

RESULTS OF IN-SITU TESTS ON SAMPLES OF GAS WITHDRAWN FROM GAS MONITORING STANDPIPES

Hole Number	BH G1
Date of Installation	05/02/1999
Depth of Installation	15.00 m *

Date	03/03/1999	03/03/1999	03/03/1999	03/03/1999	03/03/1999	
Time	10:30:00	10:31:00	10:32:00	10:33:00	10:34:00	
Instrument No and Type	GA90 (1240)					
Atmospheric Pressure (millibars)	965	965	965	965	965	
Depth to Sampling Point (m)	0.00					
Depth to Water (m)	1.54					
Flow Rate (m/sec)	-					
In-situ Differential Pressure (mm H2O) millibars	+0.0					
Flammable Gas as methane (CH4)	% LEL	<1	<1	<1	<1	<1
	% VOL	<0.1	<0.1	<0.1	<0.1	<0.1
Oxygen (O2)	% VOL	20.1	20.1	20.1	20.2	20.2
Carbon Dioxide (CO2)	% VOL	<0.1	<0.1	<0.1	<0.1	<0.1
Hydrogen Sulphide (H2S)	ppm	-	-	-	-	-
Gas Sample Taken	No					
Operator	IRK					
Ambient Temp. (Deg C)	7					
Downhole Temp. (Deg C)	7					
Weather	Overcast, showers, cool, moderate breeze.					
Remarks	Tap closed.					

KEY: 'LEL' = Lower Explosive Limit
'-' = not measured / not recorded

'*' = depth to base as installed
'***' = depth to base as measured

112/01

	Input by SJR	Date 16/03/1999	Checked by SJR	Date 16/03/1999		
 FOUNDATION & EXPLORATION SERVICES	Project BUCKLEY WELLS LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452	
					Figure No FT2/5 pg 1	

RESULTS OF IN-SITU TESTS ON SAMPLES OF GAS WITHDRAWN FROM GAS MONITORING STANDPIPES

Hole Number	BH G1
Date of Installation	05/02/1999
Depth of Installation	15.00 m *

Date		11/03/1999	11/03/1999	11/03/1999	11/03/1999	11/03/1999	
Time		08:25:00	08:26:00	08:27:00	08:28:00	00:00:00	
Instrument No and Type		GA90 (1240)					
Atmospheric Pressure (millibars)		1004	1004	1004	1004	1004	
Depth to Sampling Point (m)		0.00					
Depth to Water (m)		1.82					
Flow Rate (m/sec)		0.20 max 0.19 ave 0.17 min (1st min)	0.18 max 0.14 ave 0.09 min (3rd min)	0.07 max 0.06 ave 0.04 min (5th min)			
In-situ Differential Pressure (mm H2O) millibars		+0.0					
Flammable Gas as methane (CH4)	% LEL	<1	<1	<1	<1	<1	
	% VOL	<0.1	<0.1	<0.1	<0.1	<0.1	
Oxygen (O2)	% VOL	19.0	18.9	18.9	18.9	18.9	
Carbon Dioxide (CO2)	% VOL	0.7	0.8	0.8	0.8	0.8	
Hydrogen Sulphide (H2S)	ppm	-	-				
Gas Sample Taken		No					
Operator		IRK					
Ambient Temp. (Deg C)		6					
Downhole Temp. (Deg C)		-					
Weather		Clear skies, bright, dry, cool, still.					
Remarks		Tap closed.					

KEY: 'LEL' = Lower Explosive Limit '*' = depth to base as installed
 '-' = not measured / not recorded '**' = depth to base as measured

	Input by SJR	Date 16/03/1999	Checked by SJR	Date 16/03/1999		112/01
 FOUNDATION & EXPLORATION SERVICES	Project BUCKLEY WELLS LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No	4452
					Figure No	FT2/5 pg 2

RESULTS OF IN-SITU TESTS ON SAMPLES OF GAS WITHDRAWN FROM GAS MONITORING STANDPIPES

Hole Number	BH G4
Date of Installation	10/02/1999
Depth of Installation	12.00 m *

Date	03/03/1999	03/03/1999	03/03/1999	03/03/1999	03/03/1999	03/03/1999
Time	09:54:00	09:55:00	09:56:00	09:57:00	09:58:00	09:59:00
Instrument No and Type	GA90 (1240)					
Atmospheric Pressure (millibars)	965	965	964	964	964	964
Depth to Sampling Point (m)	0.00					
Depth to Water (m)	5.50					
Flow Rate (m/sec)	0.07 max 0.06 ave 0.05 min (1st min)	0.05 max 0.04 ave 0.02 min (3rd min)	0.02 max 0.02 ave 0.01 min (5th min)			
In-situ Differential Pressure (mm H2O) millibars	+ 0.0					
Flammable Gas as methane (CH4)	% LEL	68	70	64	72	76
	% VOL	3.4	3.5	3.2	3.6	3.8
Oxygen (O2)	% VOL	11.2	11.1	11.1	10.7	10.4
Carbon Dioxide (CO2)	% VOL	2.2	2.2	2.1	2.2	2.3
Hydrogen Sulphide (H2S)	ppm	-	-	-	-	-
Gas Sample Taken	No					
Operator	IRK					
Ambient Temp. (Deg C)	6					
Downhole Temp. (Deg C)	7					
Weather	Overcast, showers, cool, moderate breeze.					
Remarks	Tap open.					

KEY: 'LEL' = Lower Explosive Limit '*' = depth to base as installed
'-' = not measured / not recorded '***' = depth to base as measured

112/01

Input by SJR	Date 16/03/1999	Checked by SJR	Date 16/03/1999	Contract No 4452
Project BUCKLEY WELLS LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Figure No FT1/6 pg 1



RESULTS OF IN-SITU TESTS ON SAMPLES OF GAS WITHDRAWN FROM GAS MONITORING STANDPIPES

Hole Number	BH G4
Date of Installation	10/02/1999
Depth of Installation	12.00 m *

Date	03/03/1999	03/03/1999	03/03/1999	03/03/1999	03/03/1999	
Time	11:15:00	11:16:00	11:17:00	11:18:00	11:19:00	
Instrument No and Type	GA90 (1240)					
Atmospheric Pressure (millibars)	967	967	967	967	967	
Depth to Sampling Point (m)	0.00					
Depth to Water (m)	5.50					
Flow Rate (m/sec)	0.20 max 0.13 ave 0.06 min (1st min)	<0.01 (3rd min)				
In-situ Differential Pressure (mm H2O) millibars	-					
Flammable Gas as methane (CH4)	% LEL	6	6	8	8	10
	% VOL	0.3	0.3	0.4	0.4	0.5
Oxygen (O2)	% VOL	8.8	8.7	8.9	9.1	9.1
Carbon Dioxide (CO2)	% VOL	0.8	0.9	1.0	1.1	1.2
Hydrogen Sulphide (H2S)	ppm	-	-	-	-	-
Gas Sample Taken	Yes					
Operator	IRK					
Ambient Temp. (Deg C)	-					
Downhole Temp. (Deg C)	-					
Weather	Overcast, showers, cool, moderate breeze.					
Remarks	Readings taken 1hr after pruging with nitrogen.					

KEY: 'LEL' = Lower Explosive Limit
'-' = not measured / not recorded

* = depth to base as installed
** = depth to base as measured

Input by SJR	Date 16/03/1999	Checked by SJR	Date 16/03/1999	112/01
Project BUCKLEY WELLS LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452
				Figure No FT1/6 pg 2

RESULTS OF IN-SITU TESTS ON SAMPLES OF GAS WITHDRAWN FROM GAS MONITORING STANDPIPES

Hole Number	BH G4
Date of Installation	10/02/1999
Depth of Installation	12.00 m *

Date	11/03/1999	11/03/1999	11/03/1999	11/03/1999	11/03/1999	11/03/1999
Time	12:30:00	12:31:00	12:32:00	12:33:00	12:34:00	12:35:00
Instrument No and Type	GA90 (1240)					
Atmospheric Pressure (millibars)	1004	1004	1003	1003	1003	1003
Depth to Sampling Point (m)	0.00					
Depth to Water (m)	7.72					
Flow Rate (m/sec)	0.04 max 0.02 ave <0.01 min (1st min)	<0.01 (3rd min)				
In-situ Differential Pressure (mm H2O) millibars	+0.0					
Flammable Gas as methane (CH4)	% LEL	126	132	124	122	116
	% VOL	6.3	6.6	6.2	6.1	5.8
Oxygen (O2)	% VOL	8.0	7.9	8.7	8.5	9.1
Carbon Dioxide (CO2)	% VOL	3.0	3.1	2.9	2.9	2.8
Hydrogen Sulphide (H2S)	ppm	-	-	-	-	-
Gas Sample Taken	No					
Operator	IRK					
Ambient Temp. (Deg C)	9					
Downhole Temp. (Deg C)	-					
Weather	Overcast, dry, cool, still.					
Remarks	Tap closed.					

KEY: 'LEL' = Lower Explosive Limit '*' = depth to base as installed
'-' = not measured / not recorded '***' = depth to base as measured

112/01

	Input by SJR	Date 16/03/1999	Checked by SJR	Date 16/03/1999		
 FOUNDATION & EXPLORATION SERVICES	Project BUCKLEY WELLS LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452	
					Figure No FT1/6 pg 3	

RESULTS OF IN-SITU TESTS ON SAMPLES OF GAS WITHDRAWN FROM GAS MONITORING STANDPIPES

Hole Number	BH G4
Date of Installation	10/02/1999
Depth of Installation	12.00 m *

Date	11/03/1999	11/03/1999	11/03/1999	11/03/1999	11/03/1999	
Time	14:05:00	14:06:00	14:07:00	14:08:00	14:09:00	
Instrument No and Type	GA90 (1240)					
Atmospheric Pressure (millibars)	1003	1002	1002	1002	1002	
Depth to Sampling Point (m)	0.00					
Depth to Water (m)	7.72					
Flow Rate (m/sec)	<0.01 (1st min)					
In-situ Differential Pressure (mm H2O) millibars	-					
Flammable Gas as methane (CH4)	% LEL	6	6	6	6	
	% VOL	0.3	0.3	0.3	0.3	
Oxygen (O2)	% VOL	7.2	8.7	8.7	8.7	
Carbon Dioxide (CO2)	% VOL	0.4	0.4	0.4	0.4	
Hydrogen Sulphide (H2S)	ppm	-	-	-	-	
Gas Sample Taken	Yes					
Operator	IRK					
Ambient Temp. (Deg C)	-					
Downhole Temp. (Deg C)	-					
Weather	Overcast, dry, cool, still.					
Remarks	Readings taken 1hr after pruging with nitrogen.					

KEY: 'EL' = Lower Explosive Limit
 '-' = not measured / not recorded
 '*' = depth to base as installed
 '**' = depth to base as measure



**FOUNDATION
& EXPLORATION
SERVICES**

Input by
SJR
Project

Date
16/03/1999

Checked by
SJR

Date
16/03/1999

112/01

BUCKLEY WELLS LOCOMOTIVE DEPOT,
BURY, LANCASHIRE

Contract No

4452

Figure No

FT1/6 pg 4

Landfill Gas Monitoring on 12th January 2006

Weather: raining Surface ground conditions: wet

Monitoring Equipment: GA2000

Ambient concentrations (% Volume) CH4: 0%, CO2: 0%, O2: 20.2%.

Barometric pressure: Start of visit 1010mb, end of visit 1024mb.

DataField CS - GA Mode Data Output

Device ID	Date/Time dd/mm/yy	CH4(%)	CO2(%)	O2(%)	PEAKCH4(%)	PEAKCO2(%)	MIN O2(%)	BARO(mb)	PRESSURE	FLOW	POD(l/h)	Dipmeter	H2S	CO
JB578CP2	1/12/2006 14:49	0	3	18.6	0	3	18.5	1012	0.98	1.6	4.8	0	0	
JB578CP3	1/12/2006 14:55	0	0.8	20.4	0	0.8	20.3	1012	0.31	1.7	3.1	0	0	
JB578BH1	1/12/2006 15:10	0	4.4	14.2	0	4.4	13.9	1012	0.01	1.8	1.1	0	0	
JB578BH3	1/12/2006 14:36	0	3.9	17	0	3.9	17	1012	-0.04	0.5	0.6	0	0	
JB578BH4	1/12/2006 14:41	0	0	20.6	0	0	20.5	1012	0.49	0.9	0.9	0	0	
JB578BH7	1/12/2006 14:52	0	3.8	17	0	3.8	16.9	1012	0.16	1.6	3.2	0	1	

Landfill Gas Monitoring on 20th January 2006

Weather: raining Surface ground conditions: wet

Monitoring Equipment: GA2000

Ambient concentrations (% Volume) CH4: 0%, CO2: 0%, O2: 20.2%.

Barometric pressure: Start of visit 1010mb, end of visit 1024mb.

DataField CS - GA Mode Data Output

Device ID	Date/Time dd/mm/yy	CH4(%)	CO2(%)	O2(%)	PEAKCH4(%)	PEAKCO2(%)	MIN O2(%)	BARO(mb)	PRESSURE	FLOW	POD(l/h)	Dipmeter	H2S	CO
JB578CP3	20/01/06 10:17:32	0	0.7	20.3	0	0.7	20.2	1001	0	0.5	2.8	0	0	
JB578BH1	20/01/06 10:25:50	0	4.4	15.5	0	4.5	15	1001	-0.09	0.5	1	0	0	
JB578BH3	20/01/06 10:01:19	0	4.2	16.7	0	4.2	16.7	1001	0.02	0.1	0.9	0	0	
JB578BH4	20/01/06 10:04:36	0	0	20.9	0	0	20.8	1001	-0.17	0.2	0.6	0	0	
JB578BH7	20/01/06 10:13:12	0	4.2	16.9	0	4.3	16.8	1001	-0.16	0.4	3.4	0	1	

Landfill Gas Monitoring on 25th January 2006

Weather: raining Surface ground conditions: wet

Monitoring Equipment: GA2000

Ambient concentrations (% Volume) CH4: 0%, CO2: 0%, O2: 20.2%.

Barometric pressure: Start of visit 1019mb, end of visit 1020mb.

DataField CS - GA Mode Data Output

Device ID	Date/Time dd/mm/yy	CH4(%)	CO2(%)	O2(%)	PEAKCH4(%)	PEAKCO2(%)	MIN O2(%)	BARO(mb)	PRESSURE	FLOW POD(l/h)	Dipmeter	H2S	CO
JB578CP2	25/01/06 14:22:05	0	2	18.9	0	2	18.8	1019	0.04	0.5	1.1	0	0
JB578CP3	25/01/06 14:29:33	0	0.4	20	0	0.5	19.9	1019	0.04	0.8	0.9	0	0
JB578BH1	25/01/06 14:13:16	0	4	17.1	0	4	17.1	1020	-0.11	0.1	3.7	0	0
JB578BH4	25/01/06 14:16:14	0	0	20.1	0	0	19.9	1019	0.26	0.2	2.8	0	0
JB578BH7	25/01/06 14:25:46	0	2.5	19.3	0	2.4	19.3	1019	-0.07	0.7	3.1	0	0

Landfill Gas Monitoring on 3rd February 2006

Weather: raining Surface ground conditions: wet

Monitoring Equipment: GA2000

Ambient concentrations (% Volume) CH4: 0%, CO2: 0%, O2: 20.2%.

Barometric pressure: Start of visit 1017mb, end of visit 1016mb.

DataField CS - GA Mode Data Output

Device ID	Date/Time dd/mm/yy	CH4(%)	CO2(%)	O2(%)	PEAKCH4(%)	PEAKCO2(%)	MIN O2(%)	BARO(mb)	PRESSURE	FLOW	POD(l/h)	Dipmeter	H2S	CO
JB578CP2	2/3/2006 14:07	0	0	20	0	0	19.9	1016	0.05	-0.1	4	0	0	
JB578CP3	2/3/2006 14:13	0	1.5	19.5	0	1.5	19.5	1016	-0.03	0.2	1.7	0	0	
JB578BH1	2/3/2006 13:58	0	0	18.3	0	3.8	17.7	1016	-0.04	0.1	1	0	0	
JB578BH3	2/3/2006 13:55	0	3.8	17.3	0	3.7	17.4	1017	-0.17	0	1.1	0	0	
JB578BH4	2/3/2006 14:03	0	0	19.7	0	0	19.6	1016	0.82	-0.3	1.4	0	0	
JB578BH7	2/3/2006 14:10	0	1.7	19.4	0	1.7	19.4	1016	-0.25	0.1	2.9	0	0	

Landfill Gas Monitoring on 10th February 2006

Weather: raining Surface ground conditions: wet

Monitoring Equipment: GA2000

Ambient concentrations (% Volume) CH4: 0%, CO2: 0%, O2: 20.2%.

Barometric pressure: Start of visit 1016mb, end of visit 1017mb.

DataField CS - GA Mode Data Output

Device ID	Date/Time dd/mm/yy	CH4(%)	CO2(%)	O2(%)	PEAKCH4(%)	PEAKCO2(%)	MIN O2(%)	BARO(mb)	PRESSURE	FLOW	POD(l/h)	Dipmeter	H2S	CO
JB578CP2	2/10/2006 11:48	0	0	20.7	0	0	20.6	1017	0.07	0.1	2.8	0	0	
JB578CP3	2/10/2006 11:56	0	0	20.6	0	0	20.5	1016	0.11	-0.7	2	0	0	
JB578BH1	2/10/2006 11:37	0	0	19.6	0	3.9	18	1016	-0.08	0.2	1.2	0	0	
JB578BH3	2/10/2006 11:34	0	3.9	17.8	0	3.9	17.8	1016	0.05	0.1	1	0	0	
JB578BH4	2/10/2006 11:40	0	0	20.6	0	0	20.5	1016	0.4	0.1	1.3	0	0	
JB578BH7	2/10/2006 11:52	0	3.3	18.8	0	3.2	19	1016	0.11	0	2.4	0	0	

Landfill Gas Monitoring on 16th February 2006

Weather: raining Surface ground conditions: wet

Monitoring Equipment: GA2000

Ambient concentrations (% Volume) CH4: 0%, CO2: 0%, O2: 20.2%.

Barometric pressure: Start of visit 969mb, end of visit 970mb.

DataField CS - GA Mode Data Output

Device ID	Date/Time dd/mm/yy	CH4(%)	CO2(%)	O2(%)	PEAKCH4(%)	PEAKCO2(%)	MIN O2(%)	BARO(mb)	PRESSURE	FLOW	POD(l/h)	Dipmeter	H2S	CO
JB578CP2	UNABLE TO ACCESS													
JB578CP3	16/02/06 10:45:30	0	1	20.7	0	1	20.7	970	0.17	-0.1	5.6	0	0	
JB578BH1	16/02/06 10:55:21	0	2	15.7	0	4.6	15.5	969	-0.01	0.1	2	0	0	
JB578BH3	16/02/06 10:23:32	0	3.9	17.2	0	3.9	17	970	2.44	0	2	0	1	
JB578BH4	16/02/06 10:27:51	0	0	20.8	0	0	20.6	969	-0.42	0.3	0.7	0	0	
JB578BH7	16/02/06 10:40:42	0	3.4	19.1	0	3.6	18.9	970	0.2	-0.4	6	0	0	

Landfill Gas Monitoring on 23rd February 2006

Weather: raining Surface ground conditions: very wet

Monitoring Equipment: GA2000

Ambient concentrations (% Volume) CH4: 0%, CO2: 0%, O2: 20.2%.

Barometric pressure: Start of visit 971mb, end of visit 972mb.

DataField CS - GA Mode Data Output

Device ID	Date/Time dd/mm/yy	CH4(%)	CO2(%)	O2(%)	PEAKCH4(%)	PEAKCO2(%)	MIN O2(%)	BARO(mb)	.PRESSURE	FLOW	POD(l/h)	Dipmeter	H2S	CO
JB578CP2	UNABLE TO ACCESS													
JB578CP3	23/2/2006 15:57	0	1	20.4	0	1	20.1	972	0.12	-0.2	4.1	0	0	
JB578BH1	23/2/2006 15:30	0	4.6	15.8	0	4.7	15.5	971	-0.01	0.2	1.8	0	0	
JB578BH3	23/2/2006 15:37	0	3	17.6	0	3.3	17	971	0.1	0	1.1	0	1	
JB578BH4	23/2/2006 15:40	0	0	20.6	0	0	19.8	972	0.3	0.5	0.6	0	0	
JB578BH7	23/2/2006 15:47	0	3.1	19.1	0	3.4	18.5	972	0.15	-0.1	5.1	0	0	

Landfill Gas Monitoring on 23rd March 2006

Weather: raining Surface ground conditions: wet

Monitoring Equipment: GA2000

Ambient concentrations (% Volume) CH4: 0%, CO2: 0%, O2: 20.2%.

Barometric pressure: Start of visit 1001mb, end of visit 1001mb.

DataField CS - GA Mode Data Output

Device ID	Date/Time dd/mm/yy	CH4(%)	CO2(%)	O2(%)	PEAKCH4(%)	PEAKCO2(%)	MIN O2(%)	BARO(mb)	PRESSURE	FLOW	POD(l/h)	Dipmeter	H2S	CO
JB578CP2	UNABLE TO ACCESS													
JB578CP3	23/3/2006 10:54	0	0	20.4	0	0	20.3	1001	0.01	-5.3	3.7		0	1
JB578BH1	23/3/2006 10:37	0	2.2	18.5	0	2.1	18.4	1001	-0.04	-0.2	1.5		0	0
JB578BH3	23/3/2006 10:40	0	1.8	18.7	0	2	18.7	1001	-0.21	-1.1	1.1		0	1
JB578BH4	23/3/2006 10:42	0	0	20.3	0	0	20.1	1001	-0.15	-0.9	0.5		0	2
JB578BH7	23/3/2006 10:49	0	2.4	18.9	0	2.5	18.8	1001	-0.24	-1.9	4.7		0	1

Landfill Gas Monitoring on 29th March 2006

Weather: raining Surface ground conditions: wet

Monitoring Equipment: GA2000

Ambient concentrations (% Volume) CH4: 0%, CO2: 0%, O2: 20.2%.

Barometric pressure: Start of visit 995mb, end of visit 994mb.

DataField CS - GA Mode Data Output

Device ID	Date/Time dd/mm/yy	CH4(%)	CO2(%)	O2(%)	PEAKCH4(%)	PEAKCO2(%)	MIN O2(%)	BARO(mb)	PRESSURE	FLOW POD(l/h)	Dipmeter	H2S	CO
JB578CP2	29/3/2006 10:58	0	0.4	19.6	0	0.4	19.6	995	-0.03	-1.6	7.2	0	0
JB578CP3	29/3/2006 10:50	0	0	20.3	0	0	20.1	995	0.05	-1.8	7.4	0	3
JB578BH1	29/3/2006 11:09	0	4	17.2	0	4	17.1	994	0.06	-0.8	1.9	0	2
JB578BH3	29/3/2006 10:28	0	2.4	16.9	0	2.4	16.8	995	0.57	-0.2	1.8	0	4
JB578BH4	29/3/2006 10:35	0	0	20.2	0	0	20	995	0.36	-1	0.6	0	5
JB578BH7	29/3/2006 10:43	0	2.6	17.9	0	2.6	17.8	995	0.05	-2	Dry @ 6.4	0	1

JB 578 Buckley Wells Gas Monitoring Summary

		CH4	CO2	O2	Flow	DIP	H2S	CO
JB578CP2	1/4/2006 12:16	0		4	17.1	0.7	3.1	
JB578CP2	1/12/2006 14:49	0		3	18.6	1.6	4.8	0
JB578CP2	25/01/06 14:22:05	0		2	18.9	0.5	1.1	0
JB578CP2	2/3/2006 14:07	0		0	20	-0.1	4	0
JB578CP2	2/10/2006 11:48	0		0	20.7	0.1	2.8	0
JB578CP2	29/3/2006 10:58	0		0.4	19.6	-1.6	7.2	0
	MIN	0		0	17.1	-1.6	1.1	0
	MAX	0		4	20.7	1.6	7.2	0
	MEAN	0	1.566667		19.15	0.2	3.833333	0
JB578CP3	1/5/2006 14:24	0		0.5	20.4	0.7	2.5	
JB578CP3	1/12/2006 14:55	0		0.8	20.4	1.7	3.1	0
JB578CP3	20/01/06 10:17:32	0		0.7	20.3	0.5	2.8	0
JB578CP3	25/01/06 14:29:33	0		0.4	20	0.8	0.9	0
JB578CP3	2/3/2006 14:13	0		1.5	19.5	0.2	1.7	0
JB578CP3	2/10/2006 11:56	0		0	20.6	-0.7	2	0
JB578CP3	16/02/06 10:45:30	0		1	20.7	-0.1	5.6	0
JB578CP3	23/2/2006 15:57	0		1	20.4	-0.2	4.1	0
JB578CP3	23/3/2006 10:54	0		0	20.4	-5.3	3.7	1
JB578CP3	29/3/2006 10:50	0		0	20.3	-1.8	7.4	3
	MIN	0		0	19.5	-5.3	1.7	0
	MAX	0		1.5	20.7	0.2	7.4	3
	MEAN	0	0.583333	20.31667	-1.316667	4.083333		0.666667
JB578BH1	1/5/2006 14:40	0		4.3	18.1	0.9	0.8	
JB578BH1	1/12/2006 15:10	0		4.4	14.2	1.8	1.1	0
JB578BH1	20/01/06 10:25:50	0		4.4	15.5	0.5	1	0
JB578BH1	2/3/2006 13:58	0		0	18.3	0.1	1	0
JB578BH1	2/10/2006 11:37	0		0	19.6	0.2	1.2	0
JB578BH1	16/02/06 10:55:21	0		2	15.7	0.1	2	0
JB578BH1	23/2/2006 15:30	0		4.6	15.8	0.2	1.8	0
JB578BH1	23/3/2006 10:37	0		2.2	18.5	-0.2	1.5	0
JB578BH1	29/3/2006 11:09	0		4	17.2	-0.8	1.9	2
	MIN	0		0	15.7	-0.8	1	0
	MAX	0		4.6	19.6	0.2	2	2
	MEAN	0	2.133333	17.51667	-0.066667	1.566667		0.333333
JB578BH3	1/4/2006 12:08	0		0	20.3	0.5	0.9	
JB578BH3	1/12/2006 14:36	0		3.9	17	0.5	0.6	0
JB578BH3	20/01/06 10:01:19	0		4.2	16.7	0.1	0.9	0
JB578BH3	25/01/06 14:13:16	0		4	17.1	0.1	3.7	0
JB578BH3	2/3/2006 13:55	0		3.8	17.3	0	1.1	0
JB578BH3	2/10/2006 11:34	0		3.9	17.8	0.1	1	0
JB578BH3	16/02/06 10:23:32	0		3.9	17.2	0	1.8	1
JB578BH3	23/2/2006 15:37	0		3	17.6	0	1.1	1
JB578BH3	23/3/2006 10:40	0		1.8	18.7	-1.1	1.1	1
JB578BH3	29/3/2006 10:28	0		2.4	16.9	-0.2	1.8	4
	MIN	0		1.8	16.9	-1.1	1	0
	MAX	0		3.9	18.7	0.1	1.8	4
	MEAN	0	3.133333	17.58333	-0.2	1.316667		1.166667

JB578BH4	1/4/2006 12:03	0	0	19.1	0.3	0.8		
JB578BH4	1/12/2006 14:41	0	0	20.6	0.9	0.9	0	0
JB578BH4	20/01/06 10:04:36	0	0	20.9	0.2	0.6	0	0
JB578BH4	25/01/06 14:16:14	0	0	20.1	0.2	2.8	0	0
JB578BH4	2/3/2006 14:03	0	0	19.7	-0.3	1.4	0	0
JB578BH4	2/3/2006 14:03	0	0	19.7	-0.3	1.4	0	0
JB578BH4	2/10/2006 11:40	0	0	20.6	0.1	1.3	0	0
JB578BH4	16/02/06 10:27:51	0	0	20.8	0.3	0.7	0	0
JB578BH4	23/2/2006 15:40	0	0	20.6	0.5	0.6	0	0
JB578BH4	23/3/2006 10:42	0	0	20.3	-0.9	0.5	0	2
JB578BH4	29/3/2006 10:35	0	0	20.2	-1	0.6	0	5
MIN		0	0	19.7	-1	0.5	0	0
MAX		0	0	20.8	0.5	1.4	0	5
MEAN		0	0	20.36667	-0.216667	0.85	0	1.166667

JB578BH7	1/5/2006 14:20	0	3.8	18	0.3	4.7		
JB578BH7	1/12/2006 14:52	0	3.8	17	1.6	3.2	0	1
JB578BH7	20/01/06 10:13:12	0	4.2	16.9	0.4	3.4	0	1
JB578BH7	25/01/06 14:25:46	0	2.5	19.3	0.7	3.1	0	0
JB578BH7	2/3/2006 14:10	0	1.7	19.4	0.1	2.9	0	0
JB578BH7	2/3/2006 14:10	0	1.7	19.4	0.1	2.9	0	0
JB578BH7	2/10/2006 11:52	0	3.3	18.8	0	2.4	0	0
JB578BH7	16/02/06 10:40:42	0	3.4	19.1	-0.4	6	0	0
JB578BH7	23/2/2006 15:47	0	3.1	19.1	-0.1	5.1	0	0
JB578BH7	23/3/2006 10:49	0	2.4	18.9	-1.9	4.7	0	1
JB578BH7	29/3/2006 10:43	0	2.6	17.9	-2 Dry @	6.4	0	1
MIN		0	1.7	17.9	-2	2.4	0	0
MAX		0	3.4	19.4	0.1	6	0	1
MEAN		0	2.75	18.86667	-0.716667	4.22	0	0.333333

APPENDIX O

TIER 2 RISK ASSESSMENT PARAMETERS AND SSVS

Tier 2 SSVs Selection and Justification.

For the Buckley Wells site, appropriate land use scenarios for each zone or location are given in the Table Below:

LKA have identified three different human receptors, namely site visitors or tourists, site maintenance workers e.g. guides or gardeners and ELLR engineering staff.

Site Visitors / Tourists

For site visitors, it was considered appropriate to contrast the soil contamination data against the ATRisk soil database Open Spaces SSVs. The SSVs are derived using an adopted UK compliant version of RISC-4 and conservative exposure factors and receptor behaviour for this scenario have been used to develop an SSV.

The exposure parameters and receptor behaviour assume a 0 to 6 year old female child as the key receptor and the assume that the receptor will be on site 78 days per year for a total of 3 hours. The parameters also assume that 200mg of soil per day will be ingested as opposed to 100mg/day as outlined in CLR10.

LKA consider it unlikely that tourists would visit the site 78 separate days per year and consider that site activities would not result in the amounts of ingestion or dermal contact with soil assumed by the SSV. Therefore with respect to tourists, LKA consider the ATRisk SSV for open space to be highly conservative.

Site Maintenance Workers

For site maintenance workers who may be tending to plants or footpaths etc there is a direct pathway for dermal contact and ingestion. For this receptor it was considered appropriate to contrast the contamination results to the ATRisk playing fields SSVs.

ELLR Engineering Staff

Much of the site activities are considered to be internal to buildings, sheds and workshops and as such LKA consider it appropriate to contrast the soil contamination results to CLEA SGVs and ATRisk SSVs for the commercial and industrial land use.

Contaminant	Commercial/Industrial	Playing Fields	Open Spaces
Arsenic	500	186	86.3
Cadmium	1400	545	160
Chromium	5000	2800	870
Lead	750*	750*	750*
Mercury	480	220	73
Nickel	5000	930	340
Selenium	8000	3600	1200
Phenol	21900	240000	151000
Naphthalene	98	620	620
Benzo(a)pyrene	29	4.56	3.96
TPH aliphatic C5-6	220	520	520

TPH aliphatic C6-8	270	270	270
TPH aliphatic C8-10	24	140	140
TPH aliphatic C10-12	86	66	66
TPH aliphatic C12-16	38	38	38
TPH aliphatic C16-35	>1000000	680000	520000
TPH aromatic C5-7	0.3	8.1	806
TPH aromatic C7-8	150	1000	1000
TPH aromatic C8-10	38	843	1100
TPH aromatic C10-12	210	630	630
TPH aromatic C12-16	290	290	290
TPH aromatic C16-21	10600	4210	1810
TPH aromatic C21-35	10600	4210	1810

APPENDIX P

CLR7 STATISTICAL TESTS

Data Input By	CJC	15/8/2006
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Analyte	Units	SGV	Min	Max	x mean	Sx	n	t	US95	T	T crit	Outlier Assessment	Assessment
Arsenic	mg/kg	86.3	7.9	50	30.98	17.52	4	2.353	51.58	0.83	1.43	No Outliers	No Action Required
Cadmium	mg/kg	160	0.5	1.1	0.66	0.29	4	2.353	1.01	1.49	1.43	Outliers Present	No Action Required
Lead	mg/kg	750	18	260	129.45	3.73	4	2.353	608.62	0.53	1.43	No Outliers	No Action Required
Chromium	mg/kg	870	8.1	31	18.28	9.50	4	2.353	29.45	1.15	1.43	No Outliers	No Action Required
Inorganic Mercury	mg/kg	73	0.2	1	0.57	0.33	4	2.353	0.96	1.06	1.43	No Outliers	No Action Required
Nickel	mg/kg	340	9.6	29	18.90	8.03	4	2.353	28.34	1.09	1.43	No Outliers	No Action Required
Selenium	mg/kg	1200	0.72	1.1	0.91	0.16	4	2.353	1.11	1.09	1.43	No Outliers	No Action Required
B(a)P	mg/kg	3.96	1	2.5	1.50	0.87	3	2.920	2.96	1.15	1.15	Outliers Present	No Action Required
Naphthalene	mg/kg	620	1	1	1.00	0.87	3	2.920	1.00	#DIV/0!	1.15	#DIV/0!	No Action Required
Copper	mg/kg	130	34	110	82.50	33.67	4	2.353	122.11	0.70	1.43	No Outliers	No Action Required
Zinc	mg/kg	300	66	130	92.50	27.33	4	2.353	124.66	1.30	1.43	No Outliers	No Action Required

SGV	Soil Guideline Value
x mean	Arithmetic mean of measured concentrations for an analyte
Min	Minimum value of measured concentrations for an analyte
Max	Maximum value of measured concentrations for an analyte
Sx	Unbiased analyte standard deviation
n	Number of samples
t	Value for 95th percentile confidence limit based upon number of samples
US95	The Upper 95th percentile bound of sample
T	Outlier test statistic
T crit	Critical T value dependant on n

CJC	15/8/2006
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Analyte	Units	SGV	Min	Max	x mean	Sx	n	t	US95	T	T crit	Outlier Assessment	Assessment
Arsenic	mg/kg	500	7.9	50	30.98	17.52	4	2.353	51.58	0.83	1.43	No Outliers	No Action Required
Cadmium	mg/kg	1400	0.5	1.1	0.66	0.29	4	2.353	1.01	1.49	1.43	Outliers Present	No Action Required
Lead	mg/kg	750	18	260	129.45	3.73	4	2.353	608.62	0.53	1.43	No Outliers	No Action Required
Chromium	mg/kg	5000	8.1	31	18.28	9.50	4	2.353	29.45	1.15	1.43	No Outliers	No Action Required
Inorganic Mercury	mg/kg	480	0.2	1	0.57	0.33	4	2.353	0.96	1.06	1.43	No Outliers	No Action Required
Nickel	mg/kg	5000	9.6	29	18.90	8.03	4	2.353	28.34	1.09	1.43	No Outliers	No Action Required
Selenium	mg/kg	8000	0.72	1.1	0.91	0.16	4	2.353	1.11	1.09	1.43	No Outliers	No Action Required
B(a)P	mg/kg	29	1	2.5	1.50	0.87	3	2.920	2.96	1.15	1.15	Outliers Present	No Action Required
Napthalene	mg/kg	98	1	1	1.00	0.87	3	2.920	1.00	#DIV/0!	1.15	#DIV/0!	No Action Required
Total PAH	mg/kg	50	1	95	37.38	43.55	4	2.353	88.61	0.97	1.43	No Outliers	Further Action Required
Copper	mg/kg	130	34	110	82.50	33.67	4	2.353	122.11	0.70	1.43	No Outliers	No Action Required
Zinc	mg/kg	300	66	130	92.50	27.33	4	2.353	124.66	1.30	1.43	No Outliers	No Action Required

Note

SGV	Soil Guideline Value
x mean	Arithmetic mean of measured concentrations for an analyte
Min	Minimum value of measured concentrations for an analyte
Max	Maximum value of measured concentrations for an analyte
Sx	Unbiased analyte standard deviation
n	Number of samples
t	Value for 95th percentile confidence limit based upon number of samples
US95	The Upper 95th percentile bound of sample
T	Outlier test statistic
T crit	Critical T value dependant on n



Site Name

Proposed Exhibits Area (site visitor)

Site Ref No.

JB571

Site Use

Open Space SSV

Data Input By

CJC

15/8/2006

Analyte	Units	SGV	Min	Max	x mean	Sx	n	t	US95	T	T crit	Outlier Assessment	Assessment
Arsenic	mg/kg	86.3	10	43	21.83	13.17	6	2.015	32.66	1.36	1.73	No Outliers	No Action Required
Cadmium	mg/kg	160	0.5	17	3.30	6.71	6	2.015	8.82	2.02	1.73	Outliers Present	No Action Required
Lead	mg/kg	750	22	310	100.21	2.67	6	2.015	225.10	1.15	1.73	No Outliers	No Action Required
Chromium	mg/kg	870	14	25	19.83	3.82	6	2.015	22.97	1.22	1.73	No Outliers	No Action Required
Inorganic Mercury	mg/kg	73	0.2	0.48	0.28	0.12	6	2.015	0.38	1.59	1.73	No Outliers	No Action Required
Nickel	mg/kg	340	36	83	51.50	20.01	6	2.015	67.96	1.47	1.73	No Outliers	No Action Required
Selenium	mg/kg	1200	0.3	1.3	0.77	0.41	6	2.015	1.11	1.12	1.73	No Outliers	No Action Required
B(a)P	mg/kg	3.96	1	1.6	1.10	0.24	6	2.015	1.30	2.04	1.73	Outliers Present	No Action Required
Naphthalene	mg/kg	620	1	2	1.17	0.24	6	2.015	1.50	2.04	1.73	Outliers Present	No Action Required
Total PAH	mg/kg	40	1	21	7.15	8.69	6	2.015	14.30	1.31	1.73	No Outliers	No Action Required
Copper	mg/kg	130	41	380	167.00	124.15	6	2.015	269.13	1.31	1.73	No Outliers	Further Action Required
Zinc	mg/kg	300	120	490	236.67	148.01	6	2.015	358.42	1.53	1.73	No Outliers	Further Action Required

Note

SGV Soil Guideline Value

x mean Arithmetic mean of measured concentrations for an analyte

Min Minimum value of measured concentrations for an analyte

Max Maximum value of measured concentrations for an analyte

Sx Unbiased analyte standard deviation

n Number of samples

t Value for 95th percentile confidence limit based upon number of samples

US95 The Upper 95th percentile bound of sample

T Outlier test statistic

T crit Critical T value dependant on n

Site Name

Proposed Exhibits Area - worker

Site Ref No.

JB571

Site Use

Commercial/Industrial

Data Input By

CJC

15/8/2006



Analyte	Units	SGV	Min	Max	x mean	Sx	n	t	US95	T	T crit	Outlier Assessment	Assessment
Arsenic	mg/kg	500	10	43	21.83	13.17	6	2.015	32.66	1.36	1.73	No Outliers	No Action Required
Cadmium	mg/kg	1400	0.5	17	3.30	6.71	6	2.015	8.82	2.02	1.73	Outliers Present	No Action Required
Lead	mg/kg	750	22	310	100.21	2.67	6	2.015	225.10	1.15	1.73	No Outliers	No Action Required
Chromium	mg/kg	5000	14	25	19.83	3.82	6	2.015	22.97	1.22	1.73	No Outliers	No Action Required
Inorganic Mercury	mg/kg	480	0.2	0.48	0.28	0.12	6	2.015	0.38	1.59	1.73	No Outliers	No Action Required
Nickel	mg/kg	5000	36	83	51.50	20.01	6	2.015	67.96	1.47	1.73	No Outliers	No Action Required
Selenium	mg/kg	8000	0.3	1.3	0.77	0.41	6	2.015	1.11	1.12	1.73	No Outliers	No Action Required
B(a)P	mg/kg	29	1	1.6	1.10	0.24	6	2.015	1.30	2.04	1.73	Outliers Present	No Action Required
Napthalene	mg/kg	98	1	2	1.17	0.24	6	2.015	1.50	2.04	1.73	Outliers Present	No Action Required
Copper	mg/kg	130	41	380	167.00	124.15	6	2.015	269.13	1.31	1.73	No Outliers	Further Action Required
Zinc	mg/kg	300	120	490	236.67	148.01	6	2.015	358.42	1.53	1.73	No Outliers	Further Action Required
Note													
SGV	Soil Guideline Value												
x mean	Arithmetic mean of measured concentrations for an analyte												
Min	Minimum value of measured concentrations for an analyte												
Max	Maximum value of measured concentrations for an analyte												
Sx	Unbiased analyte standard deviation												
n	Number of samples												
t	Value for 95th percentile confidence limit based upon number of samples												
US95	The Upper 95th percentile bound of sample												
T	Outlier test statistic												
T crit	Critical T value dependant on n												

Site Name

Proposed Play Area (site visitor)

Site Ref No.

JB571

Site Use

Open Space SSV

Data Input By

CJC

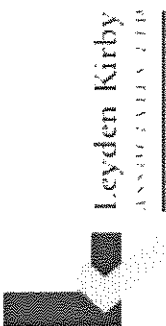
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Analyte	Units	SGV	Min	Max	x mean	Sx	n	t	US95	T	T crit	Outlier Assessment	Assessment
Arsenic	mg/kg	86.3	4.1	50	23.64	13.66	8	1.895	32.79	1.26	1.91	No Outliers	No Action Required
Cadmium	mg/kg	160	0.5	1.1	0.64	0.22	8	1.895	0.78	1.97	1.91	Outliers Present	No Action Required
Lead	mg/kg	750	6	270	91.25	3.94	8	1.895	228.61	0.79	1.91	No Outliers	No Action Required
Chromium	mg/kg	870	8.1	18	12.31	3.32	8	1.895	14.54	1.49	1.91	No Outliers	No Action Required
Inorganic Mercury	mg/kg	73	0.2	0.54	0.27	0.12	8	1.895	0.35	2.09	1.91	Outliers Present	No Action Required
Nickel	mg/kg	340	5.1	51	16.96	14.30	8	1.895	26.54	2.02	1.91	Outliers Present	No Action Required
Selenium	mg/kg	1200	0.3	1.3	0.68	0.32	8	1.895	0.90	1.48	1.91	No Outliers	No Action Required
B(a)P	mg/kg	3.96	1	2.3	1.34	0.56	7	1.943	1.75	1.64	1.83	No Outliers	No Action Required
Napthalene	mg/kg	620	1	1	1.00	0.56	7	1.943	1.00	#DIV/0!	1.83	#DIV/0!	No Action Required
Copper	mg/kg	130	12	170	75.25	51.52	8	1.895	109.77	1.19	1.91	No Outliers	No Action Required
Zinc	mg/kg	300	26	190	83.75	58.19	8	1.895	122.74	1.57	1.91	No Outliers	No Action Required

Note

- SGV
- Soil Guideline Value
- x mean
- Arithmetic mean of measured concentrations for an analyte
- Min
- Minimum value of measured concentrations for an analyte
- Max
- Maximum value of measured concentrations for an analyte
- Sx
- Unbiased analyte standard deviation
- n
- Number of samples
- t
- Value for 95th percentile confidence limit based upon number of samples
- US95
- The Upper 95th percentile bound of sample
- T
- Outlier test statistic
- T crit
- Critical T value dependant on n



Site Name

Proposed Car Park (site worker)

Site Ref No.

JB571

Site Use

Commercial/Industrial

Data Input By

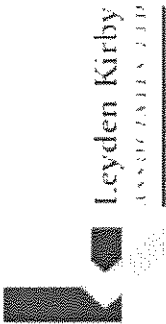
CJC

15/8/2006

Analyte	Units	SGV	Min	Max	x mean	Sx	n	t	US95	T	T crit	Outlier Assessment	Assessment
Arsenic	mg/kg	500	4.1	50	23.64	13.66	8	1.895	32.79	1.26	1.91	No Outliers	No Action Required
Cadmium	mg/kg	1400	0.5	1.1	0.64	0.22	8	1.895	0.78	1.97	1.91	Outliers Present	No Action Required
Lead	mg/kg	750	6	270	91.25	3.94	8	1.895	228.61	0.79	1.91	No Outliers	No Action Required
Chromium	mg/kg	5000	8.1	18	12.31	3.32	8	1.895	14.54	1.49	1.91	No Outliers	No Action Required
Inorganic Mercury	mg/kg	480	0.2	0.54	0.27	0.12	8	1.895	0.35	2.09	1.91	Outliers Present	No Action Required
Nickel	mg/kg	5000	5.1	51	16.96	14.30	8	1.895	26.54	2.02	1.91	Outliers Present	No Action Required
Selenium	mg/kg	8000	0.3	1.3	0.68	0.32	8	1.895	0.90	1.48	1.91	No Outliers	No Action Required
B(a)P	mg/kg	29	1	2.3	1.34	0.56	7	1.943	1.75	1.64	1.83	No Outliers	No Action Required
Napthalene	mg/kg	98	1	1	1.00	0.56	7	1.943	1.00	#DIV/0!	1.83	#DIV/0!	No Action Required
Copper	mg/kg	130	12	170	75.25	51.52	8	1.895	109.77	1.19	1.91	No Outliers	No Action Required
Zinc	mg/kg	300	26	190	83.75	58.19	8	1.895	122.74	1.57	1.91	No Outliers	No Action Required

Note

- SGV
- Soil Guideline Value
- x mean
- Arithmetic mean of measured concentrations for an analyte
- Min
- Minimum value of measured concentrations for an analyte
- Max
- Maximum value of measured concentrations for an analyte
- Sx
- Unbiased analyte standard deviation
- n
- Number of samples
- t
- Value for 95th percentile confidence limit based upon number of samples
- US95
- The Upper 95th percentile bound of sample
- T
- Outlier test statistic
- T crit
- Critical T value dependant on n



Site Name

Proposed Play Area (site worker)

Site Ref No.

JB571

Site Use

Commercial/Industrial

Data Input By

CJC

15/8/2006

Analyte	Units	SGV	Min	Max	x mean	Sx	n	t	US95	T	T crit	Outlier Assessment	Assessment
Arsenic	mg/kg	500	4.1	50	23.64	13.66	8	1.895	32.79	1.26	1.91	No Outliers	No Action Required
Cadmium	mg/kg	1400	0.5	1.1	0.64	0.22	8	1.895	0.78	1.97	1.91	Outliers Present	No Action Required
Lead	mg/kg	750	6	270	91.25	3.94	8	1.895	228.61	0.79	1.91	No Outliers	No Action Required
Chromium	mg/kg	5000	8.1	18	12.31	3.32	8	1.895	14.54	1.49	1.91	No Outliers	No Action Required
Inorganic Mercury	mg/kg	480	0.2	0.54	0.27	0.12	8	1.895	0.35	2.09	1.91	Outliers Present	No Action Required
Nickel	mg/kg	5000	5.1	51	16.96	14.30	8	1.895	26.54	2.02	1.91	Outliers Present	No Action Required
Selenium	mg/kg	8000	0.3	1.3	0.68	0.32	8	1.895	0.90	1.48	1.91	No Outliers	No Action Required
B(a)P	mg/kg	29	1	2.3	1.34	0.56	7	1.943	1.75	1.64	1.83	No Outliers	No Action Required
Napthalene	mg/kg	98	1	1	1.00	0.56	7	1.943	1.00	#DIV/0!	1.83	#DIV/0!	No Action Required
Copper	mg/kg	130	12	170	75.25	51.52	8	1.895	109.77	1.19	1.91	No Outliers	No Action Required
Zinc	mg/kg	300	26	190	83.75	58.19	8	1.895	122.74	1.57	1.91	No Outliers	No Action Required

Note

- SGV
- Soil Guideline Value
- x mean
- Arithmetic mean of measured concentrations for an analyte
- Min
- Minimum value of measured concentrations for an analyte
- Max
- Maximum value of measured concentrations for an analyte
- Sx
- Unbiased analyte standard deviation
- n
- Number of samples
- t
- Value for 95th percentile confidence limit based upon number of samples
- US95
- The Upper 95th percentile bound of sample
- T
- Outlier test statistic
- T crit
- Critical T value dependant on n

Site Name

Proposed Pedestrian Walkways (site work)

Site Ref No.

JB571

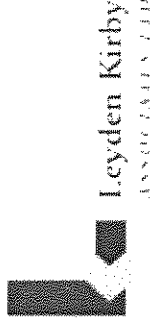
Site Use

Commercial/Industrial

Data Input By

CJC

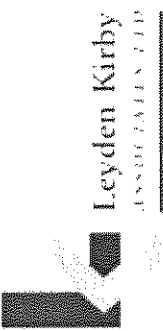
15/8/2006



Analyte	Units	SGV	Min	Max	x mean	Sx	n	t	US95	T	T crit	Outlier Assessment	Assessment
Arsenic	mg/kg	500	3.6	130	50.21	34.51	19	1.734	63.94	1.37	2.36	No Outliers	No Action Required
Cadmium	mg/kg	1400	0.5	2.4	0.96	0.50	19	1.734	1.16	2.13	2.36	No Outliers	No Action Required
Lead	mg/kg	750	8.8	2300	260.46	3.72	19	1.734	439.11	1.66	2.36	No Outliers	No Action Required
Chromium	mg/kg	5000	5.1	32	16.95	8.58	19	1.734	20.36	1.38	2.36	No Outliers	No Action Required
Inorganic Mercury	mg/kg	480	0.1	8.9	1.42	2.56	19	1.734	2.44	2.12	2.36	No Outliers	No Action Required
Nickel	mg/kg	5000	2.3	80	40.21	25.06	19	1.734	50.18	1.02	2.36	No Outliers	No Action Required
Selenium	mg/kg	8000	0.1	2.1	1.08	0.59	19	1.734	1.31	1.09	2.36	No Outliers	No Action Required
B(a)P	mg/kg	29	0.5	22	4.36	7.45	14	1.771	7.89	1.91	2.21	No Outliers	No Action Required
Napthalene	mg/kg	98	0.5	14	2.09	7.45	14	1.771	4.01	2.52	2.21	Outliers Present	No Action Required
Total PAH	mg/kg	50	2	860	95.47	210.53	19	1.734	179.22	2.05	2.36	No Outliers	Further Action Required
Copper	mg/kg	130	4.4	770	219.13	196.33	19	1.734	297.23	1.42	2.36	No Outliers	Further Action Required
Zinc	mg/kg	300	4.7	350	150.67	94.48	19	1.734	188.25	1.16	2.36	No Outliers	No Action Required

Note

SGV Soil Guideline Value
 x mean Arithmetic mean of measured concentrations for an analyte
 Min Minimum value of measured concentrations for an analyte
 Max Maximum value of measured concentrations for an analyte
 Sx Unbiased analyte standard deviation
 n Number of samples
 t Value for 95th percentile confidence limit based upon number of samples
 US95 The Upper 95th percentile bound of sample
 T Outlier test statistic
 T crit Critical T value dependant on n



Site Name
Site Ref No. **Site Use**
Data Input By

Analyte	Units	SGV	Min	Max	x mean	Sx	n	t	US95	T	T crit	Outlier Assessment	Assessment
Arsenic	mg/kg	500	3.6	130	37.44	29.58	36	1.699	45.82	1.70	2.64	No Outliers	No Action Required
Cadmium	mg/kg	1400	0.5	17	1.24	2.73	36	1.699	2.02	4.15	2.64	Outliers Present	No Action Required
Lead	mg/kg	750	6	2300	162.80	3.80	36	1.699	237.68	1.97	2.64	No Outliers	No Action Required
Chromium	mg/kg	5000	5.1	32	16.79	7.36	36	1.699	18.88	1.43	2.64	No Outliers	No Action Required
Inorganic Mercury	mg/kg	480	0.1	8.9	0.91	1.92	36	1.699	1.45	2.66	2.64	Outliers Present	No Action Required
Nickel	mg/kg	5000	2.3	83	35.41	23.95	36	1.699	42.19	1.19	2.64	No Outliers	No Action Required
Selenium	mg/kg	8000	0.1	2.1	0.93	0.51	36	1.699	1.07	1.33	2.64	No Outliers	No Action Required
B(a)P	mg/kg	29	0.5	22	2.82	5.20	30	1.699	4.43	2.68	2.56	Outliers Present	No Action Required
Napthalene	mg/kg	98	0.5	14	1.71	5.20	30	1.699	2.55	3.43	2.56	Outliers Present	No Action Required
Copper	mg/kg	130	4.4	770	166.32	163.63	36	1.699	212.65	1.74	2.64	No Outliers	Further Action Required
Zinc	mg/kg	300	4.7	490	146.02	104.47	36	1.699	175.60	1.62	2.64	No Outliers	No Action Required

Note

Soil Guideline Value
 Arithmetic mean of measured concentrations for an analyte
 Minimum value of measured concentrations for an analyte
 Maximum value of measured concentrations for an analyte
 Unbiased analyte standard deviation
 Number of samples
 Value for 95th percentile confidence limit based upon number of samples
 The Upper 95th percentile bound of sample
 Outlier test statistic
 Critical T value dependant on n

CJC	15/8/2006
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207

SGV	Soil Guideline Value
x mean	Arithmetic mean of measured concentrations for an analyte
Min	Minimum value of measured concentrations for an analyte
Max	Maximum value of measured concentrations for an analyte
Sx	Unbiased analyte standard deviation
n	Number of samples
t	Value for 95th percentile confidence limit based upon number of samples
US95	The Upper 95th percentile bound of sample
T	Outlier test statistic
T crit	Critical T value dependant on n

APPENDIX Q

COAL MINING MAPS

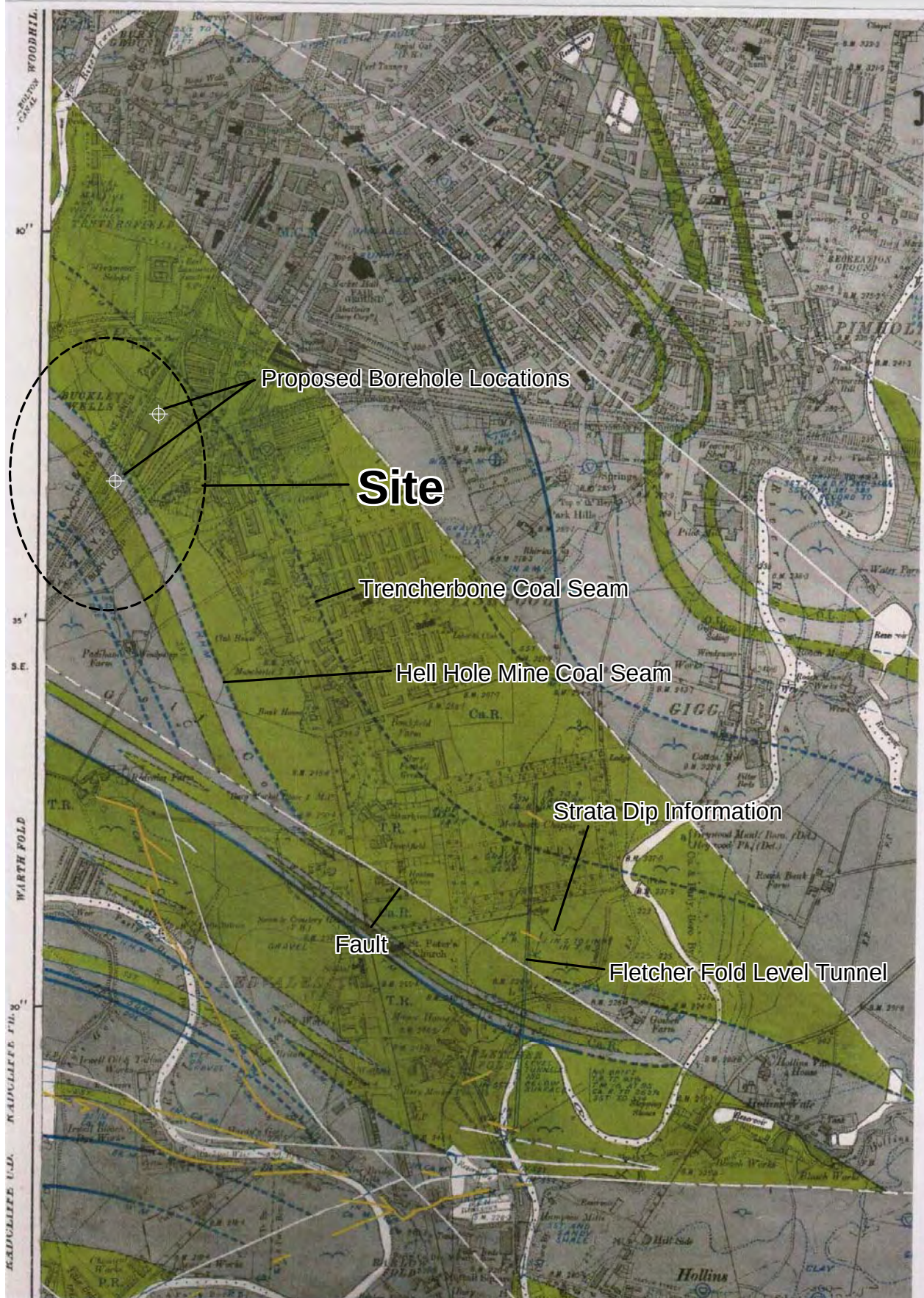


Figure 2: Lancs Sheet 88SW 1910 Geological Map

Drawn: March 2006



Figure 1: Lancs Sheet 87 and 88 1st Edition Geological Map

Drawn: March 2006

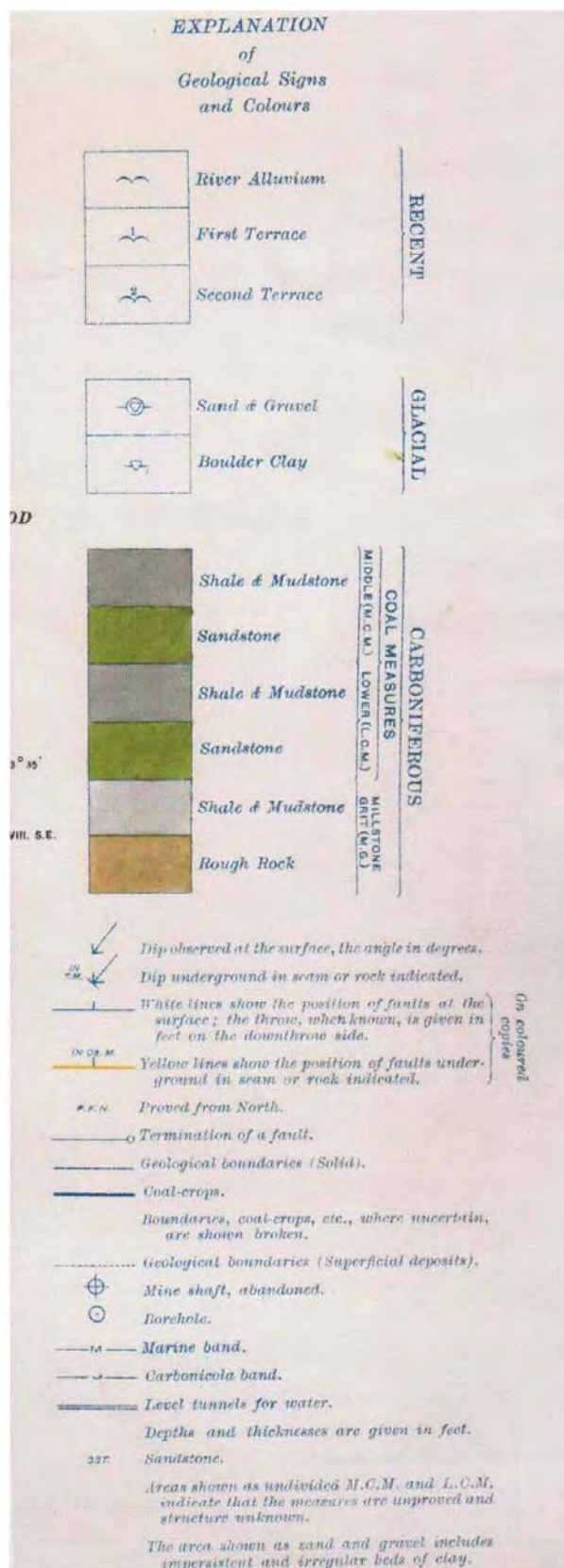
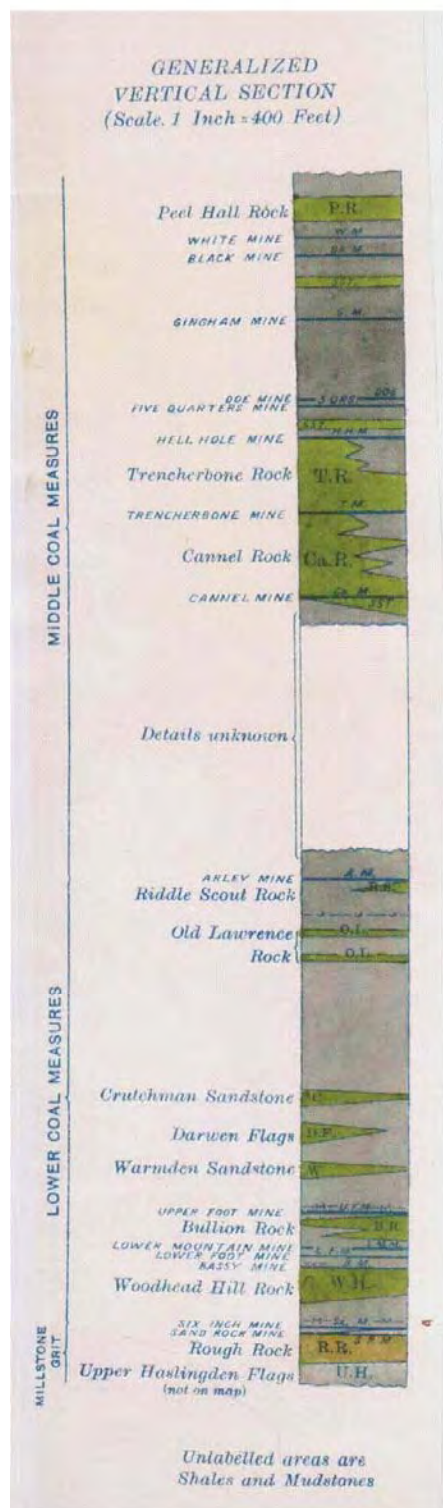


Figure 3: Legend for Lancs Sheet 88SW 1910 Geological Map

Drawn: March 2006



Figure 4: Lancs Sheet 87SE 1931 Geological Map

Drawn: March 2006

MICHELLE WADDICOR,
LEYDEN KIRBY ASSOCIATES LTD,
BURY BUSINESS CENTRE,
KAY STREET,
BURY,
BURY,
LANCS,
BL9 6BU

This matter is being dealt with by Ken Rowe

Our Ref: **10027088-06**

Your Ref: JB 578

Electronic Ref: EME_00003989430001_005

RRUID: 005.00003989430001

Date: 24 January 2006

Dear Sir,

Coal Mining Report

LAND AT BUCKLEY WELLS LOCOMOTIVE WORKS, BARON STREET, BURY, LANCASHIRE

I refer to the enquiry dated 23rd January 2006, received 23rd January 2006, in connection with the above.

This report is based on and limited to the records in the possession of The Coal Authority at the time the search is answered.

Past Underground Mining

According to the records in our possession, the property is not within the zone of likely physical influence on the surface from past underground coal workings.

However you may wish to know that the property is in an area where coal is believed to exist at or close to the surface that may have been worked at some time in the past.

Present Underground Mining

The property is not within the zone of likely physical influence on the surface from any present underground coal workings.

Future Underground Mining

The property is not within a geographical area for which a licence to extract coal by underground methods is awaiting determination by the Coal Authority.

The property is not within a geographical area for which a licence to extract coal by underground methods has been granted.

The property is not within the zone of likely physical influence at the surface from plans of future workings in our possession.

However reserves of coal exist in the locality which could be worked at some time in the future subject to feasibility, licences, and planning consents.

We have no record of any notice of the risk of the land being affected by subsidence being given under S.46 of the Coal Mining Subsidence Act 1991.

Shafts and Adits

Within or within 20 metres of the property there are 2 mine entries, the approximate positions of which are shown on the attached plan. Your attention is drawn to the statements made on that plan.

We have no record of what steps, if any, have been taken to treat the mine entries.

The records held by the Coal Authority may be incomplete. Consequently, there may exist in this locality mine entries of which we have no knowledge.

Surface Geology

Records in our possession do not disclose any fault or other line of weakness at the surface as having affected the stability of the property.

Past Opencast Mining

The property is not located within the geographical boundary of an opencast site from which coal has been extracted by opencast methods.

Present Opencast Mining

The property does not lie within 200 metres of the geographical boundary of an opencast site within which coal is being extracted by opencast methods.

Future Opencast Mining

The property is not within 800 metres of the geographical boundary of an opencast site for which a licence to extract coal by opencast methods is awaiting determination.

The property is not within 800 metres of the geographical site boundary of an opencast site for which a licence to extract coal by opencast methods has been granted.

Subsidence

The records in our possession do not disclose any damage notice or claim having been given, made or pursued in respect of the property since 1 January 1984.

The records in our possession do not disclose any current "Stop Notice" affecting the property.

The records in our possession do not show any request having been made to execute preventative works under S.33 of the Coal Mining Subsidence Act 1991.

Withdrawal of Support

The property does not lie within a geographical area in respect of which a notice of entitlement to withdraw support has been published.

The property does not lie within a geographical area in respect of which a notice has been given under S.41 of the Coal Industry Act 1994, revoking the entitlement to withdraw support.

Working Facilities Orders

The property is not within a geographical area that is the subject of an Order made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to Owners of Former Copyhold Land

The property is not within an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Additional Remarks

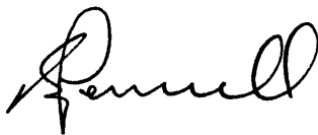
In view of the mining circumstances a prudent developer would seek appropriate technical advice before works are undertaken on site. All proposals should have regard to good engineering practice in mining areas as identified in authoritative publications on mining stability problems. In any event, no activities should be undertaken that intersect, disturb, or interfere with any coal or mines of coal without permission of the Coal Authority.

These replies are prepared in accordance with the 2003 editions of the Coal Authority's Terms and Conditions, User Guide and the Law Society's Guidance Notes.

Copyright in coal mining reports and certificates belongs to the Coal Authority. Information used to compile this report is protected by the Coal Authority's database right. All rights are reserved and unauthorised use is prohibited. Copyright and other intellectual property is not transferred to external parties by possession of a mining report or certificate, however those for whom the report is supplied have the right to use it.

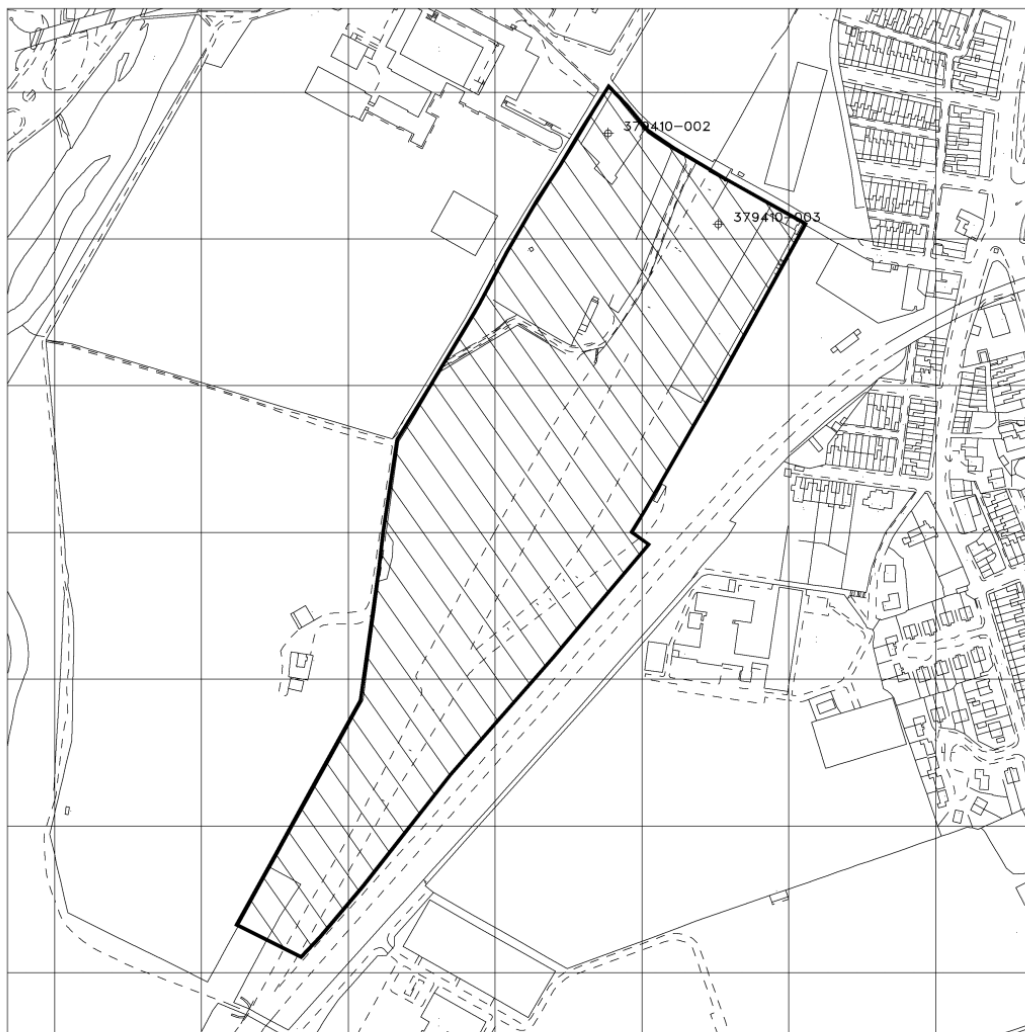
We acknowledge the receipt of your remittance in payment of our fee.

Yours faithfully

A handwritten signature in black ink, appearing to read 'Pennell', with a stylized flourish at the end.

Stephen Pennell

Director of Mining Information and Services



Crown Copyright.

PLAN NOT TO SCALE

This map is reproduced from the Ordnance Survey material by The Coal Authority [or division thereof] with the permission of the Controller of Her Majesty's Stationery Office, Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. Licence Number: AL51060A001.

This is a plan of the boundaries of the property in respect of which this report has been prepared. It is the responsibility of the user to ensure that the boundaries shown correspond with those of the property.

APPROXIMATE POSITION OF ENQUIRY BOUNDARY SHOWN



APPROXIMATE POSITION OF DISUSED MINE SHAFTS SHOWN



This plan shows the approximate location of the disused mine entry/entries referred to in the attached mining report. For reasons of clarity, mine entry symbols may not be drawn to the same scale as the plan.

Property owners have the benefit of statutory protection (under the Coal Mining Subsidence Act 1991). This contains provision for the making good, to the reasonable satisfaction of the owner, of physical damage from disused coal mine workings including disused coal mine entries. A DTL leaflet setting out the rights and the obligations of either the Coal Authority or other responsible persons under the 1991 Act can be obtained by telephoning 0845 762 6848.

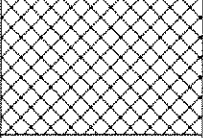
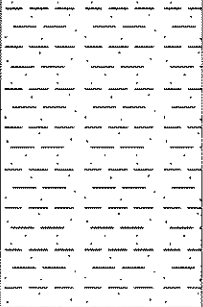
If you wish to discuss the relevance of any of the information contained in the attached report you should seek the advice of a qualified mining engineer or surveyor. If you or your adviser wish to examine the source plans from which the information has been taken these are available at our Mansfield office, free of charge, by prior appointment, telephone 01623 638233. Should you or your adviser wish to carry out any physical investigations that may enter, disturb or interfere with any disused mine entry the prior permission of the owner must be sought. For coal mine entries the owner will normally be the Coal Authority.

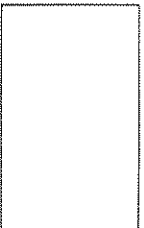
The Coal Authority, regardless of responsibility and in conjunction with other public bodies, provide an emergency call out facility in coalfield areas to assess the public safety implications of mining features (including disused mine entries). Our emergency telephone number at all times is 01623 646333.

APPENDIX R

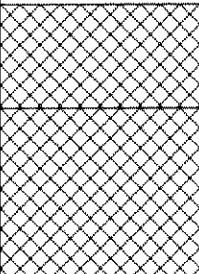
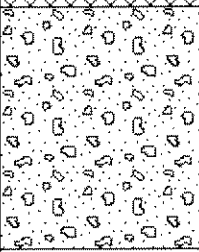
GEOTECHNICAL INFORMATION
PROPOSED CAR PARKING AREA

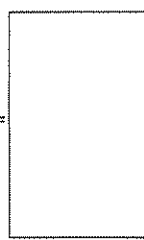
 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment 360 Rubber Duck Methods Mechanical Excavation Contractor MA Excavations
TRIAL PIT No. TP6		Client Bury MBC	Date 19.12.05

Depth (m)	B	Legend	Groundwater	Field Records
0.00	Ground Surface			
	MADE GROUND Soft dark grey very sandy clay with rare glass and brick fragments.			
	Firm to stiff light brown mottled grey CLAY .			
1.00				
	End of Trial Pit			Slight inflow at 1.4m
2.00				
3.00				

Remarks Dry, No odour Stability Sides stable	Dimensions A =  D = B = C =		Logged by CJC
			Scale NTS
			Sample taken at depth 0.3

 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment 360 Rubber Duck Methods Mechanical Excavation Contractor MA Excavations
TRIAL PIT No. TP7		Client Bury MBC	Date 19.12.05

Depth (m)	B	Legend	Groundwater	Field Records
0.00	Ground Surface			
	MADE GROUND Soft dark grey very sandy clay with rare glass and brick fragments.			
	POSSIBLE MADE GROUND Brown fine to coarse sand with occasional rounded cobbles and coarse subrounded gravel.			
1.00	Brown fine to coarse SAND and GRAVEL with occasional subangular to rounded cobbles.			
	End of Trial Pit			
2.00				
3.00				

Remarks Dry, No odour Stability Sides stable	Dimensions A =  D = B = C =	Logged by CJC
		Scale NTS
		Sample taken at depth 0.3, 0.9

PROJECT: BUCKLEY WELLS LOCOMOTIVE DEPOT, LOCATION: BURY, LANCASHIRE			METHOD OF EXCAVATION: MECHANICAL EXCAVATION			RECORD OF TRIAL PIT NO: TP 1		
CONTRACT NO: 4452			SURFACE DIMENSIONS OF PIT: 12.0m x 2.00m			CO-ORDINATES: E: N: Sheet 1 of 1		
INSTITU TESTING			START DATE: 28/01/99 FINISH DATE: 28/01/1999			GROUND LEVEL: 22.05 m O D		
Depth (m)	Type	Result	SAMPLES		Description of Strata	Thickness (m)	Depth (m)	Level Strata (m.o.d.) Symbol
			Depth (m)	Type				
0.10	CD		0.10	CD	1	Branbles/weeds over TOPSOIL: Black fine to coarse sand with some silt and a little clay with occasional rootlets. Grey, fine to coarse SAND with much silt/clay and much subrounded fine to coarse gravel including sandstone, with a little organic matter and slightly malodorous.	0.60	81.45
0.80			0.80	CD	2			
1.50			1.50	CD	3			
2.00			2.00	CD	4			
					END OF TRIAL PIT		2.40	79.65

REMARKS: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out to check for services. Services were not located. 2. Slight seepages of groundwater were encountered at 0.60m depth. 3. The sides of the trial pit were unstable and collapsing below 1.60m depth. 4. The trial pit was terminated at 2.40m depth due to side wall instability. 5. On completion the trial pit was backfilled to ground level with compacted arisings.	PLAN		Scale 1:25
	Logged by: GL/knh	Date: 28/01	
	Checked by: SJR	04/02	
Approved by: RJE			09/04

FOUNDATION & EXPLORATION SERVICES	FIGURE:
TP1	



Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

4811

Sheet

1 / 8

DETERMINATION OF CALIFORNIA BEARING RATIO (CBR)

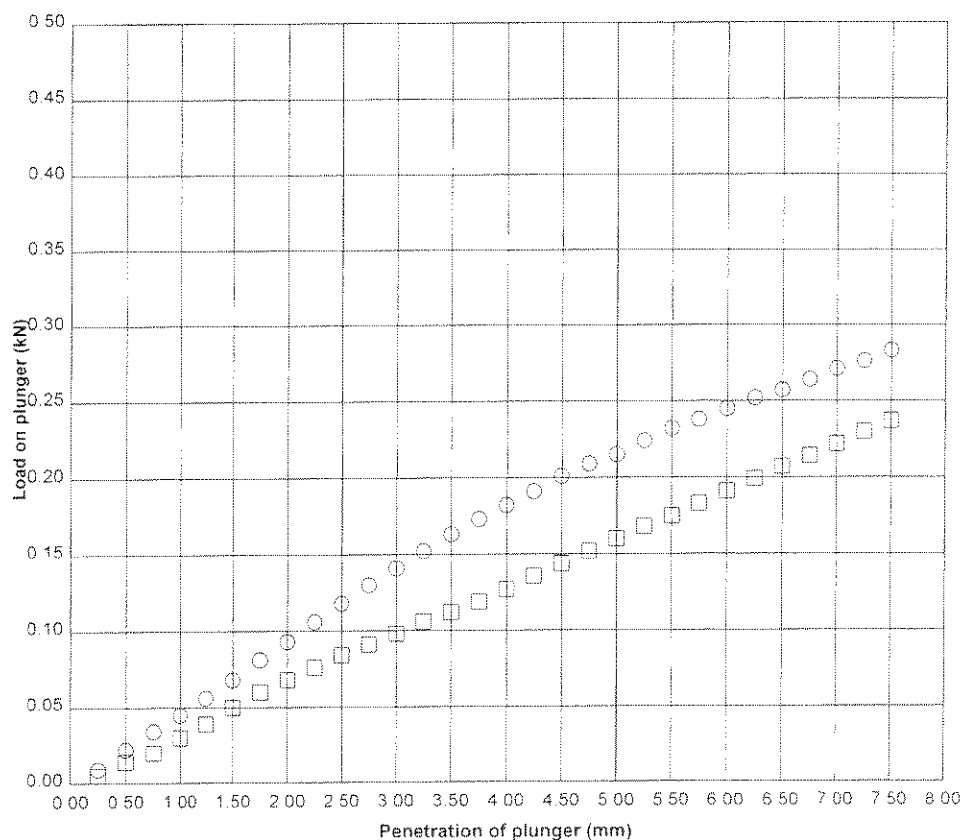
Borehole / Trial Pit	Depth (m)	Sample	% Passing 20 mm Sieve	Description
TP-06	0.00	B1	100 %	Black very organic TOPSOIL

Moisture Content %	
Bulk Density Mg/m³	1.62
Dry Density Mg/m³	1.13
Soaked Test	No

Test on	☐ TOP	
Moisture Content %	43	
Surcharge weight kg		
Penetration mm	2.5	5.0
Force kN	0.08	0.16
Corrected CBR %	0.64	0.81

Test on	☐ BOTTOM	
Moisture Content %	43	
Surcharge weight kg		
Penetration mm	2.5	5.0
Force kN	0.12	0.22
Corrected CBR %	0.94	1.1

Test on	TOP	BOTTOM
Reported CBR %	0.73	1.0



Method of Preparation : The specimen was prepared by Dynamic compression using a 4.5 kg Rammer
BS 1377:PART 1:1990:7.6.1 General 1990:7.6.5 California bearing ratio test BS 1377:PART 4:1990:7.2 Preparation of test sample

Method of Test : BS 1377:PART 4:1990:7.4 Penetration test procedure

Remarks :



Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

4811

Sheet

2 / 8

DETERMINATION OF CALIFORNIA BEARING RATIO (CBR)

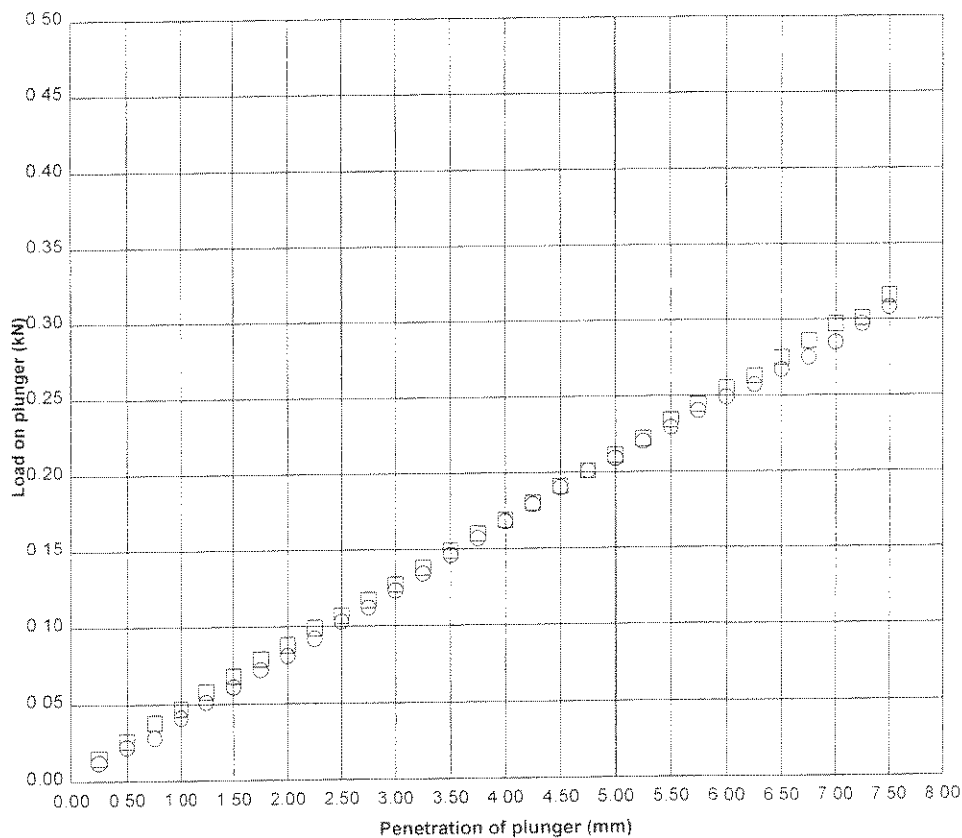
Borehole / Trial Pit	Depth (m)	Sample	% Passing 20 mm Sieve	Description
TP-07	0.00	B1	99 %	Black organic slightly gravelly TOPSOIL

Moisture Content %	
Bulk Density Mg/m³	1.66
Dry Density Mg/m³	1.22
Soaked Test	No

Test on	☐ TOP
Moisture Content %	35
Surcharge weight kg	
Penetration mm	2.5 5.0
Force kN	0.11 0.21
Corrected CBR %	0.83 1.0

Test on	☐ BOTTOM
Moisture Content %	36
Surcharge weight kg	
Penetration mm	2.5 5.0
Force kN	0.10 0.21
Corrected CBR %	0.78 1.1

Test on	TOP	BOTTOM
Reported CBR %	0.93	0.92
Mean CBR %	0.93	



Method of Preparation : The specimen was prepared by Dynamic compression using a 4.5 kg Rammer
BS 1377 PART 1:1990 7.6.1 General 1990 7.6.5 California bearing ratio test BS 1377 PART 4:1990 7.2 Preparation of test sample

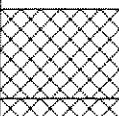
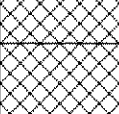
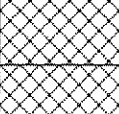
Method of Test : BS 1377 PART 4:1990 7.4 Penetration test procedure

Remarks :

APPENDIX S

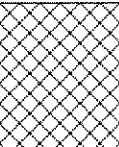
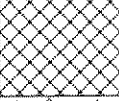
GEOTECHNICAL INFORMATION
CARRIAGE / STEAM SHED EXTENSION

 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment Auto Trip Drop Hammer Methods Window Sampling Contractor Mini Bore
Borehole No BH3		Client Bury MBC	Date 09.12.05

Depth (m)	Description	Legend	Sample/Tests			Field Records	
			Depth	Sample			Results
				Type	No.		
0.00	Ground Surface MADE GROUND Black coarse ash with much coarse angular gravel of crushed brick, clinker, concrete with occasional fragments of coal.					Well installed to 5.0m	
1.00	MADE GROUND Soft dark brown clay mixed with much medium to coarse gravel of ash, clinker and occasional brick and coal		1.0m	SPT	3/5-2,5,2,2 N=11		
2.00	MADE GROUND Black coarse ash with much coarse angular gravel of crushed brick, clinker, concrete with occasional fragments of coal. Very occasional cobble sized sandstone. Very rare fragments of slate.		2.0m	SPT	5/6-4,3,4,5 N=16		
3.00	MADE GROUND Medium dense wet medium brown gravelly fine to medium sand with much gravel of angular to sub-rounded ash, clinker, brick, sandstone, concrete and coal. Becoming dark brown @ 2.0m		3.0m	SPT	5/5,5,5,5,5 N=20		
4.00	Wet firm to stiff brown slightly sandy gravelly CLAY with much coarse gravel of sandstone and mudstone		4.0m	SPT	2/2-3,5,4,5 N=17		
5.00	End of Borehole						
6.00							
7.00							
8.00							

Remarks	Logged by M Waddicor
	Scale NTS
	Sample taken at depth 0.3, 3.4

 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment Auto Trip Drop Hammer Methods Window Sampling Contractor Mini Bore	
Borehole No BH4		Client Bury MBC	Date 09.12.05	

Depth (m)	Description	Legend	Sample/Tests			Field Records	
			Depth	Sample			Results
				Type	No.		
0.00	Ground Surface						
0.00 - 1.00	MADE GROUND Grass underlain by medium to dark brown sandy soil with much coarse angular gravel of ash, brick, clinker, concrete and coal. Occasional cobble sized sandstone between 0.8-1.0m						
1.00 - 2.00	MADE GROUND Medium dense very wet medium brown very gravelly medium sand with much coarse angular gravel of brick, concrete and coal.		1.0m	SPT		2/3-2,3,2,3 N=10	
2.00 - 3.00	Wet firm to stiff grey gravelly CLAY with much fine to medium angular to sub rounded gravel of mudstone and coal. Approximate boundary due to backfilling		2.0m	SPT		4/5-5,5,6,7 N=23	
3.00 - 4.00	Wet grey brown slightly clayey gravelly fine to medium SAND . Approximate boundary due to backfilling						
4.00 - 4.20	Wet soft to firm gravelly CLAY with fine gravel of mudstone and occasional lenses of brown sand. End of Borehole						
5.00							
6.00							
7.00							
8.00							

Remarks	Logged by M Waddicor
	Scale NTS
	Sample taken at depth 0.5

Drilling Services Ltd. DANBAR		1 The Spinney Billinge Road Pemberton Wigan WN5 9HU		Telephone: 01942 213342 Fax: 01942 733192		RECEIVED - 4 MAY 2006 DAILY DRILLING REPORT		SITE: Buckley wells DATE: 26.4.06		JOB NO: 4811 BOREHOLE NO: 1											
SAMPLING										STRATA DESCRIPTIONS											
TYPE	FROM	TO	RECOVERY	DEPTH OF CASING	SPT BLOWS					DEPTH OF CHANGE											
					0-75	75-150	150-225	225-300	300-375												375-450
											91	Black Ash									
											0.30	CONCRETE									
											0.50	Black Rust									
											2.00	Sand & Gravel									
											3.00	Brown sandy Brackish clay									
											4.00	Sand & Gravel									
											6.00	Grey + Brown Sandy Brackish clay									
											14.50	Grey Siltstone									
											19.50	Black Siltstone X									
											20.00	Grey Mudstone									
											21.00	Yellow + Grey Sandstone									
											22.00	Grey Siltstone									
											22.50	Grey Sandstone									
											23.50	Grey Siltstone									
WATER RECORD										Casing Details										REMARKS	
START OF DAY	DEPTH OF BORE	DEPTH OF CASING	DEPTH OF WATER	STUCK	STRIKE DETAILS			CHISELLING TIME		SIZE	FROM	TO									
					FLOW RATE	AFTER 20 MINS	SEALED	DEPTH FROM	TO												HRS
END OF DAY																					
SAMPLE KEY										D DISTURBED B BULK CS CPT SPT U U100 W WATER DRILLER CLIENT											

PROJECT: BUCKLEY WELLS LOCOMOTIVE DEPOT, LOCATION: BURY, LANCASHIRE				METHOD OF EXCAVATION: MECHANICAL EXCAVATION				RECORD OF TRIAL PIT NO: TP15			
CONTRACT NO: 4452				SURFACE DIMENSIONS OF PIT: 120m x 2.00m				CO-ORDINATES: E: N: Sheet 1 of 1			
INSITU TESTING				START DATE: 04/02/99... FINISH DATE: 04/02/1999				GROUND LEVEL 94.00 m.O.D.			
Depth (m)	Type	Result	Depth (m)	Type	No.	DESCRIPTION OF STRATA		Thickness (m)	Depth (m)	Level (m.O.D.)	Strata Symbol
0.10	CD		0.10	CD	1	MADE GROUND: Grass over black fine to coarse ash sand.		0.20	0.20	93.80	
0.40	B		0.40	B	2	Brown, subrounded and rounded fine to coarse GRAVEL and occasional cobbles of sandstone with much fine to coarse sand and some locally much silt.		(2.00)			
1.00	CD		1.00	CD	3						
1.50	CD		1.50	CD	4						
2.00	CD		2.00	CD	5						
2.60	VN/ VR	62/22 56/10 42/20	2.60	CD	6	Firm, brown, CLAY with a little fine to coarse sand and a little subrounded fine gravel including mudstone. <GLACIAL DRIFT>		2.20	81.80		
3.10	VN/ VR	70/26 60/20 48/18	3.10	CD	7			3.10	80.90		
END OF TRIAL PIT											

EMARKS:		PLAN		Scale 1:25	
1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out to check for services. Services were not located. 2. The presence of groundwater was not apparent during excavation. 3. The sides of the trial pit remained stable during excavation. 4. On completion the trial pit was back-filled to ground level with compacted arisings.					

Logged by:	GL/kmh	Date:	04/02	FOUNDATION & EXPLORATION SERVICES FIGURE:
Checked by:	SJR		05/02	
Approved by:	RJE		09/04	
				TP15

START DATE 04 02 99

DRILLING METHOD CABLE PERCUSSION

EQUIPMENT DANDD 2000

RECORD OF BOREHOLE No: BH G1

CASING DETAILS: 150 mm to 13.90 m
mm to m

SHEET 1 OF 2

BOREHOLE DIA: 150 mm to 15.00 m
mm to mNATIONAL GRID CO-ORDINATES
E. N
GROUND LEVEL 85.05 m.O.D.

Date & Time	Casing Depth (m)	Depth to Water (m)	SAMPLE			U100 Blows	U100 Rec (m)	DESCRIPTION OF STRATA	Depth (Thickness) (m)	Level (m.O.D.)	Strata Symbol
			Depth (m) At From To	Type	No.	Test Length (mm)	SPT Blows /N				
04/02	0.00	Dry	0.00 0.60	B	1			MADE GROUND: Black, fine to coarse ash sand with a little subangular coarse gravel of limestone.	(0.60)	84.45	
			0.60 1.20	B	2						
			1.20 1.65	S	3		C 22	MADE GROUND: Black, fine to coarse ash sand with some subangular fine to coarse gravel and some cobbles including brick and concrete and occasional fragments of wood. Locally grading in to gravel with some sand.	(1.40)		
			1.65 1.70								
			2.10 2.55	B	4		C 10		2.00		
			2.55 2.60						(0.70)		
			2.70 3.20	D U	5 6	120	0.35	MADE GROUND: Dark brown, fine to coarse sand with a little silt, a little clay, a little subrounded fine to coarse gravel including sandstone and occasional subangular fragments of brick.	2.70		
			3.20 3.60					Stiff, dark brown, CLAY with some locally a little fine to coarse sand and a little subrounded fine gravel including mudstone.	(2.70)		
			3.60 4.30	2W B D	9 7 8		S 18	<GLACIAL DRIFT>	(2.20)		
			4.30 4.25								
04/02 05/02	5.00	Dry	4.80 5.00	UH 2W B	18 10	120	0.00	Dense brown, subrounded fine to coarse GRAVEL of sandstone with a little fine to coarse sand and a little clay.	4.90	80.15	
			5.00 5.45				C 35		(1.80)		
			5.45 5.50								
			6.00 6.35	B	11	195	C 50				
			6.35 6.50								
			6.70 7.20	B U	12 13	120	0.35	Stiff locally very stiff, dark brown, CLAY with a little fine to coarse sand and a little subrounded fine gravel including mudstone and sandstone.	6.70		
			7.20 7.20	D	14			<GLACIAL DRIFT>	(2.60)		
			8.20 8.65	D B	16 15		S 33				
			8.65 8.70								
			9.60 10.00	D U# B	17 19	120	0.00	Grey SILT with a little clay and a little fine sand.	9.30		
05/02									(0.70)	75.75	
									10.00	75.05	

REMARKS:

1. Prior to boring, a Cable Avoidance Tool (CAT) survey was carried out. An inspection pit was hand-dug to 1.20m depth (1.25 hrs) and rescanned using the CAT to check for services. Services were not located.
2. The borehole was advanced by chiselling techniques from 3.20m to 3.30m depth (0.25 hr), 6.25m to 6.70m depth (0.5 hr), 9.60m to 9.85m depth (0.5 hr) and 14.80m to 14.90m depth (0.5 hr).
3. Freshwater was encountered at 4.80m depth rising to 3.90m after 5 mins, to 3.70m after 10 mins, to 3.65m after 15 mins and to 3.60m after 20 mins. This strike was sealed off by the casing at low 8.20m depth.

SCALE 1:50

Logged by	Date
GL/kmh	19/02
Checked by	
SJR	23/02
Approved by	
RJE	09/04

FOUNDATION
& EXPLORATION
SERVICESBUCKLEY WELLS LOCOMOTIVE DEPOT,
BURY, LANCASHIRE

CONTR. No 4452

FIGURE: BHG1

START DATE 04 02 99

DRILLING METHOD CABLE PERCUSSION

EQUIPMENT: DANDG 2000

RECORD OF BOREHOLE No: BH G1

CASING DETAILS: 150 mm to 13.90 m
mm to m

SHEET 2 OF 2

BOREHOLE DIA: 150 mm to 15.00 m
mm to m

NATIONAL GRID CO-ORDINATES

E N
GROUND LEVEL: 85.05 m O.D.

Date & Time	Casing Depth (m)	Depth to Water (m)	SAMPLE			U100 Blows	U100 Rec (m)	DESCRIPTION OF STRATA	Depth (Thickness) (m)	Level (m O.D.)	Strata Symbol
			Depth (m) At/From To	Type	No						
05/02	10.10	1.50	10.20 10.50	10.65 10.70	B	20	S 21	Medium dense, grey fine SAND with some silt/clay. Locally grading to brown clay with some sand and a little gravel	10.00	75.05	
	11.60	1.20	11.70 11.71	12.15 12.20	D B	22 21	S 34	Below 11.70m dense.	(3.80)		
	13.00	3.00	13.20 13.21	13.45 13.70	D B	24 23	S 46				
	13.90	9.40	13.90 13.90	14.30	D U	25 26	120 0.35	Very stiff, dark grey CLAY with much subangular fine to coarse gravel of mudstone. (Completely Weathered Mudstone).	13.80	71.25	
			14.30 14.31	15.00	D B	27 28			(1.20)		
05/02	13.90	9.40						END OF BOREHOLE	15.00	70.05	

REMARKS:

4. A second groundwater strike was encountered at 9.40m depth rising to 4.80m over a 20 minute monitoring period.
 5. On completion of sampling, a 50mm diameter slotted standpipe was installed with the slotted section from 1.00m to 15.00m depth with the following details: gravel filter from the base of the hole up to 0.80m, bentonite seal up to 0.30m and concrete to ground level with a flush lockable protective stopcock box cover.

Logged by	Date
GL/kmh	19/02
Checked by	
SJR	23/02
Approved by	
RJE	09/04

SCALE 1:50

FOUNDATION
& EXPLORATION
SERVICESBUCKLEY WELLS LOCOMOTIVE DEPOT,
BURY, LANCASHIRE

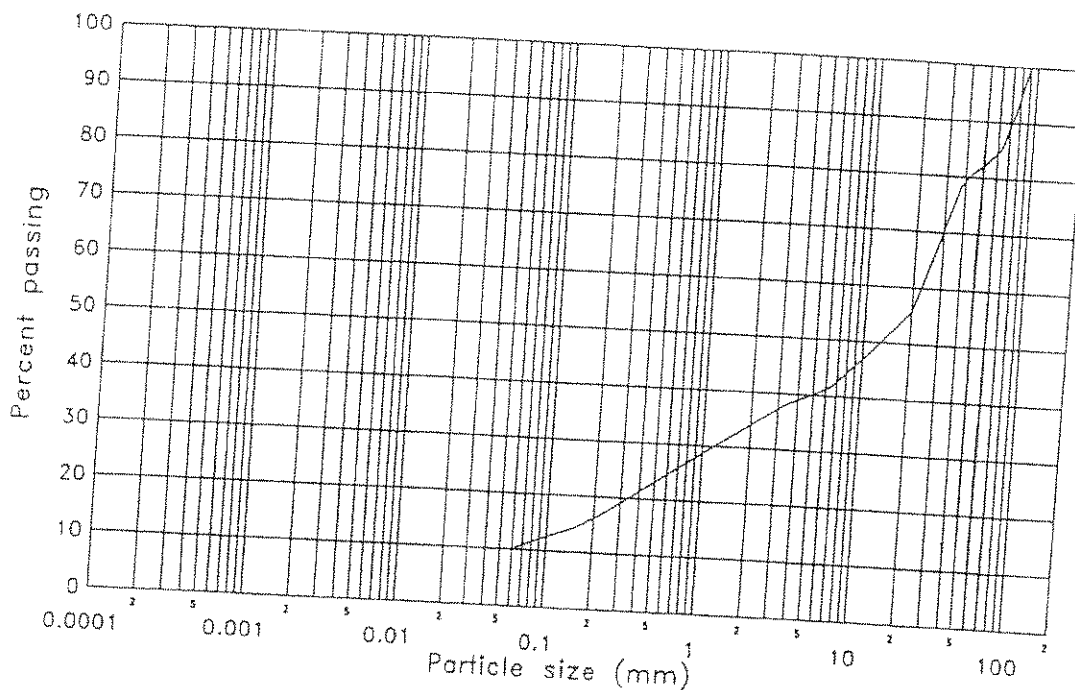
CONTRACT No. 4452

FIGURE: BHG1

PARTICLE SIZE DISTRIBUTION

B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: BH01	Sample No: 1+2+3	Sample Type: B	Depth: 0.00



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

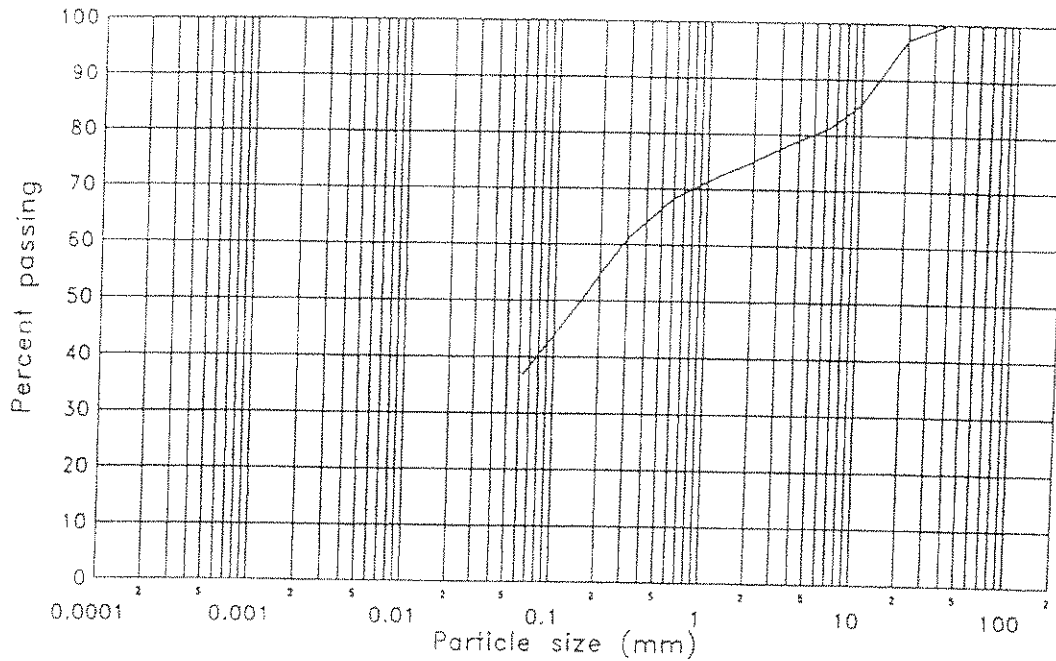
%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	10	24	51	15
Loss on Pretreatment:	Not Applicable		Description Brown GRAVEL with much sand some cobbles and some silt	
Test Date:	26/03/1999			
Uniformity Coefficient:	374.1			

	Input by MB	Date 26/03/1999	Checked by [Signature]	Date 29/03/99		
FOUNDATION & EXPLORATION SERVICES Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE					Contract No 4452	
					Figure No LT2/13	
					105/03	

PARTICLE SIZE DISTRIBUTION

B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: BHC1	Sample No: 7	Sample Type: B	Depth: 3.80



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

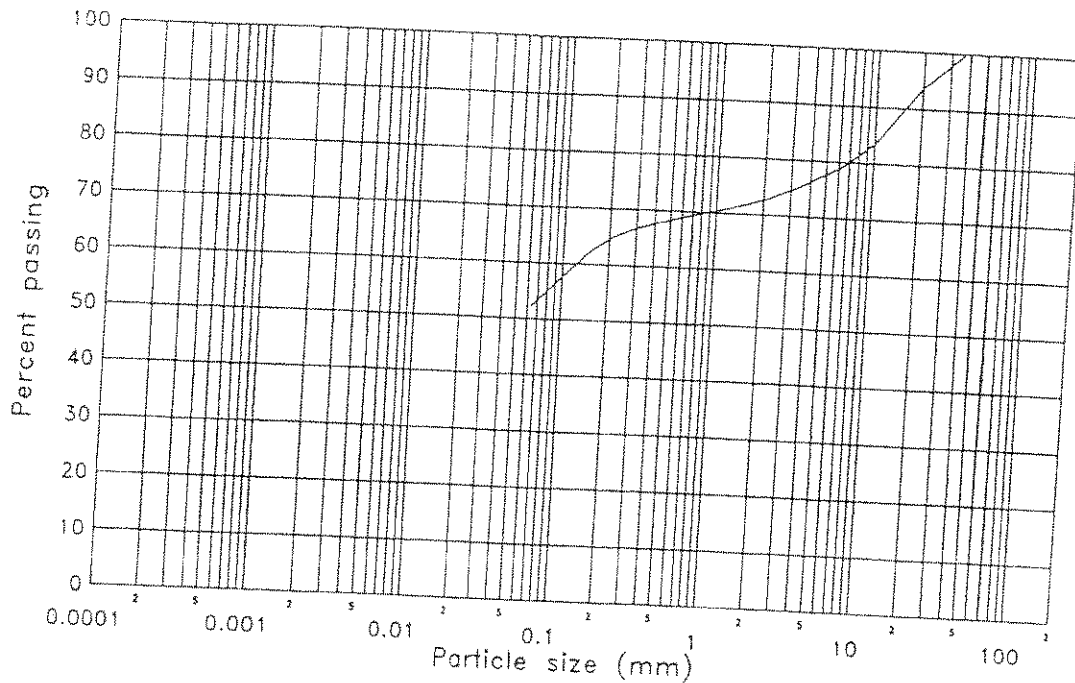
%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	37	38	25	0
Loss on Pretreatment:	Not Applicable		Description Brown CLAY with some sand and some gravel	
Test Date:	22/03/1999			
Uniformity Coefficient:	10.2			

	Input by <i>MB</i>	Date 24/03/1999	Checked by <i>[Signature]</i>	Date 1.4.99			
	Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE					Contract No 4452	
						Figure No LT2/14	

PARTICLE SIZE DISTRIBUTION

B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: BHG1	Sample No: 15	Sample Type: B	Depth: 8.20



CLAY	SILT			SAND			GRAVEL			COBBLES
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	

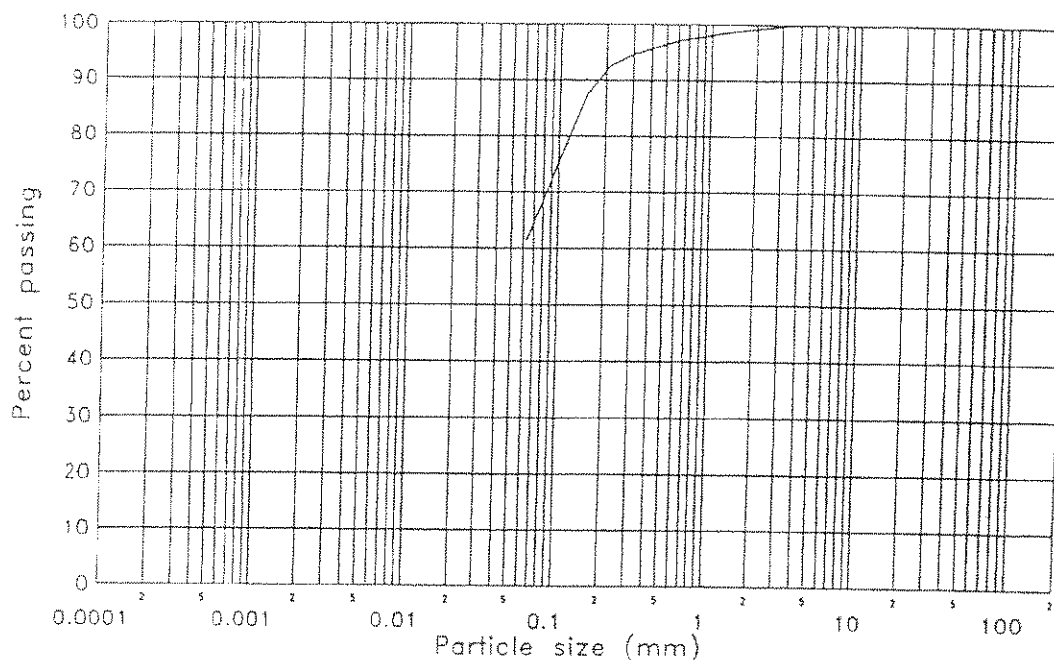
SUMMARY

%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	52	21	27	0
Loss on Pretreatment:	Not Applicable		Description Brown CLAY with a little gravel and a little sand	
Test Date:	22/03/1999			
Uniformity Coefficient:	4.9			

	Input by: <i>MB</i>	Date: 24/03/1999	Checked by: <i>[Signature]</i>	Date: 1.4.99		
FOUNDATION & EXPLORATION SERVICES	Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE					Contract No
						4452
						LT2/15

PARTICLE SIZE DISTRIBUTION B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.6

Sample Details			
Borehole No: BHG1	Sample No: 20	Sample Type: B	Depth: 10.20



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	61	38	1	0
Loss on Pretreatment:	Not Applicable		Description Brown CLAY with some sand and a little gravel	
Test Date:	08/03/1999			
Uniformity Coefficient:	2.5			

FOUNDATION & EXPLORATION SERVICES	Input by <i>MD</i>	Date 10/03/1999	Checked by <i>CE</i>	Date 26.3.99	
	Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452
					Figure No LT2/16

SUMMARY OF SOIL CLASSIFICATION TESTS

BS 1377: Part 2: 1990

BS 1377: Part 2: 1990													
SOIL CLASSIFICATION TESTS													
Hole	Type	Depth	Sample No.	Classification Tests								Method	Description
				Bulk Density (Mg/m ³)	Moisture Content (%)	Dry Density (Mg/m ³)	Particle Density (Mg/m ³)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% passing 425 μ m		
BHC4	D	3.20	16		30			33	24	9	100	AR	Brown CLAY/SILT with a little sand
BHC4	B	12.70	29		14			25	17	8	37	WS	Brown CLAY with some gravel and a little sand
BHC5	D	5.90	12		17			29	18	11	78	HP	Brown CLAY with a little sand and a little gravel
BHC5	D	7.80	16		22			35	24	11	98	HP	Brown CLAY/SILT with a little sand and a little gravel
BHC5	D	12.50	26		13			23	16	7	70	HP	Brown CLAY/SILT with a little sand and a little gravel
BHG1	D	2.80	5		11			23	14	9	82	HP	Brown CLAY with a little sand and a little gravel
BHG1	S	5.70	12		17			38	20	18	86	HP	Brown CLAY with a little sand and a little gravel
Input by MB				Date 01/04/1999		Checked by [Signature]		Date 01/04/1999					
Project				BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE									
				Contract No 4452									
				Figure No L11/3									
				102/02									

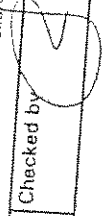
SUMMARY OF SOIL CLASSIFICATION TESTS

BS 1377: Part 2: 1990

Hole	Type	Depth	Sample No.	Classification Tests							Method	Description		
				Bulk Density (Mg/m ³)	Moisture Content (%)	Dry Density (Mg/m ³)	Particle Density (Mg/m ³)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)			% passing 425 μ m	
TP13	D	2.10	5		19				35	21	14	53	VS	Brown CLAY with a little sand and a little gravel
TP15	D	2.60	6		13				24	14	10	70	HP	Brown CLAY with a little sand and a little gravel
				Input by MB	Date 01/04/1999	Checked by 2	Date 01/04/1999							
 FOUNDATION & EXPLORATION SERVICES				Project		BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE			Contract No 4452					
									Figure No LT1/6					

SUMMARY OF UNDRAINED SHEAR STRENGTH TESTS IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF POREWATER PRESSURE

BS 1377: Part 7: 1990: Tests 8 & 9

Specimen Details												Undrained Triaxial Compression Results (Total Stress)										Description
Hole	Type	Depth	Sample No.	Specimen Depth mm	Test Type	Preparation	Dimensions mm	w %	γ_b Mg/m ³	γ_d Mg/m ³	Rate of Strain %/min	Membrane Thickness mm	Cell Pressure kPa	Membrane Correction kPa	Maximum Deviator Stress kPa	Failure Strain %	Mode of Failure	Cohesion (Avg) kPa				
BHG1	U	2.80	6	40	UU	U	199, 103	11	2.31	2.08	2.01	0.24	50.0	0.92	342	20.10	C	171	Very stiff brown CLAY with a little sand and a little gravel			
BHG1	U	6.80	13	40	UU	U	179, 102	16	2.19	1.89	2.23	0.24	125.0	0.90	373	19.50	C	186	Very stiff brown CLAY with a little sand and a little gravel			
BHG2	U	2.60	7	120	UU	U	200, 103	20	2.09	1.74	2.00	0.24	50.0	0.92	118	20.00	C	59	Firm brown CLAY with a little sand and a little gravel			
BHG2	U	4.50	12	100	UU	U	199, 103	19	2.14	1.79	2.00	0.24	100.0	0.62	149	11.50	C	74	Firm brown CLAY with a little sand and a little gravel			
BHG2	U	8.00	17	70	UU	U	163, 102	17	2.14	1.83	1.83	0.24	160.0	0.92	215	20.20	C	108	Stiff brown CLAY with a little sand and a little gravel			
BHG2	U	12.50	26	70	UU	U	200, 101	13	2.28	2.02	2.00	0.24	250.0	0.92	554	20.00	C	277	Very stiff brown CLAY with a little sand and a little gravel			
Preparation: REM - remoulded U - undisturbed				Test Type: UU - unconsolidated undrained UUM - unconsolidated undrained multistage				Mode of Failure: B - Brittle C - Combined P - Plastic				Checked by:  Date: 29/03/1999				* Latex Membranes used						
FOLNDA™ ON & EXPLORATION SERVICES				Project				BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452				Figure No LT5/2						
																104/03						

ey: Preparation: REM - remoulded
U - undisturbed

Test Type: UU - unconsolidated undrained
UUM - unconsolidated undrained multistage

Input by

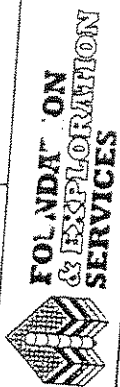
Date

Mode of Failure: B - Brittle C - Combined
P - Plastic

Checked by

Date

* Latex Membranes used



Project

BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE

Contract No

4452

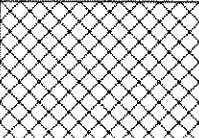
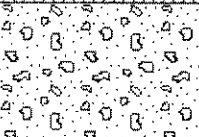
Figure No

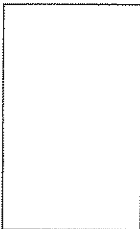
L15/2

APPENDIX T

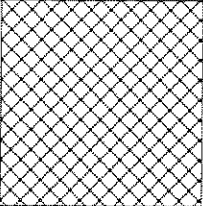
GEOTECHNICAL INFORMATION
NEW ROADWAYS AND TRACK BED

 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment 360 Rubber Duck Methods Mechanical Excavation Contractor MA Excavations
TRIAL PIT No. TP-G3		Client Bury MBC	Date 19.12.05

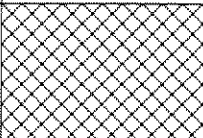
Depth (m)	B	Legend	Groundwater	Field Records
0.00	Ground Surface			
	MADE GROUND Dark grey brown very gravelly slightly clayey coarse sand with much clinker and ash gravel and some fine to coarse brick gravel.			
	Brown clayey SAND and GRAVEL .			
	End of Trial Pit			
1.00				
2.00				
3.00				

Remarks Dry, no odour Stability Sides stable	Dimensions A =  B = D = C =		Logged by CJC
			Scale NTS
			Sample taken at depth 0-0.4

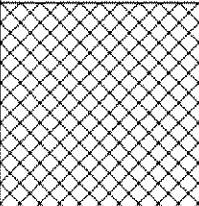
 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment 360 Rubber Duck Methods Mechanical Excavation Contractor MA Excavations
TRIAL PIT No. TP-G4		Client Bury MBC	Date 19.12.05

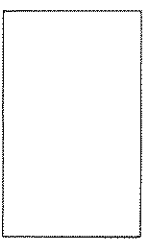
Depth (m)	B	Legend	Groundwater	Field Records
0.00	Ground Surface			
	MADE GROUND Dark grey mottled black fine to coarse ash and clinker gravel with occasional subrounded gravel.			
	End of Trial Pit			
1.00				
2.00				
3.00				

Remarks Dry, no odour Stability Sides stable	Dimensions A =  D = B = C =	Logged by CJC
		Scale NTS
		Sample taken at depth 0-0.3

 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment 360 Rubber Duck Methods Mechanical Excavation Contractor MA Excavations	
TRIAL PIT No. TP-G5		Client Bury MBC	Date 19.12.05	
Depth (m)	B	Legend	Groundwater	Field Records
0.00	Ground Surface			
	MADE GROUND Dark brownish grey gravelly coarse sand with much clinker and ash gravel, brick gravel and fine rootlets. Occasional fragments of coal and slate.			
	End of Trial Pit			
1.00				
2.00				
3.00				

Remarks Dry, no odour Stability Sides stable	Dimensions		
	A = 		Logged by CJC
	D = B = C =		Scale NTS
			Sample taken at depth 0-0.4

 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment 360 Rubber Duck Methods Mechanical Excavation Contractor MA Excavations	
TRIAL PIT No. TP-G6		Client Bury MBC	Date 19.12.05	
Depth (m)	B	Legend	Groundwater	Field Records
0.00	Ground Surface MADE GROUND Brambles over black ash and clinker gravel with occasional brick, coal and slate fragments.			
1.00	End of Trial Pit			
2.00				
3.00				

Remarks Dry, no odour Stability Sides stable	Dimensions A =  B = C = D =		Logged by CJC
			Scale NTS
			Sample taken at depth 0-0.4

PROJECT: BUCKLEY WELLS LOCOMOTIVE DEPOT,
LOCATION: BURY, LANCASHIRE
CONTRACT NO: 4452

METHOD OF EXCAVATION: MECHANICAL EXCAVATION
SURFACE DIMENSIONS OF PIT: 100m x 2.10m
START DATE: 26/01/98... FINISH DATE: 26/01/1999

RECORD OF TRIAL PIT NO: TP 2
CO-ORDINATES: E: N: Sheet 1 of 1
GROUND LEVEL: 85.20 m.O.D

INSITU TESTING			SAMPLES		DESCRIPTION OF STRATA	Thickness (m)	Depth (m)	Level Strata (m.O.D.) Symbol
Depth (m)	Type	Result	Depth (m)	Type				
			0.00	CD	MADE GROUND: Black, fine to coarse ash sand.	0.20	85.00	
			0.40	B	Brown, subrounded fine to coarse GRAVEL and many cobbles of sandstone with some fine to coarse sand and a little silt.			
			0.90	CD				
			1.40	B				
			1.90	CD				
2.20			2.20	CD	Firm, light brown CLAY with a little fine to coarse sand and a little subrounded fine gravel including mudstone.	2.00	83.20	
2.20			2.60	V	<GLACIAL DRIFT>			
3.00	VR	64/24	3.00	CD				
3.00	VN	62/20						
3.00		72/28						
					END OF TRIAL PIT	3.20	82.00	

REMARKS:
1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out to check for services. Services were not located.
2. Slight seepages of groundwater were encountered at 0.20m depth (not enough to sample).
3. Moderate seepages of groundwater were encountered at 2.00m depth.
4. The sides of the trial pit were unstable and collapsing when excavating below 2.00m depth.
5. On completion the trial pit was backfilled to ground level with compacted arisings.

PLAN

Scale 1:25

FOUNDATION & EXPLORATION SERVICES

FIGURE: TP2

Logged by: GL/kmh
Checked by: SJR
Approved by: RJE

Date: 26/01
04/02
09/04

PROJECT: BUCKLEY WELLS LOCOMOTIVE DEPOT, LOCATION: BURY, LANCASHIRE CONTRACT NO: 4452			METHOD OF EXCAVATION: MECHANICAL EXCAVATION SURFACE DIMENSIONS OF PIT: 2.00m x 1.10m START DATE: 26/01/99... FINISH DATE: 26/01/1999			RECORD OF TRIAL PIT NO: TP10 CO-ORDINATES: E: N: Sheet 1 of 1 GROUND LEVEL: 2185 m O.D.					
INSITU TESTING			SAMPLES			DESCRIPTION OF STRATA			Thickness (m)	Depth (m)	Level Strata Symbol
Depth (m)	Type	Result	Depth (m)	Type	No.						
			0.00	CD	1	MADE GROUND: Grass/brambles over black fine to coarse ash sand and subangular fine to coarse gravel of ash and clinker with some silt, a little subangular fine and medium gravel of brick and occasional glass bottles; with occasional rootlets.					
			0.40	B	2						
			1.00	CD	3						
			1.50	B	4	Below 1.50m; rootlets absent.			3.10		
			2.00	CD	5	Below 2.00m; with occasional brown clayey bands.					
			2.50	CD	6						
			3.00	B	7						
						END OF TRIAL PIT			3.10	78.75	
REMARKS:											
1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out for services. Services were not located. 2. The presence of groundwater was not apparent during excavation. 3. The sides of the trial pit were unstable and collapsing below 100m depth. 4. On completion the trial pit was backfilled to ground level with compacted fillings.											
PLAN											
Scale 1:25											
Logged by: GL/knh Checked by: SJR Approved by: RJE Date: 26/01 04/02 09/04 FOUNDATION & EXPLORATION SERVICES FIGURE: TP10											

PROJECT: BUCKLEY WELLS LOCOMOTIVE DEPOT,

LOCATION: BURY, LANCASHIRE

CONTRACT NO: 4452

METHOD OF EXCAVATION: MECHANICAL EXCAVATION

SURFACE DIMENSIONS OF PIT:

START DATE: 04/02/99... FINISH DATE: 04/02/1999

RECORD OF TRIAL PIT NO: TP11

CO-ORDINATES: E: N:

Sheet 1 of 1

GROUND LEVEL: 82.75 m.O.D.

INSITU TESTING			SAMPLES		DESCRIPTION OF STRATA	Thickness (m)	Depth (m)	Level (m.O.D.)	Strata Symbol
Depth (m)	Type	Result	Depth (m)	Type No.					
1.20			0.10	CD 1	MADE GROUND: Black, fine to coarse ash sand and subangular fine to coarse gravel of ash and clinker with some silt and a little subrounded medium and coarse gravel of sandstone.	(1.00)	1.00	81.75	
1.20			0.60	B 2					
1.20	VN/ VR	23/22 26/14 20/14	1.20	CD 3					
			1.70	B 4	MADE GROUND: Soft, black-brown, clay with a little fine to coarse ash sand and occasional bricks.	(-0.60)	1.60	81.15	
			2.20	D 5	Dark grey, fine to coarse SAND with some to much silt and some to much subrounded fine to coarse gravel of sandstone (Possible Made Ground).				
			2.70	CD 6		(1.80)	3.40	79.35	
			3.50	B 7	Brown, subrounded fine to coarse GRAVEL of sandstone with a little fine to coarse sand and some silt.				
					END OF TRIAL PIT	(0.30)	3.70	79.05	

REMARKS:

1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out to check for services. Services were not located.
2. The presence of groundwater was not apparent during excavation.
3. The sides of the trial pit were unstable and collapsing when excavating below 2.50m depth.
4. On completion the trial pit was backfilled to ground level with compacted arisings.

PLAN

Scale 1:25

Logged by: GL/kmh

Checked by: SJR

Approved by: RJE

Date: 04/02

05/02

09/04

FOUNDATION & EXPLORATION SERVICES

FIGURE: TP11

PROJECT: BUCKLEY WELLS LOCOMOTIVE DEPOT,		METHOD OF EXCAVATION: MECHANICAL EXCAVATION		RECORD OF TRIAL PIT NO: TP12	
LOCATION: BURY, LANCASHIRE		SURFACE DIMENSIONS OF PIT: 0.80m x 1.60m		CO-ORDINATES: E: N:	
CONTRACT NO: 4452		START DATE: 04/02/99...		FINISH DATE: 04/02/1999	
INSITU TESTING		SAMPLES		DESCRIPTION OF STRATA	
Depth (m)	Type	Result	Depth (m)	Type	No.
0.30 0.50 0.90	VN/ VR	32/22 36/22 24/19	0.10	CD	1
			0.90	CD	2
			1.50	B	3
			2.00	CD	4
			2.50	CD	5
			3.00	CD	6
			3.50	CD	7
			3.70	W	8
END OF TRIAL PIT					

REMARKS:

- Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out to check for services. Services were not located.
- Recovered materials were unsuitable for vane tests below 2.00m depth.
- Rapid inflows of groundwater were encountered at 3.70m depth.
- The sides of the trial pit remained stable during excavation.
- On completion the trial pit was backfilled to ground level with compacted arisings.

PLAN

Scale 1:25

LOGGED BY: GL/knh

CHECKED BY: SJR

APPROVED BY: RJE

DATE: 04/02

DATE: 05/02

DATE: 09/04

FOUNDATION & EXPLORATION SERVICES

FIGURE TP12

LOCATION: BURNLEY WELLS LOCOMOTIVE DEPOT, BURY, LANCASHIRE				METHOD OF EXCAVATION: MECHANICAL EXCAVATION				RECORD OF TRIAL PIT NO: TP13			
CONTRACT NO: 4452				SURFACE DIMENSIONS OF PIT:				CO-ORDINATES:			
INSIT. NO:				START DATE: 04/02/99... FINISH DATE: 04/02/1999				Sheet 1 of 1			
Result				DESCRIPTION OF STRATA				GROUND LEVEL: 8365 m O.D.			
Depth (m)	Type	Depth (m)	No.	Thickness (m)	Level (m.a.s.l.)	Strata Symbol					
0.20	CD	1		(0.60)	83.05						
0.70	B	2									
1.20	CD	3		(1.30)							
1.80	CD	4									
2.10	CD	5			81.75						
2.60	CD	6		(1.80)							
3.10	CD	7									
3.60	CD	8			79.95						
END OF TRIAL PIT											
REMARKS:				1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out to check for services. Services were not located. 2. Slight seepages of groundwater were encountered at 1.90m depth (not enough to sample). 3. The sides of the trial pit were unstable and collapsing when excavating below 2.00m depth. 4. On completion the trial pit was backfilled to ground level with compacted arisings.							
				Scale 1:25				TP13			

FOUNDATION
& EXPLORATION
SERVICES

Logged by: GL/knh
Checked by: SJR
Approved by: RJE

Date: 04/02

FIGURE:

05/02

09/04

PROJECT: BUCKLEY WELLS LOCOMOTIVE DEPOT, BURY, LANCASHIRE				METHOD OF EXCAVATION: MECHANICAL EXCAVATION				RECORD OF TRIAL PIT NO: TP14			
CONTRACT NO: 4152				SURFACE DIMENSIONS OF PIT: 120m x 0.80m				CO-ORDINATES: E: N: Sheet 1 of 1			
INSITU TESTING				START DATE: 04/02/99... FINISH DATE: 04/02/1999				GROUND LEVEL: 83.00 m O.D.			
Depth (m)	Type	Result	Depth (m)	Type	No.	DESCRIPTION OF STRATA		Thickness (m)	Depth (m)	Level Strata Symbol	
0.10	CD		0.10	CD	1	MADE GROUND: Black, fine to coarse ash, sand and subangular fine to coarse gravel of ash and clinker with some silt and a little rounded fine to coarse gravel of sandstone.					
0.60	B		0.60	B	2	At 0.60m grading to gravel with much sand and some silt.					
1.10	CD		1.10	CD	3						
1.60	CD		1.60	CD	4						
2.10	B		2.10	B	5						
2.60	CD		2.60	CD	6						
3.10	CD		3.10	CD	7						
				END OF TRIAL PIT				3.40	79.60		

REMARKS:

- Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out to check for services. Services were not located.
- The presence of groundwater was not apparent during excavation.
- The sides of the trial pit remained stable during excavation.
- On completion the trial pit was backfilled to ground level with compacted arisings.

Scale 1:25

Logged by: GL/kmh

Checked by: SJR

Approved by: RJE

Date: 04/02

05/02

09/04

FIGURE: TP14

FOUNDATION & EXPLORATION SERVICES

Site : Buckley Wells Locomotive Works[^] Bury

Client : Leyden Kirby Associates

Job Number

4811

Sheet

5 / 8

DETERMINATION OF CALIFORNIA BEARING RATIO (CBR)

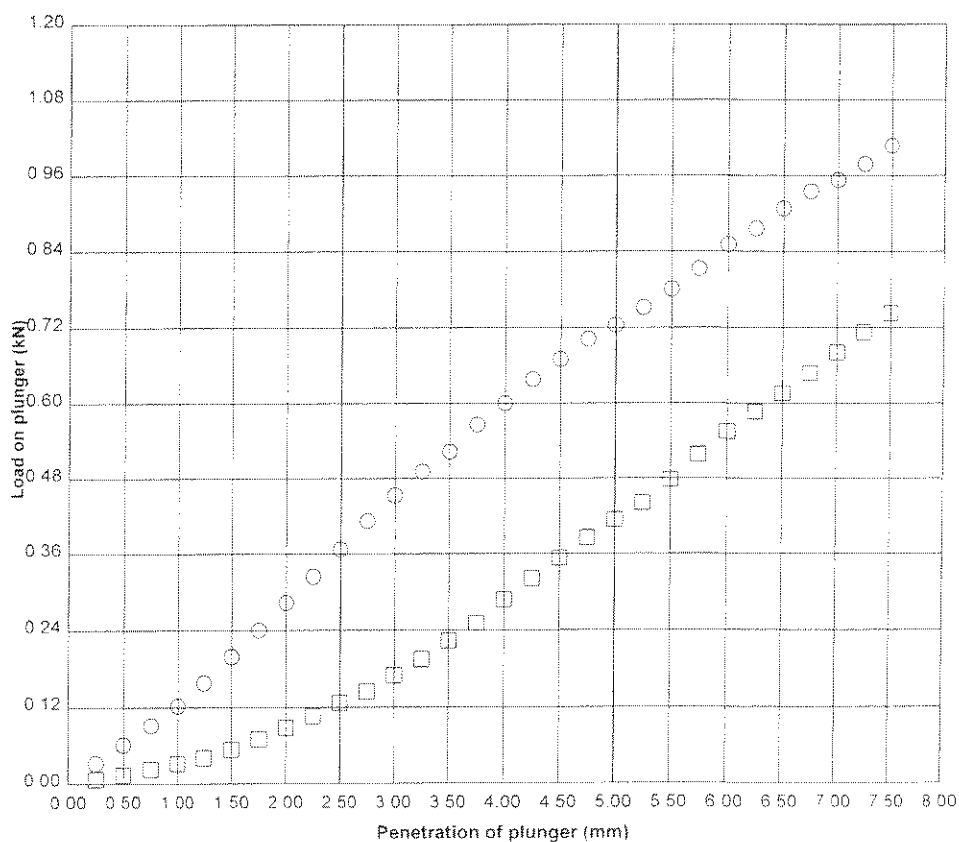
Borehole / Trial Pit	Depth (m)	Sample	% Passing 20 mm Sieve	Description
TP-G3	0.00	B1	90 %	Black organic gravelly SAND

Moisture Content %	
Bulk Density Mg/m ³	1.82
Dry Density Mg/m ³	1.53
Soaked Test	No

Test on	☐ TOP
Moisture Content %	18
Surcharge weight kg	
Penetration mm	2.5 5.0
Force kN	0.13 0.41
Corrected CBR %	0.96 2.1

Test on	☐ BOTTOM
Moisture Content %	20
Surcharge weight kg	
Penetration mm	2.5 5.0
Force kN	0.37 0.72
Corrected CBR %	2.8 3.6

Test on	TOP	BOTTOM
Reported CBR %	1.5	3.2

Method of Preparation : The specimen was prepared by Dynamic compression using a 4.5 kg Rammer
BS 1377:PART 1:1990:7.6.1 General 1990:7.6.5 California bearing ratio test BS 1377:PART 4 1990:7.2 Preparation of test sample

Method of Test : BS 1377:PART 4:1990:7.4 Penetration test procedure

Remarks :



Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

4811

Sheet

6 / 8

DETERMINATION OF CALIFORNIA BEARING RATIO (CBR)

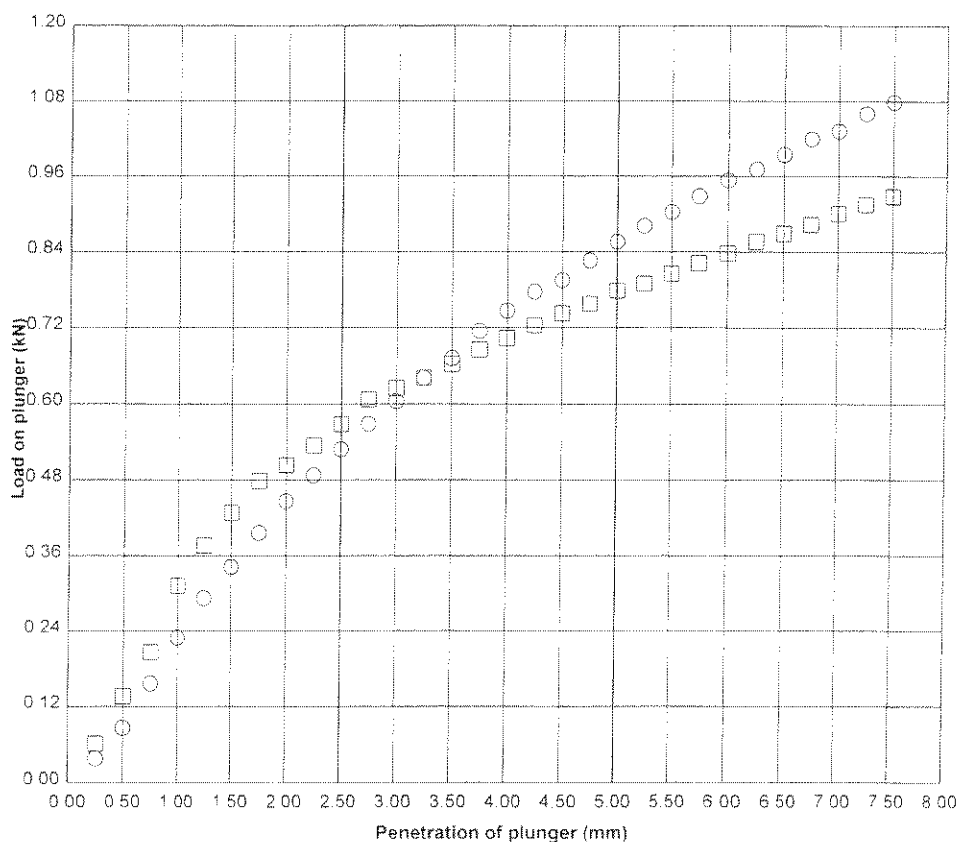
Borehole / Trial Pit	Depth (m)	Sample	% Passing 20 mm Sieve	Description
TP-G4	0.00	B1	85 %	Black organic gravelly SAND

Moisture Content %	
Bulk Density Mg/m ³	1.70
Dry Density Mg/m ³	1.42
Soaked Test	No

Test on	☐ TOP
Moisture Content %	20
Surcharge weight kg	
Penetration mm	2.5 5.0
Force kN	0.57 0.78
Corrected CBR %	4.3 3.9

Test on	☐ BOTTOM
Moisture Content %	20
Surcharge weight kg	
Penetration mm	2.5 5.0
Force kN	0.53 0.86
Corrected CBR %	4.0 4.3

Test on	TOP	BOTTOM
Reported CBR %	4.1	4.1
Mean CBR %	4.1	



Method of Preparation : The specimen was prepared by Dynamic compression using a 4.5 kg Rammer.
BS 1377 PART 1:1990 7.6.1 General 1990.7.6.5 California bearing ratio test BS 1377 PART 4:1990 7.2 Preparation of test sample

Method of Test : BS 1377 PART 4:1990 7.4 Penetration test procedure

Remarks :



Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

4811

Sheet

7 / 8

DETERMINATION OF CALIFORNIA BEARING RATIO (CBR)

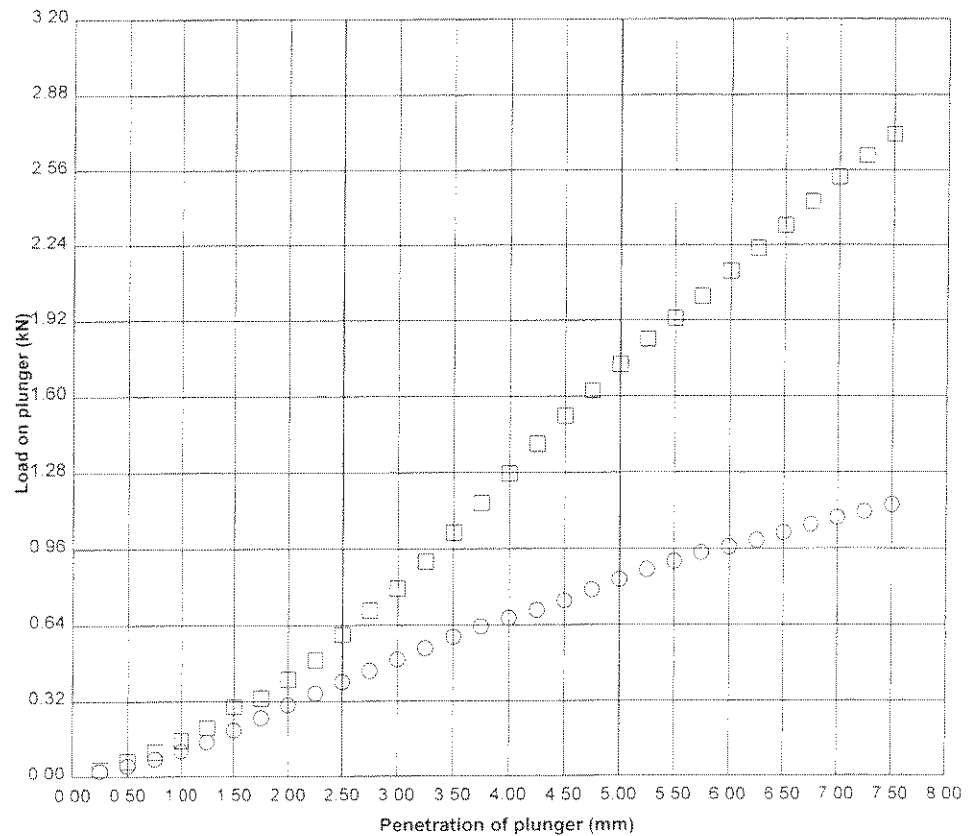
Borehole / Trial Pit	Depth (m)	Sample	% Passing 20 mm Sieve	Description
TP-G5	0.00	B1	89 %	Brown gravely slightly clayey slightly organic SAND

Moisture Content %	
Bulk Density Mg/m³	1.84
Dry Density Mg/m³	1.54
Soaked Test	No

Test on	☐ TOP	
Moisture Content %	19	
Surcharge weight kg		
Penetration mm	2.5	5.0
Force kN	0.60	1.7
Corrected CBR %	4.6	8.7

Test on	☐ BOTTOM	
Moisture Content %	19	
Surcharge weight kg		
Penetration mm	2.5	5.0
Force kN	0.40	0.83
Corrected CBR %	3.0	4.2

Test on	TOP	BOTTOM
Reported CBR %	6.6	3.6



Method of Preparation : The specimen was prepared by Dynamic compression using a 4.5 kg Rammer
BS 1377 PART 1:1990:7.6.1 General 1990:7.6.5 California bearing ratio test BS 1377 PART 4:1990:7.2 Preparation of test sample

Method of Test : BS 1377 PART 4:1990:7.4 Penetration test procedure

Remarks :



Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

4811

Sheet

8 / 8

DETERMINATION OF CALIFORNIA BEARING RATIO (CBR)

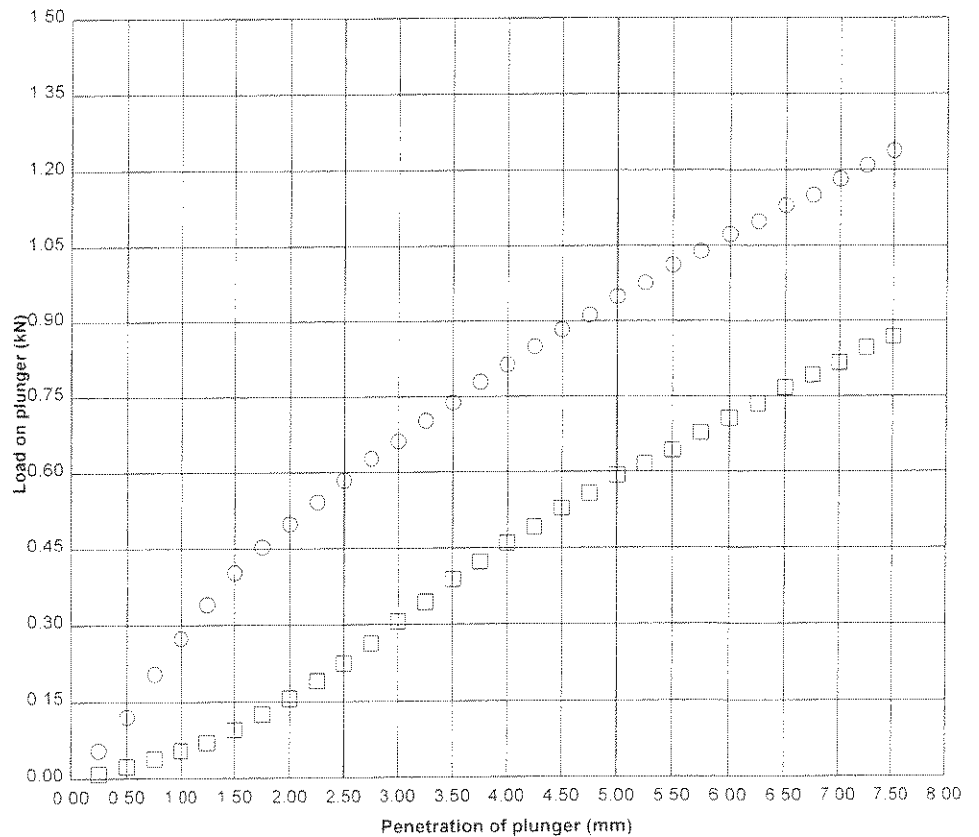
Borehole / Trial Pit	Depth (m)	Sample	% Passing 20 mm Sieve	Description
TP-G6	0.00	B1	88 %	Black organic gravely CLAY

Moisture Content %	
Bulk Density Mg/m³	1.50
Dry Density Mg/m³	1.24
Soaked Test	No

Test on	☐ TOP
Moisture Content %	21
Surcharge weight kg	
Penetration mm	2.5 5.0
Force kN	0.22 0.59
Corrected CBR %	1.7 3.0

Test on	☐ BOTTOM
Moisture Content %	21
Surcharge weight kg	
Penetration mm	2.5 5.0
Force kN	0.58 0.95
Corrected CBR %	4.4 4.8

Test on	TOP	BOTTOM
Reported CBR %	2.3	4.6



Method of Preparation : The specimen was prepared by Dynamic compression using a 2.5 kg Rammer
BS 1377:PART 1 1990 7.6 1 General 1990 7.6.5 California bearing ratio test BS 1377 PART 4 1990 7 2 Preparation of test sample

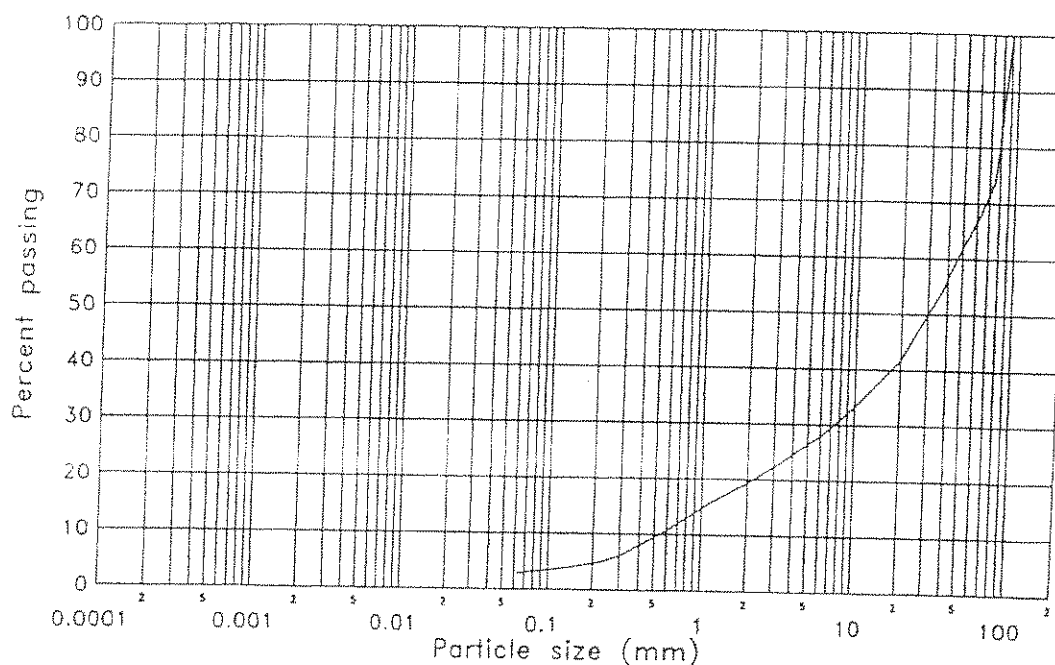
Method of Test : BS 1377 PART 4 1990 7 4 Penetration test procedure

Remarks :

PARTICLE SIZE DISTRIBUTION

B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: TP2	Sample No: 4	Sample Type: B	Depth: 1.40



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	3	16	49	32
Loss on Pretreatment:	Not Applicable		Description Brown SAND and GRAVEL with some cobbles and a little silt	
Test Date:	19/03/1999			
Uniformity Coefficient:	114.9			

		Input by <i>MB</i>	Date 21/03/1999	Checked by <i>[Signature]</i>	Date 1.4.99		
FOUNDATION & EXPLORATION SERVICES		Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452	
						Figure No LT2/26	

PARTICLE SIZE DISTRIBUTION

B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

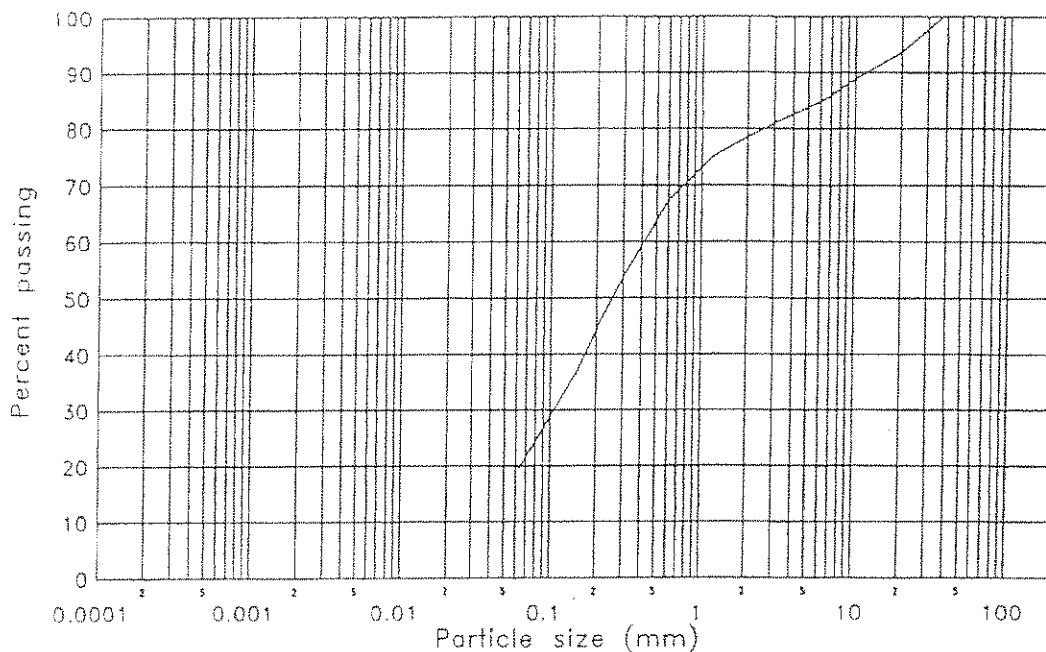
Sample Details

Borehole No: TP11

Sample No: 4

Sample Type: B

Depth: 1.70



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	20	59	21	0
Loss on Pretreatment:	Not Applicable		Description Brown SAND with much gravel and some silt	
Test Date:	31/03/1999			
Uniformity Coefficient:	9.8			

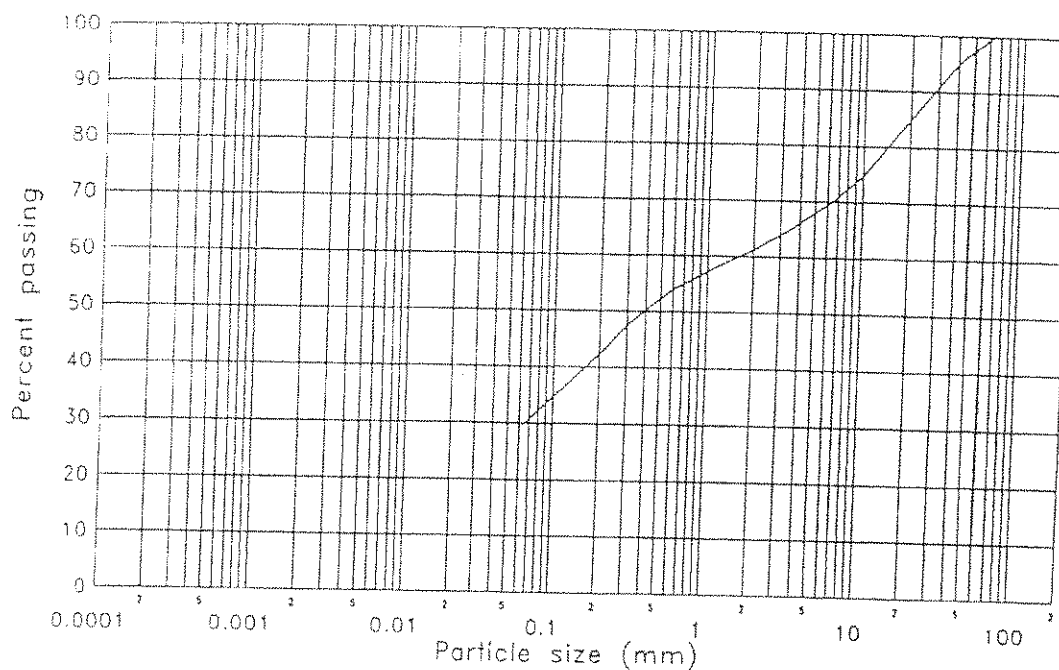
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Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE		Contract No 4452	
 FOUNDATION & EXPLORATION SERVICES		Figure No LT2/30	

PARTICLE SIZE DISTRIBUTION

B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details

Borehole No: TP12	Sample No: 3	Sample Type: B	Depth: 1.50
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CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

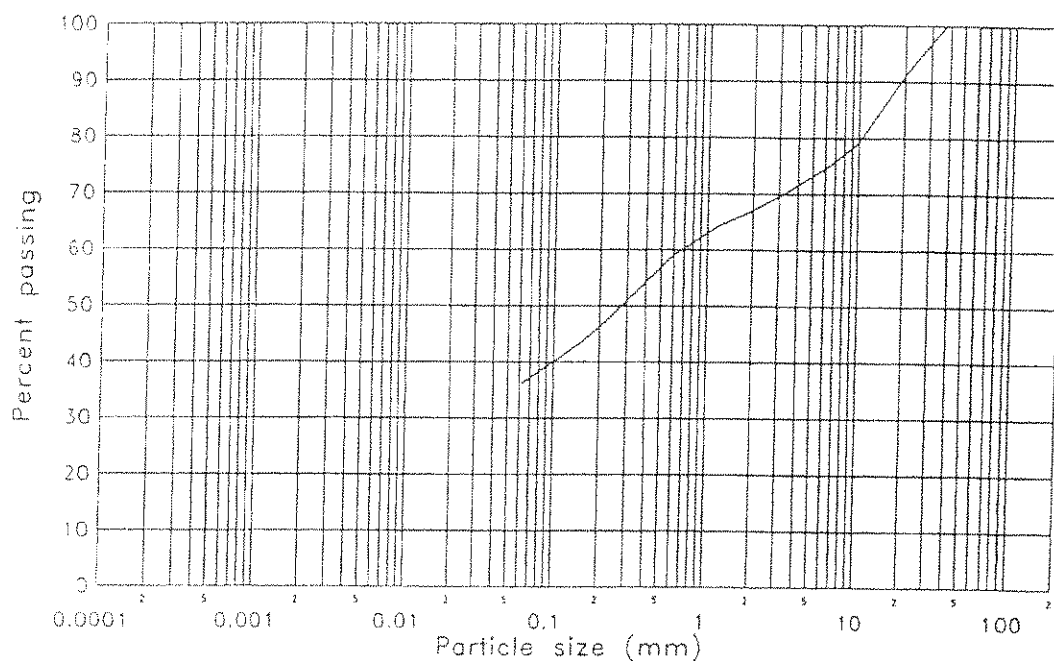
SUMMARY

%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	30	31	39	0
Loss on Pretreatment:	Not Applicable		Description Brown GRAVEL with much sand and much clay	
Test Date:	04/03/1999			
Uniformity Coefficient:	55.0			

FOUNDATION & EXPLORATION SERVICES	Input by <i>MB</i>	Date 06/03/1999	Checked by <i>[Signature]</i>	Date 26.3.99	
	Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452
					Figure No LT2/31

PARTICLE SIZE DISTRIBUTION B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: TP13	Sample No: 6	Sample Type: D	Depth: 2.60



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

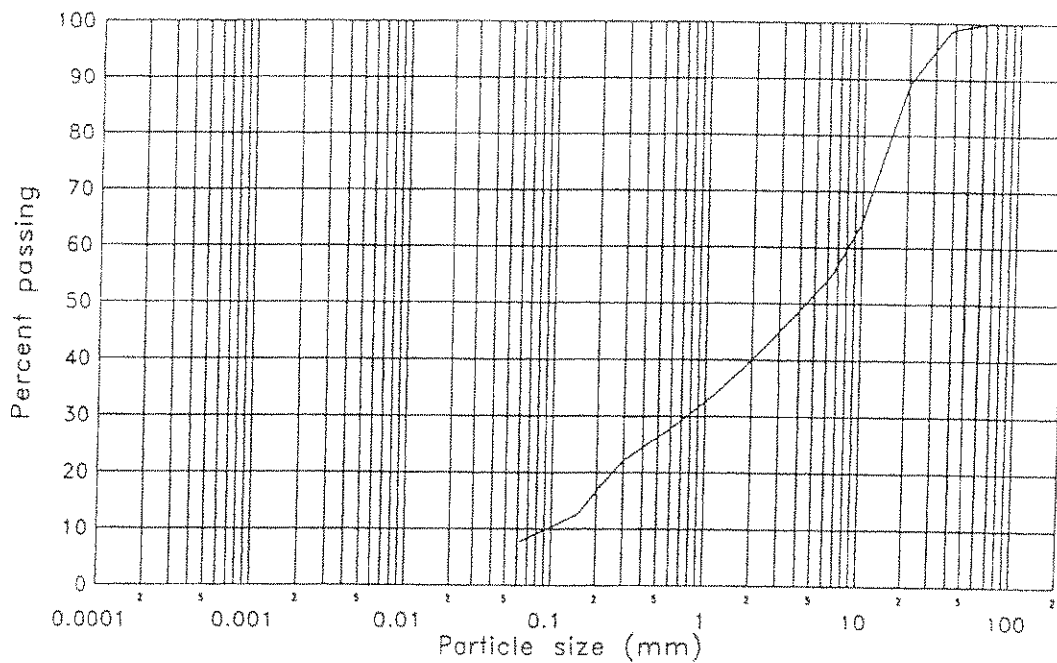
%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	36	31	33	0
Loss on Pretreatment:	Not Applicable		Description Brown CLAY with some gravel and some sand	
Test Date:	05/03/1999			
Uniformity Coefficient:	24.6			

	Input by MB	Date 07/03/1999	Checked by [Signature]	Date 26.3.99	
	Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452
					Figure No LT2/ 32

PARTICLE SIZE DISTRIBUTION

B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: TP14	Sample No: 2	Sample Type: B	Depth: 0.60



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

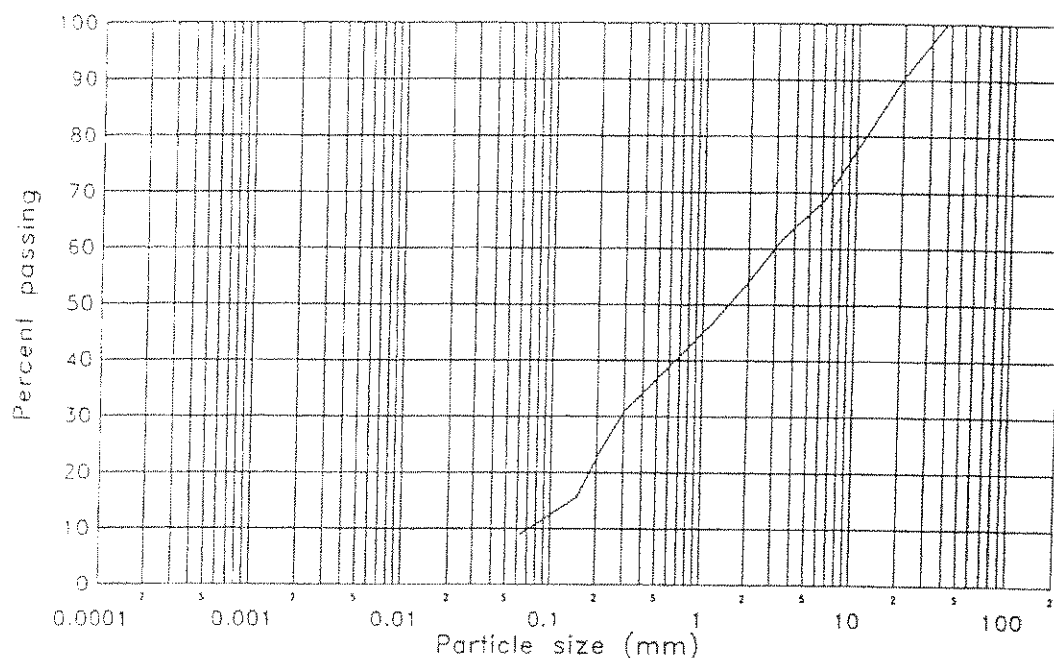
SUMMARY

%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	8	32	60	0
Loss on Pretreatment:	Not Applicable		Description Brown GRAVEL with much sand and some silt	
Test Date:	19/03/1999			
Uniformity Coefficient:	86.7			

 FOUNDATION & EXPLORATION SERVICES	Input by <i>MB</i>	Date 21/03/1999	Checked by <i>[Signature]</i>	Date 1.4.99	
	Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452
					Figure No LT2/33

PARTICLE SIZE DISTRIBUTION B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: TP14	Sample No: 5	Sample Type: B	Depth: 2.10



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	9	45	46	0
Loss on Pretreatment:	Not Applicable		Description Brown SAND and GRAVEL with some silt	
Test Date:	05/03/1999			
Uniformity Coefficient:	41.4			

		Input by <i>MB</i>	Date 07/03/1999	Checked by <i>[Signature]</i>	Date 20.3.99		
FOUNDATION & EXPLORATION SERVICES		Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452	
						Figure No LT2/34	

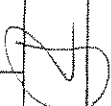
BS 1377: Part 2: 1990

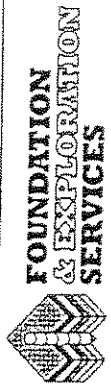


**FOUNDATION
& EXPLORATION
SERVICES**

SUMMARY OF SOIL CLASSIFICATION TESTS

BS 1377: Part 2: 1990

Hole	Type	Depth	Sample No.	Classification Tests								Method	Description		
				Bulk Density (Mg/m ³)	Moisture Content (%)	Dry Density (Mg/m ³)	Particle Density (Mg/m ³)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% passing 425 μ m				
BRG4	U	10.10	26	2.22	14	1.94							Brown SILT with a little sand and a little gravel		
BRG4	D	12.00	31		12			32	18	14	78	HP	Brown CLAY with a little sand and a little gravel		
TP2	D	2.20	6		11			23	14	9	72	HP	Brown CLAY with a little sand and a little gravel		
TP3	D	0.80	2		38								Brown CLAY with a little sand and a little gravel		
TP7	CD	0.50	2		41			47	29	18	97	HP	Brown CLAY/SILT with a little sand and a little gravel		
TP7	D	2.20	5		37			35	27	8	95	HP	Brown SILT with some sand and a little gravel		
TP12	B	1.50	3		21			30	19	11	57	WS	Brown CLAY with a little sand and some gravel		
				Input by	MB	Date	01/04/1999	Checked by			Date	01/04/1999			
				Project		BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE								Contract No 4452	
												Figure No		LT1/5	
												102/02			



DETERMINATION OF THE SHEAR STRENGTH BY DIRECT SHEAR

Large Shearbox Apparatus : BS 1377 : Part 7 : 1990. Method 5

Borehole/Sample Nos. TP10 / 2, 4 and 7 Combined

Date : April 1999

Sample Depths (m) : 0.40 - 3.00

Specimen Depth (m) : 0.40 - 3.00

Specimen Details

Sample Types : Bults - Remoulded

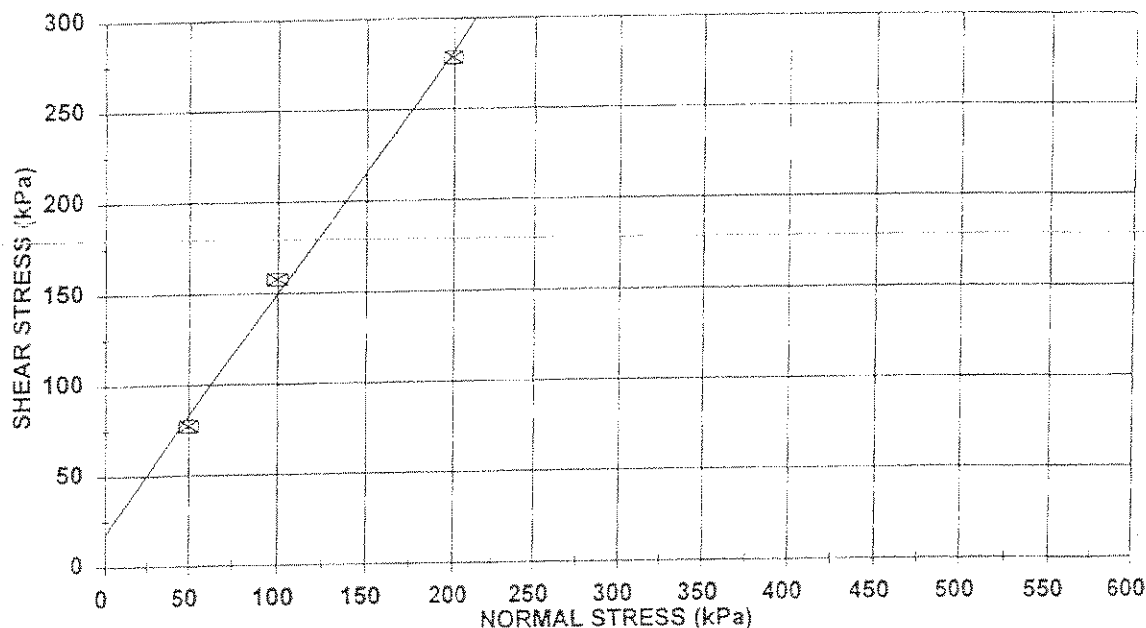
Sample Orientation : Not applicable

Preparation Method : Remoulded using a vibrating hammer
Clause 5.4.5

Sample Description : Black sandy fine to coarse GRAVEL
(Sieved to pass a 20 mm B.S. test sieve)

			Sample 1	Sample 2	Sample 3
INITIAL PROPERTIES	Sample Height	mm	150.4	149.0	148.5
	Sample Width	mm	300.0	300.0	300.0
	Sample Length	mm	300.0	300.0	300.0
	Moisture Content	%	26	27	23
	Bulk Density	Mg/m ³	1.60	1.61	1.62
	Dry Density	Mg/m ³	1.27	1.27	1.31
	Particle Density (assumed)	Mg/m ³	2.70		
	Degree of Saturation	%	62	64	59
	Voids Ratio		1.126	1.123	1.060
	Test Conditions		Submerged		
CONSOLIDATION	Applied Normal Stress	kPa	50	100	200
	Consolidated Height	mm	149.3	146.6	145.2
	Consolidated Dry Density	Mg/m ³	1.27	1.28	1.33
SHEARING	Rate of Displacement	mm/min	0.12	0.12	0.12
	Maximum Shear Stress	kPa	78	158	278
	Horizontal Displacement at Maximum Shear Stress	mm	6.4	13.5	11.8

PEAK STRENGTH	Eff. cohesion (c')	17 kPa	Eff. angle of friction (φ')	52.8 degrees
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Variation from BS 1377 and reason :

Remarks on testing :

Prepared By	D Hill	Date	20/04/99	Approved By	For Contractor	Date	For Engineer	Date
Checked By	AP [Signature]	Date	23/04/99					



**FOUNDATION
& EXPLORATION
SERVICES**

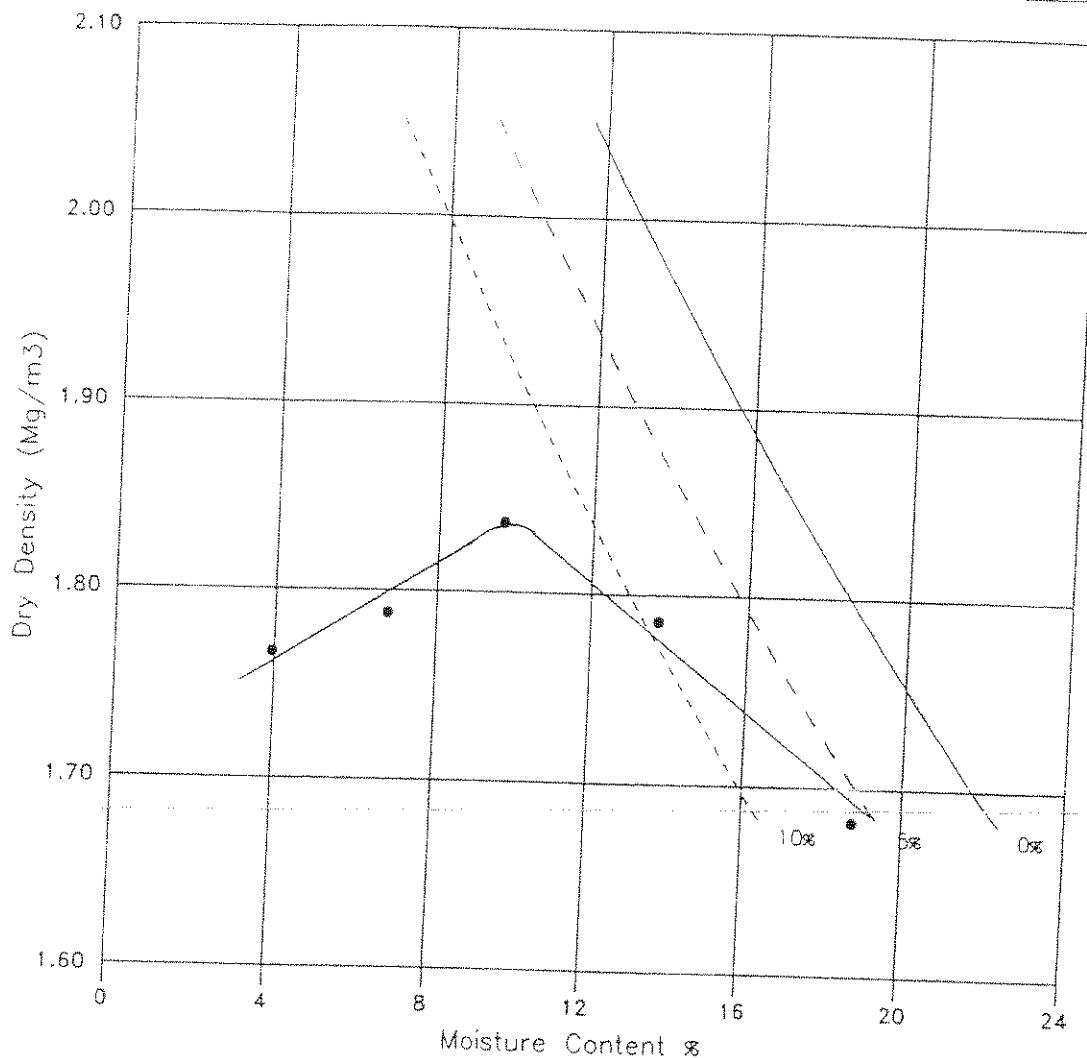
BUCKLEY WELLS, BURY

CONTRACT: M4452

FIGURE: LT6/1

MOISTURE CONTENT/DRY DENSITY RELATIONSHIP TEST B.S. 1377: Part 4: 1990: 3.3/3.4/3.5/3.6/3.7

Sample Details			
Borehole No: TP12	Sample No: 3	Sample Type: B	Depth: 1.50



SUMMARY

Test Date	04/03/1999	Type of Compaction	2.5kg Compaction
Sample Preparation	Single sample	Maximum Dry Density	1.83 Mg/m³
Particle Density (assumed)	(2.70) Mg/m³	Optimum Moisture Content	10 %
Moisture Content	19 %	Description	Brown GRAVEL with much sand and much clay
Material retained on			
37.5mm sieve	7 %		
20mm sieve	17 %		

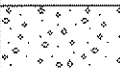
	Input by	Date	Checked by	Date		
	MP	06/03/1999	[Signature]	29.3.99		
	Project				Contract No	
BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Figure No	4452	
					LT3/1	106/01

APPENDIX U

GEOTECHNICAL INFORMATION

NEW SHED ON NORTHERN SITE BOUNDARY

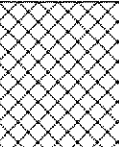
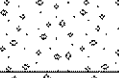
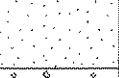
 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment Auto Trip Drop Hammer Methods Window Sampling Contractor Mini Bore
Borehole No BH1		Client Bury MBC	Date 09.12.05

Depth (m)	Description	Legend	Sample/Tests			Field Records	
			Depth	Sample			Results
				Type	No.		
0.00	Ground Surface						
	MADE GROUND Dark brown clayey topsoil						
	MADE GROUND Coarse black ash gravel with much coarse angular gravel of coal, clinker and occasional concrete						
1.00	MADE GROUND Cobble sized sandstone		1.0m	SPT		3/4-5,5,5,5 N=20	
2.00	MADE GROUND Soft brown gravelly clayey sand with much medium to coarse gravel of brick and occasional sandstone		2.0m	SPT		3/4-4,4,2,2 N=12	
3.00	NO RETURN Loose to medium dense light to dark brown coarse SAND and GRAVEL with some occasional cobble sized sandstone. Rare fragments of coal. Becoming very wet @ 2.5m		3.0m	SPT		1/0-1,0,1,0 N=2	
4.00	Wet firm to stiff grey gravelly CLAY with some fine to medium gravel of mudstone		4.0m	SPT		1/1-2,5,5,4 N=16	
5.00	End of Borehole						
6.00							
7.00							
8.00							

Well installed to 3.0m

Remarks	Logged by M Waddicor
	Scale NTS
	Sample taken at depth 0.2

 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment Auto Trip Drop Hammer Methods Window Sampling Contractor Mini Bore
Borehole No BH2		Client Bury MBC	Date 09.12.05

Depth (m)	Description	Legend	Sample/Tests			Field Records	
			Depth	Sample			Results
				Type	No.		
0.00	Ground Surface MADE GROUND Dark brown clayey topsoil with some cobble sized sandstone between 0.7-0.8m						
1.00	NO RETURN		1.0m	SPT		1/3-3,3,3,3 N=12	
2.00	Very wet light to dark brown coarse SAND and GRAVEL with much coarse gravel of sandstone						
	Wet soft to firm brown sandy gravelly CLAY with much medium to coarse gravel of mudstone and sandstone		2.0m	SPT		1/3-3,3,2,2 N=10	
3.00	Medium dense very wet brown clayey gravelly medium SAND with much coarse gravel of sandstone		3.0m	SPT		4/4-4,4,4,4 N=16	
4.00	Wet firm brown sandy gravelly CLAY with some medium to coarse gravel of mudstone		4.0m	SPT		1/1-1,1,4,3 N=9	
5.00	End of Borehole						
6.00							
7.00							
8.00							

Remarks	Logged by M Waddicor
	Scale NTS
	Sample taken at depth 0.40

PROJECT: BUCKLEY WELLS LOCOMOTIVE DEPOT, BURY, LANCASHIRE				METHOD OF EXCAVATION: MECHANICAL EXCAVATION				RECORD OF TRIAL PIT NO: TP 4			
CONTRACT NO: 4452				SURFACE DIMENSIONS OF PIT: 120m x 230m				CO-ORDINATES:			
INSITU TESTING				START DATE: 28/01/99... FINISH DATE: 28/01/1999				Sheet 1 of 1			
Depth (m)	Test	Result	SAMPLES	DESCRIPTION OF STRATA				Thickness (m)	Depth (m)	Level (m.o.d.)	Strata Symbol
0.00			CD 1	MADE GROUND: Grass over topsoil: black fine to coarse sand including some ash, some silt and a little clay with occasional rootlets.				0.10	83.95		
0.40			B 2	MADE GROUND: Stone setts.				0.30	83.75		
1.00			CD 3	Brown, subrounded fine to coarse GRAVEL and occasional cobbles of sandstone with locally much fine to coarse sand and some silt.							
1.60			CD 4								
2.40	VN/ VR	102/20 82/20 96/18	CD 5	Stiff, brown, CLAY with a little fine to coarse sand and a little subrounded fine gravel including mudstone.				2.20	81.85		
2.90	VN/ VR	94/28 82/30 88/20	CD 6	<GLACIAL DRIFT>							
				END OF TRIAL PIT				3.10	80.95		

REMARKS:

- Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out to check for services. Services were not located.
- Slight seepages of groundwater were encountered at 110m depth (not enough to sample).
- The sides of the trial pit remained stable during excavation.
- On completion the trial pit was backfilled to ground level with compacted arisings.

PLAN

Scale 1:25			FOUNDATION & EXPLORATION SERVICES		
Logged by:	Date:		Checked by:	Date:	
GL/knh	28/01		SJR	04/02	
Approved by:			RJE	09/04	
			FIGURE: TP4		



Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

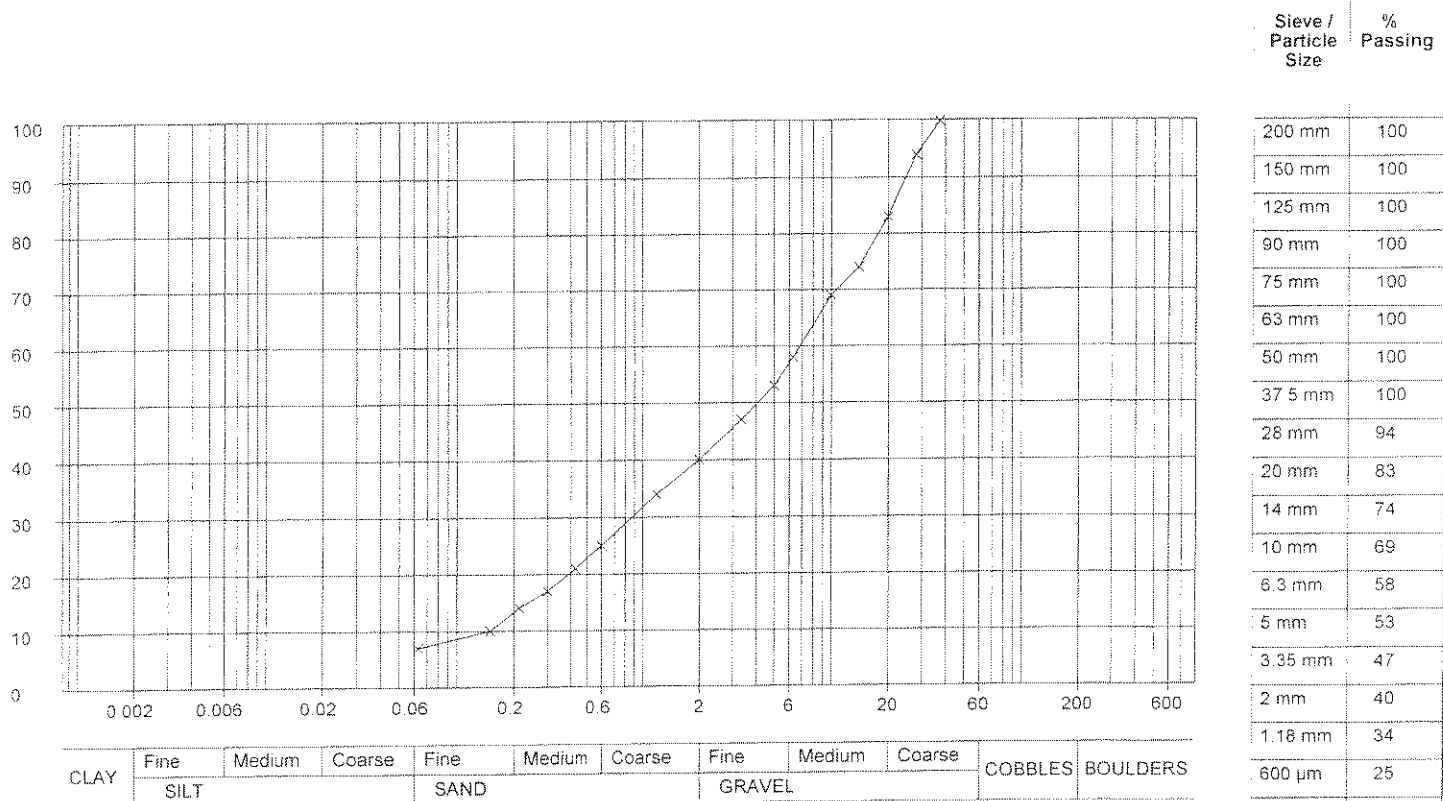
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Sheet

1/2

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Pipette/ Hydrometer	Description
WS-BH1	1.50	B1	N/A	Brown gravelly SAND Gravel is fine to medium



Grading Analysis

D85	21.3 mm
D60	6.9 mm
D10	200.0 µm
Uniformity Coefficient	45.7

Particle Proportions

Cobbles + Boulders	0%
Gravel	60%
Sand	33%
Silt/Clay	7%

Method of Preparation : BS 1377 PART 1:1990:7.3 Initial preparation 1990:7.4.5 Particle size tests

Preparation Details : Sample washed with no dispersant used, Oven Dried at 105 - 110°C

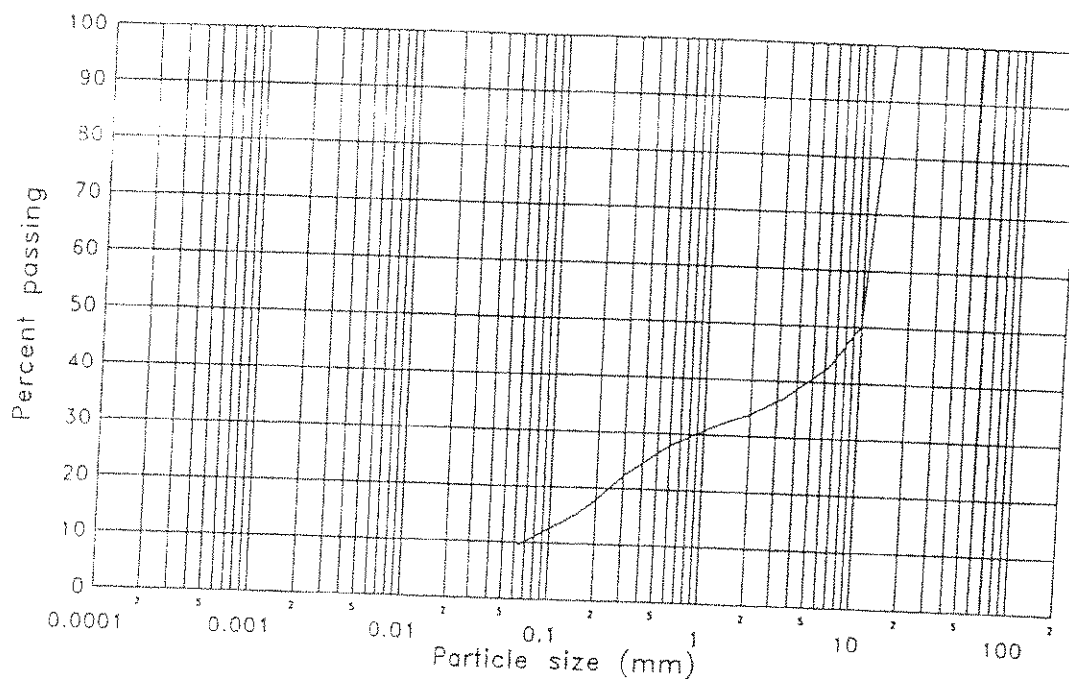
Method of Test : BS 1377 PART 2:1990:9 Determination of particle size distribution

Remarks :

PARTICLE SIZE DISTRIBUTION

B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: TP4	Sample No: 3	Sample Type: D	Depth: 1.00



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

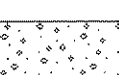
%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	10	24	66	0
Loss on Pretreatment:	Not Applicable		Description Brown GRAVEL with much sand and some clay	
Test Date:	05/03/1999			
Uniformity Coefficient:	157.4			

FOUNDATION & EXPLORATION SERVICES	Input by <i>MB</i>	Date 07/03/1999	Checked by <i>[Signature]</i>	Date 26.3.99	
	Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452
					Figure No LT2/27

APPENDIX V

GEOTECHNICAL INFORMATION
PROPOSED NEW STATION AND PLATFORM

 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment Auto Trip Drop Hammer Methods Window Sampling Contractor Mini Bore	
Borehole No BH5		Client Bury MBC	Date 09.12.05	

Depth (m)	Description	Legend	Sample/Tests			Field Records	
			Depth	Sample			Results
				Type	No.		
0.00	Ground Surface						
	MADE GROUND Black coarse ash gravel with much occasional inclusions of soft brown clay and rare fine brick gravel.						
1.00	MADE GROUND Brown gravelly coarse sand with much coarse angular gravel of brick, concrete and clinker. Occasional gravel and cobble sized sandstone. Becoming slightly clayey from 0.9m.		1.2m	SV		68kNm-2	
2.00	NO RETURN						
	POSSIBLE MADE GROUND Firm to stiff brown grey reworked sandy gravelly CLAY with rare cobble sized concrete @ 1.8m.		2.0m	SPT		4/4-5,4,5,8 N=22	
3.00	NO RETURN						
	Medium dense light brown coarse SAND and GRAVEL with much coarse gravel of coal and sandstone.		3.0m	SPT		4/5-6,7,7,7 N=27	
4.00			4.0m	SPT		5/7-7,5,6,7 N=25	
5.00	End of Borehole						
6.00							
7.00							
8.00							

Remarks	Logged by M Waddicor
	Scale NTS
	Sample taken at depth 0.3

START DATE 05.02.99

DRILLING METHOD CABLE PERCUSSION

EQUIPMENT DANDI 2000

RECORD OF BOREHOLE No: BH G2

CASING DETAILS 150 mm to 12.00 m
mm to m

SHEET 1 OF 2

BOREHOLE DIA. 150 mm to 15.00 m
mm to m

NATIONAL GRID CO-ORDINATES:

E N
GROUND LEVEL 84.65 m O.D.

Date & Time	Casing Depth (m)	Depth to Water (m)	SAMPLE				U100 Blows	U100 Rec.(m)	DESCRIPTION OF STRATA	Depth (Thickness) (m)	Level (m O.D.)	Strata Symbol
			Depth (m) From	To	Type	No						
05/02			0.50	1.00	B	1			MADE GROUND: Black, fine to coarse ash sand and subangular fine and medium gravel of ash and clinker with some silt and a little gravel of limestone. Locally grading in to sand with a little gravel.	(1.85)		
	0.00	Dry	1.20 1.21	1.45 1.70	D B	2		S 6				
	1.50	Dry	1.85 1.90	2.35	D U	3 4	42	0.40	Soft, grey CLAY/SILT with a little fine to coarse sand and a little organic matter. <ALLUVIUM>	1.85	82.80	
	2.40	Dry	2.40 2.60	3.05	D U	6 7	63		Firm, dark brown-grey, CLAY with a little fine to coarse sand and a little subrounded fine gravel including mudstone.	(0.55)	82.25	
			3.10		D	8			<GLACIAL DRIFT>	2.40		
	3.10	Dry	3.60 3.60	4.10 4.05	B D	9 10		S 20		(1.80)		
05/02 06/02	4.20 4.20	Dry Dry	4.30		D	11			Stiff, dark brown, CLAY with a little fine to coarse sand.	4.20	80.45	
	4.30	Dry	4.50	4.95	U	12	120		<GLACIAL DRIFT>			
			5.00 5.10	5.60	D B	13 14			At 5.00m with a little subrounded fine and medium gravel including mudstone.			
	4.50	Dry	6.00 6.01	6.45 6.50	U# B	15	97	0.00				
	6.10	Dry	6.50	6.95	D	16		S 29				
	7.50	Dry	8.00	8.45	U	17	105			(7.10)		
			8.50		D	18						
			9.00		2W	23						
	7.70	Dry	9.50 9.51	9.95 10.00	D B	20 19		S 37				

REMARKS: 1. Prior to boring, a Cable Avoidance Tool (CAT) survey was carried out. An inspection pit was hand-dug to 1.20m depth (1.25 hrs) and rescanned using the CAT to check for services. Services were not located.
2. Groundwater was encountered at 11.30m depth rising to 9.00m over a 20 minute monitoring period. This strike was sealed off by the casing below 12.50m depth.
3. The borehole was advanced by chiselling techniques to 13.90m to 14.10m depth (0.5 hr)
4. On completion of sampling, the borehole was backfilled to ground level with cement bentonite grout.

SCALE 1:50

FOUNDATION
& EXPLORATION
SERVICESBUCKLEY WILLS LOCOMOTIVE DEPOT,
BURY, LANCASHIRE

Logged by	Date
GL/kmh	19/02
Checked by	
SJR	23/02
Approved by	
RJE	09/04

CONTRACT No 4452

FIGURE: BHG2

START DATE: 05/02/98

DRILLING METHOD: CABLE PERCUSSION

EQUIPMENT: SANDO 2000

RECORD OF BOREHOLE No: BH 62

CASING DETAILS: 150 mm to 12.00 m
mm to m

SHEET 2 OF 2

BOREHOLE DIA 150 mm to 15.00 m
mm to mNATIONAL GRID CO-ORDINATES:
E N
GROUND LEVEL 84.65 m O.D.

Date & Time	Casing Depth (m)	Depth to Water (m)	SAMPLE			U100 Blows	U100 Rec. (m)	DESCRIPTION OF STRATA	Depth (Thickness) (m)	Level (m O.D.)	Strata Symbol
			Depth (m) At/From To	Type	No.	Test Length (mm)	SPT Blows /N				
06/02								CLAY as previous page			
Strik 20min	7.70	Dry	11.00	U	21	120	0.30				
	7.70	11.30	11.30	B	24						
	7.70	9.00	11.45	D	22						
	11.40	7.00	11.50	D	25	225	S 42	Dense, grey, fine SAND with much silt. <GLACIAL DRIFT>	11.30 (0.50)	73.35	
								Stiff, grey, CLAY with a little fine to coarse sand and a little subrounded fine gravel including mudstone. <GLACIAL DRIFT>	11.80	72.85	
	12.00	Damp	12.50	U	26	120	0.40				
			13.00	D	27						
									(3.20)		
	12.00	Dry	14.10	D	29		S 49	Below 14.10m very stiff.			
			14.11	B	28						
06/02	12.00	Dry						END OF BOREHOLE	15.00	69.65	

REMARKS

Logged by
GL/kmhDate
19/02

Checked by

SJR

23/02

Approved by

RJE

09/04

SCALE 1:50

FOUNDATION
& EXPLORATION
SERVICESBUCKLEY WELLS LOCOMOTIVE DEPOT,
BURY, LANCASHIRE

CONTRACT No. 4452

FIGURE: BHG2

DETERMINATION OF THE ONE - DIMENSIONAL CONSOLIDATION PROPERTIES

BS 1377 : Part 5 : 1990. Method 3

Borehole/Sample No. : BHG2 / 5
 Sample Depth (m) : 1.90 - 2.35
 Specimen Details
 Sample Type : U100

Date : March 1999
 Specimen Depth (m) : 1.95

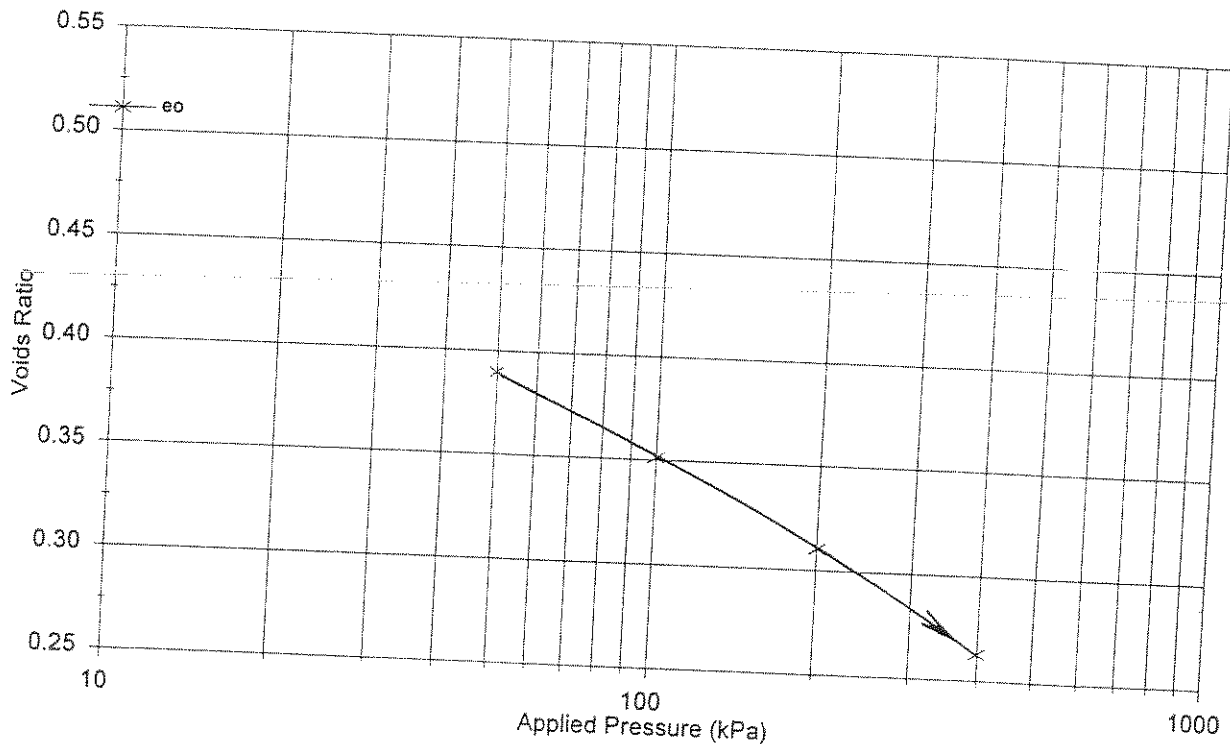
Sample Description : Brown CLAY with a little sand and a little gravel

Sample Axis Orientation : Vertical
 Preparation Method : Extruded and hand trimmed
 Test Temperature (° C) : 19.5

INITIAL PROPERTIES	Sample Height	mm	19.01	Pressure Range (kPa)	Mv (m ² /MN)	Cv (ROOT) (m ² /year)
	Sample Diameter	mm	75.00			
	Moisture Content	%	26			
	Bulk Density	Mg/m ³	1.87			
	Dry Density	Mg/m ³	1.49			
	Particle Density (measured)	Mg/m ³	2.25			
	Voids Ratio		0.5109			
	Degree of Saturation	%	114			
	Swelling Pressure	kPa	—			
	Moisture Content	%	15			
FINAL PROPERTIES	Voids Ratio		0.2630			

Variation from BS 1377 and reason :

Remarks on testing :



Prepared By		Date	16.3.99	Approved By	For Contractor	Date	For Engineer	Date
Checked By		Date	20.3.99					

**FOUNDATION
& EXPLORATION
SERVICES**

BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE

CONTRACT: M4452

FIGURE: LT4/3

DETERMINATION OF THE ONE - DIMENSIONAL CONSOLIDATION PROPERTIES

BS 1377 : Part 5 : 1990. Method 3

Borehole/Sample No. : BHG2 / 7
Sample Depth (m) : 2.60 - 3.05

Date : March 1999
Specimen Depth (m) : 2.66

Specimen Details
Sample Type : U100

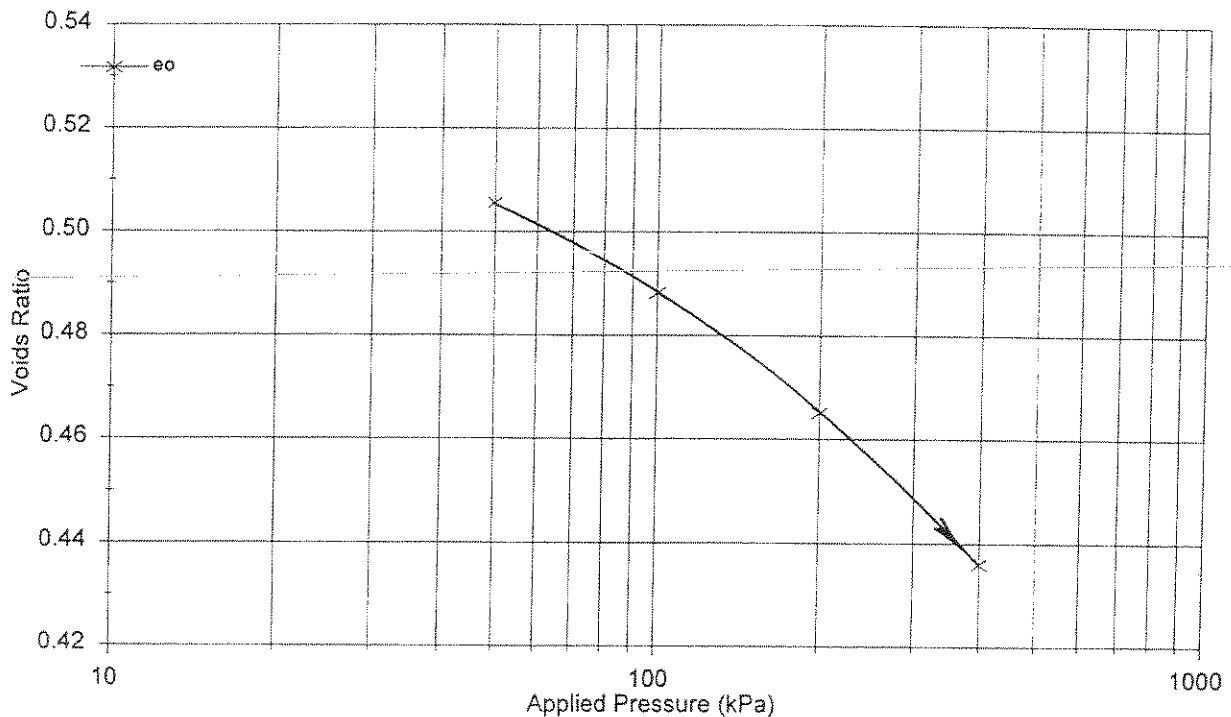
Sample Axis Orientation : Vertical
Preparation Method : Extruded and hand trimmed
Test Temperature (° C) : 19.5

Sample Description : Brown CLAY with a little sand

INITIAL PROPERTIES	Sample Height	mm	18.93	Pressure Range (kPa)	Mv (m ² /MN)	Cv (ROOT) (m ² /year)
	Sample Diameter	mm	74.99			
	Moisture Content	%	21			
	Bulk Density	Mg/m ³	2.07			
	Dry Density	Mg/m ³	1.70			
	Particle Density (measured)	Mg/m ³	2.61			
	Voids Ratio		0.5317			
	Degree of Saturation	%	105			
FINAL PROPERTIES	Swelling Pressure	kPa	—	2 - 50	0.35	4.3
	Moisture Content	%	19			
	Voids Ratio		0.4360			
				50 - 100	0.23	1.8
				100 - 200	0.16	2.7
				200 - 400	0.099	4.9

Variation from BS 1377 and reason :

Remarks on testing :



Prepared By	<i>[Signature]</i>	Date	16.3.99	Approved By		For Contractor	Date	For Engineer	Date
Checked By	<i>[Signature]</i>	Date	24.3.99						



**FOUNDATION
& EXPLORATION
SERVICES**

BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE

CONTRACT : M4452

FIGURE: LT4/4

SUMMARY OF UNDRAINED SHEAR STRENGTH TESTS IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF POREWATER PRESSURE

BS 1377: Part 7: 1990: Tests B & 9

Specimen Details										Undrained Triaxial Compression Results (Total Stress)											
Hole	Type	Depth	Sample No.	Specimen Depth mm	Test Type	Preparation	Initial Properties				Rate of Strain %/min	Membrane Thickness mm	Cell Pressure kPa	Membrane Correction kPa	Maximum Deviator Stress kPa	Failure Strain %	Mode of Failure	Cohesion (Avg) kPa	Description		
							Dimensions mm	w %	γ_b Mg/m ³	γ_d Mg/m ³											
BHG1	U	2.80	6	40	UU	U	199, 103	11	2.31	2.08	2.01	0.24	50.0	0.92	342	20.10	C	171	Very stiff brown CLAY with a little sand and a little gravel		
BHG1	U	6.80	13	40	UU	U	179, 102	16	2.19	1.89	2.23	0.24	125.0	0.90	373	19.50	C	186	Very stiff brown CLAY with a little sand and a little gravel		
BHG2	U	2.60	7	120	UU	U	200, 103	20	2.09	1.74	2.00	0.24	50.0	0.92	118	20.00	C	59	Firm brown CLAY with a little sand and a little gravel		
BHG2	U	4.50	12	100	UU	U	199, 103	19	2.14	1.79	2.00	0.24	100.0	0.62	149	11.50	C	74	Firm brown CLAY with a little sand and a little gravel		
BHG2	U	8.00	17	70	UU	U	163, 102	17	2.14	1.83	1.83	0.24	160.0	0.92	215	20.20	C	108	Stiff brown CLAY with a little sand and a little gravel		
BHG2	U	12.50	26	70	UU	U	200, 101	13	2.28	2.02	2.00	0.24	250.0	0.92	554	20.00	C	277	Very stiff brown CLAY with a little sand and a little gravel		
Key: Preparation: REM - remoulded U - undisturbed										Test Type: UU - unconsolidated undrained UUM - unconsolidated undrained multistage											
Input by MB										Date 29/03/1999		Checked by [Signature]		Date 29/03/1999		Mode of Failure: B - Brittle C - Combined P - Plastic					
Project										* Latex Membranes used											
FOLNDA™ ON & EXPLORATION SERVICES										BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE											
										Contract No 4452											
										Figure No LT5/2											
										104/03											

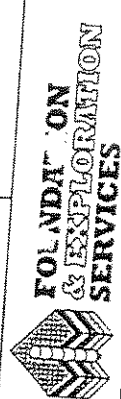
Preparation: REM - remoulded
U - undisturbed

Test Type: UU - unconsolidated undrained
UUM - unconsolidated undrained multistage

Input by MB Date 29/03/1999

Mode of Failure: B - Brittle C - Combined P - Plastic

Checked by [Signature] Date 29/03/1999



Project

BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE

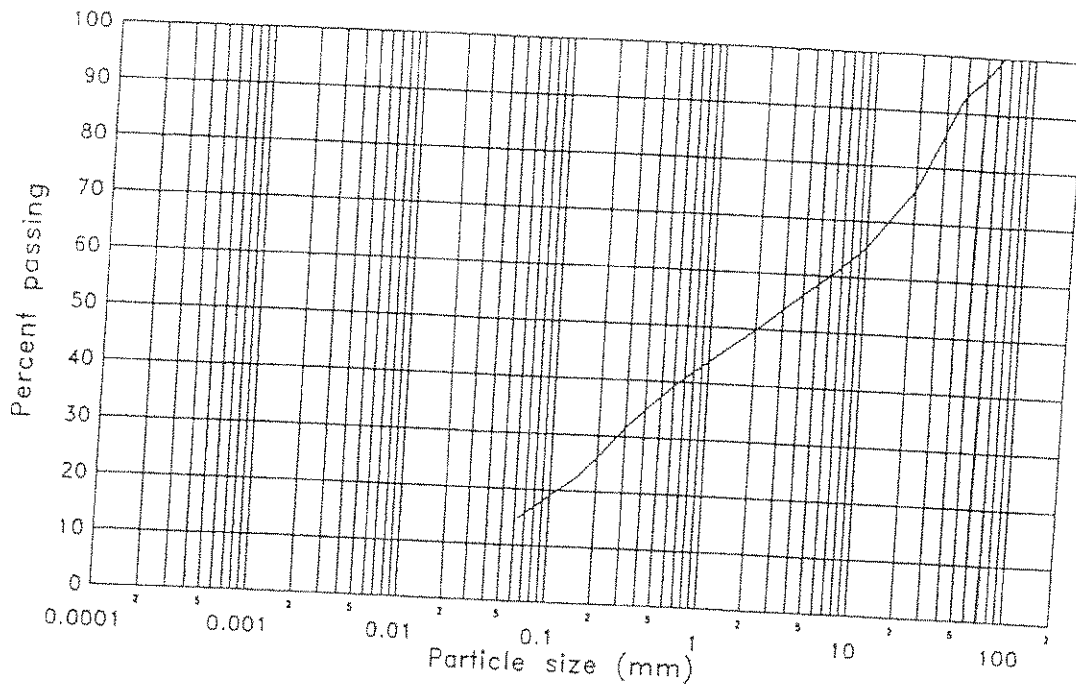
Contract No 4452

Figure No LT5/2

PARTICLE SIZE DISTRIBUTION

B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: BHG2	Sample No: 1	Sample Type: B	Depth: 0.50



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

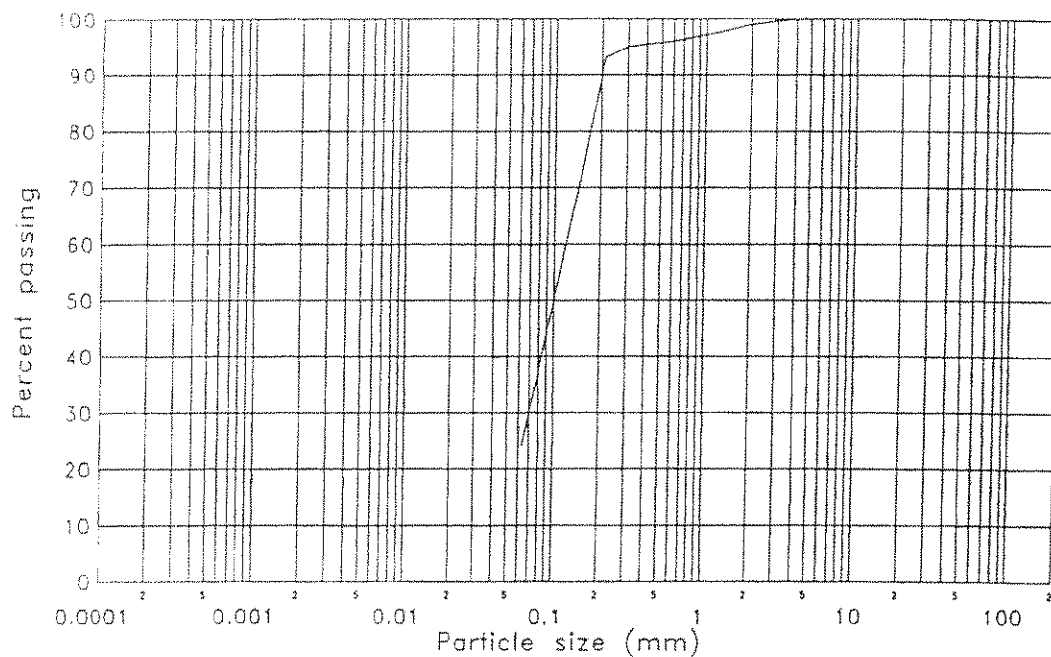
%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	15	35	50	0
Loss on Pretreatment:	Not Applicable		Description Brown GRAVEL with much sand and some silt	
Test Date:	22/03/1999			
Uniformity Coefficient:	110.5			

FOUNDATION & EXPLORATION SERVICES	Input by <i>MB</i>	Date 24/03/1999	Checked by <i>[Signature]</i>	Date 24/03/99	
	Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452
					Figure No LT2/17

PARTICLE SIZE DISTRIBUTION

B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: BH02	Sample No: 22	Sample Type: D	Depth: 11.45



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

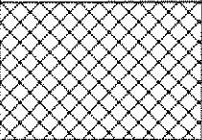
%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	24	75	1	0
Loss on Pretreatment:	Not Applicable		Description Brown grey SAND with much silt and a little gravel	
Test Date:	05/03/1999			
Uniformity Coefficient:	3.7			

	Input by <i>MB</i>	Date 07/03/1999	Checked by <i>[Signature]</i>	Date 20/3/99	
 FOUNDATION & EXPLORATION SERVICES	Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452
					Figure No LT2/18

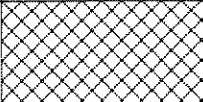
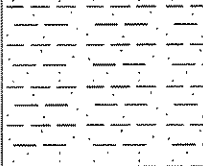
APPENDIX W

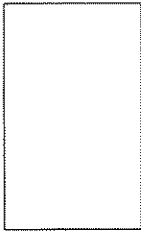
GEOTECHNICAL INFORMATION
ENGINEERING WORKS AREA

 Leyden Kirby <i>ASSOCIATES LTD</i> Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment 360 Rubber Duck Methods Mechanical Excavation Contractor MA Excavations
TRIAL PIT No. TP-G1		Client Bury MBC	Date 19.12.05

Depth (m)	B	Legend	Groundwater	Field Records
0.00	Ground Surface			
	MADE GROUND Dark grey silty clayey fine to coarse sand with many fine rootlets and rare pottery fragments.			
	Soft orange brown very sandy CLAY with occasional coarse subrounded gravel.			
	End of Trial Pit			
1.00				
2.00				
3.00				

Remarks Dry, no odour Stability Sides stable	Dimensions A =  D = B = C =		Logged by CJC
			Scale NTS
			Sample taken at depth 0-0.4

 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment 360 Rubber Duck Methods Mechanical Excavation Contractor MA Excavations	
TRIAL PIT No. TP-G2		Client Bury MBC	Date 19.12.05	
Depth (m)	B	Legend	Groundwater	Field Records
0.00	Ground Surface			
	MADE GROUND Dark grey silty clayey fine to coarse sand with many fine rootlets and rare pottery fragments.			
	Soft brown very sandy CLAY with occasional coarse subrounded gravel.			
	End of Trial Pit			
1.00				
2.00				
3.00				

Remarks Dry, no odour Stability Sides stable	Dimensions A =  D = B = C =	Logged by CJC
		Scale NTS
		Sample taken at depth 0-0.5

PROJECT: BUCKLEY WELLS LOCOMOTIVE DEPOT, LOCATION: BURY, LANCASHIRE CONTRACT NO: 4452						METHOD OF EXCAVATION: MECHANICAL EXCAVATION SURFACE DIMENSIONS OF PIT: START DATE: 04/02/99.. FINISH DATE: 04/02/1999				RECORD OF TRIAL PIT NO: TP 6 CO-ORDINATES: E..... N..... Sheet 1 of 1 GROUND LEVEL: 77.90 m O.D.			
INSITU TESTING		SAMPLES		DESCRIPTION OF STRATA		Thickness (m)	Depth (m)	Level (m.O.D.)	Strata Symbol				
Depth (m)	Type	Result	Depth (m)	Type	No.								
0.10	CD		0.10	B	1	Gross over TOPSOIL Black, fine to coarse sand with a little organic matter; with occasional rootlets.	0.30	77.50					
0.50	B		0.50	B	2	Brown, subrounded fine to coarse GRAVEL of sandstone with some fine to coarse sand and some silt.							
1.00	CD		1.00	CD	3		(2.00)						
1.60	CD		1.60	CD	4								
2.10	B		2.10	B	6		2.30	75.60					
END OF TRIAL PIT													

REMARKS:

- 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out to check for services. Services were not located.
- 2. Rapid inflows of groundwater were encountered at 2.20m depth.
- 3. The sides of the trial pit were unstable and collapsed when excavating below 1.00m depth.
- 4. On completion the trial pit was backfilled to ground level with compacted arisings.

Scale 1:25

PLAN

Logged by: GL/kmh
Checked by: SJR
Approved by: RJE

Date: 04/02
05/02
09/04

FOUNDATION & EXPLORATION SERVICES

FIGURE: TP6



Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

4811

Sheet

3 / 8

DETERMINATION OF CALIFORNIA BEARING RATIO (CBR)

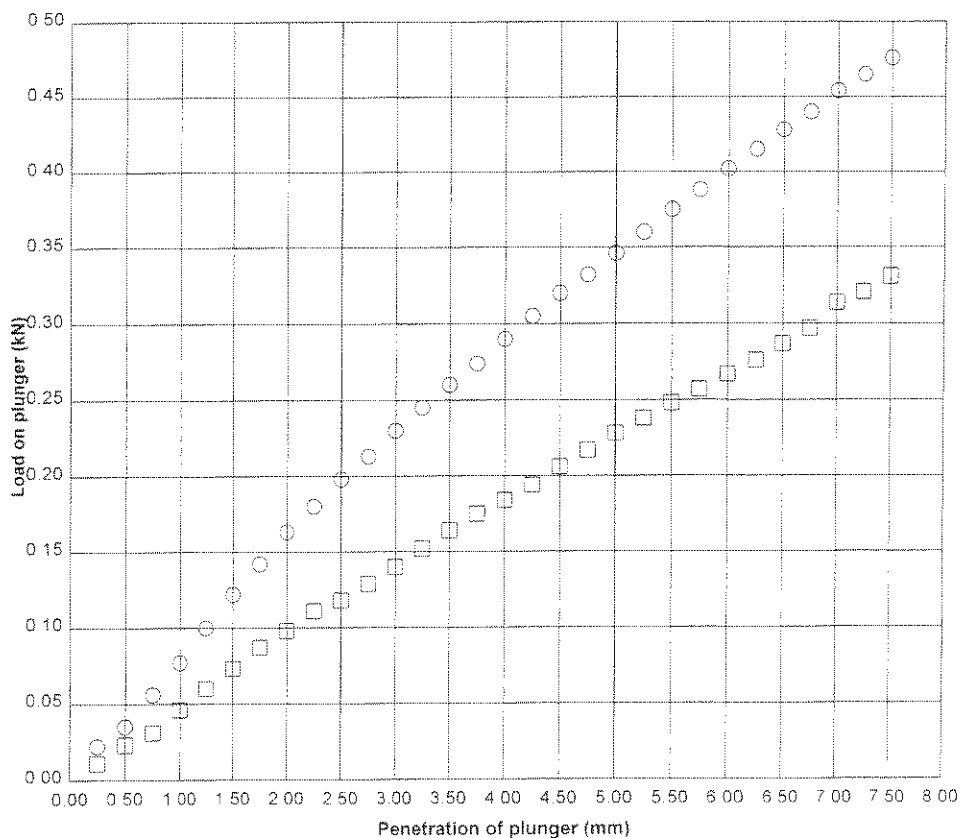
Borehole / Trial Pit	Depth (m)	Sample	% Passing 20 mm Sieve	Description
TP-G1	0.00	B1	100 %	Black very organic TOPSOIL.

Moisture Content %	
Bulk Density Mg/m³	1.71
Dry Density Mg/m³	1.26
Soaked Test	No

Test on	☐ TOP
Moisture Content %	35
Surcharge weight kg	
Penetration mm	2.5 5.0
Force kN	0.12 0.23
Corrected CBR %	0.89 1.1

Test on	☐ BOTTOM
Moisture Content %	36
Surcharge weight kg	
Penetration mm	2.5 5.0
Force kN	0.20 0.35
Corrected CBR %	1.5 1.7

Test on	TOP	BOTTOM
Reported CBR %	1.0	1.6



Method of Preparation : The specimen was prepared by Dynamic compression using a 4.5 kg Rammer
BS 1377 PART 1:1990 7.6.1 General 1990 7 6.5 California bearing ratio test BS 1377 PART 4 1990 7 2 Preparation of test sample

Method of Test : BS 1377 PART 4 1990:7 4 Penetration test procedure

Remarks :



Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

4811

Sheet

4 / 8

DETERMINATION OF CALIFORNIA BEARING RATIO (CBR)

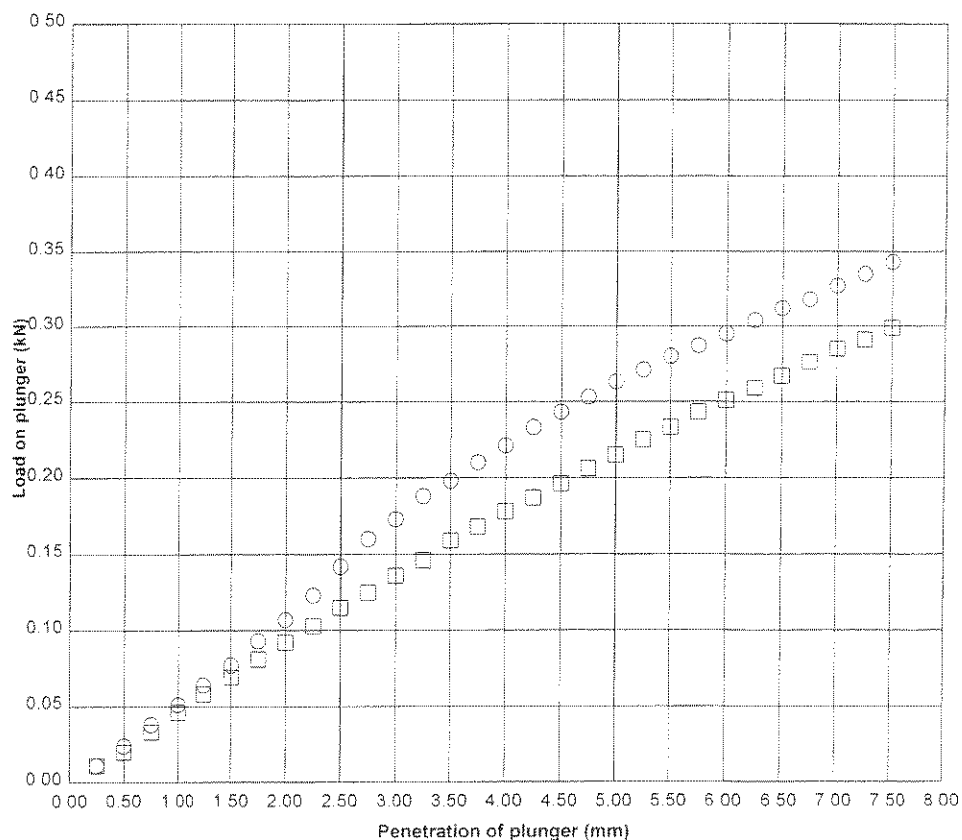
Borehole / Trial Pit	Depth (m)	Sample	% Passing 20 mm Sieve	Description
TP-G2	0.00	B1	100 %	Black very organic slightly gravelly TOPSOIL

Moisture Content %	
Bulk Density Mg/m³	1.75
Dry Density Mg/m³	1.29
Soaked Test	No

Test on	☐ TOP
Moisture Content %	35
Surcharge weight kg	
Penetration mm	2.5 5.0
Force kN	0.12 0.22
Corrected CBR %	0.90 1.1

Test on	☐ BOTTOM
Moisture Content %	36
Surcharge weight kg	
Penetration mm	2.5 5.0
Force kN	0.14 0.26
Corrected CBR %	1.1 1.3

Test on	TOP	BOTTOM
Reported CBR %	1.0	1.2
Mean CBR %	1.1	



Method of Preparation : The specimen was prepared by Dynamic compression using a 4.5 kg Rammer
BS 1377 PART 1:1990:7.6.1 General 1990:7.6.5 California bearing ratio test BS 1377 PART 4:1990:7.2 Preparation of test sample

Method of Test : BS 1377 PART 4:1990:7.4 Penetration test procedure

Remarks :

APPENDIX X

GEOTECHNICAL INFORMATION
PROPOSED NEW CARRIAGE SHED

START DATE 15/02/99

DRILLING METHOD CABLE PERCUSSION

EQUIPMENT DANDO 2000

RECORD OF BOREHOLE No: BH C2

CASING DETAILS 150 mm to 10.40 m
mm to m

SHEET 1 OF 2

BOREHOLE DIA: 150 mm to 15.00 m
mm to m

NATIONAL GRID CO-ORDINATES

E N
GROUND LEVEL 82.35 m O.D.

Date & Time	Casing Depth (m)	Depth to Water (m)	SAMPLE			U100 Blows	U100 Rec.(m)	DESCRIPTION OF STRATA	Depth (Thickness) (m)	Level (m O.D.)	Strata Symbol
			Depth (m) To From	Type	No.						
15/02			8.00 1.00	B	1			MADE GROUND: Black, fine to coarse ash sand and subangular fine to coarse gravel of ash and clinker with some silt.			
	NH	Dry	1.20 1.21	D B	3		S 2				
	1.70	Dry	2.20 2.21	D B	4		S 4	Below 2.20m, with a little clay.			
	3.10	Dry	3.20 3.21	D B	7 6		S 4				
	3.10	Dry	4.10 4.11	D B	9 8		S 5	At 4.10m, with a little subangular fine gravel of brick.			
	4.70	Dry	5.20 5.21	D B	11 10		S 8				
	6.10	Dry	6.50 6.60	D B	12 13		27				
			6.61 7.00	D B	15			Soft, light grey-brown, CLAY/SILT with some fine to coarse sand. <ALLUVIUM>	6.50	75.85	
	7.20	Damp	7.10 7.30	D B	14						
			7.31 7.80	D B 2W	17 16 18		S 50	Dense, grey, subrounded fine to coarse GRAVEL including sandstone and mudstone with a little clay and a little fine to coarse sand.	7.10	75.25	
	8.70	6.00	8.70 9.02	B	19		C 50				
			8.70 9.20	B	165						
	9.50	Damp	9.50 9.60	D U	20 21		120				
			10.05	D U	120		0.40	Very stiff, dark brown, CLAY with a little locally some fine to coarse sand and a little	9.50	72.85	

REMARKS: 1. Prior to boring, a Cable Avoidance Tool (CAT) survey was carried out. An inspection pit was hand-dug to 1.20m depth (1.0 hr) and resconned using the CAT to check for services. Services were not located.
 2. The borehole was observed as damp at 7.30m depth.
 3. Groundwater was encountered at 7.70m depth rising 4 mins, to 7.40m after 15 mins and to 7.30m after 20 mins.
 4. The borehole was advanced by chiselling techniques from 7.30m to 8.40m depth (0.25 hr).
 5. On completion of sampling, the borehole was backfilled to ground level with cement bentonite grout.

Logged by GL/kmh

Date 19/02

Checked by

SJR 23/02

Approved by

RJE 09/04

FOUNDATION
EXPLORATION
SERVICESBUCKLEY WELLS LOCOMOTIVE DEPOT,
BURY, LANCASHIRE

CONTRACT No. 4452

FIGURE: BHC2

START DATE 15/02/99
DRILLING METHOD: CABLE PERCUSSION
EQUIPMENT: DANDO 2000

RECORD OF BOREHOLE No: BH C2

CASING DETAILS: 150 mm to 10.40 m
mm to m

SHEET 2 OF 2

BOREHOLE DIA: 150 mm to 1500 m
mm to m

NATIONAL GRID CO-ORDINATES:
E N
GROUND LEVEL: 82.35 m O.D.

Date & Time	Casing Depth (m)	Depth to Water (m)	SAMPLE			U100 Blows	U100 Rec. (m)	DESCRIPTION OF STRATA	Depth (Thickness) (m)	Level (m O.D.)	Strata Symbol
			Depth (m) At/From To	Type	No.	Test Length (mm)	SPT Blows /N				
15/02			10.10	D	22			Subrounded fine and medium gravel including mudstone, sandstone and coal (GLACIAL DRIFT)			
	10.40	Dry	11.00 11.01	D B	24 23		S 42				
	10.40	Dry	12.50 12.90	U D	25 26	120	0.35		(5.50)		
	10.40	Dry	14.00 14.10	B D	27 28	295	S 50				
15/02	10.40	Dry						END OF BOREHOLE	15.00	67.35	

REMARKS:

SCALE 1:50

Logged by
GL/kmh

Date
19/02

Checked by
SJR

Date
23/02

Approved by
RJE

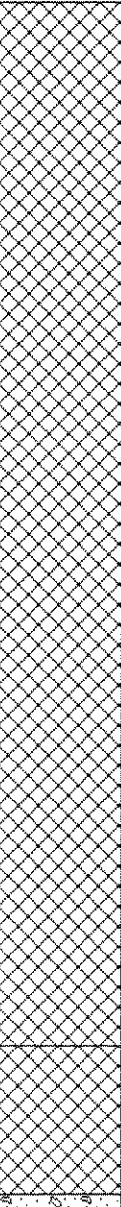
Date
09/04

FOUNDATION
& EXPLORATION
SERVICES

BUCKLEY WELLS LOCOMOTIVE DEPOT,
BURY, LANCASHIRE

CONTRACT No. 4452

FIGURE: BHC2

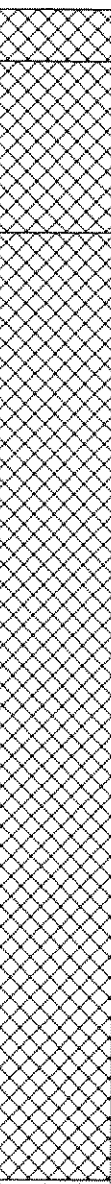
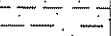
 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment Dando 130 Methods Cable Percussion Contractor P Blacklege				
Borehole No CP2		Client Bury MBC		Date 12.12.05			
Depth (m)	Description	Legend	Sample/Tests			Field Records	
			Depth	Sample			Results
				Type	No.		
0.00	Ground Surface						
0.00	MADE GROUND Black sandy soil ash and clinker (Drillers description)						
1.00							
2.00							
3.00							
4.00							
5.00							
6.00							
7.00							
8.00							
	MADE GROUND Balcksandy soil ash clinker and gravel (Drillers description).						
Remarks Seal from base to 8.0m, 50mm slotted pipe in gravel 1.0m. Plain pipe to GL. Seal to 0.2m, concrete to GL.						Logged by PB	
						Scale NTS	
						Sample taken at depth	

 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment Dando 130 Methods Cable Percussion Contractor P Blacklege
Borehole No CP2		Client Bury MBC	Date 12.12.05

Depth (m)	Description	Legend	Sample/Tests			Field Records	
			Depth	Sample			Results
				Type	No.		
	Medium dense orange brown SAND and fine to medium GRAVEL . (Drillers description).		8.0m	SPTc		1/2-2,2,3,3 N=10	Damp from 8.0 to 9.6m
9.00	Medium dense yellowish brown clayey SAND and medium to coarse GRAVEL (Drillers description).		9.0m	SPTc		2/3-4,5,5,6 N=20	
10.00	Very stiff brown mottled grey sandy CLAY (Drillers description).		10.0m	U100		81 blows for 350mm	
11.00		11.0m	SPT		6/7-9,11,11,13 N=45		
12.00		12.0m	SPT		6/8-9,11,10,15 N=45		
13.00		13.0m	U100		100 blows for 250mm		
14.00		14.0m	SPT		10/10-13,28,22-50ref		
15.00		15.0m	SPT		11/14-20,30-50ref		
16.00	End of Borehole						

Remarks Seal from base to 8.0m, 50mm slotted pipe in gravel 1.0m. Plain pipe to GL. Seal to 0.2m, concrete to GL.	Logged by PB
	Scale NTS
	Sample taken at depth

 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment Dando 130 Methods Cable Percussion Contractor P Blacklege		
Borehole No CP3		Client Bury MBC	Date 12.12.05		

Depth (m)	Description	Legend	Sample/Tests			Field Records	
			Depth	Sample			Results
				Type	No.		
0.00	Ground Surface						
	MADE GROUND Black coarse gravel. (Drillers description)						
1.00	MADE GROUND Black sandy soil ash clinker and gravel with clay inclusions (Drillers description).						
2.00	MADE GROUND Soft brown very sandy gravelly clay. (Drillers description).						
3.00							
4.00							
5.00							
6.00							
7.00							
8.00	Soft grey very sandy CLAY with occasional						

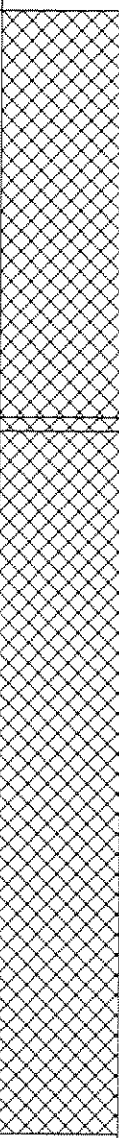
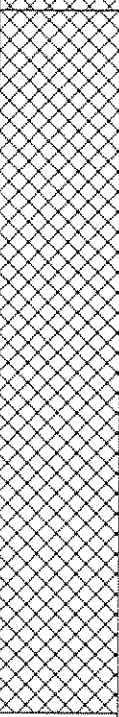
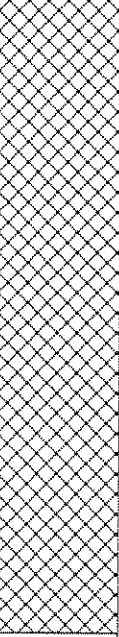
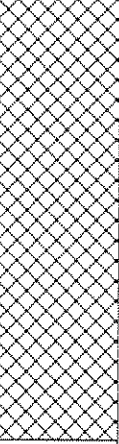
Remarks Seal from base to 7.5m, 50mm slotted pipe in gravel 1.0m. Plain pipe to GL. Seal to 0.2m, concrete to GL.	Logged by PB
	Scale NTS
	Sample taken at depth

 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment Dando 130 Methods Cable Percussion Contractor P Blacklege
Borehole No CP3		Client Bury MBC	Date 12.12.05

Depth (m)	Description	Legend	Sample/Tests			Field Records	
			Depth	Sample			Results
				Type	No.		
8.00			8.0m	SPT		1/2-2,2,2,2 N=8	Strike at 9.3m, rising to 9.0m, sealed at 11.0m
9.00			9.0m	U100		20 blows for 450mm	
10.00	Brown SAND and GRAVEL . (Drillers description).		10.0m	SPT		2/2-2,3,3,3 N=11	
11.00	Stiff light brown mottled red and yellow sandy CLAY . (Drillers description).		11.0m	SPT		0/10-13,17,19,23 N=7	
12.00			12.0m	U100		101 blows for 450mm	
13.00	End of Borehole						Strike at 12.5m, rising to 11.4m, not sealed
14.00							
15.00							
16.00							

Remarks Seal from base to 7.5m, 50mm slotted pipe in gravel 1.0m. Plain pipe to GL. Seal to 0.2m, concrete to GL	Logged by PB
	Scale NTS
	Sample taken at depth

 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment Auto Trip Drop Hammer Methods Window Sampling Contractor Mini Bore
Borehole No BH7		Client Bury MBC	Date 09.12.05

Depth (m)	Description	Legend	Sample/Tests			Field Records	
			Depth	Sample			Results
				Type	No.		
0.00	Ground Surface						
0.00	MADE GROUND Black coarse ash with much angular coarse gravel of clinker, coal and brick. Inclusions of brown fine sand. Becoming slightly clayey @ 1.7m-1.9m						
1.00							
2.00							
3.00	MADE GROUND Light to medium brown coarse sand and gravel with much gravel of brick and sandstone						
3.00							
4.00	MADE GROUND Black coarse ash with much angular coarse gravel of clinker, coal and brick. Inclusions of brown fine sand.						
4.00							
5.00							
6.00							
7.00							
8.00							
8.00	End of Borehole						

Well installed to 6.5m

Remarks	Logged by M Waddicor
	Scale NTS
	Sample taken at depth 0.60

[illegible]

[illegible]

PROJECT: BUCKLEY WELLS LOCOMOTIVE DEPOT, LOCATION: RURY, LANCASHIRE			METHOD OF EXCAVATION: MECHANICAL EXCAVATION			RECORD OF TRIAL PIT NO: TP 9		
CONTRACT NO.			SURFACE DIMENSIONS OF PIT: 0.80m x 1.50m			CO-ORDINATES: E. N.		
INSITU EXISTING			START DATE: 26/11/99... FINISH DATE: 26/11/1999			Sheet 1 of 1		
Depth (m)	Type	Result	DESCRIPTION OF STRATA			Thickness (m)	Depth (m)	Level (m.a.s.l.)
0.10	B		MADE GROUND: Grey, subangular coarse gravel of granite.			0.10	0.10	81.95
0.50	CD		MADE GROUND: Black, fine to coarse ash sand and subangular fine to coarse gravel of ash and clinker with some silt and a little subangular coarse gravel of granite with occasional rootlets.					
1.00	B							
1.50	CD							
2.00	CD							
2.50	CD							
3.00	CD							
3.30	CD		Brown, subrounded fine to coarse GRAVEL including mudstone with a little fine to coarse sand, some silt and a little clay.			3.20	78.85	
			END OF TRIAL PIT			3.60	78.45	

REMARKS: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out for services. Services were not located. 2. The presence of groundwater was not apparent during excavation. 3. The sides of the trial pit were unstable and collapsing below 1.50m depth. 4. On completion the trial pit was backfilled to ground level with compacted arisings.	PLAN		Scale 1:25
	Logged by: GL/kmh	Date: 26/01	FOUNDATION & EXPLORATION SERVICES
	Checked by: SJR	04/02	
	Approved by: RJE	09/04	TP9

START DATE 10/02/98	RECORD OF BOREHOLE No: BH C4	SHEET 1 OF 2
DRILLING METHOD CABLE PERCUSSION	CASING DETAILS: 150 mm to 13.80 m mm to m	NATIONAL GRID CO-ORDINATES: E..... N.....
EQUIPMENT DANDD 2000	BOREHOLE DIA: 150 mm to 14.00 m mm to m	GROUND LEVEL 82.15 m.O.D.

Date & Time	Casing Depth (m)	Depth to Water (m)	SAMPLE			U100 Blows	U100 Rec. (m)	DESCRIPTION OF STRATA	Depth (Thickness) (m)	Level (m.O.D.)	Strata Symbol
			Depth (m) At/From To	Type	No.						
10/02			0.50 1.00	B	1			MADE GROUND: Black, fine to coarse ash sand and subangular fine to coarse gravel of ash and clinker with some silt and occasional subangular fragments of pottery and burnt shale. Locally grading to sand with a little gravel.			
	Nil	Dry	1.20 1.21 1.65 1.70	D B	2 3		S 4				
	1.70	Dry	2.20 2.21 3.65 3.70	D B	4 5		S 4				
	3.00	Dry	3.20 3.21 3.65 3.70	D B	6 7		S 2				
	4.00	Dry	4.20 4.21 4.65 4.70	D B	8 9		S 4				
								(7.60)			
10/02 11/02	4.70 4.70 4.70	Dry Dry Dry	5.20 5.21 5.65 5.70	D B	10 11		S 7				
	6.10	Dry	6.70 6.71 7.15 7.20	D B	12 13		S 10				
								Below 7.00m; with occasional fragments of brick.			
	7.00	Dry	7.60 7.70 8.15 8.20	D U B	14 15 17	23		MADE GROUND: Firm, orange-brown, clay with some fine to coarse sand.	7.60 (0.60)	74.55	
	8.30	Dry	8.20 8.35 8.40 8.41 8.85 9.00	D B 2W	16 18 19 24		S 12	MADE GROUND: Orange-brown, fine and medium sand with a little silt and a little clay. At 8.40m; with occasional subangular coarse gravel of brick.	8.20	73.95	
								(2.10)			
	9.10	Dry	9.70 9.71 10.15 10.20	U B	20	18	0.25				
11/02											

REMARKS: 1. Prior to boring, a Cable Avoidance Tool (CAT) survey was carried out. An inspection pit was hand-dug to 1.20m depth (1.0 hr) and rescanned using the CAT to check for services. Services were not located.
 2. Groundwater was encountered at 11.00m depth rising to 8.75m after 5 mins, to 8.60m after 10 mins, to 8.45m after 15 mins and to 8.35m after 20 mins.
 3. The borehole was advanced by chiselling techniques from 13.40m to 13.45m depth (0.25 hr) and 13.85m to 14.00m depth (1.0 hr).

SCALE 1:50

Logged by JGL/kmh	Date 19/02
Checked by SJR	23/02
Approved by RJE	09/04

**FOUNDATION
& EXPLORATION
SERVICES**

BUCKLEY WELLS LOCOMOTIVE DEPOT,
BURY, LANCASHIRE

CONTRACT No. 4452

FIGURE: BHC4



Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

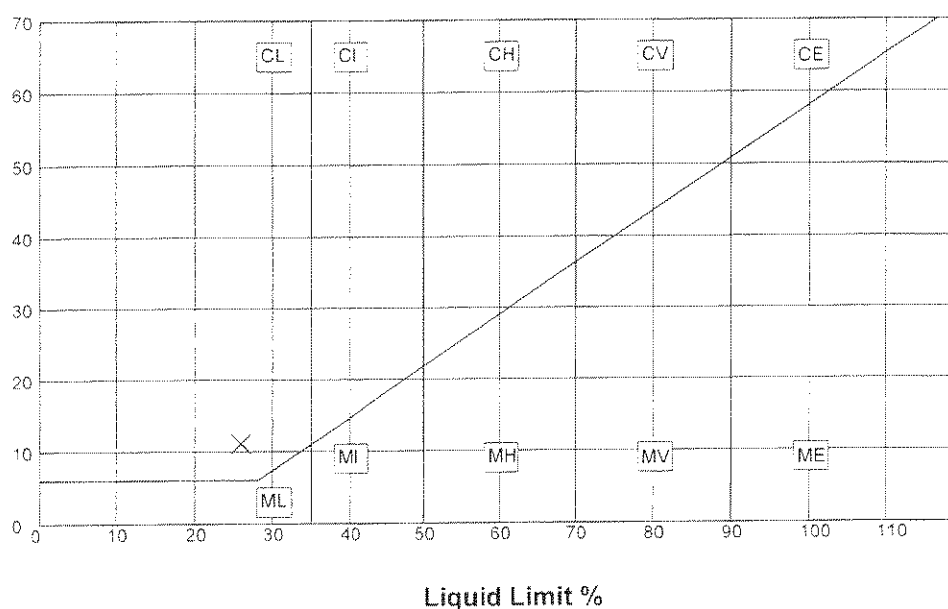
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Sheet

2 / 4

**DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT
AND DERIVATION OF PLASTICITY AND LIQUIDITY INDEX**

Borehole / Trial Pit	Depth (m)	Sample	Natural/ Sieved	Description
BH-02	11.00	B18	Natural	Brown gravelly CLAY. Gravel is coarse to fine

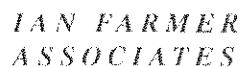
Plasticity
Index %Casagrande
Plasticity
Chart

Liquid Limit	26 %	Plastic Limit	15 %
Liquidity Index	-0.08	Plasticity Index	11 %
Natural Moisture Content	14 %	Classification	CL

Material Passing 425µm sieve			
Percentage passing	90 %	Corrected Moisture Content	14 %

Method of Preparation : BS 1377 PART 1:1990:7.4 Preparation of samples for classification tests BS 1377 PART 2:1990:4.2 & 5.2 Sample preparations

Method of Test : BS 1377:PART 2:1990:3 Determination of moisture content 1990:4 Determination of the liquid limit BS 1377 PART 2:1990:5 Determination of the plastic limit and plasticity index



Laboratory Test Results

Site : Buckley Wells Locomotive Works^ Bury

Job Number

4811

Client : Leyden Kirby Associates

Sheet

Engineer :

111

DETERMINATION OF EQUIVALENT SHEAR STRESS BY HAND VANE

Borehole/ Trial Pit	Depth (m)	Sample	Type	Location	Readings	Equivalent Shear Stress kN/m²	Description
BH-02	13.00	U23		Top	4.00 4.00 4.00	98	Stiff grey gravelly CLAY

Method of Preparation :

Method of Test :

Remarks :



IAN FARMER
ASSOCIATES

Laboratory Test Results

Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

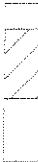
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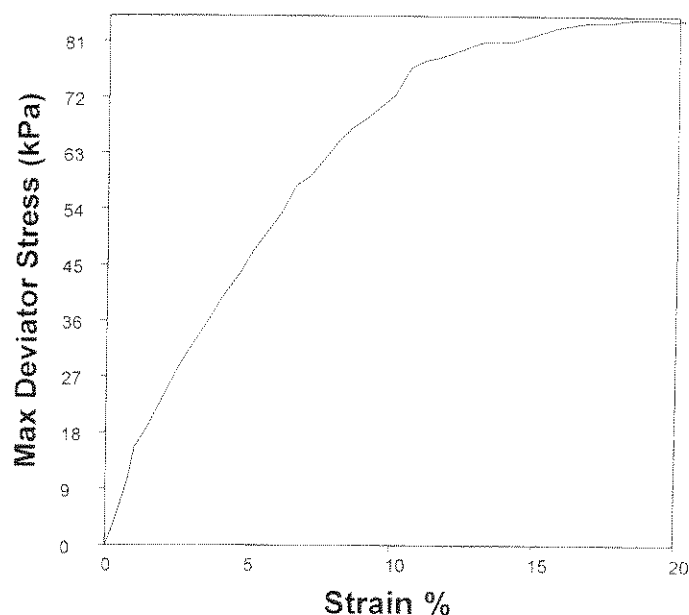
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1 / 1

DETERMINATION OF DENSITY, MOISTURE CONTENT AND UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT THE MEASUREMENT OF PORE PRESSURE

Borehole / Trial Pit	Depth (m)	Sample	Description
BH-03	9.00	U10	Soft brown very sandy CLAY

Initial Specimen		Length of Sample (mm)		450	
		Depth from top of sample (mm)		30	
		Condition of Sample:		Undisturbed	
		Orientation:		Vertical	
Test Type			Multistage		
Length of Specimen (mm)			197.6		
Diameter of Specimen (mm)			102.9		
Moisture Content (%)			27		
Bulk Density (Mg/m³)			2.11		
Dry Density (Mg/m³)			1.66		
Membrane Thickness (mm)			0.2		
Membrane Type			Latex		
Rate of Strain (%/min)			1.52		
Test Results	Measured Cell Pressure (kPa)		90	180	360
	Strain at Failure (%)		6.1	10.1	19.2
	Membrane Correction (kPa)		0.3	0.4	0.7
	Corrected Deviator Stress (kPa)		53	72	84
	Shear Stress (kPa)		27	36	42
	Mode of Failure (B/P/C)		Plastic		



Method of Preparation : BS 1377 PART 1 1990:7 4.2 Moisture content 1990: Preparation of undisturbed samples for testing BS 1377 PART 2:1990:7 2

Method of Test : BS 1377:PART 2:1990:3 Determination of moisture content 1990:7 Determination of density BS 1377 PART 7 1990:8 Undrained shear strength 1990:9 Multistage loading

Remarks : Membrane Type: Latex



Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

4811

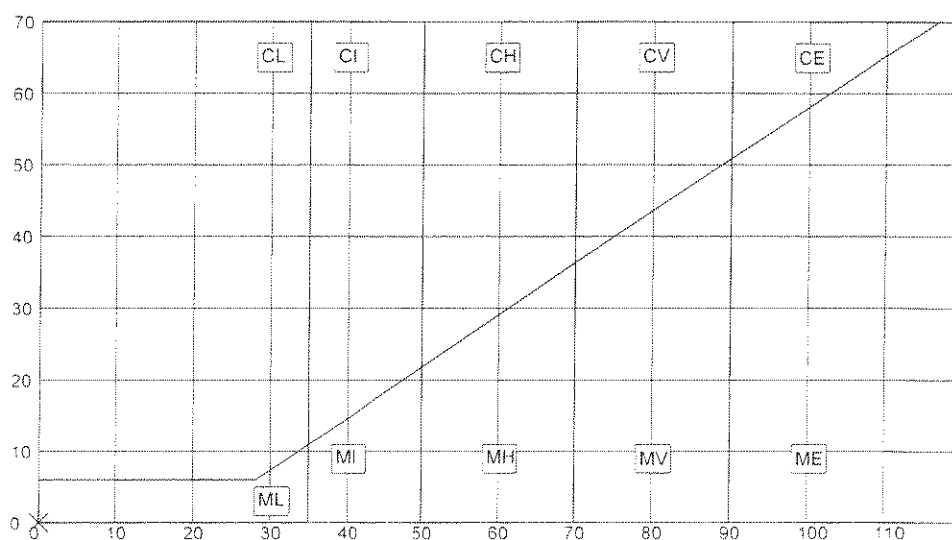
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3 / 4

**DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT
AND DERIVATION OF PLASTICITY AND LIQUIDITY INDEX**

Borehole / Trial Pit	Depth (m)	Sample	Natural/ Sieved	Description
BH-03	10.00	B12	Natural	Brown gravelly CLAY. Gravel is fine to medium

Plasticity
Index %



Casagrande
Plasticity
Chart

Liquid Limit %

Liquid Limit	0 %	Plastic Limit	0 %
Liquidity Index	0.00	Plasticity Index	0 %
Natural Moisture Content	15 %	Classification	

Material Passing 425µm sieve			
Percentage passing	15 %	Corrected Moisture Content	74 %

Method of Preparation : BS 1377 PART 1:1990:7.4 Preparation of samples for classification tests BS 1377:PART 2:1990:4.2 & 5.2 Sample preparations

Method of Test : BS 1377:PART 2:1990:3 Determination of moisture content 1990:4 Determination of the liquid limit BS 1377:PART 2:1990:5 Determination of the plastic limit and plasticity index



Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

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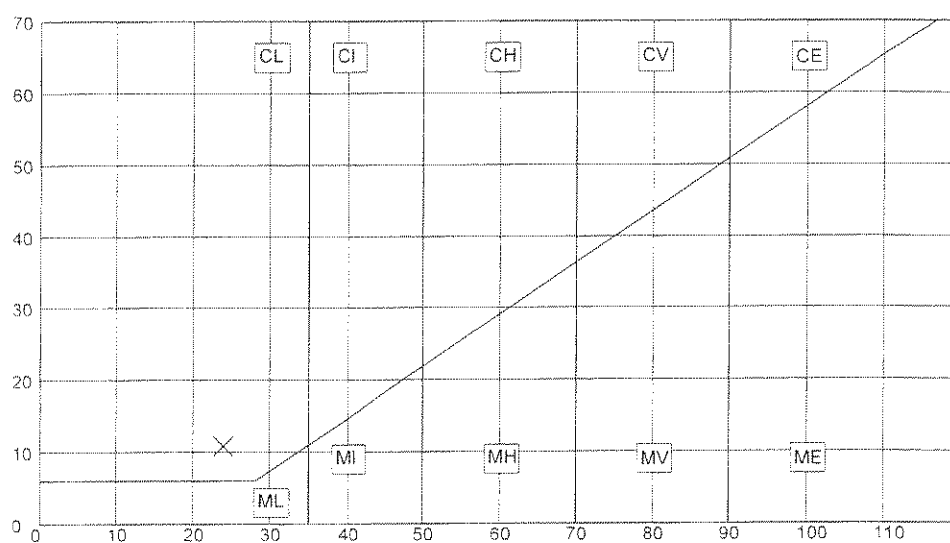
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4 / 4

DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT
AND DERIVATION OF PLASTICITY AND LIQUIDITY INDEX

Borehole / Trial Pit	Depth (m)	Sample	Natural/ Sieved	Description
BH-03	12.50	D16	Natural	Brown gravelly CLAY. Gravel is fine to medium

Plasticity
Index %



Casagrande
Plasticity
Chart

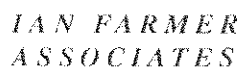
Liquid Limit %

Liquid Limit	24 %	Plastic Limit	13 %
Liquidity Index	0.91	Plasticity Index	11 %
Natural Moisture Content	14 %	Classification	CL

Material Passing 425µm sieve			
Percentage passing	51 %	Corrected Moisture Content	23 %

Method of Preparation : BS 1377:PART 1:1990:7.4 Preparation of samples for classification tests BS 1377:PART 2:1990:4.2 & 5.2 Sample preparations

Method of Test : BS 1377:PART 2:1990:3 Determination of moisture content 1990:4 Determination of the liquid limit BS 1377:PART 2:1990:5 Determination of the plastic limit and plasticity index



Site : Buckley Wells Locomotive Works^ Bury
Client : Leyden Kirby Associates

Job Number
4811

Sheet
1 / 1

DETERMINATION OF MOISTURE CONTENT / BULK DENSITY / DRY DENSITY

Borehole/ Trial Pit	Depth (m)	Sample	Moisture Content %	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Description
BH-01	9.20	U18	21	1.54	1.28	Grey brown SAND with occasional cobbles
BH-02	10.00	U14	12	1.8	1.62	Brown gravelly CLAY. Gravel is fine to coarse
BH-02	13.00	U23	10	2.66	2.42	Stiff grey gravelly CLAY
BH-03	12.00	U15	22	2.29	1.88	Brown very sandy CLAY

Method of Preparation: BS 1377:PART 1:1990:8.2.8.3.8.4

Method of Test : BS 1377-PART 2-1990-7 Determination of Density

Remarks :



Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

4811

Sheet

1 / 1

**DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT
AND DERIVATION OF PLASTICITY AND LIQUIDITY INDEX**

Borehole/ Trial Pit	Depth (m)	Sample	Natural / Sieved	Natural Moisture Content %	Sample Passing 425µm Sieve		Liquid Limit %	Plastic Limit %	Plasticity Index %	Liquidity Index	Class	Description
					Percentage %	Moisture Content %						
BH-01	9.20	U18	Natural	20								Grey brown SAND with occasional cobbles
BH-01	9.70	D19	Natural	25	100	25		NP				Grey SILT
BH-02	10.00	U14	Natural	12								Brown gravelly CLAY Gravel is fine to coarse
BH-02	11.00	B18	Natural	14	90	14	26	15	11	-0.08	CL	Brown gravelly CLAY Gravel is coarse to fine
BH-02	13.00	U23	Natural	9.8								Stiff grey gravelly CLAY
BH-03	9.00	U10	Natural	27								Soft brown very sandy CLAY
BH-03	10.00	B12	Natural	15	15	74		NP				Brown gravelly CLAY Gravel is fine to medium
BH-03	12.00	U15	Natural	22								Brown very sandy CLAY
BH-03	12.50	D16	Natural	14	51	23	24	13	11	0.91	CL	Brown gravelly CLAY Gravel is fine to medium

Method of Preparation : BS 1377 PART 1:1990:7.4 Preparation of samples for classification tests BS 1377 PART 2:1990 4.2 & 5.2 Sample preparations

Method of Test : BS 1377 PART 2:1990:3 Determination of moisture content 1990 4 Determination of the liquid limit BS 1377 PART 2:1990 5 Determination of the plastic limit and plasticity index

Remarks :



Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

4811

Sheet

1 / 1

DETERMINATION OF NATURAL MOISTURE CONTENT

Borehole/ Trial Pit	Depth (m)	Sample	Moisture Content %	Description
BH-01	9.20	U18	21	Grey brown SAND with occasional cobbles
BH-01	9.70	D19	25	Grey SILT
BH-02	10.00	U14	12	Brown gravelly CLAY. Gravel is fine to coarse
BH-02	11.00	B18	14	Brown gravelly CLAY. Gravel is coarse to fine
BH-02	13.00	U23	9.8	Stiff grey gravelly CLAY
BH-03	9.00	U10	27	Soft brown very sandy CLAY
BH-03	10.00	B12	15	Brown gravelly CLAY. Gravel is fine to medium
BH-03	12.00	U15	22	Brown very sandy CLAY
BH-03	12.50	D16	14	Brown gravelly CLAY. Gravel is fine to medium
WS-BH1	1.50	B1	8.1	Brown gravelly SAND Gravel is fine to medium

Method of Preparation : BS 1377 PART 1:1990 7.4 Preparation of samples for classification tests BS 1377 PART 2:1990 4.2 & 5.2 Sample preparations

Method of Test : BS 1377 PART 2:1990 3.2 Determination of moisture content

Remarks :



Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

4811

Sheet

1 / 1

DETERMINATION OF THE pH VALUE AND THE SULPHATE CONTENT OF SOIL AND GROUNDWATER

Borehole/ Trial Pit	Depth (m)	Sample	Concentration of Soluble Sulphate			Percentage of sample passing 2mm Sieve %	pH	Description
			Total S04 %	S04 in 2:1 water:soil g/l	Groundwater g/l			
BH-01	3.00	B7		0.1		89	7.5	Brown slightly gravelly sandy CLAY
BH-01	7.00	B14		0.2		77	6.8	Brown slightly gravelly sandy CLAY
BH-01	9.20	U18		<0.1		87	6.9	Grey brown SAND with occasional cobbles
BH-02	1.00	B2		0.2		70	7.2	Brown sandy gravelly CLAY with traces of silt. Gravel is fine to coarse
BH-02	8.00	B10		0.1		89	7.2	Brown gravelly CLAY. Gravel is fine to coarse
BH-02	10.00	U14		<0.1		81	5.1	Brown gravelly CLAY. Gravel is fine to coarse
BH-03	5.00	B5		0.1		87	7.0	Brown very sandy CLAY
BH-03	9.00	U10		0.1		94	6.1	Soft brown very sandy CLAY
BH-03	10.00	B12		0.1		90	6.4	Brown gravelly CLAY. Gravel is fine to medium
BH-03	12.00	U15		<0.1		94	6.2	Brown very sandy CLAY
WS-BH1	1.50	B1		<0.1		83	6.8	Brown gravelly SAND. Gravel is fine to medium
WS-BH1	2.50	B2		<0.1		85	7.1	Brown sandy GRAVEL with traces of silt

Method of Preparation : BS 1377 PART 1:1990:7.5 Preparation of soil for chemical tests BS 1377 PART 3:1990:5.2, 5.3, 5.4 & 9.4

Method of Test : BS 1377 PART 3:1990:5 Determination of the sulphate content of soil and ground water BS 1377:PART 3:1990:9 Determination of the pH value

Remarks :

SUMMARY OF SOIL CLASSIFICATION TESTS

BS 1377: Part 2: 1990

Hole	Type	Depth	Sample No.	Classification Tests							Method	Description
				Bulk Density (Mg/m ³)	Moisture Content (%)	Dry Density (Mg/m ³)	Particle density (Mg/m ³)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% passing 425 μ m	
BHC1A	U	5.80	6				2.61					Brown CLAY with a little sand and a little gravel
BHC1A	D	6.30	7		15			36	18	18	86	Brown CLAY with a little sand and a little gravel
BHC1A	U	3.70	10		11							Grey CLAY with a little sand and a little gravel
BHC2	U	6.60	13				2.63					Brown CLAY with a little sand and a little gravel
BHC2	B	6.60	15		37			35	23	12	90	Brown CLAY/SILT with a little sand and a little gravel
BHC2	B	8.70	19		17			31	21	10	27	Brown green CLAY/SILT with some gravel and a little sand
BHC2	D	9.50	20		10							Brown CLAY with a little sand and a little gravel

Input by MB

Checked by

Date 01/04/1999

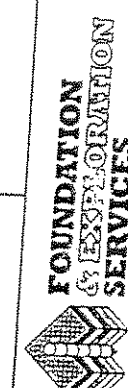
Project

BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE

Contract No 4452

Figure No

LT1/1



SUMMARY OF SOIL CLASSIFICATION TESTS

BS 1377: Part 2: 1990

Hole	Type	Depth	Sample No.	Classification Tests							Method	Description
				Bulk Density (Mg/m ³)	Moisture Content (%)	Dry Density (Mg/m ³)	Particle Density (Mg/m ³)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% passing 425 µm	
BHC2	D	10.10	22		11							Brown CLAY with some gravel and a little sand
BHC2	B	11.00	23		17			23	15	8	73	Brown CLAY with a little sand and a little gravel
BHC2	U	12.50	25		11							Brown CLAY with a little sand and a little gravel
BHC2	D	12.90	26		17			22	16	6	78	Brown CLAY/SILT with a little sand and a little gravel
BHC3	B	4.40	9		25			31	18	13	64	Grey CLAY with a little sand and a little gravel
BHC3	D	5.00	11		13			40	27	13	90	Brown CLAY with a little sand and a little gravel
BHC4	D	7.60	14		27							Brown CLAY/SILT with a little sand and a little gravel

Input by MB

Date

01/04/1999

Checked by

Date

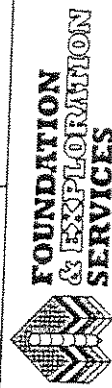
01/04/1999

Project

BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE

Contract No
4452

Figure No
LT1/2



SUMMARY OF SOIL CLASSIFICATION TESTS

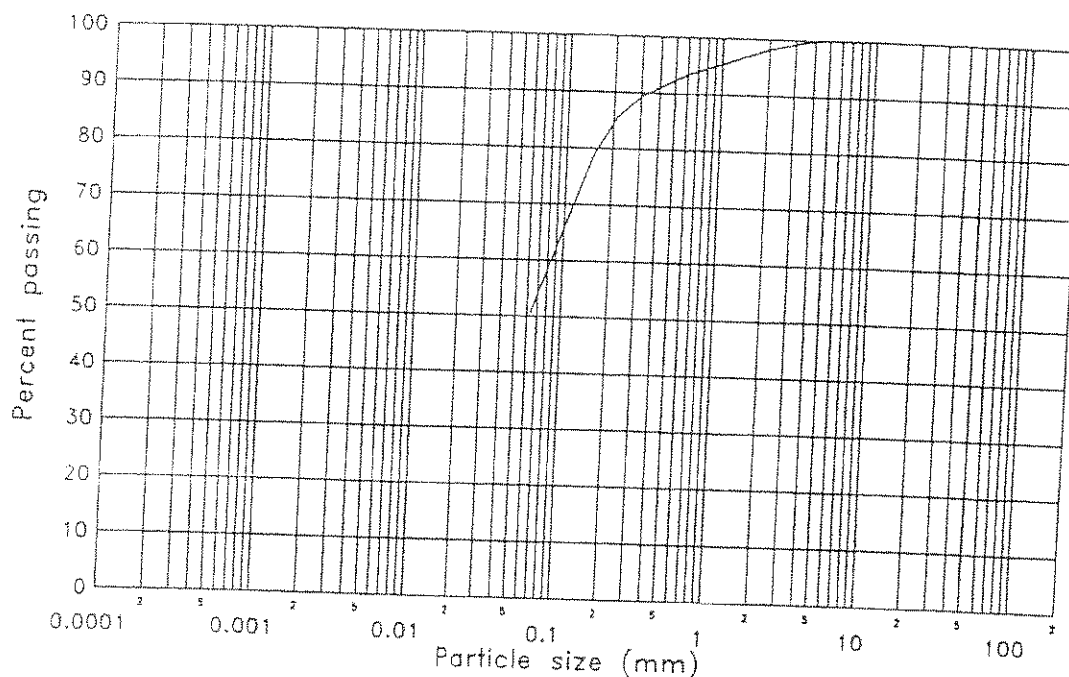
BS 1377: Part 2: 1990

SUMMARY OF SOIL CLASSIFICATION TESTS													
BS 1377: Part 2: 1990													
Hole	Type	Depth	Sample No.	Classification Tests								Method	Description
				Bulk Density (Mg/m ³)	Moisture Content (%)	Dry Density (Mg/m ³)	Particle Density (Mg/m ³)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% passing 425 µm		
BHC4	D	8.20	16		30			33	24	9	100	AR	Brown CLAY/SILT with a little sand
BHC4	B	12.70	29		14			25	17	8	37	WS	Brown CLAY with some gravel and a little sand
BHC5	D	5.90	12		17			29	18	11	78	HP	Brown CLAY with a little sand and a little gravel
BHC5	D	7.80	16		22			35	24	11	98	HP	Brown CLAY/SILT with a little sand and a little gravel
BHC5	D	12.50	26		13			23	16	7	70	HP	Brown CLAY/SILT with a little sand and a little gravel
BHG1	D	2.80	5		11			23	14	9	82	HP	Brown CLAY with a little sand and a little gravel
BHG1	D	5.70	12		17			38	20	18	86	HP	Brown CLAY with a little sand and a little gravel
Input by MB				Date	01/04/1999	Checked by	Date		01/04/1999				
Project				BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE									
FOUNDATION & EXPLORATION SERVICES				Contract No 4452									
				Figure No LT11/3									
				102/02									

PARTICLE SIZE DISTRIBUTION

B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: BHC2	Sample No: 15	Sample Type: B	Depth: 6.60



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

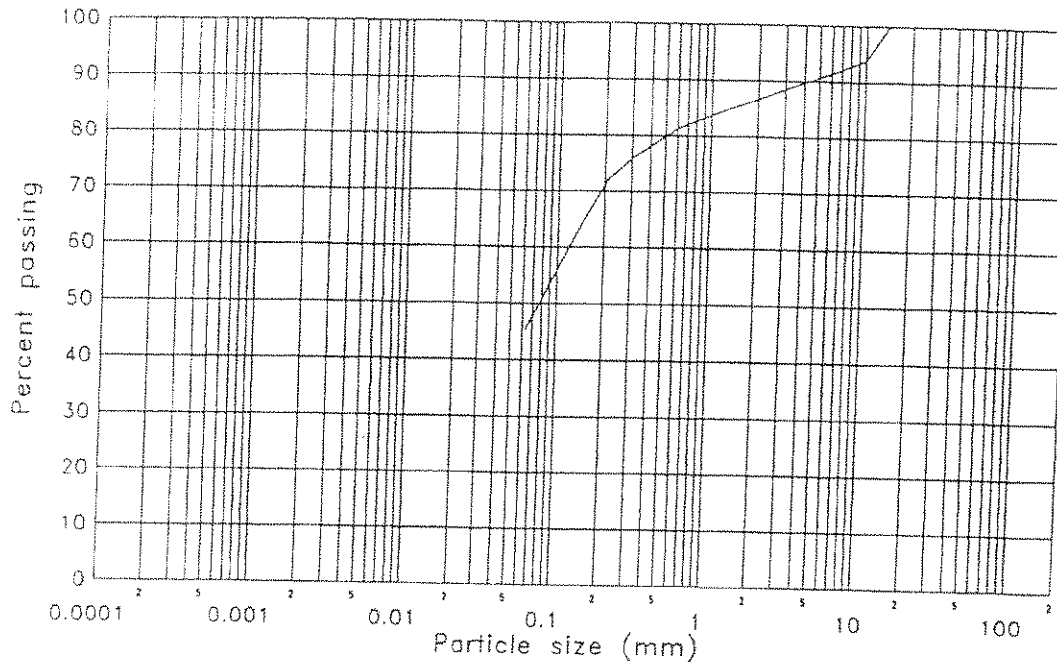
%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	51	47	2	0
Loss on Pretreatment:	Not Applicable		Description Brown black CLAY with some sand and a little gravel	
Test Date:	08/03/1999			
Uniformity Coefficient:	3.4			

	Input by: <i>AB</i>	Date: 10/03/1999	Checked by: <i>[Signature]</i>	Date: 26.3.99	
FOUNDATION & EXPLORATION SERVICES	Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No
					4452
					LT2/ 3
105/03					

PARTICLE SIZE DISTRIBUTION

B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: BHC2	Sample No: 23	Sample Type: 8	Depth: 11.00



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

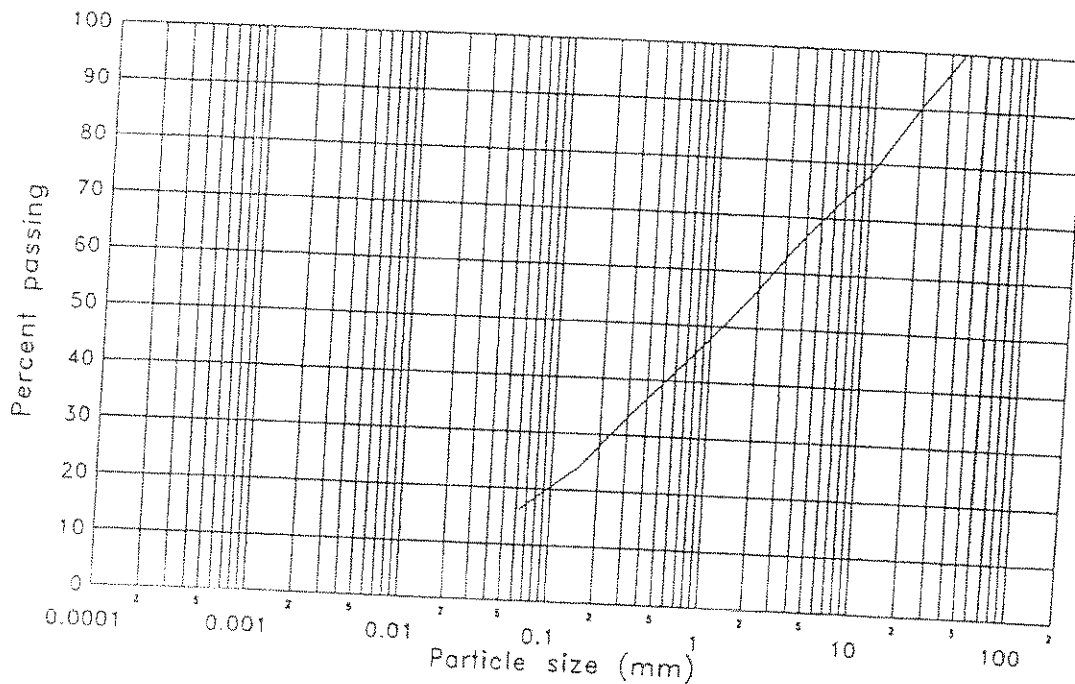
%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	45	42	13	0
Loss on Pretreatment:	Not Applicable		Description Brown CLAY with some sand and a little gravel	
Test Date:	08/03/1999			
Uniformity Coefficient:	4.6			

	Input by <i>MR</i>	Date 10/03/1999	Checked by <i>[Signature]</i>	Date <i>26.3.99</i>		
 FOUNDATION & EXPLORATION SERVICES	Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452	
					Figure No LT2/ 4	
	105/03					

PARTICLE SIZE DISTRIBUTION

B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: BHC4	Sample No: 2	Sample Type: B	Depth: 1.20



CLAY	FINE			MEDIUM			COARSE			SAND			GRAVEL			COBBLES

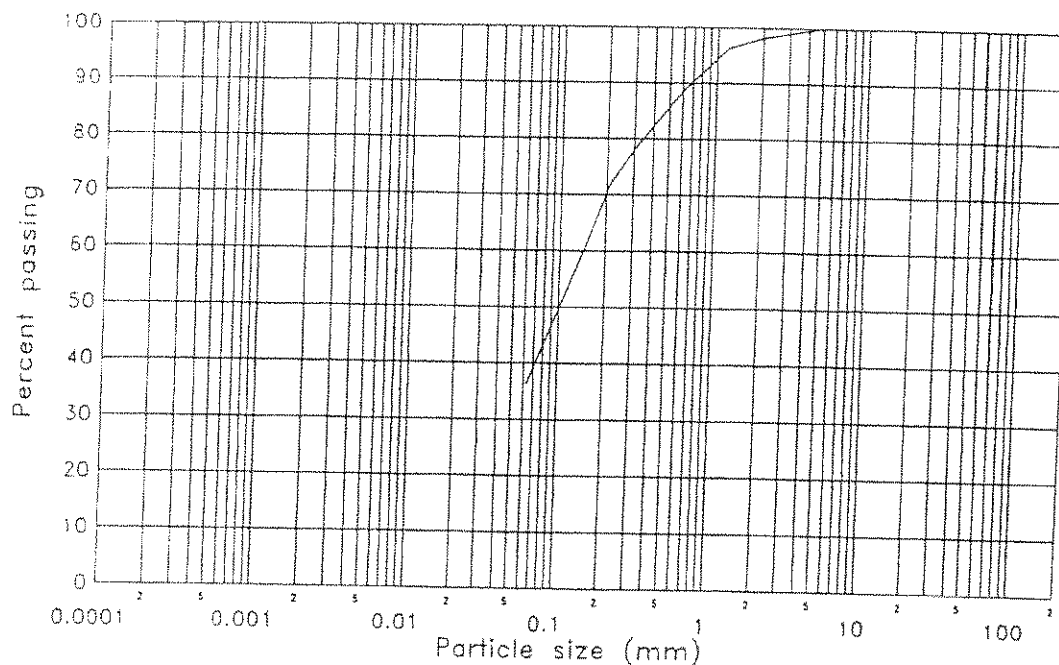
SUMMARY

%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	16	41	43	0
Loss on Pretreatment:	Not Applicable		Description Brown SAND and GRAVEL with some silt	
Test Date:	19/03/1999			
Uniformity Coefficient:	61.6			

		Input by: <i>IR</i>	Date: 21/03/1999	Checked by: <i>[Signature]</i>	Date: 26/3/99	
FOUNDATION & EXPLORATION SERVICES		Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452
						Figure No LT2/ 7

PARTICLE SIZE DISTRIBUTION B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: BHC4	Sample No: 22	Sample Type: B	Depth: 10.40



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

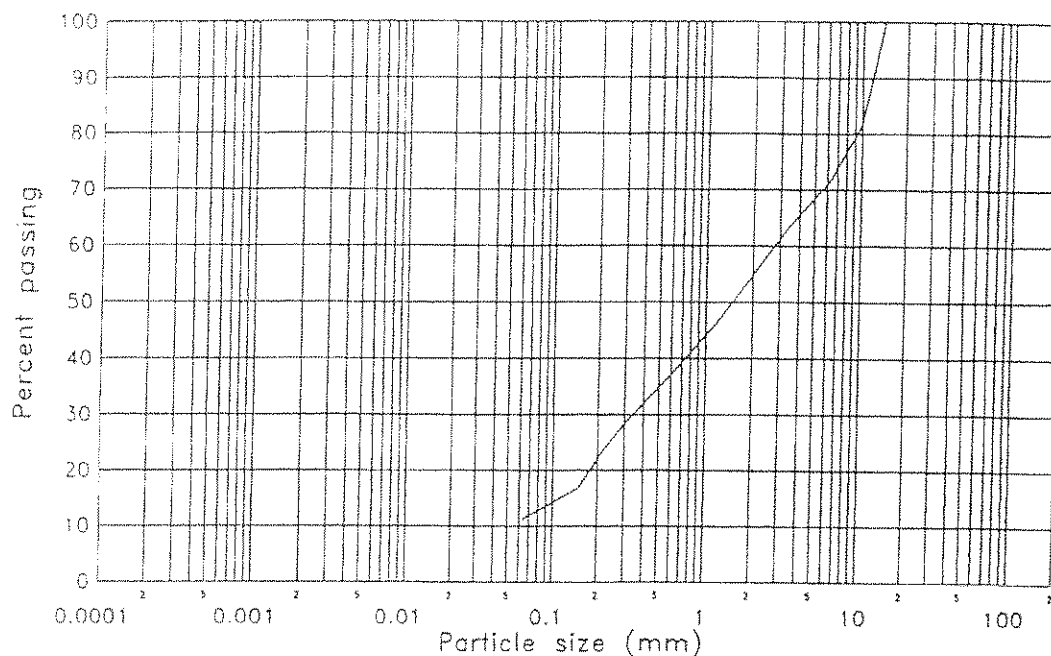
%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	36	62	2	0
Loss on Pretreatment:	Not Applicable		Description Brown SAND with much silt and a little gravel	
Test Date:	19/03/1999			
Uniformity Coefficient:	5.2			

	Input by	MB	Date	21/03/1999	Checked by	[Signature]	Date	26.3.99
	Project							Contract No
	BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE							4452
							Figure No	LT2/ 8

PARTICLE SIZE DISTRIBUTION

B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: TP8	Sample No: 3	Sample Type: B	Depth: 1.30



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

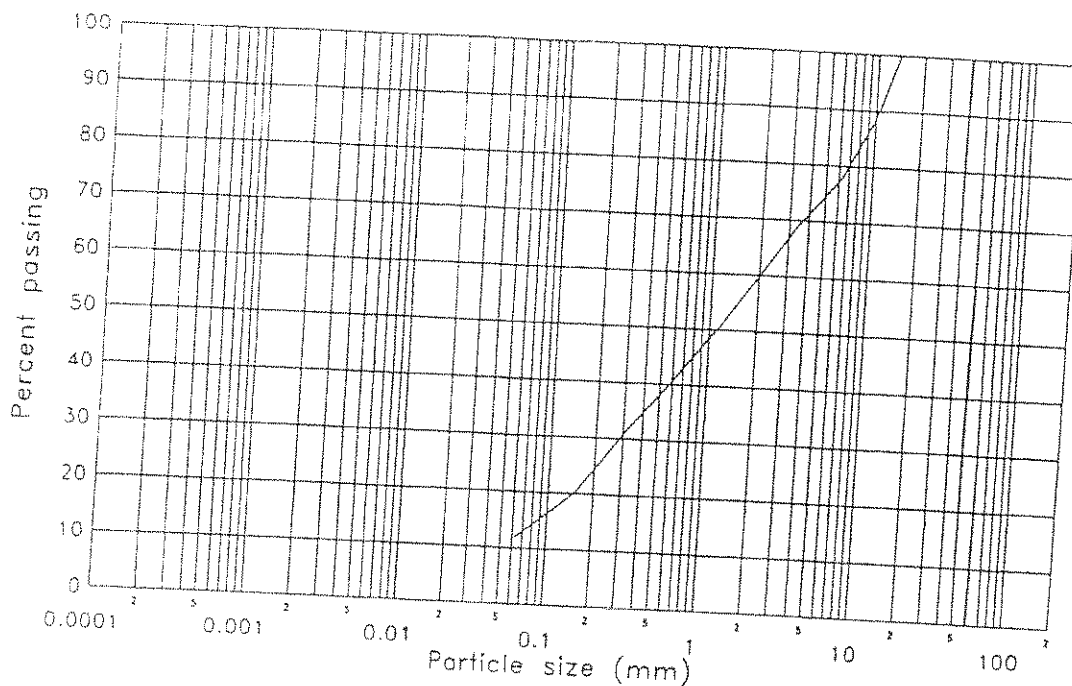
%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	11	44	45	0
Loss on Pretreatment:	Not Applicable		Description Brown SAND and GRAVEL with some silt	
Test Date:	08/03/1999			
Uniformity Coefficient:	49.7			

		Input by <i>MB</i>	Date 10/03/1999	Checked by <i>[Signature]</i>	Date 26.3.99	
FOUNDATION & EXPLORATION SERVICES		Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452
						Figure No LT2/28

PARTICLE SIZE DISTRIBUTION

B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: TP9	Sample No: 3	Sample Type: B	Depth: 1.00



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	12	48	40	0
Loss on Pretreatment:	Not Applicable		Description Brown SAND and GRAVEL with much silt	
Test Date:	19/03/1999			
Uniformity Coefficient:	39.1			

FOUNDATION & EXPLORATION SERVICES	Input by: MB	Date: 21/03/1999	Checked by: [Signature]	Date: 26.3.99	
	Project: BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No: 4452
					Figure No: LT2/ 29

DETERMINATION OF THE ONE - DIMENSIONAL CONSOLIDATION PROPERTIES

BS 1377 : Part 5 : 1990. Method 3

Borehole/Sample No : BHC2 / 13

Date : March 1999

Sample Depth (m) : 6.60 - 7.05

Specimen Depth (m) : 6.64

Specimen Details

Sample Type : U100

Sample Axis Orientation : Vertical

Sample Description : Brown CLAY with a little sand

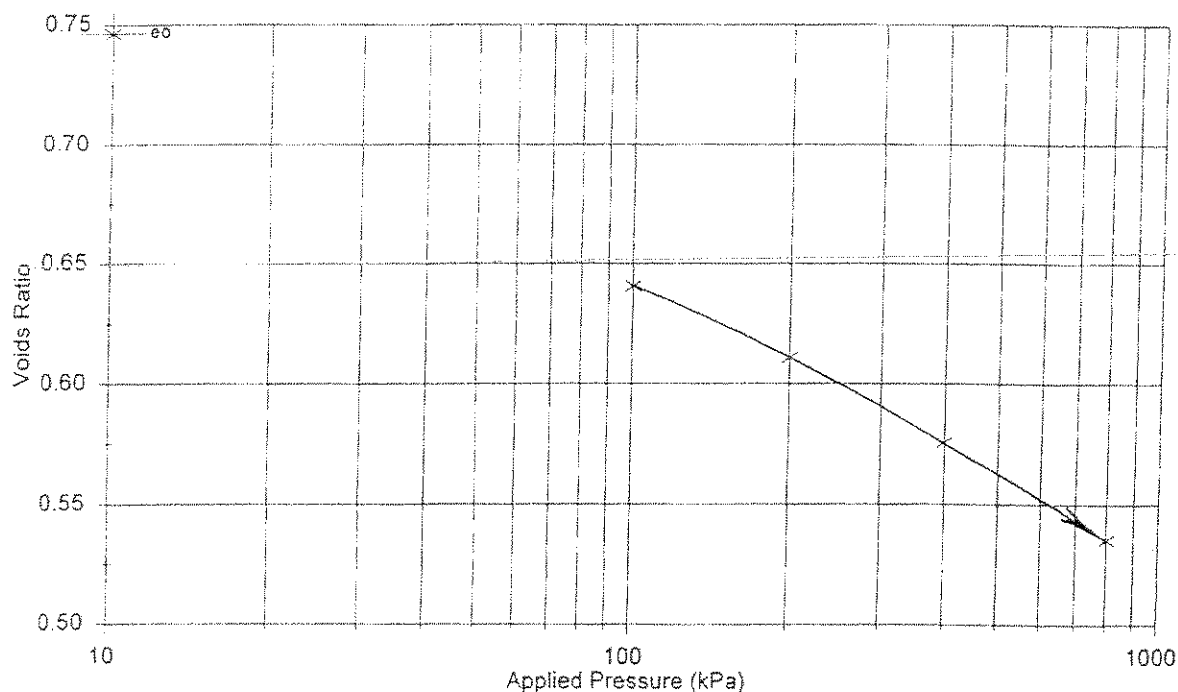
Preparation Method : Extruded and hand trimmed

Test Temperature (°C) : 19.5

INITIAL PROPERTIES	Sample Height	mm	18.93	Pressure	Mv	Cv (ROOT)
	Sample Diameter	mm	74.94	Range (kPa)	(m²/MN)	(m²/year)
	Moisture Content	%	33	2 - 100	0.62	10
	Bulk Density	Mg/m³	2.00	100 - 200	0.18	6.5
	Dry Density	Mg/m³	1.51	200 - 400	0.11	23
	Particle Density (measured)	Mg/m³	2.63	400 - 800	0.064	26
	Voids Ratio		0.7466			
	Degree of Saturation	%	115			
	Swelling Pressure	kPa	-----			
FINAL PROPERTIES	Moisture Content	%	24			
	Voids Ratio		0.5353			

Variation from BS 1377 and reason :

Remarks on testing :



Prepared By		Date	16.3.99	Approved By	For Contractor	Date	For Engineer	Date
Checked By		Date	29.3.99					

**FOUNDATION
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SERVICES**

BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE

CONTRACT : M4452

FIGURE: LT4/2

SUMMARY OF UNDRAINED SHEAR STRENGTH TESTS IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF POREWATER PRESSURE

BS 1377: Part 7: 1990: Tests 8 & 9

Specimen Details										Undrained Triaxial Compression Results (Total Stress)									
Hole	Type	Depth	Sample No	Specimen Depth mm	Test Type	Preparation	Dimensions mm	w %	γ_b Mg/m ³	γ_d Mg/m ³	Rate of Strain %/min	Membrane Thickness mm	Cell Pressure kPa	Membrane Correction kPa	Maximum Deviator Stress kPa	Failure Strain %	Mode of Failure	Cohesion (Avg) kPa	Description
BHC1A	U	5.80	6	180	UU	U	199, 103	17	2.18	1.87	2.00	0.24	110.0	0.90	253	19.60	C	127	Stiff brown CLAY with a little sand and a little gravel
BHC2	U	6.60	13	90	UU	U	198, 101	26	2.04	1.62	1.51	0.24	120.0	0.78	73	15.60	P	37	Soft brown CLAY with some silt and a little sand
BHC2	U	9.60	21	50	UU	U	179, 102	12	2.27	2.03	2.23	0.24	190.0	0.90	746	19.50	C	373	Hard brown CLAY with a little sand and a little gravel
BHC4	U	7.70	15	90	UU	U	196, 103	26	1.98	1.57	1.53	0.24	150.0	0.92	53	19.90	C	27	Soft brown CLAY with a little sand and a little gravel
BHC4	U	12.50	27	10	UU	U	154, 102	11	2.28	2.05	2.58	0.24	250.0	0.92	531	20.10	C	266	Very stiff brown CLAY with a little sand and a little gravel Short specimen tested
BHC5	U	8.00	17	30	UU	U	179, 102	27	1.96	1.54	2.23	0.24	150.0	0.92	52	20.10	C	26	Soft brown CLAY with a little sand and a little gravel

Key: Preparation: REM - remoulded
U - undisturbed

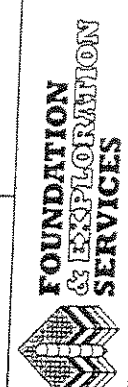
Test Type: UU - unconsolidated undrained
UUM - unconsolidated undrained multistage

Input by MB Date 29/03/1999

Mode of Failure: B - Brittle C - Combined
P - Plastic

Checked by [Signature] Date 29/03/1999

* Latex Membranes used



BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY,
LANCASHIRE

Contract No
4452

Figure No
LT15/1

DETERMINATION OF THE SHEAR STRENGTH BY DIRECT SHEAR

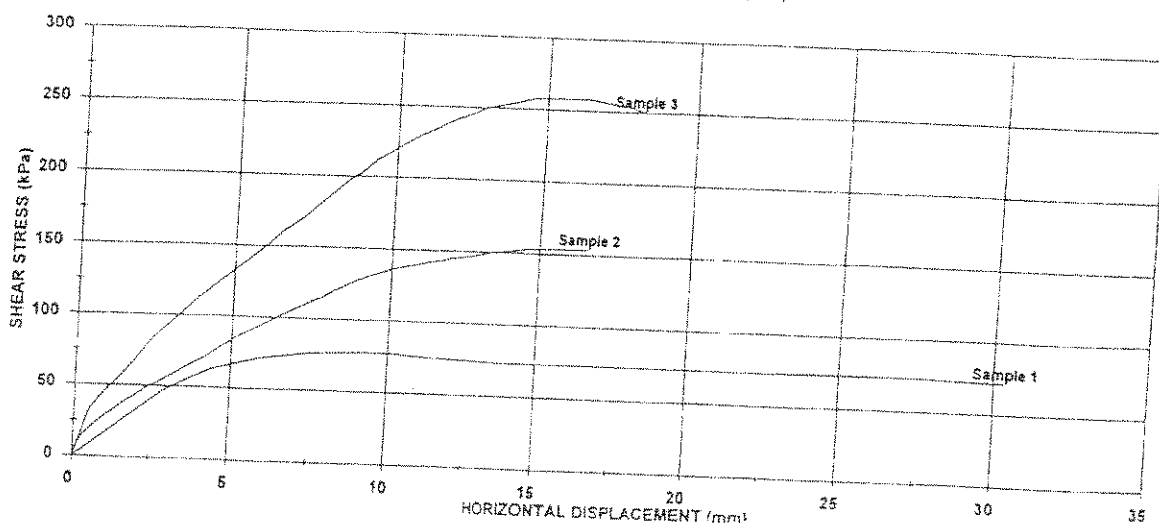
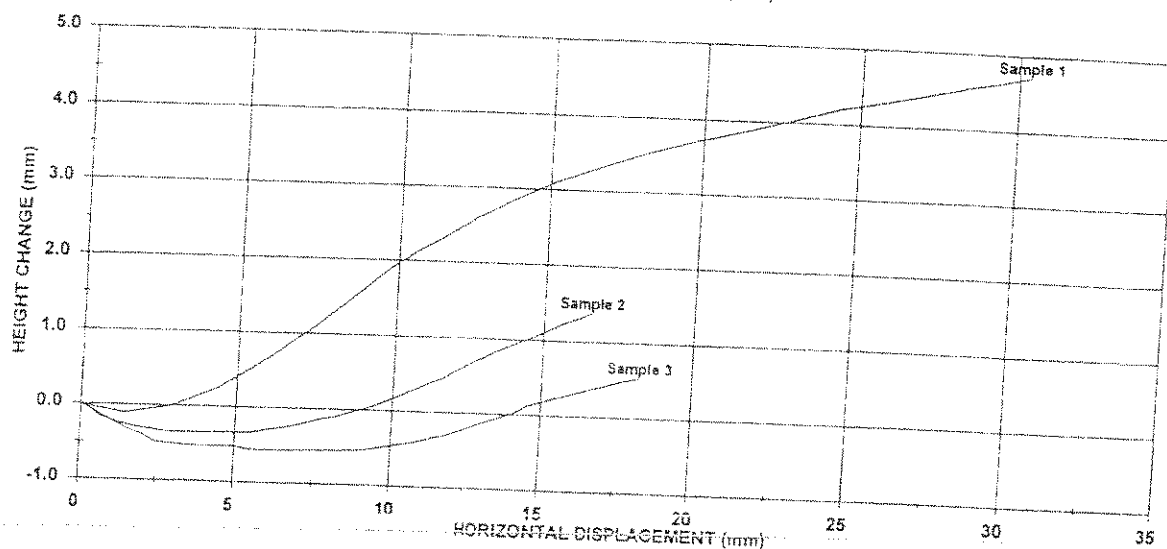
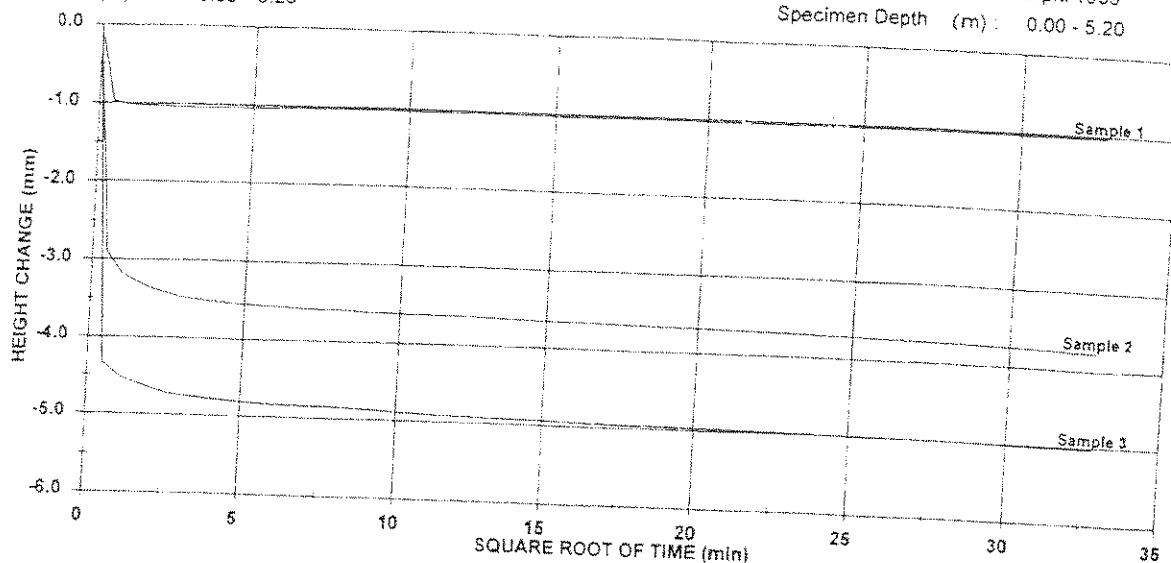
Large Shear Box Apparatus : BS 1377 : Part 7 : 1990 : Method 5

Borehole/Sample No. BH C2 / 1, 2, 4, 6, 8 and 10 Combined

Date April 1999

Sample Depth (m) 0.00 - 5.20

Specimen Depth (m) 0.00 - 5.20



Prepared By	D Hill	Date	23/04/99	Approved By		For Contractor	Site	For Engineer	Date
Checked By	AP [Signature]	Date	23/04/99						



**FOUNDATION
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SERVICES**

BUCKLEY WELLS, BURY

CONTRACT M4452

FIGURE LT6/1

DETERMINATION OF THE SHEAR STRENGTH BY DIRECT SHEAR

Large Shearbox Apparatus : BS 1377 : Part 7 : 1990. Method 5

Borehole/Sample Nos. : BH C2 / 1, 2, 4, 6, 8 and 10 Combined

Date : April 1999

Sample Depths (m) : 0.00 - 5.20

Specimen Depth (m) : 0.00 - 5.20

Specimen Details

Sample Types : Bults - Remoulded

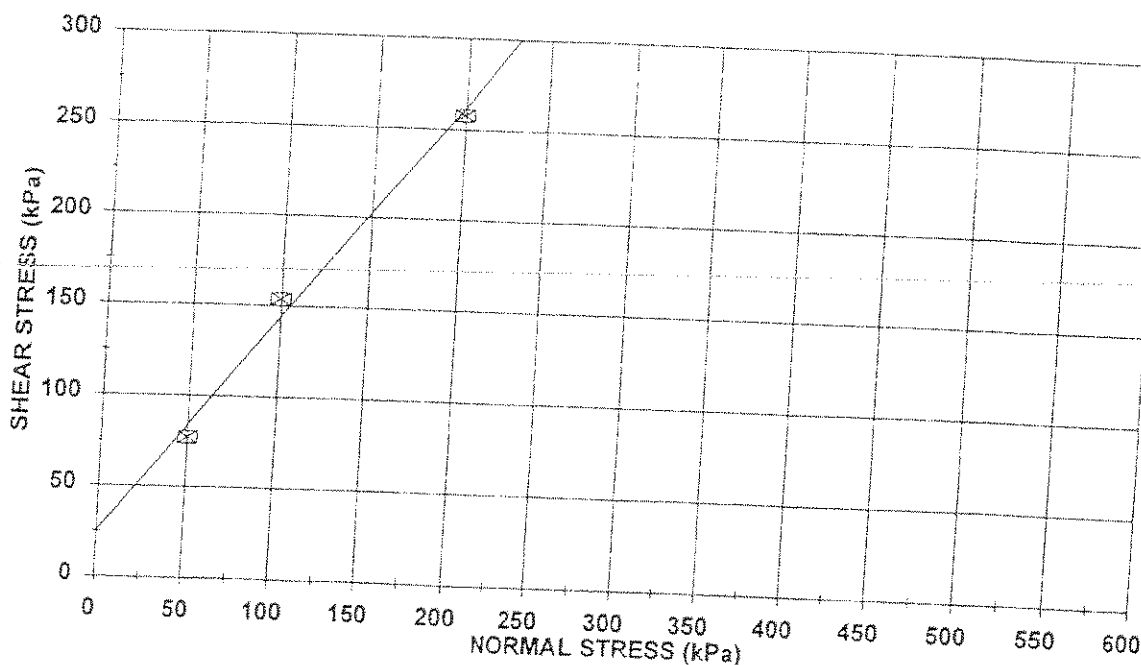
Sample Orientation : Not applicable

Sample Description : Black sandy fine to coarse GRAVEL
(Sieved to pass a 20 mm B.S. test sieve)

Preparation Method : Remoulded using a vibrating hammer
Clause 5.4.5

INITIAL PROPERTIES	Sample Height	Sample 1	Sample 2	Sample 3
	Sample Width mm	150.3	145.0	144.4
	Sample Length mm	300.0	300.0	300.0
	Moisture Content %	300.0	300.0	300.0
	Bulk Density Mg/m ³	29	26	30
	Dry Density Mg/m ³	1.50	1.55	1.55
	Particle Density (assumed) Mg/m ³	1.16	1.23	1.19
	Degree of Saturation %	2.70		
	Voids Ratio	59	58	65
	Test Conditions	1.327	1.188	1.261
CONSOLIDATION	Applied Normal Stress kPa	Submerged		
	Consolidated Height mm	50	100	200
	Consolidated Dry Density Mg/m ³	149.2	141.2	139.4
SHEARING	Rate of Displacement mm/min	1.16	1.25	1.21
	Maximum Shear Stress kPa	0.30	0.075	0.059
	Horizontal Displacement at Maximum Shear Stress mm	77	154	258
		9.3	15.5	16.4

PEAK STRENGTH	Eff. cohesion (c') 25 kPa	Eff. angle of friction (φ') 49.8 degrees
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Variation from BS 1377 and reason :
Remarks on testing :

Prepared By	D Hill	Date	23/04/99	Approved By	For Contractor	Date	For Engineer	Date
Checked By	<i>Approved</i>	Date	23/04/99					



**FOUNDATION
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SERVICES**

BUCKLEY WELLS, BURY

CONTRACT : M4452

FIGURE: LT6/2

SUMMARY OF CHEMICAL ANALYSIS

BS 1377: Part 3: 1990

Hole	Depth (m)	Sample Number	Sample Type	Laboratory Reference Number	Organic Content Test 3 (% dry mass)	Loss on Ignition Test 4 (% dry mass)	Sulphate Content as SO ₃ (as SO ₄) Test 5.5			Carbonate Content (as CO ₂) Test 6.3 † (% dry mass)	Chloride Content (as Cl) Test 7.2		pH Value Test 9	pH Value
							Soil (% dry mass)	2:1 Water: Soil Extract (g/l)	Groundwater (g/l)		Soil (% dry mass)	Groundwater (g/l)		
BHC1A	3.15	2	W	CN 1635/1										
BHC1A	5.70	5	D	CN 1635/2			0.01 (0.01)		0.11 (0.13)				7.1	6.3
BHC2	14.10 - 14.55	28	D	CN 1635/4			0.02 (0.02)							6.8
BHC3	1.60	4	W	CN 1635/5										
BHC4	8.35	24	W	CN 1635/6										
BHC4	12.30	26	D	CN 1635/7			0.01 (0.01)		0.01 (0.01)				6.6	
BHC5	7.00 - 7.45	15	D	CN 1635/8			0.04 (0.05)		0.12 (0.14)				7.2	
BHC5	10.50 - 10.95	23	D	CN 1635/9			0.02 (0.02)							7.0
BHG1	3.60	9	W	CN 1635/10										7.2
BHG1	4.81	18	W	CN 1635/11										7.2
BHG2	3.10	8	D	CN 1635/12										7.2
BHG2	9.00	23	W	CN 1635/13			< 0.01		0.13 (0.16)				6.9	
BHG3	0.60 - 1.20	2	B	CN 1635/14					0.13 (0.16)				7.1	
BHG3	7.20	20	W	CN 1635/15			0.03 (0.04)		0.07 (0.08)				7.1	6.8
BHG4	6.10	15	D	CN 1635/16									7.0	7.3
BHG4	7.42	22	W	CN 1635/17			0.02 (0.02)		0.07 (0.08)				7.0	7.3
TP1	2.00	4	CD	CN 1635/18	5.4		0.01 (0.01)		0.13 (0.16)				7.0	6.0

Key: D - disturbed sample; B - bulk disturbed sample; U - undisturbed sample

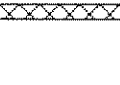
* In house method on Sample as received and not dried ground powder
† denotes tests not included in the accreditation schedule of the laboratory
Delete as applicable

Input by	RP	Date	18/03/1999	Checked by	MM	Date	
Project				BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE			
FOUNDATION & EXPLORATION SERVICES				Contract No 4452			
				Figure No LTG-1			
				10901			

APPENDIX Y

GEOTECHNICAL INFORMATION
RELOCATION OF TURNTABLE

 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment Auto Trip Drop Hammer Methods Window Sampling Contractor Mini Bore
Borehole No BH6		Client Bury MBC	Date 09.12.05

Depth (m)	Description	Legend	Sample/Tests			Field Records	
			Depth	Sample			Results
				Type	No.		
0.00	Ground Surface						
	MADE GROUND Black angular coarse ash with occasional coarse angular to sub rounded gravel of brick and clinker. NO RETURN						
1.00	MADE GROUND Brown medium sand with coarse angular to sub-rounded brick gravel NO RETURN		1.0m	SPT		1/0-0,1,0,0 N=1	
2.00	MADE GROUND Very soft brown sandy gravelly clay with much coarse angular gravel of brick and ash		2.0m	SPT		1/1-0,0,1,0 N=1	
3.00	MADE GROUND Very loose very wet grey slightly clayey gravelly sand with much coarse angular gravel of brick and coal		3.0m	SPT		1/0-1,0,1,0 N=2	
4.00	Wet very soft to soft grey gravelly sandy CLAY with occasional gravel of mudstone and coal		4.0m	SPT		1/1-0,1,1,0 N=2	
5.00	End of Borehole						
6.00							
7.00							
8.00							

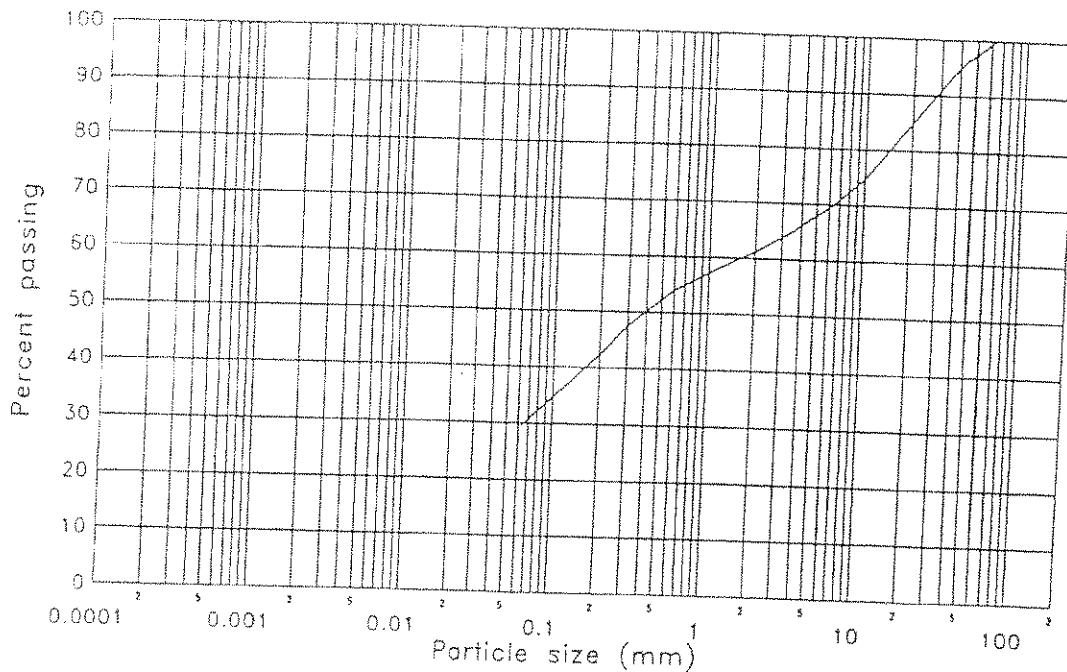
Remarks	Logged by M Waddicor
	Scale NTS
	Sample taken at depth 0.90

PROJECT: BUCKLEY WELLS LOCOMOTIVE DEPOT,				METHOD OF EXCAVATION: MECHANICAL EXCAVATION				RECORD OF TRIAL PIT NO: TP12			
LOCATION: BURY, LANCASHIRE				SURFACE DIMENSIONS OF PIT: 0.80m x 1.60m				CO-ORDINATES: E: N: Sheet 1 of 1			
CONTRACT NO: 4452				START DATE: 04/02/99... FINISH DATE: 04/02/1999				GROUND LEVEL: 83.00 m.O.D.			
INSITU TESTING				SAMPLES							
Depth (m)	Type	Result	Depth (m)	Type	No.	DESCRIPTION OF STRATA					
0.20			0.10	CD	1	MADE GROUND: Black, fine to coarse ash sand with some subangular fine to coarse gravel of ash.					
0.90	VN/VR	32/22 36/22 24/18	0.90	CD	2	MADE GROUND: Soft, brown, clay with a little fine to coarse sand, a little subrounded fine to coarse gravel including sandstone. With occasional fragments of pottery, occasional bricks and occasional bands of ash.					
0.90			1.50	B	3	At 1.50m grading to gravel with much sand and much clay.					
			2.00	CD	4	END OF TRIAL PIT					
			2.50	CD	5						
			3.00	CD	6						
			3.50	CD	7						
			3.70	W	8						
								PLAN			
								Scale 1:25			
REMARKS:				1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out to check for services. Services were not located. 2. Recovered materials were unsuitable for vane tests below 2.00m depth. 3. Rapid inflows of groundwater were encountered at 3.70m depth. 4. The sides of the trial pit remained stable during excavation. 5. On completion the trial pit was backfilled to ground level with compacted aggregate.				Logged by: GL /kmh Date: 04/02 Checked by: SJR Approved by: RJE FIGURE: TP12 FOUNDATION & EXPLORATION SERVICES			

PARTICLE SIZE DISTRIBUTION

B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: TP12	Sample No: 3	Sample Type: 8	Depth: 1.50



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	30	31	39	0
Loss on Pretreatment:	Not Applicable		Description Brown GRAVEL with much sand and much clay	
Test Date:	04/03/1999			
Uniformity Coefficient:	55.0			

	Input by <i>MB</i>	Date 06/03/1999	Checked by <i>[Signature]</i>	Date 26.3.99	
	Project				Contract No
	BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				4452
					Figure No
					LT2/31

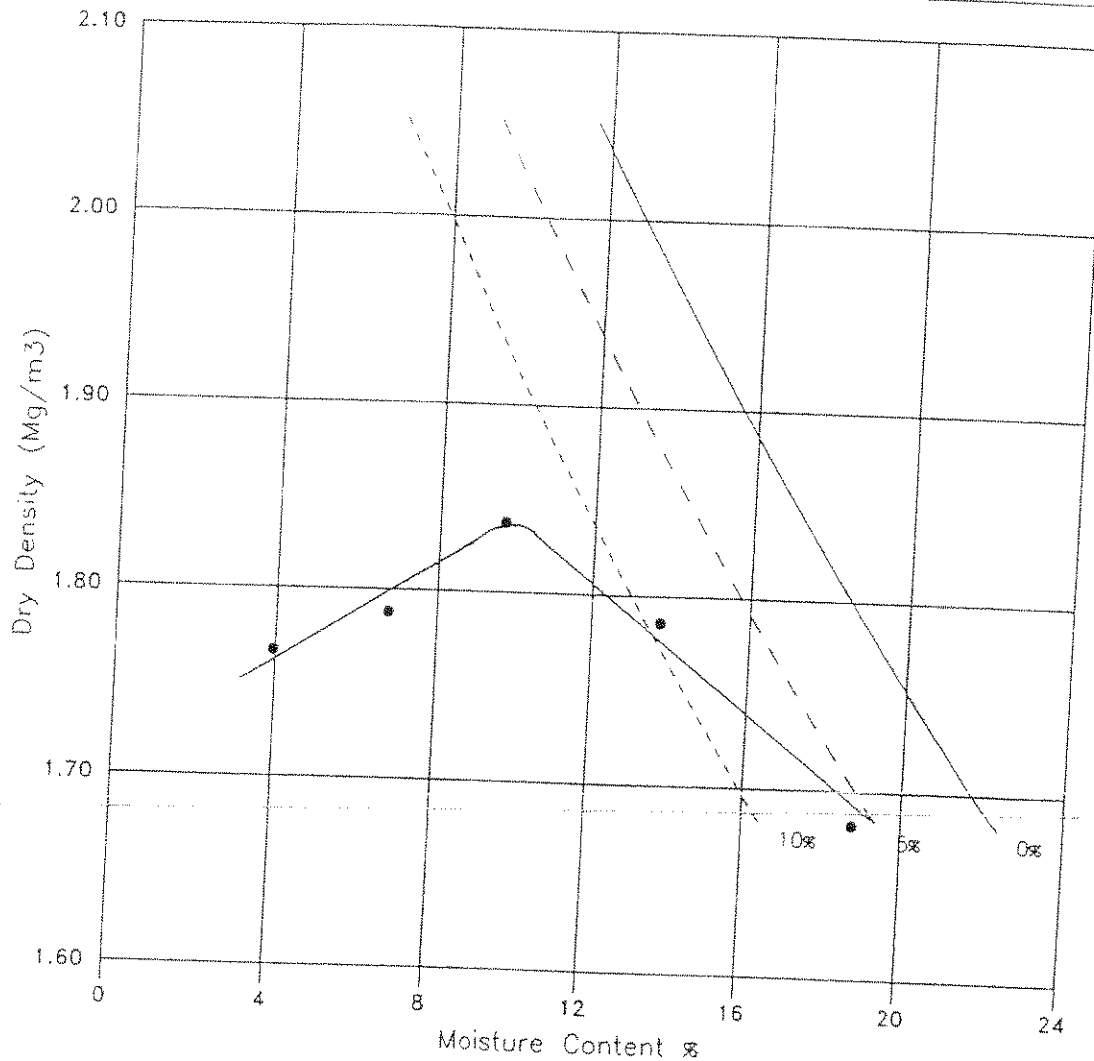
SUMMARY OF SOIL CLASSIFICATION TESTS

BS 1377: Part 2: 1990

Hole	Type	Depth	Sample No.	Classification Tests								Method	Description		
				Bulk Density (Mg/m³)	Moisture Content (%)	Dry Density (Mg/m³)	Particle Density (Mg/m³)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% passing 425 µm				
BHG4	U	10.10	26	2.22	14	1.94							Brown SILT with a little sand and a little gravel		
BHG4	D	12.00	31		12			32	18	14	78	HP	Brown CLAY with a little sand and a little gravel		
TP2	D	2.20	6		11			23	14	9	72	HP	Brown CLAY with a little sand and a little gravel		
TP3	D	0.80	2		38								Brown CLAY with a little sand and a little gravel		
TP7	CD	0.50	2		41			47	29	18	97	HP	Brown CLAY/SILT with a little sand and a little gravel		
TP7	D	2.20	5		37			35	27	8	95	HP	Brown SILT with some sand and a little gravel		
TP12	R	1.50	3		21			30	19	11	57	WS	Brown CLAY with a little sand and some gravel		
				Input by	MS	Date	01/04/1999	Checked by			Date	01/04/1999			
				Project				BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE						Contract No 4452	
										Figure No LT1/5					
														102/02	

MOISTURE CONTENT/DRY DENSITY RELATIONSHIP TEST B.S. 1377: Part 4: 1990: 3.3/3.4/3.5/3.6/3.7

Sample Details			
Borehole No: TP12	Sample No: 3	Sample Type: B	Depth: 1.50



SUMMARY

Test Date	04/03/1999	Type of Compaction	2.5kg Compaction
Sample Preparation	Single sample	Maximum Dry Density	1.83 Mg/m³
Particle Density (assumed)	(2.70) Mg/m³	Optimum Moisture Content	10 %
Moisture Content	19 %	Description	Brown GRAVEL with much sand and much clay
Material retained on			
37.5mm sieve	7 %		
20mm sieve	17 %		

	Input by	MC	Date	06/03/1999	Checked by	[Signature]	Date	29.3.99	
	Project	BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE						Contract No	4452
							Figure No	LT3/1	

APPENDIX Z

GEOTECHNICAL INFORMATION

NEW BRIDGE



Leyden Kirby
ASSOCIATES LTD

Bury Business Centre
Kay Street
Bury
BL9 6BU

Site Reference JB578

Site Name Buckley Wells

Equipment Dando 130

Methods Cable Percussion

Contractor P Blacklege

Borehole No CP1

Client Bury MBC

Date 13.12.05

Depth (m)	Description	Legend	Sample/Tests			Field Records	
			Depth	Sample			Results
				Type	No.		
0.00	Ground Surface						
	MADE GROUND Medium dense black ash and clinker. (Drillers description).						
1.00							
			1.2m	SPT		1/1-2,1,1,2 N=6	
2.00							
			2.0m	SPT		1/1-1,1,1,1 N=4	
3.00							
			3.0m	SPT		1/1-1,1,1,1 N=4	
4.00							
			4.0m	SPT		1/1-1,1,1,2 N=5	
5.00							
		5.0m	SPT		1/1-1,1,2,1 N=5		
6.00							
	MADE GROUND Firm brown sandy clay with some gravel and sandstone fragments. (Drillers description).		6.0m	SPT		1/2-2,3,3,2 N=10	
7.00							
			7.0m	SPT		3/3-4,5,5,4 N=18	
8.00							
Remarks						Logged by PB	
						Scale NTS	
						Sample taken at depth	



Leyden Kirby
ASSOCIATES LTD

Bury Business Centre
Kay Street
Bury
BL9 6BU

Site Reference JB578

Site Name Buckley Wells

Equipment Dando 130

Methods Cable Percussion

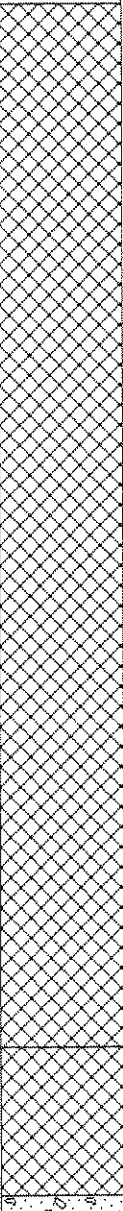
Contractor P Blacklege

Borehole No CP1

Client Bury MBC

Date 13.12.05

Depth (m)	Description	Legend	Sample/Tests				Field Records
			Depth	Sample		Results	
				Type	No.		
			8.0m	SPT		2/3-3,4,5,5 N=17	Water at 9.9m rising to 8.0m after 20 mins
9.00	Firm to stiff grey sandy CLAY with occasional sand inclusions. (Drillers description).						
			9.2m	U100		46 blows for 450mm	
10.00	Very stiff light brown mottled red and yellow CLAY . (Drillers description).						
			10.0m	SPT		1/5-7,11,14,17,19N=61	
	End of Borehole						
11.00							
12.00							
13.00							
14.00							
15.00							
16.00							
Remarks						Logged by PB	
						Scale NTS	
						Sample taken at depth	

 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578	Equipment Dando 130				
		Site Name Buckley Wells	Methods Cable Percussion				
			Contractor P Blacklege				
Borehole No CP2		Client Bury MBC		Date 12.12.05			
Depth (m)	Description	Legend	Sample/Tests			Field Records	
			Depth	Sample			Results
				Type	No.		
0.00	Ground Surface						
0.00	MADE GROUND Black sandy soil ash and clinker (Drillers description)						
1.00							
2.00							
3.00							
4.00							
5.00							
6.00							
7.00	MADE GROUND Balcksandy soil ash clinker and gravel (Drillers description).						
8.00							
Remarks Seal from base to 8.0m, 50mm slotted pipe in gravel 1.0m. Plain pipe to GL. Seal to 0.2m, concrete to GL						Logged by PB	
						Scale NTS	
						Sample taken at depth	

 Leyden Kirby ASSOCIATES LTD Bury Business Centre Kay Street Bury BL9 6BU		Site Reference JB578 Site Name Buckley Wells	Equipment Dando 130 Methods Cable Percussion Contractor P Blacklege
Borehole No CP2		Client Bury MBC	Date 12.12.05

Depth (m)	Description	Legend	Sample/Tests			Field Records	
			Depth	Sample			Results
				Type	No.		
	Medium dense orange brown SAND and fine to medium GRAVEL . (Drillers description).		8.0m	SPTc		1/2-2,2,3,3 N=10	Damp from 8.0 to 9.6m
9.00	Medium dense yellowish brown clayey SAND and medium to coarse GRAVEL (Drillers description).		9.0m	SPTc		2/3-4,5,5,6 N=20	
10.00	Very stiff brown mottled grey sandy CLAY (Drillers description).		10.0m	U100		81 blows for 350mm	
11.00		11.0m	SPT		6/7-9,11,11,13 N=45		
12.00		12.0m	SPT		6/8-9,11,10,15 N=45		
13.00		13.0m	U100		100 blows for 250mm		
14.00		14.0m	SPT		10/10-13,28,22-50ref		
15.00		15.0m	SPT		11/14-20,30-50ref		
	End of Borehole						
16.00							

Remarks Seal from base to 8.0m, 50mm slotted pipe in gravel 1.0m. Plain pipe to GL. Seal to 0.2m, concrete to GL.	Logged by PB
	Scale NTS
	Sample taken at depth



Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

4811

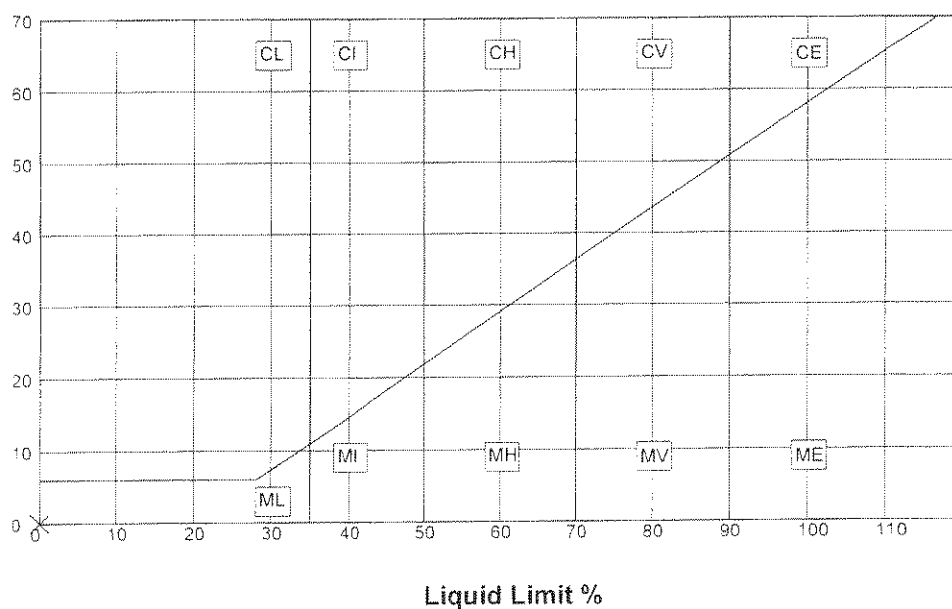
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1 / 4

DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT
AND DERIVATION OF PLASTICITY AND LIQUIDITY INDEX

Borehole / Trial Pit	Depth (m)	Sample	Natural/ Sieved	Description
BH-01	9.70	D19	Natural	Grey SILT

Plasticity
Index %



Casagrande
Plasticity
Chart

Liquid Limit	0 %	Plastic Limit	0 %
Liquidity Index	0.00	Plasticity Index	0 %
Natural Moisture Content	25 %	Classification	

Material Passing 425µm sieve			
Percentage passing	100 %	Corrected Moisture Content	25 %

Method of Preparation : BS 1377 PART 1:1990 7.4 Preparation of samples for classification tests BS 1377 PART 2:1990 4.2 & 5.2 Sample preparations

Method of Test : BS 1377:PART 2:1990:3 Determination of moisture content 1990:4 Determination of the liquid limit BS 1377:PART 2:1990:5 Determination of the plastic limit and plasticity index



Site : Buckley Wells Locomotive Works^ Bury

Job Number

4811

Client : Leyden Kirby Associates

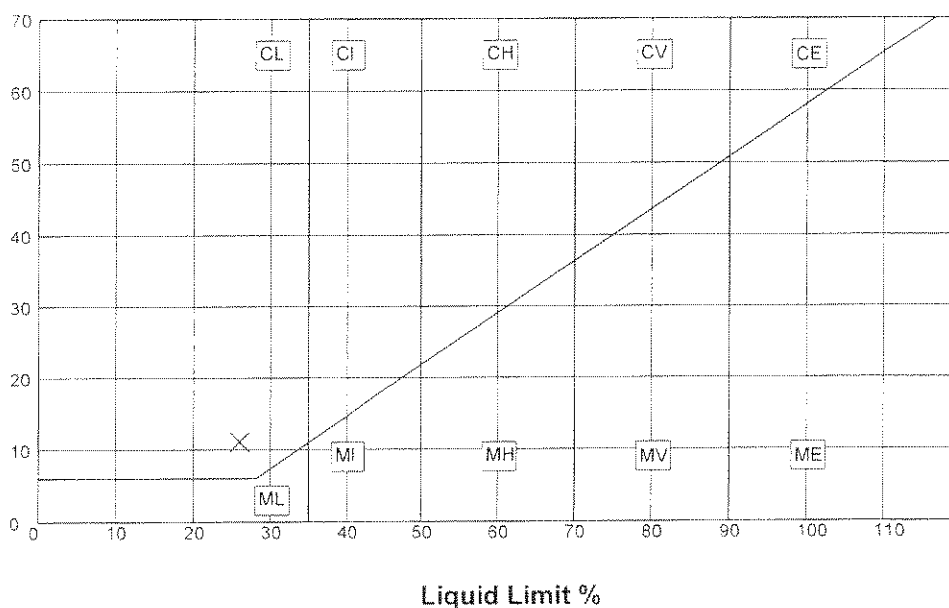
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2 / 4

**DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT
AND DERIVATION OF PLASTICITY AND LIQUIDITY INDEX**

Borehole / Trial Pit	Depth (m)	Sample	Natural/ Sieved	Description
BH-02	11.00	B18	Natural	Brown gravelly CLAY Gravel is coarse to fine

Plasticity
Index %



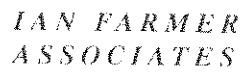
Casagrande
Plasticity
Chart

Liquid Limit	26 %	Plastic Limit	15 %
Liquidity Index	-0.08	Plasticity Index	11 %
Natural Moisture Content	14 %	Classification	CL

Material Passing 425µm sieve			
Percentage passing	90 %	Corrected Moisture Content	14 %

Method of Preparation : BS 1377 PART 1:1990 7.4 Preparation of samples for classification tests BS 1377 PART 2:1990 4.2 & 5.2 Sample preparations

Method of Test : BS 1377:PART 2:1990 3 Determination of moisture content 1990 4 Determination of the liquid limit BS 1377:PART 2:1990 5 Determination of the plastic limit and plasticity index



Site : Buckley Wells Locomotive Works^ Bury
Client : Leyden Kirby Associates
Engineer :

Job Number
4811

Sheet
1 / 1

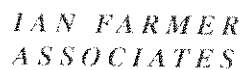
DETERMINATION OF EQUIVALENT SHEAR STRESS BY HAND VANE

Borehole/ Trial Pit	Depth (m)	Sample	Type	Location	Readings	Equivalent Shear Stress kN/m ²	Description
BH-02	13.00	U23		Top	4.00 4.00 4.00	98	Stiff grey gravelly CLAY

Method of Preparation :

Method of Test :

Remarks :



Site : Buckley Wells Locomotive Works^ Bury
Client : Leyden Kirby Associates

Job Number
4811

Sheet
1 / 1

DETERMINATION OF MOISTURE CONTENT / BULK DENSITY / DRY DENSITY

Borehole/ Trial Pit	Depth (m)	Sample	Moisture Content %	Bulk Density (Mg/m³)	Dry Density (Mg/m³)	Description
BH-01	9.20	U18	21	1.54	1.28	Grey brown SAND with occasional cobbles
BH-02	10.00	U14	12	1.8	1.62	Brown gravelly CLAY. Gravel is fine to coarse
BH-02	13.00	U23	10	2.66	2.42	Stiff grey gravelly CLAY
BH-03	12.00	U15	22	2.29	1.88	Brown very sandy CLAY

Method of Preparation: BS 1377 PART 1 1990:8.2,8.3,8.4

Method of Test : BS 1377 PART 2:1990 7 Determination of Density

Remarks :

Site : Buckley Wells Locomotive Works[^] Bury

Client : Leyden Kirby Associates

Job Number

4811

Sheet

1 / 1

**DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT
AND DERIVATION OF PLASTICITY AND LIQUIDITY INDEX**

Borehole/ Trial Pit	Depth (m)	Sample	Natural / Sieved	Natural Moisture Content %	Sample Passing 425µm Sieve		Liquid Limit %	Plastic Limit %	Plasticity Index %	Liquidity Index	Class	Description
					Percentage %	Moisture Content %						
BH-01	9.20	U18	Natural	20								Grey brown SAND with occasional cobbles
BH-01	9.70	D19	Natural	25	100	25		NP				Grey SILT
BH-02	10.00	U14	Natural	12								Brown gravely CLAY Gravel is fine to coarse
BH-02	11.00	B18	Natural	14	90	14	26	15	11	-0.08	CL	Brown gravely CLAY Gravel is coarse to fine
BH-02	13.00	U23	Natural	9.8								Stiff grey gravely CLAY
BH-03	9.00	U10	Natural	27								Soft brown very sandy CLAY
BH-03	10.00	B12	Natural	15	15	74		NP				Brown gravely CLAY Gravel is fine to medium
BH-03	12.00	U15	Natural	22								Brown very sandy CLAY
BH-03	12.50	D16	Natural	14	51	23	24	13	11	0.91	CL	Brown gravely CLAY Gravel is fine to medium

Method of Preparation : BS 1377 PART 1:1990:7.4 Preparation of samples for classification tests BS 1377 PART 2:1990:4.2 & 5.2 Sample preparations

Method of Test : BS 1377 PART 2:1990:3 Determination of moisture content 1990:4 Determination of the liquid limit BS 1377 PART 2:1990:5 Determination of the plastic limit and plasticity index

Remarks :



Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

4811

Sheet

1 / 1

DETERMINATION OF NATURAL MOISTURE CONTENT

Borehole/ Trial Pit	Depth (m)	Sample	Moisture Content %	Description
BH-01	9.20	U18	21	Grey brown SAND with occasional cobbles
BH-01	9.70	D19	25	Grey SILT
BH-02	10.00	U14	12	Brown gravelly CLAY Gravel is fine to coarse
BH-02	11.00	B18	14	Brown gravelly CLAY Gravel is coarse to fine
BH-02	13.00	U23	9.8	Stiff grey gravelly CLAY
BH-03	9.00	U10	27	Soft brown very sandy CLAY
BH-03	10.00	B12	15	Brown gravelly CLAY Gravel is fine to medium
BH-03	12.00	U15	22	Brown very sandy CLAY
BH-03	12.50	D16	14	Brown gravelly CLAY Gravel is fine to medium
WS-BH1	1.50	B1	8.1	Brown gravelly SAND Gravel is fine to medium

Method of Preparation : BS 1377 PART 1:1990:7.4 Preparation of samples for classification tests BS 1377 PART 2:1990:4.2 & 5.2 Sample preparations

Method of Test : BS 1377 PART 2:1990:3.2 Determination of moisture content

Remarks :



Site : Buckley Wells Locomotive Works^ Bury

Client : Leyden Kirby Associates

Job Number

4811

Sheet

1 / 1

DETERMINATION OF THE pH VALUE AND THE SULPHATE CONTENT OF SOIL AND GROUNDWATER

Borehole/ Trial Pit	Depth (m)	Sample	Concentration of Soluble Sulphate			Percentage of sample passing 2mm Sieve %	pH	Description
			Total SO ₄ %	SO ₄ in 2:1 water:soil g/l	Groundwater g/l			
BH-01	3.00	B7		0.1		89	7.5	Brown slightly gravelly sandy CLAY
BH-01	7.00	B14		0.2		77	6.8	Brown slightly gravelly sandy CLAY
BH-01	9.20	U18		<0.1		87	6.9	Grey brown SAND with occasional cobbles
BH-02	1.00	B2		0.2		70	7.2	Brown sandy gravelly CLAY with traces of silt Gravel is fine to coarse
BH-02	8.00	B10		0.1		89	7.2	Brown gravelly CLAY Gravel is fine to coarse
BH-02	10.00	U14		<0.1		81	5.1	Brown gravelly CLAY Gravel is fine to coarse
BH-03	5.00	B5		0.1		87	7.0	Brown very sandy CLAY
BH-03	9.00	U10		0.1		94	6.1	Soft brown very sandy CLAY
BH-03	10.00	B12		0.1		90	6.4	Brown gravelly CLAY Gravel is fine to medium
BH-03	12.00	U15		<0.1		94	6.2	Brown very sandy CLAY
WS-BH1	1.50	B1		<0.1		83	6.8	Brown gravelly SAND Gravel is fine to medium
WS-BH1	2.50	B2		<0.1		85	7.1	Brown sandy GRAVEL with traces of silt

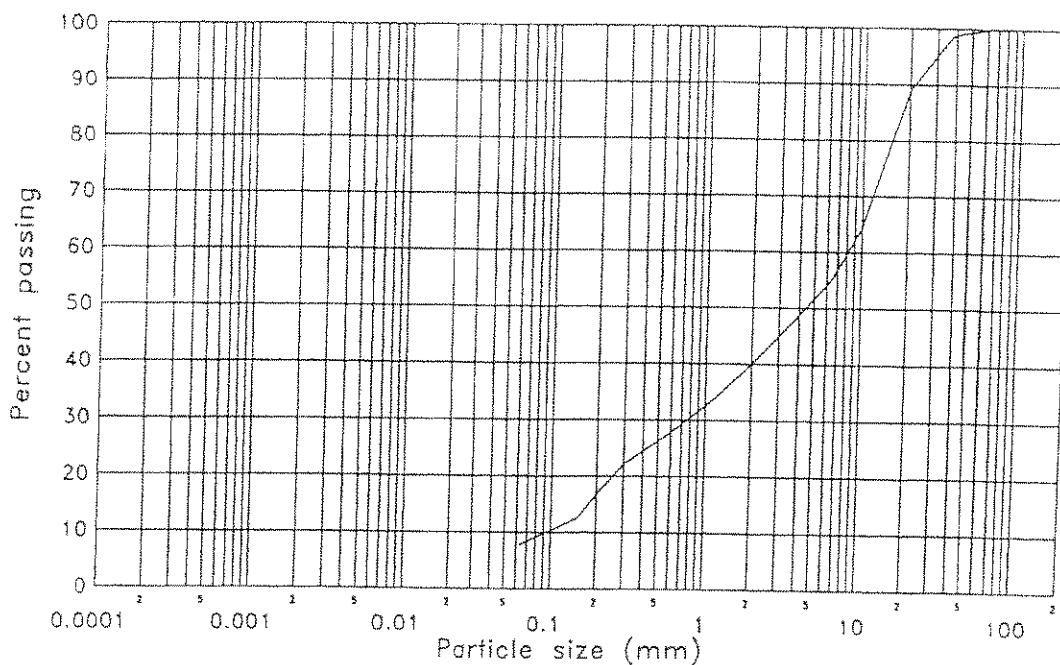
Method of Preparation : BS 1377 PART 1:1990:7.5 Preparation of soil for chemical tests BS 1377 PART 3:1990:5.2, 5.3, 5.4 & 9.4

Method of Test : BS 1377:PART 3:1990:5 Determination of the sulphate content of soil and ground water BS 1377:PART 3:1990:9 Determination of the pH value

Remarks :

PARTICLE SIZE DISTRIBUTION B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: TP14	Sample No: 2	Sample Type: B	Depth: 0.60



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

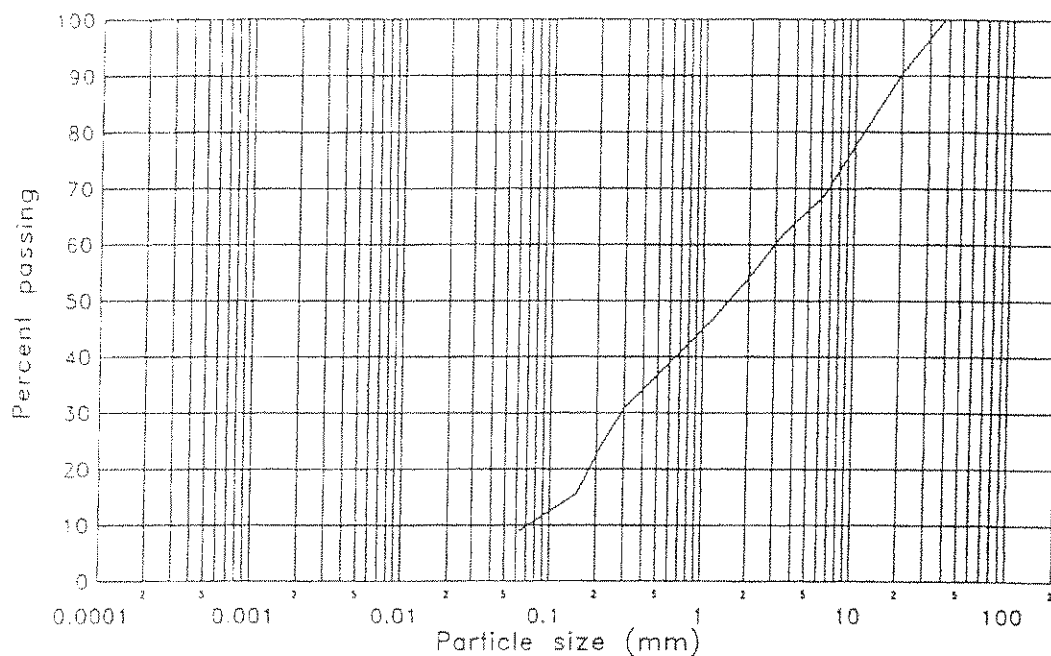
%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	8	32	60	0
Loss on Pretreatment:	Not Applicable		Description Brown GRAVEL with much sand and some silt	
Test Date:	19/03/1999			
Uniformity Coefficient:	86.7			

		Input by <i>MB</i>	Date 21/03/1999	Checked by <i>[Signature]</i>	Date 1.4.99		
		Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452	
						Figure No LT2/33	

PARTICLE SIZE DISTRIBUTION

B.S. 1377: Part 2: 1990: 9.2/9.3/9.4/9.5

Sample Details			
Borehole No: TP14	Sample No: 5	Sample Type: 8	Depth: 2.10



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

SUMMARY

%CLAY	%SILT	%SAND	%GRAVEL	%COBBLES
Incl. with silt	9	45	46	0
Loss on Pretreatment:	Not Applicable		Description Brown SAND and GRAVEL with some silt	
Test Date:	05/03/1999			
Uniformity Coefficient:	41.4			

		Input by <i>MB</i>	Date 07/03/1999	Checked by <i>[Signature]</i>	Date <i>20.3.99</i>	
FOUNDATION & EXPLORATION SERVICES		Project BUCKLEY WELLS, LOCOMOTIVE DEPOT, BURY, LANCASHIRE				Contract No 4452
						Figure No LT2/34