

Croxley Rail Link: Cost Report

Croxley Rail Link

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1019324-ENG-NNN-RPT-KBW-115

7 September 2011

mouchel 
Produced for
Hertfordshire County Council

Prepared by
Kim Wilson
Principal Quantity Surveyor

Export House
Cawsey Way
Woking
Surrey GU21 6QX

T +44 (0)1483 731168
F +44 (0)1483 731008
E kim.wilson@mouchel.com

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Distribution

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|--------------|-----------------|--------|
| Mouchel | Tom Duckmanton | e-mail |
| Mouchel | Steve Parkinson | e-mail |

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| 5 Risk | 50 |
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1 Executive Summary

| | Item | (%) | Dec 10 Budget at 1Q07 (£) | (%) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | (%) | August 2011 estimate @ 2Q11 (£) | Extra/Saving (£) | Revenue potential (£) | Resale value (£) | Comments |
|----|--|------------|---------------------------|-----|---|-----|---------------------------------|-------------------|-----------------------|------------------|--|
| 1 | Stations | | 7,658,850 | | 8,424,735 | | 11,690,000 | 3,265,265 | | | Reflects current LU requirements of staffed stations. Previous assumption was for unstaffed. Target figures included |
| 2 | New structures | | 6,786,000 | | 7,464,600 | | 10,050,000 | 2,585,400 | | | Design developed |
| 3 | Existing structures | | 1,717,675 | | 1,889,443 | | 1,760,000 | -129,443 | | | Design developed |
| 4 | Earthworks and retaining walls | | 2,500,000 | | 2,750,000 | | 2,600,000 | -150,000 | | | Design developed |
| 5 | Demolitions | | 86,000 | | 94,600 | | 230,000 | 135,400 | | | Demolitions calculated based on detailed methodology |
| 6 | Permanent way | | 5,329,500 | | 5,862,450 | | 8,400,000 | 2,537,550 | | | Design developed |
| 7 | Removal of ballast | | 125,630 | | 138,193 | | 0 | -138,193 | | | Assumed used in fill |
| 8 | Fencing | | 500,000 | | 550,000 | | 640,000 | 90,000 | | | Design developed |
| 9 | Power | | 6,088,500 | | 6,697,350 | | 12,820,000 | 6,122,650 | | | Includes £2.7m for substation. Design developed. |
| 10 | Service diversions | | 370,000 | | 407,000 | | 400,000 | -7,000 | | | Provisional sums pending further investigations |
| 11 | Signalling | | 10,800,000 | | 11,880,000 | | 16,920,000 | 5,040,000 | | | Based on quotation |
| 12 | Telecomms | | 2,520,000 | | 2,772,000 | | 0 | -2,772,000 | | | Included in other cost items |
| 13 | Environmental | | 350,000 | | 385,000 | | 385,000 | 0 | | | Not updated |
| 14 | Landscape/streetscape/highways alterations | | 0 | | 0 | | 0 | 0 | | | Separate budget |
| | Sub-Totals | C/F | 44,832,155 | | 49,315,371 | | 65,895,000 | 16,579,630 | | | |

| | | | | | | | | | | | |
|----|---------------------------------|--------------|--------------------|---------------------|--------------------|-------|--------------------|-------------------|--|--|--|
| | Sub-Totals | B/F | 44,832,155 | | 49,315,371 | | 65,895,000 | 16,579,630 | | | |
| 15 | Preliminaries | 21.30% | 9,549,249 | | 10,504,174 | | 10,320,000 | -184,174 | | | Includes target LU management costs |
| | Sub-Totals | | 54,381,404 | | 59,819,544 | | 76,215,000 | 16,395,456 | | | |
| 16 | Profit & O/H | 7.50% | 4,078,605 | | 4,486,466 | 5.00% | 2,964,750 | -1,521,716 | | | Reduced |
| 17 | Design | 6.36% | 3,458,657 | | 3,804,523 | | 3,300,000 | -504,523 | | | Target figure included |
| 18 | PM inc legals | 4.00% | 2,175,256 | | 2,392,782 | | 2,150,000 | -242,782 | | | |
| 19 | Assurance | 3.00% | 1,631,442 | | 1,794,586 | | 500,000 | -1,294,586 | | | |
| 20 | Third party costs | | 7,780,951 | | 8,559,046 | | 0 | -8,559,046 | | | Excluded - ineligible costs |
| 21 | Possession costs | | 500,000 | | 550,000 | | 540,000 | -10,000 | | | |
| | Sub-Totals | | 74,006,316 | | 81,406,947 | | 85,669,750 | 4,262,803 | | | |
| 22 | Rolling stock | | 8,302,000 | | 9,132,200 | | 9,000,000 | -132,200 | | | Target figure included; Quotation awaited |
| 23 | Risk | | 12,700,000 | | 13,970,000 | | 5,100,000 | -8,870,000 | | | Based on Monte Carlo simulation calculation; |
| 24 | Land | | 4,000,000 | | 4,400,000 | | 4,240,000 | -160,000 | | | |
| 25 | TWA | | 0 | | 0 | | 0 | 0 | | | Excluded |
| 26 | Third party compensation | | 250,000 | | 275,000 | | 160,000 | -115,000 | | | |
| 27 | Monitoring | | 370,031 | | 407,034 | | 200,000 | -207,034 | | | Met Line and borehole monitoring during contract |
| | Sub-Totals | @2007 | 99,628,347 | @2011 | 109,591,182 | | 104,369,750 | -5,221,432 | | | |
| 28 | Inflation 2007-2014 | 20.27% | 20,196,165 | Inflation 2011-2015 | 10,233,330 | | 12,470,000 | 2,236,670 | | | Based on F&A indices |
| | Total Estimated Cost | | 119,824,512 | | 119,824,512 | | 116,839,750 | -2,984,762 | | | |
| | Say Total Estimated Cost | | | | | | 116,800,000 | | | | |

2. Scope

Hertfordshire County Council commissioned Mouchel to prepare Stage C estimates for the Croxley Rail Link as part of a BAFB submission to the Department of Transport. This cost report sets out details of these estimates, details Value Engineering exercises undertaken, and sets down the approach to calculating Risk Allowances.

3. Estimate

The following information was used in preparation of this estimate:

Power Supplies

- 1 Croxley Rail Link - Preliminary High Level Traction Power Supply Equipment Quantities Prepared by Parsons Brinckerhoff Ltd
- 2 Croxley Rail Link - Preliminary High Level Traction Power Supply Equipment Quantities Prepared by Parsons Brinckerhoff Ltd dated 4 August 2011
- 3 Croxley Rail Link - Preliminary High Level Traction Power Supply Equipment Quantities Prepared by Parsons Brinckerhoff Ltd dated 11 August 2011

Earthworks Permanent Way and Platform Extensions

| Drawing Prefix | Number | Rev. | Title |
|-----------------------------|--------|------|---|
| 1019324/GEO/GEN/GEN/FOD/00/ | 20001 | | General Layout |
| 1019324/GEO/GEN/GEN/FOD/00/ | 20002 | | Walkover Summary Details |
| 1019324/GEO/GEN/GEN/FOD/00/ | 20003 | | Indicative Route Geology & Historical Exploratory Holes |
| 1019324/GEO/GEN/GEN/FOD | 20101 | A | Layout showing extent of Earthworks |
| 1019324/GEO/GEN/GEN/FOD | 20102 | A | Layout showing extent of Retaining Structures |
| 1019324/GEO/GEN/GEN/FOD | 20103 | A | Layout - Viaduct to Ascot Rd Bridge |
| 1019324/GEO/GEN/GEN/FOD | 20104 | A | Layout - Metropolitan LineTie-in |
| 1019324/GEO/GEN/GEN/FOD | 20201 | A | Cross Section of Cuttings |
| 1019324/GEO/GEN/GEN/FOD | 20301 | A | Cross Section of Embankments (Gabions) |
| 1019324/GEO/GEN/GEN/FOD | 20401 | A | Cross Section of Embankments (Reinforced Soil) |
| 1019324/GEO/EWK/GEN/FOD | 20402 | A | Cross Section - Modular Block Faced Vertical Reinforced Soil Wall |
| 1019324/GEO/EWK/GEN/FOD | 20403 | A | Cross Section - Soil Wall & Culvert (Section B-B) |
| 1019324/GEO/EWK/GEN/FOD | 20404 | A | Cross Section - Existing Section at 74Km 888m |
| 1019324/GEO/EWK/GEN/FOD | 20405 | A | Cross Section - Proposed Section at 74Km 888m |

| | | | |
|-------------------------|-------------|----|--|
| Un-numbered | Un-numbered | | Cross Section - Viaduct to Ascot Rd Bridge - Section Location Plan |
| Un-numbered | Un-numbered | | Cross Section 33-37 Location Plan |
| Un-numbered | Un-numbered | | Revised Cross Sections for Geotech (29/3/11) |
| 1019324/ENG/PWY/GEN/FOD | 12101 | A | Indicative Track Geometry Details - Sheet 1 |
| 1019324/ENG/PWY/GEN/FOD | 12102 | A | Indicative Track Geometry Details - Sheet 2 |
| 1019324/ENG/PWY/GEN/FOD | 12103 | A | Indicative Track Geometry Details - Sheet 3 |
| 1019324/ENG/PWY/GEN/FOD | 12104 | A | Indicative Track Geometry Details - Sheet 4 |
| 1019324/ENG/PWY/GEN/FOD | 12105 | A | Indicative Track Geometry Details - Sheet 5 |
| 1019324/ENG/PWY/GEN/FOD | 12106 | A | Indicative Track Geometry Details - Sheet 6 |
| 1019324/ENG/PWY/GEN/FOD | 12107 | A | Indicative Track Geometry Details - Sheet 7 |
| 1019324/ENG/PWY/GEN/FOD | 12108 | A | Indicative Track Geometry Details - Sheet 8 |
| 1019324/ENG/PWY/WFJ/FOD | 12213 | A | Watford Junction Station - P.Way Layout Option 2 |
| NR/CIV/SD | 3012 | P1 | Standard Platform Design - Traditional Front Wall Platform - Sheet 3 of 10 - Typical Cross Section |

Existing Structures

1 Mouchel Conceptual Design Statements

Conceptual Design Statement for Bridge Strengthening to ELR WCG No.2 Brook - Document Number 1019324-ENG-BRI-CDS-FNF-039 Ver A

Conceptual Design Statement for Bridge Works to ELR WCG No.3 River Colne North Bridge - Document Number 1019324-ENG-BRI-CDS-BBS-040 Ver A

Conceptual Design Statement for Bridge Works to ELR CCG2 No.1 River Colne Side Channel - Document Number 1019324-ENG-BRI-CJY-041 Ver A

Conceptual Design Statement for Widening and Repairs to ELR CCG2 No.2 Stadium Station Approach - Document Number 1019324-ENG-BRI-GDM-042 Ver A

2 Mouchel Feasibility Reports

Mouchel Conceptual Design Statement for New Track Drainage - Document Number 1019324-ENG-DNG-CDS-LTD-095 Rev 01

Mouchel Feasibility Report for Overline Bridges Croxley Branch Line: Disused Section - Document Number 1019324-ENG-BRI-RPT-CJY-031 B

Mouchel Feasibility Report for Underline Bridges Croxley Branch Line: Operational Section - Document Number 1019324-ENG-BRI-RPT-FNF-048

Mouchel Feasibility Report for Overline Bridges Croxley Branch Line: Operational Section - Document Number 1019324-ENG-BRI-RPT-FNF-030 Ver B

3 Mouchel Drawings

1019324 - ENG-BRI-CMSC-GDM-020 Ver B - Croxley Rail Link Development - Bridge Location Plan

1019324 - ENG-BRI-WCG-FOD-10111 Rev A - Existing GA - Bridge ID WCG No.2 Brook

1019324 - ENG-BRI-WCG-FOD-10112 Rev A - Proposed GA - Bridge ID WCG No.2 Brook

1019324 - ENG-BRI-WCG-FOD-10212 Rev A - Existing GA - Bridge ID WCG No.3 River Colne (North)

1019324 - ENG-BRI-WCG-FOD-10213 Rev A - Proposed GA - Bridge ID WCG No.3 River Colne (North)

1019324 - ENG-BRI-WCG-S-10310 Rev A - GA - Bridge ID WCG No.3A River Colne South Bridge

1019324 - ENG-BRI-CCG2-FOD-10411 Rev A - Existing GA - Bridge ID CCG2 No.1 River Colne Side Channel

1019324 - ENG-BRI-CCG2-FOD-10412 Rev A - Proposed GA - Bridge ID CCG2 No.1 River Colne Side Channel

1019324 - ENG-BRI-CCG2-FOD-10513 Rev A - Existing GA - Bridge ID CCG2 No.2 (Sheet 1 of 3)

1019324 - ENG-BRI-CCG2-FOD-10514 Rev A - Existing GA - Bridge ID CCG2 No.2 (Sheet 2 of 3)

1019324 - ENG-BRI-CCG2-FOD-10515 Rev A - Existing GA - Bridge ID CCG2 No.2 (Sheet 3 of 3)

1019324 - ENG-BRI-CCG2-FOD-10516 Rev A - Proposed GA - Bridge ID CCG2 No.2 (Sheet 1 of 3)

1019324 - ENG-BRI-CCG2-FOD-10517 Rev A - Proposed GA - Bridge ID CCG2 No.2 (Sheet 2 of 3)

1019324 - ENG-BRI-CCG2-FOD-10518 Rev A - Proposed GA - Bridge ID CCG2 No.2 (Sheet 3 of 3)

Draft Plan and Section of CCG2 No.5 Ascot Road Bridge

Drainage

| | |
|--|-------|
| 1019324/ENG/DNG/CCG/FOD/80101 | REV A |
| 1019324/ENG/DNG/CCG/FOD/80102 | REV A |
| 1019324/ENG/DNG/CCG/FOD/80103 | REV A |
| 1019324/ENG/DNG/CCG/FOD/80104 | REV A |
| 1019324/ENG/DNG/CCG/FOD/80105 | REV A |
| 1019324/ENG/DNG/CCG/FOD/80106 | REV A |
| 1019324/ENG/DNG/CCG/FOD/80107 | REV A |
| 1019324/ENG/DNG/CCG/FOD/80108 | REV A |
| 1019324/ENG/PWY/GEN/FOD/12304 | REV A |
| 1019324-ENG-DNG-CDS-LTD-095 Rev 01_draft5_.pdf | |

Viaduct

| | |
|-------------------------------|-----------|
| 1019324-ENG-BRI-ASR-FOD-11001 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11002 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11003 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11005 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11006 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11007 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11008 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11009 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11010 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11011 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11015 | Version B |

Bridge

| | |
|-------------------------------|-----------|
| 1019324-ENG-BRI-ASR-FOD-11001 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11002 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11003 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11005 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11006 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11007 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11008 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11009 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11010 | Version B |
| 1019324-ENG-BRI-ASR-FOD-11011 | Version B |

1019324-ENG-NNN-RPT-KBW-115

Ascot Road Station

1019324-ARC-STN-ARS-FOD-

| | | | | |
|-------------------------------|----|-------|-------|---|
| ASCOT ROAD SITE PLAN | A1 | 1:500 | 60100 | |
| ASCOT ROAD KEY PLAN | A1 | 1:250 | 60110 | B |
| ASCOT ROAD CONCOURSE PLAN | A1 | 1:100 | 60120 | B |
| ASCOT ROAD PLATFORM PLAN 1OF3 | A1 | 1:100 | 60125 | B |
| ASCOT ROAD PLATFORM PLAN 2OF3 | A1 | 1:100 | 60126 | B |
| ASCOT ROAD PLATFORM PLAN 3OF3 | A1 | 1:100 | 60127 | B |
| ASCOT ROAD ROOF PLAN | A1 | 1:100 | 60130 | |
| ASCOT ROAD ELEVATIONS | A1 | 1:100 | 60151 | |
| ASCOT ROAD ELEVATIONS | A1 | 1:100 | 60152 | |
| ASCOT ROAD PLATFORM ELEVATION | A1 | 1:100 | 60153 | |
| ASCOT ROAD PLATFORM ELEVATION | A1 | 1:100 | 60154 | |
| ASCOT ROAD SECTIONS | A1 | 1:100 | 60171 | B |
| ASCOT ROAD SECTIONS | A1 | 1:100 | 60172 | B |

Watford Hospital Station

1019324-ARC-STN-WWS-FOD-

| | | | | |
|--------------------------------------|----|-------|-------|---|
| WATFORD HOSPITAL SITE PLAN | A1 | 1:500 | 60200 | |
| WATFORD HOSPITAL KEY PLAN | A1 | 1:250 | 60210 | B |
| WATFORD HOSPITAL CONCOURSE PLAN | A1 | 1:100 | 60220 | B |
| WATFORD HOSPITAL PLATFORM PLAN 1OF3 | A1 | 1:100 | 60225 | B |
| WATFORD HOSPITAL PLATFORM PLAN 2OF3 | A1 | 1:100 | 60226 | B |
| WATFORD HOSPITAL PLATFORM PLAN 3OF3 | A1 | 1:100 | 60227 | B |
| WATFORD HOSPITAL PLATFORM PLAN 4OF4 | A1 | 1:100 | 60228 | B |
| WATFORD HOSPITAL ROOF PLAN | A1 | 1:100 | 60230 | A |
| WATFORD HOSPITALELEVATIONS | A1 | 1:100 | 60251 | A |
| WATFORD HOSPITALELEVATIONS | A1 | 1:100 | 60252 | A |
| WATFORD HOSPITALL PLATFORM ELEVATION | A1 | 1:100 | 60253 | |
| WATFORD HOSPITALL PLATFORM ELEVATION | A1 | 1:100 | 60254 | |
| WATFORD HOSPITAL SECTIONS | A1 | 1:100 | 60271 | B |

| | | | | |
|--|----|-------|---------------|---|
| WATFORD HOSPITAL CURRENT PROPOSALS (1019324-ARC-STN-) | A1 | 1:200 | WWS-FOD-60900 | A |
| WATFORD HOSPITAL OPTION A PLAN (1019324-ARC-STN-) | A1 | 1:200 | WWS-FOD-60901 | A |
| WATFORD HOSPITAL OPTION B PLAN (1019324-ARC-STN-) | A1 | 1:200 | WWS-FOD-60902 | A |
| WATFORD HOSPITAL OPTION C PLAN (1019324-ARC-STN-) | A1 | 1:200 | WWS-FOD-60903 | A |
| WATFORD HOSPITAL OPTION APPRAISAL (1019324-ARC-STN-) | A1 | 1:200 | WWS-FOD-60904 | A |
| VIADUCT SUPPORT | A1 | 1:50 | VDT-SKT-60905 | |

Watford High Street Station

1019324-ARC-STN-WFH-FOD

| | | | | |
|--|----|-------|-------|---|
| WATFORD HIGH STREET SITE PLAN | A1 | 1:500 | 60300 | |
| WATFORD HIGH STREET KEY PLAN | A1 | 1:100 | 60310 | A |
| WATFORD HIGH STREET CONCOURSE PLAN | A1 | 1:100 | 60320 | A |
| WATFORD HIGH STREET PLATFORM PLAN | A1 | 1:100 | 60325 | A |
| WATFORD HIGH STREET PLATFORM PLAN | A1 | 1:100 | 60326 | A |
| WATFORD HIGH STREET PLATFORM PLAN | A1 | 1:100 | 60327 | A |
| WATFORD HIGH STREET ELEVATION | A1 | 1:100 | 60351 | |
| WATFORD HIGH STREET PLATFORM ELEV. | A1 | 1:100 | 60353 | |
| WATFORD HIGH STREET SECTION | A1 | 1:100 | 60371 | |
| WATFORD HIGH STREET KEY PLAN OPTION 2A | A1 | 1:100 | 60380 | A |
| WATFORD HIGH STREET CONCOURSE PLAN OPTION 2A | A1 | 1:100 | 60381 | A |
| WATFORD HIGH STREET PLATFORM PLAN OPTION 2A | A1 | 1:100 | 60382 | A |
| WATFORD HIGH STREET KEY PLAN OPTION 2B | A1 | 1:100 | 60385 | A |
| WATFORD HIGH STREET CONCOURSE PLAN OPTION 2B | A1 | 1:100 | 60326 | A |

Watford Junction Station

1019324-ARC-STN-WFH-FOD

| | | | | |
|------------------------------------|----|-------|-------|---|
| WATFORD HIGH STREET SITE PLAN | A1 | 1:500 | 60300 | |
| WATFORD HIGH STREET KEY PLAN | A1 | 1:100 | 60310 | A |
| WATFORD HIGH STREET CONCOURSE PLAN | A1 | 1:100 | 60320 | A |
| WATFORD HIGH STREET PLATFORM PLAN | A1 | 1:100 | 60325 | A |
| WATFORD HIGH STREET PLATFORM PLAN | A1 | 1:100 | 60326 | A |
| WATFORD HIGH STREET PLATFORM PLAN | A1 | 1:100 | 60327 | A |

| | | | | |
|--|----|-------|-------|---|
| WATFORD HIGH STREET ELEVATION | A1 | 1:100 | 60351 | |
| WATFORD HIGH STREET PLATFORM ELEV. | A1 | 1:100 | 60353 | |
| WATFORD HIGH STREET SECTION | A1 | 1:100 | 60371 | |
| WATFORD HIGH STREET KEY PLAN OPTION 2A | A1 | 1:100 | 60380 | A |
| WATFORD HIGH STREET CONCOURSE PLAN OPTION 2A | A1 | 1:100 | 60381 | A |
| WATFORD HIGH STREET PLATFORM PLAN OPTION 2A | A1 | 1:100 | 60382 | A |
| WATFORD HIGH STREET KEY PLAN OPTION 2B | A1 | 1:100 | 60385 | A |
| WATFORD HIGH STREET CONCOURSE PLAN OPTION 2B | A1 | 1:100 | 60326 | A |

This estimate is based on:

- 1 Second quarter 2011 rates and prices
Inflation has been calculated from second quarter 2011 up to first quarter 2015, being half way through
- 2 the proposed construction period
- 3 Inflation calculations have been based on Franklin & Andrews Rail Tender Indices July 2011
- 4 Alternative inflation calculations have been based on an allowance of 2.5% per annum
- 5 Procurement strategy has been assumed to be as follows:
 - 5.1 Traditional contract let by Hertfordshire County Council for all civils and rail works
London Underground to procure rolling stock, signalling and telecommunications, gatelines and ticket machines
 - 5.2 Enabling works contracts to be let for treating Japanese Knotweed and other problem vegetation, as well as undergrowth clearance.
- 6 Risk allowance is based on calculations following a Risk Workshop session
Station estimates for Ascot Road, Watford Hospital, Watford High Street and Watford Junction stations
- 7 are based on figures provided by Acanthus
Signalling, telecommunications and rolling stock estimates are based on figures provided by London
- 8 Underground
- 9 Activity durations and gang sizes provided by Vinci
- 10 Outline programme dated 03-06-11 ref VINCI/CRL/PROG/001 provided by Vinci
- 11 Risk workshop held on 16th June 2011
- 12 Possessions being booked well in advance
- 13 Signalling being carried out between January and December 2014
- 14 Scope and cost review meeting held on 10th August 2011

Ascot Road Station Assumptions

- 1 Glazed Elevations to be Schuco 50 or similar
- Expanded metal cladding to be galvanized expanded mesh attached to 100mm medium density block cavity wall
- 2 (uninsulated)
- External Masonry walls to be outer skin in facings pc £400 per 1000, non ferrous ties and 100mm
- 3 medium density block inner skin, uninsulated other than to habitable rooms
- 4 Public areas to have ceramic tiles PC £90 per m2 supplied and laid on 50mm cement and sand screed
- Platform finishes to be standard copers, blister tile tactile strip and precast concrete paved surfacing pc £50 per m2
- 5 laid
- 6 Metal tile suspended ceiling to public areas pc £120/m2
- 7 Platform canopy 180m2 at £1200 per m2 including structure
- 8 Station Totems pc £2,500 each
- 9 Platform seating PC £1500 each
- 10 Provisional sum for signage £100,000
- 11 Provisional sum for below ground drainage foul and surface water including connections £100,000
- 12 Internal walls to be left fair faced and undecorated

Watford Hospital Station Assumptions

Architectural

- 1 Glazed Elevations to be Schuco 50 or similar
- Expanded metal cladding to be galvanized expanded mesh attached to 100mm medium density block cavity wall
- 2 (uninsulated)
- External Masonry walls to be outer skin in facings pc £400 per 1000, non ferrous ties and 100mm
- 3 medium density block inner skin, uninsulated other than to habitable rooms
- 4 Public areas to have ceramic tiles PC £90 per m2 supplied and laid on 50mm cement and sand screed
- Platform finishes to be standard copers, blister tile tactile strip and precast concrete paved surfacing pc £50 per m2
- 5 laid
- 6 Metal tile suspended ceiling to public areas pc £120/m2
- 7 Platform canopy 120m2 at £1200 per m2 including structure
- 8 Station Totems pc £2,500 each
- 9 56 Platform seats PC £280 each
- 10 Provisional sum for signage £100,000
- 11 Provisional sum for below ground drainage foul and surface water including connections £100,000
- 12 Platform back screens to be 1800mm high pallisade fences not metal panellised screens indicated
- 13 Internal walls to be left fair faced and undecorated

Structural

- 1 Provisional quantity of 2000m3 allowed for excavation and disposal

Exclusions

- 1 VAT
- 2 Local Authority and other fees
- 3 TWA costs
- 4 Client team costs
- 5 Finance charges
- 6 Public Enquiry costs

7 Any costs relating to closure of Metropolitan Line to Watford or for converting to stabling

8 EIA costs

9 Stamp duty

10 Planning application fees

11 Building Control fees

12 Section 106 & Section 278 payments

13 Special bonds

14 Special contract conditions

15 Hand held fire extinguishers

16 IT and infrastructure

17 Shopfronts and fire curtains to retail units

18 Tax allowances and grants

- 19 Capital allowances
- 20 Agency/appraisal and marketing costs
- 21 Stopping up orders
- 22 Optimism bias
- 23 Public highway work
- 24 Non eligible costs

| Estimate Summary | | | | | | | | | | | |
|------------------|--|------------|---------------------------|-----|---|-----|---------------------------------|-------------------|-----------------------|------------------|--|
| | Item | (%) | Dec 10 Budget at 1Q07 (£) | (%) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | (%) | August 2011 estimate @ 2Q11 (£) | Extra/Saving (£) | Revenue potential (£) | Resale value (£) | Comments |
| 1 | Stations | | 7,658,850 | | 8,424,735 | | 11,690,000 | 3,265,265 | | | Reflects current LU requirements of staffed stations. Previous assumption was for unstaffed. Target figures included |
| 2 | New structures | | 6,786,000 | | 7,464,600 | | 10,050,000 | 2,585,400 | | | Design developed |
| 3 | Existing structures | | 1,717,675 | | 1,889,443 | | 1,760,000 | -129,443 | | | Design developed |
| 4 | Earthworks and retaining walls | | 2,500,000 | | 2,750,000 | | 2,600,000 | -150,000 | | | Design developed |
| 5 | Demolitions | | 86,000 | | 94,600 | | 230,000 | 135,400 | | | Demolitions calculated based on detailed methodology |
| 6 | Permanent way | | 5,329,500 | | 5,862,450 | | 8,400,000 | 2,537,550 | | | Design developed |
| 7 | Removal of ballast | | 125,630 | | 138,193 | | 0 | -138,193 | | | Assumed used in fill |
| 8 | Fencing | | 500,000 | | 550,000 | | 640,000 | 90,000 | | | Design developed |
| 9 | Power | | 6,088,500 | | 6,697,350 | | 12,820,000 | 6,122,650 | | | Includes £2.7m for substation. Design developed. |
| 10 | Service diversions | | 370,000 | | 407,000 | | 400,000 | -7,000 | | | Provisional sums pending further investigations |
| 11 | Signalling | | 10,800,000 | | 11,880,000 | | 16,920,000 | 5,040,000 | | | Based on quotation |
| 12 | Telecomms | | 2,520,000 | | 2,772,000 | | 0 | -2,772,000 | | | Included in other cost items |
| 13 | Environmental | | 350,000 | | 385,000 | | 385,000 | 0 | | | Not updated |
| 14 | Landscape/streetscape/highways alterations | | 0 | | 0 | | 0 | 0 | | | Separate budget |
| | Sub-Totals | C/F | 44,832,155 | | 49,315,371 | | 65,895,000 | 16,579,630 | | | |

| | | | | | | | | | | | |
|----|---------------------------------|--------------|--------------------|---------------------|--------------------|-------|--------------------|-------------------|--|--|---|
| | Sub-Totals | B/F | 44,832,155 | | 49,315,371 | | 65,895,000 | 16,579,630 | | | |
| 15 | Preliminaries | 21.30% | 9,549,249 | | 10,504,174 | | 10,320,000 | -184,174 | | | Includes target LU management costs |
| | Sub-Totals | | 54,381,404 | | 59,819,544 | | 76,215,000 | 16,395,456 | | | |
| 16 | Profit & O/H | 7.50% | 4,078,605 | | 4,486,466 | 5.00% | 2,964,750 | -1,521,716 | | | Reduced Target figure included |
| 17 | Design | 6.36% | 3,458,657 | | 3,804,523 | | 3,300,000 | -504,523 | | | |
| 18 | PM inc legals | 4.00% | 2,175,256 | | 2,392,782 | | 2,150,000 | -242,782 | | | |
| 19 | Assurance | 3.00% | 1,631,442 | | 1,794,586 | | 500,000 | -1,294,586 | | | |
| 20 | Third party costs | | 7,780,951 | | 8,559,046 | | 0 | -8,559,046 | | | |
| 21 | Possession costs | | 500,000 | | 550,000 | | 540,000 | -10,000 | | | |
| | Sub-Totals | | 74,006,316 | | 81,406,947 | | 85,669,750 | 4,262,803 | | | |
| 22 | Rolling stock | | 8,302,000 | | 9,132,200 | | 9,000,000 | -132,200 | | | Target figure included; Quotation awaited |
| 23 | Risk | | 12,700,000 | | 13,970,000 | | 5,100,000 | -8,870,000 | | | |
| 24 | Land | | 4,000,000 | | 4,400,000 | | 4,240,000 | -160,000 | | | Excluded |
| 25 | TWA | | 0 | | 0 | | 0 | 0 | | | |
| 26 | Third party compensation | | 250,000 | | 275,000 | | 160,000 | -115,000 | | | |
| 27 | Monitoring | | 370,031 | | 407,034 | | 200,000 | -207,034 | | | |
| | Sub-Totals | @2007 | 99,628,347 | @2011 | 109,591,182 | | 104,369,750 | -5,221,432 | | | |
| 28 | Inflation 2007-2014 | 20.27% | 20,196,165 | Inflation 2011-2015 | 10,233,330 | | 12,470,000 | 2,236,670 | | | Based on F&A indices |
| | Total Estimated Cost | | 119,824,512 | | 119,824,512 | | 116,839,750 | -2,984,762 | | | |
| | Say Total Estimated Cost | | | | | | 116,800,000 | | | | |

| Estimate Summary With Inflation at 2.5% per annum | | | | | | | | | | | |
|---|--|-----|---------------------------|-----|---|-----|---------------------------------|-------------------|-----------------------|------------------|--|
| Ref | Item | (%) | Dec 10 Budget at 1Q07 (£) | (%) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | (%) | August 2011 estimate @ 2Q11 (£) | Extra/Saving (£) | Revenue potential (£) | Resale value (£) | Comments |
| 1 | Stations | | 7,658,850 | | 8,424,735 | | 11,690,000 | 3,265,265 | | | Reflects current LU requirements of staffed stations. Previous assumption was for unstaffed. Target figures included |
| 2 | New structures | | 6,786,000 | | 7,464,600 | | 10,050,000 | 2,585,400 | | | Design developed |
| 3 | Existing structures | | 1,717,675 | | 1,889,443 | | 1,760,000 | -129,443 | | | Design developed |
| 4 | Earthworks and retaining walls | | 2,500,000 | | 2,750,000 | | 2,600,000 | -150,000 | | | Design developed |
| 5 | Demolitions | | 86,000 | | 94,600 | | 230,000 | 135,400 | | | Demolitions calculated based on detailed methodology |
| 6 | Permanent way | | 5,329,500 | | 5,862,450 | | 8,400,000 | 2,537,550 | | | Design developed |
| 7 | Removal of ballast | | 125,630 | | 138,193 | | 0 | -138,193 | | | Assumed used in fill |
| 8 | Fencing | | 500,000 | | 550,000 | | 640,000 | 90,000 | | | Design developed |
| 9 | Power | | 6,088,500 | | 6,697,350 | | 12,820,000 | 6,122,650 | | | Includes £2.7m for substation. Design developed. |
| 10 | Service diversions | | 370,000 | | 407,000 | | 400,000 | -7,000 | | | Provisional sums pending further investigations |
| 11 | Signalling | | 10,800,000 | | 11,880,000 | | 16,920,000 | 5,040,000 | | | Based on quotation |
| 12 | Telecomms | | 2,520,000 | | 2,772,000 | | 0 | -2,772,000 | | | Included in other cost items |
| 13 | Environmental | | 350,000 | | 385,000 | | 385,000 | 0 | | | Not updated |
| 14 | Landscape/streetscape/highways alterations | | 0 | | 0 | | 0 | 0 | | | Separate budget |
| | Sub-Totals | | 44,832,155 | | 49,315,371 | | 65,895,000 | 16,579,630 | | | |

| | | | | | | | | | | | |
|----|---------------------------------|--------------|--------------------|---------------------|--------------------|-------|--------------------|-------------------|--|--|--|
| | Sub-Totals | | 44,832,155 | | 49,315,371 | | 65,895,000 | 16,579,630 | | | |
| 15 | Preliminaries | 21.30% | 9,549,249 | | 10,504,174 | | 10,320,000 | -184,174 | | | Includes target LU management costs |
| | Sub-Totals | | 54,381,404 | | 59,819,544 | | 76,215,000 | 16,395,456 | | | |
| 16 | Profit & O/H | 7.50% | 4,078,605 | | 4,486,466 | 5.00% | 2,964,750 | -1,521,716 | | | Recalculated; excluding Signalling & Telecomms |
| 17 | Design | 6.36% | 3,458,657 | | 3,804,523 | | 3,300,000 | -504,523 | | | Target figure included |
| 18 | PM inc legals | 4.00% | 2,175,256 | | 2,392,782 | | 2,150,000 | -242,782 | | | |
| 19 | Assurance | 3.00% | 1,631,442 | | 1,794,586 | | 500,000 | -1,294,586 | | | Target figure included |
| 20 | Third party costs | | 7,780,951 | | 8,559,046 | | 0 | -8,559,046 | | | Excluded - ineligible costs |
| 21 | Possession costs | | 500,000 | | 550,000 | | 540,000 | -10,000 | | | |
| | Sub-Totals | | 74,006,316 | | 81,406,947 | | 85,669,750 | 4,262,803 | | | |
| 22 | Rolling stock | | 8,302,000 | | 9,132,200 | | 9,000,000 | -132,200 | | | Target figure included; |
| 23 | Risk | | 12,700,000 | | 13,970,000 | | 5,100,000 | -8,870,000 | | | Based on Monte Carlo simulation calculation; |
| 24 | Land | | 4,000,000 | | 4,400,000 | | 4,240,000 | -160,000 | | | |
| 25 | TWA | | 0 | | 0 | | 0 | 0 | | | Excluded |
| 26 | Third party compensation | | 250,000 | | 275,000 | | 160,000 | -115,000 | | | |
| 27 | Monitoring | | 370,031 | | 407,034 | | 200,000 | -207,034 | | | Met Line and borehole monitoring during contract |
| | Sub-Totals | @2007 | 99,628,347 | @2011 | 109,591,182 | | 104,369,750 | -5,221,432 | | | |
| 28 | Inflation 2007-2014 | 20.27% | 20,196,165 | Inflation 2011-2015 | 10,233,330 | | 6,980,000 | -3,253,330 | | | Based on 2.5% inflation per annum |
| | Total Estimated Cost | | 119,824,512 | | 119,824,512 | | 111,349,750 | -8,474,762 | | | |
| | Say Total Estimated Cost | | | | | | 111,350,000 | | | | |

| Stations | | | | | | | | |
|------------|--------------------------------|--------|------------------|--|---------------------------|---|------------------|---------------------------------|
| Ref | Element | | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
| 1.0 | Watford Hospital Station | | 5,500,000 | Target agreed at meeting on 10.8.11 based on Cyril Sweett estimate dated 12.8.11 but with reduced specification and areas | | | | Greater area to allow for staff |
| | Less O/H&P | 5.00% | -275,000 | | | | | |
| | Total | | 5,225,000 | | 4,134,850 | 4,548,335 | 676,665 | |
| 2.0 | Ascot Road Station | | 5,700,000 | Target agreed at meeting on 10.8.11 based on Cyril Sweett estimate dated 18.7.11 but with reduced specification Drainage to back of platform only | | | | Greater area to allow for staff |
| | Add Drainage | | 20,000 | | | | | |
| | Sub-Total | | 5,720,000 | | | | | |
| | Less O/H&P | 5.00% | -286,000 | | | | | |
| | Total | | 5,434,000 | | 3,524,000 | 3,876,400 | 1,557,600 | |
| 3.0 | Watford High Street | | | | | | | |
| | Work to out of gauge platforms | | 60,195 | See platform extension buildup | | | | Additional requirement |
| | Add Signage | | 2,000 | From Cyril Sweett base estimate 27.7.11 | | | | Additional requirement |
| | CIS | | 50,000 | From Cyril Sweett base estimate 27.7.11 | | | | Additional requirement |
| Less O/H&P | 5.00% | -2,600 | | | | | | |
| | Total | | 109,595 | | 0 | 0 | 109,595 | |

| Stations (Contd) | | | | | | | | |
|------------------|--|-------|-------------------|--|---------------------------|---|------------------|---|
| Ref | Element | | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
| 4.0 | Watford Junction Platform extensions to platforms 3&4 Regauging work to platforms 1&2 | | 489,968 | See platform extension buildup | | | | Additional requirement |
| | | | 60,000 | | | | | |
| | | | 183,000 | From Cyril Sweett base estimate 27.7.11 | | | | |
| | Cyril Sweett estimate Less O/H&P Network signing | 5.00% | -9,150 | Changes to signing and other information systems at non-CRL stations served by the Metropolitan line (meeting 10.8.11) | | | | Additional requirement for signage, CIS and lighting to platform extensions |
| | | | 200,000 | | | | | Additional requirement |
| | Total | | 923,818 | | 0 | 0 | 923,818 | |
| | Station Totals | | 11,692,413 | | | | | |
| | Say Station Totals | | 11,690,000 | | 7,658,850 | 8,424,735 | 3,265,265 | |

| New Structures | | | | | | | |
|-----------------------|---------------------------------|-------------------|------------------------|----------------------------------|--|-------------------------|--|
| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
| 1 | Viaduct | 6622078 | See viaduct buildup | | | | Design developed |
| 2 | Drainage | 465217 | See drainage buildup | | | | Design developed |
| 3 | Bridge | 2175614 | See bridge buildup | | | | Design developed |
| 4 | Drainage | 229524 | See drainage buildup | | | | Design developed |
| 5 | Ascot Road Embankment | 507814 | See earthworks buildup | | | | Design developed |
| 6 | Drainage | 50512 | See drainage buildup | | | | Design developed |
| | New Structures Total | 10,050,759 | | | | | |
| | Say New Structures Total | 10,050,000 | | 6,786,000 | 7,464,600 | 2,585,400 | |

| Existing Structures | | | | | | | |
|---------------------|---|------------------|---------------------------------|---------------------------|---|------------------|---|
| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
| 1 | Existing structures | | | | | | |
| | CWJ66-Water Lane | 28,710 | See existing structures buildup | 0 | 0 | 28,710 | New requirement |
| 1.1 | WCG1-Wiggenhall Road | 106,833 | See existing structures buildup | 18,340 | 20,174 | 86,659 | Wiggenhall overbridge |
| 1.2 | WCG2-Brook | 308,581 | See existing structures buildup | | 0 | 308,581 | |
| 1.3 | WCG3-River Colne (N) | 362,928 | See existing structures buildup | 503,602 | 553,962 | -191,034 | River Colne (N) Underbridge |
| 1.4 | WCG3A-River Colne (S) | 118,686 | See existing structures buildup | | 0 | 118,686 | New requirement |
| 1.5 | CCG2/1-River Colne Side Channel | 247,278 | See existing structures buildup | 239,777 | 263,755 | -16,477 | River Colne (S) Underbridge |
| 1.6 | CCG2/2-Stadium approach road (Cardiff Road) | 240,842 | See existing structures buildup | 386,222 | 424,844 | -184,002 | Cardiff Road Underbridge and Arch Underbridge |
| 1.7 | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Sub Total | C/F | 1,413,858 | | 1,147,941 | 1,262,735 | 151,123 | |
| | | | | | | | |
| | | | | | | | |

| | Existing Structures (Contd) | | | | | | |
|------------------|--------------------------------------|------------------|---------------------------------|------------------|------------------|-----------------|---|
| Sub Total | B/F | 1,413,858 | | 1,147,941 | 1,262,735 | 151,123 | |
| 1.8 | CCG2/3 - Vicarage Road | 108,183 | See existing structures buildup | 14,672 | 16,139 | 92,044 | Vicarage Road Overbridge |
| 1.9 | CCG2/4 - Tolpits Lane | 109,463 | See existing structures buildup | 15,065 | 16,572 | 92,892 | Tolpits Lane Overbridge |
| 1.10 | CCG2/5B - Culvert | 130,000 | See existing structures buildup | 77,026 | 84,729 | 45,271 | Culvert Extension |
| | | | | 462,971 | 509,268 | -509,268 | Ascot Road Underbridge omitted and being demolished - see demolitions |
| | Existing Structures Total | 1,761,504 | | | | | |
| | Say Existing Structures Total | 1,760,000 | | 1,717,675 | 1,889,443 | -127,939 | |

Earthworks

| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|-----|--------------------------------|------------------|------------------------|---------------------------|---|------------------|---------------------------------|
| 1 | Earthworks & Retaining Walls | 3,720,938 | See earthworks buildup | | | | Design developed |
| 2 | Less: Ascot Road Embankment | -507,814 | See earthworks buildup | | | | |
| 3 | Fencing | -639,934 | See earthworks buildup | | | | |
| | Earthworks Total | 2,573,190 | | | | | |
| | Say Earthworks Total | 2,600,000 | | 2,500,000 | 2,750,000 | -150,000 | |

Demolitions

| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|----------|------------------------------|----------------|-------------------------|---------------------------|---|------------------|---------------------------------|
| 1 | Demolitions | | | | | | |
| 1.1 | CCG2/5 - Ascot Road | 105,610 | See demolitions buildup | | | 105,610 | |
| 1.2 | CCG2/5B - Culvert | 95,000 | See demolitions buildup | | | 95,000 | |
| 1.3 | Watford West Station | 27,500 | See demolitions buildup | 18,000 | 19,800 | 7,700 | |
| | Croxley Green Station | | | 18,000 | 19,800 | -19,800 | Not now demolished |
| | Canal and River Gade bridges | | | 50,000 | 55,000 | -55,000 | Not now demolished |
| | Demolitions Total | 228,110 | | | | | |
| | Say Demolitions Total | 230,000 | | 86,000 | 94,600 | 135,400 | |

**Permanent
Way**

| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|------------|------------------------------------|------------------|------------------------------|--|--|-----------------------------|--|
| 1 | Permanent Way | 6,133,053 | See permanent way buildup | | | | Design developed |
| 2 | Track Drainage | 2,263,896 | See drainage buildup | | | | |
| 3 | Less removal of ballast | 0 | Used as fill | | | | |
| | Permanent Way Total | 8,396,949 | | | | | |
| | Say Permanent Way Total | 8,400,000 | | 5,329,500 | 5,862,450 | 2,537,550 | |

Fencing

| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|-----|-----------------------------|----------------|------------------------|---------------------------|---|------------------|---------------------------------|
| 1 | Fencing: Palisade | 444,505 | See earthworks buildup | | | | Design developed |
| 2 | Handrail | 195,429 | See earthworks buildup | | | | |
| | Fencing Total | 639,934 | | | | | |
| | Say Fencing Total | 640,000 | | 500,000 | 550,000 | 90,000 | |

Traction
Power

| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|-----|-------------------------------------|-------------------|-------------------------------|---------------------------------|---|---------------------|---------------------------------------|
| 1 | Traction power | 12,819,000 | See traction power buildup | | | | Design developed |
| | Traction Power Total | 12,819,000 | | | | | |
| | Say Traction Power Total | 12,820,000 | | 6,088,500 | 6,697,350 | 6,122,650 | |

Service Diversions

| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|-----|-------------------------------------|----------------|---|---------------------------|---|------------------|---|
| 1 | Service diversions | 400,000 | See existing structures and demolitions buildup | | | | Provisional sums pending further investigations |
| | Service Diversions Total | 400,000 | | | | | |
| | Say Service Diversions Total | 400,000 | | 370,000 | 407,000 | -7,000 | |

Signalling

| Ref | Element | (%) | Value (£) | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|-----|---|--------|------------|-------------------------|--|---------------------------|---|------------------|---------------------------------|
| 1 | LU signalling | | | | | | | | |
| | Bombardier | | 11,848,000 | | Estimate from LU 16.8.11 | | | | Design developed |
| 1.1 | Wayside sub project | | 500,000 | | Estimate from LU 16.8.11 | | | | |
| 1.2 | Train fit sub project | | 60,000 | | Estimate from LU 16.8.11 | | | | |
| 1.3 | SCCI sub project | | 50,000 | | Estimate from LU 16.8.11 | | | | |
| 1.4 | CIS | | 272,000 | | Estimate from LU 16.8.11 not duplicated with station comms | | | | |
| 1.5 | LVAC | | 1,039,666 | | Estimate from LU 16.8.11 | | | | |
| 1.6 | CRMS (cable route management system) | | 797,331 | | Estimate from LU 16.8.11 | | | | |
| 1.7 | Estimate @ 2014 Less inflation allowance | 17.59% | | 14,566,997 2,562,335 | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | Sub-Total | | C/F | 12,004,662 | | | | | |

| | | | | | | | | |
|----------|------------------------------------|--|------------|-------------------|---|-------------------|-------------------|------------------|
| | Signalling (Contd) | | | | | | | |
| | Sub-Total | | B/F | 12,004,662 | | | | |
| 2 | NR Signalling 41 nr SEUs | | 120,000 | 4,920,000 | As Steve Bissell estimate 20.7.11 | | | |
| 2.1 | | | | | | | | |
| | Sub-Total | | | 4,920,000 | | | | |
| | Signalling Total | | | 16,924,662 | | | | |
| | Say Signalling Total | | | 16,920,000 | | 10,800,000 | 11,880,000 | 5,040,000 |

Telecomms

| Ref | Element | Value (£) | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|-----|---|-----------|-----------|---------|---------------------------|---|-------------------|---------------------------------|
| 1 | Telecomms Included in other cost items | | 0 | | | | | |
| | Telecomms Total | | 0 | | | | | |
| | Say Telecomms Total | | 0 | | 2,520,000 | 2,772,000 | -2,772,000 | |

Environmental

| Ref | Element | Value (£) | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|-----|---------------------------------------|-----------|----------------|---------|---------------------------|---|------------------|---------------------------------|
| 1 | Environmental As previous estimate | | 385,000 | | | | | |
| | Environmental Total | | 385,000 | | | | | |
| | Say Environmental Total | | 385,000 | | 350,000 | 385,000 | 0 | |

Preliminaries

| Ref | Element | Value (£) | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|-----|--------------------------------|-----------|-------------------|--|---------------------------|---|------------------|---------------------------------|
| 1 | Preliminaries | | 7,774,591 | See preliminaries buildup | | | | Preliminaries now calculated |
| 2 | Additional surveys | | 50,000 | Added at meeting 10.8.11 | | | | |
| 3 | LU management and assurance | 2,500,000 | 2,500,000 | Target figure decided at meeting 10.8.11 | | | | |
| | Preliminaries Total | | 10,324,591 | | | | | |
| | Say Preliminaries Total | | 10,320,000 | | 9,549,249 | 10,504,174 | -184,174 | |

Design

| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|-----|-------------------------------|------------------|---|---------------------------|---|------------------|---------------------------------|
| 1 | Design | 3,300,000 | Target cost as agreed at meeting on 10.8.11 | | | | |
| | Design Costs Total | 3,300,000 | | | | | |
| | Say Design Costs Total | 3,300,000 | | 3,458,657 | 3,804,523 | -504,523 | |

PM Costs

| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|-----|---------------------------|------------------|-------------------------------|---------------------------|---|------------------|---------------------------------|
| 1 | Project Management costs | 1,000,000 | | | | | |
| 2 | Legal fees (Agreements) | 450,000 | Say 3nr Agreements @ £150,000 | | | | |
| 3 | QS fees | 700,000 | | | | | |
| | PM Costs Total | 2,150,000 | | | | | |
| | Say PM Costs Total | 2,150,000 | | 2,175,256 | 2,392,782 | -242,782 | |

Assurance

| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|----------|-----------------------------------|----------------|-----------------|---------------------------|---|-------------------|---------------------------------|
| 1 1.1 | Assurance Assurance | 500,000 | Figure from HCC | | | | |
| | Third Party Costs Total | 500,000 | | | | | |
| | SayThird Party Costs Total | 500,000 | | 1,631,442 | 1,794,586 | -1,294,586 | |

Third Party Costs

| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|----------|---|-----------|---------|---------------------------|---|-------------------|---------------------------------|
| 1 1.1 | Third Party Costs Part 1 claims | 0 | | | | | |
| | Third Party Costs Total | 0 | | | | | |
| | Say Third Party Costs Total | 0 | | 7,780,951 | 8,559,046 | -8,559,046 | |

Possessions

| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|-----|------------------------------|----------------|------------------------|---------------------------|---|------------------|---------------------------------|
| 1 | Possession costs | 541,479 | See possession buildup | | | | Now calculated |
| | Possessions Total | 541,479 | | | | | |
| | Say Possessions Total | 540,000 | | 500,000 | 550,000 | -10,000 | |

Rolling Stock

| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|-----|--------------------------------|------------------|--|---------------------------|---|------------------|---------------------------------|
| 1 | Rolling stock | 9,000,000 | As instructed at meeting 10.8.10 by LU | | | | |
| | Rolling Stock Total | 9,000,000 | | | | | |
| | Say Rolling Stock Total | 9,000,000 | | 8,302,000 | 9,132,200 | -132,200 | |

Risk

| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|-----|-----------------------------------|------------------|------------------|---------------------------|---|-------------------|---------------------------------|
| 1 | Risk allowance at 90% probability | 5,100,000 | See risk buildup | | | | |
| | Risk Total | 5,100,000 | | | | | |
| | Say Risk Total | 5,100,000 | | 12,700,000 | 13,970,000 | -8,870,000 | |

Land Costs

| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|----------|--|------------------|---------|---------------------------|---|------------------|---------------------------------|
| 1 | Land Costs | | | | | | |
| 1.1 | Viaduct | 1,500,000 | | | | | |
| 1.2 | NR land between Ascot Road and LOROL line | 1,800,000 | | | | | |
| 1.3 | NR land between Ascot Road and Croxley Green | | | | | | |
| 1.4 | HCC owned land for car park at Ascot Road | 928,000 | | | | | |
| 1.5 | Watford Hospital station land | 15,000 | | | | | |
| | Land Costs Total | 4,243,000 | | | | | |
| | Say Land Costs Total | 4,240,000 | | 4,000,000 | 4,400,000 | -160,000 | |

Third Party Compensation Costs

| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|----------|---|----------------|---------|---------------------------|---|------------------|---------------------------------|
| 1 1.1 | Third Party Compensation Costs Surveyors fees | 160,000 | | | | | |
| | Third Party Compensation Costs Total | 160,000 | | | | | |
| | Say Third Party Compensation Costs Total | 160,000 | | 250,000 | 275,000 | -115,000 | |

Monitoring

| Ref | Element | Total (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) | Changes to Dec 10 specification |
|-----|-----------------------------------|----------------|--|---------------------------|---|------------------|---------------------------------|
| 1 | Monitoring | | | | | | |
| 1.1 | Monitoring | 200,000 | Met Line and borehole monitoring during contract | | | | |
| | Monitoring Costs Total | 200,000 | | | | | |
| | Say Monitoring Costs Total | 200,000 | | 370,031 | 407,034 | -207,034 | |

Inflation

| Ref | Element | Current Net Value (2Q 2011) (£) | Annual Adjustment (%) | Total Increase (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) |
|-----|--------------------------------|---------------------------------------|--------------------------|-----------------------|--------------------------|---------------------------------|---|---------------------|
| | | | 2Q11-1Q15 | | | | | |
| 1 | Civils & Stations | 27,355,000 | 15.80% | 4,322,090 | See inflation buildup | | | |
| 2 | Signalling | 16,920,000 | 17.59% | 2,976,228 | See inflation buildup | | | |
| 3 | Telecomms | 2,772,000 | 17.86% | 495,079 | See inflation buildup | | | |
| 4 | Traction Power | 12,820,000 | 17.30% | 2,217,860 | See inflation buildup | | | |
| 5 | Rolling Stock | 9,000,000 | 16.82% | 1,513,800 | See inflation buildup | | | |
| 6 | Permanent Way | 8,400,000 | 17.11% | 1,437,240 | See inflation buildup | | | |
| | Inflation Total | | | 12,962,297 | | | | |
| | Say Inflation Total | | | 12,960,000 | | 20,196,165 | 10,233,330 | 2,726,670 |

Note: Based on F&A rail tender indices July 2011

Alternative
Inflation
Calculation
Based on 2.5%
per annum

| Ref | Element | Current Net Value (2Q 2011) (£) | Annual Adjustment (%) | Total Increase (£) | Comment | Dec 10 Budget at 1Q07 (£) | Dec 10 Budget at 2Q11 based on allowance of 2.5%/annum in Business Case (£) | Extra/Saving (£) |
|-----|--------------------------------|---------------------------------------|--------------------------|-----------------------|---------|---------------------------------|---|---------------------|
| | | | 2Q11-1Q15 | | | | | |
| 1 | Civils & Stations | 27,355,000 | 9.38% | 2,564,531 | | | | |
| 2 | Signalling | 16,920,000 | 9.38% | 1,586,250 | | | | |
| 3 | Telecomms | 2,772,000 | 9.38% | 259,875 | | | | |
| 4 | Traction Power | 12,820,000 | 9.38% | 1,201,875 | | | | |
| 5 | Rolling Stock | 9,000,000 | 9.38% | 843,750 | | | | |
| 6 | Permanent Way | 8,400,000 | 9.38% | 787,500 | | | | |
| | Inflation Total | | | 7,243,781 | | | | |
| | Say Inflation Total | | | 7,240,000 | | 20,196,165 | 10,233,330 | -2,993,330 |

Note: Based on 2.5% inflation per annum as instructed by HCC

4. Value Engineering

25.1 Value Engineering Meeting

A Value Engineering meeting was held on 16th June 2011 facilitated by Mouchel.

The following items were identified:

| Action No | Brief Description of Actions by Mouchel | Outcome |
|-----------|--|---|
| 1 | Single Line Working | Not feasible |
| 4 | Omit turnback at Watford Hospital | Omitted at meeting on 10.8.11. Saving £263k net |
| 5 | Reduce Level of Network Resilience | Included in the QRA as an “Opportunity”. Not appropriate to review at this time. |
| 6 | Completely close Watford Met branch | No alternative stabling location has been identified so this is not appropriate at this time. |
| 11 | Examine feasibility of reusing existing NR track | Scheme identified that maximises reuse of track and incorporated into GRIP 3 report. |
| 12 | Share power facility with proposed Hospital site. | Not feasible |
| 13 | Challenge LU preference for conventional build sub-station | To be considered at detailed design stage |
| 14 | Reduce Platform Canopy and Furniture Requirements | Reductions agreed in target costs for stations at meeting on 10.8.11 |
| 16 | Review options for reducing costs on viaduct | Loading for viaduct and bridge reduced from RU to RL. No saving by removing cladding and having “dirty” structure. No saving by replacing |

| Action No | Brief Description of Actions by Mouchel | Outcome |
|-----------|--|--|
| | | viaduct span and piers with embankment and abutments. |
| 17 | Review practicality of omitting walkways on existing bridges | Opportunity included in Risk Register |
| 19 | Options for junction with MET line | No saving in overall cost |
| 20 | Track Drainage | Opportunity included in Risk Register to omit 90% of track drainage in cuttings and on the flat. |
| 21 | Traction Power – Assess effect of different TPH | New substation needed for 6 trains per hour running |

25.2 Other Value Engineering exercises

- 4.2.1 An exercise was carried out to compare precast with steel construction for the viaduct. Steel was chosen as the more economic.
- 4.2.2 An option study was carried out on different methods of construction for the tie-in between the viaduct and the Metropolitan Line. A reinforced solution was identified as the most economic.
- 4.2.3 An option study was carried out on the cost of different gradients at Watford Hospital Station.
- 4.2.4 An option study was undertaken on track layouts at Watford Junction station.
- 4.2.5 Option studies were undertaken on different layouts for Ascot Road, Watford Hospital, Watford High Street and Watford Junction stations.

5. Risk

In order to calculate Risk Allowances for the estimate a Risk Workshop was held, facilitated by Mouchel.

Attendees were as follows:

David Leboff – Project Sponsor London Underground

Ian Chambers – Project Sponsor Network Rail

Ian Barnicoat – DPE Network Rail

Chris Deal – TfL London Overground

Michael Watkins – Director Acanthus Architects

Tom Palfreyman – Principal Traction Power Engineer Parsons Brinkerhoff

Jonathan Pitman – Senior Planning Engineer Vinci

Sam Luke – Technical Director Mouchel

Tom Duckmanton – Project Manager Mouchel

Steve Parkinson – Divisional Manager/Engineering Project Manager Mouchel Rail Limited

Kim Wilson – Principal Quantity Surveyor Mouchel

Martin Morris – Principal Engineer Permanent Way Mouchel Rail Limited

Tony Paraskeva –Principal Geotechnical Engineer Mouchel

John Houghton – Assistant Project Manager Mouchel

Sabekq Alateeqi – Mouchel

1019324-ENG-NNN-RPT-KBW-115

Methodology used at the Workshop was as follows:

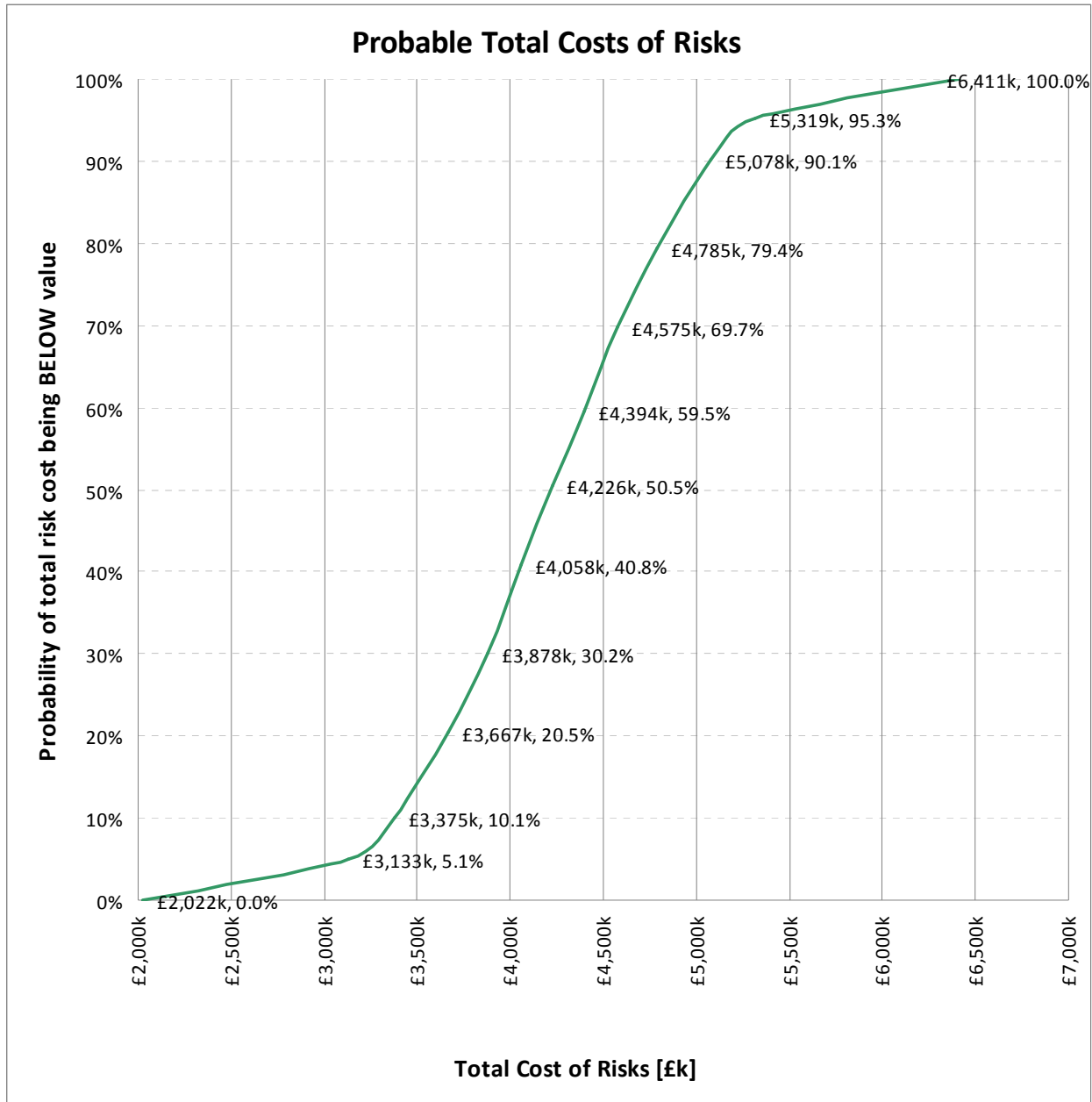
1. The existing Risk Register was discussed and any risks which had expired were closed.
2. Attendees were given time to set down new risks and opportunities. These were collected and discussed, and agreed additions were made to the risk register.
3. Probabilities and impacts were agreed after the meeting.

Methodology used in the risk estimation calculation was as follows:

1. Risk items classified as L (low) for both 'Probability' and 'Impact', and risks with zero cost were excluded from the estimation calculation.
2. 'Opportunity' costs were taken as negative and off-set the risks in the estimation.
3. Probabilities of occurrence were input as bands (L, M, H) representing ranges of probability:

| | | | | |
|---|--------|-----|----|------|
| L | Low | 0% | to | 40% |
| M | Medium | 40% | to | 60% |
| H | High | 60% | to | 100% |
4. Costs of risks were input as 'minimum', 'most likely' and 'maximum', given in £1,000s, for each risk item.
5. The estimation of the likely total out-turn cost of all the risks was made using a Monte Carlo method which takes random values, within specified limits, for the occurrence and value of each risk. The random probability of occurrence was multiplied by the randomised cost to give a possible cost of each risk. The resulting costs for all the risk items were added to give a likely out-turn total. This calculation was repeated 2000 times to give a spread of out-turn totals.
6. It was assumed that the probability of occurrence of each risk would fall uniformly within the band L, M or H given for that item. This distribution was implemented as a random value between the limits given for the appropriate band.
7. It was assumed that the cost of each item would lie on a triangular distribution between the 'minimum' and 'maximum' with the 'most likely' cost being the most probable.
8. The out-turn totals were counted to find the number of instances below each selected values. These counts were converted to the percentage probability of the out-turn total falling below the selected values.

9. Recalculation of the spreadsheet selects a different set of random values, but the summary distribution of out-turn values remains substantially static indicating that taking 2000 samples is sufficient to provide a good indication of the expected total cost of risk.
10. The distribution of the out-turn totals is presented as a cumulative graph showing the probability that a given out-turn total will not be exceeded.



Input features

Cost items included: 51
 Maximum possible sum of costs: £23,030k

Randomised Estimates

Samples 2000

Estimated
 Minimum £2,022k
 Mean £4,226k
 Maximum £6,411k
 Std Deviation £664k

PLOT DATA

Estimates falling below given cost

| Cost | Estimates | Probabilities |
|----------------|-------------|---------------|
| £2,022k | 0 | 0.0% |
| £3,133k | 102 | 5.1% |
| £3,375k | 202 | 10.1% |
| £3,667k | 409 | 20.5% |
| £3,878k | 603 | 30.2% |
| £4,058k | 816 | 40.8% |
| £4,226k | 1010 | 50.5% |
| £4,394k | 1190 | 59.5% |
| £4,575k | 1394 | 69.7% |
| £4,785k | 1587 | 79.4% |
| £5,078k | 1802 | 90.1% |
| £5,319k | 1905 | 95.3% |
| £6,411k | 1999 | 100.0% |

Normal distribution probabilities

| Probabilities | SDs | Normal cum. |
|----------------------|--------------|--------------------|
| 2.5% | -1.960 | £2,924k |
| 5.0% | -1.645 | £3,133k |
| 10.0% | -1.282 | £3,375k |
| 20.0% | -0.842 | £3,667k |
| 30.0% | -0.524 | £3,878k |
| 40.0% | -0.253 | £4,058k |
| 50.0% | 0.000 | £4,226k |
| 60.0% | 0.253 | £4,394k |
| 70.0% | 0.524 | £4,575k |
| 80.0% | 0.842 | £4,785k |
| 90.0% | 1.282 | £5,078k |
| 95.0% | 1.645 | £5,319k |
| 97.5% | 1.960 | £5,528k |

| Risk Owner | Ref | Risk Description | Probability High / Medium / Low | Impact High / Medium / Low | Maximum Risk £k | Most Likely Risk £k | Minimum Risk £k | Mitigation/Notes |
|------------|------------|--|---------------------------------|----------------------------|-----------------|---------------------|-----------------|---|
| | 1 | <u>EMPLOYER'S RISKS</u> | | | | | | |
| | 1.1 | Scope | | | 550 | 330 | 100 | |
| HCC | 1.1.1 | Change in high level Project Requirements | | | | | | Closed |
| HCC | 1.1.2 | Reorganisation of NR/TFL structure. Loss of expertise, support, comms, understanding, loss of continuity. | M | L | 150 | 110 | 50 | Governance in place. Work delivered under agreements |
| HCC | 1.1.3 | Objections to TWAO application/ public enquiry. Rework and re submission leading to delay and increased costs. | M | M | 400 | 220 | 50 | Delay and extra cost. If significant objections would stop scheme. Only manageable changes considered. Maximum risk reflects only whatever recommendations HCC is willing to take on. |
| HCC | 1.1.4 | Failure to agree performance regime, could lead to a delay in project. | L | L | | | | Insignificant risk |
| HCC | 1.1.5 | Delay in obtaining track access agreement (delay starts on service date) | L | L | | | | Insignificant risk |
| HCC | 1.1.6 | Delay to agreeing connection agreement at infrastructure boundary. | L | L | | | | Insignificant risk |
| HCC | 1.1.7 | ROGS (certificate of safety verification) interface not fully understood | L | L | | | | Insignificant risk |
| HCC | 1.1.8 | Objections to new LU substation as part of the planning/TWAO process. - see 1.1.3 | L | L | | | | Insignificant risk |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Risk Owner | Ref | Risk Description | Probability High / Medium / Low | Impact High / Medium / Low | Maximum Risk £k | Most Likely Risk £k | Minimum Risk £k | Mitigation/Notes |
|------------|-------|--|---------------------------------|----------------------------|-----------------|---------------------|-----------------|---|
| | 1.2 | Contract Strategy / Programme | - | - | 800 | 250 | 150 | |
| HCC | 1.2.1 | Onerous commercial conditions may lead to contractors building additional risk allowance into price. | L | M | 500 | 100 | 50 | Civil works costs based upon standard form of contract. Onerous conditions may affect civil estimate. Contract strategy should minimise this risk. |
| HCC | 1.2.2 | Delay in starting the Project results in additional inflation to project costs. | | | | | | If there was a delay which affected inflation it would be a delay of 12 months or more which would be a showstopper |
| HCC | 1.2.3 | Programme delays lead to additional project management costs. | M | M | 300 | 150 | 100 | Fully detailed programme to be developed to include appropriate levels of float; and programme to be managed to schedule. Maximum risk reflects only stand-by costs charged for Project Management. |
| HCC | 1.2.4 | Delays due to funding problems - see 1.2.3 | | | | | 0 | |
| HCC | 1.2.5 | Delays due to CPO issues/land disputes - see 1.2.3 | | | | | 0 | |
| HCC | 1.2.6 | Delays due to legal challenge - see 1.2.3 | | | | | 0 | |
| HCC | 1.2.7 | Delays due to other developments - see 1.2.3 | | | | | 0 | |
| HCC | 1.2.8 | Delays due to late approvals - see 1.2.3 | | | | | 0 | |
| | 1.3 | LUL / NR/Train Ops Interfaces | - | - | 0 | | | |
| LU | | LUL / NR/Train Ops Interfaces | | | | | | Could delay implementation of service not construction works |
| | 1.4 | Rolling Stock | - | - | 750 | 600 | 100 | |
| LU | 1.4.1 | Uncertainty regarding cost of rolling stock | M | H | 750 | 600 | 100 | Discussions taking place with LU contractor to produce +/-20% estimate by August 2011. Maximum risk to be reviewed after price and conditions received. |
| | | | | | | | | |

| Risk Owner | Ref | Risk Description | Probability High / Medium / Low | Impact High / Medium / Low | Maximum Risk | Most Likely Risk | Minimum Risk £k | Mitigation / Notes |
|------------|------------|---|---------------------------------|----------------------------|--------------|------------------|-----------------|--|
| | 1.5 | Additional Regulatory requirements | | | 290 | 100 | 20 | |
| HCC | 1.5.1 | Existing overline road bridges - provision of steps up & down cutting to cross the road above and provision of lockable gates | | | | | | Closed |
| HCC | 1.5.2 | Existing 3 No. underline bridge decks - steps down embankments to cross the road below | | | | | | Closed |
| HCC | 1.5.3 | Watford Junction Station - Buffers | | | | | | Closed |
| HCC | 1.5.4 | Watford Junction Station - Increased platform length | | | | | | Closed |
| HCC | 1.5.5 | Watford Junction Station - Station – Increased Platform Lengths - Changes to track and signalling | | | | | | Closed |
| HCC | 1.5.6 | Watford Junction Station – Increased Platform Lengths - revisions to track connections | | | | | | Closed |
| HCC | 1.5.7 | Provision of remotely controlled DC track isolating switches in lieu of hook switches | | | | | | Closed |
| HCC | 1.5.8 | Other HMRI requirements | L | M | 290 | 100 | 20 | Other HMRI requirements not identified at this stage |
| | 1.6 | Inflation (Start - Spring 14 Completion Autumn 15) | | | 2000 | 1200 | 100 | |
| HCC | 1.6.1 | Estimating error in assumption about future inflation rate leads to additional project costs. | M | H | 1000 | 600 | 50 | Need to regularly check and update cost estimate to reflect latest industry predictions. |
| HCC | 1.6.2 | Scarcity of rail resource results in higher inflation | L | H | 1000 | 600 | 50 | Need to regularly check and update cost estimate to reflect latest industry predictions. |
| HCC | 1.6.3 | Inflation in tender prices post recession | | | | | | Covered by 1.6.1 |

| Risk Owner | Ref | Risk Description | Probability High / Medium / Low | Impact High / Medium / Low | Maximum Risk | Most Likely Risk | Minimum Risk £k | Mitigation / Notes |
|------------|--------|---|---------------------------------|----------------------------|--------------|------------------|-----------------|--|
| HCC | 1.7 | Technology / Standards change during project | L | M | 0 | 0 | 0 | See 3.1.27 below |
| | | Moving from BS to Euro standards | | | | | | |
| | 2 | <u>SITE RISKS</u> | | | | | | |
| | 2.1 | Ground Conditions / Ground Water | | | 850 | 590 | 170 | |
| HCC | 2.1.1 | Additional dewatering works due to higher than anticipated water tables / permeability of underlying soils. | | | | | | Closed |
| HCC | 2.1.2 | Potential of finding significant obstructions during earthworks leading to additional site investigation and alternative works. | M | M | 250 | 175 | 50 | Carry out site investigation |
| | 2.1.2A | Dealing with two hidden NR subways | H | L | 100 | 65 | 20 | Carry out site investigation |
| HCC | 2.1.3 | Uncertainty relating to the condition of embankments and cuttings and infrastructure owner's requirements | L | M | 250 | 175 | 50 | Carry out investigations |
| HCC | 2.1.4 | Greater than anticipated settlement of new embankment leads to additional secondary ground works. | L | M | 250 | 175 | 50 | Carry out site investigation. Design ground improvement as required and construct early in the programme |
| HCC | 2.1.5 | Viaduct - Ground conditions are less competent than expected leading to change in pile type | | | | | | Closed |
| HCC | 2.1.6 | 2 New Stations - Ground conditions are less competent than expected resulting in piles required | | | | | | Closed |
| HCC | 2.1.7 | Other unforeseen ground conditions leading to additional SI and or site earth works. | L | L | | | | Undertake thorough site investigation and feed interpretative report into design. |
| HCC | 2.1.8 | Potential of finding munitions or archaeological find leads to protracted extension of the works and additional costs. | L | L | | | | Assume not on critical path |
| | | | | | | | | |

| Risk Owner | Ref | Risk Description | Probability High / Medium / Low | Impact High / Medium / Low | Maximum Risk | Most Likely Risk | Minimum Risk £k | Mitigation / Notes |
|------------|------------|--|---------------------------------|----------------------------|--------------|------------------|-----------------|--|
| | 2.2 | Contaminated Ground | | | 100 | 80 | 20 | |
| HCC | 2.2.1 | Extra over for the disposal of contaminated material from existing earthworks operations | M | M | 100 | 80 | 20 | Carry out site investigation to determine level of contamination. Disposal of hazardous material where necessary |
| | 2.3 | Asset Conditions | M | L | 0 | 0 | 0 | |
| HCC | 2.3.1 | Discovery and hence disposal of asbestos in demolished station (Watfor West) | | | | | 0 | Closed |
| | 2.4 | Access | | | 0 | 0 | 0 | |
| HCC | 2.4.1 | Rail | - | - | 0 | 0 | 0 | Included in cost estimate |
| | 2.4.2 | Civils | - | - | 0 | 0 | 0 | Included in cost estimate |
| HCC | 2.4.2.1 | Health Campus Site is found not to be available for site compound and access – alternative facility required incurring additional cost | | | | | | Closed |
| HCC | 2.4.2.2 | Access to viaduct foundation work zone is more restricted than anticipated and results in higher costs being incurred. | L | L | | | | Seek formal agreement for land use at earliest opportunity and explore suitable alternatives. |
| | 2.5 | Environmental | | | 650 | 380 | 100 | |
| HCC | 2.5.1 | Additional vegetation clearance required due to length of delay in commencing works. | L | L | | | | Carry out survey |
| HCC | 2.5.2 | Extra over for dealing with Japanese Knotweed | M | L | 150 | 80 | 50 | Carry out survey and commence treatment at earliest opportunity. |
| HCC | 2.5.3 | Environmental constraints associated with vegetation removal including SSSI risks | L | L | | | | Carry out survey and consultation with relevant bodies |
| HCC | 2.5.4 | Site runoff - polluting incident | L | L | | | | Insignificant risk |
| HCC | 2.5.5 | Protected species being discovered on site - construction delay | L | H | 500 | 300 | 50 | Carry out survey |
| HCC | 2.5.6 | Fly tipping before and during construction | L | L | | | | Insignificant risk |
| HCC | 2.5.7 | Noise/air pollution during construction | L | L | | | | Insignificant risk |
| HCC | 2.5.8 | Damage to chalk aquifer - polluting incident | L | L | | | | Insignificant risk |

| Risk Owner | Ref | Risk Description | Probability High / Medium / Low | Impact High / Medium / Low | Maximum Risk | Most Likely Risk | Minimum Risk £k | Mitigation / Notes |
|------------|-------------|---|---------------------------------|----------------------------|--------------|------------------|-----------------|--|
| HCC | 2.6 | Land Costs | - | - | 0 | 0 | 0 | |
| | 2.7 | Restricted Working Hours | | | 0 | 0 | 0 | |
| HCC | 2.7.1 | Additional restrictions on working hours due to close proximity of live rail and other rail projects being implemented during the same period. | L | L | | | | Communicate planned works adjacent to NR / LU live rails at the earliest opportunity and adjust programme accordingly. |
| | 2.8 | Building over live roads, rails etc | | | 0 | 0 | 0 | |
| HCC | 2.8.1 | Traffic management – extra over for additional traffic management requirements to reflect timing or complexity of final design solution - see above | | | | | | Closed |
| HCC | 2.8.2 | Restricted site access - extra over for additional traffic management requirements to reflect timing or complexity of final design solution | | | | | | Closed |
| | 2.9 | Unforeseen services | | | 500 | 350 | 250 | |
| HCC | 2.9.1 | Extra Over for determining Way leave issues | L | L | | | | Early consultation with landowners. |
| HCC | 2.9.2 | Extra Over for diversion of existing services | M | H | 500 | 350 | 250 | Undertake detailed investigations |
| HCC | 2.9.3 | Extra Over for repairs to existing services - construction - contractor's risk | | | | | | Carry out condition survey of existing services |
| | 2.10 | Interfaces to existing roads / paths / drains / services | L | L | 0 | 0 | 0 | Insignificant risk |
| HCC | 2.10.1 | Interfaces to existing roads/paths/drains/services | | | | | | To be incorporated into design |
| | | | | | | | | |
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| Risk Owner | Ref | Risk Description | Probability High / Medium / Low | Impact High / Medium / Low | Maximum Risk | Most Likely Risk | Minimum Risk £k | Mitigation / Notes |
|------------|----------|---|---------------------------------|----------------------------|--------------|------------------|-----------------|--|
| | 3 | <u>DESIGN RISKS</u> | | | | | | |
| HCC | 3.1 | Design development | | | 11230 | 6525 | 2345 | |
| HCC | 3.1.1 | Tolpits Lane Overbridge - 65mm departure from absolute minimum may not be granted - cut back abutment faces by 33mm each side, otherwise rebuild bridge | L | L | | | | Mitigation is to cut back abutment faces. Maximum risk is to rebuild the bridge if 65mm departure from absolute minimum is not granted |
| HCC | 3.1.2 | Tolpits Lane Overbridge - Provision of metal safety fences on road approaches and over bridge decks if cutting back the abutment faces, or 65mm departure, are accepted - see 3.1.1 | | | | | | If P6 parapets are not required metal safety fences will be constructed on road approaches and over bridge. If P6 parapets are required the bridge deck will need to be reconstructed. These costs are included in the rebuild costs |
| HCC | 3.1.3 | Unknown buried services on overline bridge decks to be replaced | | | | | | Closed |
| HCC | 3.1.4 | Vicarage Road Overbridge - Provision of metal safety fences on road approaches and over bridge decks - see 3.1.1 | | | | | | If P6 parapets are not required metal safety fences will be constructed on road approaches and over bridge. If P6 parapets are required the bridge deck will need to be reconstructed. |
| HCC | 3.1.5 | Wiggenhall Road Overbridge - Departure from absolute minimum by 206mm may not be granted - risk of having to rebuild the entire bridge | | | | | | Closed |
| HCC | 3.1.6 | Wiggenhall Road Overbridge - Provision of metal safety fences on road approaches and over bridge decks if the 206mm departure is accepted - see 3.1.1 | | | | | | If P6 parapets are not required metal safety fences will be constructed on road approaches and over bridge. If P6 parapets are required the bridge deck will need to be reconstructed. These costs are included in the rebuild costs |
| HCC | 3.1.7 | Ascot Road Station - Provision of pedestrian controlled crossing to car park and pedestrian guard rails both side of road | | | | | | Closed |

| Risk Owner | Ref | Risk Description | Probability High / Medium / Low | Impact High / Medium / Low | Maximum Risk | Most Likely Risk | Minimum Risk £k | Mitigation / Notes |
|------------|--------|---|---------------------------------|----------------------------|--------------|------------------|-----------------|--|
| HCC | 3.1.8 | Extra Over for complying with additional DDA requirements such as Platform and Train Access | | | | | | Closed |
| HCC | 3.1.9 | General design development | M | M | 2000 | 1000 | 500 | General changes to design through the design development process. Assessed financial impact represents 2% of the base estimate |
| HCC | 3.1.10 | Planning requires noise suppression baffles and other measures etc at station/viaduct. | M | L | 100 | 70 | 20 | Discussions with Local Authority |
| HCC | 3.1.11 | Watford junction track layout is not compatible with S class/NR train. | L | M | 250 | 100 | 20 | Use rail grinding train to reprofile rail heads and change switch blades for new |
| HCC | 3.1.12 | Insufficient consultation with rail stakeholders /customers results in scope creep, costs increase. | L | L | | | | Insignificant risk |
| HCC | 3.1.13 | S class/NR train wheel profiles not compatible if track relayed. | L | L | | | | Insignificant risk |
| HCC | 3.1.14 | Global stability of met line embankment i.e. opposite slope to new earthwork. | L | M | 250 | 150 | 20 | Further investigation |
| HCC | 3.1.15 | Flood risk on River Colne bridges concession is not granted. | L | L | | | | Insignificant risk |
| HCC | 3.1.16 | NR signalling design is not capable of ascertaining LU trains without new interlocking. | | | | | | Closed |
| HCC | 3.1.17 | Import of larger quantities of earthwork fills. | M | L | 250 | 170 | 50 | Site investigation |
| HCC | 3.1.18 | Access points not adequately defined/agreed - potential delays | L | L | | | | Insignificant risk |
| HCC | 3.1.19 | Additional surveys required - time and cost implications. | L | L | | | | Insignificant risk |
| HCC | 3.1.20 | Noise during service (train wheels/ rail interface/ substation plant. | L | L | | | | Insignificant risk |
| HCC | 3.1.21 | PA announcement at stations, volume control etc. | L | L | | | | Insignificant risk |

| Risk Owner | Ref | Risk Description | Probability High / Medium / Low | Impact High / Medium / Low | Maximum Risk | Most Likely Risk | Minimum Risk £k | Mitigation / Notes |
|------------|--------|--|---------------------------------|----------------------------|--------------|------------------|-----------------|--------------------------------------|
| HCC | 3.1.22 | Delays/design changes due to assurance issues. | M | L | 150 | 100 | 20 | Sort out in design process |
| NR | 3.1.23 | Signal sighting issues on NR infrastructure. Sighting of signals from trains and location of signals. | L | L | | | | Insignificant risk |
| LU | 3.1.24 | Integration of customer information system at Watford Junction. | L | L | | | | Insignificant risk |
| LU/NR | 3.1.25 | Delay in obtaining derogations/concessions or not granted. See 3.1.22 | | | | | | |
| HCC | 3.1.26 | Uncertainty regarding eurocode rail loading on existing bridges. | M | H | 4100 | 3000 | 1000 | Agree loading requirements with LU |
| HCC | 3.1.27 | Third party issues due to adjacent NG/DNO substation (at watford hospital); eg EMC, earthing requiring special measures. | M | L | 200 | 100 | 50 | Further investigation |
| HCC | 3.1.28 | Structural; bridge abutments require replacement rather than modification. | L | M | 300 | 220 | 100 | Further investigation |
| HCC | 3.1.29 | Additional drainage costs to EA or Thames Water requirements | L | M | 200 | 150 | 50 | Further investigation |
| HCC | 3.1.30 | Difficulty in providing required road access to LU substation and similar locations. | M | L | 100 | 70 | 20 | Substation location to be identified |
| HCC | 3.1.31 | Presence of water courses requiring special containment and discharge measures (transformer oil) | L | L | | | | Insignificant risk |
| HCC | 3.1.32 | EMC issues on NR Euston - Watford lines (reusing stock, signalling , electrification, telecoms), associated with joint running etc. | L | M | 600 | 250 | 50 | Further investigation |
| HCC | 3.1.33 | Signalling and telecoms power supply requirements undefined. (LU) | | | | | | Closed |
| HCC | 3.1.34 | Capacity at electrical control rooms to accommodate C&I, alarms | M | H | 1000 | 300 | 100 | |

| Risk Owner | Ref | Risk Description | Probability High / Medium / Low | Impact High / Medium / Low | Maximum Risk | Most Likely Risk | Minimum Risk £k | Mitigation / Notes |
|------------|--------|---|---------------------------------|----------------------------|--------------|------------------|-----------------|--------------------|
| HCC | 3.1.35 | Delay in securing approval for the viaduct design planning and assurance. See above planning and assurance risks | | | | | | |
| HCC | 3.1.36 | Use of eurocodes in the design process see 1.7 | | | | | | |
| HCC | 3.1.37 | EMC with respect to neighbourhood on new LU line (eg impact on sensitive apparatus, equipment, cabling). | L | L | | | | Insignificant risk |
| HCC | 3.1.38 | Command/control/ops implementation precipitates step change in peripheral service supply. | L | L | | | | Insignificant risk |
| NR | 3.1.39 | SFO do not agree with station changes at Watford Jn/high street. See above | | | | | | |
| HCC | 3.1.40 | Problematic trackside cable routes for 11KV cables (NR) requiring elevated trough/GRP at additional costs, or alternative non rail route. | M | L | 200 | 80 | 25 | |
| HCC | 3.1.41 | Unknown ground conditions require extensive/special foundations provisions (Piling etc), eg substation see above | | | | | | |
| HCC | 3.1.42 | Need for junction lighting at new and replaced junction. | M | M | 300 | 125 | 50 | |
| LU | 3.1.43 | Change of scope re operational requirements see 1.1.4 | | | | | | |
| LU | 3.1.44 | Insufficient trains to operate services. | | | | | | Show stopper |
| HCC | 3.1.45 | Tender prices exceed funding allowance. -see 1.6.1 | | | | | | |
| HCC | 3.1.46 | Regrading required near River Colne - flood levels much higher than when railway was first installed - see 3.1.15 | | | | | | |
| HCC | 3.1.47 | Ground conditions for platform extensions at Watford Junction and Watford High Street unsuitable for strip foundations | L | L | | | | Insignificant risk |

| Risk Owner | Ref | Risk Description | Probability High / Medium / Low | Impact High / Medium / Low | Maximum Risk | Most Likely Risk | Minimum Risk £k | Mitigation / Notes |
|------------|------------|--|---------------------------------|----------------------------|--------------|------------------|-----------------|--------------------------|
| HCC | 3.1.48 | Lack of space for fabrication of steelwork for viaduct see 2.4.2.2 | | | | | | |
| HCC | 3.1.49 | Acceptability of extending of bare top contact conductor rail system. | L | L | | | | Show stopper |
| | 3.1.50 | Additional noise barriers | M | H | 480 | 240 | 120 | added Aug 2011 (v9) |
| | 3.1.51 | Increased number of possessions | M | L | 250 | 100 | 50 | added Aug 2011 (v9) |
| | 3.1.52 | Existing NR signalling control point at Wembley proves inadequate | M | M | 500 | 300 | 100 | |
| | 3.2 | Adequate Power | | | 5500 | 2800 | 1600 | |
| HCC | 3.2.1 | Power supply to new substation from Croxley hall substation | | | | | | Closed |
| LU | 3.2.2 | Sufficient capacity does not exist within existing LU 11kV system (post SSL Upgrade), via Croxley Hall substation, for additional traction power load (and associated disturbance e.g. harmonics) | L | H | 2500 | 1000 | 500 | To be modelled by LU |
| LU | 3.2.3 | Sufficient space does not exist within Croxley Hall substation for housing additional 11kV feeder circuit breakers and existing 11 kV switchboards are recent LU approved type. | L | L | | | | To be modelled by LU |
| HCC | 3.2.4 | A suitable location for a new traction substation cannot be found/obtained which is no further east than Watford West station | L | L | | | | To be investigated by PB |
| HCC | 3.2.5 | Requirements within LU Std 1-124 are applicable on joint running section up to Watford Junction in terms of minimum DC voltage levels & outage conditions to be designed for, <u>without</u> exception of providing for an HV busbar or bus-section outage condition | M | M | 500 | 300 | 100 | TQ to be raised with LU |
| HCC | 3.2.6 | Requirement arising from modelling to reinforce NR DC traction power supply system south of Watford substation | | | | | | Closed |
| HCC | 3.2.7 | 11kV switchboard at Watford substation cannot be extended by using additional switchgear panels within existing substation. | | | | | | Closed |

| Risk Owner | Ref | Risk Description | Probability High / Medium / Low | Impact High / Medium / Low | Maximum Risk | Most Likely Risk | Minimum Risk £k | Mitigation / Notes |
|------------|--------------------|--|---------------------------------|----------------------------|--------------|------------------|-----------------|--|
| HCC | 3.2.8 | 11kV cable feeder system cannot be reconfigured at Bushey substation so that one of the existing 2 feeder cables (to Bushey) bypasses Bushey and is extended to connect to Watford substation. | L | L | | | | Agreement to be sought from NR by sharing outline proposal with NR. |
| HCC | 3.2.9 (Additional) | Insufficient capacity exists on NR Euston to Watford 11kV system, with source at Acton Lane grid, for additional traction power load (and associated disturbance e.g. harmonics) | M | H | 2500 | 1500 | 1000 | This risk relates to the last assumption listed in section 3.3 of PB Preliminary High Level Traction Power Equipment Quantities Report |
| | 3.3 | Signalling | | | 795 | 500 | 100 | |
| LU | 3.3.1 | Risk of programme being out of alignment with the LU signalling upgrade works leading to separate package of work having to be initiated for this project. | M | H | 795 | 500 | 100 | Discussions to be held with LU contractor. Maximum risk to be reviewed once estimate received. |
| | 3.4 | Safety / other requirements for rail operators | | | 0 | 0 | 0 | |
| HCC | 3.4.1 | | | | | | | Closed |
| | 4 | <u>THIRD PARTY RISKS</u> | | | | | | |
| HCC | 4.1 | Planning / public enquiries | | | 0 | 0 | 0 | Covered above |
| | 5 | <u>CONSTRUCTION RISKS</u> | | | 1650 | 1170 | 250 | |
| HCC | 5.1 | Security of the site breached | L | L | | | | Insignificant risk |
| HCC | 5.2 | Delays by statutory undertakers | M | L | 150 | 120 | 50 | Move this risk to HCC contractor |
| HCC | 5.3 | Terrorism, strikes etc | L | L | | | | Insignificant risk |
| HCC | 5.4 | Protesters/squatters | L | L | | | | Insignificant risk |
| HCC | 5.5 | Delay in construction results in delayed start to service | | | | | | Not construction risk |
| HCC | 5.6 | Contractors single source/supplier going bust timescale for sourcing replacement | L | M | 500 | 350 | 100 | Carry out thorough financial checks on key companies |

| Risk Owner | Ref | Risk Description | Probability High / Medium / Low | Impact High / Medium / Low | Maximum Risk | Most Likely Risk | Minimum Risk £k | Mitigation / Notes |
|------------|------|--|---------------------------------|----------------------------|--------------|------------------|-----------------|--------------------------------|
| HCC | 5.7 | Serious accident during construction phase may stop works | L | L | | | | Insignificant risk |
| HCC | 5.8 | London overground objection to possession requests | L | L | | | | Insignificant risk |
| LU | 5.9 | Met line Tie In temp works sequencing with LU operations. | L | L | | | | Insignificant risk |
| HCC | 5.10 | Damage to existing Met/NR infrastructure during construction works, finance penalties reputation | L | L | | | | Insignificant risk |
| HCC | 5.11 | Temporary works design of viaduct - how will the bridge be constructed/installed. - see restricted access | L | L | | | | Insignificant risk |
| HCC | 5.12 | Poor electrical soil resistivity at substation site requiring extensive additional earthing measures. | L | L | | | | Insignificant risk |
| HCC | 5.13 | Issues in existing DL substation at watford (asbestos,PCBs etc) preventing installation of equipment, connection thereto | L | L | | | | Insignificant risk |
| LU | 5.14 | Problems within overall SSL signal upgrade mean we have to pick up development costs or design from new, i.e. there is no Richmond solution. | L | M | 1000 | 700 | 100 | Discussions with LU contractor |
| HCC | 5.15 | Lack of skilled resource due to Crossrail/Thameslink and other projects. - see 1.6.2 | | | | | | |
| HCC | 5.16 | Noise during construction | L | L | | | | Insignificant risk |
| HCC | 5.17 | Theft of materials - delay to works/costs of replacement. | L | L | | | | Insignificant risk |
| | | | | | | | | |
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| Risk Owner | Ref | Risk Description | Probability High / Medium / Low | Impact High / Medium / Low | Maximum Risk | Most Likely Risk | Minimum Risk £k | Mitigation / Notes |
|------------|----------|--|---------------------------------|----------------------------|----------------------|------------------|-----------------|----------------------------|
| | 6 | <u>OPPORTUNITIES</u> | | | 8340 | 5604 | 2635 | |
| HCC | 6.1 | Prefabrication, common station design elements. | M | L | 250 | 80 | 50 | Further investigation |
| HCC | 6.2 | Descoping of track drainage on disused section. | M | H | 1500 | 1000 | 500 | Further investigation |
| HCC | 6.3 | Use of existing radio masts for communications | L | L | | | | Insignificant risk |
| HCC | 6.4 | Simplified arangements to provide DC feeding of Watford Met 'Spur Lines' | L | L | | | | Insignificant risk |
| HCC | 6.5 | Early reinforcement of traction power on NR Euston - Watford line (to assist with funding/finance.) Also 'part' on LUL | | | | | | No effect on capital costs |
| HCC | 6.6 | Provide new 11 KV supply for new LU traction substation (combined with Hospital) | L | L | | | | Insignificant risk |
| HCC | 6.7 | Provide new 11KV DNO supply for Watford sub (vs reinforce existing 11KV system). | L | L | | | | Insignificant risk |
| HCC | 6.8 | Modular housings for new LU substation (challenge masonry/brick built preferences). | L | M | 300 | 250 | 100 | Discussions |
| HCC | 6.9 | Build over stations, property and land., e.g. Watford West | H | H | | | | Business case item |
| HCC | 6.10 | Reduced resilience for rail systems i.e. under equipment outage conditions (challenge need for redundant equipment, and in relation to when maintenance is taking place eg night time only). | L | M | 250 | 200 | 50 | Discussions with LU |
| HCC | 6.11 | Combine new LU substation with track parallelling ' HUT' / location at croxley junction (met line). | M | M | 250 | 170 | 50 | Further investigation |
| | | Added (v9) 15 Aug 2011 | | | | | | |
| | 6.12 | Reuse of buffers from Watford Met | M | L | 100 | 50 | 25 | added Aug 2011 (v9) |
| | 6.13 | Reduction of extent of drainage | M | H | 1872 | 1000 | 50 | added Aug 2011 (v9) |
| | 6.14 | Omission of walkway to existing bridges | M | L | 100 | 50 | 25 | added Aug 2011 (v9) |
| | 6.15 | Possibility of modifying NR interlocking signalling | L | M | 3400 | 2500 | 1500 | |
| | 6.16 | Omission of walkways to existing structures | H | M | 318 | 304 | 285 | |
| | | | | | | | | |
| | | | | | Running Total | 17325 | 9271 | 2670 |

6. Scope and Cost Review

A Scope and Cost Review meeting was held on 10th August 2010.

Attendees:

Mike Younghusband - HCC
 David Leboff – LU
 Jon Kirkup – LU
 Rob Tamkin – LU
 Retha Olivier – LU
 Michael Watkins - Acanthus
 Tom Duckmanton - Mouchel
 Kim Wilson – Mouchel

The following were agreed and incorporated into the Cost Plan:

1. Stations

1.1 Watford Hospital

Agreed to reduce areas (e.g. review need for police interview room, SCR, etc)
 Reduction in finishes (£500/m² over station)
 Reduce length of canopy - £100k saving
 Reduce CCTV spec
 Reduction by use of prefabrication methods

Agreed target reduction £800k

1.2 Ascot Road

Reduction in specification – target £100k
 Use ticket gates, seats etc from Watford Met station
 Reduce length of canopy – target £100k

Overall target reduction £600k

1.3 Watford High Street

Omit platform extensions – saving £147k

Omit concrete paviers – saving £6k

Omit services to platform extensions – saving £15k

Overall reduction £168k

1.4 Watford Junction

Omit platform extensions to Platforms 1&2 – saving £200k

Omit staff accommodation – saving £80k

Reduce allowance for CIS from £100k to £50k – saving £50k

Omit benches – saving £13,500

Omit totems – saving £15,000

Omit building services to Platform 1&2 extensions and welfare – saving £50k

Omit services to new welfare facilities – saving £20k

Omit demolition works – saving £20k

Reduction of general LU signage allowance from £50k to £48.5k – saving £1,500

Overall reduction £450k

2. Permanent Way

Omit turnback at Watford Hospital station – saving £263k

Overall reduction £263k

3. Signage generally

Add £200,000 for changes to signing and other information systems at non-CRL stations served by the Metropolitan Line.

Overall addition £200k

4. Design costs

Reduce to £3,300,000

Overall saving £664,961

1019324-ENG-NNN-RPT-KBW-115

5. PM costs

Reduce to £2,000,000 to include legal costs.

Overall saving £493,686

6. Assurance

Reduce to £1,500,000

Overall saving £370,265

7. Risk

Opportunities to be priced:

Drainage reduction

Buffers omission

Omission of one walkway to existing bridges

Risks to be priced:

Additional noise barriers

Increased number of possessions

The risk allowance calculation was rerun and incorporated into the Cost Plan.

9. Telecomms

Definition to be established and estimate to be reviewed. This is still being reviewed.

10. Signalling

A revised estimate was received from LU and this was incorporated into the Cost Plan.

11. Rolling Stock

Reduce estimate to £9m.

Overall saving £3m

12. Station External Works

HCC to consider whether these could be included in separate budget.

13. Preliminaries

LU management costs and assurance on rolling stock, telecoms, signalling, and Prestige reduced to £2,500,000.

Overall saving £3,102,560