



A6 to Manchester Airport Relief Road

B007 – Woodford Road Bridge
Preliminary Design Report-Draft
Report No. 1007/704/087

September 2013

PRELIMINARY DESIGN REPORT

Structure Name : Woodford Road Bridge

Structure Number : B007

Report No. 1007/704/087

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
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5	13/09/2013	Final	L Fields	N Sheena	N Sheena

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3D Model

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1. Description of Site

The proposed Woodford Road Bridge is part of the South East Manchester Multi Modal Strategy (SEMMMS) A6 to Manchester Airport Relief Road scheme (A6MARR), carrying the existing Woodford Road over the A6MARR route. It is located 300m north of the existing Woodford Bridge which crosses the West Coast Main Railway Line.

There are a number of residential and commercial properties in the vicinity of the site and along Woodford Road, North and South of the proposed bridge. The immediate surrounding area is generally open farm land. 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: Woodford Road, a two lane carriageway with footways either side (3.0m Footway+ 7.3 Carriageway + 1.0m Verge).

Under Structure: Under Structure – A6MARR with a total width of 23.9m.

3. Proposed structure

The proposed structure will be a single span simply supported bridge (Semi Integral construction). The superstructure will be in the form of a composite plate girder steel beam & reinforced concrete slab deck. The bridge superstructure will be supported on full height reinforced concrete (R.C) abutments, which will be founded on bored piles. The square deck width including parapet up stands will be 12.3m. R.C return wing walls on piled foundations are also proposed. A proposed General Arrangement drawing is included in Appendix B.

4. Span arrangements

Single skewed span of 33.7m measured between abutment faces. Skew angle is approximately 47 degrees.

5. Bridge Articulation

The superstructure will be supported on bearings under each plate girder; free at one end and pinned at other end.

6. Headroom and Clearances

The provided headroom is greater than 5.3m. In accordance with TD 27 there is a need to consider impact on the superstructure. The lane width and cycle way width are in accordance with TD 27.

7. Road Restraint system (Bridge Parapets)

Type N2 steel parapet with mesh infill is in accordance with Road Restraints Risk Assessment Process (RRRAP) and with TD 19/06. Working width class to be not greater than W4 and will be decided in the final stage of design. The parapet height is to be 1.0m at both North and South Verges.

8. Preferred Structural Options

8.1. Superstructure Options

Simply supported, semi-integral composite steel plate girder with slab deck. Refer to Drawing number 1007/3D/DF7/A6-MA/B007/707 and the 3D Model:

For span ranges of 30m to 45m, steel plate girder is normally considered a cost effective solution. The advantages and disadvantages of using steel plate girder composite structure are given below;

Advantages:

- With composite structures, lower construction depth will be achievable. Normal depth to span ratio is 1/20 to 1/30 typical.
- Overall, lower weight of superstructure will be achievable. With composite bridge, typically 30-50% reduction of weight is anticipated compared with similar concrete decks.
- Light units for erection will be achievable. As a result, erection will be carried out by smaller cranes.
- Pre-fabrication in factory is possible. Quality control will be undertaken in good condition.
- Even number of girders achieves better optimisation of material and allows bracing in pairs.
- Permanent formwork provides self supporting system during construction and eliminates false-work.
- Reduces site works which is weather dependent.

Disadvantages:

- Maintenance is required against corrosion.
- Delivery times are dependent on specialist supplier.

8.2 Substructure Options

(In-situ concrete wall abutment)

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

Taking the geotechnical information into account, piled foundation would be a suitable foundation solution in order to reduce settlements from the embankment and bridge loading, which could affect the track and track bed. Further discussion regarding the geotechnical assessment is addressed in section 9 of this report.

9. Geotechnical Information

The ground and groundwater conditions for the proposed Woodford Road Bridge have been assessed using relevant geological maps (Stockport Sheet 98, Solid and Drift Scale 1:50,000) and 7 No. exploratory bore holes logs are provided by a number of phases of GI for the area.

9.1 Groundwater

Groundwater was encountered in 7 of the 8 exploratory bore holes, five of which indicated strikes at more than one depth. All but two readings showed a rise in level after 20mins, the two strikes that didn't show a rise were within the Sand bands, all others were within the Clay or at the Clay/Sand horizon. These changes in levels indicate fast flowing water. The overall depths ranged from 1.2mbgl (87.05mAOD) and 9.5mbgl (77.91mAOD).

9.2 Preliminary Geotechnical Assessment

It is anticipated that the maximum allowable bearing pressures for a pad foundation on the firm to stiff CLAY would be 150kPa, with consideration needed for settlement in the soft material at depth (refer to Appendix C for further information).

It is therefore recommended that piled foundation would provide a more suitable foundation solution for the proposed bridge in order to achieve the required loads and settlement tolerance. The length of piles will need to be confirmed by the pile designer.

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 almost all of the 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 drainage methods, along with temporary mitigation measures during construction.

10. Environmental Impact Considerations

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

11. Appearance

The proposed superstructure will obviously be visible, which on elevation comprises of approximately 1.5m deep steel beams and 0.5m string course spanning across the A6MARR. 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 in Appendix B). The bridge approaches will be carried on approximately 3.0m embankments. The

abutment and wing wall facing at the bridge location is going to be of concrete finish.

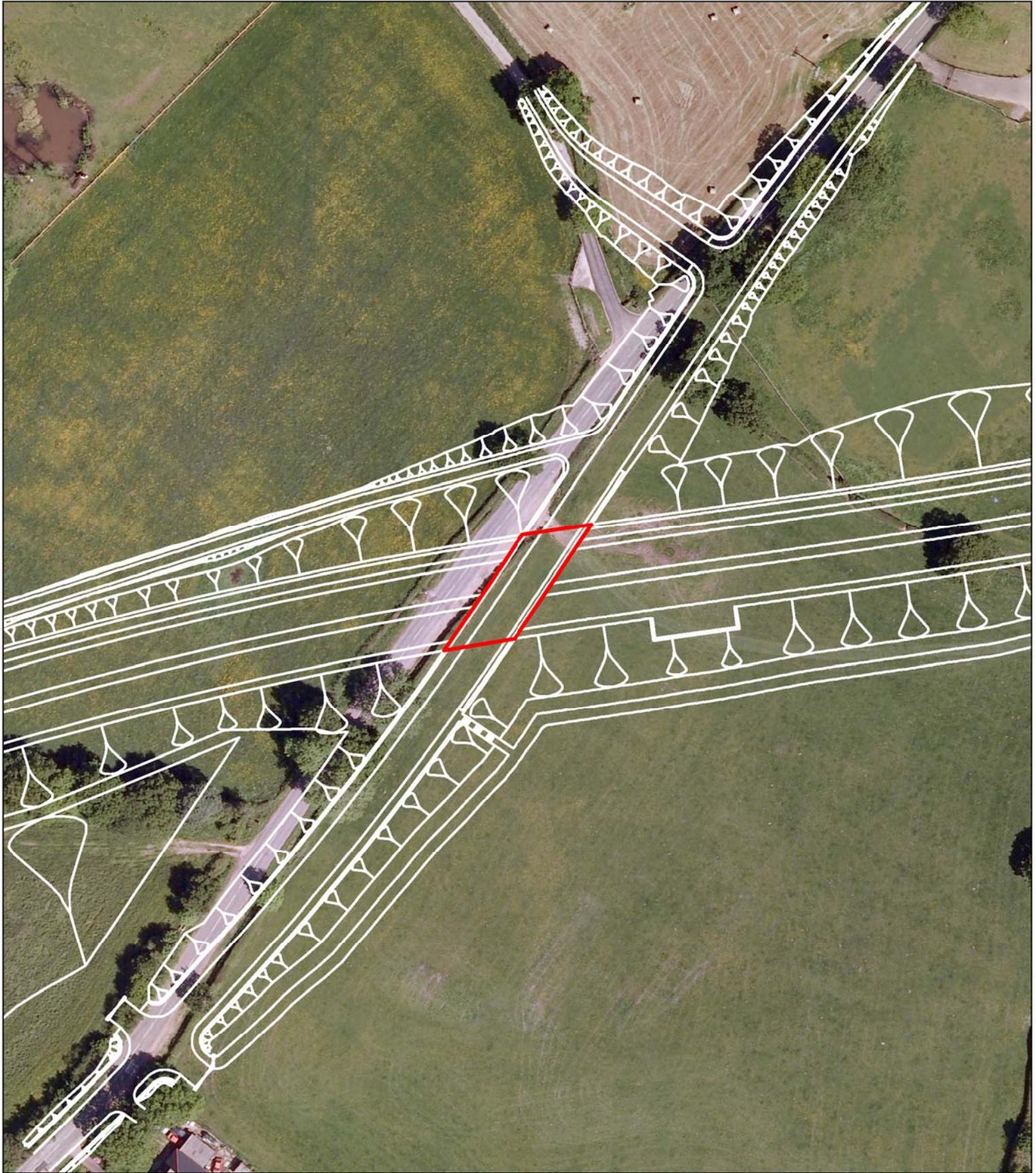
Appendix A: Location plan



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Ordnance Survey 100019571

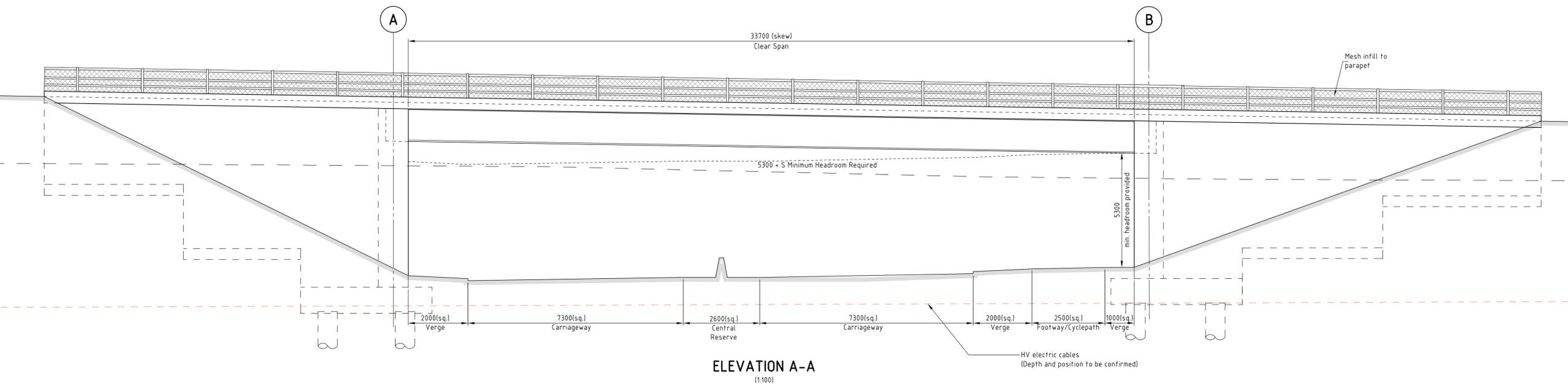


Drawn	CL	Checked	SC	Approved	NH	 NORTH
Date	12/08/2013	Date	12/08/2013	Date	12/08/2013	
Size	A4	Scale	1 : 1,250			
GIS Task	4268	Filename				
Drawing No.	1007-3D-DF7-A6-MA-B007-ALP			Revision		

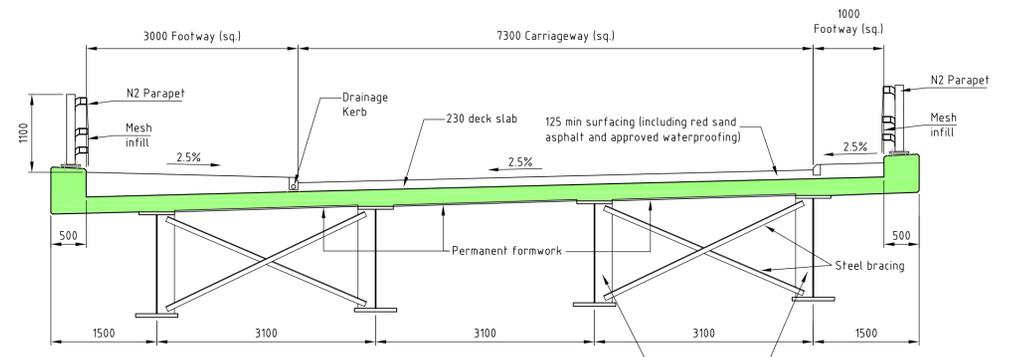
**Appendix B: Proposed General Arrangement drawing
3D Model**

NOTES

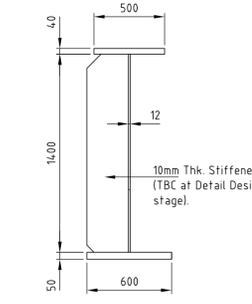
- This drawing has been produced based on the latest MX highway model - Draft Design Freeze DF7, as provided by the client (July 2013).
- This drawing has been produced mainly for the purpose of preliminary design and planning.
- Levels are in metres and above Ordnance Datum.
- All dimensions are in 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
 Abutment 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 : F1.
 Buried face of abutment : F1.
 Waterproofing : F4.
 Precast beams : F5.
 Precast concrete panel : F4.
 Parapet edge beam : F4, U3.
 Deck slab top surface : U4.



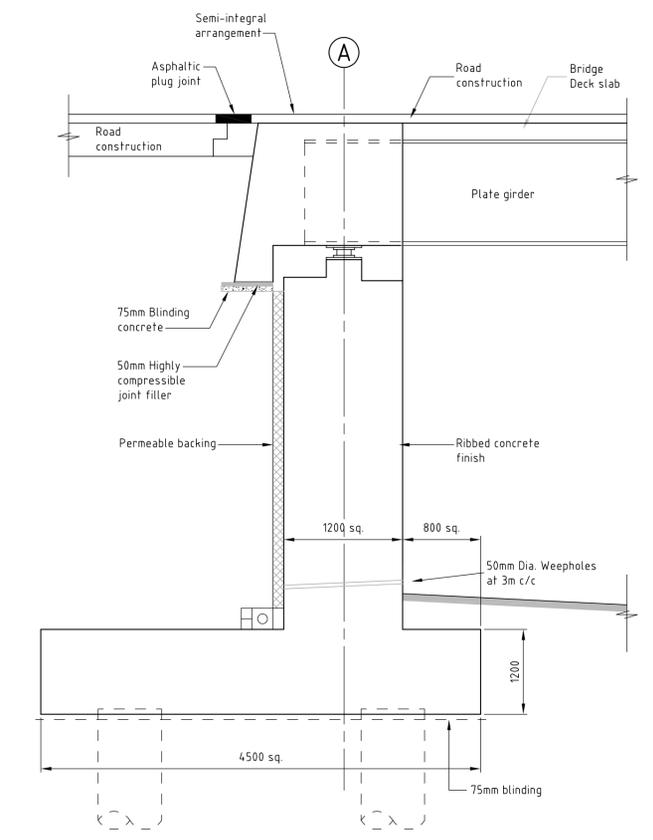
ELEVATION A-A
(1:100)



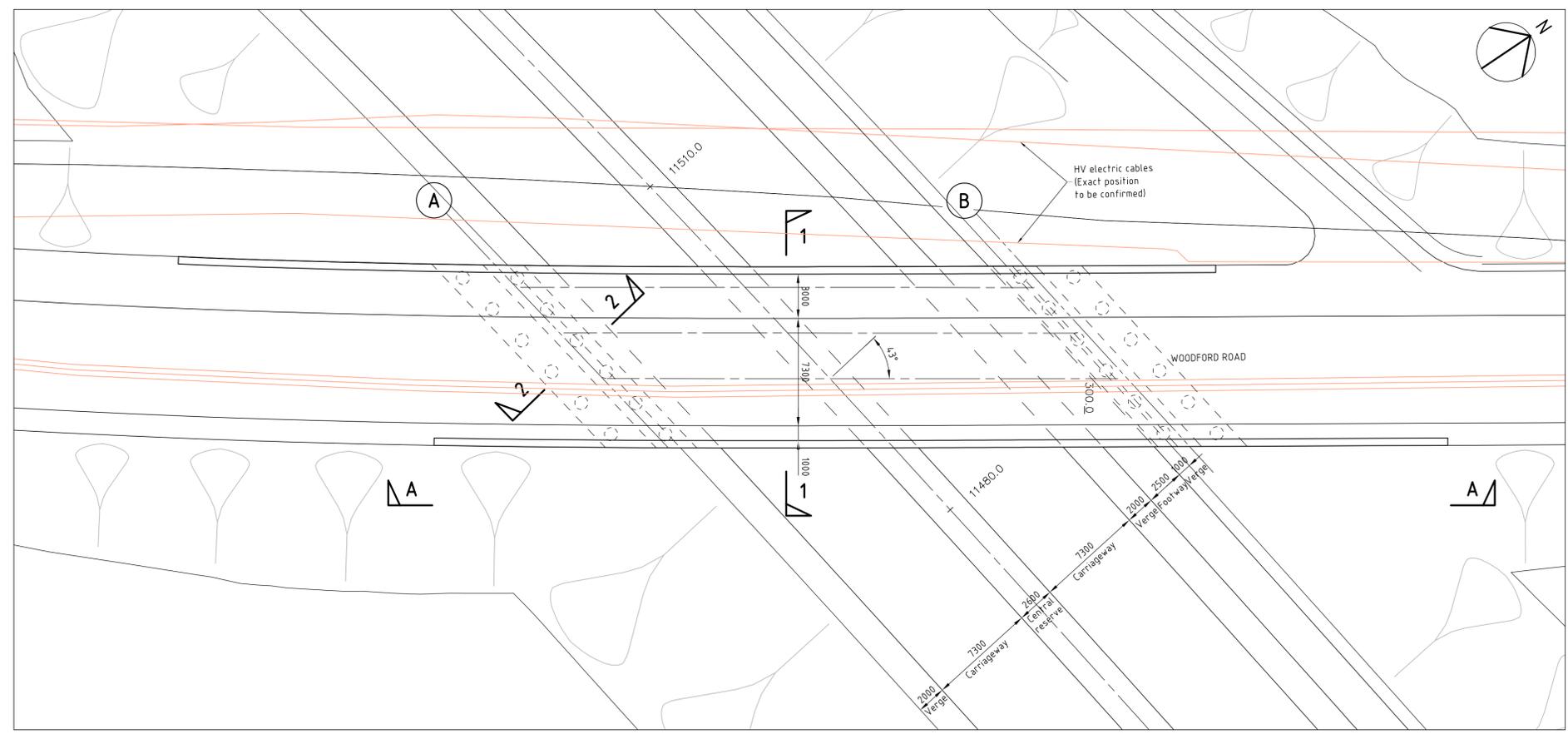
SECTION 1-1
(1:50)



TYPICAL SECTION THROUGH MAIN GIRDER
(1:25)



SECTION 2-2
(1:50)



PLAN
(1:200)

Rev.	Drawn	Checked	Date	Revision Details
C	SPH	MM	12.09.13	ISSUED FOR PLANNING
B	SPH	MM	02.09.13	PARAPETS UPDATED.
A	SPH	N.A	18/03/13	REVISED INCORPORATING CLIENTS COMMENTS
-	SPH	NS	15/5/12	Elevation & Section 2-2 revised.

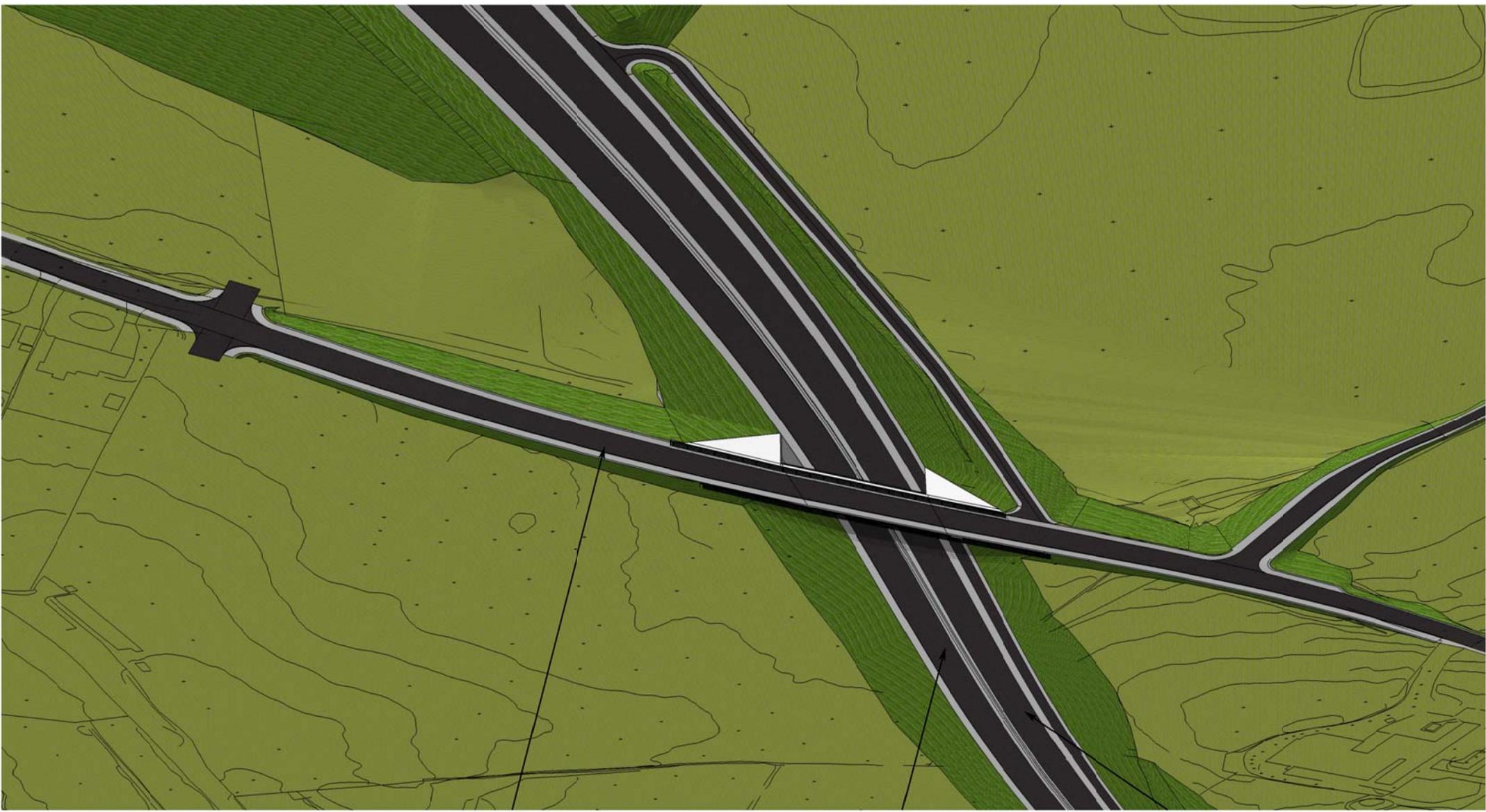
South east manchester multi modal strategy
semms
 STOCKPORT MANCHESTER CITY COUNCIL
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A6 TO MANCHESTER AIRPORT RELIEF ROAD

B007 WOODFORD ROAD BRIDGE GENERAL ARRANGEMENT

Drawn	Engineer	Checked	Approved
BDJ	LF	LF/NS	NS
Date	Date	Date	Date
DEC '11	DEC '11	DEC '11	DEC '11
Size	Scale	AS SHOWN	
A1	AS SHOWN		
SCG No.	Filename		

Drawing No. 1007/3D/DF7/A6-MA/B007/707 Revision C



Woodford Road

SEMMS Westbound

SEMMS Eastbound

Appendix C: Reviewed Ground Investigation Information

BOREHOLE LOG

Project: SEMMS		Job No: 37732ISG		Borehole No.	
Date: 04-04-2005/05-04-2005		Co-ordinates: E 390745.5 N 384320.4		BH100	
Contractor: GEOTECHNICAL ENGINEERING LIMITED			Engineer: Faber Maunsell Ltd		
Sheet: 1 of 2					

Samples & Tests				Water/ (Flush Return)		Strata			Legend	Backfill/ Instrument
Depth	Type No	Test Results	TCR SCR RQD	If (mm)	O.D. Level	Depth (Thickness)	Description			
0.00	D 1									
0.00-0.30	D* 1				86.27	0.30	TOPSOIL: Firm and stiff friable dark brown and grey-brown sandy clay with a little subangular to rounded fine and medium gravel of various lithologies and frequent fine rootlets. Occasional fine gravel size pockets of orange-brown discolouration.			
0.30-0.80	B 3					(0.50)				
0.50	D 4				85.77	0.80	Firm and stiff light grey-brown and orange-brown sandy locally slightly sandy CLAY with a little fine and medium subangular fine and medium predominantly sandstone gravel and occasional fine rootlets.			
0.80-1.20	D 5					(0.90)				
1.00	D 6						Stiff dark brown mottled grey slightly micaceous slightly sandy CLAY with a little subrounded and rounded sandstone gravel and occasional fine rootlets. Locally indistinctly structured with much orange-brown staining and occasional thin partings of orange-brown sand.			
1.20-1.65	D* 6				84.87	1.70				
2.00-2.45	D 9	SPT N = 13(450mm)					Firm brown mottled grey slightly sandy CLAY with a little subangular to rounded fine sandstone gravel and occasional fine gravel size pockets of silt and fine sand. 2.00 - 2.45 With occasional fine fragments of coal and fine silt partings.			
2.45-2.00	B 10	2 3/2 3 4 4								
3.00-3.45	U 11						3.50 - 3.50 Gravel becomes rare. Silt partings become frequent.			
3.50	D 12									
4.00-4.45	D 13	SPT N = 12(450mm)					Stiff brown slightly micaceous slightly sandy CLAY:SILT.			
4.45-4.00	B 14	1 2/3 2 4 3				(5.30)				
5.00-5.45	U 15						5.50 - 5.50 Becoming locally red-brown and sandy.			
5.50	D 16									
6.00-6.45	D 17	SPT N = 13(450mm)					Stiff indistinctly structured brown locally slightly sandy CLAY with occasional fine silt partings and medium gravel size pockets of orange-brown sand.			
6.45-6.00	B 18	2 2/3 3 4 3				79.57				
7.00-7.45	U 19						Stiff indistinctly structured brown locally slightly sandy CLAY with occasional fine silt partings and medium gravel size pockets of orange-brown sand.			
7.45-7.00	B 19					(1.00)				
8.00-8.45	B 20	SPT N = 14(450mm)					Stiff indistinctly structured brown locally slightly sandy CLAY with occasional fine silt partings and medium gravel size pockets of orange-brown sand.			
8.45-8.00		2 2/3 4 3 4				78.57				
9.00-9.45	U 21						Stiff indistinctly structured brown locally slightly sandy CLAY with occasional fine silt partings and medium gravel size pockets of orange-brown sand.			
9.50	D 22									

Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks		
					EQUIPMENT: Light cable percussive (shell and auger) rig. METHOD: Hand dug inspection pit 0.00-1.20m. Cable percussion (150mm) 1.20-17.50m. CASING: 150mm diam to 17.50m. BACKFILL: On completion, a standpipe piezometer (19mm) was installed with tip at 15.00m, bentonite seal 17.50-15.00m, granular response zone 15.00-13.00m, bentonite seal 13.00-0.20m, concrete and raised cover 0.20-0.00m. REMARKS: Hole advanced by chiselling 17.10-17.50m (1hr). Method: CP	

AGS3_NEW GLEB | SW BH LOG (CP/RC) | K:\47060785 - SEMMS\050 PROJECT INFORMATION\GINT\47060785-SEMMS.GPJ | AGS3_NEW GDT | 23/11/2011 | 10:42:02



BOREHOLE LOG

Project: SEMMS		Job No: 37732ISG		Borehole No.	
Date: 04-04-2005/05-04-2005		Co-ordinates: E 390745.5 N 384320.4		BH100	
Contractor: GEOTECHNICAL ENGINEERING LIMITED			Engineer: 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
10.00-10.45	D 23 SPT B 24	N = 19(450mm) 3 4/5 4 5 5					(5.00)	Stiff indistinctly structured brown locally slightly sandy CLAY with occasional fine silt partings and medium gravel size pockets of orange-brown sand. <i>(continued)</i>		
11.00-11.45	U 25									
11.50	D 26							11.50 - 12.45 With frequent medium gravel size lenses and pockets of red-brown fine to coarse sand.		
12.00-12.45	D 27 SPT B 28	N = 13(450mm) 2 2/2 3 4 4								
13.00-13.00	D 29 SPT D 30	N = 50(285mm) 7 13/15 35				73.57	13.00	Very dense red-brown silty fine and medium SAND.		
13.50	D 31							13.50 - 13.50 Becoming fine to coarse grained.		
14.00-14.50	D 32 SPT B 33	N = 50(220mm) 9 16/50					(3.00)	14.00 - 16.00 Locally tending to a weak sandstone.		
15.00-15.30	D 34 SPT	N = 50(255mm) 7 13/21 29								
16.50-16.50	D 35 C	N = 50(85mm) 25 /50				70.57	16.00	Weak to moderately weak red-brown fine to coarse grained SANDSTONE recovered as silty sand and coarse gravel size fragments.		
17.50-17.50	D 36 C	N = 50(155mm) 10 15/50				69.07	17.50	End of Borehole		

AGS3_NEW GLEB | SW BH LOG (CP/RG) | K:\47060785 - SEMMS\050 PROJECT INFORMATION\GINT\47060785-SEMMS.GPJ | AGS3_NEW GDT | 23/11/2011 | 10:42:03

Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks		
					EQUIPMENT: Light cable percussive (shell and auger) rig. METHOD: Hand dug inspection pit 0.00-1.20m. Cable percussion (150mm) 1.20-17.50m. CASING: 150mm diam to 17.50m. BACKFILL: On completion, a standpipe piezometer (19mm) was installed with tip at 15.00m, bentonite seal 17.50-15.00m, granular response zone 15.00-13.00m, bentonite seal 13.00-0.20m, concrete and raised cover 0.20-0.00m. REMARKS: Hole advanced by chiselling 17.10-17.50m (1hr). Method: CP	



BOREHOLE LOG

Project: SEMMS		Job No: 37732ISG		Borehole No.
Date: 01-04-1992/02-04-1992		Co-ordinates: E 390766.3 N 384334.8		EA POYNTON 85_1
Contractor: GEOTECHNICAL ENGINEERING LIMITED			Engineer: 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 5328 SPT				86.44	0.60	TOPSOIL: Dark brown sandy with rootlets.			
0.95		D 5329						Stiff orange and grey slightly sandy CLAY with some subangular fine and medium gravel with occasional gleying on fissure surfaces.			
1.20		U 5330					(1.55)				
1.70	1.70	D 5331 SPT				84.89	2.15				
2.15		D 5332						Firm to stiff brown silty sandy CLAY with occasional subangular fine gravel. At 2.40m: very stiff. Below 2.90m: with bands of firm silty clay and poorly laminated clay.			
2.40		U 5333									
2.90	2.90	D 5334 SPT									
3.35		D 5335					(2.35)				
3.60		U 5336									
4.10	4.10	D 5337 SPT				82.54	4.50	Firm red-brown very sandy CLAY with some subangular and subrounded fine, medium and coarse gravel. At 6.00m: soft.			
4.55		D 5338									
5.40	5.40	D 5339 SPT									
5.85		D 5340						medium dense orange-brown fine and medium SAND with bands of firm brown sandy CLAY. Below 8.40m: brown fine, medium and coarse sand.			
6.00		U 5341					(2.80)				
6.50	6.50	D 5342 SPT				79.74	7.30				
6.95		D 5343									
7.30		DU 5344									
7.65	7.70	D 5345 SPT									
8.15		D 5346									
8.40	8.40	B 429 SPT									
8.90	8.90	D 5347 SPT					(3.40)				
9.50	9.50	B 430 SPT D 5348									

Water Strikes					Method, Equipment and Remarks				
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: CP				
4.10		20	2.80						

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BOREHOLE LOG

Project: SEMMS		Job No: 37732ISG		Borehole No.	
Date: 13-04-1992/13-04-1992		Co-ordinates: E 390846.0 N 384345.0		EA POYNTON 86_2	
Contractor: GEOTECHNICAL ENGINEERING LIMITED			Engineer: Faber Maunsell Ltd		Sheet: 1 of 3

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
						87.46	0.25	TOPSOIL: (turfed)		
0.50	0.50	D 5374SPT N = 10(450mm) 1 2/2 2 3 3						Firm orange and grey fissured sandy CLAY. Below 1.70m: firm to stiff orange-brown with some subangular fine and medium gravel. Below 2.40m: stiff. At 2.90m: brown silt, poorly laminated. At 4.60m: firm, laminated. Below 5.30m: very sandy. At 7.20m: firm to stiff.		
1.00		D 5375								
1.20		U 5376								
1.70	1.70	D 5377SPT N = 13(450mm) 2 2/3 3 3 4								
2.20		D 5378								
2.40		U 5379								
2.90	2.90	D 5380SPT N = 19(450mm) 3 3/4 5 5 5								
3.40		D 5381								
3.60		U 501 U 5382								
4.10	4.10	D 5383SPT N = 19(450mm) 2 3/4 5 5 5								
4.60		D 5384			(8.65)					
4.80		U 5385								
5.30	5.30	D 5386SPT N = 24(450mm) 2 3/7 6 6 5								
5.80		D 5387								
6.00		U 502 U 5388								
6.50	6.50	D 5389SPT W 5390 N = 18(450mm) 1 3/4 4 4 6								
7.00		D 5391								
7.20		U 5392								
7.70	7.70	W 5393SPT D 5394 N = 23(450mm) 3 5/5 6 6 6								
8.20		D 5395								
8.40		U 503 U 5396								
8.90		D 5397 U 5398			78.81	8.90				
9.40	9.40	D 5399SPT N = 67(450mm) 8 14/14 16 17 20				(0.80)				
9.90		D 5400			78.01	9.70				
							Stiff red-brown fissured very sandy CLAY with some subrounded fine, medium and coarse gravel.			
								Below 10.00m: medium dense red-brown fine, medium and coarse SAND.		

Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: CP	
7.30		20	6.50			
9.70		20	7.70			

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BOREHOLE LOG

Project: SEMMS		Job No: 37732ISG		Borehole No.	
Date: 13-04-1992/13-04-1992		Co-ordinates: E 390846.0 N 384345.0		EA POYNTON 86_2	
Contractor: GEOTECHNICAL ENGINEERING LIMITED			Engineer: Faber Maunsell Ltd		Sheet: 2 of 3

Samples & Tests				Strata				Backfill/ Instrument
Depth	Type No	Test Results	TCR SCR RGD If (mm)	Water/ (Flush Return)	O.D. Level	Depth (Thickness)	Description	
10.00	B 433	SPT N = 26(450mm) 3 5/6 6 6 8					Below 10.00m: medium dense red-brown fine, medium and coarse SAND. (continued)	X
10.50	D 5401	SPT N = 23(450mm) 2 3/5 6 6 6				(2.00)		X
11.10	D 5402	SPT N = 19(450mm) 1 3/4 5 5 5						X
11.70	U 504 D 5403 U 5404				76.01 75.91	11.70 11.80	Firm brown silty sandy CLAY. Firm brown laminated silty CLAY with silt partings.	X
12.20	D 5405	SPT N = 17(450mm) 2 3/3 4 5 5				(1.00)		X
12.70	D 5406	C N = 33(450mm) 4 5/8 8 8 9			74.91	12.80	Dense red-brown fine, medium and coarse SAND and sub-angular coarse GRAVEL. Below 15.20m: very dense.	X
13.40	C	N = 31(450mm) 2 4/7 8 8 8						X
14.00	C	N = 45(450mm) 5 7/8 11 12 14						X
14.60	C	N = 48(450mm) 6 8/10 11 12 15						X
15.20	C	N = 57(450mm) 6 8/11 14 15 17				(5.30)		X
15.80	C	N = 57(450mm) 5 7/11 14 15 17						X
16.40	C	N = 0(525mm) 50 0/0 0 0 0						X
17.00	B 435	C N = 51(450mm) 5 8/8 12 15 16						X
17.60	C	N = 66(450mm) 5 10/12 15 18 21			69.61	18.10	Very dense orange-brown fine and medium SAND.	X
18.20	D 5407	SPT N = 70(450mm) 10 12/14 16 18 22						X
18.80	D 5408	SPT N = 49(450mm) 5 9/10 12 12 15				(1.90)		X
19.40	D 5409	SPT N = 67(450mm) 6 8/10 15 18 24			67.71	20.00	End of Borehole	X

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 | 10:38:17

Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: CP	
12.80		20	12.80	No rise		

BOREHOLE LOG

Project: SEMMS		Job No: 37732ISG		Borehole No.	
Date: 03-04-1992/06-04-1992		Co-ordinates: E 390875.1 N 384348.2		EA POYNTON 86_3	
Contractor: GEOTECHNICAL ENGINEERING LIMITED			Engineer: Faber Maunsell Ltd		Sheet: 1 of 2

Samples & Tests					Water/ (Flush Return)		Strata			Backfill/ Instrument	
Depth	Type No	Test Results	TCR SCR RGD	If (mm)	O.D. Level	Depth (Thickness)	Description	Legend			
					87.21	0.20	Turf over TOPSOIL.				
0.50	0.50	D 541 ISPT N = 8(450mm) 1 2/2 2 2 2					Firm orange-brown mottled grey silty slightly sandy CLAY with fine, medium and coarse subrounded gravel. Below 1.20m: stiff.				
1.00		D 5412				(1.50)					
1.20		U 5413									
1.70	1.70	D 5414 SPT N = 17(450mm) 2 3/3 4 5 5			85.71	1.70	Stiff brown slightly sandy fissured CLAY with occasional gleying and root traces above 2.90m. A little fine, medium and coarse subrounded gravel. Below 4.80m: firm. Below 6.50m: stiff.				
2.20		D 5415									
2.40		U 5416									
2.90	2.90	D 5417 C N = 22(450mm) 3 5/5 5 6 6									
3.40		D 5418									
3.60		U 501 U 5419									
4.10	4.10	D 5420 SPT N = 18(450mm) 1 3/4 4 5 5					(5.80)				
4.60		D 5421									
4.80		U 5422									
5.30	5.30	D 5423 SPT N = 13(450mm) 1 1/2 3 3 5									
5.80		D 5424									
6.00		U 502 U 5425									
6.50	6.50	D 5426 SPT N = 17(450mm) 1 2/2 4 5 6					79.91	7.50	Firm brown very sandy CLAY with some fine, medium and coarse subangular gravel.		
7.00		D 5427									
7.20		U 5428									
7.70	7.70	D 5429 SPT N = 26(450mm) 4 4/4 6 9 7									
8.20		D 5430				(1.40)					
8.40		U 503 U 5431									
8.90		SPT N = 32(450mm) 6 7/7 9 8 8					78.51	8.90	Firm to stiff brown slightly sandy CLAY with a little fine, medium and coarse subrounded gravel.		
9.40		D 5432									
9.50	9.50	B 438 SPT N = 11(450mm) 1 2/2 3 3 3					77.91	9.50	Medium dense brown fine and medium SAND.		
										(0.70)	

Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: CP	
3.60		20	2.70			
9.50		20	7.20			

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BOREHOLE LOG

Project: SEMMS		Job No: 37732ISG		Borehole No.	
Date: 03-04-1992/06-04-1992		Co-ordinates: E 390875.1 N 384348.2		EA POYNTON 86_3	
Contractor: GEOTECHNICAL ENGINEERING LIMITED			Engineer: 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	D 5433	SPT N = 24(450mm) 2 3/5 6 6 7				77.21	10.20	Medium dense brown fine and medium SAND. (continued)	XO	
10.60	D 5434							Soft brown very silty laminated CLAY. 11.30m to 11.80m: slightly sandy with a little fine, medium and coarse subangular gravel. Below 12.00m: firm.		
10.80	U 504 U 5435									
11.30	D 5436	SPT N = 17(450mm) 2 3/3 4 4 6					(2.30)			
11.80	D 5437									
12.00	U 5438									
12.50	B 439	SPT N = 105(375mm) 6 10/20 35 50 0				74.91	12.50	Very dense dark orange-brown fine, medium and coarse very gravelly SAND with occasional rounded cobbles. 13.70m: becoming dense occasional medium and coarse bands.		
13.00	D 5439	C N = 76(450mm) 5 8/14 19 27 16								
13.70	C	N = 33(450mm) 3 5/8 8 8 9					(2.90)			
14.30	C	N = 33(450mm) 1 3/6 8 9 10								
14.90	C	N = 30(450mm) 2 3/5 7 8 10								
						72.01	15.40	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

Project: SEMMS		Job No: 37732ISG		Borehole No.	
Date: 07-04-1992/07-04-1992		Co-ordinates: E 390881.0 N 384390.0		EA POYNTON 86_4	
Contractor: GEOTECHNICAL ENGINEERING LIMITED			Engineer: 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
						86.83	0.15	Turf over TOPSOIL		
0.50	0.50	D 5440 SPT						Soft to firm orange-brown mottled grey-brown sandy CLAY with occasional brown fine and medium sand partings.		
							(1.55)			
1.00		D 5441								
1.70	1.70	D 5442 SPT				85.28	1.70	Firm brown sandy CLAY with a little fine and medium subangular gravel. Below 4.80m: stiff to very stiff.		
2.20		D 5443								
2.40		U 501 U 5444								
2.90	2.90	D 5443 SPT								
3.40		U 678								
3.60		D 5446 U 5447								
4.10	4.10	D 5448 SPT								
4.60		D 5449					(5.60)			
4.80		U 5450								
5.30	5.30	D 5451 SPT								
5.80		D 5452								
6.00		U 502 U 5453								
6.50	6.50	D 5454 SPT								
7.00		D 5455								
7.20		U 5456				79.68	7.30	Very stiff dark orange-brown sandy CLAY with a little fine, medium and coarse subangular gravel.		
7.70	7.70	D 5457 SPT					(1.60)			
8.40		U 503 DU 5458								
8.90	8.90	D 5458 SPT				78.08	8.90	Medium dense grey-brown fine medium and coarse slightly silty slightly gravelly SAND.		
9.40		D 5460					(1.40)			
9.50	9.50	B 440 SPT								

Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: CP	
3.50		20	2.60	medium inflow		
8.90		20	7.20	medium inflow		

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BOREHOLE LOG

Project: SEMMS		Job No: 37732ISG		Borehole No.	
Date: 07-04-1992/07-04-1992		Co-ordinates: E 390881.0 N 384390.0		EA POYNTON 86_4	
Contractor: GEOTECHNICAL ENGINEERING LIMITED			Engineer: 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
10.10	SPT	N = 14(450mm) 2 2/3 3 4 4				76.68	10.30	Medium dense grey-brown fine medium and coarse slightly silty slightly gravelly SAND. <i>(continued)</i>	X
10.60	D 5461 U 5462					76.18	10.80 (0.50)	Firm brown slightly sandy CLAY with a little fine, medium and coarse subangular gravel.	X
11.10	D 5463	SPT N = 21(450mm) 2 3/4 4 6 7						Firm to stiff brown very silty laminated CLAY with occasional silt dustings on laminae.	X
11.70	U 504 U 5464						12.40 (1.60)		
12.20	D 5465	SPT N = 21(450mm) 3 4/4 5 6 6				74.58	12.40		
12.70	D 5466							medium dense dark orange-brown fine, medium and coarse silty slightly gravelly SAND. At 12.70m: slightly clayey. At 14.00m: becoming dense, occasional soft gleying silt pockets. Occasional cobbles. 14.60m to 15.10m: medium and coarse gravelly SAND. At 15.20m: very gravelly occasional subrounded cobbles. 16.40m: gravelly. At 17.00m: slightly gravelly. At 17.60m: gravelly. At 18.20m: very gravelly. At 19.50m: some cobbles.	X
12.80	B 441	C N = 25(450mm) 3 4/5 5 7 8							X
13.40	C	N = 28(450mm) 2 5/6 7 7 8							X
14.00	C	N = 43(450mm) 3 7/8 10 11 14							X
14.60	C	N = 56(450mm) 3 8/11 12 15 18							X
15.80	C	N = 68(450mm) 1 5/10 15 19 24					17.60 (7.60)		X
16.40	B 442	C N = 90(450mm) 4 8/12 19 26 33							X
17.00	C	N = 76(450mm) 3 9/12 18 21 25							X
18.20	C	N = 58(450mm) 3 4/8 11 18 21							X
18.80	B 443	C N = 64(450mm) 1 3/7 12 21 24							X
19.50	C	N = 79(450mm) 6 8/14 16 22 27							X
						66.98	20.00	End of Borehole	X

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Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: CP	
12.40		20	12.40	Borehole damp		



BOREHOLE LOG

Project: SEMMS		Job No: 37732ISG		Borehole No.	
Date: 30-12-1999/30-12-1899		Co-ordinates: E 390904.9 N 384393.1		EA POYNTON 87_1	
Contractor: GEOTECHNICAL ENGINEERING LIMITED			Engineer: Faber Maunsell Ltd		Sheet: 1 of 3

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
						86.91	0.20	TOPSOIL		
0.50	0.50	D 5467 SPT						Stiff orange-brown slightly sandy CLAY with some pockets of coarse sand. At 1.70m: with occasional gleying on fissured surfaces and manganese staining. At 2.40m: very stiff. Below 2.90m: firm to stiff brown silty with some subangular and subrounded fine gravel. Below 6.50m: very sandy with some to much gravel.		
		D 5468								
		U 5469								
1.70	1.70	D 5470 SPT								
		D 5471								
2.40		U 501 U 5472								
2.90	2.90	D 5473 SPT								
		D 5474								
		U 502 U 5475								
						(7.50)				
4.10	4.10	D 5476 SPT								
		D 5477								
		U 5478								
5.30	5.30	D 5479 SPT								
		D 5480								
6.00		U 503 U 5481								
6.50	6.50	D 5482 SPT								
		D 5483								
		U 5484								
7.70	7.70	B 444 SPT D 5485				79.41	7.70	Medium dense brown fine, medium and coarse gravelly SAND.		
8.20	8.30	D 5486 SPT								
		D 5487								
8.80	9.00	SPT					(2.70)			
		D 5488								
9.50	9.60	B 445 SPT								

Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: CP	
7.80		20	7.00			

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BOREHOLE LOG

Project: SEMMS		Job No: 37732ISG		Borehole No.	
Date: 30-12-1999/30-12-1899		Co-ordinates: E 390904.9 N 384393.1		EA POYNTON 87_1	
Contractor: GEOTECHNICAL ENGINEERING LIMITED			Engineer: Faber Maunsell Ltd		Sheet: 2 of 3

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
10.10 10.20	D 5489 D 5490	SPT N = 16(450mm) 1 3/4 4 4 4				76.71	10.40	Medium dense brown fine, medium and coarse gravelly SAND. (continued)	X O	
							(0.40)	Firm brown sandy CLAY.	X O	
10.70 10.80	D 5491 U 504 U 5492					76.31	10.80	Firm to stiff brown laminated very silty CLAY. Below 12.00m: with thin partings of orange silt.	X O	
11.30	SPT	N = 16(450mm) 2 3/3 4 4 5					(2.20)		X O	
11.80 12.00	D 5493 U 505 U 5494								X O	
12.50	D 5495	SPT N = 18(450mm) 2 3/3 5 5 5				74.11	13.00	Firm to stiff red-brown very sandy stony CLAY.	X O	
13.00	U 506 D 5496 U 5497						(0.40)		X O	
13.50	B 446 D 5498	SPT N = 31(450mm) 3 3/8 10 7 6				73.71	13.40	Dense red-brown fine medium and coarse clayey silty SAND.	X O	
14.00 14.10	D 5499 U 5500						(0.60)		X O	
14.60	D 5501	SPT N = 20(450mm) 3 3/5 5 5 5				73.11	14.00	Stiff and very stiff red-brown very sandy CLAY with a little subangular fine and medium gravel with occasional sand bands. Below 15.50m: very stiff. Below 17.00m: with some cobbles and boulders. At 18.00m: with subrounded and rounded cobbles.	X O	
15.10 15.30	D 5502 U 5503								X O	
15.80	D 5504	SPT N = 25(450mm) 4 4/5 6 6 8					(6.10)		X O	
16.30 16.50	D 5505 U 5506								X O	
16.80	D 5507	C N = 0(525mm) 50 0/0 0 0 0							X O	
17.50	U 5508								X O	
18.00	D 5509	SPT N = 50(163mm) 12 31/50 0 0 0							X O	
18.50	D 5510								X O	
19.10	U 5511								X O	
19.60	D 5512	SPT N = 97(375mm) 12 14/18 29 50 0							X O	

Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: CP	
13.50		20	13.50	No rise		
18.70		20	18.70	No rise		

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BOREHOLE LOG

Project: SEMMS		Job No: 37732ISG		Borehole No.	
Date: 26-03-1992/26-03-1992		Co-ordinates: E 390952.0 N 384370.0		EA POYNTON 87_2	
Contractor: GEOTECHNICAL ENGINEERING LIMITED			Engineer: Faber Maunsell Ltd		Sheet: 1 of 2

Samples & Tests					Water/ (Flush Return)		Strata			Backfill/ Instrument
Depth	Type No	Test Results	TCR SCR RGD	If (mm)	O.D. Level	Depth (Thickness)	Description	Legend		
					87.64	0.20	TOPSOIL: (turfed)			
0.50	0.50	D 5514SPT N = 15(450mm) 2 2/3 3 4 5					Soft to firm grey-brown very sandy CLAY with pockets of coarse sand. Below 1.20m: firm to stiff orange-brown fissured with gleying and some subangular fine gravel. At 2.40m: very stiff. Below 2.90m: brown. 4.10m to 5.30m: poorly laminated.			
1.20		U 5515								
1.70	1.70	D 5516SPT N = 19(450mm) 2 3/4 5 5 5								
2.40		U 501 U 5517								
2.80		W 5518								
2.90	2.90	D 5519SPT N = 22(450mm) 1 4/5 5 6 6								
3.60		U 5520								
4.10	4.10	D 5521SPT N = 10(450mm) 1 1/2 2 3 3			(8.20)					
4.80		U 502 U 5522								
5.30	5.30	D 5523SPT N = 16(450mm) 1 2/3 3 5 5								
6.00		U 5524								
6.50	6.50	D 5525SPT N = 12(450mm) 2 2/2 3 3 4								
7.20		U 503								
7.30		U 5526 W 5528								
7.70	7.70	D 5527SPT N = 29(450mm) 3 5/6 6 8 9								
8.40		U 504			79.44	8.40	Stiff red-brown very sandy CLAY with much subangular and subrounded fine, medium and coarse gravel.			
8.90	8.90	U 5529SPT D 5530 N = 39(450mm) 5 7/12 9 9 9				(1.30)				
9.60		B 447 U 5531			78.14	9.70	Medium dense brown fine, medium and coarse SAND.			

Water Strikes					Method, Equipment and Remarks	
Strike Depth	Casing Depth	Post Mins	Post Depth	Flow Remarks	Method: CP	
3.60		20	2.80			
9.70		20	7.30			

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BOREHOLE LOG

Project: SEMMS		Job No: 37732ISG		Borehole No.	
Date: 26-03-1992/26-03-1992		Co-ordinates: E 390952.0 N 384370.0		EA POYNTON 87_2	
Contractor: GEOTECHNICAL ENGINEERING LIMITED			Engineer: 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
10.10	B 448 SPT D 5532	N = 19(450mm) 2 3/3 5 5 6					(1.70)	Medium dense brown fine, medium and coarse SAND. <i>(continued)</i>		
10.70	SPT	N = 21(450mm) 1 3/4 5 5 7								
11.40	D 5533					76.44	11.40	Firm red-brown very sandy CLAY.		
11.50	U 5534					76.14	11.70			
12.00	D 5535 BPT	N = 14(450mm) 1 2/2 4 4 4					(0.80)	Soft to firm brown laminated silty CLAY.		
						75.34	12.50	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

