MEETING CLIENT NEEDS

Case Study

VALUE FOR MONEY IN ROAD INFRASTRUCTURE DELIVERY

Colin D Jensen
Department of Main Roads, Queensland, Australia.
colin.jensen@mainroads.qld.gov.au

Sam Fernando
Department of Main Roads, Queensland, Australia.
samson.z.fernando@mainroads.qld.gov.au

ABSTRACT

Achieving value for money for purchases is of paramount importance to government organisations to ensure the optimum use of public money. But this is not easy, especially when dealing with complicated purchases. The paper outlines the work being done in the Queensland Department of Main Roads, Australia (Main Roads) to improve the value for money achieved in the delivery of its works program.

The department has achieved significant value for money outcomes through many initiatives such as packaging of projects, effective supply chain management and the selection of appropriate forms of delivery. In packaging of projects, combining similar works, breaking up larger projects into smaller contracts and varying the sequence, scheduling and programming of works bring excellent results for Main Roads. Relationship contracts, particularly alliance contracts, and Early Contractor Involvement are some forms of delivery that are extremely useful, if selected for appropriate projects. Main Roads’ use of non-price factors in the selection of tenderers is another initiative that contributes to achieving value for money outcomes in the delivery of road infrastructure projects.

Keywords: Value for money, non-price factors, supply chain management, packaging of works.
1.0 INTRODUCTION

Achieving value for money through government purchasing requires the department/agency to achieve the best return and performance for the money being spent. However, this is not an easy task. On one hand, the public are increasingly becoming more knowledgeable about the services they receive. They continuously increase their expectations and demand better services. On the other hand, the government has its own demands and expectations about the use of tax payer's money for the benefit of the whole community. All these expectations complicate the meaning of value for money services and make it difficult for public sector organisations to achieve the desired outcomes either at the level of individual purchase or whole categories of goods/services. The objective of this paper is to describe how the Queensland Department of Main Roads (Main Roads), which is the state road authority for Queensland Australia, is facing this significant challenge for the delivery of road infrastructure.

Whilst some of the above considerations are embedded in the planning and design phases of Main Roads' road infrastructure delivery, this paper focuses on the achievement of value for money for services in the delivery of Main Roads' works program, i.e. construction and maintenance of road infrastructure projects.

There are several mechanisms available to Main Roads to achieve value for money outcomes such as packaging of projects to suit specific circumstances and selecting appropriate contract types. We believe that our suppliers also add value to our services. We use effective supply chain management and the use of non-price factors in the tendering process to identify, award contracts and to work cooperatively with our suppliers to enhance value for money outcomes. These are discussed in detail in the paper.

2.0 WHAT IS VALUE FOR MONEY IN OUR BUSINESS?

According to the State Purchasing Policy of the Queensland State Government (Queensland Purchasing, 2000), price is not the sole indicator of value. There are three factors in determining value for money (VFM): contribution to the advancement of state government priorities; non-cost factors such as fitness for purpose, quality, service and support; and cost-related factors including whole-of-life costs and transaction costs associated with acquiring, using, and holding, maintaining and disposing of the goods or services. The State Government priorities listed in the Better Purchasing Guide are: more jobs for Queenslanders, building Queensland's regions, skilling Queensland – skills and innovation - the 'Smart State', safer and more supportive communities, better quality of life, valuing the environment and strong Government leadership.

Taking the above as guidance, Main Roads uses the definition of value for money for roadwork's delivery as the achievement of maximum overall benefit to the users of the facility and the wider community (including the broader social aspects) at an appropriate agency cost (Main Roads Project Delivery System, Volume 1, 2005: 39). The overall benefits expected from road infrastructure projects include project specific goals such as completion within budget and time, achieving quality and fitness for service. The broader user and community benefits include achieving government priorities, fulfilling stakeholder expectations and contributing to desired industry cultural changes.

3.0 PACKAGING OF PROJECTS TO ENHANCE VFM OUTCOMES

Works are packaged into project sizes that allow efficient delivery having regard to all relevant circumstances. Such packaging may include combining smaller works that are similar in nature (i.e. bulking up), breaking up components of larger projects and making them into separate contracts (breaking up), and changing the sequencing, scheduling, or
programming of works. There are advantages in each of these depending on specific project circumstances.

3.1 BULKING UP LIKE WORKS

Increasing the size of a project (i.e. bulking up) can lead to efficiency gains. According to the Queensland Transport Road Infrastructure Delivery Efficiency Project, increasing the size of projects up to a certain size leads to efficiencies of scale in road projects (Main Roads Project Delivery System, Volume 1, 2005:8). An example of this is the use of district/regional reseal programs in which a number of reseals are bulked together into one contract. Another example successfully used is a number of minor pavement stabilisation projects grouped under one contract.

Local industry policy, indigenous reconciliation, more jobs for Queensland, skills and innovation, quality of life and building Queensland’s regions are some of the broader government proprieties that are considered in bulking up projects. For example, sequencing smaller projects encourages the local construction industry and minimises the impact to the community.

3.2 BREAKING UP WORKS

Large contracts could deter competition (especially in the current high demand market) as not many contractors are available or have the capacity to compete for these projects in Queensland. The potential pool of competitors could be increased if several smaller contracts are called. Smaller contractors also tend to have lower overheads. If the work is to be given to the local government on sole invitee basis, the project size is selected to suit the capability of the particular local government. In such situations breaking up the works may be advantageous.

One way of creating smaller contracts is to split up the works into specialised components to increase competitiveness. For example, it may be appropriate in some cases to split the earthworks from the pavement works if a specialised pavement is being considered – e.g., a concrete pavement.

When considering the splitting out of specialised components, we take care in identifying the risks at the interface of different contracts. For example, when splitting road and bridge construction from a project, the construction of bridge abutments and road embankments may need careful coordination. Conversely, having all elements of a project under one contract gives the contractor greater control over the coordination of activities.

Another way of breaking up the works is to make materials supply a separate contract (for example, gravel or precast concrete products). Such contracts assist in the timing of the project as well as efficiencies in obtaining quality materials. This is particularly useful in remote areas where longer order/lead times are required to ensure materials are delivered to site in a timely manner.

3.3 SEQUENCING/ SCHEDULING/ PROGRAMMING OF WORKS

Spacing out the timing of projects can lead to greater competition for the project and enable the tenderer to spend more time on construction planning and pricing of the work. When like works are bulked up into larger value contracts, benefit can be often gained by allowing a high degree of flexibility in the timing of the works. An example of this is a district reseal program. By allowing a six to nine month period for the contractor to undertake the works, it allows resource scheduling by the contractor and provides for certain economies in the
purchase and supply of materials. Given that the work can be completed in less than this time.

4.0 PROJECT DELIVERY

There has been a tendency in the government sector of the road construction industry to adopt a form of contract and let this dictate the process for project delivery. There is a growing recognition that this is not the conceptually appropriate way. While a lot of road projects are similar and could end up with the same delivery type response we need to approach its determination in a different way. This has been epitomised in the work of Construction Queensland's "Wealth Creation through Equitable Asset Delivery".

It advocates a move away from allowing a preselected contract type to dictate project initiation implementation processes. This can result in a lack of risk appropriate to the particular project being considered or the creation of an inequitable relationship between clients, consultants and contractors. It advocates a reverse process, i.e. Move from a situation depicted in Figure 1 to one depicted by Figure 2.

*Figure 1: Strategy Dictated by Contract*

*Figure 2: Desirable model of asset delivery – form follows function*

Main Roads is adopting a strong formalised project management approach to the delivery of its projects. The process considers:
• Project objectives (includes time, cost, functionality, quality standard, local employment, environmental, break-throughs and so on)
• Market appetite
• Project complexity: urban/rural, multi-lane – build under traffic, technology – heavy duty pavements and so on
• Stakeholder / community issues
• Project geographic location – availability of materials, skilled labour, specialised plant
• Fit for purpose outcomes – ability to fully specify the output vs. need to retain flexibility
• Risk allocation – place risk where the consequences can best be managed
• Innovation – best approach to drive innovative solutions, reduce rework – for example, combine design with construction
• Programming and sequencing – commencing activities in parallel (design and construction) can result in optimal timeframes.

The issues considered above become inputs to the selection of the delivery system appropriate to the project. The Main Roads Project Delivery System takes into consideration packaging (size, speciality components and sequencing) and contract type. Risk elements specific to the project (scope, time, risk, constructability, sensitivity, capacity and capability, budget and location) are examined and scored in a matrix, with each element weighted according to its importance in delivering the required project outcomes.

The matrix determines the preferred design/construct interface, the degree to which broad risks can be costed, whether they are best allocated or shared, and the degree of change likely in the project. In general, the more uncertainty, complexity, degree of change and the need for engagement of the client in the process, the more the project is suited to an alliance approach.

The majority of Main Roads projects are relatively straightforward, easily scoped and suited to traditional delivery. The current construction market has added an extra dimension to obtaining value for money from the appropriate delivery method. Value for money from traditional delivery assumes that value is achieved by 'cheapest' price in an efficient and effective market.

The current engineering and mining market has generated high demand for construction resources (both personnel and materials) with limited supply, and has enabled suppliers to be more selective in their work.

The forecast additional increase in the demand for the delivery of infrastructure projects and the shortage of experienced people to undertake the work has resulted in the need to explore alternative and less resource-intensive forms of delivery. To this end, Main Roads has developed a new form of contract called Early Contractor Involvement Contract. This allows the engagement of the contractor early in the design and/or planning process prior to the land acquisition and other processes such as environmental clearance.

This contract type (ECI) can be divided into two stages. It is similar to a project alliance for stage one and a Design & Construct contract for stage two. In the first stage, the principle, contractor and contractor’s designer plan the performance of the work under the contract, undertake the detailed planning and preliminary design, deal with risks in stage one and price the work for stage two. Stage two applies only if the principle accepts the contractor’s stage two offer. If accepted, the contractor completes the detailed design and constructs the work. The Early Contractor Involvement methodology enables Main Roads to gain the benefits of a design and construct delivery method but to minimise the intensive resources required in the tender process of a normal Design & Construct delivery method.
The Early Contractor Involvement is the newest form of contract being considered by Main Roads in its quest to achieve value for money outcomes. This form of contract has the following characteristics:

- Engagement of the contractor is by non-price attributes plus overheads and profit
- The Principal’s designer may or may not be novated
- Payment until a firm price is established is on a cost plus basis with open book principles
- It is heavily partnered, with incentives built in
- Risks are negotiated
- The construction phase may be on a lump sum basis
- It can help in fast tracking projects
- It gives ownership of the design to the contractor mitigating owner design risks in the construction
- It has the ability to build constructability into the design.

Main Roads intends to use this form of contract for its Maroochy River Bridge Duplication Project on Sunshine Motorway in Queensland.

External perception of value for money often focuses on the appropriateness of the risk adjusted price (RAP). There are a number of pressures exerted in the development of a RAP to produce the best price (See Fig 3 – Price Pressures in Developing the Risk Adjusted Price)

**Figure 3: Price Pressures in Developing the Risk Adjusted Price**

Client leadership is critical to the successful outcome of the project. It involves a hands-on approach where the client, through espousing appropriate behaviours and actions, influences the supply chain to adopt a collaborative, group problem solving, best for project approach.
5.0 USE OF SUPPLY CHAIN MANAGEMENT

Effective supply chain management is a mechanism used by Main Roads to achieve value for money outcomes. We endeavour to increase openness, transparency and efficiency in supply chain management. This approach towards supply chain management helps us to identify the strengths, weaknesses and opportunities of our suppliers, which are essential to achieve value for money outcomes. Improved early communication with us enables our suppliers to provide a better service often resulting in innovation. Our supply chain management does not stop with the first tier suppliers.

5.1 HOW DO WE MANAGE OUR SUPPLY CHAIN?

There are many strategies and activities we use for effective supply chain management some of which are described below.

Our prequalification system helps us to manage first tier supplier information well. Not only do we keep records of organisational information such as financial, human resource and technical, we maintain performance related information as well, which helps us to make informed purchasing decisions. Our recording system extends beyond first tier suppliers. For example, we have created several specialised supplier registers that capture information on suppliers of high risk products such as prestressed concrete and asphalt.

We have excellent two way open communication with our suppliers, both at project level and supplier community level. We use ‘Value Management Packaging Workshops’ for large complex projects to involve the supply chain and other stakeholders in order to get their ideas for the delivery of these projects.

Figure 4 depicts this diagrammatically. The need for the use of the various techniques depends on the complexity of the project. However, a partnering approach is a fundamental component of the process.

Figure 4: Supply Chain Integration
We have an excellent relationship with professional supplier organisations and have constant dialogue with them. Their input is always sought to improve our strategies and practices. Most of our suppliers fall into the engineering profession. Main Roads is a major supporter of the peak engineering professional organisation in the country, Engineers Australia. Main Roads supports the Queensland Division as a Platinum Sponsor and encourages its staff to play major roles. Such active participation with and support to professional organisations helps Main Roads to form excellent relationships with them and use the same to achieve better value for money outcomes for the organisation and contribute to the betterment of the industry.

At the project level, we use partnering to improve the relationships with our contractors. Partnering is a structured management approach, which encourages teamwork across contractual boundaries. We use partnering in several forms. Extended partnering, which requires entering into agreements and attending relationship workshops is an improved form of partnering used for complex projects.

We use alliancing, which is a highly evolved form of partnering, for high cost highly complex projects. In fact, Main Roads can be considered as a pioneer in using alliance approach for road works. After conducting a research on relationship contracting, Manley and Hampson of the QUT/CSIRO Construction Research Alliance declared in October 2000 that Main Roads appeared to be the only road construction agency in the world (at that time) involved in alliance contracting (Manley, 2000: 9).

The road infrastructure projects of the department for which alliance approach has been used include the following:

- Georgina River Alliance, Cloncurry - Cost Aust$15.16 Million (American$ 11.37 Million)
- Pacific Motorway Package 4 - Cost approximately Aust$18 Million (American$ 13.5 Million)
- Port of Brisbane Motorway Package 3 - Cost approximately Aust$ 105 Million (American$ 78.8 Million).

Main Roads has expanded the use of the alliance approach to a strategic level by forming a strategic alliance with one of our delivery partners, the local government (represented by the Local Government Association of Queensland) to further improve our services in the provision of road infrastructure in Queensland. The alliance agreement signed in late 2002 between the Main Roads and the Local Government Association of Queensland included initiatives such as managing funding and investment, asset management, joint purchasing and resource sharing and improving capability of partners, in addition to the construction and maintenance of local roads for regional significance.

5.2 VALUE FOR MONEY OUTCOMES THROUGH SUPPLY CHAIN MANAGEMENT

Increased focus on supply chain management helps us to achieve the following:

- Improved risk allocation and management. We allocate risk to the party best placed to manage it and better understanding of our suppliers plays a significant role in risk management
- Our ability to attract a diverse range of suppliers, bringing increased competition and innovation to our work
- A close relationship with suppliers, particularly professional bodies that represent our suppliers, helps changing industry culture benefiting our suppliers and enabling us to achieve value for money outcomes
Early supply chain involvement helps the suppliers to understand our requirements better and for us to get their ideas to avoid costly mistakes and variation claims.

Better quality solutions offered by suppliers also contribute to better value for money outcomes.

Long-term partnerships help our suppliers to deploy their resources more effectively and provide competitive rates.

6.0 USE OF NON-PRICE FACTORS IN THE SELECTION OF TENDERERS

We still believe that the lowest tender approach from appropriately prequalified contractors delivers value for money for most of our projects which are low cost and relatively simple. However, higher value projects and those involving greater complexity (including technical, social and environmental issues) entail more significant risks. For such projects, we believe that the best approach to achieve value for money outcomes is to consider both price and non-price factors using transparent and uniform processes.

The non-price factors that we consider in Main Roads fall into the following broad areas:

- Project specific requirements not adequately covered by the prequalification system
- Government priorities
- Desired industry cultural change initiatives that would have long-term benefits.

We decide the relative importance of price with respect to non-price factors through assigning weights. This is an area where considerable attention is required. A higher weighting to non-price factors can contribute to achieving better non-price objectives. However, this may also result in an increase in the tender amount. On the other hand, a high weighting for price may have a marginal impact on the final non-price objectives. For most of our contracts, we use 80% to 90% weighting for price. We recommend the use of non-price selection criteria for all contracts, particularly for those with an estimated total cost of $5M and over.

Main Roads recently used price and non-price tender selection approach for the following road infrastructure projects in Queensland:

- Maroochy Road Bridge, Maroochydore – approximate cost Aust$22 Million (American$ 16.5 Million)
- Plain Lands Interchange, Toowoomba - cost Aust$10.8 Million (American$ 8.1 Million)
- Linkfield Connection Road, Brisbane - cost Aust$18.9 Million (American$ 14.2 Million).

The value for money outcomes relevant to the use of non-price factors in awarding contracts include:

- Higher rate of success of projects due to the selection of contractors after considering their methodology, resource strategy, supply chain management and other relevant criteria
- Reduction in overall cost due to reduction in variation claims, administration costs resulting from litigation and supervision costs
- Reduction in overall cost of projects due to effectively managing risks
- Ability to pay a fair contract price to contractors enabling them to make an appropriate profit. A contract price with little or no profit margin may be reflected back down through
the supply chain creating economic problems for a number of suppliers and creating other problems to clients

- Potential to create a less-adversarial and claims-oriented industry by developing a higher level of trust
- Potential to create accountability for past performance as it can be incorporated into the selection criteria
- Contribute to achievement of state government priorities
- Contribute to desired industry cultural change initiatives that would have long-term value for money benefits.

7.0 ARE THESE ENOUGH TO ENSURE VALUE FOR MONEY OUTCOMES?

Having these initiatives in place is not sufficient to guarantee value for money outcomes for Main Roads. Much more is needed. One of the most important things is informed decision making.

No two road projects are similar. The considerations that can add value for money for our projects are several and require subjective judgment. Therefore, it is of vital importance that sufficient guidelines are made available to our staff to make intelligent decisions. Main Roads has produced a number of manuals to provide guidance for making decisions with respect to achieving value for money outcomes. In addition, Main Roads' staff is adequately trained to take informed decisions in this area.

Once a decision has been made it needs to be implemented properly and confirmed by reviewing the final results to ascertain the achievement of value for money outcomes. Main Roads uses a project management tool named ‘OnQ’, which enables it to incorporate expected value for money outcomes in project management documentation under project goals, monitor the achievement of the same during the implementation of the project and to record outcomes achieved after completion which can be compared against expectations at the commencement of the project. We analyse reasons for any unfulfilled expectations and use learnings in future projects.

8.0 CONCLUSIONS

Just like any other investors, the public are always observing the performance of public service organisations which are funded through their tax dollars. The public wants these organisations to be economic, efficient and effective. They want public service organisations to achieve value for money outcomes in their delivery of services.

As a good corporate citizen, Main Roads has taken up this challenge very seriously. We have adopted a large number of measures to achieve value for money outcomes. Some of those related to the delivery of road infrastructure were discussed in the paper. Main Roads has a good reputation for its past initiatives in this area, some of which received world-wide attention.

For instance, during an international Bar Association conference held in Amsterdam in 2000, delegates from the USA, Europe including the United Kingdom, Asia and Africa were surprised to learn that Australian public sector procurement methods had advanced to the point of adopting project alliancing to deliver high profile complex projects in Australia. Main Roads was recognised as the first road authority to introduce project alliancing for road infrastructure delivery (Jensen C., 2005). Main Roads continues to provide value for money services to Queenslanders providing examples to other public service organisations in Queensland.
9.0 REFERENCES

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