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**Innovative Organisational and Procurement Strategies in the Management of Highway
Networks, an Examination of England's Road Administration**

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Abstract

In their quest to become highly efficient and professional asset managers in maintaining their road networks and delivering a programme of network improvements some road administrations have undergone significant changes in the way they operate in order to become more efficient and provide a more effective road network.

The Highway Agency (HA), an executive agency of the Department of Transport, which is responsible for the management and development of England's motorway and trunk road network, has a dedicated programme of change to deliver best value solutions and services to customers, and is therefore a model worthwhile of examination.

Whilst the HA has an annual expenditure of currently £ 2,1 billion and anticipates a level of investment of £ 21 billion over the next 10 years, it purchases 95 % of all its work from external suppliers. It already embraces new forms of contract based on improved effectiveness in relations between internal and external partners at all stages of the supply chain. It also has implemented 10 Design, Build, Finance and Operate (DBFO) road schemes in the past with different payment systems of either shadow toll, availability and active management. The HA's most challenging project over the next decade will be the widening of the M25, the London orbital motorway, through a DBFO contract over 30 years with contract award planned in 2008.

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1 Introduction

The Highways Agency (HA) has undergone a culture change in the form that its understanding of its role has become that of an operator of a network of motorways and other trunk roads in England. This entails that in addition to its traditional role of building and maintaining England's strategic road network, it now has to actively influence and control how its roads are used so as to provide the best possible service to all users. It does not see itself any longer merely as a maintainer and builder of roads. To this end it seeks to maintain, operate and improve its strategic road network by working in partnership with other organisations, both in the public and the private sector. Whilst its strategic orientation cuts across many issues including those of environment and safety, the following examination will focus on the issue of procurement of works and services by the HA. This is an essential activity the HA has to fulfil in its role as operator and in order to promote the Government's policies for sustainable development and delivering integrated transport solutions. This occurs against a backdrop of having to achieve efficiency gains in line with the wider objectives of the Government efficiency programme.

2 Efficiency in Procurement

Efficiency should be at the heart of public service provision. To this end the independent review into public sector efficiency by Sir Peter Gershon¹ identified a total efficiency gain target in excess of £20bn per year across the public sector in England, to be achieved by mid 2008 and the need to plan to achieve longer-term efficiency gains beyond that date. The cross-public sector efficiency programme set in place to implement the outcome of the review, has now become part of government policy. The Gershon report highlighted a number of potential benefits that result from improved procurement and project delivery practice and although these relate to all aspects of procurement, they apply particularly to highways procurement. These benefits include²:

- Understanding how client and customer behaviour drives supply costs.

¹ Releasing resources to the front line Sir Peter Gershon, 2004.

² Achieving Efficiency Gains From Collaborative Roads Procurement – A Highways Industry Strategy, Highways Agency, 2005.

- Ensuring quality and value from existing contracts and driving improvements from new contracts.
- Raising the level of professionalism and expertise applied to procurement activities.
- Identifying clustering of organisations and activities to better match up to the supply market and to optimise economic factors.
- Developing and designing pilot solutions e.g. new forms of contract and shared transactional services.
- Promoting and marketing best value contracts
- Monitoring and benchmarking performance.
- Sharing knowledge, experience, successes and learning.
- Shaping the market by a better understanding of forward plans and overall demand, by influencing the supply chain to develop their capabilities and capacity to meet this demand.
- Delivering better contracts and supply chain agreements.

Within this context the Highways Agency is leading two major workstreams which are to substantially contribute towards the delivery of the Department for Transport's (DfT) efficiency target to achieve £785m in efficiency gains by mid 2008. One of these workstreams is to achieve significant increases in quality and customer benefit from improved levels of service in existing contracts for the strategic road network and from achieving savings in new maintenance contracts. The other main workstream is to work collaboratively or in partnership with local authorities to achieve procurement efficiency improvements.

The strategic vision is one of highway clients and supply chain partners to work collaboratively in order to deliver efficient and continually improving highways services and infrastructure.

3 The Highways Agency

The Highways Agency is an executive agency of the Department for Transport, working to support delivery of the outcomes sought by the Secretary of State for Transport, in accordance with his

priorities, in respect of the stewardship and operation of the motorway and trunk road network in England³. Its strategic network is valued at £77bn in 2006⁴ and comprises some 8,000 km of motorway and trunk roads and carries a third of all road traffic and two thirds of all heavy freight traffic in England, which represents 170bn vehicle kilometres per year. This compares to a network of 53,183 km of motorway and trunk roads in all of Germany with 329bn vehicle kilometres per year.



Figure 1: England’s strategic road network⁵

The HA network comprises various types of roads ranging from motorways carrying 200,000 vehicles per day to single carriageway trunk roads (major A-roads) carrying fewer than 10,000 vehicles per day. To maintain the network, keeping it safe and available for use, accounts for the largest part of the budget at £1.2bn in 2005-2006.

³ Framework Document, Highways Agency, 2005.
⁴ Highways Agency Report and Accounts 2005-06, Highways Agency, p. 7, 2006.
⁵ Business Plan 2006-2007, Highways Agency, 2006.

The aim of the HA is “safe roads, reliable journeys and informed travellers”. The key objectives of the Agency are to provide a high quality service to their customers by:

- reducing congestion and improving reliability.
- improving road safety.
- respecting the environment.
- seeking and responding to feedback from customers.

Enabling objectives of the agency are to:

- ensure more effective delivery through better working relationships.
- implement best practice and innovative solutions to improve service now and in the future.
- be a good employer.
- be an efficient agency with effective processes and resource management systems.

The HA is subject to public expenditure controls and its expenditure forms part of the Departmental Expenditure Limit and administration cost limit. Decisions on allocations to the Agency rest with the Secretary of State on advice from the Principal Accounting Officer. Every year an annual report and accounts are published in accordance with the accounting policy set out by the Cabinet Office and Treasury. This report and accounts sets out the Agency’s performance related to the objectives, forecasts and targets published in that year’s business plan.

The chief executive of the HA has unlimited delegated authority for competitive procurement in accordance with Departmental and treasury guidelines. He has to keep the Permanent Secretary informed of the risks in the HA and the consequence for the HA’s provisions and contingent liabilities, including where possible an assessment of their values.

The HA was allocated £5.5bn by parliament for the year 2005-2006, of which £2.6bn represented a notional charge for cost of capital and the remaining £2.9bn represents the Agency’s operating budget.

Highways Agency 2005/06 Full Year	Budget £M	Actual £M	Variance £M
Net resource outturn	2,121	2,110	11
Capital Expenditure	755	753	2
Operating Result	2,876	2,863	13
Notional Cost Capital Charge	2,588	2,554	34

Table 1: Financial Results 2006/06⁶

Due to the large asset base of the HA, significant resource is required to cover the cost of depreciation and impairment of tangible and intangible fixed assets and the cost of capital. The main areas of expenditure, other than the cost of capital and depreciation are illustrated below.

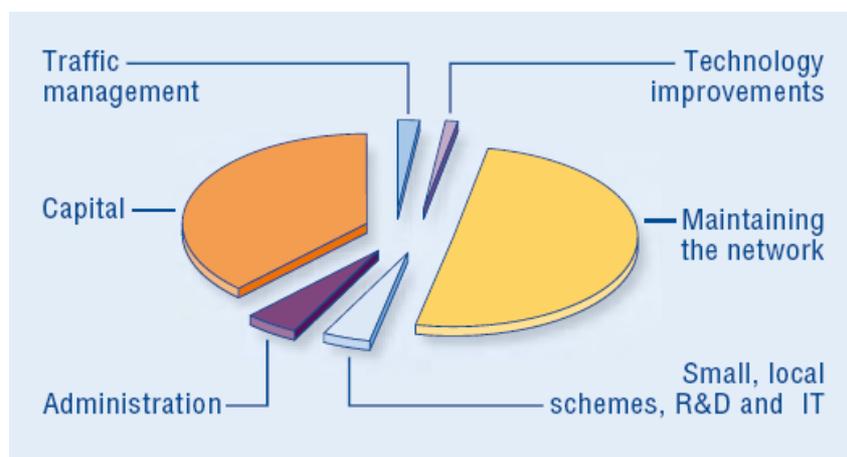


Figure 2: Analysis of main areas of expenditure⁷

The trunk road infrastructure is one of the most valuable single public assets in the UK, and maintenance of it consumes a high proportion (over 40 %) of the HA's budget. This includes replacing and maintaining surfaces, bridges and other structures, associated upkeep such as fencing, drainage, lighting and signage and the cost of keeping the network moving in winter.

During 2005-06 £753m was invested in the road network, comprising some 800 schemes with the 50 highest value schemes accounting for £528m of the total⁸.

⁶ Highways Agency Accounts 2005-2006, Highway Agency, 2006.

⁷ Ibid.

⁸ Ibid.

Public funding, and the setting of Public Services Agreement (PSA) targets is managed through the Government’s spending review process. The 2004 Spending Review-New Public Spending Plans 2005-2008 set Departmental spending plans and public service agreements for 2006-07 and 2007-08 and confirmed spending plans for 2005-06. The Agency’s net budgets (i.e. including allowable income) set for 2006-07 and 2007-08 are:

	2005-06 Actual £m	2006-07* Budget £m	2007-08* Budget £m
Resource - programme	2,015	2,490	2,464
Resource - administration	95	95	95
Capital	753	1,124	1,060
Total	2,863	3,709	3,619
Notional Cost of capital charge	2,554	2,736	2,856
* Budgets sourced from Highways Agency 2006-07 Business Plan			

Table 2: HA’s net budgets for 2006-07 and 2007-08⁹

Programme expenditure plans are for growth across the next two years, 17% in resource and 41% in capital. While administrative spending is to be held flat for the next two years, the capital plans show a large increase in expenditure.

4 Procurement Strategies

Under traditional asset management procurement in the HA focused on buying an output such as a new length of road. Now the HA purchases a level of service from its suppliers to deliver both asset management and the management of traffic to fulfil its network operator role. It purchases 95 % of its work from external suppliers. Contracting-out demands professional skills from the HA in developing its intelligent client role to focus on service outcomes and to set the right technical and performance standards in contracts. This means to be at the forefront of best procurement practice, developing better and more effective ways of working in partnership with suppliers.

⁹ Ibid.

A succession of major studies during the 1990's in England highlighted the inefficiencies of traditional methods of procuring and managing major projects. In particular the problems encountered by awarding contracts solely on the basis of lowest price have demonstrated that this does not provide value for money in either the final cost of construction or the through life and operational costs. Relations in the past between the contracting industry and government departments were also often typically dominated by conflict and distrust, which contributed to a poor performance, especially in the control of costs.

The HA recognised that change needs to be led by clients and that they must demand better value and improved performance from suppliers. In turn, this means that clients must demonstrate that they will act as good employers and will procure work in a way that allows best value to be delivered and provides fair rewards for good performance.

To achieve its objectives, the HA has developed a set of 10 principles for the delivery of best value in maintaining the strategic network to be embraced by both the HA teams and their suppliers¹⁰:

- **Early creation of delivery team;** early contractor involvement for more scope, better risk management and forward planning of work programmes and resources.
- **Integrated and incentivised supply chain;** integrating the supply chain with its specialist knowledge, incentives for innovative ideas to give best value solutions.
- **Maintaining a competitive and sustainable supply chain;** maintaining a good quality supplier base motivated and incentivised to work with the HA.
- **Clear points of responsibility, no unnecessary layers of supervision;** clarifying roles and responsibilities to reduce contractual interface problems, eliminating resource wastage.
- **E-procurement;** to make tender processes, communications and performance measurement more efficient.
- **Selection of suppliers on the basis of best value;** identifying the aspects of quality which add real, affordable value, using reality checks to confirm quality submissions and promises.

¹⁰ Procurement Strategy Review, Highways Agency, 2005.

- **Fair allocation of risks;** risks will be allocated to the party best able to manage them and the HA will accept risks where suppliers are prepared to work in partnership to manage them and control the consequences.
- **High quality design;** design solutions will be based on whole life value, assessed by reviews integrated with the Office of Government Commerce gateway review process. The HA is committed to achieve the principles of good design set out by the Government Strategy for Better Public Buildings.
- **Partnership approach based on long term relationships;** moving from short-term project partnering arrangements to long-term relationships for retention of skills and better resource and work programming.
- **Performance measurement with continual improvement targets;** establishing a five year programme of improvement under the Client's Charter Scheme to confirm benefits in the form of cost and time savings, reduced defects and accidents and improved whole life value and satisfaction with the product.

5 New Forms of Contract¹¹

New forms of contract have been designed and implemented by the HA, which enable the early involvement of the supply chain in the planning and designing of projects and service requirements. This is aimed at greater innovation, better risk management, forward investment in staff and plant and affordable, safer solutions. Such contracts include:

5.1 The Managing Agent Contractor (MAC)

A contract for maintenance, which combines the roles previously undertaken by separate Managing Agents and Term Maintenance Contractors. The MAC contract assigns single point responsibility, utilises a self certification procedure and relies on quality management systems. It is based on a strong partnership approach with an integrated supply chain and a contract duration of 7 years. It allows the MAC organisation to design and undertake all projects up to a value of £1m and incorporates elements

¹¹ Highways Agency procurement Strategy, Highways Agency, 2001.

of performance specification for routine and winter maintenance. It requires the setting of annual targets, to measure and benchmark performance and to achieve continuous improvement. The HA currently has 14 maintenance areas covering the whole of the trunk road and motorway network in England (excluding London which is managed by TfL). This number of areas provides work opportunities for between six and eight MAC companies. A new pilot maintenance contract, the enhanced MAC or EMAC, was awarded in December 2004 in Area 2 around Bristol and allows for all network management, design and maintenance services and all improvement schemes up to £2m.

5.2 Framework Contracts

Forward planning over a three year period allows work to be packaged together through framework arrangements. Frameworks provide better value for money compared with the procurement on an individual project basis. They allow long-term relationships to be developed and thus allow better programming of work and planning of resources. They enable firms to develop the skills and competence of the workforce to make use of their experience on successive projects. Frameworks are predominantly used for various consultancy, technology, surveys and small works requirements. This allows planners, designers, front-line suppliers and their supply chain to be involved in the design and programming of works, which allows more innovation and consideration of buildability. It adds value to the product or service by enabling suppliers to influence the specifications and have greater understanding of the risks to delivery and allows more time to develop health and safety plans.

The duties of design consultancy frameworks, of which there are four, include the early assessment, planning and design of projects and taking schemes forward through consultation procedures to the identification of the preferred route. Following this, duties include the organisation of further survey and preparation work leading up to the appointment of an early Design and Build contractor. The consultant continues as employer's agent playing an important role in supporting the partnership approach. One benefit of a new designer, employed by the contractor, being involved in the project is that they will bring a fresh look and can challenge initial concepts and be incentivised to find improvements. The framework arrangements allow a much faster start on new schemes, saving up to a

year when they enter a programme, achieves a more efficient use of resource by having a mix of schemes and tasks, allows earlier public consultation and parallel working on appropriate activities.

Frameworks are managed by a nominated framework manager, developing a partnership across the whole group of framework suppliers with regular meetings to review overall performance and to consider forward planning. Contractors have to support the HA in setting performance indicators, identify best practice and perform regular performance assessments to ensure that required standards and continual improvement are achieved. Incentivised target cost arrangements are the preferred form of contract with reimbursement based on actual costs. Some work continues to be performed outside of the framework contracts, so as to give other forms an opportunity to demonstrate their capability and to compare value and performance with work delivered through framework. In other words, carrying out market testing to check for value for money. Major works in excess of £5m continue to be procured individually for the time being.

5.3 Construction Management

Under Construction Management framework agreements the HA enters directly into contractual arrangements with specialist trade contractors and suppliers. Here the overall management and coordination of the projects has been carried out by construction managers. This enables the HA to understand the issues affecting the supply chain and how to improve the delivery of best value using other forms of procurement. Also issues affecting performance indicators and the measurement of actual costs are highlighted. This approach is adopted in some areas in order to establish longer term but flexible arrangements in maintenance areas.

5.4 Early Contractor Involvement

The HA has undertaken most major projects since the mid-1990's using Design and Build contracts with most risks transferred to achieve greater certainty of cost and time. The scope for contractor innovation was limited because they have not been appointed until after the statutory planning stage that establishes many constraints. It is estimated that designs are constrained by up to 80 % by the time

contractors are appointed. Seeking utmost price certainty involved the transfer of risk without giving full recognition to a contractor's ability to assess and manage the risks and has resulted in commercial pressures in the past, which have put partnership working at risk. Improved value for money can be achieved by allocating risks appropriately and price certainty delivered by managing the risks in partnership supported by incentives.

Currently the HA has introduced a new form of Design and Build contract, which it calls its Early Contractor Involvement (ECI) initiative to major projects. The first contract under this initiative was awarded in 2003 and was followed by a model contract in 2004. In essence the contractor is appointed as soon as possible after identification of the preferred route and well before the statutory stages, which normally involves a public inquiry. The contractor selection process is based largely on quality and attempts to seek out the supplier that has all the right skills and is considered capable of working in partnership in identifying the optimal solution and delivering it as efficiently and safely as possible.

Pricing of ECI contracts is based on key cost components and a process to establish a target cost when the design is finalised. Target costs will be incentivised in a way that encourages continual improvement throughout the development of the project. Risks schedules are developed with tenderers as part of the quality assessment process and to identify a fair allocation of risks to the parties best able to manage them. As a result the delivery of projects has been accelerated and transaction costs reduced. Whereas the timescale of major projects took up to 10,5 years from scheme identification to start of construction, this has now been reduced to 5,5 years when applying ECI contracts¹².

5.5 Public Private Partnerships / DBFO Contracts

The spending plans announced in 2001 aimed at the Targeted Programme of Improvements (TPI) allowed for 25 % of the estimated additional £2bn to 2010 to be invested in Public Private Partnership projects. The selection of projects takes account of the value of the scheme, the size of associated network, the impact on the strategic network operation, the nature of risks associated with the project

¹² A. Robertson, Successfully Building and Operating Big Road Projects, TransFin 2006, Nice.

and overall best value. The HA has utilised Design, Build, Finance and Operate (DBFO) contracts in the delivery of major projects beginning in 1996 and has to date 10 active DBFO contracts in operation. The A249 Stockbury (M2) to Sheerness DBFO contract is the latest contract so far, awarded in February 2004, and consists of dual 2 lane all-purpose carriageway and single carriageway of 17 km length including the construction of a major new river crossing and represents approx. £100m of investment¹³.

The first 8 DBFO contracts were let on the basis of shadow tolls, the value of which relating to the volume and compensation of traffic using the particular project road. The HA can make deductions from monthly payments if the DBFO company introduces lane closures on the project road at time of peak traffic flow that would cause congestion. With the award of the A13 Thames Gateway in the year 2000 a payment system based on lane availability was chosen. Payments are made based on the availability of the road to all road users as verified from numerous CCTV cameras located along the route. Additional payments can be received from a good safety performance in operating the road. The A1 Darrington to Dishforth DBFO contract, let in 2003, utilises a payment system where key elements are congestion management and safety performance assessments, reflecting the DBFO company's ability to actively manage congestion and improve safety along the length of the project road.

Further DBFO roads are being prepared to cover the widening of some major motorways in England. The largest among them is the proposed widening of the majority of the M25 London orbital motorway (105 km out of 196km). It represents the hub of the HA strategic road network and experiences up to 200,000 customers a day. Only minimum land is available and it represents the world's busiest motorway. Some sections have already been widened to 4 lanes and it is planned to widen the remaining 3 lane sections to 4 lanes within the existing land take. The HA will take the opportunity and introduce demand management measures such as variable speed limits, ramp metering, junction signalling linked to Local Authority networks and high occupancy vehicle lanes. The works are to be undertaken under a 30 year DBFO contract, as it is considered to be the most

¹³ Highways Agency, Road Projects Search, 2006-09-13.

efficient mechanism for construction on a live network of this scale and complexity. The DBFO company will be incentivised to improve journey time reliability and help in introducing future demand management measures. Different to past projects it is envisaged to have the debt financing subjected to separate competition to be run by the preferred bidder. This is intended to avoid an overloading of financial markets and to secure better value. A long construction programme means that it is unlikely for a fixed price over a very long period to give good value. The price for early sections is to be fixed and for establishing the price for later sections it is intended to consult with tenderers on the best means to do so.

The payment mechanism should be largely based on availability, adjusted to take into account performance. Initial payments should relate to the operation only with unitary payment increases triggered by the completion of finite sections of construction.

The DBFO contract award is expected to be in early 2008 with widening of the first section (in the NW quadrant) to begin in late 2008. Completion is expected to occur in 2015 at estimated construction costs of £2.2bn. Operation and maintenance costs for a period of over 30 years are estimated at around £4bn¹⁴.

6 Additional Tools

The HA has established an **electronic supplier database** to support its selection process. Suppliers thus do not have to resubmit certain information when expressing an interest to tender. All notices required for publication under the European Procurement Directives are published electronically and most tender correspondence is conducted by secure e-mail reducing transaction costs for the HA and its suppliers. Key suppliers systems are electronically integrated with the HA's management system helping prompt payment of invoices.

¹⁴ A. Robertson, Successfully Building and Operating Big Road Projects, TransFin 2006, Nice.

A **Capability Assessment Toolkit (CAT)** was developed to help identifying those suppliers that are most likely to deliver best value solutions and services based on a framework of capability indicators that measures the approach and potential effectiveness of individual companies. This involves tenderers to submit their bids in two parts. In the first part they set out their approach including how they will manage the risks of a safe, affordable, defect-free project or service. In the second part they must provide evidence of when and where the proposed approach has been successful.

In association with the new forms of maintenance contracts a “**Performance Review Improvement Delivery**” (**PRIDe**) group has been formed, which supports the operational delivery teams in the development of robust quality systems to provide measurement of performance, compliance audit processes, identification of best practice and the setting of improvement targets. Most importantly , the PRIDe team is to ensure that propriety is being maintained within the HA.

7 Priorities of the HA

Current priorities of the HA are to obtain accurate, reliable estimates of costs and firm budgetary controls to maximise the benefit of Early Contractor Involvement which will continue to be the main method for delivering major projects. Opportunities for collaboration with local authorities will be examined and could include, for example, the extension of the packaging initiative to include local authority projects. The development of a Major Project Community is to be continued to help achieve the objectives of speeding up delivery, sharing best practice, reducing uncertainty in workflow and funding, and improving performance. It is stated policy to maintain a competitive and sustainable supply base, which is considered to mean that at least six to eight key suppliers have to be retained. With regards to DBFO contracts a new tendering and contract management process is under development to:

- Maintain a competitive and sustainable market.
- Reduce transaction costs.
- Increase Early Contractor Involvement principles.
- Improve contract flexibility to deliver future traffic operations requirements.

8 Conclusion

The HA defines best value as the delivery of business objectives at the lowest affordable cost while achieving continuous improvement. The following components the HA considers to be of key importance. They are effectiveness, efficiency and economy underpinned by the demonstration of continual improvement. It sees a strong “Customers First” culture as a necessary prerequisite together with performance measures aligned with its corporate objectives. Importantly, it recognises that a fundamental requirement is for forward programmes to be robust, reliable and transparent to the supply chain, if one intends to benefit from a long term partnership approach. The stated aim of the HA is to ensure that customers receive the quality, best value services they deserve and to demonstrate this by a successful procurement strategy. This means that customers have to recognise a real and continuous improvement in the service they experience. This requires the HA to be a good client who encourages and incentivises its supply chains by employing professional procurement practice.

The HA believes that real value is to be gained as a result of working collaboratively with supply chain partners and that it will result in working more closely together to share successful and less successful experiences and in understanding how best to manage more efficient delivery of highway services and infrastructure in order to meet customer expectations.