SEMMMS A6 to Manchester Airport Relief Road

Aecom: WCML Crossing Option Comparison (Over v Under)

1007/6.19/108

June 2012

STOCKPORT METROPOLITAN BOROUGH COUNCIL

MANCHESTER CITY COUNCIL

Cheshire East Council

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Rev No	Comments	Date
1	Interim Report – Response to SMBC comments	19.10.05
2	Final Report	04.08.06
3	West Coast Main Line Report	14.03.12
4	West Coast Main Line Final Report	20.06.12

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Job No: 37732 Date: June 2012

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Executive Summary

In 2006 AECOM carried out a Feasibility Study of 3 No road crossings of the SEMMMS Relief Road route at rail lines between the end of existing dual carriageway Bramhall Bypass to north of the A6 interchange. One of the rail lines crossed was the twin track electrified high speed West Coast Main Line Woodford just south of Bramhall, Stockport. The alignment at that time was at Design Freeze 4A. The alignment has subsequently been revised a number of times to the present Design Freeze 5 and AECOM has been asked by Stockport MBC to review the previous findings and submit a new Feasibility Report but now just for the West Coast Main Line Crossing (WCML).

There are 2 options considered for the WCML; these being an overbridge (road over rail) and an underbridge (rail over road). As previously, both options are reviewed. The site is in fairly open ground either side of the rail route with the nearest properties being along Woodford Road approximately 150m to the southeast. The rail alignment is on a medium radius curve and results in a significant number of overhead line gantries in this location.

In addition to the revised Design Freeze, Stockport MBC has forwarded a recent document titled 'B008 – West Coast Mainline Over Bridge Preliminary Design Report', dated January 2012. This gives outline proposals for an overbridge on Design Freeze 5 alignment. No further details have been provided for an underbridge. Definitions of overbridge and underbridge adopted in the B008 report and this document are consistent.

The rail corridor at the crossing site is approximately 32 m wide between boundary fences and rail level is some 2 to 3m below general ground level. The immediate topography is generally flat although the land to the west of the crossing is slightly higher than at the east. Ground conditions are generally clays and silts to bedrock at some 16 m.

Construction of an overbridge will require long approach embankments either side of the rail crossing to provide a minimum clearance over the overhead line equipment. The bridge will have to span the full rail boundary in a single span to avoid any construction with Network Rail land and further allowance is required for abutment foundation construction width beyond the boundary.

Ground conditions are generally acceptable for construction beneath the rail using a jacked in box type structure. However, ground water table at the site is higher than the finished road level for an underbridge and therefore pumping provisions will be required. Again, long ramped approaches will be required to gain adequate depth beneath the rail crossing. Attention also needs to be given to the integrity of the OHLE and a horizontal clearance allowance of 3.0m has been in Design Freeze 5. However, if any changes are made to the horizontal alignment further review should be given to this matter. If any gantries require relocation this would most likely be costly and require long term planning and NR approval.

Construction of an overbridge will be less of a risk to the integrity of the rail during construction, and with abutments outside the rail boundary line possessions can be kept to a minimum. However, weekend or Christmas period closure is likely for installation of the superstructure. The structure proposed in the 'B008 Preliminary Design Report' is for a single span weathering steel/concrete composite structure. Articulation is semi-integral with fixity at one abutment. Abutments are reinforced concrete leaf pier type and foundations are twin row circular reinforced concrete. Overall span between bearings is shown as 44m and clearance over the rail lines is given as 7m. SMBC commissioned ND Oliver to carry out a topographic survey at this location and this alignment reflects the updated knowledge of the relevant OHLE levels. This provides full clearance beyond the rail boundary for construction of the abutments with no line closures. The Report refers to driven piles and this is considered inappropriate given the

clay conditions and possible impact on the rail lines. Bored piles would appear to be more appropriate.

On engineering and cost grounds the recommended crossing is road over rail and the proposal given in Report 'B008 – West Coast Mainline Over Bridge Preliminary Design Report', dated January 2012, is considered generally appropriate.

The previous cost estimates given in AECOM's Report of 2006 were priced for that date. Our tracking of construction costs since that time, suggest that prices have reduced by approximately 8% over this period. The previous estimate in our Report for a road over rail crossing was approximately £3,500,000 excluding approach works. This estimate was for the construction works only and does not take account of design fees, contractor's fees or other associated Network Rail costs. This estimate also assumes a slightly shorter span structure than now shown and therefore taking account of the longer span but allowing for deflation, it is considered this estimate is still appropriate.

Estimated cost for such a structure is likely to be between £4,000,000 and £6,000,000 depending on form of placement and the requirement for pumping provision will have an on-going maintenance cost implication. This estimate is again for the actual construction costs only and does not include design fees, contractor's fees or other Network Rail fees.

A cost estimate has been provided by Corderoy and SMBC respectively for the road over rail scheme at circa £6M, and circa £10M for the road under rail option. Both these estimates assume earthworks will balance and any surplus can be deposited in cuts and no off site import will be required for the embankment option. As the Corderoy estimate includes all approach works, design fees and Preliminaries they are considered to be in line with AECOM's more limited scope cost estimates.

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1 Introduction

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As part of the SEMMMS Relief Road Scheme four rail lines are crossed, the West Coast Main Line, Hazel Grove to Buxton Line, Styal Line and Airport Northern Spur (Styal Road). This Report discusses the design considerations on the West Coast Main Line at Woodford (MCH – 2m 1000yds) rail line only and takes account of a revised road Design Freeze 5.

An initial review of the West Coast Main Line crossing was undertaken by Faber Maunsell (now AECOM) and a Draft Rail Report dated April 2005 issued to Stockport Metropolitan Borough Council (SMBC). The Report considered both road over and road under rail options at the West Coast Main Line. The main issues addressed in the Report related to geotechnical conditions and the relevant design and construction implications of each option.

Following issue of the initial Draft Rail Report, Faber Maunsell, was further commissioned by SMBC to review the specific structural issues relating to the crossing. A Draft Interim Rail Bridge Crossing Report was issued in August 2006. This Report updated the initial findings and comments given in that document to take account of further discussions held with Network Rail, additional geotechnical information and revisions to the highway alignment.

In addition, a document by Stockport MBC titled 'B008-West Coast Mainline Over Bridge Preliminary Design Report' dated 2012, prepared for the SEMMMS Project Team, Manchester City Council and Cheshire East Council has been provided.

As at the Interim Stage, this AECOM Report considers options for both road over and road under rail, and comments on options for both alignments.

It is assumed regrading of the rail vertical and/or horizontal alignments is not permissible.

1.2 Cost Estimates

Conceptual stage outline construction cost estimates were provided in the AECOM August 2006 Report at prices current at that date. Our tracking of construction costs since that time, suggest that prices have reduced by approximately 8% over this period. The previous estimate in our Report for a road over rail crossing was approximately £3,500,000 excluding approach works. This estimate was for the construction works only and did not take account of design fees, contractor's fees or other associated Network Rail costs. This estimate also assumed a slightly shorter span structure than now shown and therefore taking account of the longer span but allowing for deflation, it is considered this estimate is still appropriate.

However, such a crossing will have a significant visual impact and a road under rail may have to be adopted. As reported previously in 2006 the estimated cost for such a structure, is likely to be between £4,000,000 and £6,000,000 depending on form of placement and the requirement for pumping provision will have an on-going maintenance cost implication. This estimate is again for the actual construction costs only and does not include design fees, contractor's fees or other Network Rail fees.

A cost estimate has been provided by Corderoy and SMBC respectively for the road over rail scheme at circa £6M, and circa £10M for the road under rail option. Both these estimates include all approach works, design fees and preliminaries. They also assume earthworks will balance and any surplus can be deposited in cuts and no off site import will be required for the embankment option. Taking account of the typical costs obtained from Network Rail for possessions and the above inclusions, these estimates are considered to be in line with the much more limited scoped AECOM's cost estimates.

2 Bridge Design Standards

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2.1 Loadings and Design

In accordance with current Highway Agency requirements, the design of any structure on the SEMMMS route must be in accordance with Eurocode BS EN 1991-2-2003 (or subsequent revision), applying associated UK Annexes and taking account of Railway Group Standards, Network Rail Company Standards and UIC documents.

The loading will be assumed as 'abnormal traffic' loading according to the Eurocode, as the road over the West Coast Main Line is classed as a relief road.

2.2 Clearances

AECOM has not been party to any discussions with SMBC, Network Rail or other Authorities with regards to clearances and therefore it is assumed standard requirements apply.

The previously issued AECOM road over rail structure assumed side span columns or piers adjacent to highways supporting underbridges would be located outside the Highways Agency defined vehicle impact zone. To comply with this, supports will be assumed as at a minimum clearance of 4.5m from edge of verge.

For the road over rail supports adjacent to rail corridors, a minimum clearance in accordance with Railway Group Standard of 4.5m must be provided although Network Rail has stated that for below ground level foundations this can be reduced to 3.0m. For the purposes of any additional train driver sight line requirements and also to allow for less onerous restrictions on construction, a minimum set back of 6m has been assumed unless there are other significant issues that require extra.

The proposed road over rail bridge as shown on supplied General Arrangement drawing 1007/3D/DF5/A6-MA/B008/708 shows abutments and associated foundations outside of the overall NR rail boundary and therefore all lateral clearances required are satisfied.

Vertically, Design Freeze 5 shows a road alignment which supplies a vertical clearance of 7m, as shown on the General Arrangement drawing. This should provide more than Network Rail's requirement for a minimum of 5.8m clearance from rail to soffit level and adequate clearance to the existing overhead line equipment. SMBC commissioned ND Oliver to carry out a topographic survey at this location and the road alignment reflects the updated knowledge of the relevant OHLE levels plus agreed Network Rail minimum clearance.

For the road under rail bridge, the vertical clearances are being discussed between the SEMMMS design team, Network Rail and URS. Design Freeze 5 has a road level at sufficient height to accommodate a currently assumed superstructure depth of 1.4m. If this was to change, the highway alignment will be amended to suit.

2.3 Carriageway Widths

Square carriageway width on straight open road for the Relief Road is assumed as 24.6m between outside of verges, including a 2.5m cycleway on one side only of the route and assuming a 2.5m central reserve. These carriageway details have been supplied on the Typical Cross Sections Drawing No. 1007/DF5/A6-MA/TCS/535.

2.4 Rail Track Widths

Square track widths at the WCML crossing assumed in 2006 was 4.95m as taken from the topographic model. SMBC commissioned ND Oliver to carry out a topographic survey at this location and the alignment reflects the updated knowledge of the relevant OHLE levels and clearances.

3 West Coast Main Line

3 West Coast Main Line

3.1 Description of Site

SEMMMS Relief Road crosses the West Coast Main Line at Woodford, between Bramhall and Poynton stations in roughly a north east to south west direction. This is currently a green field site with wooded and open land to the north and open land to the south. A petrol storage tank farm is located some 400m to the west.

The nearest properties are on Woodford Road, approximately 150m to the southeast. Apart from a farm on the western side of Woodford Road, all residential properties on the road have frontages towards the Relief Road, i.e, none have main gardens backing on to the Relief Road.

The immediate topography is generally flat although the land to the west of the crossing is slightly higher than at the east.

At some 400m to the east Woodford Road crosses the Relief Road. In AECOM's previous Report of 2006 it was assumed that due to the relatively close proximity to the SEMMMS rail crossing, the two crossings would have to be the same type, e.g. road over or road under rail. In the current Design Freeze 5 the SEMMMS Relief Road passes beneath Woodford Road, which is to remain at its existing vertical alignment.

There is a farm access track at the immediately northern side of the West Coast Main Line on the eastern approach to the crossing but this terminates before the crossing.

A 3m wide access track parallel to the rail line is to be provided on the immediate south side of the rail corridor for the road over rail option. This will be located outside the Network Rail fence line. For a road under rail option this track will be relocated away from the bridge and therefore need not be spanned over. There is also the potential requirement of a pedestrian bridge but SMBC need to investigate further.

Location of the crossing and longitudinal highway profile for a road over rail crossing at Design Freeze 5 are shown on Stockport MBC drawing No. 1007/3D/DF5/A6-MA/GA/657 and for rail over road on drawing No. 1007/3D/DF5/A6-MA/GA/615, both included in Appendix A of the Report. A copy of the recent topographic survey with the Relief Road superimposed is also included in Appendix C of this Report.

3.2 Road and Rail Alignments

Horizontal alignment of the Relief Road is at a radius of -1020.000m and it crosses the train corridor at a skew of approximately 36^{o}. This relatively high skew will increase the overall span of the structure by some 20% over a square crossing. It is believed there is little scope in the Relief Road alignment design to reduce the angle of intersection but any reduction would be beneficial to the design, construction and therefore cost of the structure.

The West Coast Main Line is a high speed electrified route over this section of track although the line is also used by local commuter trains and they will be at much lower speeds as they approach or depart from the nearby Poynton station. Gradient of the track is less than 1% rising westwards.

Within the immediate crossing location the overhead power lines are supported on a series of portal type gantries. The soffit level of any structure carrying the Relief Road over the rail lines will need to take account of the full height of the gantries and all fixings, although there could be scope to fix the wires to the bridge soffit. Based on a recent line topographic survey by ND Oliver, Design Freeze 5 allows for a road over rail bridge superstructure depth of 2.3m together with 1.0m clearance over the catenary wires (note this is greater than 1 Network Rail minimum clearance of 0.6m)

In AECOM's previous Report it was believed the Relief Road horizontal alignment clashed with one un-numbered overhead line gantry. However from the recent topographic survey by ND

Oliver it appears all gantry poles can be avoided by the correct clearances by Network Rail both vertically and horizontally at Design Freeze 5. However should this not be the case as gantry will most likely be piled, maintaining the foundations for any directly affected gantry will not be possible for the road under rail option due to the limited cover between rail level and top of deck. This may also apply for any gantry spread footings. Any gantry likely to be affected will need to be relocated prior to commencement of any bridge works.

The rail alignment is on a slight transition curve from the south east at the crossing site and this has an affect on the train driver sight distances particularly for the high speed trains approaching from the east (Poynton). There are no signals with sight line distance of the crossing site and therefore it is assumed there will be no train driver requirement to provide any additional clear span.

3.3 Geotechnical Considerations

From the Faber Maunsell 'West Coast Main Line, Hazel Grove to Buxton Line and Midland Line Rail Report' of February 2006 the ground conditions at the site are typically glacial till (boulder clay) around 6m thick overlying glacial sands to sandstone bedrock some 15 to 17m below existing ground level. Details of these ground conditions at the site are shown on the drawing 60186094/GEO/005, taken from the Ground Investigation Report produced by AECOM in February 2011, which can be found in Appendix D.

Ground water levels measured in boreholes are approximately 7.2m below ground level on the south west side and 9.7m on the north east side of the rail line. Monitoring of these water levels was undertaken regularly between March and July 2006 and despite very dry conditions in July there was less than 0.4m difference in levels during this period. It is unknown if any further monitoring has taken place.

3.4 Environmental Impact Considerations

The main environment issues arising from the crossing are likely to be visual and noise impact on properties along Woodford Road. The closest of these properties is some 150m from the crossing and therefore within the overall environmental impact zone for the scheme.

3.5 Crossing Options

3.5.1 Road Over Rail (Overbridge)

3.5.1.1 Design Considerations

The local topography at the crossing site will result in any road over rail bridge being visible and requiring relatively extensive approach embankments. In order to limit such impacts it is desirable to keep the vertical alignment as low as possible whilst meeting clearance requirements over the rail corridor. Minimum permissible rail clearance and form of construction should therefore be considered with the aim of limiting vertical alignment.

Discussions with Network Rail have indicated a required minimum soffit level of 5.80m above rail level although a reduction to a limit of 5.30m may be considered if an acceptable commercial case can be put forward. However, clearance may need to be increased should overhead power line height dictate. To reduce rail and catenary heights would require rail realignment and OHLE reconstruction. This is likely to require a lengthy lead in time for NR approval and mobilisation, and be at a high cost.

A number of possible design options were considered by AECOM in the previous study, and also by Stockport Metropolitan Borough Council. The current proposed design for road over rail structure by Stockport MBC as shown on supplied drawing 1007/3D/DF5/A6-MA/B008/708 is for a composite plate girder made of weathering steel with reinforced concrete slab deck supported on reinforced concrete abutments and piled foundations with splayed wingwalls. The proposed structure is a single span simply supported bridge with semi-integral construction to reduce maintenance problems. The square deck width including the parapet upstands is 25.7m. The skew angle will be approximately 36 degrees.

The single span will be 42.0m measured between abutment faces. This will allow the existing footpath on the west side to remain intact and also allows enough distance on the east side for inspection and possibly replacing the bearings without the need for possession times. This span also allows access for bearing replacements and meets the minimum maintenance requirements for the local authority Stockport MBC. The Council commissioned ND Oliver to carry out a topographic survey at the crossing location and the levels of the OHLEs are known and reflected in the Design Freeze 5 alignment.

It is also noted that the highway alignment shows the SEMMMS route passing beneath Woodford Road. No costs were included for this structure in the previous AECOM Report and no comment on them is provided in the document.

3.5.1.2 Construction Considerations

The main issues relating to construction of a road over rail structure will be piling adjacent to the rail corridor, formation of pile caps and abutments and drop in of the superstructure.

It is noted in the supplied preliminary Design Report for this crossing that piles are to be driven. Given the clay ground conditions and proximity of the electrified rail line it is considered that driven piles are not appropriate and that bored piles of similar design will be more appropriate.

3.5.1.3 Cost Estimate

Based on outline design assumptions known at the time of the AECOM 2006 Report an estimated construction cost for a road over rail single span piled foundation type structure was £3,500,000 at the then prices. This estimate was for the construction works only and did not take account of approach embankments, design fees, contractor's fees or other associated Network Rail costs. Although there is evidence to show that construction costs have fallen by some 8% since then it is believed this cost estimate is still relevant for the construction only of the Stockport MBC proposed structure.

3.5.2 Rail Over Road (Underbridge)

3.5.2.1 Design Considerations

The option to take the Relief Road beneath the West Coast Main Line will put the route in deep cut on the approaches. No structural proposals have been forwarded by Stockport MBC at the time of writing this document other than the statement that an allowance has been made for a 1.4m deep superstructure, and therefore assumptions herein are purely speculative. The option to take the Relief Road above the West Coast Main Line would also require relatively extensive approach works, meaning the two footprints are comparable.

Initial discussions with Network Rail regarding the road under rail option resulted in a very unfavourable response due to the impact on rail operations during construction. Various options for construction of bridges beneath rail lines by jacking precast concrete boxes have been successful on other schemes and several possibilities exist for construction with either short term closure or maintained running but with line speed restrictions. From the Network Rail discussions undertaken in 2006 it was highly unlikely that short term line closure would only be considered for a very limited period (no greater than 72 hours) over a planned Christmas period. Therefore a construction method will have to be adopted that can maintain rail running, albeit with reduced speed.

Ground conditions at the site are reasonably amenable to currently available construction techniques that should enable continued rail operation for all but a limited period, although there could be limitations on the length of individual clear spans. Dividing the structure into 2 spans by provision of a central reserve pier support is likely to be necessary and this will have minor implications on highway horizontal alignment due to sight line requirements. Acceptance of any method will also be subject to Network Rail approval and it will be advantageous if their approval can be given to more than one technique before any final commitment is made to a rail over road option.

Environmentally, taking the road in cutting beneath the rail will result in very much less intrusive long term visual and noise impact on the local community, although the possible greater short

term impact of relatively major earthworks and piling for retaining the approaches will need to be accepted.

The issue of drainage at the site is of significant concern for the road under rail option. With a water table approximately 7.5m below ground level there is a high probability that road level may be at or below natural water level. This will require pumped drainage provision both during construction and for the final scheme. The water table may also influence which construction techniques are appropriate.

3.5.2.2 Construction Considerations

The main construction issues of a rail over road structure relate to maintaining the integrity of the rail lines during works.

Prior to any excavations within the vicinity of the crossing the existing overhead power line gantries will need to be relocated. This will be necessary for either piled or spread footing type foundations.

Review of recent schemes to construct structures beneath live rail or road corridors shows various alternatives have been adopted, the choice in any particular case being dependent on ground conditions, permissible road/rail closure and cost. Generally the main options have been cut and cover, box jacking and a hybrid form with jacked substructure and placement of superstructure during limited line closure.

For the very limited maximum line closure period that may be allowed it is not considered feasible for full cut and cover type of construction. This assumption is based on the need to take down all overhead lines, take up the track, excavate out the ground, provide dewatering, jack in the new box structure, backfill, replace track and replace overhead power lines all within the closure.

Two main forms of jacking have been successfully employed recently in the UK whereby rail or road corridors have remained operational. In one form the track would be supported on a temporary jacked-in 'deck' while the box is slid beneath, while in the second form a tunnelling shield is provided along the leading face of the permanent box and this, together with the box structure, support the track while excavation and jacking is undertaken. In both cases it is likely that an anti-drag system will be provided to lessen jacking forces and reduce the risk of track displacement.

In a combination of both main types of placement the substructure is cast off line and jacked into place beneath the maintained rail corridor, and then during a line closure the track is removed, excavation undertaken to expose bearing shelves, a prefabricated superstructure is placed and the line reinstated.

Review of the above options should be undertaken in more detail by specialist contractors as final choice will depend on a number of cost and programme dependent factors.

3.5.2.3 Cost Estimate

Cost estimation for a major road under rail structure on the West Coast Main Line can only be speculative until the form and method of construction have been determined. Similar schemes undertaken recently have required specialist techniques and are generally part of larger Contracts. These schemes have tended to be Design and Build type packages for which obtaining costs of individual components, ie bridgeworks, is not generally available.

However, based on outline design assumptions known at the time of the AECOM 2006 Report an estimated construction cost for a road under rail structures was between £4,000,000 and £6,000,0000 at the then prices. This estimate was for the construction works only and did not take account of approach embankments, design fees, contractor's fees or other associated Network Rail costs. Although there is evidence to show that construction costs have fallen by some 8% since then it is believed this cost estimate is still relevant for the construction only of the Stockport MBC proposed structure.

3.6 Recommendation

The options to take the Relief Road over the West Coast Main Line and the alternative to take the road under the rail line both have their own advantages and disadvantages. These are summarised as follows:

Road Over Rail:

Advantages:

- Likely to be cheaper
- More conventional bridge construction;
- Manageable impact on rail operations during construction;
- More options for bridge and embankment forms;

Disadvantages:

- Visual and noise impact – requiring screening mitigation;
- Requirement to design out surcharge effects on rail lines;

The high volume of fill required for the embankment approaches may be either a benefit or disbenefit depending on cut/fill balance on the scheme.

Rail Over Road:

Advantages:

- Low permanent visual and noises impact.

Disadvantages:

- Likely to be very difficult and time consuming to obtain Network Rail approval;
- Significant construction and permanent works drainage issues;
- Possible inadequate depth for construction and clearance on Design Freeze 5 vertical alignment

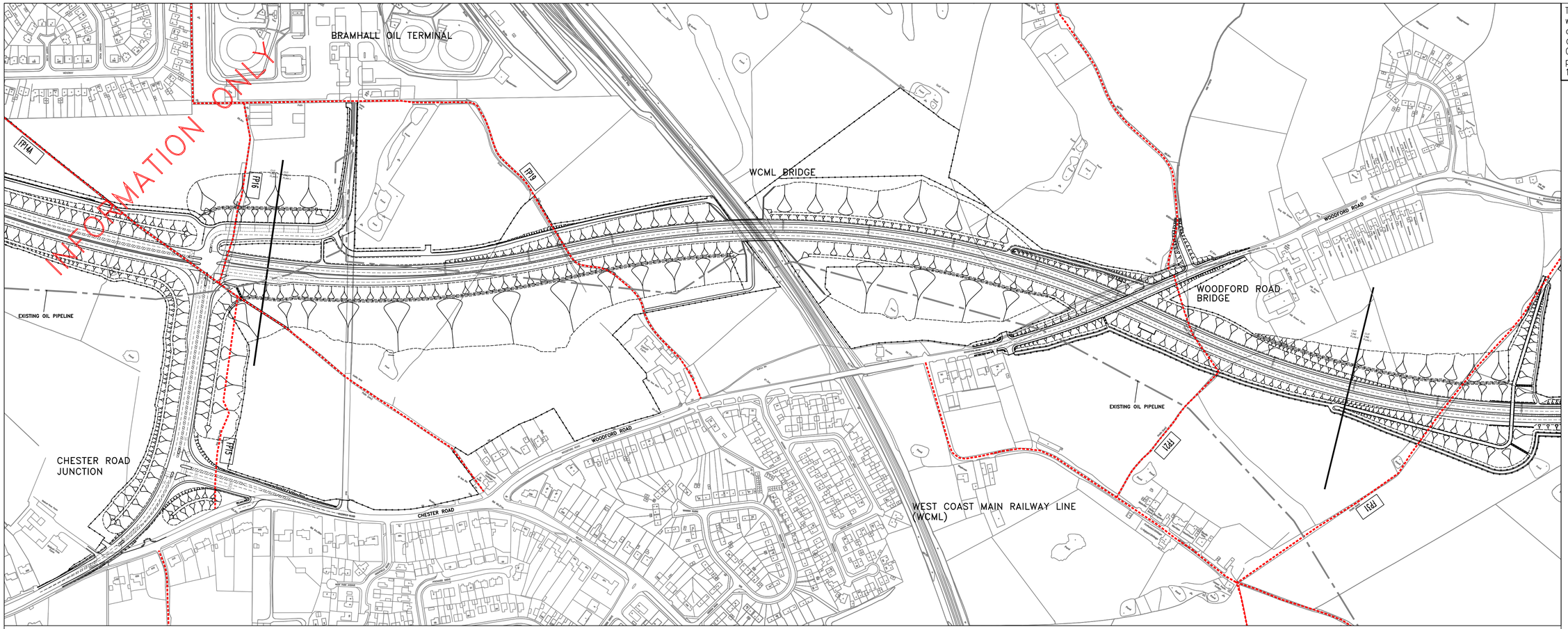
Based on these issues the recommendation at this stage of the study is to adopt a road over rail option.

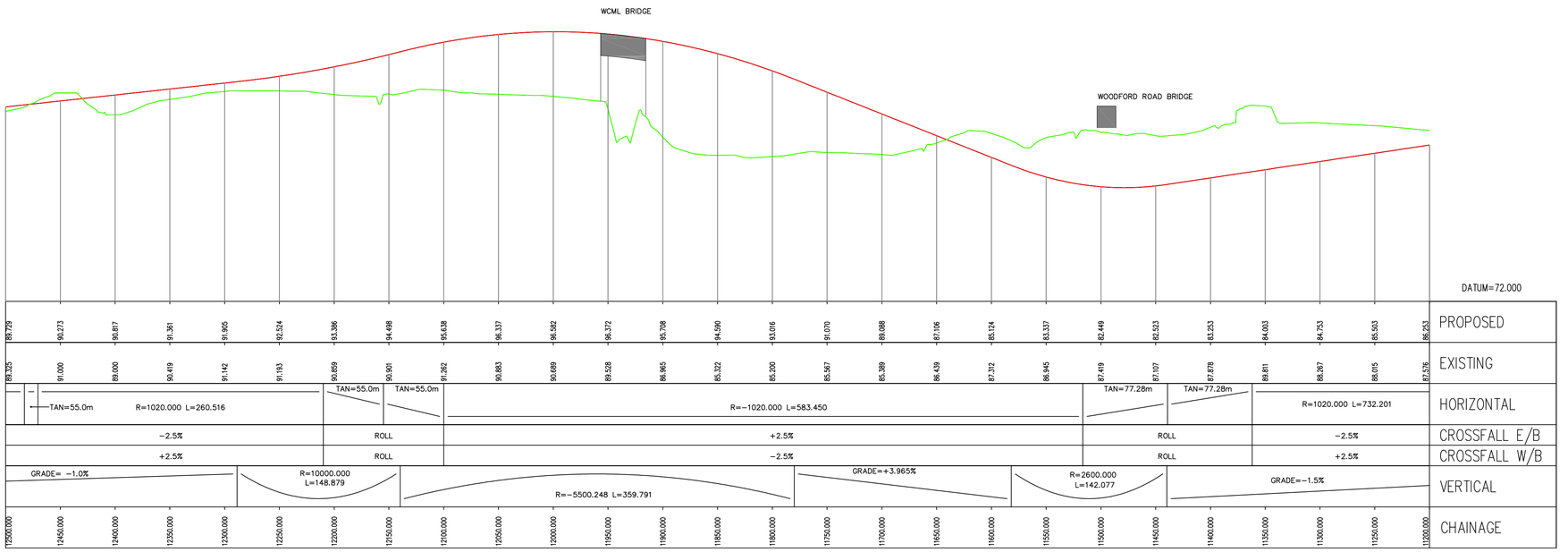
The main concerns in not opting for a rail over road crossing are the long term drainage liability due to a high ground water table and Network Rail's strong opposition to construction of a road crossing beneath such an important rail link.

The bridge design shown on supplied drawing 1007/3D/DF5/A6-MA/B008/708 is considered appropriate, but consideration should be given to reducing the vertical alignment shown at Design Freeze 5 as there appears to be more clearance over the rail than is necessary.

Appendices

Appendix A – Alignment Plans





SECTION ALONG CENTRELINE OF SEMMMS RELIEF ROAD
A6 JCT TO A555
(SPEED LIMIT 50MPH)

KEY

- EXISTING DEFINITIVE PROW
- EXISTING NON-DEFINITIVE PROW
- EXISTING BRIDLEWAY
- PROPOSED HIGHWAY / BOUNDARY FENCELINE

Rev.	Drawn	Checked	Date	Revision Details

south east manchester multi modal strategy

semmms

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Job Title

A6 to MANCHESTER AIRPORT RELIEF ROAD

Drawing Title

DESIGN FREEZE 5
GENERAL ARRANGEMENT
SHEET 4 of 10

Drawn	Engineer	Checked	Approved
SP	SP	NH	MPR
Date 01.05.12	Date 01.05.12	Date 04.05.12	Date 04.05.12

Size	Scale
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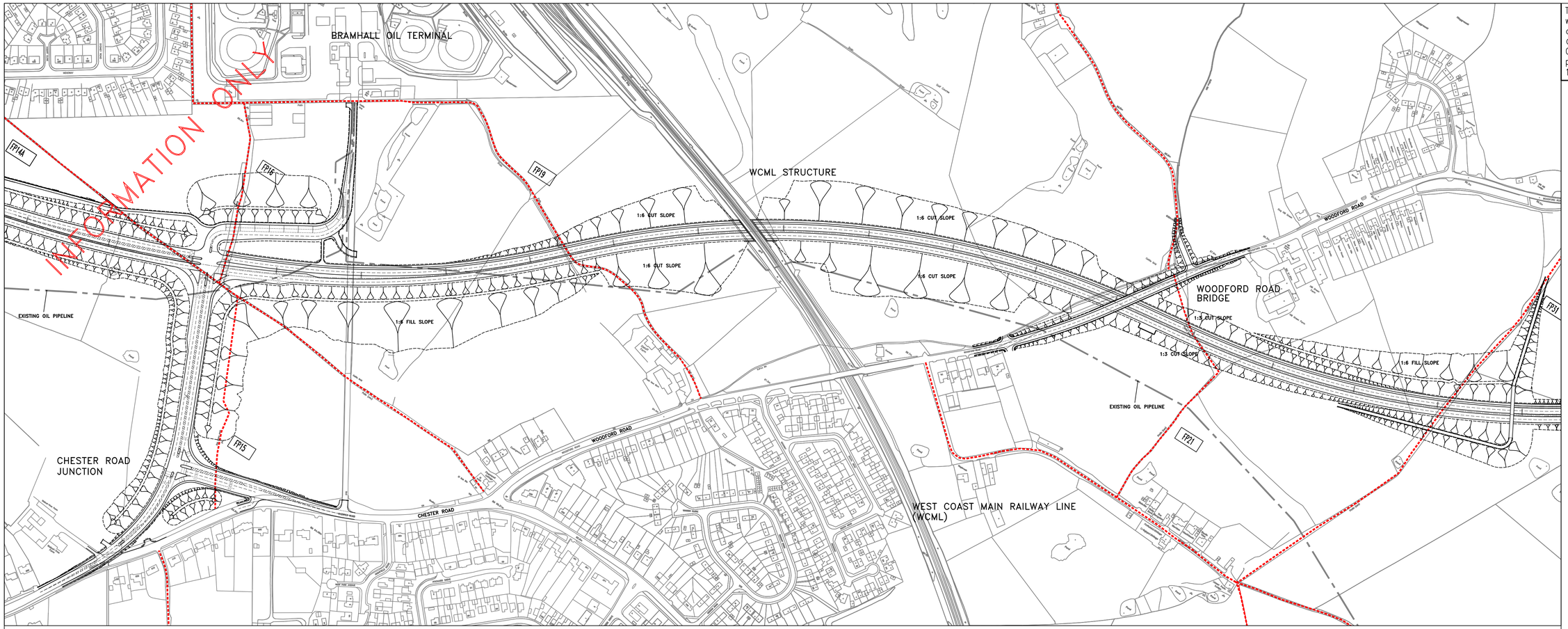
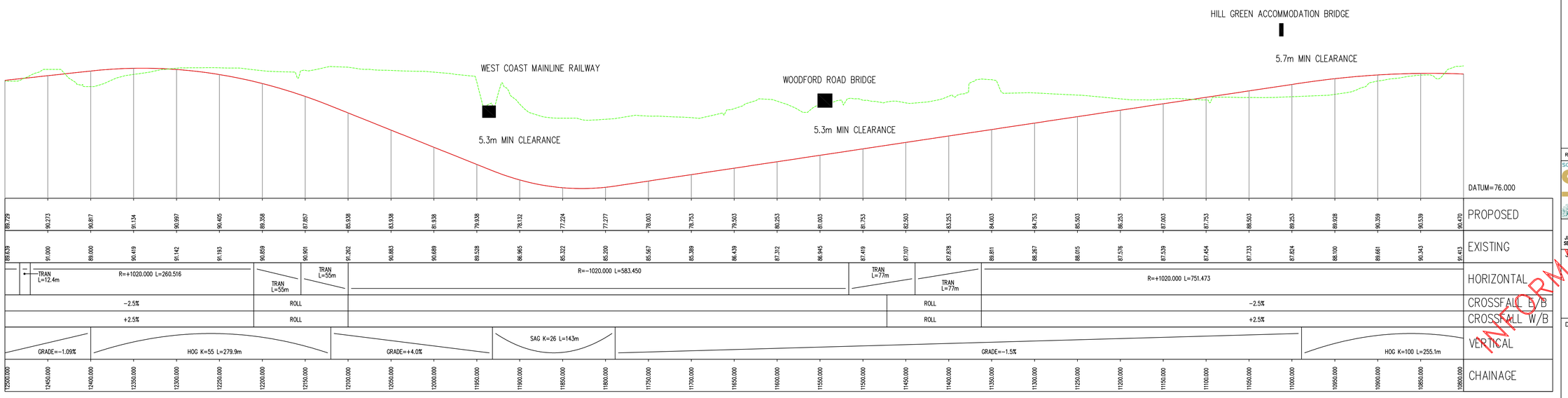
SCG No.	Filename

Drawing No. 1007/3D/DF5/A6-MA/GA/657 Revision





SECTION ALONG CENTRELINE OF SEMMMS RELIEF ROAD
A6 JCT TO A555
(SPEED LIMIT 50MPH)

KEY
- EXISTING DEFINITIVE PROW
- EXISTING NON-DEFINITIVE PROW
- EXISTING BRIDLEWAY

Rev.	Drawn	Checked	Date	Revision Details

south east manchester multi modal strategy

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SEMMMS RELIEF ROAD SCHEME A6 - AIRPORT

Drawing Title

DRAFT DESIGN FREEZE 5 WEST COAST MAINLINE RAILWAY ROAD UNDER RAIL OPTION

Drawn	Engineer	Checked	Approved
SP	SP	NH	MPR
Date	Date	Date	Date
01/03/12	01/03/12	01/03/12	01/03/12

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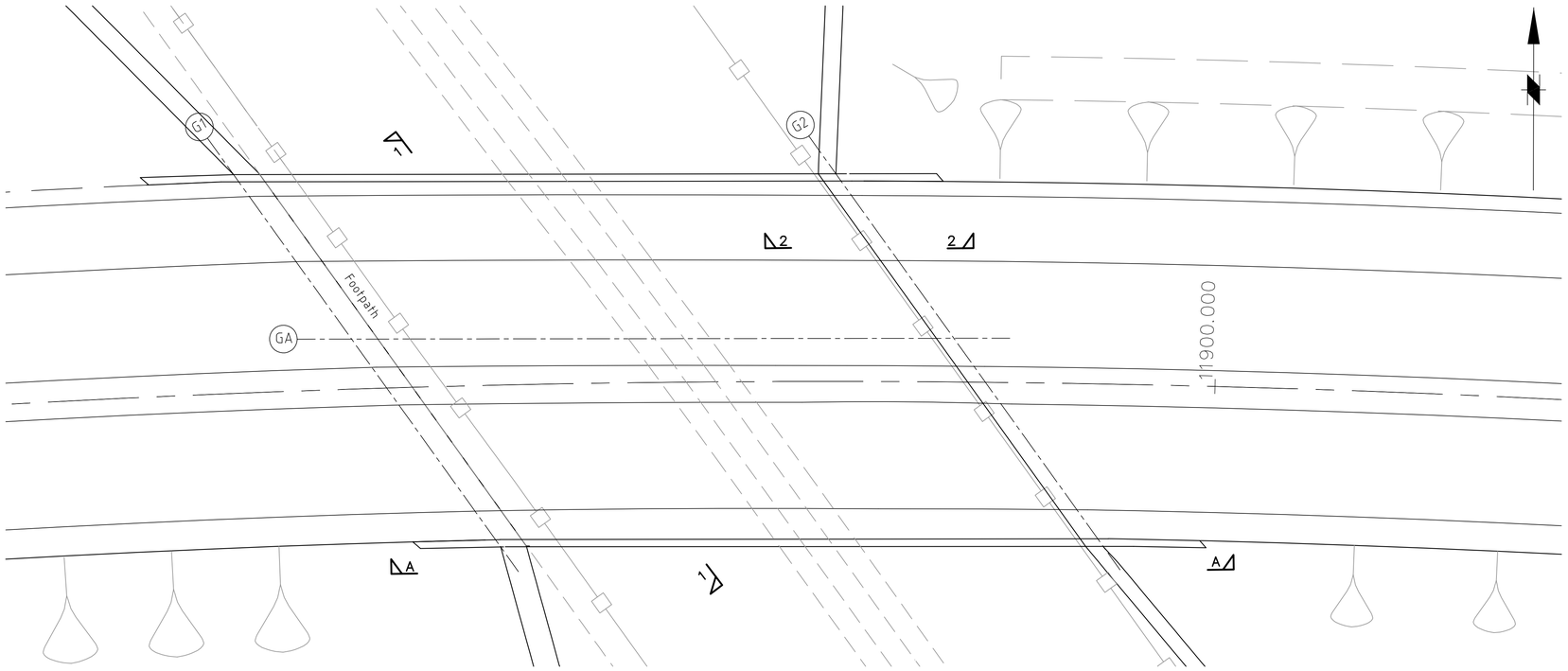
Revision:

Appendix B – General Arrangement WCML Bridge Drawing



PLAN ON BRIDGE
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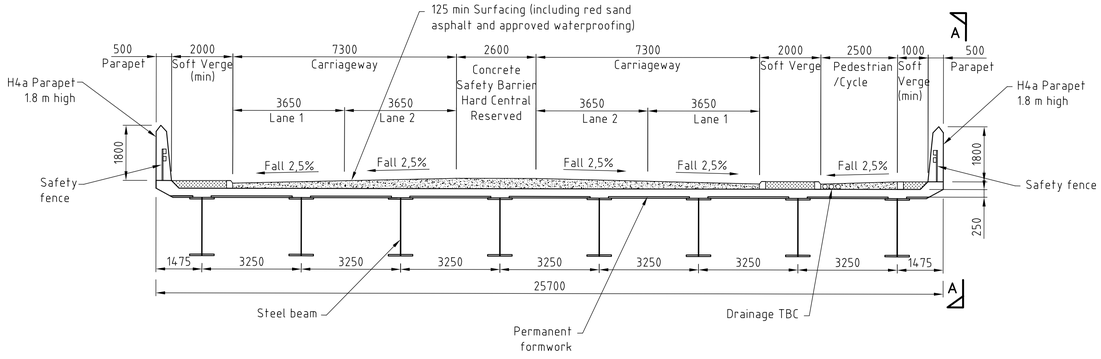

SECTION 1-1
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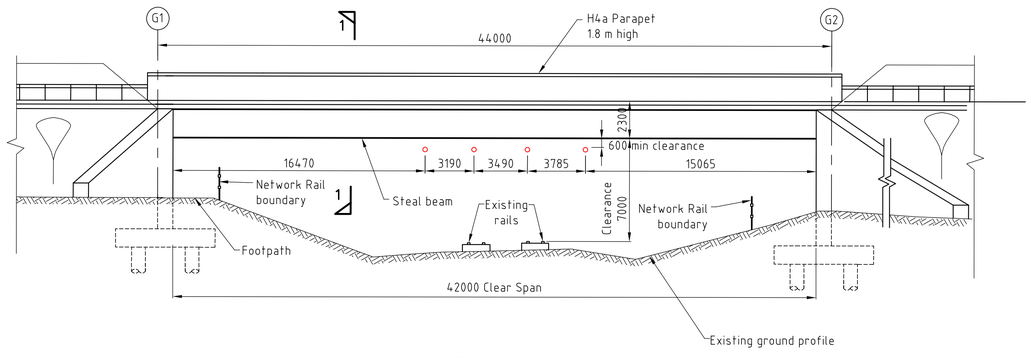
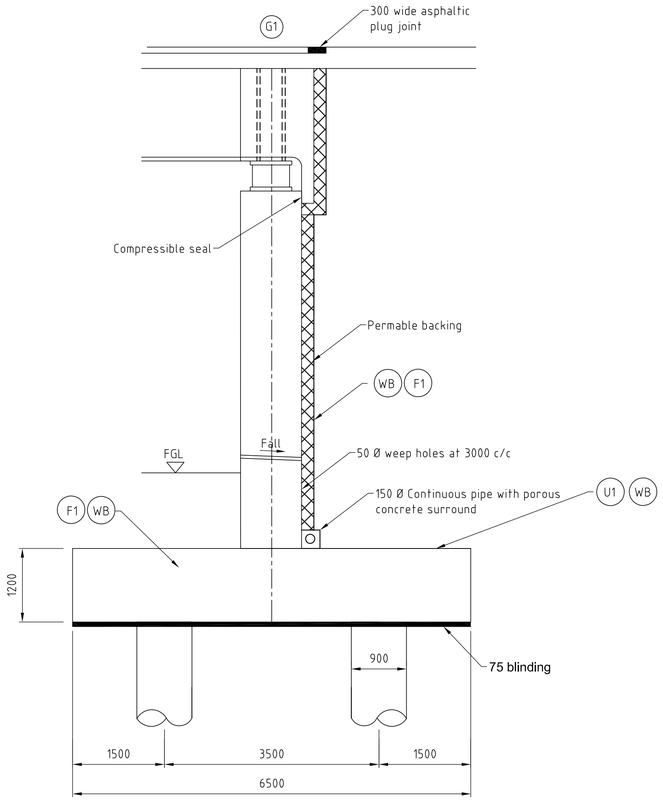


ELEVATION A-A
Scale 1:200



SECTION 2-2
Scale 1:50

NOTES

1. 1. The drawing has been produced based on the latest MX highway model - Draft Design Freeze 5 as provided by the client.

2. This drawing has been produced mainly for the purpose of planning application and feasibility study.

3. Only one option has been considered for this location as per client's instructions.

4. Levels are in meters and above Ordinate Datum.

5. All dimensions are in millimeters.

6. The option shown in this drawing is not for construction.

7. The foundation type shown on the drawing is based on the latest available geotechnical information.

8. Basic preliminary design has been undertaken to determine the geometry of the section sizes as per client's instruction.

Rev.	Drawn	Checked	Date	Revision Details

south east manchester multi modal strategy
semmms
STOCKPORT METROPOLITAN BOROUGH COUNCIL
Cheshire East Council
MANCHESTER CITY COUNCIL
HIGHWAYS&STRUCTURES
STOPFORD HOUSE
STOCKPORT SK1 3XE
TEL
FAX
Jim McMahon BSc. CEng. MICE
SERVICE DIRECTOR, MAJOR PROJECTS

Job Title

SEMMMS
RELIEF ROAD SCHEME
A6-AIRPORT

Drawing Title

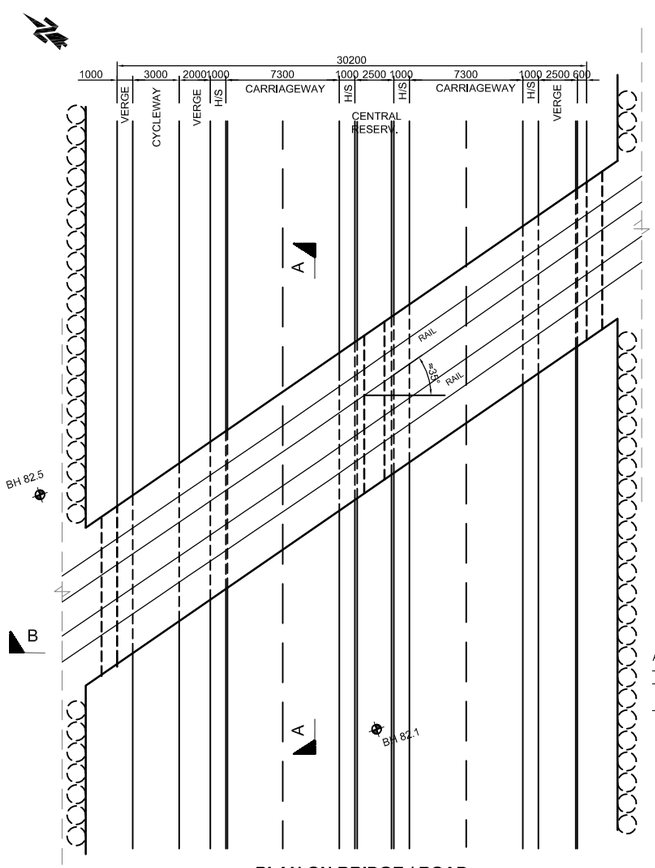
GENERAL ARRANGEMENT
WCML BRIDGE

Drawn	Engineer	Checked	Approved
RBG	LF	TK	NS
Date	Date	Date	Date
NOV/11	21/12/11	21/12/11	23/12/11
Size	Scale		
A1	AS SHOWN		
SCG No.	Filename		

Drawing No. 1007/3D/DF5/A6-MA/B008/708
Revision

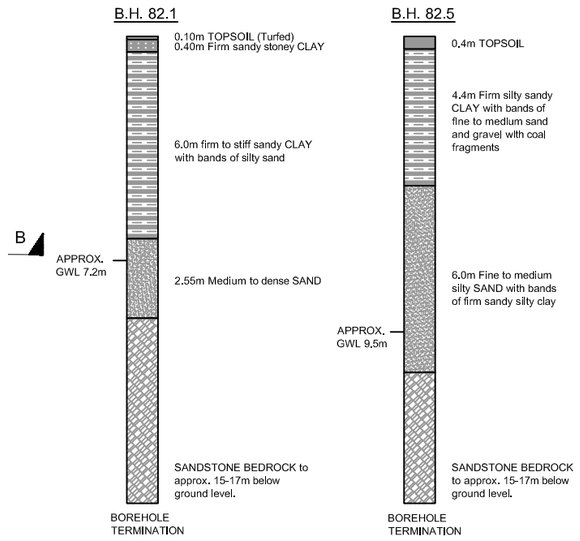
Revision

Drawing No. 37732 / A555 / STR / 3.4



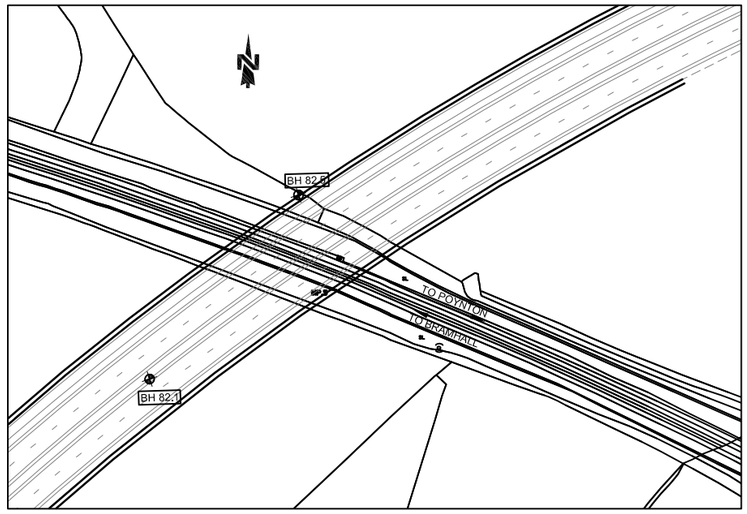
PLAN ON BRIDGE / ROAD.

SCALE 1:200



BOREHOLE LOG.

SCALE 1:100

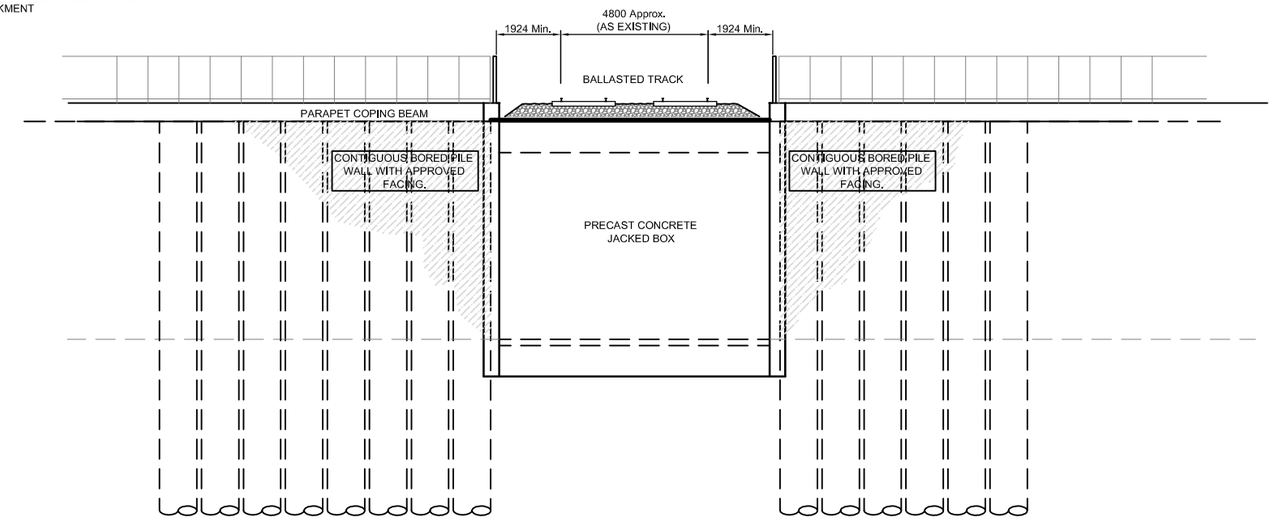


BRIDGE LOCATION PLAN.

N.T.S. - (CHAINAGE 8600.000)

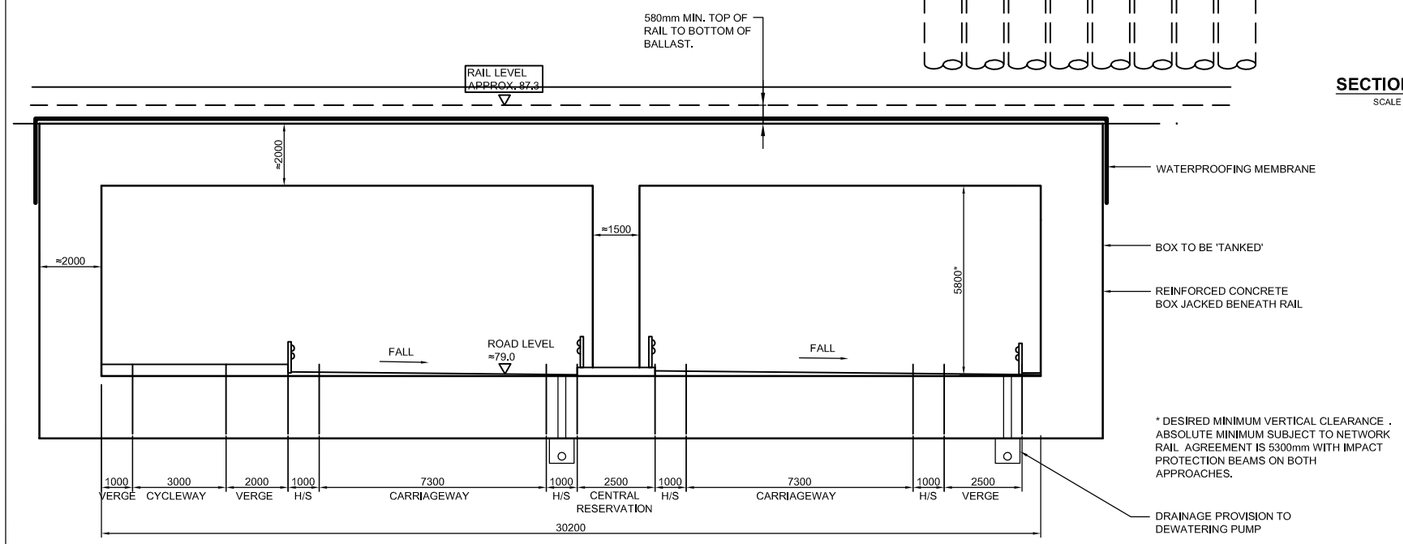
Please note : The information shown on this plan is for indication only, no warranty is made as to its accuracy. The plan must not be relied upon in the event of excavation or other works carried out in the vacinity of the services shown. No liability of any kind whatsoever is accepted by Faber Maunsell Ltd., its servants or agents for any error or omission in respect of this plan. The actual position of underground services must be verified on site before any mechanical plant is used.

APPROACH OPTIONS:-
- FACED OFF CONTIGUOUS BORED PILES
- TIED BACK REINFORCED CONCRETE WALLS WITH BELOW ROAD LEVEL INTEGRAL SLAB
- GRADED EMBANKMENT



SECTION A - A.

SCALE 1:100



SECTION B - B.

SCALE 1:100

Rev	Description of revision	Draw	Chkd	App	Date

Client

STOCKPORT METROPOLITAN BOROUGH COUNCIL

Project

A555 : M60 TO WOODFORD ROAD

Designed	
Drawn KAB	
Checked	
Reviewed	

FABER MAUNSELL
Lynnfield House, Church Street, Altrincham, WA14 4DZ
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CAD filename: F:\Projects\37732_Stockport_Framework_Engineering\Autocad\Output\

Title

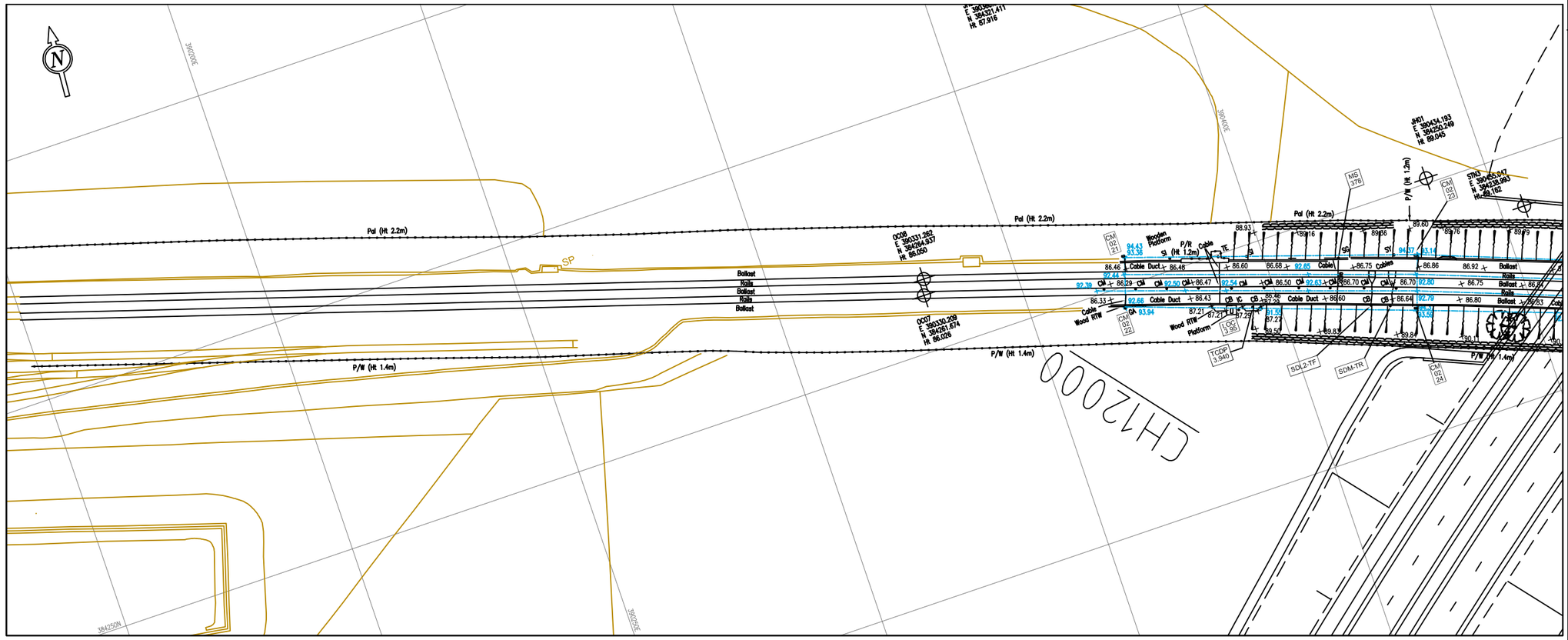
ROAD UNDER RAIL BRIDGE. (WEST COAST MAIN LINE)
GENERAL ARRANGEMENT.
JACKED R.C. BOX TYPE BRIDGE

Size A1	**Scale** AS SHOWN	**Date** 25.07.06	
Status			
Drawing No. 37732 / SEMMMS/A555/STR/3.4			**Revision**

Appendix C – Topographical Plans with Relief Road Superimposed

Revision A

Drawing No. 37732 / A555 / TOPO / 01



Notes

KEY

GRID - OS RELATED

DATUM - EXISTING STATION 1, 88.338m

FENCE LINE AND NETWORK RAIL LAND BOUNDARY

ABBREVIATIONS

CM	-	CANT MARK
EM	-	EMERGENCY PHONE
GA	-	GANTRY
MP	-	MILE POST
Pal	-	Palling
RTW	-	Retaining Wall
SG	-	SIGNAL
SI	-	SIGN
SY	-	STAY
TE	-	TELEPHONE
WB	-	WHISTLE BLOW

LOCATION OF LEVELS:-
-TRACK SIDE LEVELS TAKEN ON TOP OF BALLAST
-OVERHEAD WIRE LEVELS TAKEN ON CATENARY
(NOT LOWER PANTOGRAPH CONTACT WIRES)

Rev	Description of revision	Draw	Chkd	App	Date
A	ORIGINAL ISSUE	KAB	JFM	JFM	07.08.06

Client

STOCKPORT METROPOLITAN BOROUGH COUNCIL

Project

A555 : M60 TO WOODFORD ROAD

Designed	
Drawn	KAB
Checked	JFM
Reviewed	JFM

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CAD filename: F:\30894\autocad\output\

Title

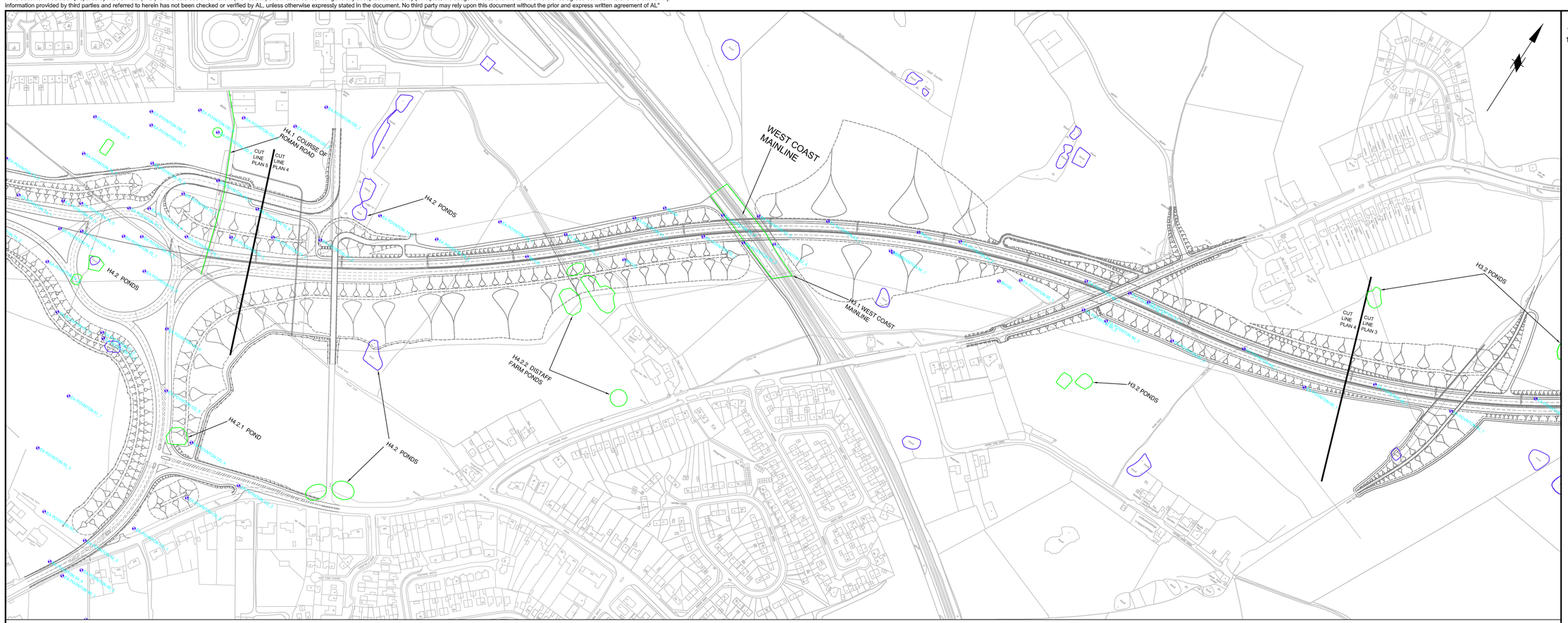
NETWORK RAIL CROSSINGS
BRAMHALL TO POYNTON WCML
TOPOGRAPHICAL SURVEY

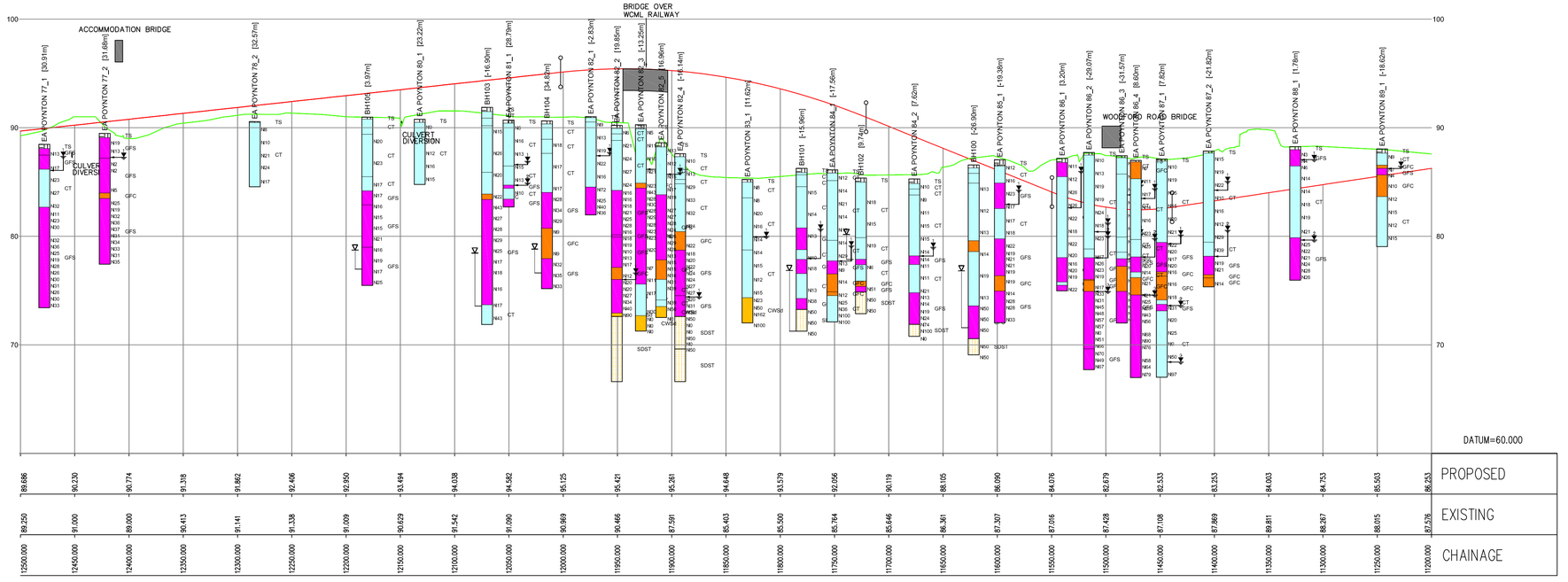
Size A1 Scale 1:500 @ A1 Date 31.07.06

Status

Drawing No. 37732 / SEMMMS/A555/TOPO/01 Revision A

Appendix D – Geotechnical Profiles





SECTION ALONG CENTRELINE OF SEMMMS RELIEF ROAD
A6 JCT TO A555
(SPEED LIMIT 50MPH)

NOTES

1. HIGHWAY ALIGNMENT AND VERTICAL GEOMETRY TAKEN FROM SMBC DRAWING 1007/3D-DF3/A6-MA/GA/176.

FEATURE IDENTIFIED FROM HISTORIC ORDNANCE SURVEY MAPS

WATERCOURSE TAKEN FROM OS VECTORMAP

STRATA KEY

TS	TOPSOIL	
MGG	MADE GROUND - GRANULAR	
MGC	MADE GROUND - COHESIVE	
CT	COHESIVE TILL	
AL	ALLUVIUM	
GFC	GLACIO FLUVIAL COHESIVE	
PEAT	PEAT	
GFS	GLACIO FLUVIAL - SAND	
GFG	GLACIO FLUVIAL - GRAVEL	
S&G	GLACIO FLUVIAL - SAND & GRAVEL	
CWC	COMPLETELY WEATHERED MUDSTONE	
CWST	COMPLETELY WEATHERED SILTSTONE	
CWSD	COMPLETELY WEATHERED SANDSTONE	
COAL	COAL	
MST	MUDSTONE	
STST	SILTSTONE	
SDST	SANDSTONE	
VOID	VOID	

Rev	Date	Detail	Made	Chk'd	App'd
B	FEB 2011	LABELS ADDED	RPA	ABSW	MdK
A	DEC 2010	ORIGINAL ISSUE	RPA	ABSW	MdK

Client: south east manchester multi modal strategy semmms — STOCKPORT — MANCHESTER CITY COUNCIL

Project:
SEMMMS
RELIEF ROAD SCHEME
A6 - AIRPORT

Title:
DRAFT DESIGN FREEZE 3
GEOLOGICAL LONG SECTION
SHEET 4 OF 12

Design:	RPA	CAD:	RPA
Chk'd:	ABSW	App'd:	MdK
Date:	NOVEMBER 2010	Scale:	H1:2500 V1:250 @A1

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No. 60186094/GEO/005 Rev: B

cm A1