



27 January 2011
www.wao.gov.uk

WALES **AUDIT** OFFICE
SWYDDFA **ARCHWILIO** CYMRU

Major transport projects



Major transport projects

I have prepared this report for presentation to the National Assembly under the Government of Wales Act 2006.

The Wales Audit Office study team that assisted me in preparing this report comprised Emma Giles, Jeremy Morgan and Matthew Mortlock, under the direction of Paul Dimblebee.

Huw Vaughan Thomas
Auditor General for Wales
Wales Audit Office
24 Cathedral Road
Cardiff
CF11 9LJ

The Auditor General is totally independent of the National Assembly and Government. He examines and certifies the accounts of the Assembly Government and its sponsored and related public bodies, including NHS bodies in Wales. He also has the statutory power to report to the National Assembly on the economy, efficiency and effectiveness with which those organisations have used, and may improve the use of, their resources in discharging their functions.

The Auditor General also appoints auditors to local government bodies in Wales, conducts and promotes value for money studies in the local government sector and inspects for compliance with best value requirements under the Wales Programme for Improvement. However, in order to protect the constitutional position of local government, he does not report to the National Assembly specifically on such local government work, except where required to do so by statute.

The Auditor General and his staff together comprise the Wales Audit Office. For further information about the Wales Audit Office please write to the Auditor General at the address above, telephone 029 2032 0500, email: info@wao.gov.uk, or see web site www.wao.gov.uk

© Auditor General for Wales 2011

You may re-use this publication (not including logos) free of charge in any format or medium. You must re-use it accurately and not in a misleading context. The material must be acknowledged as Auditor General for Wales copyright and you must give the title of this publication. Where we have identified any third party copyright material you will need to obtain permission from the copyright holders concerned before re-use.

**Report presented by the Auditor General for Wales to the
National Assembly for Wales on 27 January 2011**



M4 widening, image produced by Martin Gibson

	Summary	6
	Recommendations	15

1	Many major transport projects have cost substantially more and taken longer to complete than expected, hampering the delivery of the Assembly Government's wider transport objectives	19
	While their exact final cost can be unclear, many major transport projects have cost substantially more and taken longer to complete than expected	19
	Projects have cost more and taken longer to complete for a variety of reasons, although construction price inflation and deferral because of budget constraints have been significant factors	28
	The increasing cost of individual projects has hampered the delivery of the Assembly Government's wider transport programmes and objectives	32

2	The Assembly Government has, over time, strengthened its processes for managing projects under its direct control, but the full impact of these changes is, as yet, unclear	35
	The Assembly Government has sought to improve the management of project risk, including the provision of more realistic cost and time estimates	35
	The Assembly Government's procurement of trunk road projects has evolved in line with common practice, moving towards Early Contractor Involvement as its preferred approach for contracts worth more than £18 million	37
	The Assembly Government has taken action to improve project performance during the construction phase of trunk road projects, but relationships with utility companies have been problematic at times	41
	The Assembly Government's evaluation of completed projects has been limited in scope, but should improve over time through the use of new <i>Welsh Transport Planning and Appraisal Guidance</i> and gateway reviews	47

3 During the past two years the Assembly Government has exercised greater control over the local authority managed projects it funds 49

Before 2009-10, the Assembly Government exercised only limited control over local authority managed Transport Grant projects despite carrying most of the financial risk 50

The Assembly Government is introducing revised funding and management arrangements to provide more effective control over delivery of the new regional transport plans 56

Appendices 60

Appendix 1 – Our methodology 60

Appendix 2 – The Assembly Government’s processes for the management and review of major transport projects 67

Appendix 3 – Cost changes for recently completed and in-progress projects in the Assembly Government’s Trunk Road Forward Programme 68

Appendix 4 – Cost changes for Transport Grant funded major road projects 71

Summary

- 1 The provision and maintenance of a good quality transport network is essential to help support and grow the Welsh economy. Major road and rail improvement projects¹ are an important part of the Assembly Government's commitment to 'improving links and access between key settlements and sites across Wales and strategically important all-Wales links'².
- 2 The Assembly Government funds major road and rail improvement projects through three main programmes of work: the Trunk Road Forward Programme; the Transport Grant Programme and the Rail Forward Programme (Box 1). Between April 2002 and March 2009, the Assembly Government committed some £986 million of capital expenditure across these three programmes.
- 3 Completing major transport projects to time, cost and quality requires robust planning and effective project management, procurement and contract management. Effective relationships between the employer (the Assembly Government and local authorities in the context of this report), private contractors, consultants and other stakeholders are also important. These stakeholders include local residents and property owners, environmental and conservation bodies, and utility companies.
- 4 Recent reviews relating to major transport projects in the UK have highlighted common concerns about the delivery of projects in line with early cost and time estimates (Appendix 1). These concerns reflect the significant risks and uncertainties often involved with major transport projects, which can have a total lifespan in excess of 20 years from the point of their initial conception to completion. In particular, the typically long lifespan of major transport projects makes them very susceptible to fluctuations in construction price inflation.
- 5 We examined whether recently completed major transport projects in Wales have met their objectives and were delivered to time and cost. We focused on the delivery of 18 major road and rail infrastructure projects in Wales completed since 2004, looking in detail at 10 projects. The Assembly Government has funded all, or at least most, of the cost of these projects as part of its Trunk Road Forward Programme or from its Transport Grant budget. We have set out our approach in more detail in Appendix 1.
- 6 Overall, we found that many projects have cost substantially more and taken longer to complete than expected, hampering the delivery of the Assembly Government's wider transport objectives. Exposure to higher than expected construction price inflation, budget constraints and reprogramming decisions have been significant, but not the only, reasons why projects have cost more and taken longer to deliver than expected. The Assembly Government has, over time,

¹ For the purpose of this report, major projects are defined as those costing more than £5 million. However, the scope and complexity of the individual projects considered in this report are quite different from each other and their costs range from £5 million to more than £100 million.

² *One Wales: Connecting the Nation (The Wales Transport Strategy)*, Assembly Government, April 2008



Box 1 – Assembly Government funded transport programmes

Trunk Road Forward Programme

The trunk road network comprises motorways and other routes that cater for the movement of long distance through traffic or are of strategic importance in terms of the economic and social fabric of Wales. In March 2002, the Assembly Government unveiled a major programme of trunk road improvements. The Assembly Government updated the programme in 2004 to reflect the aims of *Wales A Better Country*, and then reprioritised it in 2008 following publication of *One Wales*. The management of projects in the programme is under the direct control of the Assembly Government.

Transport Grant Programme

The Assembly Government provides Transport Grant funding to local authorities to improve local transport services and infrastructure. In January 2001, the then Minister for the Environment announced Transport Grant funding for 15 road and rail improvement projects. In 2002 the Minister announced the addition of a further five major transport infrastructure projects. Transport Grant funding also supports a range of integrated transport packages, walking and cycling routes, bus projects and the Safer Routes To Schools and Safer Routes In Communities programmes. The Assembly Government is phasing out the Transport Grant Programme as it introduces new funding arrangements to support the delivery of new regional transport plans.

Rail Forward Programme

The Railways Act 2005 gave the Assembly Government powers to provide financial assistance for rail infrastructure improvements for the benefit of Wales. The Assembly Government launched a new Rail Forward Programme in 2008. But even before the launch of this programme, the Assembly Government was funding at least part of the cost of major rail infrastructure projects (notably the Vale of Glamorgan and Ebbw Valley railway line enhancements) through its Transport Grant Programme.

Note

These programmes of work are for construction projects and do not include maintenance projects, which are part of other programmes. For example, the Assembly Government is responsible for managing and maintaining the more than 1000 miles of trunk roads in Wales.

Source: Assembly Government

strengthened its management of schemes under its direct control and, during the past two years, has exercised greater control over local authority managed projects that it funds.

Many major transport projects have cost substantially more and taken longer to complete than expected, hampering the delivery of the Assembly Government's wider transport objectives

- 7 We have only presented data where we have been confident of being able to compare progress on projects at equivalent points. But even then, the bases of the early cost outturn estimates were not consistent across all of the projects we examined. Also, the final cost of many recently completed projects is still unclear because of the timescales involved in settling the final account with contractors (which can take up to five years from the completion of the main construction works). In addition, for trunk road projects, the Assembly Government's figures on final project costs take no account of any changes in land costs compared with earlier estimates.
- 8 **While their exact final cost can be unclear, many projects have cost substantially more and taken longer to complete than expected.** For the 18 completed projects that we examined, we found that final project costs were, on average, 61 per cent higher than the estimates made when approval was given to announce the preferred route³. On average, just under two-thirds of the increase in the estimated final cost occurred before the award of construction contracts. In cash terms, the total cost of these projects had increased from an estimated £366 million to £592 million.

³ Announcement of the preferred route is the third of seven key stage approval points in project delivery for projects on the Trunk Road Forward Programme, the last of which is approval of a completion report (Appendix 2). For rail and Transport Grant funded road projects, we sought, where possible to identify evidence of cost and time estimates at an equivalent stage of their delivery.

- 9** Average cost increases on the seven local authority managed road projects funded from the Transport Grant and on the two rail projects we examined, at 94 per cent and 112 per cent respectively, were much larger than the average for the nine projects on the Trunk Road Forward Programme, at 36 per cent. However, the main difference was in the increasing estimated cost before the award of construction contracts and, overall, the performance of individual projects within each programme varied significantly. For example, the increasing cost of the Porth Relief Road, to £102 million compared with the early estimate of £33 million that had not allowed for cost inflation over the lifetime of the project, skews the average figures for Transport Grant funded road schemes. Also, the cost increase on the Vale of Glamorgan railway line was small compared with the cost of the more complex Ebbw Valley railway line, which more than doubled to around £48 million.
- 10** The six trunk road projects for which the relevant data were available had been completed as much as five and a half years later than estimated on their entry into the Trunk Road Forward Programme. Just under two-thirds of the average delay occurred before the start of construction reflecting, in part, budget constraints and consequent reprogramming of activity⁴. Once under construction, across the nine most recently completed trunk road projects the average delay was just under four months, or 20 per cent of the estimated construction time. Some projects were constructed on time (such as the A5 Pont Melin Rhug) or even early (such as the A470 Lledr Stage 2).
- 11** **Projects have cost more and taken longer to complete for a variety of reasons, although construction price inflation and deferral because of budget constraints have been significant factors.** Underestimating inflation has been a significant factor in the increases in estimates of project costs before the start of construction, for one or more of the following reasons:
- a** *Early estimates did not include allowances for cost inflation over the assumed lifetime of the project.* The Assembly Government made at least some allowance for inflation in the projects it managed, as was the case on most of the local authority managed projects we examined, with the exception of the Porth Relief Road.
 - b** *Inflation rates have been higher than expected during the assumed lifetime of the project.* Many of the projects we examined were designed, procured and completed between 2000-01 and 2007-08, which was a period of high construction price inflation.
 - c** *Unplanned delays or reprogramming decisions due to budget constraints have exposed projects to additional cost inflation over time that had not been considered in previous estimates.*
- 12** Cost increases and delays can occur for a variety of other reasons both before and during construction. Across many of the projects we examined, substantial cost increases or delays were associated with one or more of the following issues: environmental mitigation; poor weather; unforeseen work, including utilities work; protracted

⁴ The initial estimates of timescales for delivery had been qualified in terms of their dependency on a range of factors, including possible budget constraints.



negotiations, for example over land costs and compensation; design changes; and the time taken to complete statutory processes. These reasons are similar to those reported by the National Audit Office in 2007 to explain delays and/or cost increases in road projects in England.

- 13 The increasing cost of individual projects has hampered the delivery of the Assembly Government's wider transport programmes and objectives.** Major transport programmes can be affected by changes in policy and strategy, as has been the case in terms of the re-prioritisation of projects in the Trunk Road Forward Programme. However delays in, and the increasing costs of, individual projects have also put pressure on programme budgets and have meant that other planned transport projects have had to be deferred. For example, the increasing costs for the planned completion of the A465 Heads of the Valleys improvement are already having an impact on plans for progressing other projects. In 2000, the Assembly Government estimated that all six sections of the Heads of the Valleys improvement could potentially be completed by 2009 for an estimated cost of £268 million (at November 2000 prices). To date, two sections have been completed at a cost of £115 million. The Assembly Government is now planning on the basis that the whole programme of works will be completed by 2020 at an estimated cost, for the remaining four sections, of £648 million (although this is at November 2009 prices, not accounting for future cost inflation).

- 14** Of the 50 projects included in the 2002 Trunk Road Forward Programme, the Assembly Government identified 23 as high-ranking 'phase one' and 'phase two' projects⁵. As at November 2010, six of the eight phase one projects have been completed, with one near completion and the remaining project deferred following the public inquiry. Of the 15 phase two projects, two have been completed and five are under construction. Most of the other phase two projects are undergoing statutory procedures, environmental impact assessments, inspections, public inquiries and consultation, or publication of draft orders.
- 15** Of the remaining 27 projects, seven are in preparation, although not necessarily at the point of having identified a preferred route, and five are the subject of further studies. The remaining projects are on hold. These include the M4 Relief Road, which has incurred preparatory costs of £13.9 million but is not being taken forward because the estimated cost increased to more than £1 billion, making it unaffordable within existing transport budgets. The Assembly Government is also not taking forward plans for the Cardiff International Airport access road, which featured in the 2004 update to the Trunk Road Forward Programme. That scheme has incurred preparatory costs of £1.9 million.
- 16** The Assembly Government had originally expected that the Transport Grant Programme announced in 2001 would take five years to complete. However, the Assembly Government is still funding, and will continue to fund for a number of years, several of the projects announced in 2001 and added to in 2002, based on its assessment that, despite rising costs they still represent value for money. Major projects have consumed an

⁵ Phase one projects were programmed to be technically ready for delivery (to start construction) before March 2005, and phase two projects were identified as requiring more technical work but possibly being ready to proceed to construction by March 2008.

increasing proportion of the annual Transport Grant expenditure since 2001, and budget constraints have restricted the pace of progress on two ongoing major projects, the Ceredigion Link Road Stage 1 and the Port Talbot Peripheral Distributor Road Stage 2.

The Assembly Government has, over time, strengthened its processes for managing projects under its direct control, but the full impact of these changes is, as yet, unclear

- 17 The Assembly Government's processes for managing trunk road projects have evolved to take account of its own experience and emerging good practice. The changes that the Assembly Government has made should, in principle, help provide greater certainty about final project costs and completion dates for future projects. But the full impact of these changes is, as yet, unclear, and there remains scope for improvement in a number of areas of project and relationship management.
- 18 **The Assembly Government has taken action to improve the management of project risks, including the provision of more realistic cost and time estimates.** In particular the Assembly Government: updated its risk management procedures in 2008-09; has been applying since 2003 the optimism bias approach recommended by HM Treasury⁶; and now has better access to information on contractors' actual costs on previous projects on which to base its cost estimates. Most of the early estimates for the recently completed projects we examined had been developed before the Treasury introduced its guidance on optimism bias in

2003 and all pre-dated the changes to risk management procedures.

- 19 **The Assembly Government's procurement of trunk road projects has evolved in line with common practice, moving towards Early Contractor Involvement as its preferred approach for contracts worth more than £18 million.** Most of the recently completed projects we examined had adopted a design and build approach, whereby around 80 per cent of the design work would have been completed before the award of the construction contract. Since then, the Assembly Government has moved towards use of the Early Contractor Involvement design and build approach as its preferred option for construction contracts worth more than £18 million. Under Early Contractor Involvement, the contractor is engaged before the detailed design stage and completion of statutory processes, to assist in planning and estimating the cost of the project. The Welsh Office was closely involved in the development of the concept of Early Contractor Involvement having trialled the approach on planned improvements to the A40 Robeston Wathen Bypass in the mid 1990s. But that project was deferred and has since been subsumed within current improvement work on the A40 Penblewin to Slebech Park.
- 20 The Early Contractor Involvement approach for the recent M4 widening project has been credited by all of the key project stakeholders for the relatively good performance of the project during the construction phase, in terms of its delivery to cost and time estimates. The Assembly Government expects that the A40 Penblewin to Slebech Park improvement will also be completed within the £40.5 million budget estimated before the start of construction.

⁶ Optimism bias is an approach recommended by HM Treasury to try and counter what it had found was a demonstrated systematic tendency for project appraisers to be overly optimistic about project delivery.



- 21** The evidence base in Wales in terms of the improved value for money offered by Early Contractor Involvement is limited. The Assembly Government has, to date, used the approach on only six transport projects, of which the M4 widening project is the only one completed. A review on behalf of the Highways Agency in England concluded that Early Contractor Involvement had helped to deliver projects more quickly, with fewer changes to the specification during construction and a higher quality of workmanship. But the evidence in terms of project costs was less conclusive. The Assembly Government has questioned whether the Highways Agency's findings are entirely relevant to its own situation because of the different approaches to Early Contractor Involvement. For example, unlike the Highways Agency the Assembly Government has always used cost and quality criteria when tendering for Early Contractor Involvement contracts.
- 22** **The Assembly Government has taken action to improve project performance during the construction phase of trunk road projects but relationships with utility companies have been problematic at times.** The Assembly Government has, over time, introduced more disciplined project management and reporting arrangements in line with accepted project management principles.
- 23** The Assembly Government employs its own qualified engineers as project directors, while also contracting with independent project managers (known as employer's agents). Employer's agents welcomed some elements of the hands-on approach of the Assembly Government's project directors but, at times, there has been confusion about roles and responsibilities, for example in terms of approving design changes.
- 24** The Assembly Government does not currently have a system to support robust collection and analysis of information on the performance of trunk road projects. A database system used until 2007-08 became outdated and, since that time, officials have been using an interim spreadsheet based solution to track current and forecast project expenditure. The Assembly Government is identifying its requirements for a new system. These requirements may ultimately be met within the context of a new central project and programme management system for the whole of the Assembly Government, which is expected to be implemented during 2011-12.
- 25** The Assembly Government has introduced a set of key indicators (in terms of cost and time, quality and project/relationship management) to help manage contractor performance. But the application of these indicators is still not fully developed. For example, there is scope for the Assembly Government to: clarify with contractors the way in which finishing projects early or under budget can contribute to a higher score; look to undertake some quality assurance of the scoring undertaken by employer's agents; and analyse performance trends across all contractors and projects to help identify and address any common points of concern.
- 26** Relationships between the Assembly Government, its agents and its trunk road contractors are generally good, and the types of contract used by the Assembly Government for its trunk road projects are designed to facilitate mutual co-operation and trust. However, relationships with utility companies have been problematic at times. These problems have stemmed, in the main, from poor two-way communication and the Assembly Government's lack of influence over utility companies' priorities, resulting in some significant delays and cost increases on

individual projects. A code of practice sets out the main stages for carrying out utilities work on road projects. However, Assembly Government officials considered that there was too much reliance on the goodwill of utility companies, and little incentive for them to complete their work in a way that is timely or cost-effective for the public sector employer.

27 The evaluation of completed trunk road projects has been limited in scope, but should improve over time through the use of new *Welsh Transport Planning and Appraisal Guidance* and gateway reviews.

The expected benefits of individual projects have been considered as part of the Assembly Government's initial assessment of value for money. The Assembly Government does collect information to identify the extent to which completed trunk road projects have met their objectives in terms of traffic flows, passenger numbers or reduced accident and casualty figures. However, officials have acknowledged that they do not yet have as good an understanding of whether the expected wider social, economic and environmental benefits from completed projects have been realised.

28 In November 2006, the Assembly Government's Transport Division adopted and adapted the Office of Government Commerce's gateway review process. The four review stages introduced for major transport projects (including Transport Grant funded projects) include a benefits realisation review, to be carried out between 12 and 18 months after a project has been completed. However, there has been a lack of clarity in terms of whether:

- a completion of the project should be defined as the completion of the main construction works or the point of project closure following the defects liability period, which could be as much as five years later; and
- b a benefits realisation review should be completed where a project, because of its timing, had not passed through the previous gateway review stages.

29 The Assembly Government is yet to carry out a benefits realisation review despite the completion of main construction work on four trunk road projects between November 2006 - when the Assembly Government issued guidance on the use of application of these reviews to transport projects - and December 2008. The Assembly Government is planning a review of the A470 Llanrwst to Hafod project, completed in May 2009, although it has not yet developed any guidance on how to go about such a review.

30 The new *Welsh Transport Planning and Appraisal Guidance*, introduced in June 2008, also promotes project evaluation. Under this guidance, all project proposals will have to set out clearly their intended environmental, social and economic outcomes, as well as identifying how these outcomes will be monitored and evaluated. The Assembly Government is also obliged to commission full external evaluations of projects costing more than £2 million in total that are in receipt of European Union Structural Funds support. There are currently five trunk road and two rail projects that satisfy this criteria.



During the past two years the Assembly Government has exercised greater control over the local authority managed projects it funds

- 31 Although the Assembly Government allocates and distributes Transport Grant funding, the relevant local authority has ultimate responsibility for all aspects of project delivery.
- 32 **Before 2009-10, the Assembly Government exercised only limited control over these projects despite carrying most of the financial risk.** The Assembly Government had provided relatively little project management guidance or direct support to local authorities despite concerns about the capacity of local authorities to deliver major capital projects. Work commissioned by the Assembly Government to assess more systematically the skills and experience available across local government has been only partly completed. The Assembly Government's recent focus has been on ensuring that appropriately skilled personnel are in place to support the delivery of the new Regional Transport Plans and individual projects.
- 33 The Assembly Government's direct involvement in the delivery of Transport Grant funded projects has been limited. It has assigned engineers working on the Trunk Road Forward Programme as advisers on most of the larger Transport Grant funded projects, but their role on these projects has not been clearly set out and the nature and extent of their involvement has been inconsistent. Over the past two years the Assembly Government has engaged a
- member of staff with significant experience of the Trunk Road Forward Programme to help in terms of applying closer scrutiny of, and advice in relation to, Transport Grant projects. There has also been greater continuity in the management of the Assembly Government's Transport Grant team.
- 34 The Assembly Government had not made clear its expectations of local authorities in terms of undertaking project gateway reviews. The Transport Grant guidance to local authorities makes it clear that responsibility for monitoring and evaluating projects lies with the relevant authority. But neither this guidance, nor the Transport Grant terms and conditions have been updated to refer specifically to the requirement for gateway reviews. We were unable to find any evidence of gateway reviews having been undertaken on the Transport Grant funded projects we examined.
- 35 Before 2009-10, the Assembly Government carried most of the financial risks and local authorities had little incentive to control project costs on Transport Grant funded projects. Despite trying to improve the reliability of cost estimates in the projects it manages, the Assembly Government had done little to encourage more accurate cost estimation by local authorities or to improve its scrutiny of early cost estimates. Until 2009-10, the only advice to local authorities was that they should provide inflation assumption adopted costs.
- 36 Assembly Government officials became more directly involved in discussions with local authorities when estimated project costs started increasing significantly. Due, at least in part, to this intervention, local authorities have taken forward work which has helped to identify and secure some positive outcomes

in terms of project costs. For example, drawing on its experience on the Porth Relief Road, Rhondda Cynon Taf County Borough Council and its supply partners undertook a value engineering exercise on the plans for the Church Village Bypass. Combined with savings in the supply chain process, this exercise realised cost savings of around £35 million.

- 37 Before 2009-10, Transport Grant terms and conditions stated that Assembly Government funding would be extended to cover all of the increases in costs that were beyond the local authority's control or which could not have been foreseen. Even where cost increases could have been anticipated and avoided, the terms and conditions still committed the Assembly Government to meet 80 per cent of the increase.
- 38 The Assembly Government has never actually limited its support to cover only 80 per cent of the cost increase. The Assembly Government had indicated that it would do so on the A486/B4336 Ceredigion Link Road Stage 1 before ultimately agreeing with Ceredigion County Council to meet the cost increase on the Llandysul Bypass element of the scheme. However, in doing so the Assembly Government also agreed with the Council that it would remove the remaining Post Bach to Synod Inn improvement section from the list of Transport Grant approved projects.
- 39 In 2008-09, the Assembly Government sought legal and financial advice to support the case for exercising greater control over the delivery of Transport Grant projects. The advice confirmed that Transport Grant funding was entirely at the discretion of the Minister for Economy and Transport, having been regarded previously as essentially a top-slicing of local authorities' unhypothecated grant. The Assembly Government used this advice as the basis for introducing tighter controls over all Transport Grant projects from 2009-10 onwards.
- 40 From 2009-10, Transport Grant terms and conditions state that each application for additional funding to meet rising project costs will be assessed on its own merits. New monthly progress reports on Transport Grant funded projects should also give the Assembly Government earlier warning of likely changes in project costs.
- 41 These new reporting requirements follow efforts by the Assembly Government to reduce the gap between the amount of Transport Grant funding distributed in the financial year and the amount that is spent by local authorities. As at March 2004, local authorities held in their accounts some £15.3 million (29 per cent) of the £52 million Transport Grant for 2003-04. In March 2009, just £3.2 million (three per cent) of the £119 million Transport Grant for 2008-09 remained unspent in local authority accounts.
- 42 **The Assembly Government is introducing revised funding and management arrangements to provide more effective control over the delivery of the new regional transport plans.** The plans are intended to support delivery of the Wales transport strategy and have been developed by each of the four regional transport consortia in Wales. The Deputy First Minister approved the plans in December 2009.
- 43 The Assembly Government has set aside £22 million in 2010-11 to support delivery of the regional plans, although annual funding could increase as the legacy Transport Grant funded road schemes are completed. The Assembly Government will decide indicative



allocations and invite each consortium to submit business plans for those schemes within its regional plan that it wishes to take forward in the following financial year. Although initially this would be an annual process, the Assembly Government intends to move towards a three-year approach.

- 44** The Assembly Government has consulted local government on the management arrangements for overseeing delivery of the regional transport plans. These arrangements, delivered through regional and national groups, are predicated on the Assembly Government's belief that local authorities are still best placed to deliver local transport improvements. The Assembly Government will coordinate and chair the national groups.
- 45** The Assembly Government has developed, in collaboration with the regional consortia, some initial guidelines to support the new arrangements, for example in terms of project appraisal and review (including gateway reviews), business planning and financial controls. However, 2010-11 is regarded as a transitional year and the new arrangements will not be fully implemented until 2011-12. These new arrangements should strengthen significantly the Assembly Government's oversight of locally managed transport projects.

Recommendations

Information systems and analysis of project performance

- 1** For the past three years, the Assembly Government has been without an adequate information system to support the collection and analysis of data on the performance of major trunk road projects. It is identifying its information requirements to support delivery of the Trunk Road Forward Programme, with a view to any new system also supporting the delivery of other transport programmes. The Assembly Government is also considering whether its needs in respect of the management of transport programmes might be met within the context of a new central project and programme management system for the whole of the organisation.
- We recommend that the Assembly Government should ensure that the new system can:**
- a** record information to track the performance of all major transport projects at key stages of their delivery;
 - b** incorporate the information needed to facilitate benchmarking project performance against projects in other parts of the UK;
 - c** record all changes in project costs that occur through the lifecycle of the project, including changes in land costs; and
 - d** facilitate the analysis and sharing, on an annual basis, of the reasons for cost increases and delays on individual projects across all Assembly Government transport programmes.

Project and contract management

2 The Assembly Government introduced gateway reviews for all major trunk road and Transport Grant funded projects in late 2006. But the reviews have not been carried out consistently, and the requirement to undertake them has not been included in Transport Grant guidance and terms and conditions. **We recommend that the Assembly Government takes action to ensure that:**

- a gateway reviews become custom and practice for all current and future major projects;
- b all major transport projects completed since the end of 2006 are subject to a benefits realisation review; and
- c benefits realisation reviews are started within 12 to 18 months of the completion of the main construction works.

3 The Assembly Government has introduced a set of key performance indicators to measure the performance of construction contractors and consultants on its trunk road projects. The approach is designed to provide an incentive for contractors to perform well and assessed performance then informs the tender process for future projects. **We recommend that the Assembly Government should encourage the use of a common set of key performance indicators across all major transport projects in Wales and, in doing so:**

- a ensure that contractors are clear about the way in which the key performance indicator system gives credit for the delivery of projects earlier or at lower cost than planned, while ensuring that quality is not compromised;
- b for projects under its direct control, quality assure the performance indicator scores given by the independent project manager (employer's agent); and
- c share and analyse information on contractor performance to help identify and address common areas of underperformance.

4 The Assembly Government has not provided any detailed guidance for local authorities in terms of how they should manage the key stages of major transport projects. We see no reason why the core practices that underpin the successful delivery of major transport projects should be any different whether these projects are managed by the Assembly Government or by local authorities. **We recommend that the Assembly Government develops and communicates to local authorities detailed guidance that sets out its expectations and general good practice in the planning and delivery of major transport projects. Particular issues highlighted by our examination which might be addressed in any new guidance include:**

- a the use of appropriate inflation indices, construction material cost indices and optimism bias when estimating project costs;



- b** the use of project risk registers, encouraging the public sector employer and construction contractor to agree and maintain a joint risk register;
 - c** advice on the use of different types of contractual models;
 - d** the use of key performance indicators;
 - e** expectations in terms of local project management arrangements; and
 - f** how the scope of the processes set out in *Welsh Transport Planning and Appraisal Guidance* and gateway reviews guidance relate to each other.
- b** working with the UK Government's Department for Transport to update the existing good practice guide to managing works in the street to refer more explicitly to the delivery of major transport projects;
 - c** whether there is scope, particularly within an Early Contractor Involvement approach, for the construction contractor to undertake more preparatory work on behalf of utility companies; and
 - d** if necessary, the scope for a change in the supporting legislation (the New Roads and Street Works Act 1991 and the Street Works - Sharing the Cost of Works [Wales] Regulations 2005) to place a greater onus on utility companies to deliver their work in a way that is cost-effective and timely from the perspective of the public sector employer.

Working with utility companies

- 5** The successful delivery of major transport projects requires effective working relationships between all the parties involved. Relationships with utility companies have been problematic at times, contributing to delays and rising project costs, and there is little incentive for utility companies to undertake work in a way that is cost-effective or timely from the perspective of the public sector employer. **We recommend that the Assembly Government engages with local government and the utility companies to develop some clearly agreed principles in terms of how they should work together throughout the lifecycle of major transport projects. Options that the Assembly Government could explore include:**
- a** developing a more formal memorandum of understanding with utility companies, for example to include provision for the regular monthly reporting of actual and forecast costs and timescales of utilities work during the construction phase;

Overseeing the delivery of local authority managed projects

- 6** Although not yet fully defined and implemented, the Assembly Government's proposed management arrangements for the delivery of the new regional transport plans have the potential to strengthen significantly its oversight of local authority managed transport projects. The arrangements need to be able to demonstrate that they support enhanced scrutiny of project delivery while not in themselves presenting a barrier to delivery, for example through delayed decision making. The arrangements also need to demonstrate that they are helping to identify and address problems in project delivery at an early stage, contributing to improved project performance in terms of delivery to cost and time estimates.

We recommend that, towards the end of 2011-12, the Assembly Government should commission a review to provide an early check of the effectiveness of its arrangements for overseeing the delivery of the regional transport plans.

- 7 By appointing its own engineers as project directors on the Trunk Road Forward Programme, the Assembly Government has a relatively hands-on approach to project management. However, the engineers' contribution in their secondary role of providing advice on major Transport Grant projects has been inconsistent.

We recommend that the Assembly Government should examine whether the technical capacity it employs is being deployed to best effect between the management of trunk road projects and the Assembly Government's oversight of local authority managed projects. In doing so, the Assembly Government should consider the risks and benefits of delegating more responsibility for managing trunk road projects to the employer's agent.

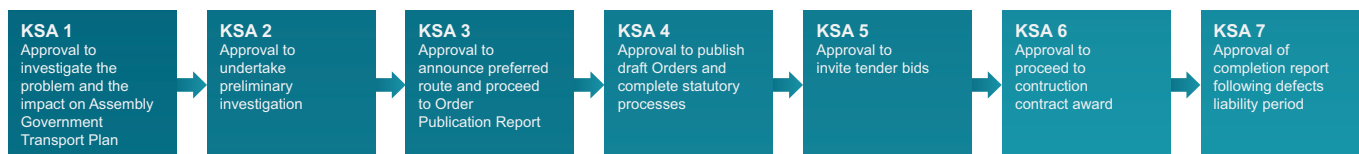


Part 1 – Many major transport projects have cost substantially more and taken longer to complete than expected, hampering the delivery of the Assembly Government’s wider transport objectives

- 1.1** This part of our report examines the delivery of 18 major road and rail infrastructure projects in Wales completed since the start of 2004. The Assembly Government has funded all, or at least most, of the cost of these projects as part of its Trunk Road Forward Programme, its Transport Grant Programme or its Rail Forward Programme (**Box 1** on page 7). Some projects have received additional funding direct from local authorities or from other sources, such as European Union funding.
- 1.2** We examined 10 projects in detail and gathered basic data on the costs and timescales of a further eight completed projects (**Appendix 1**). We have only presented data where we have been confident of being able to compare progress on projects at a broadly equivalent point. But even then, the bases of the early cost outturn estimates were not consistent across all of the projects we examined.
- 1.3** In this part of our report, we examine:
- a** the extent to which major transport projects have been delivered in line with early and subsequent estimates of their costs and duration;
 - b** the predominant reasons for changes to the estimated cost or timescales of individual projects; and
 - c** the impact of cost increases and delays on delivery of the Assembly Government’s wider transport programmes and objectives.
- While their exact final cost can be unclear, many major transport projects have cost substantially more and taken longer to complete than expected**
- Many projects have cost substantially more and taken longer to complete than expected**
- 1.4** For projects in the Trunk Road Forward Programme, the Assembly Government has identified seven Key Stage Approval (KSA) points (**Figure 1**). We examined the extent of and reasons for changes in estimates of cost and completion date between these points. We focused in particular on KSAs 3 and 6, which mark the most significant project milestones, and the latest estimated final/out-turn cost following the completion of construction⁷. Cost and completion date estimates before KSA 3 are inevitably uncertain given that the full scope of the project and the preferred route would not then have been determined.

⁷ Project costs can change after the completion of construction while the final account is settled and other costs, such as land and compensation, are agreed (paragraphs 1.14 to 1.16).

Figure 1 – The Assembly Government’s Key Stage Approval (KSA) process for projects funded from the Trunk Road Forward Programme



Note

The *Order Publication Report* details the orders and related statutory procedures that provide the necessary legal authority to deliver a project. They include line orders (to establish the route of a new road), side road orders (connecting local roads associated with a new road scheme) and compulsory purchase orders (purchase of land). Notice of draft orders is published in the local press and objections are dealt with through Public Inquiry.

Where the Assembly Government adopts an Early Contractor Involvement approach (paragraphs 2.9 to 2.16), the tender process would take place between KSA 3 and KSA 4, rather than between KSA 5 and KSA 6.

Source: Assembly Government

1.5 For projects on the Transport Grant Programme, local authorities apply their own local project approval arrangements. And, when managing rail projects, the Assembly Government uses Network Rail’s Guide to Railway Investment Projects system (Appendix 2). In most cases, we were able to find evidence of cost estimates made at equivalent stages of these different types of project, but the evidence to compare time-to-completion estimates was less robust. In particular, the data held by the Assembly Government did not include estimated completion dates for rail projects and road projects funded under the Transport Grant Programme.

1.6 We could not find evidence of the initial estimated completion dates for three of the nine most recently completed trunk road projects. For the other six projects, the projects were completed as much as five and a half years later than initially estimated (Figure 2). Just under two-thirds of the average delay in these projects occurred before the award of construction contracts (KSA 6), reflecting, in part, budget constraints and consequent reprogramming of activity.

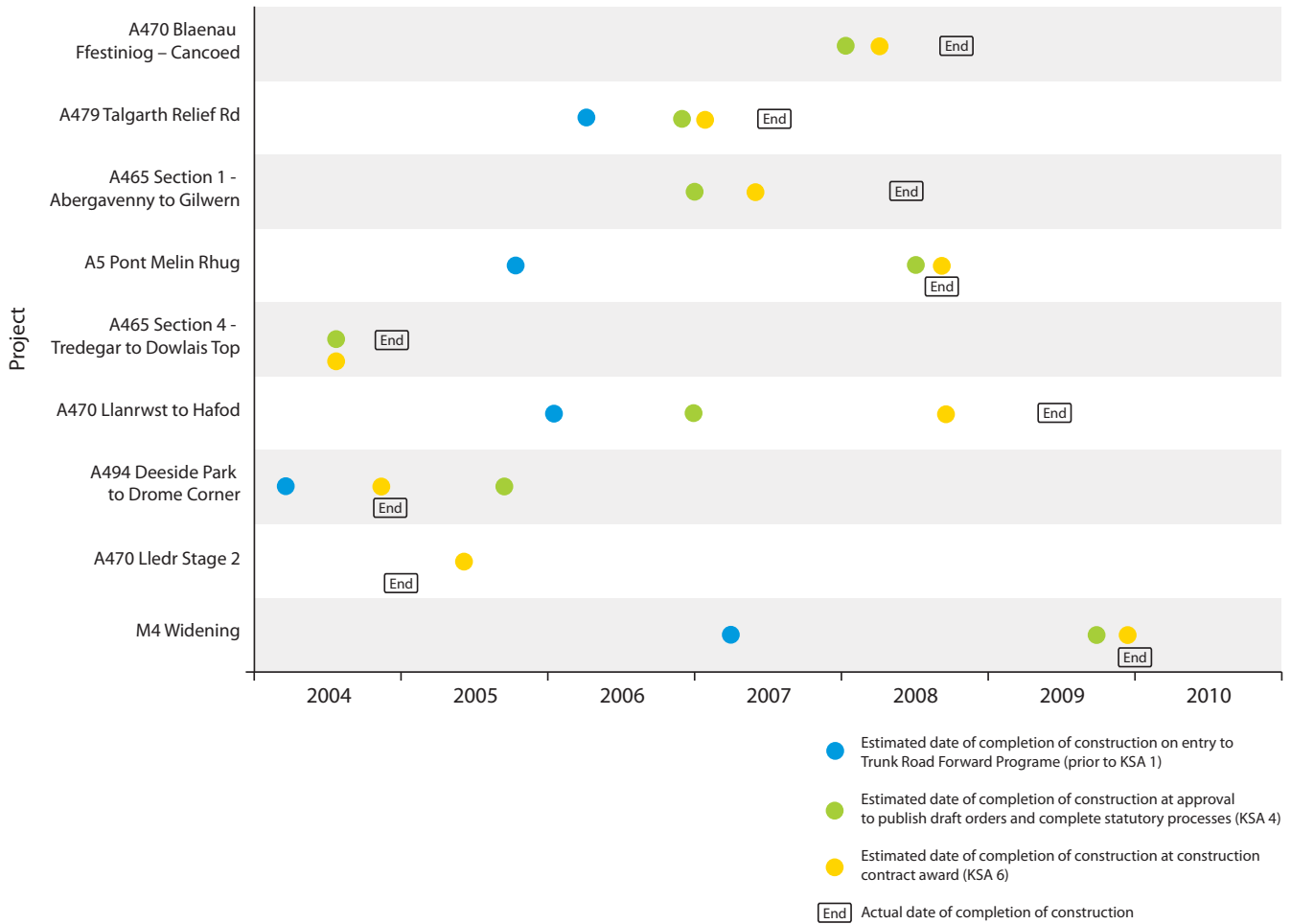
1.7 Once under construction, across the nine most recently completed trunk road projects the average delay was just under four months, or 20 per cent of the estimated construction time. Some projects were constructed on time (such as the A5 Pont Melin Rhug) or even early (such as the A470 Lledr Stage 2) (Figure 3).

1.8 Project costs also increased significantly compared with early estimates. Across all 18 completed projects we examined⁸, we found that the latest estimated final project costs were, overall, some 61 per cent higher than the estimates made when announcing the preferred route (KSA 3) (Figure 4). In cash terms, the total cost of these projects had increased from an estimated £366 million to £592 million. On average, just under two-thirds of the increase in the estimated final cost occurred before the award of the construction contract at KSA 6.

⁸ When considering cost increases, we were able to compare trends across the Trunk Road Forward Programme, Transport Grant funded projects and the Rail Forward Programme.



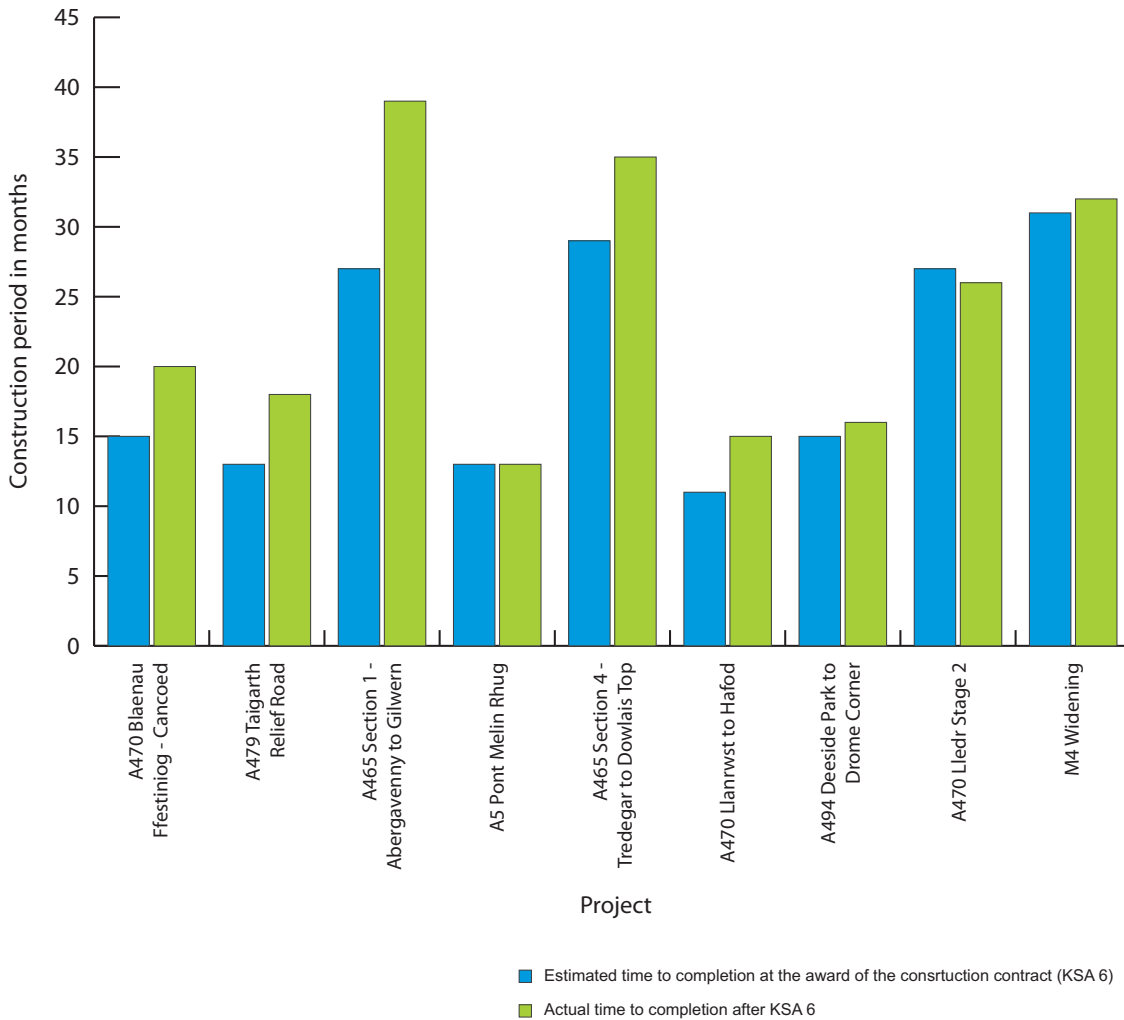
Figure 2 – Overall delays in the completion of major trunk road projects



Note
 Dates for the completion of construction were not estimated before KSA 4 for the A470 Blaenau Ffestiniog to Cancoed and A465 section 1 and 4 projects, while the completion date for the A470 Lledr Stage 2 was originally estimated as May 1999. Very little data was available at KSA 3 but KSA 4 records included the estimated timescales reported when publishing Orders.

Source: Wales Audit Office analysis of Assembly Government data

Figure 3 – Timescales for the construction phase in major trunk road projects



Source: Wales Audit Office analysis of Assembly Government data

1.9 Based on aggregated information for seven of the eight road projects that were among our 10 case study projects, the main construction works accounted for 81 per cent of the total project cost, land and building costs for nine per cent, and other costs, including professional fees and surveys, also for nine per cent. Land and building costs tend to be proportionally higher on those projects that involve the construction of a completely new route.

1.10 The total cost increase on the seven local authority managed road projects funded from the Transport Grant and on the two rail projects we examined, at 94 per cent and 112 per cent respectively, were much greater than the average for the nine projects on the Trunk Road Forward Programme (36 per cent increase). However, the main difference was in the percentage increase in the estimated cost before the award of construction contracts. From the award of the construction



Figure 4 – Increases in estimates of final costs before construction and through to the completion of major transport projects

Programme (and number of projects)	Percentage cost increase pre construction – KSA 3 to KSA 6		Percentage cost increase including construction – from KSA 3 to latest estimated final cost	
	Total	Range in project performance	Total	Range in project performance
Trunk Road Forward Programme (9)	18	-15 – 61	36	14 - 122
Transport Grant road projects (7) ¹	70	19 - 165	94	16 - 240
Rail projects (2)	50	6 – 95	112	10 – 218
All projects (18)	38	-15 - 165	61	10 - 240

Note
 1 These seven road projects do not include the Church Village Bypass that was opened fully to the public in September 2010. Appendix 4 provides details of the changing cost of this and other Transport Grant funded road projects. However, the figures presented in Appendix 4 track changes on an annual basis, rather than between specific stages of project delivery.

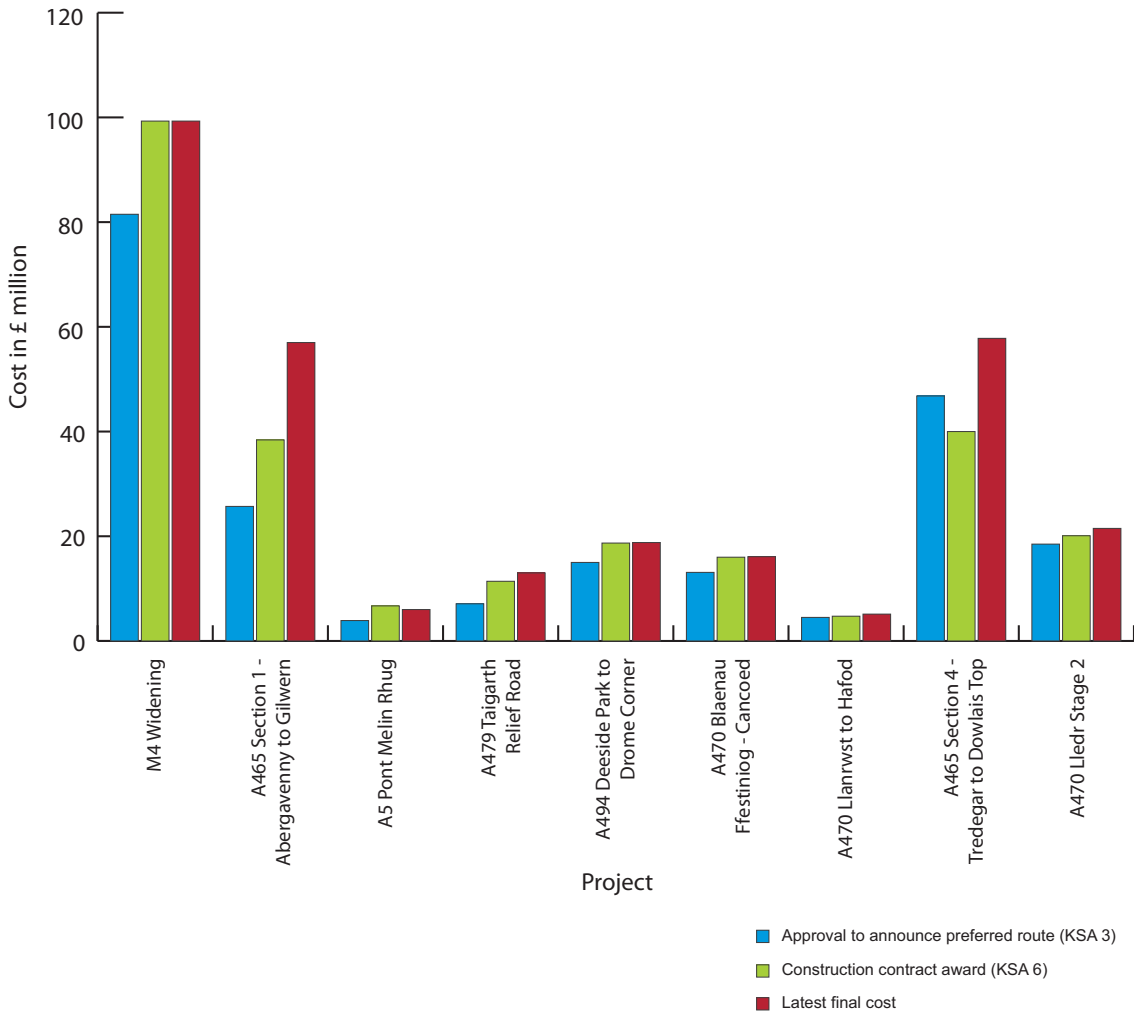
Source: Wales Audit Office analysis of Assembly Government data

contract to completion, the total cost of the nine trunk road projects increased by 15 per cent and the cost of the seven Transport Grant funded road projects increased by 14 per cent. And, overall, the performance of individual projects within each programme varied significantly (Figures 5 and 6). For example:

- a the increasing cost of the Porth Relief Road, to £102 million compared with the early estimate of £33 million that had not allowed for cost inflation over the lifetime of the project, skews the average figures for Transport Grant funded road schemes;
- b the cost increase on the Vale of Glamorgan railway line was small compared with the cost of the more complex Ebbw Valley line, which more than doubled to around £48 million – although the early estimate for the Ebbw Valley line did not include any allowance for the eventual £5.12 million combined cost of land, compensation and Network Rail fees; and
- c on the Trunk Road Forward Programme, the estimate of the final cost of the A479 Talgarth Relief Road increased by 43 per cent before construction began, while the two A465 projects (sections 1 and 4) increased in cost by up to 50 per cent during construction⁹.

⁹ Appendices 3 and 4 provide more detail on the changing costs over time for major transport projects.

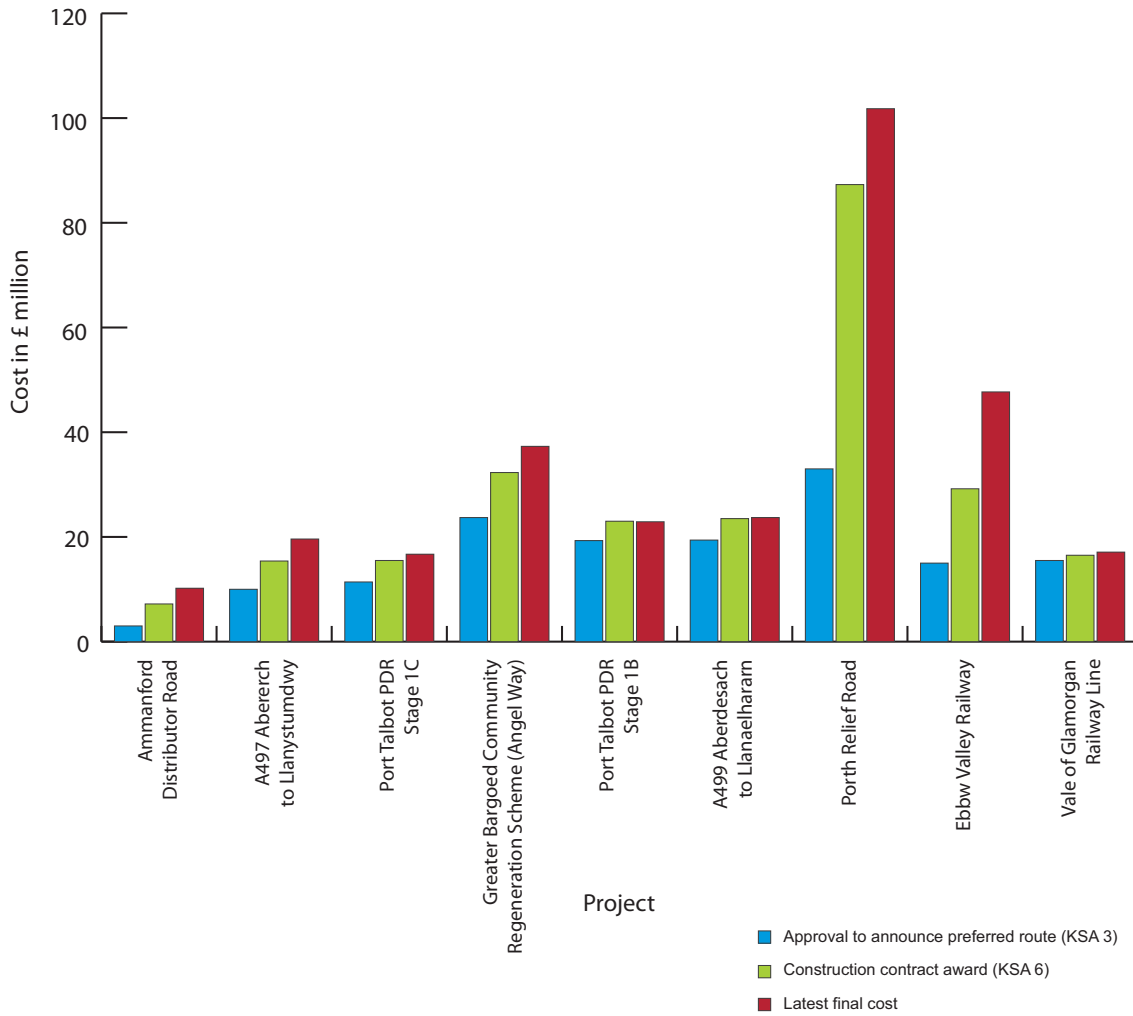
Figure 5 – Increases in estimates of final costs for Trunk Road Forward Programme projects



Source: Wales Audit Office analysis of Assembly Government data



Figure 6 – Increases in estimates of final costs for Transport Grant funded road projects and rail projects



Note

- 1 The estimated cost at the equivalent of KSA 3 for the Porth Relief Road did not include any allowance for inflation over the lifetime of the project.
- 2 The initial estimated cost for the Ebbw Valley line did not include any allowance for land costs, compensation or Network Rail fees. At completion, the total cost of these three elements was £5.12 million.

Source: Wales Audit Office analysis of Assembly Government and local authority data

- 1.11** It is difficult to compare the performance of major transport projects in Wales with the rest of the UK, in terms of their completion to cost and time. This is because published results for recently completed projects in England and Scotland do not compare progress at exactly the same points used in our analysis, and because early cost estimates are not necessarily calculated on a like-for-like basis (for example, in terms of whether inflation assumptions are included).
- 1.12** However, recent reports elsewhere in the UK have highlighted cost increases on some projects that, in percentage terms, are on a par with some of the larger increases on recent projects in Wales. For example, Audit Scotland's review of major capital projects described the ongoing completion of the M74, the estimated cost of which rose from £245 million at the start of 2001 to £692 million in 2008. Audit Scotland's review also highlighted the increasing cost, from £37 million to £85 million, of the Stirling-Alloa-Kincardine rail link. As in the case of the Ebbw Valley railway line, the Stirling-Alloa-Kincardine link was delivered through a third-party contractor rather than by Network Rail, and managed by Clackmannanshire Council before being taken over by Transport Scotland.
- 1.13** It is also possible to compare more reliably project performance in terms of any increase in the estimated cost after the award of the main construction contract. Drawing on their published results for major capital projects, Audit Scotland provided us with information showing that, for 10 transport projects completed between 2003 and 2005, with a combined out-turn cost of £199 million, they had identified a total cost reduction of five per cent compared with estimates made before

the award of construction contracts. Although completed over a different time period, the total cost of the 18 projects we considered had increased by 17 per cent after the award of construction contracts (KSA 6). However, seven of these projects had increased in cost by 10 per cent or less, with a further two projects reporting a latest final cost lower than estimated at the award of the construction contract.

The timescales involved in settling the final account and the way land and building costs are recorded mean that the full cost of most recently completed projects is still unclear

- 1.14** We have reported the latest position in terms of the cost of recently completed projects, but the final cost can be unclear for several years after completion of construction. Open book accounting means that clients have sight of contractors' costs, but there can be disputes about who should be responsible for certain costs that arise during construction or in the defects liability period which follows the completion of construction (**Case Study 1**). During the defects liability period, which can last between one and five years, the client can require the contractor to return to the site to complete any omissions in the works or to make good any defective work or materials. Seven of our 10 case study projects are still in their defects liability period.
- 1.15** Most major transport projects require the compulsory purchase of land and buildings. Plans for major transport schemes can also have a negative impact on local land and property prices, known as 'blight'. The Assembly Government and local authorities have powers under the Town and Country Planning Act 1990 to acquire blighted land and buildings, for which owners receive the market value before the impact of blight.



Case Study 1 – Delays in ascribing responsibility for remedial works costs on the Ebbw Valley railway line

From 1962, the Ebbw Valley line had only operated a freight service, but this service also ended with the closure of the Corus steelworks in 2002. The Assembly Government wanted to reopen the line to passenger services to help revitalise the local area and decided to proceed with the project by contracting out the construction works to a third party, rather than the work being delivered by Network Rail. The project is the only railway scheme in Wales to have been completed in this way.

The main stakeholders involved in the project were:

- a Blaenau Gwent County Borough Council as the purchasing client;
- b Network Rail, the owner of Britain's rail infrastructure ultimately responsible for the asset and for 'signing off' the final design;
- c the construction contractor and employer's agent (the project manager which also had responsibility for developing the outline design before the appointment of the construction contractor); and
- d the Assembly Government as the main funder through the Transport Grant.

Other stakeholders included Caerphilly County Borough Council and Newport City Council.

There were lengthy negotiations and generally difficult relationships between the main stakeholders, leading at one point to a six-month delay. One key negotiating point related to the extent to which Blaenau Gwent County Borough Council could transfer its own risks to the construction contractor.

The original intention had been to go to tender for the construction contract at stage 4 of the Guide to Railway Investment Projects process (single option development). However, delays in developing the design, combined with pressure to start construction to ensure continued eligibility for EU funding, meant that tenders were sought with a less detailed design at the pre-feasibility stage (stage 2). On winning the tender, the construction contractor became responsible for developing a detailed design which Network Rail, as owners of the rail infrastructure, were required to 'sign off'.

The line opened to passengers in February 2008. But there has been a dispute between Blaenau Gwent County Borough Council, the Assembly Government and the contractor about responsibility for the cost of remedial works (needed to ensure that the 'as built' line met a design that Network Rail was prepared to 'sign off').

1.16 The land elements of project costs are updated throughout the life of local authority managed road and rail projects funded by the Transport Grant Programme. For projects funded by the Trunk Road Forward Programme, the Assembly Government estimates land and building costs at KSA 3 (approval to announce preferred route). Since 2002, the Assembly Government has monitored these costs against a central programme budget and has not reflected changes to the early estimates in revisions to the estimated cost of individual projects at subsequent key stages. Nor is the income

earned from any subsequent sale of blighted land and buildings discounted from overall project costs¹⁰. As a result, the actual net land and building costs of recently completed projects has not been clear. The Assembly Government has indicated that changes to its central finance systems mean that it will now be able to account for changing land costs on a project-by-project basis.

¹⁰ Since the start of 2004-05, the Assembly Government has spent £48 million acquiring land and buildings for its trunk road projects. Between 2004-05 and 2008-09, the Assembly Government recouped £6.6 million from the sale of land and buildings blighted by transport projects.

Projects have cost more and taken longer to complete for a variety of reasons, although construction price inflation and deferral because of budget constraints have been significant factors

1.17 The Assembly Government has not produced its own overall analysis of the reasons for late completion and cost increases on major transport projects. From our detailed examination of 10 case study projects, we identified a range of common reasons, some

Case Study 2 – Delays and cost increases on the Ebbw Valley railway line because of the presence of protected species

The presence of protected species (slow-worms and common lizards) on-site led to delays of approximately three months and added an estimated £0.95 million to the total project costs. These additional costs were due to carrying out ecological surveys, relocating both species and the delays to preliminary work caused by finding these species. The presence on site of these species in large numbers accounted for some, but not all, of the delay in opening the Llanhilleth and Cross Keys stations.

Case Study 3 – Delays and cost increases on the A465 Section 1 (Abergavenny to Gilwern) due to environmental contamination and poor weather

Turning the A465 Section 1 into a dual carriageway required the demolition of a petrol station. However, the site was found to be contaminated and had to be investigated and decontaminated, resulting in a three-month delay and additional costs of £2.2 million due mainly to prolongation of the contract. Liability for this additional cost – between the petrol station owner and the Assembly Government – has not yet been determined. Poor weather also led to a separate three-month delay during construction.

related to each other, both before and during construction (Figure 7). These reasons are similar to those described by the National Audit Office in 2007 to explain delays and/or cost increases in road projects in England.

1.18 During the construction stage, delays and cost increases have related mainly to changes to the contract specification – sometimes to reflect changes in design standards as was the case for the safety barriers on the M4 widening project – and delays caused by utility companies. For example, on the A497 Abererch to Llanystumdwy improvement project delays in the completion of work to divert gas mains contributed to a six-month delay in the main construction programme. Environmental conditions and measures taken to respond to public concern can also have a significant impact on the progress and cost of construction (Case Studies 2 to 4).

Case Study 4 – Delays and cost increases on the A465 Section 4 (Tredegar to Dowlais Top) because of changes made in response to public concerns

Two bridges served the village of Princetown on the north side of the A465 between Rhymney and Tredegar. Both bridges required demolition and replacement. The plans put forward at public inquiry showed work on the two bridges to be sequential, thus maintaining one bridge in service at all times, but requiring temporary detours of 1.5 and 2.5 miles during the time that each was out of service.

However, four years later, when construction reached the point of demolition of the first bridge, local residents and businesses on the Tafarnaubach Industrial Estate remained unhappy with the loss of the road bridges and the level of consultation over the contractor's plans. After reconsideration, the Assembly Government approved the provision of a temporary light bridge during reconstruction of the Princetown bridge and a full strength bridge at Tafarnaubach during reconstruction, thus retaining access at each end of the community. Pedestrians could use the new footbridge at Princetown. The extra work to construct the temporary bridges cost £1.3 million and resulted in a 14-week delay during the construction period.



Figure 7 – Significant reasons for late completion and/or cost increases across our 10 case study projects

Reason for delay and/or cost increase	A470 Blaenau Ffestiniog to Cancoed	Porth Relief Road	Reopening of the Vale of Glamorgan railway	Reopening of the Ebbw Valley railway	M4 Widening	A465 Section 1 (Abergavenny to Gilwern)	A465 Section 4 (Tredegar to Dowlais Top)	A497 Abererch to Llanystumdwy	A494/A550 Deeside Park to Drome Corner Improvement	A470 Lledr Stage 2 (Dolwyddelan to Pont-yr-Afanc)
 Environmental mitigation Additional measures may have to be taken to limit the effects of construction on the environment.										
 Weather Bad weather can lead to potentially significant delays in construction work.										
 Unforeseen work Issues sometimes only become apparent once construction work has started, for example, ground conditions being worse than expected.										
 Increase in land costs and blight Land costs can be subject to increases in cost. Also, should the size or scope of a project change, more land may be required.										
 Detailed design/specification changes Additions to the original specified work are made or revisions to initial objectives, adding costs to the contract and additional time requirements. Procurement can also take place before a sufficiently specified design has been completed leading to changes during construction.										
 Statutory undertakings (utilities works) Routing or re-routing essential services, such as gas, water and electricity by utilities companies can be frequently subject to delays and cost increases.										
 Changes in design standards Regulatory changes in design standards may result in the need for specification changes and changes to the construction contract.										
 Protracted negotiations Legal negotiations between different parties can be protracted and work can be delayed until they have been settled.										
 Statutory processes and consultation All projects go through statutory processes such as public inquiries and environmental assessments. These can take longer than anticipated.										
 Budget constraints/reprogramming Planned schemes can be delayed because of insufficient funding available from the Assembly Government.										
 Inflation Inflation in construction costs is higher than general inflation and when projects are delayed, cash prices increases because of inflation.										

Source: Wales Audit Office analysis of Assembly Government and local authority project data

1.19 Underestimating inflation has been a significant factor in the increases in estimates of project costs before construction, for one or more of the following reasons:

- a** *Early estimates did not include allowances for cost inflation over the assumed lifetime of the project.* The Assembly Government made at least some allowance for inflation in the projects it managed, as was the case on most of the local authority managed projects we examined, with the exception of the Porth Relief Road.
- b** *Inflation rates have been higher than expected during the assumed lifetime of the project.* Many of the major projects we examined were designed, procured and completed between 2000-01 and 2007-08, which was a period of high construction price inflation (Figure 8).
- c** *Unplanned delays or reprogramming decisions due to budget constraints have exposed projects to additional cost inflation over time that had not been considered in previous estimates.*

1.20 The Assembly Government's budgeted expenditure on the Trunk Road Forward Programme increased from £27.1 million in 2001-02 to £51.7 million in 2005-06¹¹. However, this increase followed a fall in the budget from £44.1 million in 1999-2000. Had the budget increased in line with construction price inflation between 1999-2000 and 2005-06, the Assembly Government has identified that it would have had at its disposal additional budgeted expenditure to the value of £108 million over this period.

1.21 In 2006, research for the Highways Agency estimated that construction price inflation accounted for an average 45 per cent of the cost increase on road projects in England. Neither the Assembly Government nor the relevant local authorities were able to provide us with data to enable us to estimate the proportion of cost increases attributable to inflation for our 10 case study projects. But it is clear from our file review and our discussions with project officers that, overall, the proportion of construction price inflation that had not been built into cost estimates was a significant factor in project cost increases.

1.22 The recent economic downturn and construction price deflation could mean that the public sector is able to attract lower tender prices for forthcoming transport projects than might have been estimated before the downturn. However, the Assembly Government expects construction price inflation to move above retail price inflation over the medium term. Also, assuming that the Assembly Government's transport budgets do not increase in line with construction price inflation, which is quite possible in light of the current uncertainty about future public spending levels, then the transport budgets may not be sufficient to fulfil current programme commitments. The UK Government's Department for Transport has already indicated to local authorities in England that they should not assume that prioritised schemes will be funded to the levels previously announced.

¹¹ After 2005-06, the scope of the Trunk Road Forward Programme budget was altered, meaning that figures for 2006-07 onwards are not directly comparable with those for the previous years.



Figure 8 – Comparing construction price inflation and the retail price index (April 1998 to March 2009)



Note
The Assembly Government calculates construction price inflation using the ROADCON INDEX, which is based on rates contained in accepted tenders for road construction projects, motorway widening and major maintenance schemes costing more than £0.25 million. Data is obtained from the Highways Agency and local authorities in England, Scotland and Wales.

Source: Office for National Statistics (RPI) and Assembly Government (CPI)

The increasing cost of individual projects has hampered the delivery of the Assembly Government's wider transport programmes and objectives

- 1.23** Major transport programmes can be affected by changes in policy and strategy. For example, the 2002 Trunk Road Forward Programme was updated in 2004 to reflect the aims of *Wales: a Better Country*¹² and the original version of the *Wales Spatial Plan*¹³. The projects within the programme were then reprioritised in 2008 following the publication of *One Wales*¹⁴, which included a commitment to improve transport links between South and North Wales. The January 2010 National Assembly for Wales Finance Committee report on *Funding Road Infrastructure* criticised these changes to the Trunk Road Forward Programme and the Assembly Government's performance in delivering the programme since 2002 (Box 2).
- 1.24** Delays in, and the increasing costs of, individual projects have also put pressure on programme budgets and have meant that other planned transport projects have had to be deferred. For example, the increasing costs for the planned completion of the A465 Heads of the Valleys improvement, between now and 2020 (Case Study 5), are already having an impact on plans for progressing other projects.

Box 2 – The National Assembly for Wales Finance Committee report on Funding Road Infrastructure

The National Assembly for Wales Finance Committee examined the allocation of funding for the development of road infrastructure, the interface with expenditure in other policy programmes (such as economic development and community regeneration) and the way in which the changes in each programme are coordinated. The Committee was critical of the way the Trunk Road Forward Programme had been managed over the previous eight years, in particular the programme's degree of integration with other government policies and programmes, the level of consultation on its content and the management of the programme budget. Based on its assessment of slippage and project cost overruns within the programme, the Committee also questioned the project management capacity of the Assembly Government, and pointed to the need for the Assembly Government to adopt more modern business practices.

Source: *Funding Road Infrastructure*, National Assembly for Wales Finance Committee, January 2010

- 1.25** The full extent and impact of such reprogramming is difficult to define given that the 2002 programme did not make any firm commitments in terms of timescales for project completion. However, of the 50 projects included in the 2002 Trunk Road Forward Programme:
- a The Assembly Government had identified 23 projects as high-ranking. Of these, eight 'phase one' projects were programmed to be technically ready for delivery (to start construction) before March 2005 and 15 'phase two' projects were identified as requiring more technical work but possibly being ready to proceed to construction by March 2008. As at November 2010, six of the eight phase

¹² *Wales: A Better Country*, Assembly Government, September 2003

¹³ *People, Places, Futures: The Wales Spatial Plan*, Assembly Government, November 2003

¹⁴ *One Wales: A progressive agenda for the government of Wales*, Assembly Government, June 2007



Case Study 5 – Delays and cost increases on the A465 Heads of the Valleys improvement

The A465 ‘Heads of the Valleys’ road between Abergavenny and Hirwaun is being turned into a dual carriageway and represents one of the largest infrastructure projects in Wales. The road improvement is intended to have a significant impact on investment and economic activity along the Heads of the Valleys corridor. In 2000, the scheme was divided into six sections, each to be delivered as a separate project.

In 2000, the Assembly Government anticipated that all six sections could potentially be completed by 2009 for an estimated cost of £268 million (at November 2000 prices). However, the timetable has slipped significantly and the Assembly Government is now planning on the basis that the whole programme of works will be completed by 2020. Two sections (1 and 4) have already been completed at a cost of £115 million and the forecast cost for the remaining four sections is £648 million (although this is at November 2009 prices, not accounting for future cost inflation). The increasing cost of the remaining sections takes account of construction price inflation since 2000 but also changes in design standards for the scheme.

Section	Cost (£ million)	Price base
Section 1: Abergavenny to Gilwern	57	(cash outturn)
Section 2: Gilwern to Brynmawr	240	(November 2009)
Section 3: Brynmawr to Tredegar	152	(November 2009)
Section 4: Tredegar to Dowlais Top	58	(cash outturn)
Section 5: Dowlais Top to Cefn Coed	123	(November 2009)
Section 6: Cefn Coed to Hirwaun	133	(November 2009)
Total	763	

one projects have been completed with one (A40 The Kell) also near completion. The remaining project, the A494 Drome Corner to Ewloe has been deferred following the public inquiry. Of the 15 phase two projects, two have been completed and five are under construction; most of the others are undergoing statutory procedures, environmental impact assessments, inspections, public inquiries and consultation, or publication of draft orders.

- b Of the remaining 27 projects, seven are in preparation, although not necessarily at the point of having identified a preferred route (KSA 3), and five are the subject of further studies. The remaining projects are on hold. These include the M4 Relief Road which has incurred preparatory costs of £13.9 million but is not being taken forward because the estimated cost increased to more than £1 billion, making it unaffordable within existing transport budgets¹⁵.

- 1.26** The Assembly Government had originally expected that the Transport Grant Programme announced in 2001 would take five years to complete. However, the Assembly Government is still funding, and will continue to fund for a number of years, several of the projects announced in 2001 and 2002, based on its assessment that, despite rising costs (Appendix 4) they still represent value for money.

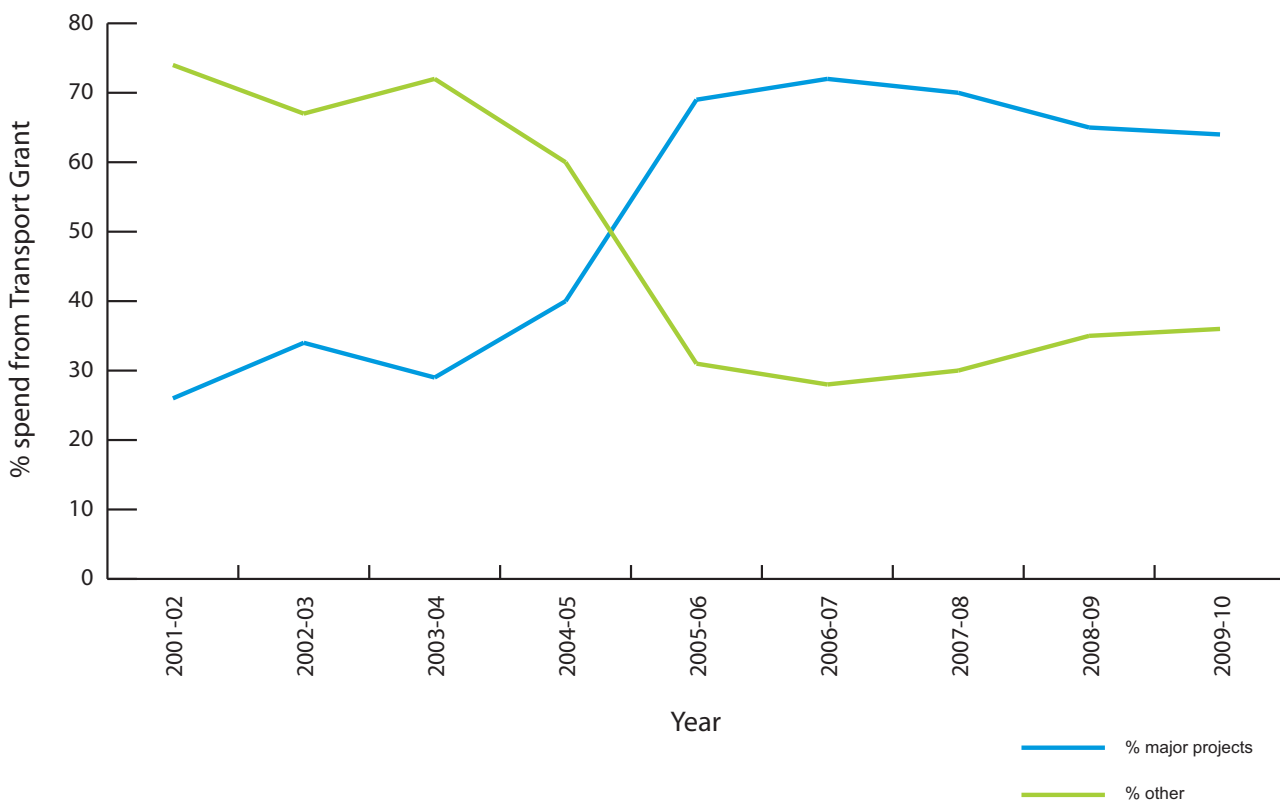
¹⁵ The Assembly Government is also not taking forward plans for the Cardiff International Airport access road which featured in the 2004 update to the Trunk Road Forward Programme. That scheme has incurred preparatory costs of £1.9 million.

1.27 Between April 2001 and March 2010, the Assembly Government committed £829 million to the Transport Grant Programme. Major projects have consumed an increasing proportion of the annual Transport Grant expenditure over this period (Figure 9). Because of budget pressures, since 2005-06 the Assembly Government has had to restrict bids for Transport Grant funding to support other parts of its transport strategy, such as integrated transport packages, walking and cycling routes, bus projects and the Safe Routes in Communities Programme (formerly Safe Routes to Schools). Annual budget

constraints have also restricted the pace of progress on two ongoing major Transport Grant funded projects, the Ceredigion Link Road Stage 1 and the Port Talbot Peripheral Distributor Road Stage 2.

1.28 The Assembly Government developed the Rail Forward Programme in 2008, following on from the new powers it acquired under the Railways Act 2005. We have not examined the Assembly Government's performance in delivering the programme because the individual projects within it are still at a relatively early stage of development.

Figure 9 – Major projects as a proportion of annual Transport Grant expenditure (March 2001 to April 2010)



Source: Assembly Government



Part 2 – The Assembly Government has, over time, strengthened its processes for managing projects under its direct control, but the full impact of these changes is, as yet, unclear

2.1 This part of the report examines the way in which the Assembly Government manages those major transport projects under its direct control. We focused on the management of trunk road projects, specifically:

- a** estimation of project costs and timescales;
- b** procurement and contracting;
- c** contract management and relationships with contractors and third parties; and
- d** project evaluation.

2.2 The Assembly Government's processes for managing trunk road projects have evolved to take account of its own experience and emerging good practice. In 2008-09, these arrangements were brought together in an electronic procedures manual. The Assembly Government has framed the manual around the Key Stage Approval process (Figure 1 on page 20) while also taking account of Prince2¹⁶ project management principles. The manual also draws on Highways Agency guidance for road projects in England.

The Assembly Government has sought to improve the management of project risk, including the provision of more realistic cost and time estimates

2.3 The Assembly Government's processes for managing the Trunk Road Forward Programme have included arrangements to identify and assess the likelihood and impact of particular project risks. However, of the projects that we examined in detail, we found that:

- a** All projects had included some allowance for the risks of late completion and additional costs, both in the early and subsequent cost and time estimates. But, in most cases, the allowance was insufficient to cover the extent of the cost increases and delays that were experienced.
- b** Risk registers for each project included details of the risks identified, and their likely impact, probability and proposed mitigation action. But some projects had two registers - one held by the Assembly Government and one held by the contractor. Employer's agents felt that this approach duplicated risks and, while there may be risks identified by either party that

¹⁶ PRINCE2 (PRojects IN Controlled Environments) is a widely used process-based method for effective project management.

they might not wish to share, best practice recommends that a joint risk register should also be agreed and maintained.

2.4 In 2008-09, the Assembly Government updated and simplified its risk management procedures for Trunk Road Forward Programme projects in an effort to:

- a** minimise the delays to schemes caused by otherwise unforeseen events;
- b** ensure that the independent project manager (the employer's agent¹⁷) and construction contractor have an opportunity to contribute effectively to the risk management process;
- c** help to better plan internal resource demands;
- d** provide a clearer record of how risks are managed if and when they materialise;
- e** identify the most cost-effective options to eliminate, reduce or mitigate risks, and make adjustments to estimated project costs; and
- f** ensure greater consistency of approach across all projects.

2.5 In 2002, research on behalf of HM Treasury found that in the early stages of major projects there was a 'demonstrated, systematic tendency for project appraisers to be overly optimistic and that to redress this tendency appraisers should make explicit, empirically based adjustments to the estimates of a project's costs, benefits and duration'¹⁸. This adjustment became known as optimism bias and, in 2003, HM Treasury reflected it in Supplementary Green Book¹⁹ Guidance (Box 3).

Box 3 – Optimism bias

In addition to the allowance made for specific risks, HM Treasury recommends that adjustments to estimates of a project's costs, benefits and duration should take account of data from past projects or similar projects elsewhere, while also recognising the unique characteristics of the project in hand. In the absence of a more specific evidence base, the Treasury encourages departments to collect their own data to inform future estimates of optimism, and in the meantime use the best available data.

The main factor that determines the amount of optimism bias applied is whether the project is 'standard' or 'non-standard'. Non-standard implies that the project has mostly unique characteristics or that the construction is likely to be particularly difficult. Other factors that influence the amount of optimism bias include the quality of the risk assessment, the project's likely environmental impact, political and funding issues and a number of engineering issues. Depending on the strength of these factors, an amount of between three per cent and 45 per cent should be added to the estimated project cost.

Source: Supplementary Green Book Guidance, HM Treasury 2003

2.6 The Assembly Government has been applying optimism bias in its estimation of the costs of trunk road projects since 2003, although most of the KSA 3 equivalent estimates for the recently completed projects that we examined were produced before 2003. The Assembly Government has not completed a sufficient number of its own projects to provide a reliable basis for estimating an appropriate level of optimism bias to apply to its projects. Therefore, the Assembly Government has used Treasury figures, based on the experience of more than 350 projects.

¹⁷ The employer's agent is generally a private sector consultant acting on behalf of the public sector client/employer to oversee the administration of a design and build contract.

¹⁸ *Review of Large Public Procurement in the UK*, Mott MacDonald, 2002

¹⁹ HM Treasury's *Green Book* guidance for central government sets out a framework for the appraisal and evaluation of all policies, programmes and projects. It describes the key stages in the development of a proposal from setting out the rationale for and objectives of the intervention, through to options appraisal and, eventually, implementation and evaluation.



- 2.7** While the Assembly Government has allowed for optimism bias in the estimated cost of individual projects, officials are considering holding back this allowance in the overall Trunk Road Forward Programme budget as a contingency. This approach is intended to help ensure that the allowance is not treated as a core part of the day-to-day project budget.
- 2.8** The Assembly Government also now has better access to information on contractors' actual costs on previous projects on which to base its cost estimates. This includes access to information held by the Highways Agency in England. Where Early Contractor Involvement is used (paragraphs 2.9 to 2.16), the Assembly Government has also been requesting more detailed estimates from its cost consultants to help set a notional target cost when tendering for these contracts once a preferred route has been identified.

The Assembly Government's procurement of trunk road projects has evolved in line with common practice, moving towards Early Contractor Involvement as its preferred approach for contracts worth more than £18 million

- 2.9** The choice of procurement route (the way in which the Assembly Government contracts for the design and construction of projects) can have a significant impact in terms of the Assembly Government's ability to attract competitive tender prices, control costs, maximise quality and apportion the appropriate amount of risk to the contractor.

There are four main ways to contract with the private sector for the delivery of major transport projects:

- a** *traditional* – contractor engaged to carry out construction work on a project that has already been designed;
- b** *design and build* – the construction contractor employs an integrated project team including designers to complete the design and make modifications during construction (before awarding the construction contract, up to 80 per cent of the design work would typically have been completed under a separate design contract);
- c** *Early Contractor Involvement design and build* – a partnering approach to design and build, in which the contractor is engaged before the detailed design stage and completion of statutory processes, to assist in planning the project and estimating its cost; and
- d** *public private partnership/private finance initiative*²⁰ – the employer contracts with the private sector on a long-term basis to build, finance and operate an asset, and pays the contractor a service charge for the use of the asset.

- 2.10** In 2002, the Assembly Government produced a procurement strategy that aimed to ensure that the procurement route chosen for each major transport project was the one most likely to 'deliver optimal value for money'. This strategy was updated in 2008 to reflect new procurement methods and changes to the cost thresholds that are used to help decide the most appropriate method. However, the strategy emphasises that other factors, such as environmental and timing

²⁰ The Assembly Government has only used PFI on the A55 project in 2001 on the section from Llanfairpwll bypass to Holyhead Harbour.

issues and the desired apportionment of project risk, should also inform the choice of procurement route.

2.11 Eight of the nine most recently completed trunk road projects have used the design and build New Engineering Contract (NEC) Option C method (Figure 10)²¹. This approach provides an incentive for the Assembly Government and the contractor to achieve

a target cost that is based on an agreed activity schedule (a breakdown of the work required). If the project is completed below the target cost, both parties receive an agreed proportion of the 'gain' share. However, if the target cost is exceeded, both parties share in the 'pain'. Factors that result in changes to the target cost are known as 'compensation events'.

Figure 10 – The Assembly Government's use of NEC design and build contracts

NEC Engineering and Construction Contracts are a system of contracts created by the Institution of Civil Engineers that guides the drafting of documents on civil engineering and construction projects for obtaining tenders and then awarding and administering contracts. The contracts are intended to:

- a** facilitate the implementation of sound project management practices;
- b** define clearly the legal relationship between the employer and the contractor; and
- c** provide for a fair apportionment of risk between the employer and contractor.

There are six options available, which differ in terms of the way in which the contractor is reimbursed and encouraged to be cost effective:

- Option A** Fixed-priced contract with activity schedule (the schedule of activities for the project with each activity being individually priced);
- Option B** Fixed-priced contract with bill of quantities (materials, parts, and labour costs are itemised);
- Option C** Target cost contract with activity schedule;
- Option D** Target cost contract with bill of quantities;
- Option E** Cost reimbursable contract (payment of the actual cost of construction plus contractor's fees; used when the definition of work to be carried out is inadequate as a basis for agreeing a target price); and
- Option F** Management contract (management contractor directly contracts with subcontractors for all works and services; management contractor tenders their fee with estimated total prices of the subcontractors).

In 2008, the Assembly Government's updated procurement strategy provided guidance on the different NEC options to be used for different values of contract. The cost thresholds are updated annually to take account of construction price inflation.

Contract value	Preferred option
Less than £6 million	Design and build NEC Option A, B, C or D
£6 million to £18 million	Design and build NEC Option C or D
£18 million to £30 million	Early Contractor Involvement version of design and build NEC Option C/Professional Services Contract (appointment of a supplier to provide professional services, for example, project managers, supervisors, designers, consultants)
More than £30 million	Early Contractor Involvement version of design and build NEC Option C/Professional Services Contract or Private Finance Initiative

Source: www.building.co.uk; www.neccontract.com; and Assembly Government

²¹ On the M4 widening, the Assembly Government applied this contract model but through Early Contractor Involvement.



2.12 In the projects we examined, we found that most compensation events had been due to changes requested by the Assembly Government, for example to comply with new design standards. The Assembly Government has therefore had to bear most of the additional cost. The potential impact of compensation events emphasises the importance of being as confident as possible in the project specification before appointing contractors (**Case Study 6**).

2.13 The Assembly Government's procurement strategy now recommends the use of Early Contractor Involvement contracts for all of its major trunk road projects with an estimated cost of more than £18 million. The Early Contractor Involvement approach brings the contractor in at a very early stage of a project and allows them to be involved in the initial design work, planning, cost estimation and statutory processes such as a public inquiry. This early involvement is intended to help give the contractor a more detailed understanding of the project specification and to reduce the level of uncertainty before construction starts, thereby bringing the final cost closer to the target cost (**Case Study 7**). Under the more conventional NEC design and build contracts, which are preferred for projects valued at less than £18 million, the contractor is presented with a fixed route and a design that is at least 80 per cent fixed, reducing the scope for innovation and contractor familiarity with the particular characteristics of the project.

Case Study 6 – Disputed responsibility for the cost of design changes on the A470 Blaenau Ffestiniog to Cancoed

As part of the procurement process, the Assembly Government asked potential contractors to price an already detailed design (the Assembly Government had originally commissioned a separate consultancy to develop the design). However, after signing the design and build contract, the contractor's design consultant found that the design provided by the Assembly Government did not comply with the standards set out in the Highways Agency's *Design Manual for Roads and Bridges*. To comply with those standards the contractor had to alter the angle of the banking at the side of the road. This change increased the total project cost by around £1 million.

Neither the Assembly Government nor the contractor would accept liability for this additional cost and the Assembly Government's employer's agent (the project manager under the contract) sought expert advice from a third party. The third party found for the contractor on the basis that, when submitting their tender, the contractor could not have been expected to assess in full their contractual liability for the design provided by the Assembly Government.

2.14 The Welsh Office was closely involved in the development of the concept of Early Contractor Involvement. The Welsh Office trialled the approach on planned improvements to the A40 Robeston Wathen Bypass in the mid 1990s, but that project was deferred and has since been subsumed within current improvement work on the A40 Penblewin to Slebech Park. The Assembly Government expects that the Penblewin to Slebech Park scheme will be completed within the budget estimated at the start of the main construction work (£40.5 million). The Early Contractor Involvement approach meant that the detailed design and planning of the construction phase was taken forward despite a delay in the completion of the statutory processes in 2008 while the National Assembly considered two petitions (from Pembrokeshire County Council and from a

Case Study 7 – Early Contractor Involvement on the M4 widening

The widening of an eight-mile length of the M4 motorway between Cardiff and Newport (Junctions 29 to 32) aimed to reduce congestion whilst minimising any adverse impacts on the countryside and local communities. The project involved the widening (from two to three lanes), together with associated works to junctions, structures and watercourse culverts.

The Assembly Government used an Early Contractor Involvement design and build approach with the contract split into two phases:

- a Phase 1 included: development of design and preparation of the target cost; value engineering¹ of the scheme; preparation of environmental statement; preparation of draft orders and appropriate publicity material; preparation work and attendance at public inquiry.
- b Following the satisfactory completion of the statutory procedures such as publication of orders, Phase 2 included completion of the detailed design, the construction of the works and subsequent environmental management of the corridor for up to five years.

After completion of the first phase, the Assembly Government assessed whether the contractor had achieved the agreed objectives and whether the target cost was affordable. Once it was satisfied, the contractor moved to the second phase. Had the Assembly Government not been satisfied at the end of the first phase, it could have terminated the contract and used the design developed by the contractor to tender for the construction of the scheme under a conventional design and build form of contract.

In February 2007, the Assembly Government agreed with the contractor a target price for construction of £78 million, with the total project cost estimated at the time at £99 million. During the course of construction, the target price increased by £2 million (2.5 per cent). £1.4 million of this increase was due to changes by the Department of Transport in design standards for safety barriers. The project was completed one month later than estimated at the time the contract was signed and the final total cost is likely to be within the £99 million budget.

The Assembly Government's project team, the employer's agent and the construction contractor have all credited the relatively good performance of the project during the construction phase to the early involvement of the contractor and their designer.

Note

¹ Value engineering is a technique for improving value for money which involves subjecting design proposals to systematic review at each stage of the design process to ensure that the final design meets user requirements, without over-specification, at the lowest possible cost.

local landowner). These petitioners raised objections to aspects of the scheme design.

- 2.15** In 2007, the Assembly Government appointed consultants to consider whether the Early Contractor Involvement approach is providing better value for money than a standard NEC design and build approach. However, the evidence base is still limited and the review is ongoing. The Assembly Government has, to date, used the Early Contractor Involvement approach on only six transport projects, of which the M4 widening is the only completed project while two of the six projects are under construction²².

- 2.16** Although a Highways Agency review of more than 80 Early Contractor Involvement projects in England identified evidence of improved delivery to time, it was less conclusive in terms of project costs (Box 4). However, the Assembly Government has questioned whether the Highways Agency's findings are entirely relevant to its own situation. The Assembly Government has pointed to differences in its own approach in terms of:

- a having always used both cost and quality criteria when tendering for Early Contractor Involvement contracts;

²² In cost terms, the two completed sections of the A465 Heads of the Valleys improvement (Section 1 – Abergavenny to Gilwern; Section 4 – Tredegar to Dowlais Top) should have been candidates for Early Contractor Involvement. However, the Assembly Government explained that this approach was not adopted because the statutory procedures had been finalised when the whole Heads of the Valleys scheme was initially being planned for delivery as a Private Finance Initiative project.



- b** having always retained within the contract a break clause in the event of not being able to agree a satisfactory target cost;
- c** its methodology for assessing quality;
- d** use of the Professional Services Contract approach (Figure 10 on page 38) during the planning stage which has provided greater control; and
- e** the way in which it has applied the pain/gain share mechanism.

Box 4 – Highways Agency experience of Early Contractor Involvement

In 2007, the Highways Agency commissioned a review of the use of Early Contractor Involvement on major road improvement projects. While the commercial principles of the Early Contractor Involvement approach were deemed sound, there were questions about whether the approach was being applied effectively.

The review found that, compared with the conventional design and build approach, Early Contractor Involvement helped deliver projects more quickly, resulted in fewer changes to the specification during construction and secured a higher quality of workmanship. But the evidence on cost was less conclusive, with the approach being described as more expensive for road widening but more competitive for new routes.

In light of this review, the Highways Agency decided:

- a** that Early Contractor Involvement will no longer be the default approach to procurement, but one of a number of available contractual models (for example, the Highways Agency is now using a partnering model for its managed motorways programme which incentivises the delivery partners to work together by gain share paid at programme as well as project level);
- b** to introduce cost as one of the criteria for the initial selection of the contractor (it had previously assessed potential Early Contractor Involvement contractors solely on quality criteria without considering factors such as contractors' proposed fees and profit margins); and
- c** if the contractor will not agree the target cost, there will now be the option of going back out to tender for the construction on a traditional fixed-price basis.

Source: Highways Agency

The Assembly Government has taken action to improve project performance during the construction phase of trunk road projects, but relationships with utility companies have been problematic at times

The Assembly Government has introduced more disciplined project management and internal reporting arrangements, although there remain weaknesses in information systems and record keeping

- 2.17** Good project management does not guarantee that a project will be delivered to the required time, cost and quality, but it should improve the chances of success and help to mitigate the impact of any problems that arise. Early in the life of each trunk road project, the Assembly Government appoints a project director with engineering and technical expertise. During construction, project directors provide monthly reports to a project board, made up of three Transport Division officials, on the latest cost of the project, projected final out-turn costs, timetable, early warnings and a summary of compensation events. This regular reporting, which has evolved over time, is in line with accepted project management principles and provides a reasonable basis for scrutinising the progress of individual projects.
- 2.18** NEC contracts require regular and detailed reporting by the contractor to the employer, in this case the Assembly Government. But the format of the reports produced by contractors has been different to that used by project directors to update the project board. These differences reflect the detailed

technical nature of contractors' reports compared with the reports to project board which are summarised to emphasise particular points of concern. However, some of the contractors we spoke to were concerned that the facts and issues they had reported sometimes get lost in translation in project directors' reports to the project board and therefore not acted upon appropriately. We also identified some gaps in record keeping on individual projects, for example, some project board reports were missing from project files.

2.19 The Assembly Government also employs an independent project manager (known as the employer's agent) for each major project. The employer's agent is responsible for the day-to-day management of the construction contract. Employer's agents told us that the Assembly Government, through its project directors, has tended to be more hands-on than the Highways Agency is in England. However, the Highways Agency has told us that it is now reducing its own reliance on employer's agents in favour of making more use of its own staff. While the employer's agents welcomed some elements of the Assembly Government's hands-on approach, they told us that this can lead to some confusion over the responsibilities of each party, for example over who is responsible for approving compensation events and designs. Employer's agents were of the view that respective responsibilities could be set out more clearly in their contracts, but the Assembly Government has indicated that new style contracts under the Professional Services Contract model ([Figure 10](#) on page 38) do now provide greater clarity.

2.20 The Assembly Government does not currently have an information system to support robust collection and analysis of information on the performance of trunk road projects, in terms of their delivery to cost and time. Until three years ago, the Assembly Government used a bespoke database system established in the mid 1990s, to record basic cost and time data in respect of Trunk Road Forward Programme projects. However, the system became outdated, also proving incompatible with the Assembly Government's new central finance system, that was introduced in April 2008. The loss of key staff also meant that the Assembly Government was unable to maintain and make best use of the system, although archive records can still be accessed. Even where we were able to obtain archived data, they did not always match the figures reported on project files.

2.21 The Assembly Government told us that it is considering its requirements for a new information system to support delivery of the Trunk Road Forward Programme, with a view that the new system should also support the delivery of other transport programmes. These requirements may ultimately be met within the context of a new central project and programme management information system for the whole of the Assembly Government, which is expected to be implemented during 2011-12. In the meantime, officials have developed an interim spreadsheet based system to track current and forecast trunk road project expenditure.



The Assembly Government has developed a set of key indicators to help manage contractor performance but their application is still not fully developed

2.22 In 2006, the Assembly Government introduced a set of key performance indicators for its Trunk Road Forward Programme projects. The indicators are used to measure and incentivise the performance of construction contractors and consultants on three main issues: cost and time; quality; and project/relationship management. Performance is measured at regular intervals throughout the life of the contract. Overall results contribute to 30 per cent of a contractor's pre-qualification mark. The pre-qualification exercise decides which potential bidders will be invited to submit full tenders for future projects. The M4 widening is the only completed trunk road project that has yet seen the key performance indicators applied throughout the whole construction contract period.

2.23 Employer's agents and contractors had mixed views on the value of the key performance indicators:

- a** Although employer's agents were generally content, they reported that they had been spending a great deal of time agreeing with contractors the weighting to be given to the scores on each of the three main issues. The Assembly Government has indicated that it intends to address this situation by, in future, stipulating this weighting as part of tender documents.
- b** Contractors recognised that the indicators encouraged improved performance but were less clear about the incentive to finish a project early or under budget. However, the Assembly Government's guidance does

make clear that such performance can contribute to a higher score, if it can be achieved without compromising performance in terms of quality or project/relationship management.

2.24 The Assembly Government has not yet analysed key performance indicator scores across all contractors and projects to see if there are common performance issues. Neither has it developed a method of quality assurance to check the consistency of standards of scoring by employer's agents.

Relationships between the Assembly Government, its agents and its trunk road contractors are generally good

2.25 The strength of the relationship between the project employer, the employer's agent and the construction contractor is critical to the success of major capital projects. In 2001, the National Audit Office concluded that a key factor explaining why construction projects were often late, significantly over budget, or did not always meet users' requirements was the sometimes adversarial relationship that existed between contractors, subcontractors, suppliers and the project employer²³.

2.26 The NEC contracts used by the Assembly Government for its trunk road projects are designed to facilitate mutual co-operation, shared financial motivation (through the target cost and sharing of surpluses or deficits approach) and trust. We found that, overall, the Assembly Government has maintained good relationships with its contractors. In all the trunk road projects we examined, the Assembly Government had developed a collaborative approach to the promotion of improved performance and problem resolution. And, in line with best practice, the Assembly Government has sought to ensure

²³ *Modernising Construction*, National Audit Office, January 2001

that, although working in close partnership with its contractors, the risk of impropriety and malpractice is minimised, by:

- a maintaining competition through competitive tendering;
- b agreeing clear targets;
- c open book accounting;
- d committing to continuous improvement, for example through a partnering charter setting out common goals for success and resolution mechanisms; and
- e providing guidance for staff.

Relationships with utility companies have been problematic at times

2.27 The delivery of major transport projects requires the Assembly Government to develop effective relationships with third-party stakeholders. These include:

- a local authorities;
- b utility companies - major transport projects will typically require the provision or re-routing of gas, water and electricity supplies;
- c the Countryside Council for Wales;
- d the Environment Agency Wales; and
- e land and property owners.

2.28 Although we did not examine in any detail the Assembly Government's relationships with stakeholders other than utility companies, there did not appear to be any significant issues of concern in these relationships. However, relationships with utilities companies have been problematic at times.

2.29 These problems have stemmed, in the main, from poor two-way communication and the Assembly Government's lack of influence over utility companies' priorities, resulting in some significant delays and cost increases on individual projects. This situation has occurred despite the existence of the Welsh Highway Authorities and Utilities Committee and additional sub-regional groups²⁴. The committee's purpose is to provide a forum for highway authorities (the Assembly Government and local authorities) to develop relationships with utility companies and other parties involved with new roads and streetworks and to facilitate improved co-operation.

2.30 Legislation covering the work of utility companies on highways is outlined in the New Roads and Street Works Act 1991 and the Street Works (Sharing of Costs of Works) (Wales) Regulations 2005. The regulations require that utility companies must provide public sector organisations with an 18 per cent discount on the full cost of the required works if the public sector organisation makes advance payments. The legislation is supported by a code of practice²⁵, which sets out the main stages for carrying out works on utilities assets (Figure 11).

2.31 The UK Government's Department for Transport and the Assembly Government have also produced a good practice guide on managing works in the street, aimed at project employers and utility companies. However, that guidance focuses on the importance of minimising disruption to highway users, residents and local communities from more regular street work. The guidance does not refer explicitly to major projects and the potentially significant impact of poor coordination and

²⁴ The Welsh Highway Authorities and Utilities Committee is one of 13 such committees operating across Great Britain.

²⁵ There is no similar legislation and guidance in place in respect of rail projects.



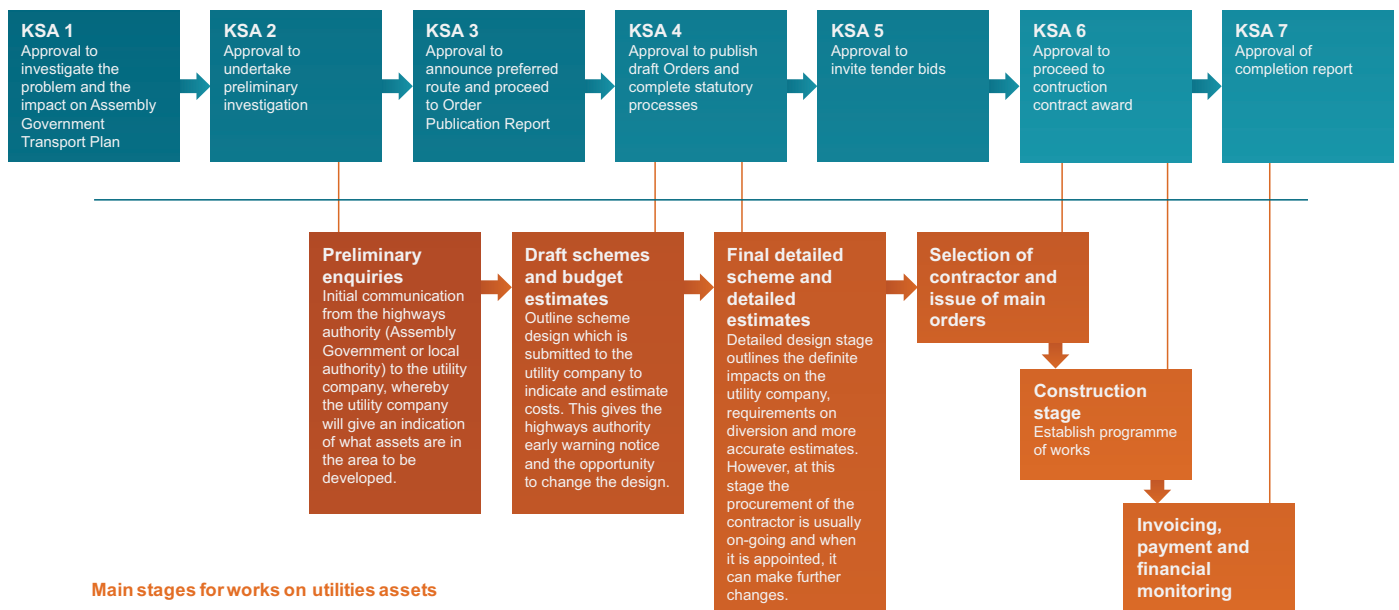
communication between highway authorities and utility companies on these projects²⁶.

2.32 The code of practice provides a reasonable framework for carrying out utilities work. However, Assembly Government officials told us that the legislation relies too much on the goodwill of utility companies and offers little incentive for them to complete their work in a way that is timely or cost-effective for the public sector employer. Early Contractor Involvement offers some potential benefits in terms of the earlier planning of utilities work and the transfer of risk (in terms of delays and cost overruns) from the employer to the construction contractor.

2.33 While the costs of utility-related work can often increase after the detailed design phase, the full detail of these costs have sometimes become clear to the Assembly Government only when the final accounts are settled. The Assembly Government has been using cost consultants to audit the costs charged by utilities on those projects which have experienced significant cost increases. This work has identified instances of incorrect charging, for example through double counting or where the utility company had not applied the required 18 per cent discount.

Figure 11 – Main stages at which utility companies should be involved in major road projects

Assembly Government's Key Stage Approval (KSA) process for projects on the Trunk Road Forward Programme



Source: Assembly Government KSA process for trunk road projects and Measures Necessary where Apparatus is Affected by Major Works (Diversionary Works) June 1992, Highways Authority and Utilities Committee, A Code of Practice, approved by the Secretaries of State for Transport, Wales and Scotland, under sections 84 and 143 of the New Roads and Street Works Act 1991.

²⁶ Working Together: A Good Practice Guide to Managing Works in the Street, May 2007, Department for Transport and Welsh Assembly Government

2.34 Local authority officers involved in the delivery of major Transport Grant funded projects highlighted similar concerns. Recognising the potential complexity and risks associated with the utilities work required on the Porth Relief Road, Rhondda Cynon Taf County Borough Council ran a workshop for all of the relevant utility companies to encourage improved relationships and a joined-up approach. Even then, the utilities work on the project proved more complex than anticipated, contributing to significant delays and cost increases during construction. Specifically, certain services (pipe work) not shown on existing records were exposed, delaying the construction work and resulting in additional work to check for other existing services.

2.35 On most of the projects we examined we identified problems with a lack of information from utility companies on when the utilities works would start and how long they would take (**Case Studies 8 and 9**). However, the utility company we spoke to told us about times when they have arrived on-site only to find that the construction contractor had not completed the required preparatory work.

Case Study 8 – Delays and cost increases in utilities work on the A465 Section 1 (Abergavenny to Gilwern)

This project was subject to major delays because of a Dŵr Cymru Welsh Water diversion of a mains water supply at Glenbaiden. The construction contractor's initial cost estimate of £1.9 million for the delays, made in late 2006, increased to £2.8 million in April 2007. Assembly Government officials said that this was caused because of a 'basic lack of adequate planning' on the part of the Dŵr Cymru, who were also unable to provide a definite completion date for the work. But Dŵr Cymru staff pointed to the fact that there was no obligation for them to start the works at a particular point in time and that it inevitably had to fit around their other priorities.

Case Study 9 – Delays and cost increases in utilities work on the A497 Abererch to Llanystumdwy

Construction work to improve a four-mile single carriageway stretch of road was expected to take 20 months. Following the award of the contract in June 2004, the project was beset with problems, which included a six-month delay to the main construction programme because of the delayed completion of diversionary work to gas pipelines. Transco had decided to place the gas main under the road, rather than adjacent to it, but the main could not be shut off because it served the whole of the Llŷn Peninsula. The final cost of the diversionary work increased to £1.5 million, around £1 million more than first estimated.



The Assembly Government's evaluation of completed projects has been limited in scope, but should improve over time through the use of new *Welsh Transport Planning and Appraisal Guidance* and gateway reviews

- 2.36** The expected benefits of individual projects have been considered as part of the Assembly Government's initial assessment of value for money. The Assembly Government does collect information to identify the extent to which completed trunk road projects have met their objectives in terms of traffic flows, passenger numbers or reduced accident and casualty figures. However, officials have acknowledged that they do not yet have as good an understanding of whether the expected wider social, economic and environmental benefits from completed projects have been realised.
- 2.37** Completed trunk road projects undergo a number of technical and safety checks once they are open for use. Key Stage Approval 7 of the Assembly Government's project management process also requires it to produce and approve a 'completion report' for each project. However, this report is not completed until after the end of the defects liability period (paragraph 1.14), which can be up to five years after the end of construction. And the report focuses mainly on the costs of the project rather than considering in more detail its wider benefits or the lessons that can be learned from the project.
- 2.38** In November 2006, the Assembly Government established, through an office instruction, that all transport projects should pass through a series of four gateway reviews (**Box 5 and Appendix 2**). The last of these reviews focuses on benefits realisation and should consider whether a project delivers the benefits and value for money identified in the original business case and cost-benefit analysis.
- 2.39** The guidance underpinning the gateway reviews stated that the benefits realisation review should be undertaken within 12 to 18 months of the completion of a project. But there has been a lack of clarity in terms of whether:
- a** completion of the project should be defined as the completion of the main construction works or the point of project closure following the defects liability period; and
 - b** a benefits realisation review should be conducted even where a project, because of its timing, had not passed through the previous gateway review stages.
- 2.40** Assembly Government officials have now told us that the most appropriate approach is for the completion of a project, for the purpose of the benefits realisation review, to be the end of construction. This approach should ensure that lessons are learnt, and any issues relating to benefits realisation identified, at a relatively early stage, rather than waiting for up to five years until the end of the defects liability period.

Box 5 – The Assembly Government’s gateway review process for transport projects

The principle of a gateway review process is that it examines programmes and projects at key decision points in their lifecycle and provides assurance that they can progress to the next stage of development.

The gateway review process was developed by the Office of Government Commerce but was adapted by the Assembly Government’s Transport Division to suit its own needs.

While the Office of Government Commerce recommends the use of six gateways, the Transport Division decided that it only needed four, as follows:

TWGR0 (*Strategic Assessment at Programme level*) – giving approval for the project to progress to undertake a preliminary investigation.

TWGR1 (*Procurement Strategy*) – carried out to approve announcement of preferred route).

TWGR2 (*Investment Decision*) – carried out to approve commencement of construction.

TWGR3 (*Benefits realisation*) – carried out 12 to 18 months after the route has been completed.

The November 2006 Office Instruction that described the formal introduction of the gateway review process for transport projects indicated that these reviews were ‘to be implemented immediately on all projects controlled by the Transport Division including Transport Grant schemes’.

2.41 The Assembly Government has not yet completed a benefits realisation review of a ‘completed’ project despite the completion of main construction work on four trunk road projects between November 2006 – when the office instruction was issued – and December 2008. The Assembly Government is planning a review of the A470 Llanrwst to Hafod project, completed in May 2009, although the Assembly Government has not yet developed any guidance on how to go about such a review. The Assembly Government is reviewing the use of gateway reviews right across the organisation to align them more closely with guidance from the Office of Government Commerce.

2.42 The new *Welsh Transport Planning and Appraisal Guidance*, published in June 2008, also promotes project evaluation. Under the guidance, all transport proposals requiring public funding and/or the approval of the Assembly Government should be planned and appraised on a common basis. All projects will have to set out clearly their intended environmental, social and economic outcomes. Project proposals will also have to set out clearly how, in the development of projects and when they have been completed, these outcomes will be monitored and evaluated. The Assembly Government is also obliged to commission full external evaluations of projects costing more than £2 million in total that are in receipt of European Union Structural Funds support. There are currently five trunk road and two rail projects that satisfy this criteria.

2.43 The provisions of the *Welsh Transport Planning and Appraisal Guidance* gateway reviews and the requirements in terms of EU funded projects should, when applied in full, encourage improved project evaluation. But there is the risk of duplication in terms of how the scope of these various reviews, and the completion report required as part of the Key Stage Approval process, fit together and support each other.



Part 3 – During the past two years the Assembly Government has exercised greater control over the local authority managed projects it funds

- 3.1** Major projects have consumed an increasing proportion of the annual Transport Grant expenditure since 2001-02 (paragraph 1.27). Although the Assembly Government administers the allocation and distribution of Transport Grant funding to local authorities (Box 6), the relevant local authority has ultimate responsibility for all aspects of project delivery, from estimating costs through to procurement, construction and post-project evaluation.
- 3.2** This part of our report examines:
- a** the Assembly Government's role in and control over major Transport Grant funded projects; and
 - b** the introduction by the Assembly Government of revised funding and management arrangements for local transport projects through the new regional transport plans.

Box 6 – The Assembly Government's approach to the allocation and distribution of Transport Grant funding

Each year, the Assembly Government invites local authorities to bid for Transport Grant funding for the following financial year. The Assembly Government's Transport Grant team, who administer the funding programme, assess bids in terms of their alignment with the Assembly Government's transport priorities.

As part of the bidding process, the Assembly Government invites bids for the continued funding of ongoing major road and rail schemes accepted into the Transport Grant Programme in 2001 and 2002. However, the increasing in-year cost of these projects has meant that, since 2005-06, the Assembly Government has had less money available, in real terms and as a proportion of the total Transport Grant expenditure, to fund projects other than major road and rail schemes. In 2009-10, the Assembly Government restricted bids for funding, other than for pre-approved major projects, to projects that align with the Safe Routes in Communities Programme.

Following the assessment of bids, and Ministerial approval, the Assembly Government issues grant offer letters to local authorities outlining the successful projects and the funding allocation for the following financial year. Local authorities then draw down their allocations by making monthly requisitions to the Assembly Government.

Before 2009-10, the Assembly Government exercised only limited control over local authority managed Transport Grant projects despite carrying most of the financial risk

The Assembly Government had provided relatively little project management guidance or direct support to local authorities despite concerns about the capacity of local authorities to deliver major transport projects

- 3.3** The Assembly Government has not produced any detailed guidance for local authorities in terms of the practical delivery of major Transport Grant funded projects. Transport Grant guidance simply describes the general process for grant applications and how the Assembly Government will then manage the grant, for example the release of funds to local authorities.
- 3.4** The absence of project delivery guidance for Welsh local authorities is of particular concern given the limited capacity of some of them to deliver major capital projects. A 2006 review, on behalf of the Welsh Local Government Association, found that one of the key challenges facing local authorities was the adoption and implementation of a consistent project management methodology²⁷. The review also pointed to the difficulty of developing and keeping the skills needed to deliver major capital projects. In July 2009, the Ministerial Advisory Group on Economy and Transport also questioned the project management skills and experience available to local authorities, although it was also critical of the Assembly Government's

capacity and capability to take forward the overall transport agenda in Wales²⁸. Some local authority officers told us that they had insufficient major capital projects to build up a pool of experienced project managers.

- 3.5** In response to one of the Ministerial Advisory Group's recommendations, the Assembly Government indicated that it would commission a skills and experience survey across local government. That exercise was undertaken by the Welsh Local Government Association but, due to the generally poor response, Assembly Government officials planned to carry out some follow-up visits to individual local authorities. Those visits have not taken place and capacity constraints mean that the Transport Division is unable to prioritise that work at the present time. Instead, the Assembly Government's recent focus has been on ensuring that appropriately skilled personnel are in place to support delivery of the new regional transport plans. Also, in written advice to Ministers, Assembly Government officials have stated that, before agreeing to support any local transport projects, it now expects local authorities to demonstrate that they have appropriately qualified staff to manage the projects.
- 3.6** The Assembly Government's direct involvement in the delivery of Transport Grant projects has been limited. To support Transport Grant staff in their monitoring of the Transport Grant Programme, engineers working on the Trunk Road Forward Programme have been assigned as advisers on the larger projects. But the engineers' role in these projects has not been clearly set out in any guidance and has been secondary to their main role in managing Trunk Road Forward Programme projects. One major

²⁷ *Excellence in Capital Project Management*, Welsh Local Government Association and PriceWaterhouseCoopers LLP, June 2006

²⁸ *Phase 2 Report on Transport*, Ministerial Advisory Group on Economy and Transport, July 2009 (the Ministerial Advisory Group was established in 2006, to advise ministers on policy and strategy and to challenge existing activities and plans).



project did not have an engineer assigned to it. We were told by Assembly Government officials that the engineers:

- a** did not consistently provide Transport Grant staff with progress reports, the requirements for which were unclear; and
- b** were unclear about how closely involved they should be in local authority managed projects, for example how frequently they should attend project meetings.

3.7 The Assembly Government employs only a small number of officials to manage the Transport Grant Programme. Despite no apparent evidence of a reduction in workload, staff numbers have declined from six full-time equivalents in June 2005 to a current complement of two full-time equivalents and a shared administrative officer.

3.8 Over the past two years the Assembly Government has also engaged a member of staff with significant experience of the Trunk Road Forward Programme to help in terms of applying closer scrutiny of, and advice in relation to, Transport Grant projects. There has also been greater continuity in management with the current Head of the Transport Grant team having been in post since July 2008. Between June 2002 and July 2008, there had been eight different heads of the Transport Grant team.

The Assembly Government had not made clear its expectations of local authorities in terms of undertaking project gateway reviews

3.9 In November 2006, the Assembly Government introduced a series of gateway reviews for the transport projects it manages (paragraphs 2.38 to 2.41). The office instruction that introduced the gateway review processes stated that the processes also applied to Transport Grant funded projects. The Assembly Government told us that the senior responsible officers - who, in the case of Transport Grant funded projects, are local authority employees - were responsible for ensuring that the reviews were carried out.

3.10 Transport Grant guidance to local authorities also makes it clear that responsibility for monitoring and evaluating projects lies with the relevant authorities and not with the Assembly Government. But neither Transport Grant guidance to local authorities nor Transport Grant terms and conditions have been updated to refer specifically to the requirement to carry out gateway reviews. And we were unable to find any evidence of gateway reviews having been undertaken for the Transport Grant projects we examined.

3.11 From our case study reviews, we are aware that there has been some post-project evaluation of the Ebbw Valley railway line (part funded by Transport Grant) and the Porth Relief Road ([Case Studies 10 and 11](#)). However, with the Assembly Government not having produced specific guidance on what the gateway benefits realisation review should consider, it is not clear whether the evaluation undertaken on these two projects would satisfy the requirements of the gateway review process.

Case Study 10 – Post-project evaluation on the Ebbw Valley railway line

Blaenau Gwent County Borough Council and the employer's agent reviewed passenger numbers and the impact of the new railway on a range of socioeconomic and other objectives in June 2009. They concluded that the service was making good progress towards:

- a** meeting public needs - trains were reliable, and passengers had positive views about the level of service provided;
- b** enhancing access to a range of services and opportunities - weekday passengers were predominantly commuting to work, with weekend passengers using the railway to access leisure and shopping opportunities;
- c** providing more environmentally sustainable transport options - 52 per cent of passengers had previously used their car for the same journey; and
- d** promoting social inclusion - 40 per cent of passengers did not have access to a car.

An Assembly Government commissioned review, carried out as part of a wider cost-benefit analysis of the possible extension of the railway line to link with Newport, found that by July 2009 passenger numbers were some 42 per cent greater than had been originally forecast.

Before 2009-10, the Assembly Government carried most of the financial risks and local authorities had little clear incentive to control project costs

3.12 The rising cost of major Transport Grant funded projects has reflected, at least in part, underestimation of project costs by local authorities. Several local authorities have emphasised to us that they kept the Assembly Government fully informed of changes in these estimates over time. Nevertheless, despite trying to improve the reliability of cost estimates in the projects it manages, the Assembly Government had done little to encourage more accurate cost estimating by local authorities or to improve its scrutiny of early cost estimates:

Case Study 11 – Post-project evaluation on the Porth Relief Road

Rhondda Cynon Taf County Borough Council examined vehicle numbers on the new bypass links and pre-existing roads and found that the scheme had met one of its key objectives of providing environmental relief to around 1,400 homes. Traffic flow data showed that the new road was carrying more traffic than originally expected and that traffic levels elsewhere in the area had reduced significantly.

The Council has also carried out a number of lessons learned exercises on key stages of the project. Key lessons from these reviews included:

- a** demonstrating to all potential contractors senior officer 'buy-in' to the project;
- b** carrying out a mid-tender review to give potential contractors the opportunity to discuss the development of their tender documents;
- c** minimising the period between issuing the tender notice and construction, to ensure continuity of key (client and contractor) staff;
- d** an integrated delivery team approach to value engineering to significantly reduce the scheme costs; and
- e** ensuring that contractors employed a specified number of local people with a history of long-term unemployment; the project set a target for employing 30 local people.

In 2008, the Council's integrated delivery team for the Porth Relief Road won the Constructing Excellence 'Best of the Best' award. Across the UK construction industry, the project was recognised for its innovative approach to procurement, the significant value engineering savings secured and the local employment opportunities created.

- a** Until 2009-10²⁹, the only advice to local authorities was that they should provide 'inflation assumption adopted' costs.
- b** The Assembly Government's Transport Grant staff lacked the expertise to scrutinise and challenge local authorities' cost estimates and, because of capacity constraints, Transport Grant staff had limited opportunity to draw in advice from the engineers working on the Trunk Road Forward Programme.

²⁹ For 2009-10, the Assembly Government informed local authorities that 'for the avoidance of doubt the overall scheme estimates should include no less than the P50 estimate of risk and indicate the levels of optimism bias (Box 3) that has been included'. A P50 estimate of risk means that authorities should include in their estimate an allowance for possible risks on a project, such that there is only a 50 per cent chance of the total amount including risk being exceeded. Optimism bias should then be applied in addition to the P50 allowance.



- c Assembly Government officials became more directly involved in discussions with local authorities when estimated project costs started increasing significantly. Due, at least in part, to this intervention, local authorities have taken forward work which has helped to identify and secure some positive outcomes in terms of project costs (Case Studies 12 to 14).

3.13 Before 2009-10, Transport Grant terms and conditions stated that the Assembly Government would extend funding to cover all of the increases in costs that were beyond the local authority's control or which could not have been foreseen. Even where cost

increases could have been anticipated and avoided, the terms and conditions still committed the Assembly Government to meet 80 per cent of the increase.

3.14 This arrangement provided little incentive for local authorities to control rising project costs, with the Assembly Government carrying most of the financial risk despite its limited involvement in these projects. Some Assembly Government officials have pointed to the potential conflict of interest between becoming too involved in local authority

Case Study 12 – Responses to rising costs on the Porth Relief Road

In August 2000, Rhondda Cynon Taf County Borough Council estimated that constructing the Porth Relief Road would cost £37 million (based on industry prices at the time and not allowing for future inflation). We found no evidence that the Assembly Government had closely scrutinised this early cost estimate.

As the project evolved, it became clear that, notwithstanding the impact of inflation, the early cost estimate was not sufficient to deliver the original design. In 2004, the council provided the Assembly Government with a revised cost estimate of £69 million. In submitting this estimate the council made clear that it was based on 2004 prices as the council felt it would be unrealistic, in an environment of spiralling construction and property price inflation, to predict a future out-turn cost. Then, in January 2005, the contractor estimated the cost of the same design to be £88 million. In response to the increasing cost estimates, the Assembly Government entered into detailed discussions with the council about the options for the scheme, including the possibility of stopping the scheme.

Despite the council undertaking a successful value engineering exercise, which helped to control certain costs, the scheme ultimately cost £102 million to deliver. Key reasons given for this further cost increase were:

- a unforeseen ground conditions;
- b adverse weather conditions; and
- c additional works stemming from complexity of work needed to divert utilities.

Case Study 13 – Responses to rising costs on the Port Talbot Peripheral Distributor Road – Stage 2

In January 2007, Neath Port Talbot County Council estimated the project costs at £73.1 million. We found no evidence that the Assembly Government had scrutinised this early cost estimate. By April 2008, the estimated cost had risen to £102 million, reflecting:

- a the more detailed design and ground investigation work carried out subsequent to the 2007 estimate;
- b larger than initially anticipated consultancy and statutory utility costs; and
- c construction price inflation, exacerbated by a year's delay because the Assembly Government did not have sufficient funds available to support the commencement of main construction work in the 2009-10 financial year as the council had planned.

The Assembly Government became more actively involved in the project in response to the rising cost estimate. The Assembly Government insisted on Early Contractor Involvement to enable a value engineering exercise to explore the scope for a significant reduction in the project's costs (which has, to date, reduced the cost of the project by some £15 million). However, the Assembly Government also indicated that it was likely to cap its total contribution to the scheme and that, if the council was not successful in its application for European Convergence Funding, the scheme would be placed on hold while other funding opportunities were explored.

European Convergence Funding and Transport Grant have now been confirmed and the council is discussing the profiling of this funding with the Welsh European Funding Office and the Assembly Government.

managed projects when, at a later point, they may wish to withhold funding for projects because cost increases could have been foreseen. But this concern is not, in our view, sufficient justification for the Assembly Government's limited involvement in these projects given concerns about the capacity of local authorities to manage these projects and the significant cost increases being reported.

Case Study 14 – Responses to rising costs on the Church Village Bypass

In its 2001-02 bid for Transport Grant funding, Rhondda Cynon Taf County Borough Council estimated the cost of the Church Village Bypass at £34 million. However, by the time of its 2008-09 bid, the estimated cost had increased to around £111 million, increasing further to £125 million during 2009. A range of factors had contributed to this cost increase, including additional environmental mitigation and geotechnical work, changes in the design and scope of the scheme and increased fees, land costs and construction prices.

In early 2007, the Assembly Government indicated that, on the grounds of affordability, the value engineering exercise already started by the council and which drew on its experience on the Porth Relief Road, should be extended to also review the overall scope of the project. This resulted in the council, in conjunction with its supply partners, rationalising the junction arrangements on the route and substituting the proposed dual carriageway design with a single carriageway.

Overall, the value engineering exercise, combined with savings in the supply chain process, realised cost savings of around £35 million. The scheme was open fully to the public in September 2010 and the latest estimate is that the final cost will be £88 million.

We have not examined this scheme in detail. However, despite the changes made as a result of the value engineering exercise, the scheme should still provide broadly equivalent benefits to the original proposal, namely:

- a relief from the effects of traffic congestion in local communities;
- b improved access between the Ely and Taff valleys;
- c provision of an alternative route linking the A470 with the M4;
- d increased journey time reliability; and
- e opportunities for further housing development.

3.15 By the end of 2008-09, the combined cost of the seven completed road projects in the Transport Grant Programme announced in 2001 and updated in 2002 was £95 million higher than the initial estimates that these projects would cost £115 million ([Appendix 4](#)). But for £11 million of funding from other sources, primarily European Union Structural Funds, the rest of the total cost of these projects was met from the Assembly Government's Transport Grant.

3.16 The Assembly Government has never limited its support to cover only 80 per cent of the increased cost. Although the Assembly Government indicated that it would do so on the A486/B4336 Ceredigion Link Road Stage 1, it ultimately agreed with Ceredigion County Council a different outcome ([Case Study 15](#)).

In 2008-09, the Assembly Government sought legal and financial advice to support the case for exercising greater control over the delivery of Transport Grant projects

3.17 Although the Assembly Government has administered the allocation and distribution of Transport Grant funding, the relevant local authority has been ultimately responsible for all aspects of project delivery. Underpinning these arrangements had been a belief that it was not the Assembly Government's place to exercise close control in terms of local authorities' project delivery arrangements.

3.18 However, following on from its closer scrutiny of cost increases on specific projects, the Assembly Government sought legal and financial advice which confirmed that Transport Grant funding was in fact entirely at the discretion of the Minister for Economy and Transport (it had been regarded previously as essentially a top-slicing of local authorities' unhypothecated grant). The Assembly



Government used this advice as the basis for introducing tighter controls over all Transport Grant projects, although these controls do not detract from local authorities' own responsibilities for project delivery.

Case Study 15 – Agreeing funding for the A486/B4336 Ceredigion Link Road Stage 1

The Assembly Government had decided, in April 2009, to limit Transport Grant funding to Ceredigion County Council to cover only 80 per cent (or £5.6 million) of a projected £7 million cost increase on the Llandysul Bypass element of the Ceredigion Link Road Stage 1 scheme. The Assembly Government took this decision because costs increased arising out of a delayed start and subsequent changes to the contract. The tender price was no longer valid because the project was not ready to proceed to construction to the timescale agreed with the contractor at the time of the tender process. However, that delay was due, in part, to the Assembly Government having been slow to approve the Council's Transport Grant bid. The Council has told us that it was not in a position to award the contract until it received confirmation from the Assembly Government on the level of Transport Grant funding for 2008-09, given that the projected expenditure profile exceeded the annual £6 million expenditure limit set previously by the Assembly Government.

Assembly Government officials continued to discuss with the Council the cost increase on the Llandysul Bypass and the status of the final section of the scheme (the Post Bach to Synod Inn improvement). The outcome was a negotiated position in which the Assembly Government met the full cost increase on the Llandysul Bypass element through Transport Grant but would not fund the remaining Post Bach to Synod Inn improvement section from Transport Grant. However, the Council still has the opportunity to seek support for this project as part of the arrangements for funding and delivering the new regional transport plans and the Assembly Government indicated that it would work with the Council to develop a revised proposal for the final section of the scheme.

- 3.19** To strengthen the incentive for local authorities to control costs more effectively, the Assembly Government issued revised Transport Grant terms and conditions for 2009-10. These terms and conditions will continue to be used to manage the legacy road schemes in the Transport Grant Programme, operating alongside other funding arrangements that the Assembly Government is introducing to support delivery of the new regional transport plans.
- 3.20** The new terms and conditions state that the Assembly Government will not normally provide funding to cover cost increases but that each application for additional funding will be judged on its own merits. However, it is not clear whether this means that the Assembly Government covering cost increases will be more the exception than the rule, or whether the Assembly Government is intending to discourage authorities from simply assuming that it will meet the cost, as per previous practice. Other than the question of whether the additional expenditure could have been foreseen or avoided, the Assembly Government has not established any specific criteria in terms of how it will decide whether or not to withhold funding. It remains to be seen how this arrangement will actually be applied in practice.
- 3.21** The Assembly Government has also strengthened Transport Grant project reporting requirements. Local authorities had traditionally drawn down funding on a monthly requisition basis, without being required to provide an update on project progress. Since April 2009, the Assembly Government has required that monthly requisitions are accompanied by a status report outlining the progress 'in month' of each project.

The monthly reports should also identify key actions for the following month and updated forecasts of future costs (for the next month, the financial year and the lifetime of the project). Previously, the Assembly Government systematically collated information on the progress of individual projects only on an annual basis, linked to authorities' bids for funding for the following financial year.

3.22 The new monthly status reports should help the Assembly Government to identify and address more proactively any concerns about the progress of individual projects and/or rising costs. Our review of a selection of progress reports suggested that while they meet the Assembly Government's basic requirements, some authorities are providing more detailed progress reports than others.

3.23 The changes to project reporting requirements follow on from efforts by the Assembly Government to reduce the level of 'debt' owed to it by local authorities. As at March 2004, local authorities held in their accounts some £15.3 million (29 per cent) of the £52 million Transport Grant for 2003-04. This money had been unspent because the projects for which it was intended had not progressed as planned. Allowing local authorities to build up this level of debt reduced the Assembly Government's capacity to reallocate the unspent funds to other projects. As at March 2009, just £3.2 million (three per cent) of the £119 million Transport Grant for 2008-09 remained unspent in local authority accounts.

The Assembly Government is introducing revised funding and management arrangements to provide more effective control over delivery of the new regional transport plans

3.24 Under the Transport (Wales) Act (2006), the Assembly Government acquired a range of additional duties and powers. The act:

- a** placed on the Assembly Government a duty known as the 'general transport duty', under which it is required to develop policies for the promotion and encouragement of safe, integrated, sustainable, efficient and economic transport facilities and services to, from and within Wales;
- b** required the Assembly Government to publish a Wales transport strategy setting out how it proposes to discharge its 'general transport duty'; and
- c** introduced a requirement for 'local transport authorities' in Wales to develop plans for local delivery of the Wales transport strategy.

3.25 The Assembly Government published the Wales transport strategy, *One Wales: Connecting the Nation*, in May 2008. The strategy sets out a series of priorities for the transport network in Wales: improved domestic and international connectivity; the integration of local transport; safety and security and the need to reduce greenhouse gas emissions and other environmental impacts.



3.26 Each of the four regional transport consortia in Wales (**Box 7**) have developed regional transport plans to support the Assembly Government's strategy. These five-year plans focus on issues relating to the regional and local road and public transport networks, as well as provision for walking and cycling. Although delayed by a year because of previous delays in the production of the Wales transport strategy, the consortia submitted their regional plans to the Assembly Government in mid 2009. The Deputy First Minister then approved the plans in December 2009.

Box 7 – The four regional transport consortia in Wales

Taith (meaning journey) covers the six North Wales councils of Flintshire, Wrexham, Conwy, Denbighshire, Gwynedd and Anglesey;

South West Wales Integrated Transport Consortia or *SWWITCH* covers Carmarthenshire, Swansea, Pembrokeshire and Neath Port Talbot councils;

South East Wales Transport Alliance or *SEWTA* covers Blaenau Gwent, Bridgend, Caerphilly, Cardiff, Merthyr Tydfil, Monmouthshire, Newport, Rhondda Cynon Taf, Torfaen and the Vale of Glamorgan councils; and

TraCC was established in 2004 and covers Ceredigion and Powys councils as well as the part of Gwynedd that covers the former Meirionnydd area.

Note

The four consortia each employ a small number of staff, with additional capacity provided by transport officers from member authorities. Consortia staff have supported local authorities with general advice, as well as delivering some project work. For example, SWWITCH runs the concessionary travel scheme in South West Wales.

3.27 In March 2010, the Assembly Government published its *National Transport Plan*, which sets out how it will deliver its responsibilities under the Wales transport strategy over the next five years. The national plan is intended to provide solutions to transport challenges that cut across regional boundaries and to enhance access from across the whole of Wales to key locations and services.

3.28 The regional transport plans include the detailed costing of a number of options intended to support the national strategy. The extent to which costed programmes are implemented will depend to a large part on the amount of funding provided by the Assembly Government to each of the consortia over the lifetime of the plans.

3.29 Although the Assembly Government told us that it may review its approach in the light of experience, funds for delivery of the regional plans will be distributed according to the local transport services grant formula. This formula takes into account the size of the population in each of the consortia areas and the proportion of the local population living in rural areas (those wards that have less than four residents per hectare).

3.30 The existing Transport Grant mechanism will continue to fund legacy road schemes agreed in 2001 and 2002 that have not yet been completed. However, the continued funding of these legacy schemes is limiting the amount of money available to deliver any new projects proposed as part of the new plans. For 2010-11, £46 million (60 per cent) of the £76.5 million budget for local transport projects has been set aside for legacy road schemes, with a further £8.5 million allocated to the Safe Routes in Communities

Programme. Although some of the legacy schemes will require financial support beyond 2010-11, the Assembly Government has yet to decide what funding it will provide.

3.31 The Assembly Government has confirmed that, for 2010-11, £22 million will be available to support the regional transport plans. The grant distribution formula results in the following indicative distribution:

- a** Sewta - 42 per cent (£9.15 million);
- b** SWWITCH - 22 per cent (£4.91 million);
- c** Taith - 22 per cent (£4.93 million); and
- d** TraCC - 14 per cent (£3.01 million).

3.32 Consortia will not automatically receive all of the funding provided for under the distribution formula. Rather, the Assembly Government will, on an annual basis, decide indicative allocations and invite each consortium to submit business plans for those schemes within its regional plan that it wishes to take forward in the following financial year. The Assembly Government will then assess these business plans before confirming actual allocations. Assembly Government officials have acknowledged the limitations of making annual allocations, in terms of the lack of certainty that this provides to support forward planning. The Assembly Government is looking to move towards a three-year approach, in line with the way it is allocating funding for the *National Transport Plan*.

3.33 Building on the changes made to the management of projects funded by the Transport Grant, the Assembly Government has consulted local government on the management arrangements for overseeing delivery of the regional transport plans (**Box 8**). In developing these proposed arrangements, the Assembly Government carried out a wide-ranging review of transport planning and delivery arrangements, examining in particular the functions of the regional transport consortia. The Ministerial Advisory Group on Economy and Transport had concluded, in 2009, that the regional consortia were an unnecessary bureaucratic burden and recommended that local authorities should lose all of their transport responsibilities, to be replaced by one or more joint transport authorities. However, the Assembly Government's response to the group's recommendations argued for the continuation of regional consortia arrangements, on the basis that local authorities are best placed to deliver local transport improvements.

3.34 The Assembly Government has developed, in collaboration with the regional consortia, some initial guidelines to support the new arrangements, for example in terms of project appraisal and review (including gateway reviews), business planning and financial controls. However, 2010-11 is regarded as a transitional year and the new arrangements will not be fully implemented until 2011-12. The Assembly Government intends to issue formal consolidated guidance later this year. These new arrangements should, in principle, strengthen significantly the Assembly Government's oversight of locally managed transport projects.



Box 8 – Proposed national and regional arrangements to oversee delivery of the Regional Transport Plans

At a national level

Three key groups will operate at a national level. Each group will have senior level representation from the relevant regional groups, will meet on a regular basis and will be coordinated and chaired by the Assembly Government:

- a *All Wales Transport Group* – will coordinate and take decisions relating to planning, funding, delivering and monitoring major local transport projects across Wales.
- b *All Wales Planning/Policy Group* – will develop transport strategies, plans and guidelines for approval by the All Wales Transport Group, aligned as appropriate to other Assembly Government plans, for example the spatial plan.
- c *All Wales Programme Group* – will use progress reports from the regional programme groups to monitor performance and report significant cases of overspend and underspend to the All Wales Transport Group. The group will also advise the All Wales Transport Group on funding applications and would authorise progression to the next stage of the gateway review process.

Regional arrangements

As it was under the previous Transport Grant funding arrangements, local authorities are ultimately responsible for the delivery of individual projects. However, local transport projects within each of the four areas covered by the regional transport consortia will be managed through the following key structures:

- a *Regional consortia joint committee or board* - will coordinate a regional response to planning, delivering and monitoring transport initiatives within its region. Senior Assembly Government officials will attend committee or board meetings, but will not have voting rights. Voting rights will be reserved for councillors sitting on the four committees/boards. The Minister for Economy and Transport will attend a meeting of each committee or board once a year.
- b *Regional management group* - will develop (for approval by the joint committee or board) regional transport policies, strategies and plans and will oversee the gateway review process. Senior Assembly Government officials will attend and will be able to table agenda items for management group meetings.
- c *Regional programme groups* - will be at the 'front line' in terms of monitoring the performance of projects and addressing any changes, in terms of time or cost. Assembly Government officials and local authority representatives will sit on the groups. Local authorities will be expected to provide the groups with progress reports for each of the local transport projects they manage. The programme groups will, in turn, submit reports to the regional management group and the All-Wales Programme Group.

The Assembly Government considered appointing regional programme directors with expertise in project and programme management, alongside a background in civil or structural engineering, to support the regional consortia. However, the Assembly Government now intends that existing staff (transport planning managers) will instead monitor the delivery of projects within each consortia area and, as necessary, access support from other Assembly Government staff.

Source: Assembly Government

Appendix 1 – Our methodology

Background literature review

- 1 In developing the scope of our work, we considered the findings and general approach described in other recent audit and review reports on major transport or other construction projects, including those reports described in **Box 9**. We also reviewed the Wales transport strategy, *One Wales: Connecting the Nation* and tracked the development of the new regional transport plans that support the strategy.

Review of the Assembly Government's procedures for major transport projects

- 2 We reviewed the Assembly Government's general approach to the management of major projects in its Trunk Road and Rail Forward Programmes. We also examined the arrangements that the Assembly Government had put in place to administrate and oversee the delivery of local authority managed Transport Grant funded projects.

Box 9 – Recent UK evidence on the delivery of major transport projects

In 2007, the **National Audit Office** reported that robust estimating is a key factor in delivering value for money from road schemes, albeit challenging because of the timescales involved in major road projects and the number of different variables that affect these projects. The report found that the cost of building roads had been significantly higher than initial estimates indicated and made recommendations for improvements in terms of: the way costs are estimated; evaluation of time and cost variances on completed schemes; dissemination of lessons learnt from individual projects; and programme monitoring by measuring and reporting progress on a project-by-project basis.

Also in 2007, the **Nichols Review**, which reported to the Secretary of State for Transport, found that the Highways Agency was not paying more than it should do for its schemes, but there had been significant increases in cost estimates, largely on schemes that were not yet in construction. The review recommended that the agency develop its systems and capability for preparing and challenging estimates and improve its delivery capability.

In 2008, **Audit Scotland** reported on major capital projects in Scotland, including a number of road and rail projects. The review found that early estimates of cost and time were too optimistic, but performance against cost and time targets was better after contracts were awarded, as plans are more certain and risks clearer. Project management and governance arrangements were broadly effective but project evaluation could be improved.

In January 2010, the **National Assembly for Wales Finance Committee** examined the allocation of funding for the development of road infrastructure, the interface with expenditure in other policy programmes (such as economic development and community regeneration) and the way in which changes in each are coordinated. The committee criticised the way the Trunk Road Forward Programme had been managed over the previous eight years, in particular the programme's integration with other government policies and programmes, consultation on its content and the management of the programme budget. Based on its assessment of slippage and project cost overruns within the programme, the committee also questioned the project management capacity of the Assembly Government, and pointed to the need for the Assembly Government to adopt more modern business practices.

Source: *Funding Road Infrastructure*, National Assembly for Wales Finance Committee, January 2010; *Review of major capital projects in Scotland*, Audit Scotland, June 2008; *Estimating and Monitoring the costs of building roads in England*, National Audit Office, March 2007; *Review of Highways Agency's Major Roads Programme*, Mike Nichols, March 2007.



The projects we examined were major construction projects and did not include large-scale maintenance projects, which are part of a different programme of work.

- 3 We maintained an ongoing dialogue with a wide range of Assembly Government officials across the Department for Economy and Transport throughout our work. We spoke to officials responsible for:
 - a the overall management of the trunk road, rail and transport grant programmes;
 - b regional and national transport planning;
 - c land acquisition;
 - d third-party compensation;
 - e procurement and contracting;
 - f financial management; and
 - g statutory processes.
- 4 In considering the Assembly Government's approach to the management of major transport projects, we also spoke with representatives from the consultancy firm EC Harris (who the Assembly Government had commissioned to carry out a best value comparison between Early Contractor Involvement and traditional design and build procurement), Dŵr Cymru Welsh Water, the Highways Agency in England and Constructing Excellence Wales³⁰.

Case studies

- 5 To supplement our general review of the Assembly Government's procedures we examined in more detail 10 recently completed major transport projects (Figure 12). The projects were chosen to represent a mix of rail schemes, road schemes delivered by local authorities but funded by the Assembly Government (through the Transport Grant) and trunk road schemes managed directly by the Assembly Government. The projects also differed in their timing, cost and complexity, as well as representing a rough geographical spread across Wales.
- 6 Our aim in this work was to find out more about the management of each project and the extent of, and main reasons for, any delays and/or cost increases. Most of the projects examined have had a very long lifecycle. For example, the public inquiry for the A494/A550 Deeside Park to Drome Corner project took place in 1993.
- 7 For each of the 10 projects, we examined Assembly Government and/or local authority project files. We did not look back as far as the original decision to support each project. We focused instead on progress after the point at which the plans for the project had been reasonably well defined (usually from when a preferred route for the project had been decided).
- 8 We also spoke with relevant officers involved in the management and delivery of the 10 projects from the following organisations:
 - a the Assembly Government;

³⁰ Construction Excellence Wales is funded by the Assembly Government and promotes best practice across the construction industry.

- b** local authorities (either in their role as the managers of the project or as stakeholders);
- c** private sector contractors responsible for designing and constructing schemes and/or acting as cost consultants, employers agents or project managers;
- d** the three Welsh trunk road agencies responsible for managing and maintaining the trunk road network in their specific area on behalf of the Assembly Government (covering North, Mid and South Wales);
- e** Arriva Trains Wales; and
- f** Network Rail.
- e** Port Talbot Peripheral Distributor Road – Stage 1B (Transport Grant Programme – managed by Neath Port Talbot County Borough Council);
- f** Port Talbot Peripheral Distributor Road – Stage 1C (Transport Grant Programme – managed by Neath Port Talbot County Borough Council);
- g** Greater Bargoed Regeneration Scheme – Angel Way (Transport Grant Programme – managed by Caerphilly County Borough Council); and
- h** A499 Aberdesach to Llanaelhaearn (Transport Grant Programme – managed by Gwynedd Council).

Analysing the performance of projects in terms of their delivery to cost and time

- 9** Drawing on our case study file review of 10 projects, we considered the performance of these projects in terms of their delivery to cost and time targets. We supplemented this analysis with basic data on the costs and timescales of a further eight completed projects, as follows:
- a** A5 Pont Melin Rhug (Trunk Road Forward Programme);
 - b** A479 Talgarth Relief Road (Trunk Road Forward Programme);
 - c** A470 Llanrwst to Hafod (Trunk Road Forward Programme);
 - d** Ammanford Distributor Road (Transport Grant Programme – managed by Carmarthenshire County Council);
- 10** We have sought to report the latest position in terms of the estimated or final cost of individual projects. Although the construction of all of our case study projects has been completed, changes to project costs can occur for up to five years after the completion of construction, during the defects liability period.
- 11** We were not always able to confirm estimates of the timescale for and/or likely costs of each project at equivalent stages, or the reasons for cost increases and delays. We have only presented data for projects where we could be confident that we were comparing progress at a broadly equivalent point.
- 12** **Appendices 3 and 4** provide additional details of the estimated and/or final costs of all recently completed or ongoing major Trunk Road Forward Programme and Transport Grant funded road projects.



Figure 12 – Summary of our 10 case study projects

Project and public sector employer	Description and objectives	Timescale	Cost
A470 Blaenau Ffestiniog to Cancoed improvements Assembly Government	Improving 2.44 miles of the A470 Cardiff to Glan Conwy trunk road in order to: a improve road safety; and b deliver more reliable journey times. The work was primarily 'online' consisting mainly of widening the original road, with some easing of the sharper bends. There was also a short 'offline' section (a short section of new road was constructed).	Construction contract awarded in July 2006. Main construction work started in August 2006 with an anticipated completion date of May 2008. The road reopened to traffic in September 2008.	Total project cost: £16.1 million.
Porth/lower Rhondda relief road Rhondda Cynon Taf County Borough Council	Construction of a 7.3 mile relief road, comprising online improvements and off-line construction work. The project also involved the construction of 11 bridges (including a 95-metre span bowstring arch bridge) and a three-mile route for cyclists and walkers. Core objectives of the scheme were to: a enhance access from the A470 to a large part of the Rhondda, to open up access to employment opportunities and retain and attract industrial development; and b provide environmental relief to approximately 1,400 properties.	Construction contract awarded in May 2005. Main construction work started in June 2005 with an anticipated completion date of March 2007. The main route opened to traffic in December 2006, although additional work continued until September 2007.	Total project cost: £102 million.
Reopening of the Vale of Glamorgan railway Assembly Government	Upgrading 6.5 miles of existing track to passenger standards (on a line closed to passenger trains since 1964) and laying 3.5 miles of new track, providing two new stations - at Rhoose (for Cardiff International Airport) and Llantwit Major - and refurbishing the bay platform at Bridgend. The core objective of the scheme was to enhance access to the airport and provide additional routes for commuters between Bridgend, Barry and Cardiff.	Some on-site work commenced in January 2002, but was then stopped in March 2002. Work restarted in June 2004 with an anticipated completion date of April 2005. The line reopened to passenger trains in June 2005.	Total project cost: £17.1 million.

Project and public sector employer	Description and objectives	Timescale	Cost
<p>Reopening of the Ebbw Valley railway line Blaenau Gwent County Borough Council</p>	<p>Upgrading 18 miles of existing track to passenger standards (on a line closed to passenger trains since 1962) and carrying out the following additional infrastructure works:</p> <ul style="list-style-type: none"> a establish a passing loop (three miles); b install new colour light signalling; c upgrade existing signalling at Park Junction; and d construct six new stations together with road access, interchange facilities and parking. <p>Core objectives of the scheme were to:</p> <ul style="list-style-type: none"> a encourage economic regeneration and reduce social exclusion, specifically by providing access to work, education, training and leisure facilities in Newport and Cardiff; and b to reduce carbon emissions by providing alternatives to the car. 	<p>The Council went out to tender separately for permanent way, signals and switches (known as Contract 1) and stations (known as Contract 2).</p> <p>Work commenced in July 2006, with an anticipated completion date of December 2007.</p> <p>The line reopened to passenger trains in February 2008, but delays in construction meant that two of the six stations (Llanhilleth and Cross Keys) did not open until late April and early June 2008, respectively.</p>	<p>Total project cost: £47.7 million.</p>
<p>M4 widening Assembly Government</p>	<p>Widening the existing motorway from dual two to dual three lane for eight miles between Castleton (Junction 29) and Coryton (Junction 32). The M4 in South Wales is a locally, nationally and internationally important route, forming part of the Trans European Road Network Route linking Cork to Moscow.</p> <p>The main objective of the widening scheme was to tackle the congestion problem on this section of the motorway and, in doing so, to make a positive contribution to local and national economic development.</p>	<p>Early Contractor Involvement design and build contract awarded in February 2005.</p> <p>The preliminary design, environmental statement and public inquiry stages were completed between 2005 and 2007.</p> <p>The first of four main construction phases started in May 2007 with an anticipated completion date for the whole scheme of December 2009.</p> <p>Construction work was completed in January 2010.</p>	<p>Total project cost: £99 million.</p>



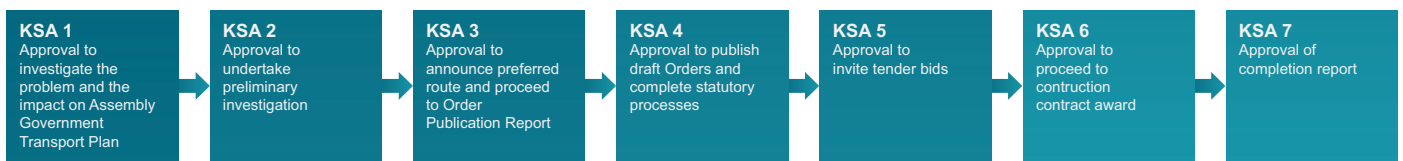
Project and public sector employer	Description and objectives	Timescale	Cost
A465 Section 1 (Abergavenny to Gilwern) Assembly Government	Part of the A465 Heads of the Valleys dualling scheme. Section 1 involved the widening of nearly four miles of road to dual carriageway standard, with much of this section falling within the boundaries of Brecon Beacons National Park. Section 1 is one of six sections of the scheme. The road improvement is intended to have a significant impact on investment and economic activity along the Heads of the Valleys corridor.	Construction contract awarded in December 2004. Main construction work started in January 2005 with an anticipated completion date of April 2007. Construction work was completed in May 2008.	Total project cost: £57 million.
A465 Section 4 (Tredegar to Dowlais Top) Assembly Government	Construction of a four-mile, two lane, dual carriageway together with terminal roundabouts and a new junction. Section 4 is one of six sections of the scheme. The road improvement is intended to have a significant impact on investment and economic activity along the Heads of the Valleys corridor.	Construction contract awarded in January 2002. Main construction work started in May 2002 with an anticipated completion date of July 2004. Construction work was completed in November 2004.	Total project cost: £58 million.
A497 Abererch to Llanystumdwy Gwynedd Council	Upgrading four miles of single carriageway road partly on the alignment of the existing road. The route is located in a designated landscape conservation area and an environmentally sensitive area. The main objectives of the project were to improve traffic flow and reduce accidents.	Construction contract awarded in April 2004. Main construction work started in June 2004 with an anticipated completion date of May 2006. Construction work was completed in June 2006.	Total project cost: £19.6 million.
A494/A550 Deeside Park to Drome Corner improvement Assembly Government	An online improvement of approximately 1.5 miles of the A494/A550 between the River Dee and the Deeside Park Interchange together with the construction of a new local road alongside connecting Deeside Park Interchange with Drome Corner. The road was widened from a two-lane dual road to a three-lane dual road, with a section of four-lane dual road. The project also involved construction of a new bridge used as a cycleway/footway and a new pedestrian underpass. The main objectives of the project were to reduce congestion and accident rates.	Construction contract awarded in May 2003. Main construction work started in July 2003 with an anticipated completion date of November 2004. Construction work completed as planned in November 2004.	Total project cost: £18.6 million.

Project and public sector employer	Description and objectives	Timescale	Cost
<p>A470 Lledr Stage 2 (Dolwyddelan to Pont-Yr-Afanc) Assembly Government</p>	<p>Upgrading 4.5 miles of the road to a standard compatible with modern trunk road standards while mitigating its environmental impact and taking advantage of opportunities to enhance the environment. The route runs through Snowdonia National Park.</p> <p>The main objectives of the scheme were to improve road safety and journey time reliability.</p>	<p>Construction contract awarded in August 2002.</p> <p>Main construction work started in November 2002 with an anticipated completion date of May 2005.</p> <p>Construction work completed in January 2005.</p>	<p>Total project cost: £21.5 million.</p>



Appendix 2 – The Assembly Government’s processes for the management and review of major transport projects

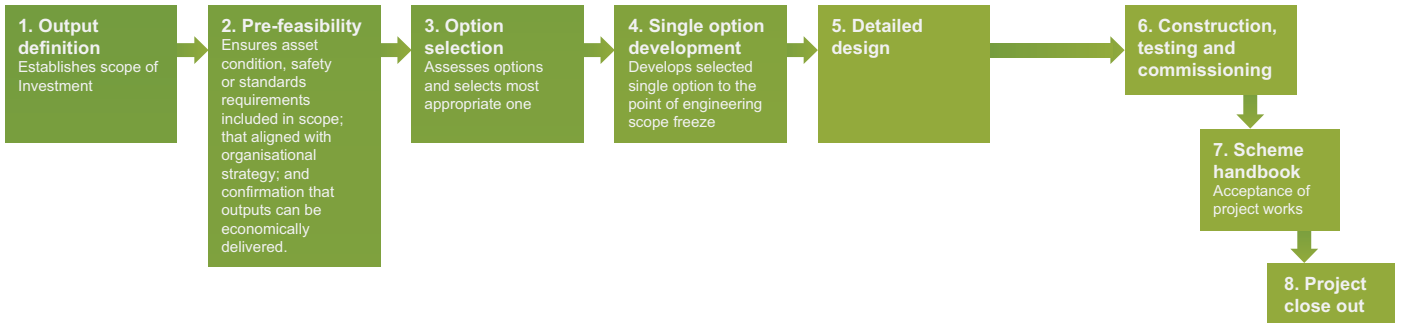
Assembly Government’s Key Stage Approval (KSA) process for projects on the Trunk Road Forward Programme



Assembly Government Transport Wales Gateway Reviews



Network Rail’s Guide to Railway Investment Projects (GRIP) system



Appendix 3 – Cost changes for recently completed and in-progress projects in the Assembly Government's Trunk Road Forward Programme

The costs presented in the table below represent estimates of final expenditure and, where relevant, the total known cost of completed projects, based on information provided by the Assembly Government about the estimates made at different key stages of the projects (where the Assembly Government was able to provide this information). We have only included projects that have reached KSA 3 (Approval to Announce Preferred Route). Cost estimates prior to KSA 3 are inevitably uncertain given that the full scope of the project and the preferred route are still to be determined. Some projects are without an estimated cost at KSA 3 because they grew out of the separate trunk road maintenance programme which does not follow the same key stage approval process.

Project and current status	Estimated cost at KSA 3 (£m)	Estimated cost at construction contract award - KSA 6 (£m)	Estimated/final out-turn cost (£m)
M4 widening Castleton to Coryton Completed January 2010	81.5 (November 2002)	99.3 (February 2007)	99.3 (or below)
A470 Llanrwst to Hafod Completed May 2009	Not prepared	4.7 (November 2006)	5.1
A470 Blaenau Ffestiniog to Cancoed Completed September 2008	15 (at KSA 4) (March 2005)	16 (June 2006)	16.1
A5 Pont Melin Rhug Completed August 2008	3.9 (1998)	6.7 (November 2006)	6
A465 Abergavenny to Hirwaun Section 1 Completed May 2008	25.7 (2000)	38.4 (January 2005)	57
A479 Talgarth Relief Road Completed July 2007	7.1 (January 2002)	11.4 (November 2005)	13
A470 Lledr Stage 2 Completed January 2005	18.5 (June 1997)	20.1 (July 2002)	21.5
A465 Abergavenny to Hirwaun Section 4 Completed November 2004	46.8 (November 2000)	39.9 (January 2002)	57.8
A494/A550 Deeside Park to Drome Corner Completed November 2004	15 (1992)	18.7 (2002)	18.8



Project and current status	Estimated cost at KSA 3 (£m)	Estimated cost at construction contract award - KSA 6 (£m)	Estimated/final out-turn cost (£m)
A470 Penloyn to Tan Lan, Llanrwst Under construction	Not prepared	6 (October 2008)	-
A470 Cwmbach to Newbridge Under construction	25 (November 2005)	50.9 (February 2010)	-
A487 Porthmadog to Tremadog improvement Under construction	26.4 (March 1994)	53.7 (December 2009)	-
A483 Four Crosses Relief Road Under construction	4.1 (at KSA 4) October 2006	6.5 (January 2010)	-
A40 St Clears to Haverfordwest (a) A40 Penblewin - Slebech Park Under construction	27.6 (March 2005)	40.5 (December 2008)	41.4
A40 St Clears to Haverfordwest (b) Llanddewi Velfrey - Penblewin In preparation	37 (June 2009)	-	-
A470 Maes yr Helmau to Cross Foxes In preparation	7.9 (2004)	-	-
A477 St Clears to Red Roses improvements In preparation	41.6 (November 2006)	-	-
A465 Abergavenny to Hirwaun Section 2 In preparation	66.2 (November 2000) 221 (August 2010)	-	-
A465 Abergavenny to Hirwaun Section 3 In preparation	43.8 (November 2001) 148.4 (August 2009)	-	-
A470 Gelligemlyn, Ganllwyd In preparation	7.3 (November 2007)	-	-
A483 Llandeilo Eastern Bypass In preparation	24.5 (2006)	-	-

Project and current status	Estimated cost at KSA 3 (£m)	Estimated cost at construction contract award - KSA 6 (£m)	Estimated/final out-turn cost (£m)
A465 Abergavenny to Hirwaun Section 5 In preparation	47.5 (November 2000) 123 (Updated November 2009)	-	-
A465 Abergavenny to Hirwaun Section 6 In preparation	53.5 (November 2000) 133 (Updated November 2009)	-	-



Appendix 4 – Cost changes for Transport Grant funded major road projects

- 1** The costs presented below represent estimates of final expenditure based on the information submitted by local authorities to the Assembly Government within each financial year as part of their bids for Transport Grant funding in the following year (these bids also set out projected project expenditure in subsequent years). Projects costs can also go up or down after the completion of construction, for example because of issues that emerge during the defects liability period or while final costs are agreed with property owners (see paragraphs 1.14 to 1.16 of the main report).
- 2** We have not examined most of these projects in close detail but, in confirming these facts, several local authorities have provided an explanation for the reasons for changing costs. These reasons vary from project to project but, overall, reflect the issues outlined in [Figure 7](#) of the main report. For example:
 - a** Wrexham County Borough Council explained that the original (section 2) route to improve access to the Wrexham Industrial Estate had to be abandoned and a new route designed, after failure at the public inquiry. The estimated costs for the alternative route were higher than the estimated costs for the original design. Less significant changes to project scope were also identified by Neath Port Talbot County Borough Council as one reason for the increasing costs of the Port Talbot Peripheral Distributor Road Stage 1B.
 - b** The relevant local authorities reported that delays in starting meant that inflation increased costs on the Improved Access to Wrexham Industrial Estate scheme and the Ceredigion Link Road. Increasing commodity prices (steel and oil-based products) were also cited as causing cost increases on the Greater Barged Community Regeneration Scheme.
 - c** Unforeseen work to address poor ground conditions was reported as increasing the costs of the Greater Barged Community Regeneration Scheme.
 - d** Carmarthenshire County Council reported that additional utilities work contributed to cost increases and a delay of 22 weeks on the Ammanford Distributor Road. Uncharted utility services also led to cost increases on stages 1B and 1C of the Port Talbot Peripheral Distributor Road.

Project and current status	Cost on entry to the Transport Grant programme	2004-05 (£m)	2005-06 (£m)	2006-07 (£m)	2007-08 (£m)	2008-09 (£m)	2009-10 (£m)	Actual project expenditure to April 2009
Church Village Bypass Completed September 2010	34	59.7	92.9	92.9	111.3	89.8	89.8	26.2
Greater Bargoed Community Regeneration Scheme – Angel Way Completed September 2009	17.4	26.5	32.5	34	32.8	34.3	37.3	31.4
A499 – Aberdesach to Llanaelhaearn Completed July 2009	12.6	20	21.7	23	23.5	22.7	22.9	18.8
Ammanford Distributor Road Completed November 2007	3	7.2	7.8	9	9.9	10.7	10.2	9.5
Port Talbot Peripheral Distributor Road - Stage 1B Completed July 2007	19.3	23	25.1	25.1	25.1	25.9	22.9	22
Porth Relief Road Completed December 2006	33	69.4	87	91.5	99	99.9	101.8	97.6
A497 – Abererch to Llanystumdwy Completed February 2006	10	17	19	19.3	19.4	19.5	19.5	19.5
Port Talbot Peripheral Distributor Road - Stage 1C Completed December 2005	11.4	16.5	18.3	15.4	18.5	16.7	17.8	14.3



Project and current status	Cost on entry to the Transport Grant programme	2004-05 (£m)	2005-06 (£m)	2006-07 (£m)	2007-08 (£m)	2008-09 (£m)	2009-10 (£m)	Actual project expenditure to April 2009
A4046 – Cwm Relief Road Completed February 2005	23.9	32.5	32.8	32.9	32.5	32.0	31.9	31.8
A484/A485 – North Carmarthenshire and Ceredigion Link Road Completed August 2004	14.7	15.6	15.6	15.8	16.1	16.3	16.2	15.8
Ceredigion Link Road – Stage 1 Under construction (see note 1)	25.9	28.8	30.1	31.1	34	48.1	43	35
Port Talbot Peripheral Distributor Road – Stage 2 In preparation	66	68.2	73.1	72.9	97.9	107.8	115.3	8.5
Improved access to Wrexham Industrial Estate – Sections 1 and 2 combined Section 2 in preparation – Section 1 completed September 2002 (see note 2)	17.8	-	28.9	29.3	35	40.2	40	10.3

Notes

- 1 The 2009-10 figure for the Ceredigion Link Road Stage 1 excludes the estimated cost of online improvements between Post Bach and Synod Inn. This cost had been included in all of the previous estimates for this scheme. Negotiations between the Assembly Government and Ceredigion County Council in 2009 about cost increases on other sections of the scheme, led to a joint agreement that the Assembly Government would no longer fund through Transport Grant the Post Bach to Synod Inn improvements (Case Study 15).
- 2 Wrexham County Borough Council has indicated that the initial cost estimate of £17.8 million dates from 1996 (prior to the announcement of the current Transport Grant programme). The changes in the preferred route for section 2 of the scheme mean that the cost estimate figures from 2005-06 onwards are not directly comparable with the initial cost estimate.