

Notes

1. This drawing should be read in conjunction with MML Phase 1 Geo-environmental Desk Study Report WJ-MMD-07-ZZ-00-N-0001.
2. Route options are based on MML Report Western Link Warrington Transport Improvement Schemes Set 1 (Ref: 02/20/02/02 A7 April 2017).
3. The illustrated geo-environmental constraints have been derived from the high level datasets described in 'Reference Drawings' below. Further detailed desk study results and intrusive ground investigation will be required to refine the risks in relation to site-specific ground conditions and engineering proposals.

Key to Symbols

- Route Options
- Study Area
- COMAH Site
- Pollution Incident
- Potentially Contaminated Land
- Landfill
- Surface Water
- Principal Aquifer

Reference drawings

1. Open source LIDAR Composite Digital Terrain Model
2. Landmark 1:10,000 scale Historic Landuse Database (HLCD)
3. Superficial geology and bedrock geology themes from BGS DigMapGB-10 mapping
4. Landmark site-identifiy data

Rev	Date	Drawn	Description	NAH	NAH
01	25/04/2017	AC	For Information	NAH	NAH
				CH/K/J	App/S

M MOTT MACDONALD
 Spring Bank House,
 33 Stamford Street,
 Warrington, WA14 1ES
 T: +44 (0) 181 505000
 W: mottmac.com

Client: **Warrington Borough Council**

Title: **Western Link
 Geo-environmental Constraints Plan**

Designed	AC	Eng Check	NAH
Drawn	AC	Coordinate	AC
GIS Check		Approved	NAH

Scale at A1: **1:10,000** Status: **INF** Rev: **PO1**

Drawing No: **382900-WL-MMD-07-ZZ-GS-N-0004**

© Mott MacDonald Ltd
 This document is issued for the purpose which is stated on the title page and is not to be used for any other purpose.
 We accept no responsibility for the consequences of the document being used for any other purpose, or containing any errors or omissions which do not constitute a breach of our contract. Information in this document is data supplied to us by other parties.

Contains Ordnance Survey data © Crown copyright and database right 2017

0 250 500 750 1,000 Metres

D. Selected BGS borehole records

SJ58NE1407

PROJECT: WARRINGTON NEW TOWN
LOCATION: Acton Grange
GROUND LEVEL: I2.7
INCLINATION: Vertical
SCALE OF LOG: I:50
DIA. OF CASING: 154 mm. to metres
DATE DRILLED: 5.4.71.

TYPE OF BORING: Shell and Auger

Reduced Level	Depth	Legend	Sampling		Soil Description	Key to Laboratory Tests	Moisture Content and plot of Atterberg Limits			
			Type	Depth			Percent			
							10	20	30	40
II.7	1.0	[Cross-hatched]	D U4	1.0	TOPSOIL - dark, sandy					
II.2	1.5	[Horizontal lines]	S(II)	1.5	CLAY - brown, sandy					
		[Dotted]	D	2.0	SAND - medium dense, medium grained, brown					
		[Dotted]	D	2.5						
		[Dotted]	S(I2)	3.0						
		[Dotted]	D	3.5						
		[Dotted]	D	4.0						
8.2	4.5	[Dotted]	S(I4)	4.5	medium dense, medium grained, red/brown					
		[Dotted]	D	5.0						
		[Dotted]	D	5.5						
6.7	6.0	[Horizontal lines]	S(4.5)*	6.0	SANDSTONE - hard					
6.2	6.5	[Horizontal lines]								
					BOTTOM OF BOREHOLE					

Ground water encountered at Quantity

SHEET I OF I

Borehole No. 357

SJ58NE1435

PROJECT: WARRINGTON NEW TOWN

LOCATION: Acton Grange

GROUND LEVEL: 12.8

INCLINATION: Vertical

SCALE OF LOG: 1:50

DIA. OF CASING: 154 mm. to metres

mm. to metres

DATE DRILLED: 5/6.4.71.

TYPE OF BORING: Shell and Auger

Reduced Level	Depth	Legend	Sampling		Soil Description	Key to Laboratory Tests	Moisture Content and Plot of Atterberg Limits				
			Type	Depth			Percent				
							10	20	30	40	
11.8	1.0	[Cross-hatched]	S(9)	1.0	TOPSOIL - dark						
		[Dotted]	D	1.5	SAND - grey/brown, medium grained, loose						
		[Dotted]	D	2.0							
10.3	2.5	[Dotted]	S(I4)	2.5							
		[Dotted]	D	3.0	red/brown, medium grained, medium dense						
		[Dotted]	S(27)	3.5							
8.8	4.0	[Dotted]	D	4.0							
		[Horizontal lines]	S(4.5)*	4.0	SANDSTONE - hard						
8.3	4.5	[Horizontal lines]									
					BOTTOM OF BOREHOLE						

Ground water encountered at Quantity

SHEET I OF I

Borehole No. 356

SJ58NE1408

PROJECT: WARRINGTON NEW TOWN

LOCATION: Acton Grange

GROUND LEVEL: 13.7

DIA. OF CASING: 154 mm. to metres

INCLINATION: Vertical

mm. to metres

SCALE OF LOG: 1:50

DATE DRILLED: 2.4.71.

TYPE OF BORING: Shell and Auger

Reduced Level	Depth	Legend	Sampling		Soil Description	Key to Laboratory Tests	Moisture Content and plot of Atterberg Limits			
			Type	Depth			Percent			
							10	20	30	40
12.7	1.0		D U4	0.5	CLAY - brown, very sandy					
			S(14)	1.0	SAND - red/grey/brown, medium dense					
11.2	2.5		D	1.5	SAND - red/brown, medium dense					
			D	2.0						
10.7	3.0		S(14)	2.5	SANDSTONE - very dense					
10.2	3.5		S(4.5)*	3.0						
BOTTOM OF BOREHOLE										

Ground water encountered at
Quantity

SHEET 1 OF 1

Borehole No. 358

SJ58NE1416

PROJECT: WARRINGTON NEW TOWN

LOCATION: Acton Grange

GROUND LEVEL: 9.2

INCLINATION: Vertical

SCALE OF LOG: 1:50

DIA. OF CASING: 154 mm. to metres

mm. to metres

DATE DRILLED: 30.3.71

TYPE OF BORING: Shell and Auger

Reduced Level	Depth	Legend	Sampling		Soil Description	Key to Laboratory Tests	Moisture Content and plot of Atterberg Limits				
			Type	Depth			Percent				
							10	20	30	40	
8.2	1.0	[Pattern]	D	1.0	TOPSOIL						
		[Pattern]	U4		CLAY firm grey/brown sandy						
		[Pattern]	D	1.5							
		[Pattern]	D	2.0							
		[Pattern]	U4	2.5							
		[Pattern]	D	3.0							
		[Pattern]	D	3.5							
5.2	4.0	[Pattern]	D	4.0	SANDSTONE hard unweathered						
4.7	4.5	[Pattern]	S(3.5)*								
BOTTOM OF BOREHOLE											

Ground water encountered at
Quantity

SHEET 1 OF 1

Borehole No. 366

SJ58NE1417

PROJECT: WARRINGTON NEW TOWN
LOCATION: Acton Grange

GROUND LEVEL:

DIA. OF CASING: 77.8 mm. to 3.2 metres

INCLINATION: Vertical

mm. to metres

SCALE OF LOG: 1 : 50

DATE DRILLED: 12.6.71.

TYPE OF BORING: Rotary.

Reduced Level	Depth	Legend	Sampling		Soil Description	Key to Laboratory Tests	Moisture Content and plot of Atterberg Limits			
			Type	Depth			Percent			
							10	20	30	40
					TOPSOIL - dark					
	1.0				CLAY - grey/brown, sandy.					
	3.2			3.2	SANDSTONE - red, medium grained, very poorly cemented with occasional micaceous layers.					
	5.0		core recovery	5.0	fresh, medium grained, micaceous mottled white with incomplete cementing.					
	5.95		core recovery	5.95	Fresh, poorly graded, mottled and very irregularly cemented. red/grey					
	7.5		core recovery	7.5	Fresh, dark red, coarse grained, poorly cemented, massive quartzitic well sorted.					
	9.6			9.6	BOTTOM OF BOREHOLE					

Ground water encountered at Quantity

SHEET 1 OF 1

Borehole No.366

SJ58NE1419

PROJECT: WARRINGTON NEW TOWN
LOCATION: Acton Grange

British Geological Survey

GROUND LEVEL: 10.6 m

DIA. OF CASING: 154 mm. to metres

INCLINATION: Vertical

mm. to metres

SCALE OF LOG: 1 : 50

DATE DRILLED: 31.3.71.

TYPE OF BORING: Shell and Auger

Reduced Level	Depth m	Legend	Sampling		Soil Description	Key to Laboratory Tests	Moisture Content and plot of Atterberg Limits			
			Type	Depth m			Percent			
							10	20	30	40
10.1	0.5	[Pattern]	D	0.5	TOPSOIL	Tx				
		[Pattern]	U4		CLAY - firm, brown, sandy					
		[Pattern]	D	1.0						
		[Pattern]	D	1.5						
		[Pattern]	U4	2.0		Tx				
		[Pattern]	D	2.5						
		[Pattern]	D	3.0						
7.1	3.5	[Pattern]	D	3.5		Tx				
		[Pattern]	U4		hard, brown, sandy, stoney					
6.6	4.0	[Pattern]	S(24)	4.0						
		[Pattern]	D	4.5	SAND - red/brown, medium grained, medium dense					
		[Pattern]	D	5.0						
		[Pattern]	S(29)	5.5						
		[Pattern]	D	6.0						
		[Pattern]	D	6.5						
3.6	7.0	[Pattern]	S(4.5)	7.0	SANDSTONE - hard, red, unweathered					
3.1	7.5	[Pattern]			BOTTOM OF BOREHOLE					

Ground water encountered at
Quantity

SHEET 10F 1

Borehole No. 368

SJ58NE1420

PROJECT: WARRINGTON NEW TOWN
LOCATION: Acton Grange

GROUND LEVEL: 11.2 m

INCLINATION: Vertical

SCALE OF LOG: 1 : 50

DIA. OF CASING: 154 mm. to metres
 mm. to metres

DATE DRILLED: 31.3.71.

TYPE OF BORING: Shell and Auger

Reduced Level	Depth m	Legend	Sampling		Soil Description	Key to Laboratory Tests	Moisture Content and plot of Atterberg Limits			
			Type	Depth m			Percent			
							10	20	30	40
10.7	0.5	[Pattern]	D	0.5	TOPSOIL	Tx				
		[Pattern]	U4		CLAY - firm, brown, sandy					
		[Pattern]	D	1.0						
		[Pattern]	D	1.5						
9.2	2.0	[Pattern]	D	2.0	firm, brown, sandy, stoney	Tx				
		[Pattern]	U4							
		[Pattern]	D	2.5						
8.2	3.0	[Pattern]	S(30)	3.0	SAND - red, fine/medium grained, dense					
		[Pattern]	D	3.5						
		[Pattern]	D	4.0						
		[Pattern]			∇GWL 4.15m					
		[Pattern]	S(30)	4.5						
		[Pattern]	D	5.0						
		[Pattern]	D	5.5						
		[Pattern]	D	6.0						
4.7	6.5	[Pattern]	S(4.5)*	6.5	SANDSTONE - hard, unweathered					
4.2	7.0	[Pattern]			BOTTOM OF BOREHOLE					

Ground water encountered at 4.15m
 Quantity

SHEET 1 OF 1

Borehole No. 369

SJ58NE1409

PROJECT: WARRINGTON NEW TOWN

LOCATION: Acton Grange

GROUND LEVEL: 12.6

INCLINATION: Vertical

SCALE OF LOG: 1:50

DIA. OF CASING: 154 mm. to metres

mm. to metres

DATE DRILLED: 13/14.4.71.

TYPE OF BORING: Shell and Auger

Reduced Level	Depth	Legend	Sampling		Soil Description	Key to Laboratory Tests	Moisture Content and plot of Atterberg Limits			
			Type	Depth			Percent			
							10	20	30	40
					SAND - grey, medium dense					
			S(13)	1.0						
			D	1.5						
10.6	2.0		S(20)	2.0						
10.1	2.5		S(13)	2.5	CLAY - very stiff, sandy					
9.6	3.0		S(4)*	3.0	SAND - red/brown, medium dense					
9.1	3.5				SANDSTONE - red, dense					
					BOTTOM OF BOREHOLE					

Ground water encountered at
Quantity

SHEET 1 OF 1

Borehole No. 359

SJ58NE22

97/22 C

97 C

(For Survey use only)
GEOLOGICAL
CLASSIFICATION

NATURE OF STRATA

British Geological Survey
If measurements start below
ground surface, state how far ...

THICKNESS DEPTH
Feet Inches Feet Inches

DRIFT

Sand & gravel

12 0 12 0

22 C
SJ58/83

Boulders & gravel

1 6 13 6

Gravel & sand

8 4 21 10

Boulders

1 9 23 7

Red sandy clay

10 5 34 0

TRIASSIC
Sherwood
Gp.
Upper
Mottled
Sst

Soft Red Sandstone

472 11 506 11

24-4-78

SJ58NE1116

BeWT		STRATA		MACHINE EXCAVATED TRIAL PIT		Ground Level 519.1 (m AOD)		Trial Pit No. SJ58NE 1116	
Location Warrington North WwTV				Job No. 8156-18		Project Ref 3-21-48-188		Co-ordinates E 5798N 870	
Field Records		Samples		DESCRIPTION OF STRATA		Reduced Level		Strata Legend	
Station (m/2)	Depth (m)	Type	No.			m AOD	Legend	Depth (Thickness) m	
				Grass over green TOPSOIL with many roots		4.800		0.00	
	0.30	S 1		Stiff brown slightly sandy CLAY with occasional rootlets				0.30	
				Fm brown sandy laminated CLAY		4.000		1.00	
	1.40	S 2		Grey clayey ssily laminated SILT with occasional wood fragments (branches)		3.100		2.00	
	2.40	S 3						0.30	
	2.80	V 1		Trial Pit Complete		2.300		3.00	

Scale 1:50

Trial Pit excavated using a mechanical excavator.

Remarks

- 1) Fast groundwater entries at 2.80m.
- 2) Sides of pit starting to collapse.
- 3) Monitoring well installed at 3.0m.

Plan

Logged By	GL	DATE	10-08
Checked By:			
Approved By:			
FIG No.			

SUB SOIL SURVEYS LTD.
MANCHESTER.

BOREHOLE NO. 0 21

British Geological Survey

EXPLORATORY BORING RECORD

5580E 716

5811 8687

SITE Warrington REF.: 68/115
Boring Method Shell Ground Level 17 90 O.D.

DATE	DIA. OF CASING & DEPTH BELOW G.L.	WATER LEVEL MORNING & EVENING	DEPTH OF STRATA BELOW G.L.	STRATA APPROX. SCALE 10 FT. TO ONE INCH	NO. OF SAMP.	TYPE OF SAMP.	PENETRATION OF SAMPLER OR CORE BARREL		NO. OF BLOWS	CORE RECOVERY
							FROM	TO		
15.11.68	8"	Nil	1'7"	Topsoil	1	U	2'6"	4'0"	7	
				Soft to very soft brown, grey and black silty clay, organic zones and root inclusions with thick and thin lenses of silt and sand, becoming more silty with depth.	2	O	4'0"	6'6"	7	
					3	U	5'0"	6'6"	9	
					4	O	6'6"	9'0"	12	
					5	U	7'6"	11'6"	6	
					6	C	9'0"	15'6"	9	
					7	U	10'0"	19'6"	14	
					8	O	11'6"	23'6"	34	
					9	W	14'0"	27'6"	36	
					10	X	14'6"	31'6"	41	
					11	B	15'0"	35'6"	43	
					12	X	18'6"	40'0"		
					13	B	20'0"			
					14	X	22'6"			
					15	B	24'0"			
					16	X	26'6"			
					17	B	29'0"			
					18	X	30'6"			
					19	B	34'0"			
				13.11.68	26'0"	16'0"		Compact to dense brown sand and gravel, occasional cobbles with inclusions of part decomposed wood.	20	X
14.11.68		11'0"	30'0"	Dense grey and brown sand and gravel.	21	B	38'0"			
			40'0"		22	X	39'0"	40'0"	43	

Samples shown thus: Disturbed O. Undisturbed U. Standard Pen. Test X. Water W. Bulk B.

WATER STRUCK AT THE FOLLOWING DEPTHS	DEPTH OF CASING WHEN SEALED (N.S.—NOT SEALED)	ESTIMATED SEEPAGE	WATER ADDED AT FOLLOWING DEPTHS TO ASSIST BORING	WATER LEVEL IN CASED/UNCASED BOREHOLE OR COMPLETION		
				DATE	WATER LEVEL	DEPTH OF CASING
1. 13'9"	N.S.			15 11 68	6'1"	
2.						
3.						
4.						
5.						
6.						

REMARKS:

British Geological Survey

British Geological Survey

British Geological Survey

JOB SOIL SURVEYS LTD.
MANCHESTER.

BOREHOLE No. 24

EXPLORATORY BORING RECORD

S558NE 721
S907 8768

SITE Warrington

Ref.: 68/115

Doring Method Shell

Ground Level 22.70 O.D.

DATE	DIA OF CASING & DEPTH BELOW G.L.	WATER LEVEL MORNING & EVENING	DEPTH OF STRATA BELOW G.L.	STRATA APPROX. SCALE 10 FT. TO ONE INCH	NO. OF SAMP.	TYPE OF SAMP.	PENETRATION OF SAMPLER OR CORE BARREL		NO. OF BLOWS	CORE RECOVERY
							FROM	TO		
22.11.68	8"	N11	4'0"	Backfill - stones, bricks and ashes. etc	1	O	5'0"			
			9'0"	Brown sand and gravel (possibly disturbed in upper zone)	2	O	9'0"			
					3	O	14'0"			
					4	O	19'0"			
					5	O	24'0"			
					6	O	29'0"			
					7	O	34'0"			
					8	U	37'0"	38'6"	39	
22.11.68	20'6"	N11		Stiff brown sandy clay with stone inclusions (Firm zones)	9	O	38'6"			
22.11.68		N11			10	O	42'0"			
					11	W	9'0"			
25.11.68	30'	N11	42'0"							

Samples shown thus: Disturbed O. Undisturbed U. Standard Pen. Test X. Water W. Bulk B.

WATER STRUCK AT THE FOLLOWING DEPTHS	DEPTH OF CASING WHEN SEALED (IN S.—NOT SEALED)	ESTIMATED SEEPAGE	WATER ADDED AT FOLLOWING DEPTHS TO ASSIST BORING	WATER LEVEL IN CASED/UNCASED BOREHOLE ON COMPLETION		
				DATE	WATER LEVEL	DEPTH OF CASING
1. 4'0"	12'0"	slow		26.11.68	5.1"	
2.						
3.						
4.						
5.						
6.						

REMARKS:

SUB SOIL SURVEYS LTD.
MANCHESTER.

BOREHOLE No. 25

55806 722

EXPLORATORY BORING RECORD 5918 8776

SITE Warrington Ref.: 68/115
Boring Method Shell Ground Level 23.50 O.D.

DATE	DIA. OF CASING & DEPTH BELOW G.L.	WATER LEVEL MORNING & EVENING	DEPTH OF STRATA BELOW G.L.	STRATA APPROX. SCALE 10 FT. TO ONE INCH	NO. OF SAMP.	TYPE OF SAMP.	PENETRATION OF SAMPLER OR CORE BARREL		NO. OF BLOWS	CORE RECOVERY
							FROM	TO		
28.11.68	8"	N11	2'0"	Backfill	1	O	5'0"			
			7'9"	Brown sand	2	O	8'0"			
			16'0"	Firm to stiff sandy clay with stone inclusions	3	O	13'0"			
			30'0"	Stiff brown sandy clay with stone inclusions	4	O	16'0"			
			30'0"	Brown silty fine sand	5	O	21'0"			
			37'6"	Firm/stiff brown sandy clay with stone inclusions	6	O	26'0"			
			38'0"	Loose brown silty fine sand	7	O	30'0"			
			47'0"	Stiff brown sandy clay with stone inclusions	8	W	32'0"			
			54'0"		9	O	35'0"			
23.11.68	36"	32'6"			10	O	37'6"			
29.11.68		28'0"			11	X	38'6"	39'6"	4	
29.11.68	44'6"	30'			12	X	43'6"	44'6"	4	
30.11.68		20'			13	O	47'0"			
					14	O	52'0"			
					15	O	54'0"			

Samples shown thus: Disturbed O. Undisturbed U. Standard Pen. Test X. Water W. Bulk B.

WATER STRUCK AT THE FOLLOWING DEPTHS	DEPTH OF CASING WHEN SEALED (IN.S.—NOT SEALED)	ESTIMATED SEEPAGE	WATER ADDED AT FOLLOWING DEPTHS TO ASSIST BORING	WATER LEVEL IN CASED/UNCASED BOREHOLE ON COMPLETION		
				DATE	WATER LEVEL	DEPTH OF CASING
1. 30'0"	N.S.			3.12.68	6'0"	
2.						
3.						
4.						
5.						
6.						

REMARKS:

SOIL SURVEYS LTD.
MANCHESTER.

BOREHOLE No. 26

EXPLORATORY BORING RECORD

SS88NE 723
S925 8761

SITE Warrington

Ref.: 62/115

Boring Method Shell

Ground Level 22.50 O.D.

DATE	DIA. OF CASING & DEPTH BELOW G.L.	WATER LEVEL MORNING & EVENING	DEPTH OF STRATA BELOW G.L.	STRATA APPROX. SCALE 10 FT. TO ONE INCH	NO. OF SAMP.	TYPE OF SAMP.	PENETRATION OF SAMPLER OR CORE BARREL		NO. OF BLOWS	CORE RECOVERY
							FROM	TO		
30 11.68	3"	Nil	3'0"	Backfill						
			5'0"	Firm brown sandy clay with stone inclusions	1	0	5'0"			
					2	0	10'0"			
					3	0	12'0"			
					4	0	17'0"			
					5	0	22'0"			
				Brown silty sand with occasional gravel	6	0	27'0"			
					7	0	32'0"			
					8	0	37'0"			
			11'6"		9	0	40'0"			
30 11.68	12'6"	Nil		Stiff and very stiff brown sandy clay with stone inclusions						
1 12.68		Nil								
1 12.68	30'	Nil	40'0"							

Samples shown thus: Disturbed O. Undisturbed U. Standard Pen. Test X. Water W. Bulk B.

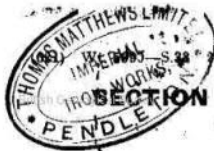
WATER STRUCK AT THE FOLLOWING DEPTHS	DEPTH OF CASING WHEN SEALED (IN.S.—NOT SEALED)	ESTIMATED SEEPAGE	WATER ADDED AT FOLLOWING DEPTHS TO ASSIST BORING	WATER LEVEL IN CASED/UNCASED BOREHOLE ON COMPLETION		
				DATE	WATER LEVEL	DEPTH OF CASING
1. 11'0"	12'6"			3.12.68	8'3"	
2.						
3.						
4.						
5.						
6.						

REMARKS:

British Geological Survey

British Geological Survey

British Geological Survey



SJ 58 NE 11
 Borehole at

115 NE 7
 Helen's Cable Works

Maps: One-inch ~~80 A~~ ⁹⁷ Six-inch Lancs 115 NE County Lancs
 Height above O.D. c. 300.0 Latitude 53° 23' 20" Longitude 2° 36' 45"
 Communicated by Measrs Tho. Matthews, Ltd Date of sinking 1904
 Made by St. Helens Cable Works Dip of Strata _____
On the site of British Aluminium Works
Water level 12 ft. **5984 8757**

	Thickness.		Depth from Surface.	
	Ft	in	Ft	in
Boring begun clay, sand & gravel		<u>5.66</u>	<u>12</u>	<u>3.66</u>
Bunter. Red sdst. (a little marl abt 125 ft)	<u>92</u>	<u>28.04</u>	<u>104</u>	<u>31.70</u>
	<u>96</u>	<u>29.26</u>	<u>200</u>	<u>60.96</u>

Taken to 149' 0" 12" No. 6.
 No. 1953 D.H. 1st.
 From now British Aluminium Co Ltd
 the Borehole known - borehole filled in
 and abandoned.

SJS&NE-152-5742, 8735

Sampling		Properties			Strata									
Depth	Type	Strength kN/m ²	v %	SPT N	Description	Depth	Level	Legend						
0.5-1.0	U(10)				MADE GROUND: Soil, clay, ash, pottery brick, fragments and pieces of metal.	G.L.	7.8							
1.2	D		19											
1.5-2.0	D.S		21	4										
2.0-2.3	B		22											
2.5-3.0	D.S		22	4										
3.0-3.2	B		21											
3.3	D		25											
3.5-4.0	U(56)	30	16			3.3	4.5							
3.8	W					3.8	4.0							
4.2	D		12											
4.5-5.0	U(80)		9											
5.2	D		7											
5.5-6.0	U(66)	280	10											
6.5	D		5											
7.0-7.5	U(60)		9		Stiff to very stiff brown sandy becoming very sandy CLAY with gravel, carbonaceous inclusions and pockets of silt and sand.									
7.8	D		9											
8.5-9.0	U(80)	155	18											
9.5	D													
9.8-10.3	D.S			35	End of Borehole.	10.3	-2.5							
Drilling					Ground Water									
Type	From	To	Size	Fluid	Struck	Behaviour	Sealed				Date	Hole	Cased	Water
Shell and Auger	GL	10.0	0.15	-	3.7	Seepage					24.6.75	-	-	-
											25.6.75	9.5	6.20	3.8
											25.6.75	10.3	6.20	3.8
Remarks * Sample disturbed due to presence of stones.														
Borehole Record					Project Warrington H.T.D.C. Whittle Brook					Contract S1070/34				
exploration associates										Borehole 2962 Sheet 1 of 1				

SJ58NE1512

Sampling		Properties			Strata				
Depth	Type	Strength kN/m ²	w %	SPT N	Description	Depth	Level	Legend	
0.50-0.95	SDB			98	MADE GROUND: Clay fill*	G.L.	8.6		
					MADE GROUND: Domestic refuse*	0.3	8.3		
1.50-1.95	SDB			91	MADE GROUND: Domestic refuse with some tarmac fill in upper regions	0.55	8.0		
2.80	D				TOPSOIL	2.95	5.6		
2.95-3.40	U(14)				Dark grey brown clayey fine to medium SAND and GRAVEL	3.2	5.4		
3.60	D				End of Borehole	3.6	5.0		

Drilling					Ground Water						
Type	From	To	Size	Fluid	Struck	Behaviour	Sealed	Date	Hole	Cased	Water
Shell and Auger	G.L.	3.6	0.15	-	2.95	Rose to 2.2m in 10 minutes		26.7.85	Nil	Nil	Nil
								26.7.85	3.6	Nil	2.2

Remarks * Drillers Description

Borehole Record exploration associates	Project Warrington and Runcorn DC Whittle Brook Rising Main	Contract S4300/25
		Borehole 8914D Sheet 1 of 1

SJ58NE1519

Sampling		Properties			Strata						
Depth	Type	Strength kN/m ²	w %	SPT N	Description	Depth	Level	Legend			
					MADE GROUND: Bricks and rubble*.	G.L.	7.9				
					MADE GROUND: Ash, stone and white chemical fill*.	0.50	7.4				
1.50-1.95	SB			25	MADE GROUND: Medium dense brown clayey medium to coarse sand with occasional gravel.	1.50	6.4				
2.20	D				Medium dense brown fine to coarse sandy GRAVEL.	2.00	5.9				
2.50-2.95	SB			16							
3.20	D				Brown fine to coarse SAND with much fine to coarse rounded gravel.	3.20	4.7				
3.50-3.95	CB			6		3.50	4.4				
4.00	D				Stiff becoming very stiff brown silty sandy CLAY with some fine to medium angular to rounded gravel.						
4.20-4.65	U(50)	150	26	12							
4.90	D										
5.50-5.95	U(60)	230	10								
					End of Borehole.	6.00	1.9				
Drilling					Ground Water						
Type	From	To	Size	Fluid	Struck	Behaviour	Sealed	Date	Hole	Cased	Water
Shell and Auger	G.L.	6.00	0.15	-	5.50	Seepage.		10.5.85	NIL	NIL	NIL
								10.5.85	6.00	4.50	6.00
Remarks Services location pit excavated to 1.5m below ground level. (2½ hours). * Drillers Description											
Borehole Record					Project			Contract S4300/25			
exploration associates					Warrington and Runcorn D.C. Whittle Brook Rising Main.			Borehole 8917 Sheet 1 of 1			

SJS&NE - 151 - 5733 - 8757

Sampling		Properties			Strata		Depth	Level	Legend			
Depth	Type	Strength kN/m ²	v %	SPT N	Description	Depth	Level					
0.5-1.0	U(31)				TOPSOIL.	0.1	8.1					
1.0-1.3	B		42		MADE GROUND: Clay, ash, decayed vegetation, etc.	0.3	7.8					
1.5-2.0	D.S			2								
2.5-3.0	D.S		36	18			2.7	5.4				
3.2-3.5	W				Medium dense dark grey, slightly clayey SILT with organic traces and roots becoming grey brown very silty SAND.							
3.5-4.0	Y.B											
4.1-4.6	U(56)	17		16		4.2	3.9					
4.7	D											
5.1-5.6	U(93)			9								
6.5-6.6	D				Stiff to very stiff brown sandy CLAY with gravel, and carbonaceous inclusions. Becoming very sandy towards base.							
6.6-7.1	U(102)	280		9								
7.4	D			8								
8.0-8.5	U(136)			8								
8.8	D			8								
9.5-10.0	U(120)	260		10								
10.0	D			11	End of Borehole.	-10.0	-1.9					
Drilling					Ground Water							
Type	From	To	Size	Fluid	Struck	Behaviour	Sealed	Date	Hole	Cased	Water	
Shell and Auger	GL	10.0	0.15	-	1.5	Seepage	4.30	25.6.75	-	-	-	
									26.6.75	8.00	6.00	1.20
									26.6.75	10.00	6.00	Nil
Remarks												
Borehole Record					Project Warrington N.T.D.C. Whittle Brook			Contract S1070/34				
exploration associates								Borehole 2961 Sheet 1 of 1				

SJ58NE1300

PROJECT: WARRINGTON NEW TOWN
 LOCATION: Whittle Brook District Distributor
 GROUND LEVEL: 7.8 DIA. OF CASING: 154 mm. to metres
 INCLINATION: Vertical mm. to metres
 SCALE OF LOG: 1:50 DATE DRILLED: 17.5.72.




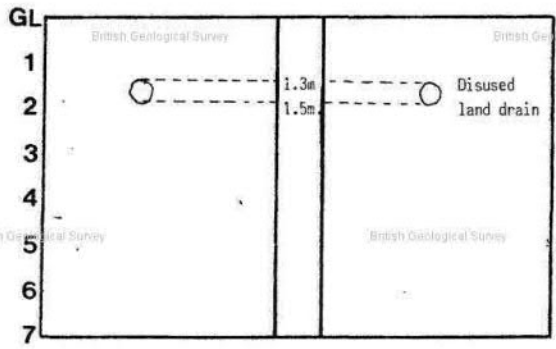
TYPE OF BORING: Shell and Auger

Reduced Level	Depth	Legend	Sampling		Soil Description	Key to Laboratory Tests	Moisture Content and plot of Atterberg Limits			
			Type	Depth			Percent			
							10	20	30	40
			D U(100)	0.50	FILL - black ashes					
			E	1.00						
6.1	1.70		D U(100)	1.50						
5.8	2.00		D	2.00	SAND - brown, clayey					
					BOTTOM OF BOREHOLE					

Ground water encountered at
Quantity

SHEET 1 OF 1

SJ58NE1580

Sampling		Properties			Strata			
Depth	Type	Strength kN m ²	w %	SPT N	Description	Depth	Level	Legend
					MADE GROUND: Dark brown silty sandy clay with gravel, bricks and cobbles.	G.L.	7.3	
					Firm friable dark brown, red brown clayey silty fine to coarse SAND with some brown silty very sandy clay pockets, and some decaying organic material.	1.5	5.8	
					Brown slightly clayey silty fine to coarse SAND and fine to coarse sub-angular to sub-rounded GRAVEL with some sub-rounded cobbles.	2.3 3.1	4.5 4.2	
					Base of Pit.			
						Groundwater & Support		
						Ingress Water ingresses at 1.5m at corner of sides A and D. Ingress slow. Behaviour: Slight, localised collapse in fill 0.5m to 1.0m. Pumping Details: None. Support Systems: None.		
Remarks						Excavation		
						Plant: JCB 3C Area: 3.2 x 1.1m. Date: 23.6.93		
Trial Pit - Record exploration associates				Project Warrington & Runcorn D. C., Whittle Brook Improvement.		Contract: S3200/31 Trial Pit 8210A Sheet 1 of 1		

SJ58NE1581

Sampling		Properties			Strata		Depth	Level	Legend
Depth	Type	Strength kN m ²	w %	SPT N	Description				
0.5-1.0	DBS			5	MADE GROUND: Soil, glass, brick fragments, sand, with firm clayey zones.		6.1	7.2	
1.5-2.0	DBS			8					
2.4-2.9 2.6	BS D			21	Medium dense yellow brown mottled brown medium coarse SAND and GRAVEL, clayey zones present throughout.		2.0	5.2	
3.5-4.0	DBS			12	Becoming grey brown towards base.				
4.6-5.1	DBS			39					
5.3 5.4-5.8	D DS			100+	Red brown occasionally mottled grey weakly cemented SANDSTONE.		5.3	1.0	
					End of Borehole.		5.8	1.4	

Drilling					Ground Water						
Type	From	To	Size	Fluid	Struck	Behaviour	Sealed	Date	Hole	Cased	Water
Shell and Auger	6.1	5.8	0.15	-		Seepage from Sandstone.		10.8.83	Nil	Nil	Nil
								11.8.83	2.1	2.0	Nil
								11.8.83	5.8	5.4	5.2

Remarks Standpipe installed to 5.4m.	
Borehole Record	Project Warrington & Runcorn D. C., Whittle Brook Improvement Scheme.
exploration associates	Contract S3200/31
	Borehole 8210C
	Sheet 1 of 1

EX1

SJ58NE8

SJ58/101B
115 NE 2

JOHN THOM LIMITED, CANAL WORKS, PATRICROFT.

JOURNAL OF BOREHOLE PUT DOWN
FOR THE PENKETH TANNING CO. LTD,
PENKETH, NEAR WARRINGTON - 1930.

7' 0"	Sandy Clay.	7' 0"
16' 0"	Stiff Clay and Pebbles.	23' 0"
1' 0"	Stones.	24' 7"
2' 0"	Clay and Pebbles.	26' 0"
1' 0"	Stones.	27' 0"
4' 0"	Hard Clay and Stone.	31' 0"
3' 0"	-ditto-	34' 0"
1' 0"	Stones.	35' 0"
6' 6"	Hard Clay and Stones.	41' 6"
2' 0"	Gravel.	43' 6"
2' 0"	Soft Sandy Marl.	45' 6"
3' 6"	Marly Sandstone.	49' 0"
41' 0"	Soft Red Sandstone.	90' 0"
3' 0"	Red and Grey Marl.	93' 0"
20' 0"	-ditto-	113' 0"
47' 0"	Red Sandstone.	160' 0"
80' 0"	Red Sandstone and Marl.	240' 0"
12' 0"	Variegated Marl.	252' 0"
10' 0"	Red Sandstone.	262' 0"
14' 0"	Extra Hard Red Marl.	276' 0"
4' 0"	Tough Variegated Marl.	280' 0"
7' 0"	Hard Red Sandy Marl.	288' 0"
6' 0"	Hard Sandstone.	293' 0"
6' 3"	Hard Sandy Marl.	300' 0"
5' 0"	Sandstone.	307' 0"
2' 0"	Variegated Marl.	307' 0"
8' 0"	Hard Sandy Marl.	315' 0"
10' 0"	Hard Sandstone.	325' 0"
15' 0"	Hard Red Sandy Marl.	340' 0"
5' 0"	Hard Grey Sandstone.	345' 0"
12' 0"	Hard Red Sandy Marl.	357' 0"
6' 0"	Hard Red Sandstone.	363' 0"
4' 0"	Hard Sandy Marl.	367' 0"
7' 0"	Hard Red Sandstone.	374' 0"
2' 0"	Hard Red Sandy Marl.	376' 0"
5' 0"	Red Sandstone.	381' 0"
9' 0"	Hard Sandstone.	390' 0"
3' 0"	Hard Red and Grey Sandstone.	393' 0"
2' 0"	Hard Sandstone.	395' 0"
7' 0"	Hard Red and Grey Sandstone.	402' 0"
4' 0"	Hard Red Sandstone.	406' 0"
3' 0"	Hard Red Sandstone.	409' 0"
7' 0"	Extra Hard Sandstone.	416' 0"
1' 0"	Red Sandstone.	417' 0"
12' 0"	Hard Red Sandstone.	429' 0"
69' 0"	Hard Sandstone.	498' 0"
14' 0"	Extra Hard Sandstone.	512' 0"
9' 0"	Sandy Sandstone.	540' 0"
33' 0"	Hard Red Sandstone.	573' 0"
18' 0"	Soft Red Sandstone.	591' 0"
9' 0"	Hard Red Sandstone.	600' 0"
1' 0"	Hard Red Sandstone.	601' 0"

SJ58NE1262

PROJECT: WARRINGTON NEW TOWN
LOCATION: Westbrook III
GROUND LEVEL: 11.3
INCLINATION: Vertical
SCALE OF LOG: 1:50
DIA. OF CASING: 154 mm. to 5.50 metres
DATE DRILLED: 3.5.72
TYPE OF BORING: Shell and Auger

Reduced Level	Depth	Legend	Sampling		Soil Description	Key to Laboratory Tests	Moisture Content and plot of Atterberg Limits			
			Type	Depth			Percent			
							10	20	30	40
10.8	0.50	[Pattern]	D	0.50	TOPSOIL - black					
		[Pattern]	U(100)							
10.3	1.00	[Pattern]	D	1.00	SAND - grey/brown, fine grained, silty, clayey.					
		[Pattern]	D	1.50	CLAY - dark brown, sandy, stony, stiff.					
		[Pattern]	U(100)	2.00						
		[Pattern]	D	2.50						
		[Pattern]	U(100)	3.00		Tx				
		[Pattern]	D	3.50						
		[Pattern]	D	4.00						
		[Pattern]	U(100)	4.50	▼ GWL. 4.50	Ch Tx				
		[Pattern]	D	5.00						
		[Pattern]	U(100)	5.50		Tx				
5.3	6.00	[Pattern]	D	6.00						
					BOTTOM OF BOREHOLE					

Ground water encountered at 4.50
 Quantity Trace

SHEET 1 OF 1

British Geological Survey

SJ58NE1263

PROJECT: WARRINGTON NEW TOWN.

LOCATION: Westbrook III

GROUND LEVEL: 10.2

DIA OF CASING: 154 mm. to 5.5 metres

INCLINATION: Vertical.

mm. to metres

SCALE OF LOG: 1:50

DATE DRILLED: 4.5.72.

TYPE OF BORING: Shell and Auger.

Reduced Level	Depth	Legend	Sampling		Soil Description	Key to Laboratory Tests	Moisture Content and plot of Atterberg Limits				
			Type	Depth			Percent				
							10	20	30	40	
9.7	0.5		D	0.5	TOPSOIL						
			U(100)	0.5	CLAY -light brown, medium firm, sandy, stony.						
			D	1.0							
			D	1.5							
			U(100)	1.5							
			D	2.0							
			D	2.5							
7.7	2.5		D	2.5	CLAY -brown, very stiff, sandy, stony.	Tx					
			D	3.0							
			U(100)	3.0							
			D	3.5							
			D	4.0							
			D	4.5			Tx				
			U(100)	4.5							
			D	5.0							
			D	5.5							
			U(100)	5.5							
4.2	6.0		D	6.0	BOTTOM OF BOREHOLE.						

Ground water encountered at NIL
Quantity

SHEET 1 OF 1

Borehole No 1209

SJ58NE1525

Sampling		Properties			Strata							
Depth	Type	Strength kN/m ²	w %	SPT N	Description	Depth	Level	Legend				
					MADE GROUND: Tarmac*.	G.L.	7.5	[Cross-hatched pattern]				
					MADE GROUND: Concrete*.	0.10	7.4					
					Stiff becoming very stiff brown silty sandy CLAY with some fine to medium rounded gravel and occasional cobbles.	0.50	7.0					
1.50-1.95	U(50)	150	12									
2.20	D											
2.50-2.95	U(60)											
3.20	D											
3.50-3.95	U(60)	210	10									
					End of Borehole.	4.00	3.5					
Drilling					Ground Water							
Type	From	To	Size	Fluid	Struck	Behaviour	Sealed	Date	Hole	Cased	Water	
Shell and Auger	G.L.	4.00	0.15	-	DRY	-	-	9.5.85	NIL	NIL	NIL	
								9.5.85	4.00	1.50	DRY	
Remarks					Services location pit excavated to 1.50m below ground level (3½ hours). * Drillers Description.							
Borehole Record					Project				Contract			
exploration associates					Warrington and Runcorn D.C. Whittle Brook Rising Main.				S4300/25			
									Borehole 8923 Sheet 1 of 1			

SJ58NE1526

Sampling		Properties			Strata							
Depth	Type	Strength kN/m ²	w %	SPT N	Description	Depth	Level	Legend				
					MADE GROUND: Tarmac.	G.L.	8.6					
						0.75	7.8					
1.50-1.95	U(30)				Stiff becoming very stiff brown silty sandy CLAY with some fine to medium angular gravel and occasional coal fragments.							
2.20	D											
2.50-2.95	U(60)	380	9									
3.20	D											
3.50-3.95	U(60)					4.00	4.6					
					End of Borehole.							
Drilling					Ground Water							
Type	From	To	Size	Fluid	Struck	Behaviour	Sealed	Date	Hole	Cased	Water	
Shell and Auger	G.L.	4.00	0.15	-	DRY	-	-	8.5.85	NIL	NIL	NIL	
								9.5.85	1.50	1.50	DRY	
								9.5.85	4.00	1.50	DRY	
Remarks					Services location pit excavated to 1.50m below ground level (1½ hours).							
Borehole Record					Project				Contract S4300/25			
exploration associates					Warrington and Runcorn D.C. Whittle Brook Rising Main.				Borehole 8924 Sheet 1 of 1			

RECORD OF WELL (SHAFT OR BORE)

(For Survey use only)

1-inch Map Registered No.

At Morley Common B.H. No 2 (* see Note)

115 NE 18

Town or Village Warrington

County Cheshire Six-inch quarter sheet 111. V. 2

For Mr. B. Laporte Ltd

Exact site of well see attached tracing

Attach a tracing from a map, or a sketch-map, if possible.

Level of ground surface above sea-level (O.D.) 25 ft.

If well-top is not at ground level, state how far ... (above; below; ft.)

SHAFT ft.; diameter ft. Details of headings

BORE 500 ft.; diameter of bore: at top 2.5 ins.; at bottom 3.5 ins. Lengths, diameters, perforations, etc., of lining tubes

Water struck at depths, below well top, of (feet)

Rest-level of water ft. above well-top. Suction at ft. Yield on hours' pumping, gal. per days' pumping,

per with depression to ft. below well-top, Capacity of pump g.p.h. Recovery to rest level in mins. hours Date of measurements Date of well

Quality of water (attach copy of analysis if available)

Well made by Mrs. Matthews Ltd, Pendleton, Manchester

Information from owner

Additional notes in space overleaf.

GEOLOGICAL CLASSIFICATION

NATURE OF STRATA

THICKNESS DEPTH
Feet ~~metres~~ Feet ~~metres~~

If measurements start below ground surface, e.g., from bottom of an existing shaft, state how far

<u>Fine yellow sand</u>	<u>10</u>	<u>3.05</u>	<u>10</u>	<u>3.05</u>
<u>Sand & gravel</u>	<u>4</u>	<u>1.22</u>	<u>14</u>	<u>4.27</u>
<u>Red sandstone</u>	<u>18</u>	<u>5.49</u>	<u>32</u>	<u>9.76</u>
<u>Red marl</u>	<u>9</u>	<u>0.91</u>	<u>35</u>	<u>10.67</u>
<u>Red sandstone</u>	<u>6</u>	<u>1.83</u>	<u>41</u>	<u>12.50</u>
<u>Red marl</u>	<u>2</u>	<u>0.61</u>	<u>43</u>	<u>13.11</u>
<u>Red sandstone</u>	<u>12</u>	<u>3.66</u>	<u>55</u>	<u>16.77</u>
<u>Dark red medium grained sst.</u>	<u>4</u>	<u>1.22</u>	<u>59</u>	<u>17.99</u>
<u>Conglomerate. Pebbles numerous and up to 1" in diameter, mainly sst, in a sandy matrix</u>	<u>1</u>	<u>0.31</u>	<u>60</u>	<u>18.30</u>
<u>Dark red sandstone with occasional greenish grey mottling with frequent marl patches and micaceous bands up to 1/2" thick</u>	<u>15</u>	<u>4.57</u>	<u>75</u>	<u>22.87</u>
<u>Dark red sst, very hard</u>	<u>18</u>	<u>5.49</u>	<u>93</u>	<u>28.36</u>
<u>Red sandstone lighter red in colour</u>	<u>2</u>	<u>0.91</u>	<u>96</u>	<u>29.27</u>
<u>Marl</u>	<u>4</u>	<u>1.22</u>	<u>100</u>	<u>30.49</u>

Continued over leaf

GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.

Date received

Correspondence File No.

1" N.S. Map No.

1" O.S. Map No.

Site marked (use symbol) on 1" Map on 6" Map

Laporte's now refer to this as their No 1 Bore

Status
Draft 1



Norwest Holst Soil Engineering Ltd.

Borehole No.
1

Date 09/02/93

BOREHOLE LOG - CABLE PERCUSSION

Sheet 1 of 1

Contract No. F9715	Method Cable Percussion	Coords. E 8,648.0
Project River Mersey, Warrington	Drilling Rig Mini Soils Probe	N 5,996.0
Client NRA North West Region	Diameter 65mm	Ground Level 7.22
Consultant Manstock		Orientation Vertical
		Date Started 04/02/93
		Date Completed 04/02/93

SJS&NE 1155

Description of Strata	Legend	Depth below G.L.	O.D. Level	Sampling	Casing Depth	() & "N"	Installation
Brown slightly clayey, silty, very sandy TOPSOIL with occasional fine gravel and many rootlets.		0.18	7.04	D 0.00 0.10			
MADE GROUND: Light brown fine and medium sand with occasional fine to coarse rounded to angular gravel of various lithologies including ash and cinders.		0.60	6.62	D 0.40 0.50			
MADE GROUND: Black and brown mottled slightly clayey sand and fine gravel of ash and cinder and occasionally red sandstone.		0.90	6.32	DS 0.60 0.90		"9"	
Loose brown fine and medium SAND with occasional fine subangular to subrounded gravel.		1.80	5.42				
Soft greyish brown silty slightly sandy CLAY. Damp with slightly organic odour.		3.40	3.82	D 3.40 4.00		"2"	
Very soft brownish grey very silty slightly sandy CLAY with organic odour and occasional fine gravel sized pockets of black amorphous organic material.		4.00	3.22	S 3.60			
Borehole complete at 4.00m.							

REMARKS - See Header Sheet for:
Key to Symbols and abbreviations
Drilling Details, Progress and Water Strikes
General Notes

Form G112
Version 1.04
Revised 24.09.92