

# EFFECTIVE AND INNOVATIVE PARTNERSHIP MODEL FOR OF MAJOR TREATMENT PROGRAMS

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## **ABSTRACT (500 WORDS MAXIMUM)**

An additional half a million people will live in Sydney's North West by 2040, placing increased demands on the city's wastewater treatment infrastructure. To address the increased loads, Sydney Water established the Lower South Creek Treatment Program (LSCTP), which includes \$400M of capacity upgrades and renewal works at three Waste Water Treatment Plants.

Following 15 years of alliancing, Sydney Water took the decision in 2013 to restructure its approach to capital delivery. The decision was founded on concerns over the cost-efficiency of the contractor-led alliancing model, where the principal took a light-touch role, and contractors were able to benefit from self-performing works at a higher cost.

The Delivery Partner contracting model, pioneered on the London 2012 Olympic Games, is being used as an alternate to traditional contracting models. This paper outlines the features of the Delivery Partner model, the costs and benefits when compared to more traditional models and the advantages that are being realised 18 months into the LSCTP.

In establishing a Delivery Partner for LSCTP, Sydney Water sought a contracting strategy that captured the construction skills of a contractor, the program management skills of an engineering consultancy and the in house knowledge of the Sydney Water operators and maintainers. Partnering as an integrated team, the Delivery Partner takes on the accountability and responsibility for the overall program outcomes and provides the management resources required to deliver the program.

Value for money is realised by more effective risk allocation, with the Delivery Partner as Principal Contractor being fully accountable for delivery, however contracts are direct with Sydney Water which reduces margin on margin. Furthermore, Cost efficiency is realised via standardisation of equipment and materials, and procuring contracts program wide. Innovation leading to program savings is rewarded with increased profit share for the Delivery Partner.

The above benefits are materialising for Sydney Water, with technology innovations such as Aerobic Granular Sludge (AGS) and Thermal Hydrolysis, as well as process innovations via the use of BIM to support more integrated program management.

## **KEYWORDS**

Delivery Partner, Program Management, Innovation, Integration, Supply Chain

## **PRESENTER PROFILE**

Anthony Korbel is the Program Director for the Lower South Creek Treatment Program, Sydney Water's \$AUS400M program to upgrade Waste Water Treatment Plants in North West Sydney. Anthony has worked for the last decade with WSP delivering and advising major infrastructure programs including the \$10bn Roy Hill Iron Ore Project, NSW

Project's delivery of \$5bn in rail upgrades and the Federal Government's delivery of the \$1bn Indigenous Housing Program in the Northern Territory.

## 1 INTRODUCTION

The Delivery Partner contracting model, pioneered on the London 2012 Olympic Games, is being used as an alternative to traditional contracting models. The Delivery Partner brings together aspects of both collaboration, integrated teaming and traditional contracting.

The Olympic Delivery Authority (ODA) was tasked with the delivery of a £9.3 billion (AU\$19.7 billion) infrastructure program consisting of 70 individual projects to be delivered under significant public scrutiny and with a fixed milestone date. The ODA appointed a Delivery Partner in September 2006 to procure a delivery partner who would be accountable for managing the delivery of the planning, design, construction, commissioning, maintenance and conversion to legacy mode. Additionally, for cost management (monitoring, reporting and control) up to the conclusion of final account in accordance with the ODA's time-certain, quality and budget objectives and priority themes.<sup>1</sup>

The Delivery Partner model is relatively new to the Australian market, with few completed case studies. Current programs which are utilising the Delivery Partner model include the NSW Government's 155km Pacific Highway Upgrade (\$4.3bn), Sydney Water's Lower South Creek Treatment Program (\$400M) and Western Sydney Airport (\$5.3bn).

## 2 DISCUSSION

### 2.1 WHAT IS A DELIVERY PARTNER?

The ODA defined a Delivery Partner as a partner organisation with a client for project and programme delivery. The Delivery Partner is not typically part of the design and construction supply chain, but a partner to the client.<sup>2</sup>

The Delivery Partner model creates a team wholly integrated with client knowledge and skills, working in collaboration with the client in a formalised partnership.

The role of the Delivery Partner is to:

- provide the skills and resources to the client organisation for total program and project management;
- acting as the single point of accountability for the project management of the delivery program;
- develop packaging and procurement strategies to optimise program outcomes;
- competitively procure contracts for the design, supply, construction and commissioning of the program of works within the Government's procurement framework;

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<sup>1</sup> Official Journal of the European Union (OJEU) (2006). Notice 2006/S 33-036394 UK-London: construction project management services

<sup>2</sup> Jacobsen, Lessons learned from the London 2012 Games construction project, OLA, London, 2011

- and, lead and manage the supply chain in the design and construction of program, including the option of acting as Principal Contractor.

A feature of both the OLA and Sydney Water programs is the ability to progressively issue packages with performance objectives and outcomes adjusted to reflect any changes to the program.

Acting as an agent for the Owner the Delivery Partner manages the supply chain in the delivery of their contracts, however it is precluded from self-performance of the works.

## 2.2 LOWER SOUTH CREEK TREATMENT PROGRAM

An additional half a million people will live in Sydney's North West by 2040, placing increased demands on the city's wastewater treatment infrastructure. To address the increased loads, Sydney Water established the Lower South Creek Treatment Program (LSCTP), which includes \$400M of capacity upgrades and renewal works at three Waste Water Treatment Plants. Rather than award the work for each project under a separate D&C contract, Sydney Water has opted for a Delivery Partner (WSP and UGL) responsible for all aspects of delivery.

The program includes three projects:

- Riverstone WWTP amplification and upgrades which includes a new biological nutrient removal (BNR) plant.
- Quakers Hill WRP upgrades which includes a new Aerobic Granulated Sludge treatment plant to replace ageing infrastructure.
- St Marys WRP upgrades and amplification works which includes a biosolids hub with energy recovery, new inlet works to replace ageing infrastructure, and expansion of the BNR plant.

Figure 1: Sydney's North West Growth Centre<sup>3</sup>



<sup>3</sup> NSW Planning and Environment, North West Growth Centre Infrastructure, NSW Government, 2018

### 2.3 WHY SYDNEY WATER CHOSE A DELIVERY PARTNER MODEL

Following 15 years of alliancing, Sydney Water took the decision in 2013 to restructure its approach to capital delivery. The decision was founded on concerns over the cost-efficiency of the contractor-led alliancing model, which has led to mixed project outcomes due to consensus decision making, limited involvement by Sydney Water as Owner, and contractors benefiting from self-performing works at a higher cost.

In establishing a Delivery Partner for LSCTP, Sydney Water sought a contracting strategy that captured the construction skills of a contractor (UGL), the program management skills of an engineering consultancy (WSP) and the in-house knowledge of the Sydney Water operators and maintainers. Partnering as an integrated team, the Delivery Partner takes on the accountability and responsibility for the overall program outcomes and provides the management resources required to deliver the program.

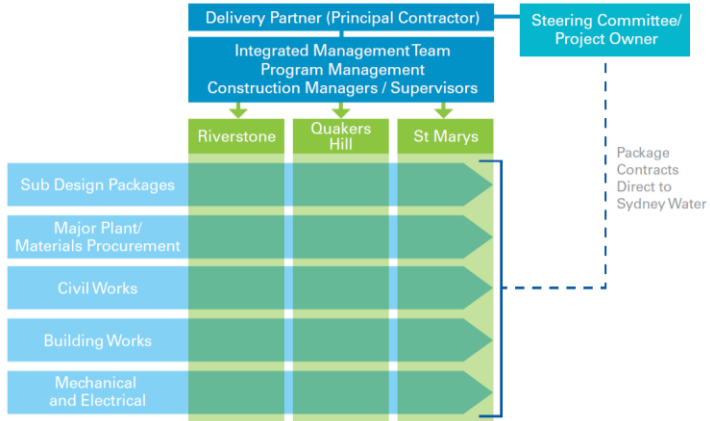
Sydney Water's objectives focus on realising the benefits of a program over three distinct projects. These benefits include procurement efficiency via program wide sourcing strategies, consistency of technology and equipment across plants and leveraging lessons to drive a culture of continual improvement.

Critical to the success of LSCTP Delivery Partner is alignment of Sydney Water's objectives with the objectives of the Delivery Partner, and the flow down through the supply chain. With the Delivery Partner integrated into the Sydney Water organisation, all levels of management and key functions interact with regularity to ensure that the program remains focussed on outcomes and delivers infrastructure that is fit for purpose. The Delivery Partner's commercial framework includes gainshare payments for outperformance of program objectives including time, cost and safety. The gainshare payments are used by the owner to incentivise performance. Flow down and management of those program objectives through the supply chain is fundamental to the success of the Delivery Partner.

The LSCTP utilises UGL to as Principal Contractor, who take on accountability for safety across the program. Having a Tier 1 Contractor (UGL) embedded within the Delivery Partner enables Sydney Water to contract directly with lower tier suppliers, whilst having assurance that those Contractors meet their safety obligations.

Figure 2: LSCTP Delivery Partner Model

Commented [CR1]: Abstract refers to costs – not sure if this needs to be a separate heading, but if not needs to be a strong focus throughout.



## 2.4 COMPARATIVE TABLE – DELIVERY PARTNER, D&C CONTRACTING AND ALLIANCING

Table 1: Comparative Table – Delivery Partner, D&C Contracting and Alliancing

	<b>Delivery Partner</b>	<b>Design and Construct</b>	<b>Alliancing</b>
Model	The Delivery Partner acts as Principal's agent in the superintendence, co-ordination, design management and construction management of contracts. All contracts are direct to the owner who is listed as the Principal, with the Delivery Partner listed as Contract Manager or Superintendent.	The Principal awards a lump sum contract to a Contractor who is fully accountable for design and construction that meets the Principal's Project Requirements.	The Owner and one or more service providers work together as an Integrated Delivery Team (usually a Project Alliance Agreement) to deliver a project where commercial interests are aligned to project outcomes.
Governance	All contract commitments remain the accountability of the owner as Principal. Delivery Partner has full accountability for delivery of contracts. A Program Control Group with representatives of the owner and Delivery Partner governs the performance of the program. The requirements for the works are managed by the Delivery Partner and approved by the Owner.	The Principal (typically the Owner) develops the concept design and issues the Principal's Project Requirements (PPRs) to the Contractor. D&C Contract has full accountability for delivery of the works.	The Alliance Leadership Team can only make decisions on a unanimous basis. The requirements for the Works are jointly developed by the Participants and approved by the Owner.
Performance of Works	The Delivery Partner is precluded from self-performing works. The Delivery Partner procures design, supply and works contracts direct with the owner to deliver the works.	The Contractor is solely responsible for executing and completing the work under the Contract in accordance with the requirements of the contract (as prescribed by the Principal in the Principal's Project Requirements).	The Alliance participants are jointly responsible for the works and deliver work via in integrated project team.
Owners involvement	Moderate	Low	Moderate to high
Compensation	Cost reimbursable with Margin cap on fee	Lump sum contract with liquidated	The compensation framework is based on the premise of 'all win / all lose' so that

	<b>Delivery Partner</b>	<b>Design and Construct</b>	<b>Alliancing</b>
	and Pain/Gain on Program KPIs.	damages on contract milestones.	parties share 'gain' or 'pain' depending on project outcomes
Risk allocation	Owner is at risk for all direct costs. The Delivery Partner is at risk for its own corporate overheads and margin as well as a capped painshare contribution, should the project overrun its target program budget. Consequential damage clause (in Owner's favour) for timely completion is included in certain instances. Owner at risk for balance of program cost.	Contractor is at risk for cost. Liquidated damages clause (in Owner's favour) for timely completion is included. Consequential damages clause (in Owner's favour) for timely completion is included in certain instances. Owner at risk for balance of program cost.	Cost risk is typically shared between Owner and alliance parties. Alliance cost risk has painshare cap, with guaranteed reimbursement of alliance direct costs (open book). Program risk typically borne by Owner.
Opportunity allocation	Delivery Partner is incentivised by gainshare mechanism which allocates a capped portion of cost underrun based on performance against key result areas. Program performance is a key result area and early delivery of key milestone(s) will contribute to gainshare amount. Owner takes balance of opportunity.	Contractor takes all cost opportunity (driving a lowest capital cost culture amongst D&C contracts). Early project completion is typically associated with underrun on time based costs for the Contractor.	Alliance parties are incentivised by capped cost gainshare mechanism. The 'cost plus' nature of alliancing limits program incentivisation, with members typically reimbursed for the length of engagement (up until painshare).
Supply Chain Management	Owner contracts service provider (Delivery Partner). Key Owner's personnel embedded in Delivery Partner Team. Owner holds direct contractual relationship with supply chain. Delivery Partner acts as Owner's agent, within Owner's commercial and procurement framework	Owner procures D&C Contractor. The D&C Contractor typically subcontracts work and is the Principal for those contracts. No direct relationship between supply chain and owner.	Owner contracts consortium of service providers and contractors. Balance of supply chain engaged via Alliance.
Typical usage	Medium to large programs of work of similar scope.	Projects with high scope certainty.	Projects with low scope certainty.



	<b>Delivery Partner</b>	<b>Design and Construct</b>	<b>Alliancing</b>
Design Responsibility	Detailed Design contracts are awarded by the Delivery Partner to a design consultancy, who accepts design responsibility.	The D&C Contractor accepts design responsibility, and will typically contract a design consultancy. The D&C Contractor has full control over design within the bounds of the PPRs.	The Alliance integrated project team incorporates design resources that take design responsibility. Design decisions are made on a best for project basis.
Capital Cost	Relatively high cost certainty. The painshare / gainshare mechanism, incentivises cost saving whilst enabling partial recovery of cost should the target program budget be exceeded. The Owner is exposed to movement in direct costs and design development. The cost of change is reasonable, reflective of the direct cost.	High cost certainty on base scope. Lowest capital cost is incentivised. Owner is insulated from market forces, escalation, design development and rework. However, there is limited opportunity for the owner to save cost. Large / complex projects require Tier 1 Contractors. The Contractor commercial stance is typically adversarial and drives a high cost of change.	Low cost certainty at business case stage. Typically used for projects with low scope certainty. Alliancing is focused on the engineered outcome and does not drive a culture of cost or time efficiency.
Program	High program certainty. Program is moderately incentivised.	High program certainty. Program is inherently incentivised.	Low program certainty. Limited incentive to optimise program. Unanimous decision making can impede program.
Operability	Relatively high level of operator engagement during design. Designated Owner SMEs embedded in Project Team. Operator inclusion in review workshops and gates with option to optimise design where appropriate.	Limited operator engagement during design. Contractor is incentivised to select lowest capital cost option. Proportionally high cost of change.	High level of operator engagement. Owner is represented at all levels of the alliance executive, management and project teams.
Whole of Life Cost / Benefits Realisation	Key focus during design and procurement.	Tertiary consideration behind capital cost and program.	Key focus during design and procurement.
Margin on works and trade	Typically single layer of margin due to Owner direct contracting at the trade and	Mixture of single and multiple layers of margin due to contractor holding (and typically marking up) all subcontracts.	Mixture of single and multiple layers of margin due to alliance members holding (and marking up) all subcontracts. Margin

	<b>Delivery Partner</b>	<b>Design and Construct</b>	<b>Alliancing</b>
contracts	supply level.	Margin duplication typically increases inversely to percentage of contractor self-performance	duplication typically increases inversely to percentage of alliance member self-performance
Equipment Supply	Managed by DP, directly engaged by Owner	Typically engaged by contractor directly. Owner procurement and free issue of certain equipment possible in appropriate circumstances.	Typically engaged by alliance member directly. Mechanisms are available for Owner procurement.
Equipment Standardisation and Maintenance	Standardisation and economies of scale available across program. Maintenance agreements back to back with supply contracts	Equipment selection driven by functional specification, lowest capital cost and lead time.	May vary depending on structure of Alliance model
Probity and administration	Owner's procurement and commercial framework used. Generates high volume of administration for Owner.	Contractor systems used. Very limited administration by Owner.	Mixture of alliance parties systems used. Limited to moderate administration by Owner.
Change Management	Typically agile. Cost of change largely limited to direct costs.	Lump-sum contracting creates a culture of contractor cost / margin recovery via change. Cost of change typically high as a result.	Unanimous decision making can impede program. Cost of change is typically reflective of direct cost plus overhead multiplier due to open book commercial arrangement.
Scaleability (of Scope)	Cost efficiency increases with addition of scope. Reduction of scope decreases efficiency of remaining scope.	Cost efficiency typically decreases with addition of scope.	Cost efficiency typically decreases with addition of scope due to lower program focus.
Economies of Scale	Enables program wide procurement and leveraging of Owner's and delivery partner's supply agreements.	Typically limited to contractor's buying power.	Cost efficiency often decreases with addition of scope.

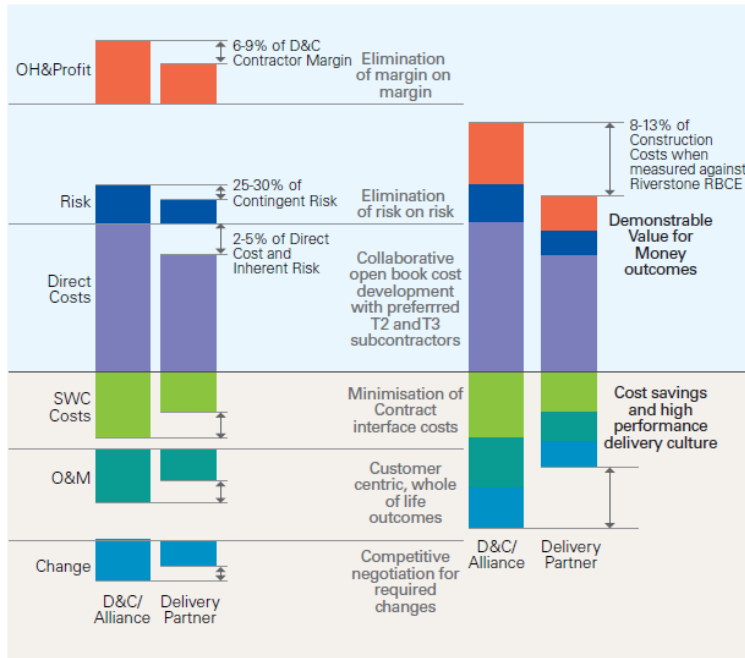
## **2.5 STRENGTHS OF THE DELIVERY PARTNER MODEL**

### **2.5.1 VALUE FOR MONEY**

The Delivery Partner model is realising value for Sydney Water by:

- Directly engaging lower tier contractors and by doing so eliminating margin on margin;
- Enabling flexible packaging strategies focussed on market capability, management of interface risk and reduction in contractor margin and overheads;
- Full transparency of costs, risks and issues'
- Effectively managing change in scope, program and funding;
- Improving supply chain integration and uniform procurement of materials and construction contracts;
- Re-engaging contractors based on demonstrated value for money and assessed performance;
- More effective risk allocation, with awarding of construction contracts after de-risking of geotechnical, services and existing infrastructure interfaces. This has reduced the need for contractors to price risk based on lack of information;
- Technology and delivery innovation which are leading to both capital and life cycle cost savings.

*Figure 3: Comparative assessment Traditional Contracting vs Delivery Partner*



### 2.5.2 DRIVING INNOVATION IN DESIGN AND CONSTRUCTION

Improved risk allocation between the Owner and Delivery Partner promotes opportunities to innovate via new technologies and improved delivery methods. Direct Cost risk remains with the Owner as Principal, whilst the Delivery Partner is incentivised via its contract to identify, develop and deliver on innovations that realise value and benefits including life cycle cost savings.

For the LSCTP, risks associated with the introduction of new technologies are mitigated during concept design through the use of Technical Reference Groups and Pilot Plants at cost to the owner. As contracts are direct with the Owner, legal and commercial negotiations provide the Owner the opportunity for establishing performance guarantees that mitigate risks of consequential loss.

The Delivery Partner’s responsibility is to manage the end to end process on behalf of the Owner through concept design, business case gateway reviews, procurement, contract award, and delivery by the Supply Chain. Any capital savings realised from the new technologies are realised as savings for the Owner and may fund the Delivery Partner’s KPI pool.

For program to date, the LSCTP has adopted three innovation technologies:

- Thermal Hydrolysis Process (THP) which is being utilised at the St Marys biosolids hub to improve biogas recovery, reduce energy consumption, and improve biosolids recovery for reuse.

- Aerobic Granular Sludge (AGS) technology is being used at the Quakers Hill WRP as an alternative to the traditional Four Stage Bardenpho, due to its significant reduction in capital cost, reduction in construction footprint, reduction in energy consumption and operating cost savings. Sydney Water is the 2nd Utility in Australia to utilise AGS for biological wastewater treatment and this is the first AGS plant being developed by Sydney Water.
- Mechanical Primary Sedimentation (MPS) Screens are being utilised at both Quakers Hill and St Marys WRP due to capital and life cycle cost savings, reduction in construction footprint and improved odour control of primary treatment.

In addition to process treatment innovation, the Delivery Partner are using digital engineering to drive innovation in its program management. Whilst BIM has traditionally been used in design development for clash detection, operability and maintainability reviews, the Delivery Partner is now using BIM to support planning, estimating, progress reporting and assessment of earned value. The BIM model provides a common platform for the supply chain to communicate, which establishes greater clarity between parties and improves efficiency in decision making.

### **2.5.3 MAINTAINING AN INTEGRATED AND COLLABORATIVE PARTNERSHIP**

The LSCTP Delivery Partner has built a trusting, long lasting partnership with Sydney Water, based on a high performing delivery team that aligns with the client's strategy, values and the Program's objectives and stretch targets.

With integrated Sydney Water personnel, the delivery organisation is matched to multiple Sydney Water interfaces including engineering, operational, financial, procurement, environment and communications requirements.

The Delivery Partner has also significantly invested in a series of Alignment activities, workshops and coaching sessions throughout the duration of the Program to improve team dynamics, communication and working relationships between the Client and the Program team.

Building a strong relationship within teams and getting the right culture is essential to success. This is achieved by identifying the right integrated framework.

Based on experience, the Delivery Partner model works well with clear work front delineation and with a linear infrastructure. However, when delivering process infrastructure (e.g. wastewater treatment plant), utmost care must be taken in defining interfaces between packages.

To date, the biggest lesson learnt has been the need for total alignment between Sydney Water's internal teams and the Delivery Partner. This includes linking design with procurement and construction, enabling the legal and procurement teams to keep pace with the Delivery Partner timescales and streamlining business, KPIs and financial systems.

### **2.5.4 PROGRAM MANAGEMENT OF THE SUPPLY CHAIN**

Benefits of the Delivery Partner model are being realised via a procurement strategy that is focussed on a program wide sourcing strategy that benchmarks performance, shares lessons program wide and utilises existing supply arrangements. The value for the Owner is realised via partnership with its supply chain, continuous improvement in performance from project to project and reduction in procurement timelines.

This strategy is implemented via:

- testing the market through a competitive tender process on a category basis
- selecting a preferred contractor based on value for money
- benchmarking the contractor's rates against competitor's program wide using a standard WBS
- assessing a contractor's performance in delivery of works
- re-estimating works from Bill of Quantities and applying benchmark rates to define a check estimate
- negotiating with preferred contractors for successive scopes within their category, capability and capacity where their rates have already been proven market competitive and performance justifies continued work

The Delivery Partner monitors supply chain performance through standardised Key Performance Indicators (KPI) that provide consistent, quality information that can be relied upon for decision making and support sole sourcing of suppliers and contractors. The KPI Score is used to assess the supplier or contractor's performance and its viability for future works within the LSCTP and Sydney Water in general.

The KPIs include safety, quality, environment and community, cashflow, schedule, key personnel and reporting. Each KPI is comprised of one or more Key Result Areas (KRAs). All KRAs are scored out of 100. Each KRA score is multiplied by the KRA weighting to calculate the KPI score for the respective function. KRA modifiers are uncapped. Each KPI score is multiplied by a KPI weighting to calculate the overall KPI score for the supplier or contractor.

## **2.5.5 PARTNERING THROUGH THE SUPPLY CHAIN**

The LSCTP Delivery Partner has had several opportunities to work with the supply chain to deliver a beneficial result not only for the client but also the individual contractors.

Upskilling of contractors and their systems not only benefits the program, but also the contractors. An example of this upskilling in practice is the engagement of lower tier contractor with limited safety systems to undertake basic civil works who is now being re-engaged following 12 months of working on the program to construct more complex water retaining structures. Coaching in the requirements of the program for safety, quality, engineering and constructability has transformed the capability of the Contractor which enables them to bid for higher value work and provides the owner with a more flexible supply chain.

## **2.6 CHALLENGES OF THE DELIVERY PARTNER MODEL**

### **2.6.1 PROCUREMENT PROCESS**

Procurement for LSCTP is direct to Sydney Water, which as a State Owned Corporation requires the Delivery Partner to work within Government procurement guidelines. The governance requirements include development of procurement strategies by category, select tender RFQ, detailed negotiations with Owner Legal and final per owner delegation manual.

When compared to a traditional D&C Contractor, this procurement process can extend 4-6 weeks to the program for each package. As the packaging strategy for LSCTP requires the procurement of up to 150 packages, this procurement process initially posed a risk to the program. This risk is now being effectively managed via use of existing supplier

relationships to sole source contracts. It is critical to note, however, that in establishing a Delivery Partner, programs must account for the time required to establish those supplier relationships.

### **3 CONCLUSIONS**

The Delivery Partner approach has resulted in successful outcomes for the London Olympics and is now being adopted within Australia for large and complex infrastructure programs in the roads, waste water treatment and aviation industries. As a delivery model, it provides the Owner with an embedded team with the capability to lead the supply chain, with the benefit of direct contracting to the Owner that build longer lasting partnerships. The Owner is provided with flexibility throughout design development and delivery to ensure that assets are fit for purpose, with a commercial model that is sufficiently agile to manage change with limited cost impact. The Delivery Partner model delivers value to the Owner by leveraging lessons across the program, standardisation of equipment, improved owner integration when compared to traditional contracting and incentivising innovation that leads to reduction in capital and operating costs.

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