

**Department for Transport**

**Highways Agency Major Roads Programme:  
Updated Scheme Cost Estimates**

**16 July 2008**

## Department for Transport

### Highways Agency Major Roads Programme: Updated Scheme Cost Estimates

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1. This paper sets out the new cost estimates that the Highways Agency (HA) has produced for all schemes in its Major Roads Programme as identified in the HA Business Plan 2008-09.
2. This paper is structured as follows:-
  - Section 1 - sets out the background and context to the latest cost estimates
  - Section 2 - details the latest cost estimates for all National schemes in the HA Major Roads Programme
  - Section 3 - details the latest cost estimates for all Regional schemes in the HA Major Roads Programme
  - Attachment 1 - describes progress post Nichols, provides an overview of the newly implemented Project Controls Framework and explains the HA's new range forecasting methodology

#### Section 1 - Introduction

3. The Major Roads Programme is made up of schemes in the Development and Construction Phases of the HA Business Plan 2008-09:-
  - Development Phase - follows Ministers deciding that a scheme should enter the Major Roads Programme and includes preparation of detailed design, statutory procedures and powers
  - Construction Phase - follows Ministerial approval for the commencement of construction to the physical completion of the project
4. Historically the Highways Agency has expressed cost estimates as a single point estimate. Further to the Nichols Report, the Highways Agency has introduced a new cost forecasting methodology designed to reflect the inherent risks and uncertainties particular to roads development and construction.
5. The Highways Agency now expresses cost estimates as a range between two figures referred to as the 'Range Min' and the 'Range Max'. They are stated in two different ways:-

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- (1) Outturn prices - that is to say estimates of costs that would be expected to prevail at the time the scheme is planned to be delivered, inclusive of all anticipated development, land and construction costs with allowances for project risk, programme risk, uncertainty and inflation.
  - (2) Base year Q2 2006 prices - are the estimates of costs that would be expected to have been incurred if the project had been constructed in Q2 2006, inclusive of all anticipated development, land and construction costs with allowances for project and programme risk and uncertainty, but excluding all inflation effects.
6. The new cost range estimates as presented in this paper comprise 15 national and 23 regional major projects currently in the Development and Construction phases, which together comprise the Major Roads Programme.
  7. Many of the new estimates for schemes which have not yet entered construction are significantly higher than previous estimates. The largest single factor causing the increase has been actual road construction price inflation which has proven to be approximately twice as high as the inflation indices upon which the previous estimates were based. Roads construction price inflation is predicted to continue to outstrip general inflation, albeit at a lesser differential than has been recent experience.
  8. The other main factors leading to higher estimates are changes in the scope and design of schemes, and the introduction of more prudent project and programme risk allowances.
  9. The new cost estimating regime that the Highways Agency has developed and implemented, together with the other improvements made to governance and project management, provide a robust foundation for successfully delivering this programme.

#### Section 2 - National Schemes

10. The Tables below contain the current range forecasts for the National Major Roads Programme, expressed as both base year Q2 2006 and outturn prices, with an assumed start date necessary to define the outturn range estimate. Any changes to scheme delivery dates will impact upon the outturn range estimates.
11. Where a scheme is currently subject to commercial negotiation, figures are not provided; figures will be published once the negotiations are concluded.

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**Table 1 Range Estimates (National Major Road Projects in Development)**

	Start of Works Year	Open to Traffic Year	Range Min		Range Max	
			Base Year Prices Q2 2006 (£m)	Outturn Prices (£m)	Base Year Prices Q2 2006 (£m)	Outturn Prices (£m)
ATM Birmingham Box Phases 1 & 2	TBC	TBC	Subject to Contract <sup>1</sup>		Subject to Contract	
A1 Dishforth to Leeming	2008/09	2011/12	226	256	321	365
M25 J16 – J23 Widening (Section 1)	2009/10	2012/13	Subject to Contract		Subject to Contract	
M25 J27 – J30 Widening (Section 4)	2009/10	2012/13	Subject to Contract		Subject to Contract	
A1 Leeming to Barton	2011/12	2014/15	218	274	307	387
A14 Ellington to Fen Ditton	2010/11	2014/15	541	690	939	1198

**Table 2 Outturn Estimates (National Schemes in Construction)**

	Construction Start Year	Open to Traffic Year	Outturn Estimate (£m)
M1 J6a – J10 Widening	2005/06	2008/09	308
A5117 / A550 Deeside Park	2006/07	2008/09	58
M6 Carlisle to Guardsmill Extension	2006/07	2008/09	131
A1 Bramham to Wetherby	2007/08	2009/10	68
A14 Haughley New St to Stowmarket	2007/08	2008/09	32
M1 J21 – J30 (Phase 1)	2007/08	2010/11	356
M25 J1b – J3 Widening	2007/08	2008/09	57
M40 J15 (Longbridge Roundabout)	2007/08	2008/09	69
M62 Junction 6 Improvement	2007/08	2008/09	35

<sup>1</sup> The ATM Birmingham Box and both M25 schemes are the subject of commercial negotiation. To release range estimates at this stage could compromise those commercial negotiations.

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12. At the time of implementing the range forecasting methodology, it was determined that those projects either in or about to enter the Construction Phase should not be included within the scope of the range forecasting process. In most instances, the estimated outturn costs are based on contracted prices, hence a single point outturn estimate for each of the schemes has been identified.

#### Section 3 - Regional Schemes

13. The Tables below contain the range forecasts for the Regional Major Roads Programme expressed as both base year Q2 2006 and outturn prices, with an assumed start date necessary to define the outturn range estimate. The composition of the regional programme and timing of the schemes is subject to advice from the regions and their priorities, as part of the Regional Funding Allocation process. Any changes to scheme delivery dates will impact upon the outturn range estimates.

**Table 3 Range Estimates (Regional Schemes in Development)**

	Start of Works Year	Open to Traffic Year	Range Min		Range Max	
			Base Year Prices Q2 2006 (£m)	Outturn Prices (£m)	Base Year Prices Q2 2006 (£m)	Outturn Prices (£m)
A421 Bedford to M1 Junction 13	2008/09	2010/11	Subject to Contract <sup>2</sup>		Subject to Contract	
A453 Widening (M1 J24 to A52)	2010/11	2012/13	118	141	162	194
A11 Fiveways to Thetford	2011/12	2014/15	85	113	118	157
A45 / A46 Tollbar End Improvement	2011/12	2014/15	86	109	118	150
A46 Newark to Widmerpool	2011/12	2012/13	279	373	377	506
A23 Warninglid Widening	2011/12	2012/13	62	76	86	105
A47 Blofield to North Burlingham	2011/12	2012/13	32	38	43	53
A21 Kippings Cross to Lamberhurst	2012/13	2014/15	78	97	114	144
A21 Tonbridge to Pembury	2012/13	2014/15	74	95	111	145
A505 Dunstable Northern Bypass	2012/13	2014/15	92	121	118	156
A57 / A628 Mottram to Tintwistle	2012/13	2014/15	171	223	240	315

<sup>2</sup> The A421 Bedford to M1 Junction 13 schemes is the subject of commercial negotiation. To release a range estimates at this stage could compromise those commercial negotiations.

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**Table 4 Outturn Estimates (Regional Schemes in Construction)**

	<b>Construction Start Year</b>	<b>Open to Traffic Year</b>	<b>Outturn Estimate (£m)</b>
A3 Hindhead Improvement	2006/07	2011/12	381
A1 Peterborough to Blyth Junctions	2006/07	2009/10	92
A2 Bean to Cobham Phase 2	2006/07	2008/09	126
A27 Southerham to Beddingham	2006/07	2008/09	34
A38 Dobwalls Bypass	2006/07	2008/09	50
A419 Blunsdon	2006/07	2008/09	66
A590 High & Low Newton (Complete)	2006/07	2008/09	35
A595 Parton to Lillyhall Improvement	2006/07	2008/09	39
A66 Long Newton Junction (complete)	2006/07	2008/09	11
A69 Haydon Bridge Bypass	2006/07	2008/09	33
M27 J3 – J4 Widening	2007/08	2009/10	36
M27 J11 – J12 Climbing Lanes	2007/08	2008/09	17

## Attachment 1

### HA Project Control Framework and the Range Forecasting Methodology

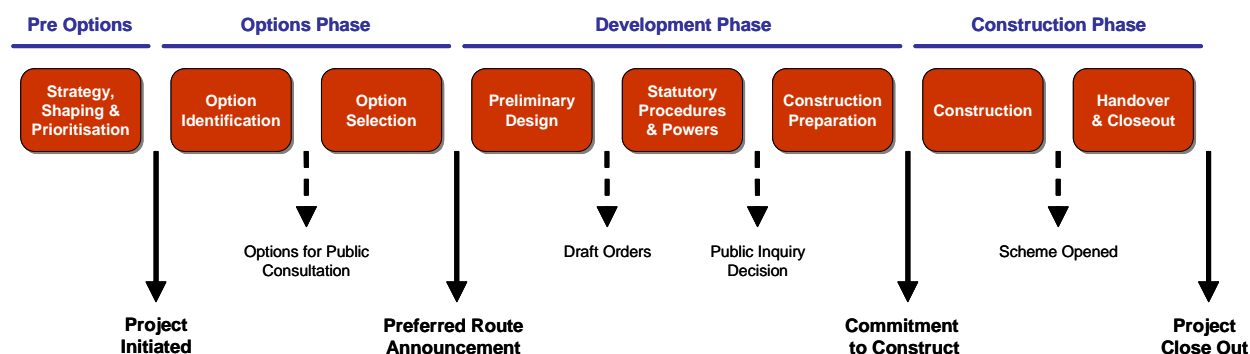
#### The Nichols Review

1. Following a period of escalation in scheme cost estimates, in July 2006 the then Secretary of State appointed Mike Nichols, Chairman and Chief Executive of the Nichols Group, to review the Highways Agency's approach to cost estimating and project management. His report was published in March 2007, making 25 recommendations. All of the recommendations were accepted and a major change programme was initiated which has now been completed.
2. Further to the Nichols review, significant improvements have been implemented:
  - replacing the Targeted Programme of Improvements with groups of schemes in three phases (Options, Development and Construction) with budgets provided only for the progression of a scheme through a phase;
  - clarifying and strengthening the governance of major projects, with the establishment of a dedicated division of project sponsors in the Department for Transport, and more clearly defining the Highways Agency's role as deliverer;
  - developing a new Project Control Framework to manage and control the development of a scheme through its lifecycle;
  - designing new methodologies and processes for cost estimating and risk assessment based on cost ranges;
  - developing better measures to track the Highways Agency's performance in delivering major schemes, included in their 2008-9 Business Plan; and
  - strengthening the organisation and capability within the Highways Agency, with an emphasis on project management and commercial skills.
3. The Nichols review identified that a key factor in the unreliability of the cost estimates was the inherent difficulty of predicting the cost of schemes at an early stage, before options and designs have been fully developed – in many cases up to ten years before a scheme could be delivered. To reflect this, Nichols recommended that future estimates were produced as a range, rather than as a single point estimate.

## The Project Control Framework

4. The Project Control Framework (PCF) is the new joint DfT and HA approach to managing major projects. It has four key components:
  - A standard project lifecycle
  - Standard project deliverables
  - Project control processes
  - Governance arrangements
5. The PCF Lifecycle identifies three phases spanning seven stages. The stages reflect the significant decision points in the project's development and delivery (see Figure 1 below). Schemes in the earliest stages of strategy, shaping and prioritisation sit outside of the PCF Lifecycle in the Pre options Phase.

**Figure 1 Key decision in the PCF Major Projects Lifecycle**



## Range Forecasting Methodology

6. As a key part of the new PCF the HA has implemented a new range forecasting methodology designed to recognise the risks and uncertainties inherent in the Roads Programme. Importantly, scheme cost estimates are now expressed as a range, rather than a single point estimate. As the project progresses through the lifecycle, risks and issues become better defined, managed and mitigated, with the range estimate refined accordingly.
7. To reflect the uncertainties in cost estimation prior to construction, cost estimates are represented as a range between a realistic minimum and maximum. The new project control procedures will ensure that costs are tightly controlled as a scheme is developed. Nevertheless, it is important to emphasise that whilst the central estimate (the mid-point of the range) will be used for planning purposes, those with responsibility for planning, including the Regional assemblies, will need to recognise the possibility that the outturn cost for a scheme could come anywhere within the range.



8. Each range forecast is built-up from six key elements (see also graphic representation of the range estimate build-up in Figure 2 overleaf):
- (1) **Base Estimate** – a ‘point estimate’ for the scheme or option includes all scheme development and construction costs but excludes all allowances for risk. Typically prepared by the Project Team according to a standard Work Breakdown Structure. Calculated to a price base of Q2 2006.
  - (2) **Price and Quantum Adjustment** – the Base Estimate is scrutinised and challenged by an HA Central Review Team that has had no role in the development of the Base Estimate. A ‘price and quantum’ adjustment to the unit rates and quantities of the Base Estimate to derive a ‘best plausible’ and ‘worst plausible’ estimate. This adjustment is undertaken by the Central Review Team to ensure consistency of approach across all of the schemes. Calculated to a price base of Q2 2006.
  - (3) **Project Risk Provision** – is derived based on the project risk register. The Central Review Team ensures consistency of approach across schemes and quantifies all reasonable foreseeable risks that can best be managed or mitigated by the project team. e.g. adverse weather, availability of plant and materials, unforeseen ground conditions. Calculated to a price base of Q2 2006.
  - (4) **Uncertainty Adjustment** – is made by the Central Review Team to make an allowance for all project and programme risks that cannot be reasonably foreseen. This most closely approximates to an adjustment for ‘optimism bias’. As the project progresses and design matures, many uncertainties become identifiable risks and are either eliminated or become entries on the project or programme risk registers. Calculated to a price base of Q2 2006.
  - (5) **Programme Risk Provision** is calculated based on a central programme risk register. The Central Review Team identifies and quantifies all reasonable foreseeable programme risks that can best be managed or mitigated centrally by the HA. A total programme risk provision is then apportioned across all of the projects according to their stage in the PCF lifecycle. The new range estimate is presented in outturn prices.
  - (6) **Inflation Adjustment** – calculated by the HA Commercial Team and applied consistently across all projects. Roads construction price inflation continues to outstrip retail price inflation. It yields ‘best plausible’ and ‘worst plausible’ estimates recalculated to outturn prices based on an assumed construction start date and the assumed commencement of operations date.

Figure 2 Range Forecasting – Estimate Build-up and changes over the PCF Lifecycle

