

1. Financial Case

1.1 Purpose

The purpose of the Financial Case for the East Coast Main Line (ECML) Enhancement Programme is to demonstrate the affordability of the Programme and to set out the anticipated funding profile over time. Figures given are in cash prices unless otherwise stated.

This Financial Case does not cover funding for, or anticipated cash flows from, the East Coast franchises, although they are considered in the Economic Case.

1.2 Funding Summary

The OBC cost estimate for the full scope of the ECML Enhancement Programme was £950m - £1,203m but this has since risen to between £1,290m - £1,550m. The recommended option as part of this FBC has an estimated total cost of £1,040m - £1,230m of which £590m – £780m is anticipated to be spent in CP6.

The recommended option removes the following schemes from the scope of the Programme, as compared with the OBC baseline:

- Northallerton to Newcastle Freight Loops
- York North Throat
- Huntingdon to Woodwalton 4-tracking

Further modelling and a clearer understanding of the freight requirement has allowed the scope to be reduced whilst still delivering the agreed Programme outcomes and passenger benefits. The comparison of options and assumptions is set out further in the strategic and economic cases.

The case for delivering the Huntingdon to Woodwalton 4-tracking scheme is still under consideration with NR. This FBC does not recommend including the scheme as part of the recommended Option 4; however, should a robust and credible case be demonstrated for the scheme then a separate submission will be made to endorse its inclusion in the Programme as set out in the Strategic Case. It is proposed that the approval of this additional scope is delegated to RIB.

1.3 Funding and Budget Profile

The Programme continues to forecast an underspend in CP5 against the original Hendy estimates and has offered around £130m funding back to manage the overall pressure on the enhancements portfolio.

In CP6 an allowance for the ECML Enhancements Programme was assumed in the CP6 Statement of Funds Available (SoFA) of £785m¹. For the recommended option the estimated costs are between £590m and £780m in the CP6 period and so remain affordable.

	CP4 (£m cash)	CP5 (£m cash)	CP6 (£m cash)	Total Cost (£m cash)
OBC Forecast (May 2017) (Full Scope)	32	462	457 to 709	950 to 1,203
FBC Forecast (May 2018) (Reduced Scope)	32	414	590 - 780	1,040 – 1,230
		CP6 SoFA Assumption	785	

The CP6 SoFA assumption includes a funding contribution of [REDACTED] from the Trans-Pennine Route Upgrade (TRU) towards the power supply upgrade at Hambleton Junction, between Doncaster and York, which will also provide power for the Trans-Pennine route. This funding is not committed for TRU but is anticipated to be required as part of the TRU scope. Should this funding not be available there will be a further pressure on the ECML Enhancements Programme; however, the upper end of the cost estimates contain a significant amount of optimism bias (derived from a Reference Class Forecast), as set out below.

1.4 Cost Basis

The estimated cost for the Programme is given as at 2 March 2018. These capital costs are provided by NR and show an Anticipated Final Cost (AFC) which is based on NR's P80² cost estimates. The level of contingency held by NR as part of those AFCs is shown in the detailed breakdown below in Figure 1.

An assessment of optimism bias has been added to these figures to reflect ongoing risk and uncertainty. The Reference Class Forecast (RCF) benchmarking method has been used for this assessment, which is explained in section 1.6.3 below. The cost ranges above reflect the AFCs at the lower end and include the RCF risk at the higher end.

The total level of RCF cost risk included in Option 4 (£190m) of this Financial Case compares with £38m optimism bias included in the economic case for the same option. The difference is primarily due to half of the power supply upgrade (PSU2) costs being assumed in the do minimum option of the Economic Case and the application of 18% optimism bias to the PSU2 costs compared with an RCF risk of 39%.

The cost table (Figure 1) shows the detailed breakdown of the schemes in the ECML Enhancements Programme including annual profiles. This table shows the potential future costs of all schemes including those not in the recommended option. The totals for the relevant options at the bottom of the table only reflect the future costs and risks of the schemes included in those options.

The total CP6 costs for option 4 in Figure 1 include an allowance of [REDACTED] due to the risk of additional access (schedule 4) costs if the Huntingdon to Woodwalton 4-tracking scheme is removed from the Programme.

² Detailed Quantitative Cost Risk Assessments have been carried out for the schemes and the AFC figures reflect the 80% confidence level from NR that schemes will come out at or below that cost.

Network Rail and the Department are working to ensure that value engineering opportunities are explored and taken where possible to further reduce costs as the schemes move into delivery. This will help to offset any costs increases that may emerge.

1.5 Cost of Work Done

The new platform at Doncaster is complete and the IEP Enabling work is largely complete; the other schemes are mainly in detailed design. The cost of work delivered, to March 2018, on the ECML Enhancement Programme is as follows:

Element of programme	Cost of Work Done March 2018 (£m, cash prices)	Total cost (£m, cash prices)	COWD / Total cost
East Coast Connectivity Schemes	■	■	■
Power Supply Upgrade Phase 2	■	■	■
Stevenage Turnback	■	■	■
IEP Enabling Works	■	■	■
Power Supply Upgrade Phase 1	■	■	■
Systems Integration	■	■	■
FULL PROGRAMME	297	1,230	24%

Costs rounded to the nearest £m

1.6 Budget Arrangements

The required funding is managed through the joint NR and DfT governance arrangement set out in the enhancement MOU³. In this case that will be through the ECML Programme Delivery Group, ECML Programme Board and Enhancement Portfolio Board.

This FBC requests that BICC approve the CP6 budget range for the ECML Enhancements Programme as set out above £590m - £780m. The delivery of the Programme within this budget range will be managed by the NSD Enhancements Portfolio Board.

A formal change control will be issued to confirm the budget to NR up to their Anticipated Final Cost of £590m (i.e. the lower end of the expected range). Any increases from this figure (up to a maximum of £780m) will be formally change controlled and managed against the wider rail enhancement portfolio. In this way the additional optimism bias cost risk will be held as contingency by the Enhancements Portfolio Board alongside other rail enhancement programmes.

The Programme would need to return to BICC for further approval should the cost forecast exceed the top end of the anticipated range (£780m).

³ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/509545/mou-dft-network-rail-rail-enhancements.pdf dated March 2016

The Programme team in DfT also has admin and programme funding for interim staff and external consultants to support the delivery of the Programme and the assurance requirements. This DfT funding has been bid for and allocated to the Network Services Intercity team and is subject to the normal Departmental rules on authorising expenditure and corporate planning routes. This cost is not included in the figures presented within this Financial Case.

1.6.1 Risks

The key risks relating to the Programme funding are set out below.

- **Cost estimates too low.** There is a risk that the costs of the schemes rise as detailed design progresses making the recommended scope unaffordable as part of the CP6 portfolio. **Mitigation.** Scheme costs will be reviewed on a case by case basis and options to value engineer or find innovative ways to deliver passenger benefits will be explored. Options for de-scoping or deferring work will be considered as appropriate. A significant amount of optimism bias cost risk (£190m) has been included in the budget estimate to account for potential future cost rises.

1.6.2 Opportunities

Significant work has been completed to understand the necessity of each infrastructure intervention and the value for money that each one provides, as well as their criticality to delivering the outcomes of the Programme.

Technical assurance has been carried out on the key schemes in the Programme to assure the process that Network Rail is using to generate estimates and to understand and manage risks and dependencies. This assurance has resulted in a number of recommendations that Network Rail have addressed. Further detail on the assurance carried out is included in the management case.

There are further value engineering opportunities on the schemes in the Programme which Network Rail and the Department will pursue on a case by case basis. These preserve the outputs of each intervention whilst reducing the up front or whole life cost.

1.6.3 Reference Class Forecasting

Independent analysis has previously been conducted by Oxford Global Projects using the 'Reference Class Forecasting' (RCF) method to provide a benchmark comparison against nearly 180 similar Western European rail upgrade programmes.

Traditional assessment of cost and timeframes in projects is based on 'bottom up' inside view of what is required which is nearly always too optimistic about costs and timescales and overestimates benefits.

The Reference Class Forecasting method asserts that the best predictor of performance in a planned project is actual performance in a class of completed comparable projects.

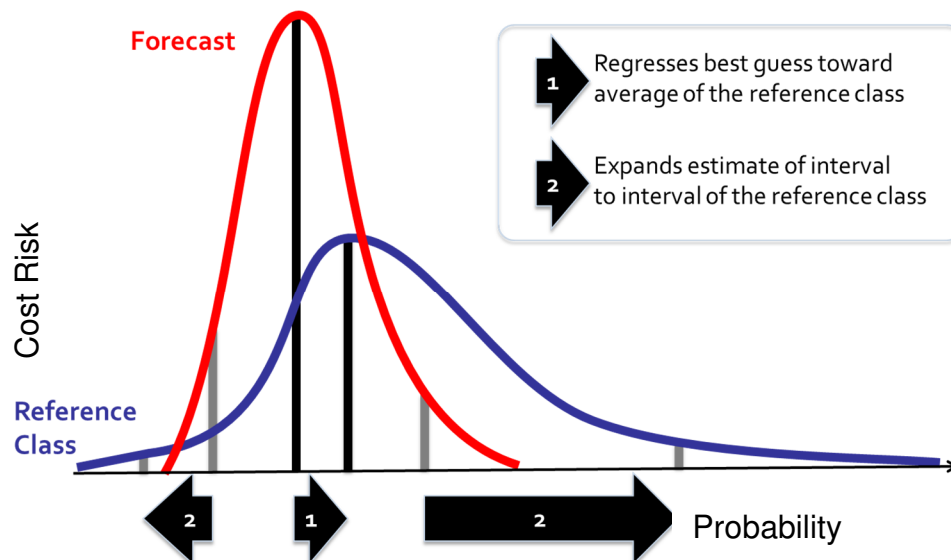


Figure 2 Reference Class Forecasting Regression

The economic assessment includes a level of cost optimism bias, in line with HMT Green Book guidance, of 6-18% ahead of delivery (FBC). This RCF confirms that the level of optimism bias used is broadly appropriate given the historical cost risk in comparable programmes; however, more cost risk is included in the Financial Case compared with the Economic Case due to the economic treatment of power supply upgrade costs in particular.

The studied reference class of projects also shows that there is a different level of cost risk exposure depending on the maturity of the project costing. As would be expected, cost risk reduces as the project matures due to the scope becoming clearer and uncertainty reducing. This continues until the project reaches the point of contracting for delivery with firm contract cost controls at which point there is a step change reduction in cost risk beyond that point.

The cost risk exposure is shown at Figure 3 for different levels of project maturity and this is related to the optimism bias guidance for DfT transport business cases in Figure 4. The optimism bias guidance recognises that a different level of risk should be applied depending on the maturity of the project with significantly more risk applied to early stage projects.

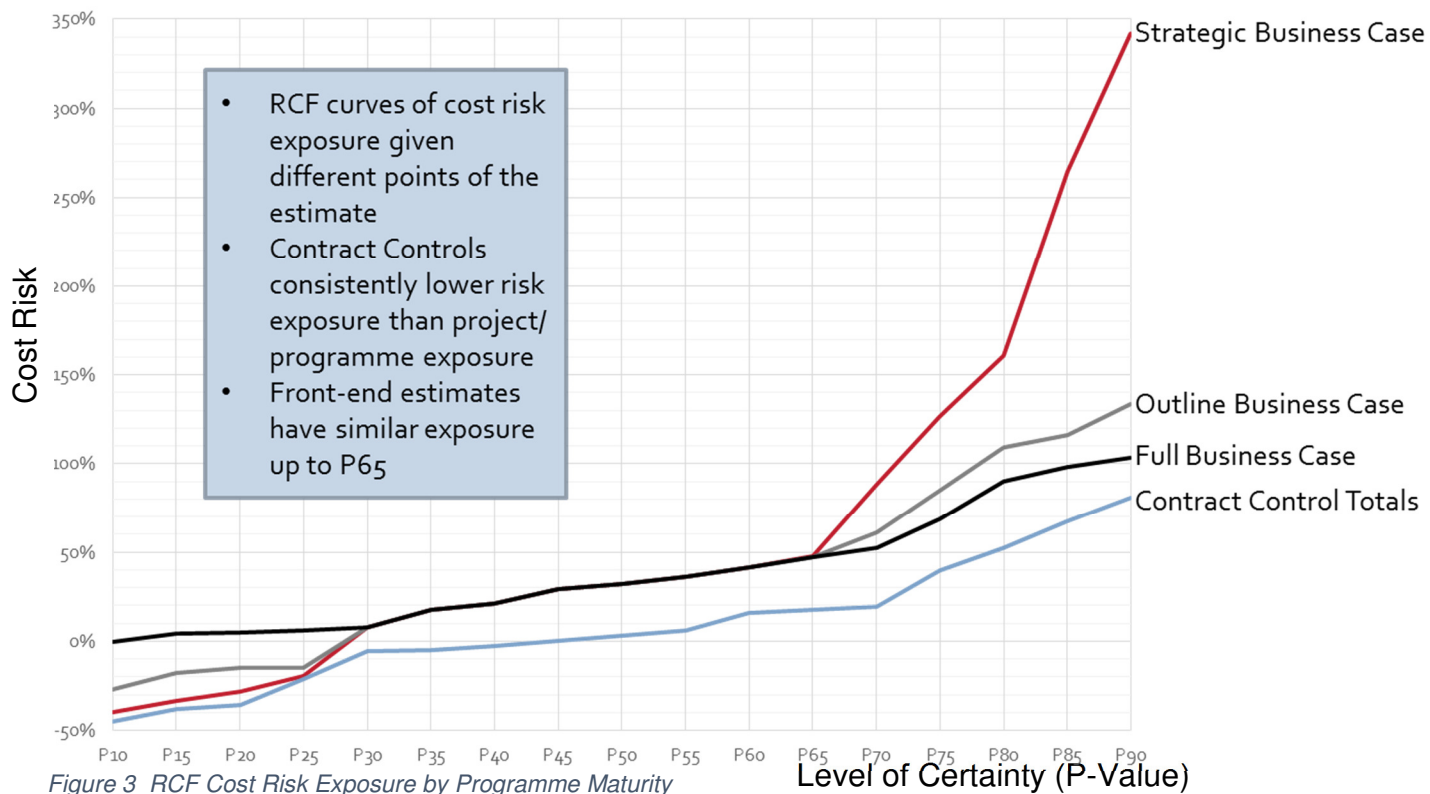


Figure 3 RCF Cost Risk Exposure by Programme Maturity

DfT Guidance		Project definition	Pre-feasibility	Option selection	Single option refinement	Design development
	QRA contingency	NA	NA	NA	QRA at mean estimate	QRA at mean estimate
	Optimism uplift	66%	50%	40%	18%	6%

RCF	Cost Risk Exposure	Strategic Business Case	Outline Business Case	Date of Decision to Build (Final Business Case)	Contract Control Totals
	P50	32.0%	32.0%	32.0%	3.2%
	P80	160.7%	109.1%	90.2%	52.5%
	P90	341.7%	133.4%	103.4%	80.6%
	P(MEAN)	72.6%	38.7%	39.6%	9.8%

- RCF database shows that P50 cost risk exposure is unchanged during the front end
- P(Mean) – which is comparable to DfT guidance – reduces from 73% to 10% throughout the front end

Figure 4 RCF Cost Risk Exposure Compared to DfT WebTAG Guidance

The ECML Enhancements Programme schemes are at a range of stages as set out in Figure 1 above. A large percentage of the cost (■■■■) is in the Power Supply Upgrade Phase 2 scheme which is at a lower level of maturity; this is reflected in the application of RCF cost risk.

The level of RCF cost risk applied to each individual scheme is shown in Figure 1 (penultimate column) and is calculated by multiplying the remaining spend on the scheme by the cost risk for the development stage of the scheme as shown by the RCF study.

Development Stage for individual schemes	Cost Risk Multiplier
Outline Business Case	38.7%
Final Business Case	39.6%
Contract Control Totals	9.8%

Figure 5 Cost Risk Multipliers by scheme maturity

As an example the Power Supply Upgrade Phase 2 is at an outline business case stage of development as the designs are progressed. The remaining spend on this scheme (■■■■) multiplied by the cost risk for the outline business case stage (38.7%) gives an RCF risk of ■■■■. This cost risk is added to the AFC to give an upper estimate of the Power Supply Upgrade Phase 2 scheme cost of ■■■■.