



# A6 to Manchester Airport Relief Road

B005 – Mill Hill Hollow Bridge  
Preliminary Design Report  
Report No. 1007/704/085

September 2013

## PRELIMINARY DESIGN REPORT

Structure Name : Mill Hill Hollow Bridge

Structure Number : B005

Report No. 1007/704/085

### Report Control Sheet

Version	Date	Status	Prepared By	Checked By	Approved By
P1	05/01/2012	Draft	N Afshar	N Sheena / T Kshirsagar	N Sheena
2	09/05/2012	Draft (Final)	N Afshar	T Kshirsagar	N Sheena
3	24/01/2013	Draft (Final)	M Mfandarahwa	N Sheena	N Sheena
4	29/08/2013	Draft	L Fields	M Mfandarahwa	N Sheena
5	13/09/2013	Final	L Fields	N Sheena	N Sheena

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## 1. Description of Site

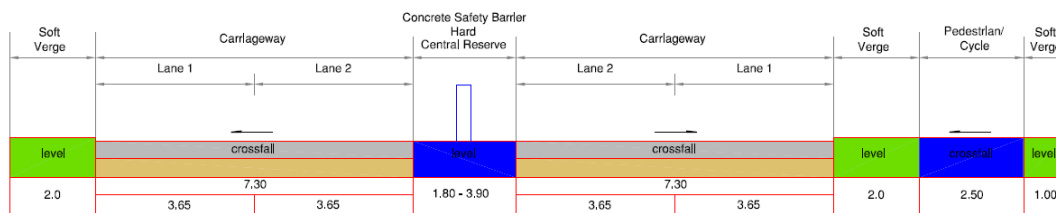
The Mill Hill Hollow Bridge is part of the South East Manchester Multi Modal Strategy (SEMMMS) A6 to Manchester Airport Relief Road (A6MARR) and crosses Norbury Brook approximately 600m North of Poynton Lake at chainage 10300m.

Site location is remote with no direct access from any suitable highway. The nearest road to the proposed structure is Woodford Road located approximately 320m to the Northwest of the farm fields. The alternative access, Macclesfield Road, is approx. 800m north of the proposed structure location. The access would be via the proposed A6MARR route with provision of a temporary bridge structure over Norbury Brook during the construction stage.

There are a few residential houses on Mill Hill Hollow Road to the North of the proposed bridge crossing. The immediate surrounding area is open farm land to the West and to the East. An aerial location plan at 1:1250 scale with the bridge extents delineated in red is included in Appendix A.

## 2. Highway Details

Over Structure – A6MARR with a total width 25.8m as shown in the cross section below:



Under Structure – The bridge spans Norbury brook which will be channelled by new retaining wall structures. The retaining walls are proposed in order to create a footpath at either side of the watercourse.

## 3. Proposed structure

The proposed structure will be a single span fully integral bridge. The superstructure will be in the form of a pre-cast pre-stressed concrete beams and reinforced concrete slab deck. The bridge superstructure will be supported on full height reinforced concrete abutments on piled foundations. The deck width including stringcourses will be 26.8m.

Footpaths at either side of Norbury Brook are supported by contiguous bored pile walls. A continuation of these walls will be used to support bridge B005A to the east of B005.

A proposed General Arrangement drawing is included in Appendix B.

#### **4. Span arrangements**

Single span of 18.0m measured between abutment centrelines. The skew angle is approximately 26 degrees. (The square span of the structure is 16.2m)

#### **5. Headroom and Clearances**

Norbury Brook is not a navigable watercourse and hence headroom is not critical. A clearance of approximately 7.2m is provided above the footpaths at either side of the watercourse

#### **6. Road Restraint system (Bridge Parapets)**

Type N2 steel parapet with mesh infill in accordance with Road Restraints Risk Assessment Process (RRRAP) and with TD 19/06. Working width class not to be greater than W4 and will be decided in the final stage of the design. Parapet height is to be 1.4m at the west verge, which contains a cycle route, and 1.0m at the east verge.

Timber post and three rail fencing with pvc mesh infill is to be provided along the retaining walls adjacent to Norbury Brook.

#### **7. Preferred Structural Options**

##### **7.1 Superstructure Options**

(Single span, fully integral pre-cast pre-stressed concrete beams and slab deck) refer to Drawing Number 1007/3D/DF7/A6-MA/B005/705:

Fully integral construction is a feasible and considered a cost effective solution. Elimination of movement joints removes a major cause of maintenance problems from penetration of dirt, water and de-icing salts, which corrode substructures. The advantages and disadvantages of using pre-cast concrete beams are given below:

The advantages for using pre-cast concrete beam construction are as follows:

- Low capital & whole-life cost
- Good aesthetics due to symmetrical structure
- Fast and efficient build
- Factory quality with engineered tolerances
- Low maintenance
- Precast beams could be lifted individually
- The beams could be lifted individually
- Permanent formwork provides self supporting system during construction and eliminates false-work
- Reduces site works which is weather dependent

Disadvantages:

- Precast concrete beams are usually heavier than comparable steel beams. As a result bigger cranes might be required to lift the precast concrete beams.
- Heavier superstructure mentioned above might lead to bigger foundation sizes
- Delivery times are dependent on specialist supplier

## 7.2 Substructure Options

Considering the topography of the site, existing ground level and the feasibility of the work, full height concrete abutment with return wing walls is the best possible option.

Taking the geotechnical information into account, piled foundation would be a suitable foundation method in order to reduce settlements from the embankment and bridge loading, which could affect the track and track bed. Further geotechnical information is addressed in section 8 of this report.

For the contiguous bored pile walls supporting the footpaths 600mm diameter bored piles have been assumed, based on a retained height of 3m. It is envisaged that the walls are constructed prior to the foundations of bridge B005. The length of the piles required would need to be confirmed after a detailed ground investigation has been carried out and the final design undertaken.

## 8. Geotechnical Information

The ground and groundwater conditions for the Mill Hill Hollow Bridge have been assessed using relevant geological maps (Stockport Sheet 98, Solid and Drift Scale 1:50,000) and 8 No. exploratory bore holes logs are provided by a number of phases of GI for the area (refer to Appendix C for further information).

### 8.1 Groundwater

Groundwater was encountered in two exploratory bore holes, one of which indicated strikes at more than one depth. The overall depths ranged from 2.2mbgl (76.67mAOD) and 6.5mbgl (71.14mAOD). Exploratory bore hole EA\_POYNTON 98\_5 recorded groundwater at 6.5m (71.14mAOD) which rose after 20mins to 1.1mbgl (76.54mAOD), which indicates fast flowing groundwater.

Without any known groundwater monitoring for the site it is important that further investigation/monitoring is carried out in order to assess these groundwater conditions as they could significantly impact on the design and build of the bridge.

### 8.2 Preliminary Geotechnical Assessment

Upon initial assessment, pad foundations founded on full height concrete abutments seemed to provide an appropriate foundation solution for the

bridge, with consideration needed for de-watering and temporary works such as sheet piles. However, exploratory bore hole EA\_POYNTON 98\_5 identified deep SANDS of up to 15mbgl (62.64mAOD), which could be a possible steep sand channel and therefore due to this feature piled foundations are proposed.

The potential for chemical attack on buried concrete within the ground has not been assessed. This will be the responsibility of the foundation designer.

Given that groundwater has been identified in a number of exploratory bore holes, with some significant changes in level over a short period of time drainage methods will need to be considered in the design. Further investigation into the groundwater levels and changes with seasons, along with flow rates is recommended for the design and drainages methods, along with temporary mitigation measures during construction.

## **9. Environmental Impact Considerations**

Refer to Volume 1 (Main Text) of the Environmental Statement.

## **10. Appearance**

The proposed superstructure comprises of 0.95m deep pre-cast beams and 0.5m string course with plain concrete finishes spanning across Norbury Brook. In addition, N2 steel parapets (post with 3 rails- open structure) will be mounted on the string courses either sides of the bridge (please refer to the 3D view of the bridge included in Appendix B).

The faces of abutments and wing walls will be a ribbed concrete finish.

**Appendix A:      Location Plan**

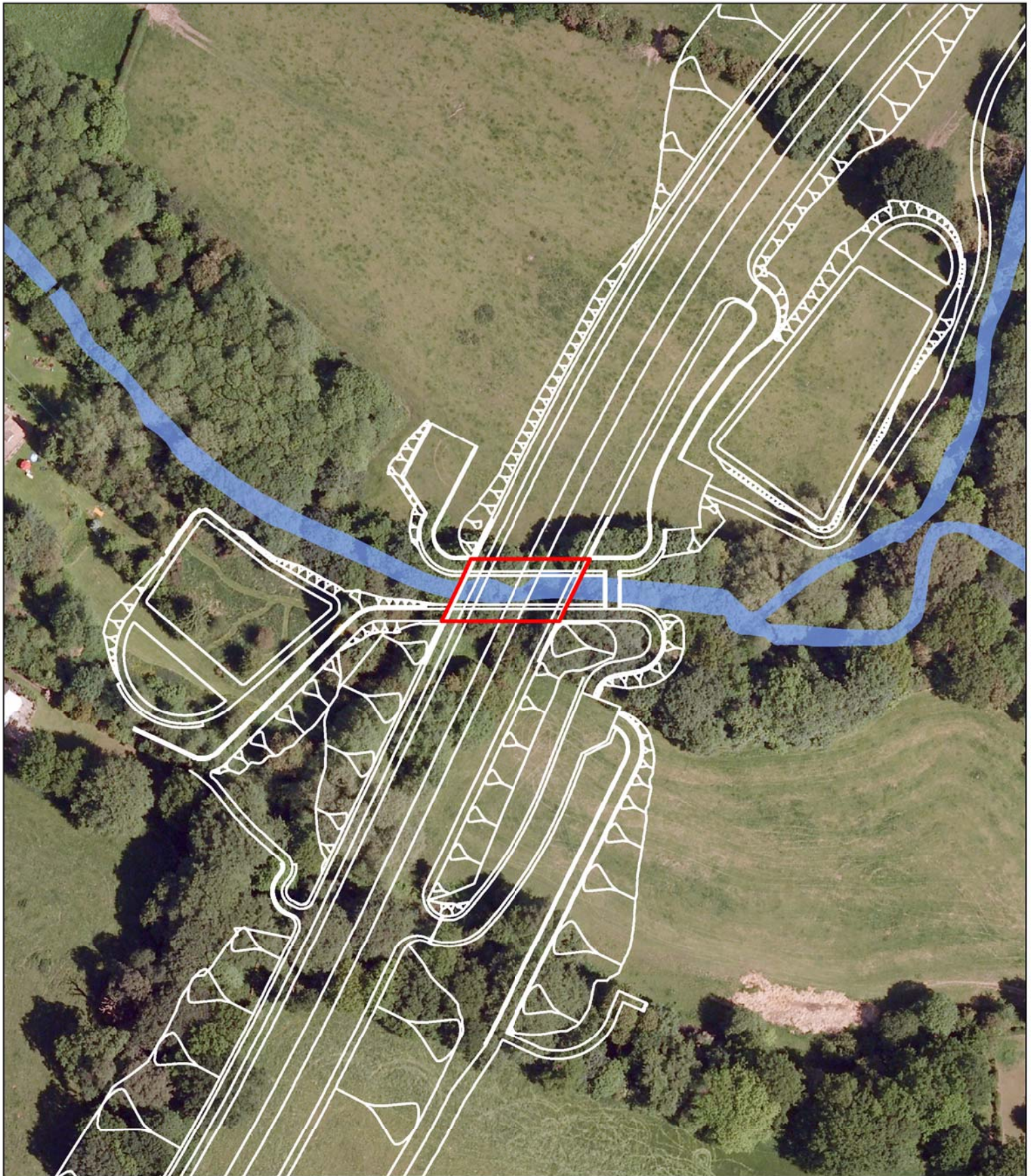





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Ordnance Survey 100019571



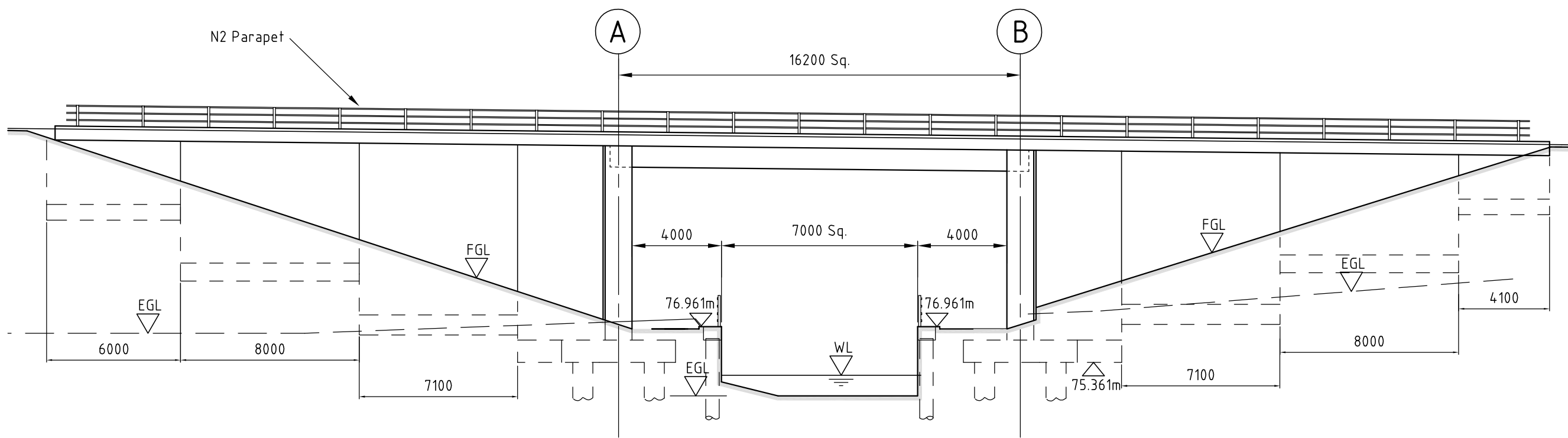
Drawn	CL	Checked	SC	Approved	NH	 <b>NORTH</b>
Date	12/08/2013	Date	12/08/2013	Date	12/08/2013	
Size	A4	Scale	1 : 1,250			
GIS Task	4268	Filename				
Drawing No.	1007-3D-DF7-A6-MA-B005-ALP			Revision		



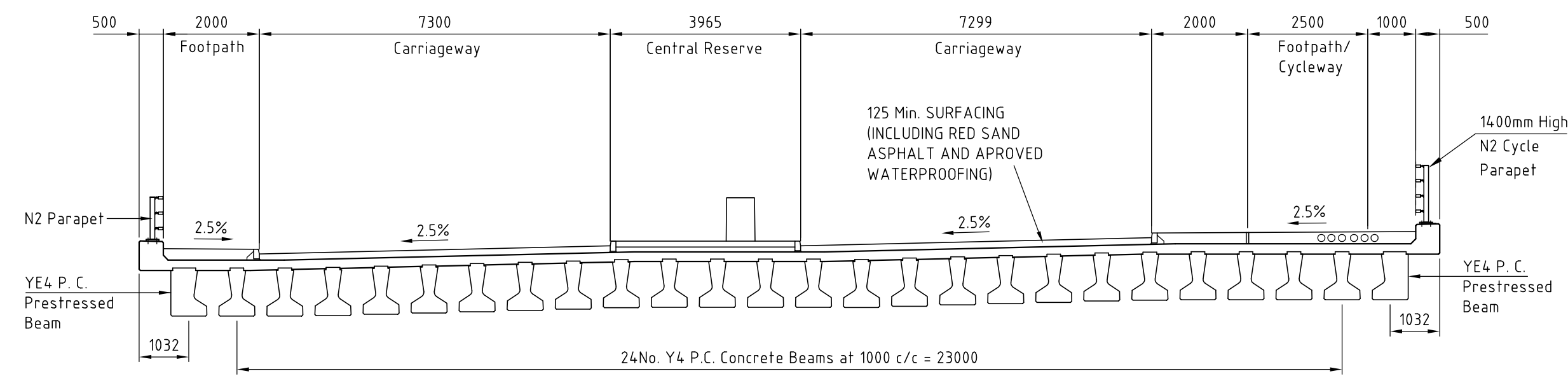
**Appendix B: Proposed General Arrangement Drawing  
3D Model**

**NOTES**

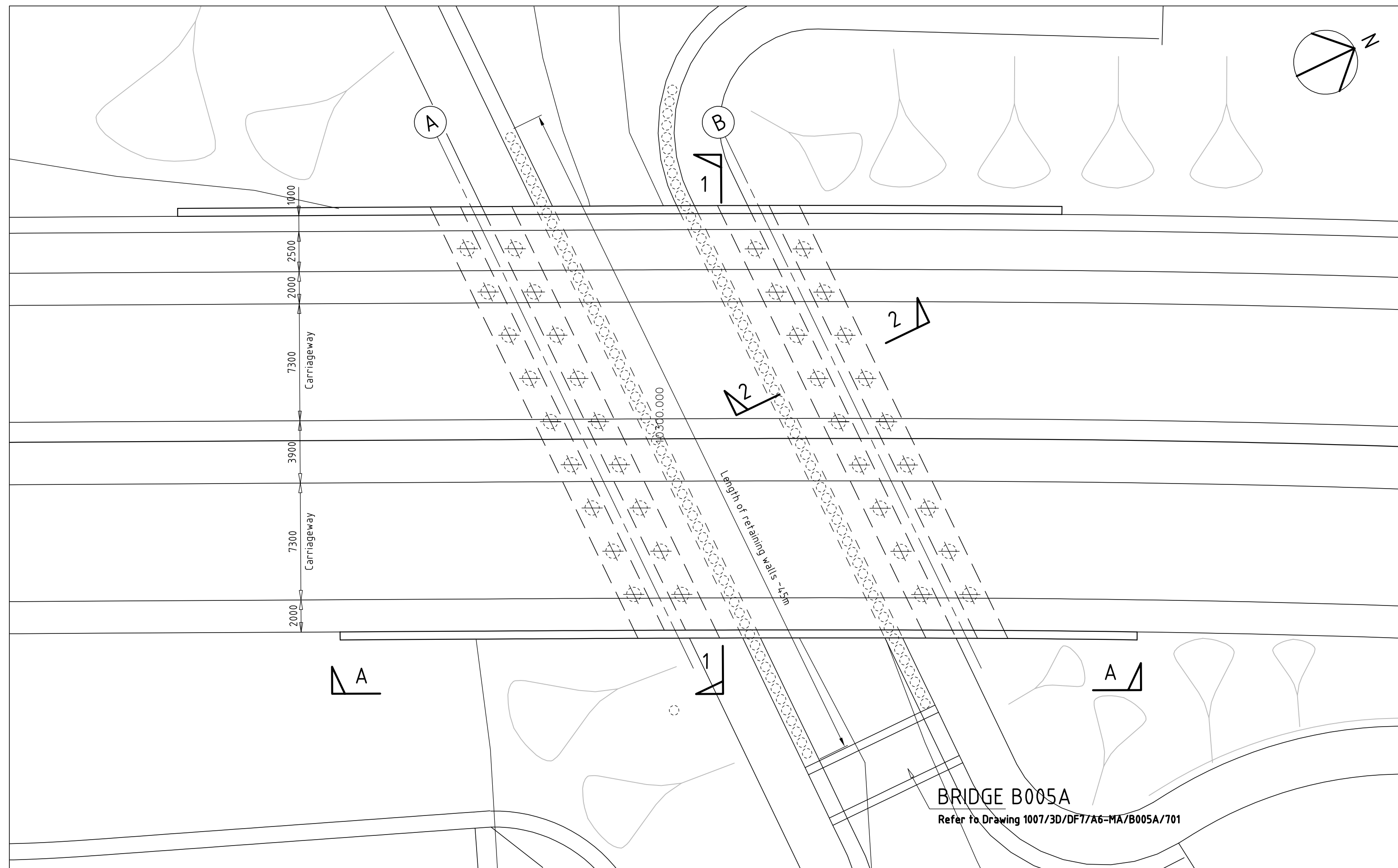
- This drawing has been produced based on the latest MX highway model - D.F.7, as provided by the client (July 2013).
- This drawing has been produced mainly for the purpose of preliminary design and planning.
- Levels are in metres and above Ordnance Datum.
- All dimensions are in millimetres.
- The option shown in this drawing is not for construction.
- The foundation type shown on the drawing is based on the latest available geotechnical information.
- Basic preliminary design has been undertaken to determine the geometry of the section sizes as per client's instruction.
- Concrete strengths:-  
 Precast panel C32/ 40  
 Piles C32/ 40  
 Abutment diaphragm C40/ 50  
 Deck slab C40/ 50  
 Parapet edge beams C40/ 50  
 Precast beams C50/ 60
- Permanent formwork is required.
- Concrete finishes to be as per MCHW specification series 1700 U.N.O. :-  
 Buried foundations : F1, U1  
 Abutment columns : F1  
 Buried face of abutment : F1  
 Waterproofing : F4  
 Precast beams : F5  
 Precast concrete panel F4  
 Parapet edge beam : F3, U3  
 Deck slab top surface : U4



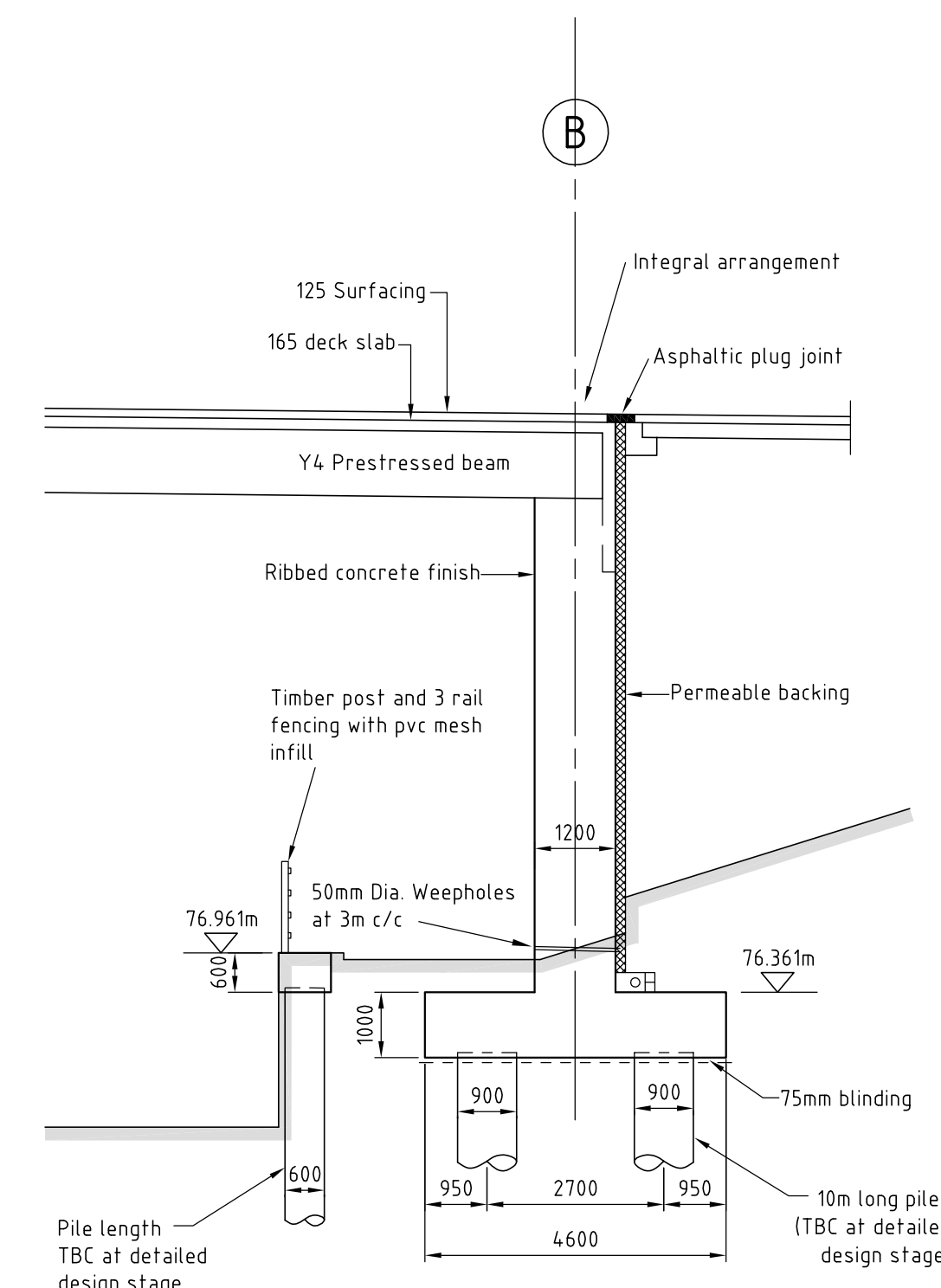
**ELEVATION A-A**  
(1:200)



**SECTION 1-1**  
(1:100)



**PLAN**  
SCALE 1:200



**SECTION 2-2**  
(1:100)

Rev.	Drawn	Checked	Date	Revision Details
C	LF	M.M.	12/09/13	ISSUED FOR PLANNING
B	SPH	M.M.	16/08/13	ADDITIONAL WALKWAY ADDED UNDER BRIDGE ROAD ALIGNMENT REVISED.
A	SPH	N.A.	19/03/13	REVISED INCORPORATING CLIENTS COMMENTS
-	LF	NS	27/1/12	Pile Foundations and wingwalls amended.

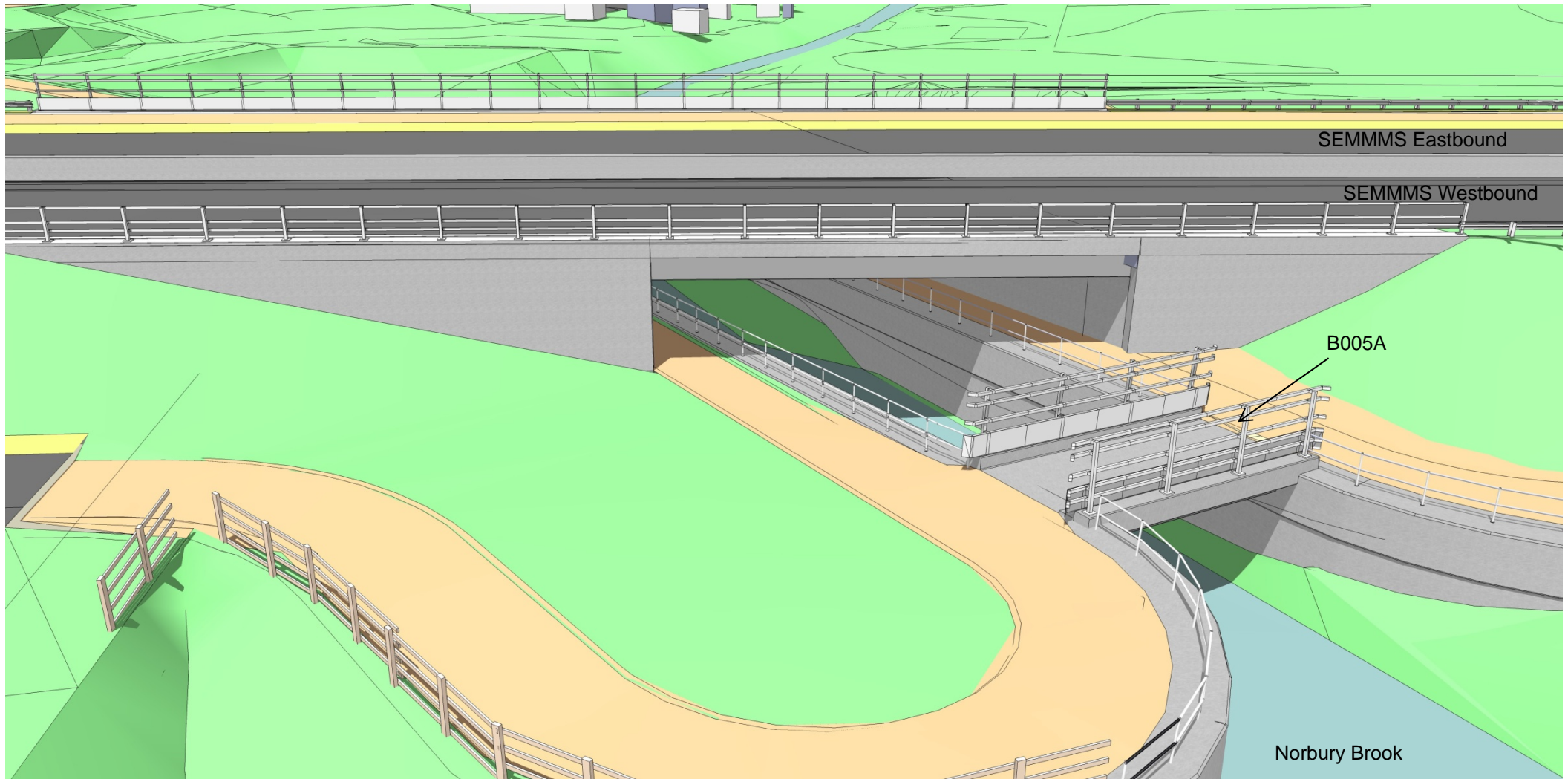
South east manchester multi modal strategy  
**semms**  
 STOCKPORT MANCHESTER CITY COUNCIL  
 FRED PERRY HOUSE, STOFFORD HOUSE  
 PICCADILLY, STOCKPORT SK1 5ZE  
 TEL 0161 474 474 FAX : 0161

**A6 TO MANCHESTER AIRPORT RELIEF ROAD**

**B005 MILL HILL HOLLOW BRIDGE GENERAL ARRANGEMENT**

Drawn	Engineer	Checked	Approved
DB/RBG	NA	TK	NS
Date	Date	Date	Date
23/11/11	23/11/11	23/11/11	23/12/11
Size	Scale	AS SHOWN	
A1	AS SHOWN		
SCG No.	Filename		

Drawing No.	Revision
1007/3D/DF7/A6-MA/B005/705	C



**B005 – Mill Hill Hollow Bridge**  
**B005A – Pedestrian Bridge over Norbury Brook**

View Looking East

**Appendix C: Reviewed Ground Investigation Information**

# BOREHOLE LOG

<b>Project:</b> SEMMS		<b>Job No:</b> 37732ISG		Borehole No.	
<b>Date:</b> 12-05-1992/12-05-1992		<b>Co-ordinates:</b> E 391771.0 N 384987.7		<b>EA POYNTON 98_1</b>	
<b>Contractor:</b> GEOTECHNICAL ENGINEERING LIMITED			<b>Engineer:</b> Faber Maunsell Ltd		Sheet: 1 of 1

Samples & Tests					Strata				Backfill/ Instrument		
Depth	Type No	Test Results	TCR SCR RGD	If (mm)	Water/ (Flush Return)	O.D. Level	Depth (Thickness)	Description		Legend	
0.50	0.50	B 558 SPT D 5811					0.20	TOPSOIL: Dark brown friable sandy with rootlets.			
							(1.00)	Loose brown silty fine, medium and coarse gravelly SAND, in places lightly organic.			
1.00		D 5812					1.20	Red-brown completely weathered fine and medium grained SANDSTONE, with occasional subrounded and rounded coarse gravel. Recovered as sand with fragments of very weak sandstone.			
1.40	1.40	B 559 C D 5813					(2.00)				
2.00		C					2.60				
2.60		C					3.20	Red-brown highly to completely weathered SANDSTONE, very weak. (flush returns only)			
3.20	3.20	D 5814 C					(3.00)				
							70.31	6.20			
											End of Borehole

AGS3\_NEW GLEB | SW BH LOG (CP/R/C) | K:\47060785 - SEMMS\050 PROJECT INFORMATION\GINT\47060785-SEMMS.GPJ | AGS3\_NEW GDT | 23/11/2011 | 10:26:11

Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: CP	





# BOREHOLE LOG

<b>Project:</b> SEMMS		<b>Job No:</b> 37732ISG		Borehole No.	
<b>Date:</b> 08-05-1992/08-05-1992		<b>Co-ordinates:</b> E 391809.5 N 384964.6		<b>EA POYNTON 98_2</b>	
<b>Contractor:</b> GEOTECHNICAL ENGINEERING LIMITED			<b>Engineer:</b> Faber Maunsell Ltd		Sheet: 1 of 1

Samples & Tests					Strata				Backfill/ Instrument	
Depth	Type No	Test Results	TCR SCR RGD	If (mm)	Water/ (Flush Return)	O.D. Level	Depth (Thickness)	Description		Legend
0.50	0.50	B 5815 SPT				78.57	0.30	TOPSOIL: firm dark-brown peaty		
							(0.40)	Firm brown and orange mottled very sandy CLAY.		
1.00	1.20	D 5816 U 5817				78.17	0.70	Loose orange and brown fine and medium SAND with small lenses of peat.		
							(0.80)			
1.70	1.70	B 560 C D 5818				77.37	1.50	Medium dense brown fine, medium and coarse clayey SAND and subangular and subrounded fine, medium and coarse GRAVEL.		
							(1.10)			
2.30	2.30	C				76.27	2.60	Medium dense brown fine, medium and coarse very silty SAND.		
							(0.50)			
2.90	2.90	B 561 SPT				75.77	3.10	Firm brown silty slightly sandy CLAY.		
							(1.00)			
4.00	4.00	D 582 ISPT				74.77	4.10	Medium dense orange-brown fine and medium SAND. Below 4.50m: red-brown		
							(2.30)			
5.80	5.90	D 5824 SPT				72.47	6.40	End of Borehole		

AGS3\_NEW GLEB | SW BH LOG (CP/R/C) | K:\47060785 - SEMMS\050 PROJECT INFORMATION\GINT\47060785-SEMMS.GPJ | AGS3\_NEW GDT | 23/11/2011 | 10:26:13

Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: CP	
2.20		20	2.20	No rise in 20 minutes		
4.30		20	3.70			

# BOREHOLE LOG

<b>Project:</b> SEMMS		<b>Job No:</b> 37732ISG		Borehole No.	
<b>Date:</b> 11-05-1992/11-05-1992		<b>Co-ordinates:</b> E 391792.7 N 385014.2		<b>EA POYNTON 98_3</b>	
<b>Contractor:</b> GEOTECHNICAL ENGINEERING LIMITED			<b>Engineer:</b> Faber Maunsell Ltd		Sheet: 1 of 2

Samples & Tests					Strata			Backfill/ Instrument		
Depth	Type No	Test Results	TCR SCR RGD	If (mm)	Water/ (Flush Return)	O.D. Level	Depth (Thickness)		Description	Legend
0.50	0.50	D 5826 SPT N = 5(450mm) 1 1/1 1 1 2					(0.90)	TOPSOIL: Firm brown sandy clay with rootlets.		
1.00		D 5827					0.90	Firm friable brown sandy CLAY with sand lenses.		
1.20		U 5828					(0.60)			
1.70	1.70	D 5829 SPT N = 35(450mm) 2 2/4 9 10 12					1.50	Medium dense brown fine, medium and coarse SAND and subangular sand subrounded fine and medium GRAVEL, occasional rounded coarse gravel.		
2.20		D 5830					(1.70)			
2.40	2.40	B 563 C U 595 N = 55(450mm) 11 14/13 14 13 15					3.20	Red-brown highly to completely weathered medium and coarse grained SANDSTONE, with occasional rounded gravel. Recovered as sand.		
2.90		C N = 74(300mm) 8 17/24 50 0 0 0					75.87			
3.50		C N = 0(600mm) 31 50/0 0 0 0					(1.40)			
4.10	4.10	B 564 C N = 0(600mm) 22 50/0 0 0 0					4.60	Below 4.60m: very weak friable poorly cemented with very closely spaced subhorizontal sandy discontinuities. Rare subrounded pebble inclusions.		
4.60		C N = 0(525mm) 50 0/0 0 0 0					74.47			
6.10		C N = 0(525mm) 50 0/0 0 0 0					(6.13)			
7.60		C N = 0(525mm) 50 0/0 0 0 0								
9.10		C N = 0(525mm) 50 0/0 0 0 0								

Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: RO	

AGS3\_NEW\_GLB | SW BH LOG (CP/RC) | K:\47060785 - SEMMS\050 PROJECT INFORMATION\GINT\47060785-SEMMS.GPJ | AGS3\_NEW\_GDT | 23/11/2011 | 10:26:14



# BOREHOLE LOG

<b>Project:</b> SEMMS		<b>Job No:</b> 37732ISG		Borehole No.	
<b>Date:</b> 11-05-1992/11-05-1992		<b>Co-ordinates:</b> E 391792.7 N 385014.2		<b>EA POYNTON 98_3</b>	
<b>Contractor:</b> GEOTECHNICAL ENGINEERING LIMITED			<b>Engineer:</b> Faber Maunsell Ltd		Sheet: 2 of 2

Samples & Tests					Strata				Backfill/ Instrument	
Depth	Type No	Test Results	TCR SCR RQD	If (mm)	Water/ (Flush Return)	O.D. Level	Depth (Thickness)	Description		Legend
10.60	C	N = 0(600mm) 31 50/0 0 0 0				68.34	10.73	Below 4.60m: very weak friable poorly cemented with very closely spaced subhorizontal sandy discontinuities. Rare subrounded pebble inclusions. <i>(continued)</i>	.....	
								End of Borehole		

AGS3\_NEW\_ELB | SW BH LOG (CP/RC) | K:\47060785 - SEMMS\050 PROJECT INFORMATION\GINT\47060785-SEMMS.GPJ | AGS3\_NEW\_GDT | 23/11/2011 | 10:26:14

Water Strikes					Method, Equipment and Remarks
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: RO



# BOREHOLE LOG

<b>Project:</b> SEMMS		<b>Job No:</b> 37732ISG		Borehole No.	
<b>Date:</b> 08-05-1992/11-05-1992		<b>Co-ordinates:</b> E 391829.2 N 385001.9		<b>EA POYNTON 98_4</b>	
<b>Contractor:</b> GEOTECHNICAL ENGINEERING LIMITED			<b>Engineer:</b> Faber Maunsell Ltd		Sheet: 2 of 2

Samples & Tests					Strata				Backfill/ Instrument	
Depth	Type No	Test Results	TCR SCR RGD	If (mm)	Water/ (Flush Return)	O.D. Level	Depth (Thickness)	Description		Legend
						66.65	10.70	Red-brown highly to completely weathered fine and medium SANDSTONE. Very weak, poorly cemented with rare subrounded pebble inclusions. Below 3.00m: medium and coarse. 6.20m: coarse subrounded gravel sized pebbles recovered. <i>(continued)</i>	.....	
								End of Borehole		

AGS3\_NEW GLEB | SW BH LOG (CP/RC) | K:\47060785 - SEMMS\050 PROJECT INFORMATION\GINT\47060785-SEMMS.GPJ | AGS3\_NEW GDT | 23/11/2011 | 10:26:16

Water Strikes					Method, Equipment and Remarks
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: CP

# BOREHOLE LOG

<b>Project:</b> SEMMS		<b>Job No:</b> 37732ISG		Borehole No.	
<b>Date:</b> 21-04-1992/22-04-1992		<b>Co-ordinates:</b> E 391805.1 N 385035.9		<b>EA POYNTON 98_5</b>	
<b>Contractor:</b> GEOTECHNICAL ENGINEERING LIMITED			<b>Engineer:</b> Faber Maunsell Ltd		Sheet: 1 of 2

Samples & Tests				Strata				Backfill/ Instrument
Depth	Type No	Test Results	TCR SCR RGD If (mm)	Water/ (Flush Return)	O.D. Level	Depth (Thickness)	Description	
0.45	0.45	D 5834 SPT N = 23(450mm) 4 4/5 5 6 7			77.24	(0.40) 0.40	Turf over TOPSOIL	
0.90		D 5835					Medium dense brown fine, medium and coarse silty SAND and GRAVEL.	
1.20	1.20	B 566 C N = 27(450mm) 4 5/5 7 7 8				(1.20)		
1.80		SPT N = 22(450mm) 3 4/4 5 5 8			76.04	1.60	medium dense red-brown fine, medium and coarse slightly silty SAND. Trace fine gravel. Below 3.00m: dense.	
2.25		D 5836						
2.40	2.40	B 567 SPT D 5837 N = 30(450mm) 4 5/5 6 8 11					Dense red-brown medium SAND. Below 7.80m: orange-brown fine, medium and coarse gravelly sand. Below 9.50m: very dense. At 12.00m: dense. Below 13.75: red-brown.	
2.85		D 5838				(2.40)		
3.00	3.00	SPT N = 36(450mm) 5 8/8 9 9 10						
3.45		D 5839			73.64	4.00		
4.00	4.00	U 596 B 666 D 5840 SPT N = 34(450mm) 6 7/7 8 8 11						
4.65		D 5841						
4.80	4.80	SPT N = 39(450mm) 6 8/8 9 11 11						
5.25		D 5842						
5.40	5.40	SPT N = 42(450mm) 7 8/9 11 11 11						
5.85		D 5843						
6.00	6.00	W 5844 SPT N = 40(450mm) 6 8/8 9 11 12						
6.45		D 5845						
7.00	7.00	B 568 U 597 D 5846 SPT N = 44(450mm) 8 8/9 11 11 13						
7.05	7.20							
7.65		D 5847						
7.80	7.80	SPT N = 44(450mm) 8 9/10 10 11 13						
8.25		D 5848						
8.40	8.40	SPT N = 49(450mm) 9 10/11 12 12 14						
8.85		D 5849						
9.05	9.05	SPT N = 47(450mm) 9 10/10 12 12 13						
9.50	9.55	D 5850 SPT N = 51(450mm) 9 11/11 12 13 15				(11.00)		

AGS3\_NEW GLEB | SW BH LOG (CP/R/C) | K:\47060785 - SEMMS\050 PROJECT INFORMATION\GINT\47060785-SEMMS.GPJ | AGS3\_NEW GDT | 23/11/2011 | 10:26:18

Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: CP	
6.50		20	1.10	Fast inflow		

# BOREHOLE LOG

<b>Project:</b> SEMMS		<b>Job No:</b> 37732ISG		Borehole No.	
<b>Date:</b> 21-04-1992/22-04-1992		<b>Co-ordinates:</b> E 391805.1 N 385035.9		<b>EA POYNTON 98_5</b>	
<b>Contractor:</b> GEOTECHNICAL ENGINEERING LIMITED			<b>Engineer:</b> Faber Maunsell Ltd		Sheet: 2 of 2

Samples & Tests				Strata					Backfill/ Instrument	
Depth	Type No	Test Results	TCR SCR RGD	if (mm)	Water/ (Flush Return)	O.D. Level	Depth (Thickness)	Description		Legend
10.00	B 569							Dense red-brown medium SAND. Below 7.80m: orange-brown fine, medium and coarse gravelly sand. Below 9.50m: very dense. At 12.00m: dense. Below 13.75: red-brown. (continued)	[Dotted Pattern]	
10.15	U 598 SPT	N = 53(450mm) 9 11/11 12 14 16								
10.60	D 5851									
11.10	D 5852									
11.35	SPT	N = 50(450mm) 9 10/11 11 12 16								
11.80	D 5853									
11.95	SPT	N = 48(450mm) 10 10/11 11 12 14								
12.40	D 5854									
12.55	SPT	N = 56(450mm) 11 12/12 14 14 16								
13.00	B 570									
13.15	D 5855 SPT	N = 55(450mm) 9 11/11 13 14 17								
13.50	D 5856									
13.75	SPT	N = 63(450mm) 10 12/12 16 17 18								
14.20	D 5857									
14.55	SPT	N = 64(450mm) 12 12/13 15 17 19								
15.00	D 5858				62.64	15.00	End of Borehole			

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Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: CP	

# BOREHOLE LOG

<b>Project:</b> SEMMS		<b>Job No:</b> 37732ISG		Borehole No.	
<b>Date:</b> 23-04-1992/24-02-1992		<b>Co-ordinates:</b> E 391844.6 N 385025.5		<b>EA POYNTON 99_1</b>	
<b>Contractor:</b> GEOTECHNICAL ENGINEERING LIMITED			<b>Engineer:</b> Faber Maunsell Ltd		Sheet: 1 of 2

Samples & Tests					Strata				Backfill/ Instrument	
Depth	Type No	Test Results	TCR SCR RQD	If (mm)	Water/ (Flush Return)	O.D. Level	Depth (Thickness)	Description		Legend
0.45	B 571 SPT D 5859	N = 9(450mm) 1 2/2 2 3 2				77.98	0.30	TOPSOIL: (turfed)		
0.90	D 5860						(0.80)	Loose brown fine and medium slightly clayey SAND.	X O X O X O	
1.20	B 572					77.18	1.10	Dense yellow-brown fine, medium and coarse silty very gravelly SAND with occasional cobbles.	X O X O X O	
1.65	SPT	N = 33(450mm) 5 5/6 8 8 11					(1.70)			
2.25	C	N = 36(450mm) 5 7/8 8 9 11								
2.80	B 573 C	N = 56(450mm) 8 9/11 11 15 19				75.48	2.80	Very dense brown subrounded medium and coarse GRAVEL, occasional cobbles.	X O X O X O	
3.40	U 599 C	N = 54(450mm) 9 14/15 11 14 14					(1.20)			
4.00	B 574 SPT	N = 47(450mm) 5 9/10 11 11 15				74.28	4.00	Very dense orange-brown fine, medium and coarse gravelly SAND.	X O X O X O	
4.45	D 5861									
4.60	SPT	N = 58(450mm) 6 9/11 15 15 17								
5.05	D 5862									
5.20	B 575 SPT	N = 50(450mm) 8 8/10 11 15 14					(3.00)			
5.65	D 5863									
5.80	SPT	N = 55(450mm) 9 11/12 12 14 17								
6.25	D 5864									
6.40	SPT	N = 68(450mm) 11 12/14 14 17 23								
6.85	D 5865									
7.00	C	N = 0(600mm) 28 50/0 0 0 0				71.28	7.00	Weak red-brown SANDSTONE.	X O X O X O	
							(5.30)			

AGS3\_NEW GLEB | SW BH LOG (CP/R/C) | K:\47060785 - SEMMS\050 PROJECT INFORMATION\GINT\47060785-SEMMS.GPJ | AGS3\_NEW GDT | 23/11/2011 | 10:26:20

Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: CP	



# BOREHOLE LOG

<b>Project:</b> SEMMS		<b>Job No:</b> 37732ISG		Borehole No.	
<b>Date:</b> 23-04-1992/24-02-1992		<b>Co-ordinates:</b> E 391844.6 N 385025.5		<b>EA POYNTON 99_1</b>	
<b>Contractor:</b> GEOTECHNICAL ENGINEERING LIMITED			<b>Engineer:</b> Faber Maunsell Ltd		Sheet: 2 of 2

Samples & Tests					Strata				Backfill/ Instrument	
Depth	Type No	Test Results	TCR SCR RGD	If (mm)	Water/ (Flush Return)	O.D. Level	Depth (Thickness)	Description		Legend
								Weak red-brown SANDSTONE. <i>(continued)</i>		
						65.98	12.30	End of Borehole		

AGS3\_NEW\_ELB | SW BH LOG (CP/RG) | K:\47060785 - SEMMS\050 PROJECT INFORMATION\GINT\47060785-SEMMS.GPJ | AGS3\_NEW\_GDT | 23/11/2011 | 10:26:20

Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: CP	





# BOREHOLE LOG



<b>Project:</b> SEMMS		<b>Job No:</b> 37732ISG		Borehole No.
<b>Date:</b> 06-05-1992/06-05-1992		<b>Co-ordinates:</b> E 391844.2 N 385028.8		<b>Ground Level:</b> 78.51 (m)
<b>Contractor:</b> GEOTECHNICAL ENGINEERING LIMITED			<b>Engineer:</b> Faber Maunsell Ltd	
				<b>EA POYNTON 99</b> - 1R Sheet: 2 of 2

Samples & Tests					Strata				Backfill/ Instrument	
Depth	Type No	Test Results	TCR SCR RGD	If (mm)	Water/ (Flush Return)	O.D. Level	Depth (Thickness)	Description		Legend
13.00	C	N = 0(600mm) 27 50/0 0 0 0				63.61	14.90	Red-brown highly weathered poorly cemented medium and coarse SANDSTONE. Very weak with very closely spaced sub-horizontal sandy discontinuities. Rare subrounded pebble inclusions, moderately weathered, wea. 8.80m to 9.00m, 9.60m to 10.60m. 9.50m. Pebbly bed. Below 10.60m: highly to completely weathered. Very weak. 13.10m to 14.50m: occasional pebbles. Very weak mudstone inclusion. <i>(continued)</i>		
								End of Borehole		

AGS3\_NEW GLEB | SW BH LOG (CP/R/C) | K:\47060785 - SEMMS\050 PROJECT INFORMATION\GINT\47060785-SEMMS.GPJ | AGS3\_NEW GDT | 23/11/2011 | 10:26:21

Water Strikes					Method, Equipment and Remarks
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: RO

# BOREHOLE LOG

<b>Project:</b> SEMMS		<b>Job No:</b> 37732ISG		Borehole No.	
<b>Date:</b> 03-04-1992/03-04-1992		<b>Co-ordinates:</b> E 391836.0 N 385065.9		<b>EA POYNTON 99_2</b>	
<b>Contractor:</b> GEOTECHNICAL ENGINEERING LIMITED			<b>Engineer:</b> Faber Maunsell Ltd		Sheet: 1 of 1

Samples & Tests					Strata				Backfill/ Instrument	
Depth	Type No	Test Results	TCR SCR RGD	If (mm)	Water/ (Flush Return)	O.D. Level	Depth (Thickness)	Description		Legend
						78.89	0.30	Turf over TOPSOIL.		
0.50	0.50	D 5866 SPT N = 6(375mm) 1 0/1 1 2 2					(0.70)	Firm brown silty slightly sandy CLAY.		
1.00		D 5867				78.19	1.00	medium dense grey-brown fine, medium and coarse SAND and GRAVEL. At 2.80m: very gravelly with occasional cobbles.		
1.20		U 5868								
1.60		B 576						(2.10)		
1.70	1.70	U 600 SPT D 5869 N = 15(450mm) 2 2/3 3 5 4								
2.20	2.30	D 5870 SPT N = 23(450mm) 3 4/4 7 5 7						76.09		
2.80	2.90	D 5871 SPT N = 50(225mm) 11 21/50 0 0 0				76.09	3.10			
3.20	3.20	D 5872 SPT B 577 N = 37(450mm) 3 5/7 8 8 14				75.89	3.30	Dense yellow brown fine, medium and coarse gravelly SAND.		
3.70	3.80	D 5873 SPT N = 47(450mm) 5 7/9 11 12 15						(2.65)		
4.30	4.40	D 5874 SPT N = 61(450mm) 5 7/11 14 15 21								
4.90	5.00	D 5875 SPT N = 83(450mm) 10 15/17 17 22 27						73.24		
5.50	5.60	D 5876 SPT N = 117(425mm) 5 7/15 21 31 50				73.24	5.95		End of Borehole	

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Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: CP	