.80m: Becomes very clayey, locally very sandy clay.	2.40		
2.40- 2.80	D							
3.20- 3.40	D							
3.50	ES							
4.00- 4.30	D				End of Borehole	5.00		

Boring				Progress				Groundwater						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	TT	G.L.			01/06/06	09:00	3.00					Sample wet between 3.00-4.00m
5.00	0.07	Window Sampler	TT	5.00		3.00	01/06/06	10:30						

Remarks	Inspection pit hand excavated to 1.20m depth. A 33mm standpipe was installed with a slotted section from 1.00m to 5.00m and with flush lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to 0.20m, concrete up to ground level. Symbols and abbreviations are explained on the accompanying key sheet. All dimensions are in metres.	Logged by SG Checked by CD Figure 1 of 1 01/08/2006 geotechnics
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BOREHOLE RECORD - Window Sampling

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Engineer SINCLAIR KNIGHT MERZ

Borehole Project No

WS2
PN061161

Client LAING O'ROURKE NORTHERN

Sampling			Properties		Strata		Scale 1:50																																																										
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	Description	Depth	Legend																																																										
0.20	D				Grass over MADE GROUND: Dark brown sandy slightly gravelly clay. Gravel is fine to medium and subangular to subrounded. Rootlets present.	G.L.																																																											
0.40	D				MADE GROUND: Firm to stiff light grey brown mottled grey slightly sandy slightly gravelly clay. Gravel is fine to medium and subangular to subrounded. Re-worked natural.	0.30																																																											
1.20- 1.40	D																																																																
2.00	D																																																																
2.40- 2.60	D				MADE GROUND: Dark grey mottled brown and light grey slightly sandy slightly gravelly clay. Gravel is fine to coarse and subangular to subrounded. Rootlets and organic odour present.	2.60																																																											
2.60- 2.90	D				At 2.90m: Becomes stiff black sandy slightly gravelly clay. Brick present.																																																												
2.95- 3.00	D																																																																
3.30- 3.60	D				MADE GROUND: Stiff dark brown mottled grey slightly sandy slightly gravelly clay. Gravel is fine to medium and angular to subrounded. Glass and metal present.	3.30																																																											
4.10- 4.40	D																																																																
					End of Borehole	5.00																																																											
<table border="1"> <thead> <tr> <th colspan="4">Boring</th> <th colspan="4">Progress</th> <th colspan="5">Groundwater</th> </tr> <tr> <th>Depth</th> <th>Dia</th> <th>Technique</th> <th>Crew</th> <th>Depth of Hole</th> <th>Depth Cased</th> <th>Depth to Water</th> <th>Date</th> <th>Time</th> <th>Depth Struck</th> <th>Depth Cased</th> <th>Rose to</th> <th>in Mins</th> <th>Depth Sealed</th> <th>Remarks on Groundwater</th> </tr> </thead> <tbody> <tr> <td>1.20</td> <td>0.40</td> <td>Inspection Pit</td> <td>TT</td> <td>G.L.</td> <td></td> <td></td> <td>01/06/06</td> <td>10:30</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td rowspan="2">None encountered during sampling.</td> </tr> <tr> <td>5.00</td> <td>0.07</td> <td>Windowless Sampler</td> <td>TT</td> <td>5.00</td> <td></td> <td></td> <td>01/06/06</td> <td>12:00</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>									Boring				Progress				Groundwater					Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater	1.20	0.40	Inspection Pit	TT	G.L.			01/06/06	10:30						None encountered during sampling.	5.00	0.07	Windowless Sampler	TT	5.00			01/06/06	12:00					
Boring				Progress				Groundwater																																																									
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater																																																			
1.20	0.40	Inspection Pit	TT	G.L.			01/06/06	10:30						None encountered during sampling.																																																			
5.00	0.07	Windowless Sampler	TT	5.00			01/06/06	12:00																																																									
Remarks Symbols and abbreviations are explained on the accompanying key sheet. All dimensions are in metres. Inspection pit hand excavated to 1.20m depth. A 33mm standpipe was installed with a slotted section from 2.00m to 5.00m and with flush lockable protective cover. Detail as follows from base of hole: gravel filter up to 2.00m, bentonite seal up to 0.20m, concrete up to ground level. Logged by SG Checked by CD Figure 1 of 1 01/08/2006 geotechnics																																																																	

BOREHOLE RECORD - Window Sampling

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Engineer SINCLAIR KNIGHT MERZ

Borehole Project No

WS2A
PN061161

Client LAING O'ROURKE NORTHERN

Sampling			Properties		Strata		Scale 1:50	
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	Description	Depth	Legend	
0.20- 0.50	D				Grass over MADE GROUND: Soft to firm dark brown slightly sandy slightly gravelly clay. Gravel is fine to coarse and subangular to subrounded.	G.L. 0.20		
0.55- 0.65	D				MADE GROUND: Firm orange brown mottled grey slightly sandy slightly gravelly clay. Gravel is fine to medium and angular to subrounded. Between 0.55-0.65m: Becomes dark brown with organic odour and rootlets (possible relict topsoil).			
1.40- 1.50	D				Between 1.40-1.50m: Fine to medium sand partings.			
2.80- 3.00	D				MADE GROUND: Dark brown clayey slightly gravelly fine to medium sand locally sandy clay. Gravel is fine and angular including brick. Rootlets and organic odour present.	2.80 3.00		
3.40	D				MADE GROUND: Firm to stiff dark brown slightly sandy slightly gravelly clay. Gravel is fine to coarse and subangular to subrounded. (Re-worked natural). At 3.40m: Occasional black fine gravel with hydrocarbon odour.			
4.70- 5.00	D				End of Borehole	5.00		

Boring				Progress				Groundwater						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	TT	G.L.			02/06/06	15:00						None encountered during sampling.
5.00	0.07	Windowless Sampler	TT	5.00			02/06/06	16:30						

Remarks	Inspection pit hand excavated to 1.20m depth.	Logged by Checked by Figure	SG CD 1 of 1 01/08/2006
	Window Sample Borehole backfilled with arisings on completion.		

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

BOREHOLE RECORD - Window Sampling

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Engineer

SINCLAIR KNIGHT MERZ

Borehole Project No

WS3
PN061161

Client LAING O'ROURKE NORTHERN

Sampling			Properties			Strata		Scale 1:50	
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT	Description	Depth	Legend	
0.20	D					Grass over dark brown slightly sandy slightly gravelly clayey TOPSOIL. Gravel is fine to medium and subangular to subrounded.	G.L.		
0.50	D						0.20		
1.00- 1.10	D				C6	Firm to stiff light brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium and subangular to subrounded including coal.	1.10		
1.00- 1.45									
1.10- 1.50	D					Loose brown slightly clayey silty slightly gravelly fine to medium SAND. Gravel is fine to medium and subangular to subrounded including coal.			
2.00- 2.38					C4/225	Between 2.10-2.60m: Possible no recovery.			
2.60- 3.00	D								
3.00- 3.45					C6				
3.50- 3.70	D								
3.70- 4.00	D						3.70		
4.00- 4.45					C7	Soft brown slightly sandy CLAY.			
4.80- 5.00	D						5.00		
						End of Borehole			

Boring				Progress					Groundwater					
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	TT	G.L.			01/06/05	13:00						None encountered during sampling.
5.00	0.07	Window Sampler	TT	5.00			01/06/05	14:30						

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Inspection pit hand excavated to 1.20m depth.
Window Sample Borehole backfilled with arisings on completion.
2.10 - 2.60m: CPT cone fell under self weight.

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Checked by
Figure

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BOREHOLE RECORD - Window Sampling

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER
BLACKLEY SCHOOL (OUR LADY'S RC HIGH
SCHOOL)

Engineer

SINCLAIR KNIGHT MERZ

Borehole
Project No

WS4
PN061161

Client LAING O'ROURKE NORTHERN

Sampling			Properties			Strata		Scale 1:50						
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT	Description	Depth	Legend						
0.20	D					Grass over MADE GROUND: Soft dark brown slightly sandy slightly gravelly clay. Gravel is fine to medium and subangular to subrounded including brick.	G.L.							
1.00- 1.30 1.00- 1.45	D			16	C6	Firm to stiff brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium and subangular to subrounded. At 1.00m: Loose.	0.20							
2.00- 2.30 2.00- 2.45	D				C10									
3.00- 3.50 3.00- 3.45	D				C4	Loose yellow brown slightly clayey fine to medium SAND.	3.00							
3.50- 4.00	D					Brown very clayey fine to medium SAND, locally very sandy clay.	3.50							
4.00- 4.50 4.00- 4.45	D				C16	At 4.00m: Medium dense.								
5.00- 5.45					C10									
						End of Borehole	5.45							
Boring			Progress					Groundwater						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	TT	G.L.			01/06/06	14:30						None encountered during sampling.
5.45	0.07	Window Sampler	TT	5.45			01/06/06	16:00						
Remarks Inspection pit hand excavated to 1.20m depth. Window Sample Borehole backfilled with arisings on completion.														
Symbols and abbreviations are explained on the accompanying key sheet. All dimensions are in metres.														
Logged by SG Checked by CD Figure 1 of 1 01/08/2006 														

BOREHOLE RECORD - Window Sampling

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Engineer

SINCLAIR KNIGHT MERZ

Borehole
Project No

WS5
PN061161

Client LAING O'ROURKE NORTHERN

Sampling			Properties		Strata		Scale 1:50	
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	Description	Depth	Legend	
0.10	D				Grass over MADE GROUND: Dark brown sandy slightly gravelly clay. Gravel is fine to coarse and subangular to subrounded including clayware and brick.	G.L.		
0.40	D					0.20		
0.60	D							
1.00- 1.30	D		9.8		Soft to firm orange brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium and subangular to subrounded. At 0.50m: Becomes brown clayey fine to medium sand (locally very sandy clay).	1.00		
1.80- 2.00	D				Firm to stiff brown mottled grey slightly sandy slightly gravelly CLAY with occasional partings of yellow brown fine to medium sand. Gravel is fine to medium and subangular to subrounded. Between 1.60-2.00m: No grey mottling with no sand partings.			
2.00- 2.30	D							
2.80- 3.00	D							
3.00- 3.30	D							
3.50- 3.80	D							
4.00- 4.30	D				At 4.00m: Becomes sandy.			
4.80- 5.00	D					5.00		
End of Borehole								

Boring				Progress				Groundwater						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	TT	G.L.			02/06/06	08:00						None encountered during sampling.
5.00	0.07	Window Sampler	TT	5.00			02/06/06	09:30						

Remarks	Inspection pit hand excavated to 1.20m depth.	Logged by Checked by Figure	SG CD 1 of 1 01/08/2006
	A 33mm standpipe was installed with a slotted section from 2.00m to 5.00m and with flush lockable protective cover. Detail as follows from base of hole: gravel filter up to 2.00m, bentonite seal up to 0.20m, concrete up to ground level.		

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

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BOREHOLE RECORD - Window Sampling

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Engineer SINCLAIR KNIGHT MERZ

Borehole Project No

WS6
PN061161

Client LAING O'ROURKE NORTHERN

Sampling			Properties		Strata		Scale 1:50							
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	Description	Depth	Legend							
0.10	D				Grass over dark brown slightly sandy slightly gravelly clayey TOPSOIL. Gravel is fine to medium and subangular to subrounded.	G.L.								
0.50	D				Light orange brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium and subangular to subrounded. At 0.70m: Becomes orange brown slightly clayey fine to medium sand.	0.30								
0.70	D					1.00								
1.50- 1.80	D				Firm to stiff brown slightly sandy slightly gravelly CLAY with occasional yellow brown fine to medium sand partings. Gravel is fine to coarse and subangular to subrounded including coal.									
2.00- 2.20	D				From 2.20m: No sand partings.									
2.70- 3.00	D				Brown slightly clayey slightly gravelly fine to medium SAND. Gravel is fine and subangular including coal. At 3.80m: Becomes very clayey, locally very sandy clay.	3.00								
3.00- 3.30	D													
3.80- 4.00	D													
4.70- 5.00	D				End of Borehole	5.00								
Boring				Progress				Groundwater						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	TT	G.L.			02/06/06	09:30						None encountered during sampling.
5.00	0.07	Window Sampler	TT	5.00			02/06/06	10:30						
Remarks Inspection pit hand excavated to 1.20m depth. A 33mm standpipe was installed with a slotted section from 2.00m to 5.00m and with flush lockable protective cover. Detail as follows from base of hole: gravel filter up to 2.00m, bentonite seal up to 0.20m, concrete up to ground level. Symbols and abbreviations are explained on the accompanying key sheet. All dimensions are in metres.														
												Logged by Checked by Figure	SG CD 1 of 1 01/08/2006	
														

BOREHOLE RECORD - Window Sampling

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER
BLACKLEY SCHOOL (OUR LADY'S RC HIGH
SCHOOL)

Engineer

SINCLAIR KNIGHT MERZ

Borehole
Project No

WS7
PN061161

Client LAING O'ROURKE NORTHERN

Sampling			Properties			Strata			Scale 1:50		
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %		Description	Depth	Legend			
0.20	D					Grass over MADE GROUND: Soft to firm dark brown slightly sandy slightly gravelly clay. Gravel is fine to medium and subangular to subrounded. Rootlets present.	G.L. 0.10				
1.00- 1.20	D					MADE GROUND: Soft to firm orange brown slightly sandy slightly gravelly clay. Gravel is fine to coarse and angular to subrounded including brick. (Re-worked natural).	1.20				
1.20- 1.50	D					At 1.00m: Becomes dark brown.					
2.20- 2.50	D			19		Firm orange brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is fine to medium and subangular to subrounded.					
						At 2.22m: Becomes stiff brown mottled grey and laminated.					
3.10	D					Brown slightly clayey slightly gravelly fine to medium SAND. Gravel is fine to medium and subangular including coal.	3.10				
						Between 3.20-4.00m: Possible no recovery.					
						Between 4.00-5.00m: Possible no recovery.	4.00				
						End of Borehole					

Boring				Progress					Groundwater					
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20	0.40	Inspection Pit	TT	G.L.			02/06/06	10:30						None encountered during sampling.
5.00	0.07	Window Sampler	TT	5.00			02/06/06	12:00						

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Inspection pit hand excavated to 1.20m depth. A 33mm standpipe was installed with a slotted section from 1.00m to 4.00m and with flush lockable protective cover. Detail as follows from base of hole: gravel filter up to 1.00m, bentonite seal up to 0.20m, concrete up to ground level.

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BOREHOLE RECORD - Window Sampling

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER
BLACKLEY SCHOOL (OUR LADY'S RC HIGH
SCHOOL)

Engineer

SINCLAIR KNIGHT MERZ

Borehole
Project No

WS8
PN061161

Client LAING O'ROURKE NORTHERN

Sampling			Properties			Strata			Scale 1:50					
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT	Description	Depth	Legend						
0.30	D					Grass over dark brown slightly sandy slightly gravelly clayey TOPSOIL.	G.L. 0.10							
1.00- 1.30 1.00- 1.45	D				C9	Firm orange brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is fine to coarse and subangular to subrounded. At 1.00m: Becomes stiff and brown mottled grey.								
1.70- 2.00 2.00- 2.45	D			24	C6	At 2.00m: Soft								
2.40- 2.70 2.70- 3.00 3.00- 3.45	D D				C6	Brown slightly clayey fine to medium SAND. Soft brown sandy CLAY. Between 3.00-4.00m: Possible no recovery.	2.40 2.70							
4.00- 4.45					C10	Between 4.00-5.00m: Possible no recovery.								
5.00- 5.45					C6									
						End of Borehole	5.45							
Boring						Progress				Groundwater				
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater
1.20 5.45	0.40 0.07	Inspection Pit Window Sampler	TT TT	G.L. 5.00			02/06/06 02/06/06	12:30 13:30						None encountered during sampling.
Remarks Inspection pit hand excavated to 1.20m depth. Window Sample Borehole backfilled with arisings on completion. Symbols and abbreviations are explained on the accompanying key sheet. All dimensions are in metres.														
												Logged by SG Checked by CD Figure 1 of 1 01/08/2006 geotechnics		

BOREHOLE RECORD – Window Sampling

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER
BLACKLEY SCHOOL (OUR LADY'S RC HIGH
SCHOOL)

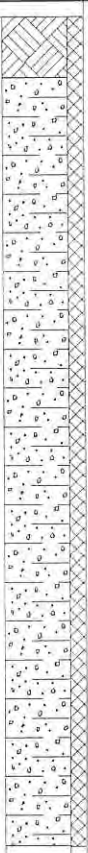
Engineer

SINCLAIR KNIGHT MERZ

Borehole
Project No

WS9
PN061161

Client LAING O'ROURKE NORTHERN

Sampling			Properties			Strata					Scale 1:50					
Depth	Sample Type	Depth Cased & (to Water)	Strength kPa	w %	SPT	Description	Depth	Legend								
0.20	D					Grass over dark brown slightly sandy slightly gravelly clayey TOPSOIL. Gravel is fine to medium and subangular to subrounded	G.L.									
0.70	D					Firm light orange brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is fine to coarse and subangular to subrounded including coal. At 1.00m: Becomes soft brown mottled grey.	0.40									
1.00- 1.30	D		16		c7											
1.00- 1.45																
2.00- 2.45					c15	At 2.00m: Becomes firm to stiff.										
2.70- 3.00	D															
3.00- 3.45					c9	At 3.00m: No grey mottling and no gravel.										
3.50- 3.80	D															
4.00- 4.45					c6	At 4.00m: Becomes soft.										
4.70- 5.00	D															
5.00- 5.45					c6											
						End of Borehole	5.45									
Boring					Progress					Groundwater						
Depth	Dia	Technique	Crew	Depth of Hole	Depth Cased	Depth to Water	Date	Time	Depth Struck	Depth Cased	Rose to	in Mins	Depth Sealed	Remarks on Groundwater		
1.20	0.40	Inspection Pit	TT	G.L.			02/06/06	13:30						None encountered during sampling.		
5.45	0.07	Windowless Sampler	TT	5.45			02/06/06	15:00								
Remarks Inspection pit hand excavated to 1.20m depth. Window Sample Borehole backfilled with arisings on completion.																
Symbols and abbreviations are explained on the accompanying key sheet.										Logged by Checked by Figure					SG CD 1 of 1 01/08/2006	
All dimensions are in metres.										geotechnics						

APPENDIX 6

LABORATORY TESTING - GEOTECHNICAL

DATA SHEET - Laboratory Test Symbols

Classification and Strength

Symbol	C - Clay (0 - containing organic matter) Plasticity	M - Silt L - Low I - Intermediate H - High V - Very High E - Extremely High
I _p	Plasticity Index	
%	% Retained on 425 µm sieve (shown over I _p value)	
w _L	Liquid Limit	
w _p	Plastic Limit	
NP	Non-Plastic	
w	Moisture Content	
Test	Quick undrained triaxial tests	
	SS	Single stage - 102mm diameter.
	S3	Single stage - set of 3 38mm diameter.
	MS	Multistage - 102mm diameter.
	D	Drained Test
	HV	Hand Vane
	PP	Pocket Penetrometer (kg/cm ²)
	UT	Unsuitable for Test
γ _b	Bulk Density	
σ ₃	Triaxial Cell Pressure	
σ ₁ - σ ₃	Deviator Stress	
##	Excessive Strain	
c _u	Undrained Cohesion	
c	Cohesion Intercept	
φ	Angle of Shearing Resistance	

Chemical Analysis

Acid Soluble	Total sulphate in specimen (expressed as SO ₃ %)
Water Soluble	Soluble Sulphate in 2:1 water : soil extract (expressed as SO ₃ g/L)
In Water	Sulphate content of groundwater (expressed as SO ₃ g/L)
pH	pH value
Organic Content	Organic content expressed as a percentage of dry weight.
Chloride Content	Chloride Ion Content expressed as a percentage of dry weight.

Consolidation

Size	Size of specimen in mm (d = diameter, h = height)
w	Moisture Content
γ _b	Bulk Density
γ _d	Dry Density
ρ _s	Particle Density (A = Assumed, M = Measured)
S _r	Initial Degree of Saturation
p	Applied Pressure
e	Voids Ratio
m _v	Coefficient of Volume Compressibility
c _{v50}	Coefficient of Consolidation - Log t
c _{v90}	Coefficient of Consolidation - √t

MCV, Compaction, CBR

MCV	Moisture Condition Value at natural moisture content
MCC	Moisture Condition Calibration
CCV	Chalk Crushing Value

Compaction

Type	2.5 = BS 2.5 kg Rammer
	4.5 = BS 4.5 kg Rammer
	V = BS Vibrating Hammer

γ_b Bulk Density

γ_d Dry Density

CBR California Bearing Ratio

Type	2.5 = Test on Specimen Recompacted using BS 2.5 kg Rammer
	4.5 = As above but using BS 4.5 kg Rammer
	V = As above but using BS Vibrating Hammer
	M = Test on open drive mould specimen cut in field
	S = Soaked Specimen

Top CBR at top of mould

Bottom CBR at bottom of mould

ND None Detected

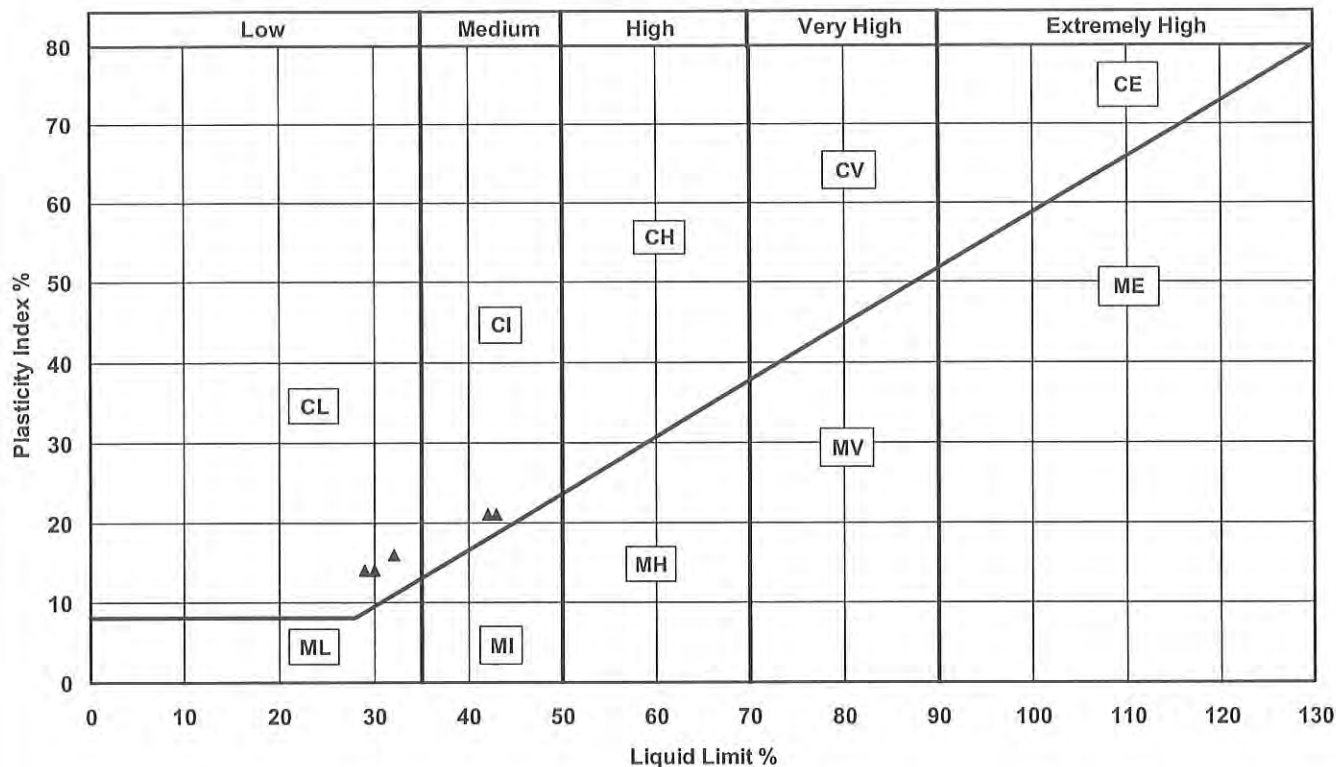
**All tests performed in accordance with BS 1377 :
Parts 1-9 : 1990 incorporating amendments where
appropriate.**

LABORATORY RESULTS - Casagrande Classification Chart

Project: MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Project No: PN061161

**PLOT OF PLASTICITY INDEX AGAINST LIQUID LIMIT
for all items tested**



Soil Type	Plasticity Characteristics
C Clay	L Low
	I Intermediate
M Silt	H High
	V Very High
	E Extremely High

Table of Soil Types and Plasticity Characteristics from BS 5930 : 1981

Remarks

24/07/2006

LABORATORY RESULTS - Classification and Strength

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Project No: PN061161

[illegible]

Remarks	Tests performed in accordance with BS 1377: 1990
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LABORATORY RESULTS - Chemical Analysis

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Project No: PN061161

[illegible]

Remarks	Tests performed in accordance with BS 1377: Part 3: 1990
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LABORATORY RESULTS - Particle Size Distribution

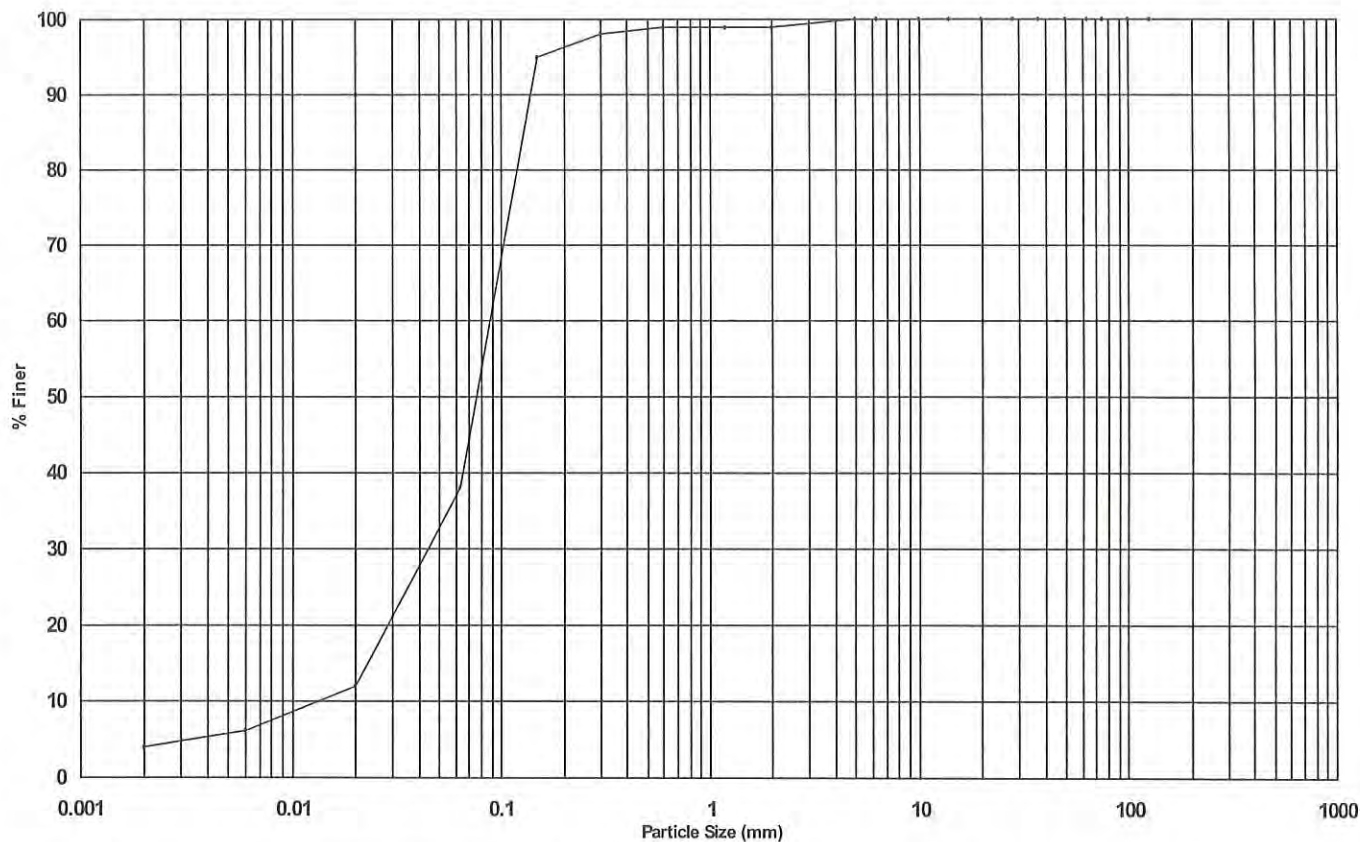
Project: MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Project No: PN061161

Hole WS3
Sample Depth 2.60-3.00m
Sample Type D
Sample Ref N01373

Sample Description

Brown slightly clayey silty fine to medium SAND with occasional gravel.



Classification	CLAY	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulders
		SILT			SAND			Gravel				

Classification	% of each
CLAY	4
SILT	33
SAND	62
GRAVEL	1
COBBLES	0
BOULDERS	0

Size	Percentage Finer
125mm	100
100mm	100
75mm	100
63mm	100
50mm	100
37.5mm	100
28mm	100
20mm	100
14mm	100
10mm	100
6.3mm	100
5mm	100
3.35mm	-

Size	Percentage Finer
2mm	99
1.18mm	99
600µm	99
425µm	-
300µm	98
212µm	-
150µm	95
75µm	-
63µm	38
20µm	12
6µm	6
2µm	4

Uniformity Coefficient	
5.00	
Sieving Method	
Wet sieve	
Fine Particle Analysis	
Method	Pipette
Pre-treated with	Hydrogen Peroxide
% loss on Pre-treatment	2.96
Particle Density	2.65 (Assumed)

Remarks Test performed in accordance with BS 1377: Part 2: 1990

24/07/2006

APPENDIX 7

LABORATORY TESTING - CHEMICAL/CONTAMINATION

ALcontrol Geochem Analytical Services Sample Descriptions

Job Number: 06/11309/02/01
Client: Geotechnics Ltd
Client Ref : PN06116

Grain sizes	
<0.063mm	Very Fine
0.1mm - 0.063mm	Fine
0.1mm - 2mm	Medium
2mm - 10mm	Coarse
>10mm	Very Coarse

[illegible]

* These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials-whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated	☒
Preliminary	☐

ALcontrol Geochem Analytical Services

[#] ISO 17025 accredited

^M MCERTS accredited

* Subcontracted test

» Shown on prev. report

Job Number: 06/11309/02/01

Matrix: SOLID

Client: Geotechnics Ltd

Location: OUR LADYS RC HIGH SCHOOL

Client Ref. No.: PN06116

Client Contact: Stewart Garnet

[illegible]

All results expressed on a dry weight basis.

Date 12.07.2006

Job Number: 06/11309/02/01
Client: Geotechnics Ltd
Client Ref. No.: PN06116

Matrix: SOLID
Location: OUR LADYS RC HIGH SCHOOL
Client Contact: Stewart Garnet

[illegible]

All results expressed on a dry weight basis.

Date 12.07.2006

Validated	☒
Preliminary	☐

ALcontrol Geochem Analytical Services Table Of Results

[#] ISO 17025 accredited

^M MCERTS accredited

* Subcontracted test

» Shown on prev. report

Job Number: 06/11309/02/01
Client: Geotechnics Ltd
Client Ref. No.: PN06116

Matrix: SOLID
Location: OUR LADYS RC HIGH SCHOOL
Client Contact: Stewart Garnet

[illegible]

All results expressed on a dry weight basis.

Date 12.07.2006

Validated

Preliminary



ALcontrol Geochem Analytical Services

[#] ISO 17025 accredited

^M MCERTS accredited

* Subcontracted test

» Shown on prev. report

Job Number: 06/11309/02/01

Matrix: SOLID

Client: Geotechnics Ltd

Location: OUR LADYS RC HIGH SCHOOL

Client Ref. No.: PN06116

Client Contact: Stewart Garnet

[illegible]

All results expressed on a dry weight basis.

Date 12.07.2006

Validated	☒
Preliminary	☐

ALcontrol Geochem Analytical Services

Table Of Results

[#] ISO 17025 accredited

^M MCERTS accredited

* Subcontracted test

» Shown on prev. report

Job Number: 06/11309/02/01
Client: Geotechnics Ltd
Client Ref. No.: PN06116

Matrix: SOLID
Location: OUR LADYS RC HIGH SCHOOL
Client Contact: Stewart Garnet

[illegible]

All results expressed on a dry weight basis.

Date 12.07.2006

Validated	☒
Preliminary	☐

ALcontrol Geochem Analytical Services

Table Of Results

[#] ISO 17025 accredited

^M MCERTS accredited

* Subcontracted test

» Shown on prev. report

Job Number: 06/11309/02/01
Client: Geotechnics Ltd
Client Ref. No.: PN06116

Matrix: SOLID
Location: OUR LADYS RC HIGH SCHOOL
Client Contact: Stewart Garnet

[illegible]

All results expressed on a dry weight basis.

Date 12.07.2006

☒

11

ALcontrol Geochem Analytical Services

ISO 17025 accredited

^M MCERTS accredited

* Subcontracted test

» Shown on prev. report

Job Number: 06/11309/02/01

Matrix: SOLID

Client: Geotechnics Ltd

Location: OUR LADYS RC HIGH SCHOOL

Client Ref. No.: PN06116

Client Contact: Stewart Garnet

[illegible]

All results expressed on a dry weight basis.

Date 12.07.2006

Validated	☒
Preliminary	☐

ALcontrol Geochem Analytical Services Table Of Results

ISO 17025 accredited

^M MCERTS accredited

* Subcontracted test

» Shown on prev. report

Job Number: 06/11309/02/01

Matrix: LEACHATE

Client: Geotechnics Ltd

Location: OUR LADYS RC HIGH SCHOOL

Client Ref. No.: PN06116

Client Contact: Stewart Garnet

[illegible]

Date 12.07.2006

- # ISO 17025 accredited
- M MCERTS accredited
- * Subcontracted test
- » Shown on prev. report

Job Number: 06/11309/02/01
Client: Geotechnics Ltd
Client Ref. No.: PN06116

Matrix: LEACHATE
Location: OUR LADYS RC HIGH SCHOOL
Client Contact: Stewart Garnet

[illegible]

Date 12.07.2006

ALcontrol Geochem Analytical Services

Table Of Results - Appendix

Job Number: 06/11309/02/01
Client: Geotechnics Ltd
Client Ref. No.: PN06116

Report Key :

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP	No Determination Possible	*	Subcontracted test
NFD	No Fibres Detected	»	Result previously reported (Incremental reports only)
#	ISO 17025 accredited	M	MCERTS Accredited
PFD	Possible Fibres Detected	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summary of Method Codes contained within report :

Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample ¹	Surrogate Corrected
TM001	In - house Method	Screening of Soils for Fibres			WET	
TM061	Method for the Determination of EPH, Massachusetts Dept. of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)	✓		DRY	
TM062	MEWAM BOOK 124 1988.HMSO/ Method 17.7, Second Site property, March 2003	Determination of Phenolic compounds by HPLC with electro-chemical detection			NA	
TM062	MEWAM BOOK 124 1988.HMSO/ Method 17.7, Second Site property, March 2003	Determination of Phenolic compounds by HPLC with electro-chemical detection	✓		WET	
TM068	ASTM D-1552	Total sulphur determination by combustion method	✓		DRY	
TM074	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS			NA	
TM074	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS	✓		DRY	
TM074	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS	✓	✓	DRY	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)			WET	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)	✓		WET	
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)	✓	✓	WET	
TM098	Method 4500E, AWWA/APHA, 20th Ed., 1999	Determination of Sulphate using the Kone Analyser			NA	
TM101	Method 4500B & C, AWWA/APHA, 20th Ed., 1999	Determination of Sulphide in soil and water samples using the Kone Analyser			NA	
TM101	Method 4500B & C, AWWA/APHA, 20th Ed., 1999	Determination of Sulphide in soil and water samples using the Kone Analyser	✓		WET	

¹ Applies to Solid samples only. **DRY** indicates samples have been dried at 35°C. **NA** = not applicable.

ALcontrol Geochem Analytical Services

Table Of Results - Appendix

Job Number: 06/11309/02/01
Client: Geotechnics Ltd
Client Ref. No.: PN06116

Report Key :

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP	No Determination Possible	*	Subcontracted test
NFD	No Fibres Detected	»	Result previously reported (Incremental reports only)
#	ISO 17025 accredited	M	MCERTS Accredited
PFD	Possible Fibres Detected	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control.

Summary of Method Codes contained within report :

Method No.	Reference	Description	ISO 17025 Accredited	MCERTS Accredited	Wet/Dry Sample ¹	Surrogate Corrected
TM127	Method 3112B, AWWA/APHA, 20th Ed., 1999	The Determination of Trace Level Mercury in Aqueous Media and Soil Extracts by Atomic Absorption Spectroscopy			NA	
TM129	Method 3120B, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 3050B	Determination of Metal Cations by IRIS Emission Spectrometer	✓	✓	DRY	
TM133	BS 1377: Part 3 1990	Determination of pH in Soil and Water using the GLpH pH Meter			NA	
TM133	BS 1377: Part 3 1990	Determination of pH in Soil and Water using the GLpH pH Meter	✓	✓	WET	
TM136	Method 17.10, Second Site property, March 2003	Determination of Sulphur by HPLC			NA	
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser			NA	
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser	✓		WET	
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS			NA	
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the "Skalar SANS+ System" Segmented Flow Analyser			NA	
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the "Skalar SANS+ System" Segmented Flow Analyser	✓	✓	WET	
TM61/89		see TM061 and TM089 for details			WET	

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

ALcontrol Geochem Analytical Services Table Of Results - Appendix

Job Number: 06/11309/02/01
Client: Geotechnics Ltd
Client Ref. No.: PN06116

Summary of Coolbox temperatures

[illegible]

APPENDIX 8
MONITORING RESULTS

FIELDWORK - Water Level Monitoring

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Project No PN061161

Client LAING O'ROURKE NORTHERN

Sheet No 1 (1 of 1)

[illegible]

Remarks

Key: S - Standpipe



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY
SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Project No PN061161
Borehole WS1
Sheet No. 1 (1 of 2)

Client LAING O'ROURKE NORTHERN

Installation Details

Installation Type	standpipe	Diameter	33mm
Depth to Base	5.00m	Cover Type	Flush lockable protective cover
Filter Zone	1.00 - 5.00m	Ground Level	
Date Installed	1 June 2006		

[illegible]

Remarks



Form 003/1

FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY
SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Project No PN061161
Borehole WS1
Sheet No. 1 (2 of 2)

Client LAING O'ROURKE NORTHERN

Installation Details

Installation Type	standpipe	Diameter	33mm
Depth to Base	5.00m	Cover Type	Flush lockable protective cover
Filter Zone	1.00 - 5.00m	Ground Level	
Date Installed	1 June 2006		

[illegible]

Remarks

FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY
SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Project No PN061161
Borehole WS2
Sheet No. 1 (1 of 2)

Client LAING O'ROURKE NORTHERN

Installation Details

Installation Type	Standpipe	Diameter	33mm
Depth to Base	5.00m	Cover Type	Flush lockable protective cover
Filter Zone	2.00 - 5.00m	Ground Level	
Date Installed	1 June 2006		

[illegible]

Remarks

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY
SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Borehole WS2

Sheet No. 1 (2 of 2)

Installation Type	Standpipe	Diameter	33mm
Depth to Base	5.00m	Cover Type	Flush lockable protective cover
Filter Zone	2.00 - 5.00m	Ground Level	
Date Installed	1 June 2006		

Remarks

FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY
SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Project No PN061161
Borehole WS5
Sheet No. 1 (1 of 2)

Client LAING O'ROURKE NORTHERN

Installation Details

Installation Type	standpipe	Diameter	33mm
Depth to Base	5.00m	Cover Type	Flush lockable protective cover
Filter Zone	2.00 - 5.00m	Ground Level	
Date Installed	2 March 2006		

[illegible]

Remarks



Form 003/1

FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY
SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Project No PN061161
Borehole WS5
Sheet No. 1 (2 of 2)

Client LAING O'ROURKE NORTHERN

Installation Details

Installation Type	standpipe	Diameter	33mm
Depth to Base	5.00m	Cover Type	Flush lockable protective cover
Filter Zone	2.00 - 5.00m	Ground Level	
Date Installed	2 March 2006		

Date	Time	Carbon Monoxide CO (ppm)	Barometric Pressure (mBars)	Flow Rate (Peak/min) (l/hr)	Remarks
15-Jun-2006		0.0	1010	0.0	
3-Jul-2006		0.0	1004	15.3	
17-Jul-2006		0.0	1012	-0.5	

Remarks

FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY
SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Project No PN061161
Borehole WS6
Sheet No. 1 (2 of 2)

Client LAING O'ROURKE NORTHERN

Installation Details

Installation Type	standpipe	Diameter	33mm
Depth to Base	5.00m	Cover Type	Flush lockable protective cover
Filter Zone	2.00 - 5.00m	Ground Level	
Date Installed	2 June 2006		

[illegible]

Remarks



Form 003/1

FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY
SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Project No PN061161
Borehole WS7
Sheet No. 1 (1 of 2)

Client LAING O'ROURKE NORTHERN

Installation Details

Installation Type	Standpipe	Diameter	33mm
Depth to Base	4.00m	Cover Type	Flush lockable protective cover
Filter Zone	1.00 - 4.00m	Ground Level	
Date Installed	2 June 2006		

[illegible]

Remarks



Form 003/1

FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project MANCHESTER SCHOOLS FRAMEWORK, HIGHER BLACKLEY
SCHOOL (OUR LADY'S RC HIGH SCHOOL)

Project No PN061161
Borehole WS7
Sheet No. 1 (2 of 2)

Client LAING O'ROURKE NORTHERN

Installation Details

Installation Type	Standpipe	Diameter	33mm
Depth to Base	4.00m	Cover Type	Flush lockable protective cover
Filter Zone	1.00 - 4.00m	Ground Level	
Date Installed	2 June 2006		

[illegible]

Remarks



Form 003/1

APPENDIX 9

EXPLORATORY HOLE LOCATION PLAN

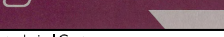
Topographical Survey Legend

B	Buildings	GV	Gas valve	RS	Rain water pipe		Level prefix descriptions
BR	Brick	HC	Hot cold	ST	Street		Below level
BS	Bus stop	HC	Hot/cold down	ST	Stair		Base level
CC	Concrete	HC	Hot/cold up	ST	Stair		First level
CG	Concrete paving slabs	KC	Kitchen	ST	Stair		Second level
CH	Chimney	KC	Kitchen	ST	Stair		Third level
CH	Chimney	LC	Lamp post	ST	Stair		Fourth level
CH	Chimney	LC	Lamp post	ST	Stair		Fifth level
CH	Chimney	LC	Lamp post	ST	Stair		Sixth level
CH	Chimney	LC	Lamp post	ST	Stair		Seventh level
CH	Chimney	LC	Lamp post	ST	Stair		Eighth level
CH	Chimney	LC	Lamp post	ST	Stair		Ninth level
CH	Chimney	LC	Lamp post	ST	Stair		Tenth level
CH	Chimney	LC	Lamp post	ST	Stair		Eleventh level
CH	Chimney	LC	Lamp post	ST	Stair		Twelfth level
CH	Chimney	LC	Lamp post	ST	Stair		Thirteenth level
CH	Chimney	LC	Lamp post	ST	Stair		Fourteenth level
CH	Chimney	LC	Lamp post	ST	Stair		Fifteenth level
CH	Chimney	LC	Lamp post	ST	Stair		Sixteenth level
CH	Chimney	LC	Lamp post	ST	Stair		Seventeenth level
CH	Chimney	LC	Lamp post	ST	Stair		Eighteenth level
CH	Chimney	LC	Lamp post	ST	Stair		Nineteenth level
CH	Chimney	LC	Lamp post	ST	Stair		Twentieth level
CH	Chimney	LC	Lamp post	ST	Stair		Twenty-first level
CH	Chimney	LC	Lamp post	ST	Stair		Twenty-second level
CH	Chimney	LC	Lamp post	ST	Stair		Twenty-third level
CH	Chimney	LC	Lamp post	ST	Stair		Twenty-fourth level
CH	Chimney	LC	Lamp post	ST	Stair		Twenty-fifth level
CH	Chimney	LC	Lamp post	ST	Stair		Twenty-sixth level
CH	Chimney	LC	Lamp post	ST	Stair		Twenty-seventh level
CH	Chimney	LC	Lamp post	ST	Stair		Twenty-eighth level
CH	Chimney	LC	Lamp post	ST	Stair		Twenty-ninth level
CH	Chimney	LC	Lamp post	ST	Stair		Thirtieth level
CH	Chimney	LC	Lamp post	ST	Stair		Thirty-first level
CH	Chimney	LC	Lamp post	ST	Stair		Thirty-second level
CH	Chimney	LC	Lamp post	ST	Stair		Thirty-third level
CH	Chimney	LC	Lamp post	ST	Stair		Thirty-fourth level
CH	Chimney	LC	Lamp post	ST	Stair		Thirty-fifth level
CH	Chimney	LC	Lamp post	ST	Stair		Thirty-sixth level
CH	Chimney	LC	Lamp post	ST	Stair		Thirty-seventh level
CH	Chimney	LC	Lamp post	ST	Stair		Thirty-eighth level
CH	Chimney	LC	Lamp post	ST	Stair		Thirty-ninth level
CH	Chimney	LC	Lamp post	ST	Stair		Fortieth level
CH	Chimney	LC	Lamp post	ST	Stair		Forty-first level
CH	Chimney	LC	Lamp post	ST	Stair		Forty-second level
CH	Chimney	LC	Lamp post	ST	Stair		Forty-third level
CH	Chimney	LC	Lamp post	ST	Stair		Forty-fourth level
CH	Chimney	LC	Lamp post	ST	Stair		Forty-fifth level
CH	Chimney	LC	Lamp post	ST	Stair		Forty-sixth level
CH	Chimney	LC	Lamp post	ST	Stair		Forty-seventh level
CH	Chimney	LC	Lamp post	ST	Stair		Forty-eighth level
CH	Chimney	LC	Lamp post	ST	Stair		Forty-ninth level
CH	Chimney	LC	Lamp post	ST	Stair		Fiftieth level
CH	Chimney	LC	Lamp post	ST	Stair		Fifty-first level
CH	Chimney	LC	Lamp post	ST	Stair		Fifty-second level
CH	Chimney	LC	Lamp post	ST	Stair		Fifty-third level
CH	Chimney	LC	Lamp post	ST	Stair		Fifty-fourth level
CH	Chimney	LC	Lamp post	ST	Stair		Fifty-fifth level
CH	Chimney	LC	Lamp post	ST	Stair		Fifty-sixth level
CH	Chimney	LC	Lamp post	ST	Stair		Fifty-seventh level
CH	Chimney	LC	Lamp post	ST	Stair		Fifty-eighth level
CH	Chimney	LC	Lamp post	ST	Stair		Fifty-ninth level
CH	Chimney	LC	Lamp post	ST	Stair		Sixtieth level
CH	Chimney	LC	Lamp post	ST	Stair		Sixty-first level
CH	Chimney	LC	Lamp post	ST	Stair		Sixty-second level
CH	Chimney	LC	Lamp post	ST	Stair		Sixty-third level
CH	Chimney	LC	Lamp post	ST	Stair		Sixty-fourth level
CH	Chimney	LC	Lamp post	ST	Stair		Sixty-fifth level
CH	Chimney	LC	Lamp post	ST	Stair		Sixty-sixth level
CH	Chimney	LC	Lamp post	ST	Stair		Sixty-seventh level
CH	Chimney	LC	Lamp post	ST	Stair		Sixty-eighth level
CH	Chimney	LC	Lamp post	ST	Stair		Sixty-ninth level
CH	Chimney	LC	Lamp post	ST	Stair		Seventieth level
CH	Chimney	LC	Lamp post	ST	Stair		Seventy-first level
CH	Chimney	LC	Lamp post	ST	Stair		Seventy-second level
CH	Chimney	LC	Lamp post	ST	Stair		Seventy-third level
CH	Chimney	LC	Lamp post	ST	Stair		Seventy-fourth level
CH	Chimney	LC	Lamp post	ST	Stair		Seventy-fifth level
CH	Chimney	LC	Lamp post	ST	Stair		Seventy-sixth level
CH	Chimney	LC	Lamp post	ST	Stair		Seventy-seventh level
CH	Chimney	LC	Lamp post	ST	Stair		Seventy-eighth level
CH	Chimney	LC	Lamp post	ST	Stair		Seventy-ninth level
CH	Chimney	LC	Lamp post	ST	Stair		Eightieth level
CH	Chimney	LC	Lamp post	ST	Stair		Eighty-first level
CH	Chimney	LC	Lamp post	ST	Stair		Eighty-second level
CH	Chimney	LC	Lamp post	ST	Stair		Eighty-third level
CH	Chimney	LC	Lamp post	ST	Stair		Eighty-fourth level
CH	Chimney	LC	Lamp post	ST	Stair		Eighty-fifth level
CH	Chimney	LC	Lamp post	ST	Stair		Eighty-sixth level
CH	Chimney	LC	Lamp post	ST	Stair		Eighty-seventh level
CH	Chimney	LC	Lamp post	ST	Stair		Eighty-eighth level
CH	Chimney	LC	Lamp post	ST	Stair		Eighty-ninth level
CH	Chimney	LC	Lamp post	ST	Stair		Ninetieth level
CH	Chimney	LC	Lamp post	ST	Stair		Ninety-first level
CH	Chimney	LC	Lamp post	ST	Stair		Ninety-second level
CH	Chimney	LC	Lamp post	ST	Stair		Ninety-third level
CH	Chimney	LC	Lamp post	ST	Stair		Ninety-fourth level
CH	Chimney	LC	Lamp post	ST	Stair		Ninety-fifth level
CH	Chimney	LC	Lamp post	ST	Stair		Ninety-sixth level
CH	Chimney	LC	Lamp post	ST	Stair		Ninety-seventh level
CH	Chimney	LC	Lamp post	ST	Stair		Ninety-eighth level
CH	Chimney	LC	Lamp post	ST	Stair		Ninety-ninth level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level

CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
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CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
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CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
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CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
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CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
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CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
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CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC	Lamp post	ST	Stair		One hundred level
CH	Chimney	LC					

Survey Station Coordinates			
STN	EAST	NORTH	LEVEL
0003	385959.79	4045418.33	106.37
P11A	385679.45	4045453.57	106.37
P14A	385661.09	4045487.86	106.09
P18	385708.62	4045454.88	106.07
P19	385736.39	4045484.38	106.07
P20	385739.33	4045484.38	106.07
P23	385530.38	4045339.57	106.84
P24	385530.38	4045439.74	106.84
PRO5	385526.91	4044741.13	101.98
PRO6	385277.02	4044643.92	101.63
PRO7	385590.19	4044451.86	101.27
PRO8	385673.73	4044463.42	101.27
PRO9	385674.25	404445.90	99.67
P10	385653.73	404463.92	101.63
P11	385660.10	404483.99	101.75
P12	385662.84	404525.84	106.08
P13	385663.44	404525.84	106.08
P14	385661.06	404548.99	101.42
P15	385661.06	404548.99	101.42
P16	385589.59	404474.75	101.86
P17	385589.59	404474.75	101.86
PR2A	385594.56	404474.75	100.69



	
The Geotechnical Centre Unit 1, Bowdler Industrial Park, Linc. Link, Salford, Greater Manchester M6 6PU	Phone: 01244 673187 Fax: 01244 673182 Email: mail@geotechnics.co.uk www.geotechnics.co.uk
Engineer: Sinclair Knight Merz (Europe) Limited Client: Laing O'Rourke Northern Limited Project: Our Lady's RC High School, Manchester Drawing Title: Exploratory Hole Location Plan Taken from a drawing supplied by the client	
Scale: NTS Project No: PN061161	Date: July 2006 File Name: GE-PN061161-001

APPENDIX 10

INVESTIGATION TECHNIQUES AND GENERAL NOTES

INVESTIGATION TECHNIQUES

INTRODUCTION

The following brief review of Ground Investigation techniques, generally used as part of most Site Investigations in the U.K., summarises their methodology, advantages and limitations. Detailed descriptions of the techniques are available and can be provided on request. This review should be read in conjunction with the accompanying General Notes.

TRIAL PITS

The trial pit is amongst the most simple yet effective means of identifying shallow ground conditions on a site. Its advantages include simplicity, speed, potential accuracy and cost-effectiveness. The trial pit is most commonly formed using a backacting excavator which can typically determine ground conditions to some 4 metres below ground level. Hand excavation is often used to locate, expose and detail existing foundations, features or services. In general, it is difficult to extend pits significantly below the water table in predominantly granular soils, where flows can cause instability. Unless otherwise stated, the Trial Pits will not have been provided with temporary side support during their construction. Under such circumstances ground conditions to some 1.2 metres can be closely inspected, subject to stability assessment, but below this depth, entrance into the pit is not permitted in the absence of shoring and hence observations will have been made from ground surface and samples taken from the excavator bucket.

Trends in strata type, level and thickness can be determined, shear surfaces identified and the behaviour of plant, excavation sides and excavated materials can be related to the construction process. They are particularly valuable in land slip investigations. Some types of insitu test can be undertaken in such pits and large disturbed or block samples obtained.

CABLE PERCUSSION BORING

The light Cable Percussion technique of soft ground boring, typically at a diameter of 150mm, is a well established simple and flexible method of boring vertical holes and generally allows data to be obtained in respect of strata conditions other than rock. A tubular cutter (for cohesive soils) or shell with a flap valve (for granular soils) is repeatedly lifted and dropped using a winch and rope operating from an "A" frame. Soil which enters these tools is regularly removed and either sampled for subsequent examination or test, or laid to one side for backfilling. Steel casing will have been used to prevent collapse of the borehole sides where necessary. A degree of disturbance of soil and mixing of layers is inevitable and the presence of very thin layers of different soils within a particular stratum may not be identified. Changes in strata type can only be detected on recognition of a change in soil samples at surface, after the interface has been passed. For the foregoing reasons, depth measurements should not be considered to be more accurate than 0.1 metre.

In cohesive soils cylindrical samples are retrieved by driving or pushing in 100mm nominal diameter tubes. In soft soils, piston sampling or vane testing may be undertaken. In granular soils and often in cohesive materials, insitu Standard Penetration Tests (SPT's) are performed. The SPT records the number of standard blows required to drive a 50mm diameter open or cone ended probe for 300mm after an initial 150mm penetration. A modified method of recording is used in more dense strata. Small disturbed samples are obtained throughout.

The technique can determine ground conditions to depths in excess of 30 metres under suitable circumstances and usually causes less surface disturbance than trial pitting.

ROTARY DRILLING

Rotary Drilling to produce cores by rotating an annular diamond-impregnated tube or barrel into the ground is the technique most appropriate to the forming of site investigation boreholes through rock or other hard strata. It has the advantage of being able to be used vertically or at an angle. Core diameters of less than 100mm are most common for site investigation purposes. Core is normally retrieved in plastic lining tubes. A flushing fluid such as air, water or foam is used to cool the bit and carry cuttings to the surface.

Examination of cores allows detailed rock description and generally enables angled discontinuity surfaces to be observed. However, vertical holes do not necessarily reveal the presence of vertical or near-vertical fissures or joint discontinuities. The core can be subjected to test in the field or laboratory. Core recovery depends upon rock type and/or techniques used. Where open hole rotary drilling is employed, descriptions of strata result from examination at surface of small particles ejected from the borehole in the flushing medium. In consequence, no indication of fissuring, bedding, consistency or degree of weathering can be obtained. Small scale plant can be used for auger drilling to limited depth where access is constrained.

Depths in excess of 60 metres can be achieved under suitable circumstances using rotary techniques, with minimal surface disturbance.

WINDOW SAMPLING

This technique involves the driving of an open-ended tube into the ground and retrieval of the soil which enters the tube. The term "window sample" arose from the original device which had a "window" or slot cut into the side of the tube through which samples were taken. This has now been superseded by the use of a thin-walled plastic liner within a sampler which has a solid wall. Diameters range from 36 to 86mm. Such samples can be used for qualitative logging, selection of

samples for classification and chemical analysis and for obtaining a rudimentary assessment of strength.

Driving devices can be hand-held or machine-mounted and the drive tubes are typically in 1m lengths. The hole formed is not cased, however, and hence the success of this technique is limited when soils and groundwater conditions are such that the sides of the hole collapse on withdrawal of the sampler. Obstructions within the ground, the density of the material or its strength can also limit the depth and rate of penetration of this light-weight investigation technique. Nevertheless, it

is a valuable tool where access is constrained such as within buildings or on embankments. Depths of up to 8m can be achieved in suitable circumstances but depths of 4m to 6m are more common.

EXPLORATORY HOLE RECORDS

The data obtained by these techniques are generally presented on Trial Pit, Borehole, Drillhole or Window Sample Records. The descriptions of strata result from information gathered from a number of sources which may include published geological data, preliminary field observations and descriptions, insitu test results, laboratory test results and specimen descriptions. A key to the symbols and abbreviations used accompanies the records. The descriptions on the exploratory hole records accommodate but may not necessarily be identical to those on any preliminary records or the laboratory summaries.

The records show ground conditions at the exploratory hole locations. The degree to which they can be used to represent conditions between or beyond such holes, however, is a matter for geological interpretation rather than factual reporting and the associated uncertainties must be recognised.

DYNAMIC PROBING

This technique typically measures the number of blows of a standard weight falling over a standard height to advance a cone-ended rod over sequential standard distances (typically 100mm). Some devices measure the penetration of the probe per standard blow. It is essentially a profiling tool and is best used in conjunction with other investigation techniques where site-specific correlation can be used to delineate the distribution of soft or loose soils or the upper horizon of a dense or strong layer such as rock.

Both machine-driven and hand-driven equipment is available, the selection depending upon access restrictions and the depth of penetration required. It is particularly useful where access for larger equipment is not available, disturbance is to be minimised or where there are cost constraints. No samples are recovered and some techniques leave a sacrificial cone head in the ground. As with other lightweight techniques, progress is limited in strong or dense soils. The results are presented both numerically and graphically. Depths of up to 10m are commonly achieved in suitable circumstances.

The hand-driven DCP probing device has been calibrated by the TRL to provide a profile of CBR values over a range of depths of up to 1.50m.

INSTRUMENTATION

The most common form of instrument used in site investigation is either the standpipe or else the standpipe piezometer which can be installed in investigation holes. They are used to facilitate monitoring of groundwater levels and water sampling over a period of time following site work. Normally a standpipe would be formed using rigid plastic tubing which has been perforated or slotted over much of its length whilst a standpipe piezometer would have a filter tip which would be placed at a selected level and the hole sealed above and sometimes below to isolate the zone of interest. Groundwater levels are determined using an electronic "dipmeter" to measure the depth to the water surface from ground level. Piezometers can also be used to measure permeability. They are simple and inexpensive instruments for long term monitoring but response times can limit their use in tidal areas and access to the ground surface at each instrument is necessary. Remote reading requires more sophisticated hydraulic, electronic or pneumatic equipment.

Settlement can be monitored using surface or buried target plates whilst lateral movement over a range of depths is monitored using slip indicator or inclinometer equipment.

GENERAL NOTES

1. The report is prepared for the exclusive use of the Client named in the document and copyright subsists with Geotechnics Limited. Prior written permission must be obtained to reproduce all or part of the report. It is prepared on the understanding that its contents are only disclosed to parties directly involved in the current investigation, preparation and development of the site.
2. Further copies may be obtained with the Client's written permission, from Geotechnics Limited with whom the master copy of the document will be retained.
3. The report and/or opinion is prepared for the specific purpose stated in the document and in relation to the nature and extent of proposals made available to Geotechnics Limited at that time. Re-consideration will be necessary should those details change. The recommendations should not be used for other schemes on or adjacent to the site without further reference to Geotechnics Limited.
4. The assessment of the significance of the factual data, where called for, is provided to assist the Client and his Engineer and/or Advisers in the preparation of their designs.
5. The report is based on the ground conditions encountered in the exploratory holes together with the results of field and laboratory testing in the context of the proposed development. The data from any commissioned desk study and site reconnaissance are also drawn upon. There may be special conditions appertaining to the site, however, which are not revealed by the investigation and which may not be taken into account in the report.
6. Methods of construction and/or design other than those proposed by the designers or referred to in the report may require consideration during the evolution of the proposals and further assessment of the geotechnical and any geoenvironmental data would be required to provide discussion and evaluations appropriate to these methods.
7. The accuracy of results reported depends upon the technique of measurement, investigation and test used and these values should not be regarded necessarily as characteristics of the strata as a whole (see accompanying notes on Investigation Techniques). Where such measurements are critical, the technique of investigation will need to be reviewed and supplementary investigation undertaken in accordance with the advice of the Company where necessary.
8. The samples selected for laboratory test are prepared and tested in accordance with the relevant Clauses of BS 1377 Parts 1 to 8, where appropriate, in Geotechnics Limited's UKAS accredited Laboratory, where possible. A list of tests is given.
9. Tests requiring the use of another laboratory having UKAS accreditation where possible are identified.
10. Any unavoidable variations from specified procedures are identified in the report.
11. Specimens are cut vertically, where this is relevant and can be identified, unless otherwise stated.
12. All the data required by the test procedures are recorded on individual test sheets but the results in the report are presented in summary form to aid understanding and assimilation for design purposes. Where all details are required, these can be made available.
13. Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes, or on the possible presence of features based on either visual, verbal, written, cartographical, photographic or published evidence, this is for guidance only and no liability can be accepted for its accuracy.
14. Classification of materials as Made Ground is based on the inspection of retrieved samples or exposed excavations. Where it is obvious that foreign matter such as paper, plastic or metal is present, classification is clear. Frequently, however, for fill materials that arise from the adjacent ground or from the backfilling of excavations, their visual characteristics can closely resemble those of undisturbed ground. Other evidence such as site history, exploratory hole location or other tests may need to be drawn upon to provide clarification. For these reasons, classification of soils on the exploratory hole records as either Made Ground or naturally occurring strata, the boundary between them and any interpretation that this gives rise to should be regarded as provisional and subject to re-evaluation in the light of further data.
15. Ground conditions should be monitored during the construction of the works and the report should be re-evaluated in the light of these data by the supervising geotechnical engineers.
16. Any comments on groundwater conditions are based on observations made at the time of the investigation, unless specifically stated otherwise. It should be noted, however, that the observations are subject to the method and speed of boring, drilling or excavation and that groundwater levels will vary due to seasonal or other effects.
17. Any bearing capacities for conventional spread foundations which are given in the report and interpreted from the investigation are for bases at a minimum depth of 1m below finished ground level in naturally occurring strata and at broadly similar levels throughout individual structures, unless otherwise stated. The foundations should be designed in accordance with the good practice embodied in BS 8004 : 1986 - Foundations, supplemented for housing by NHBC Standards. Foundation design is an iterative process and bearing pressures may need adjustment or other measures may need to be taken in the context of final layouts and levels prior to finalisation of proposals.
18. Unless specifically stated, the investigation does not take account of the possible effects of mineral extraction or of gases from fill or natural sources within, below or outside the site.
19. The costs or economic viability of the proposals referred to in the report, or of the solutions put forward to any problems encountered, will depend on very many factors in addition to geotechnical or geoenvironmental considerations and hence their evaluation is outside the scope of the report.