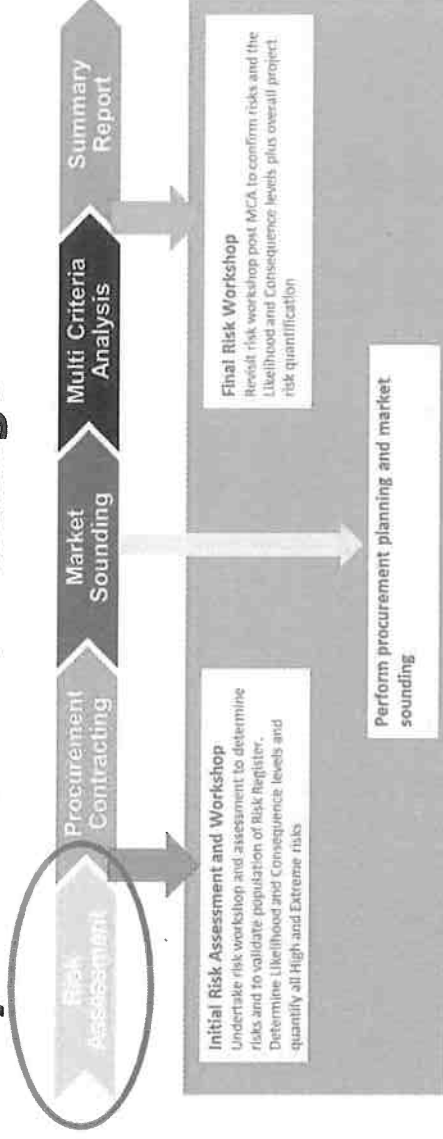
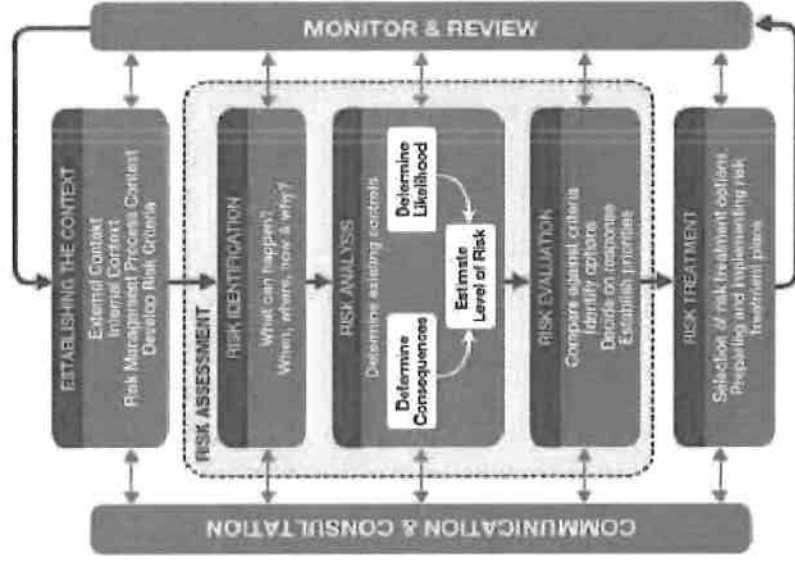


Context –Procurement Strategy Development Lanyon Drive Interchange



- Evaluation and **assessment of risks** associated with the nature of the works and staging
- Evaluation and assessment of **procurement and delivery models** for the construction of the works eg Traditional, D&C, Construct only, ECI, Design Construct and Maintain, PPP, Alliance etc
- **Market sounding** – key players, market capacity and market appetite
- Multi criteria analysis – evaluation of selected **delivery models v weighted selection criteria** eg budget and schedule certainty, flexibility for changes, whole of life cost, innovation etc
- Reporting of findings and advise to maximise the **most appropriate delivery model while minimising risks**

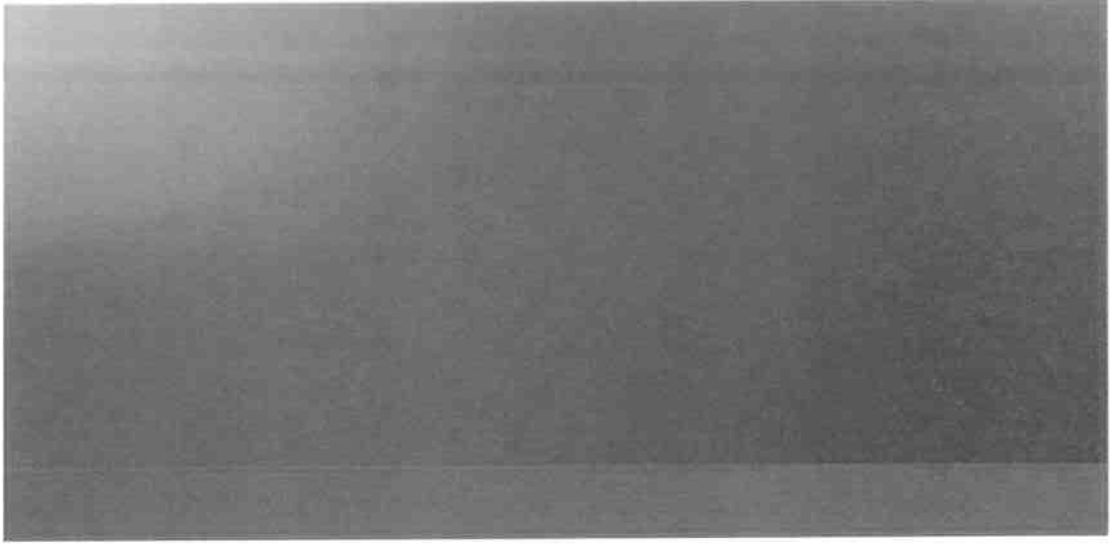
Risk Workshop Process



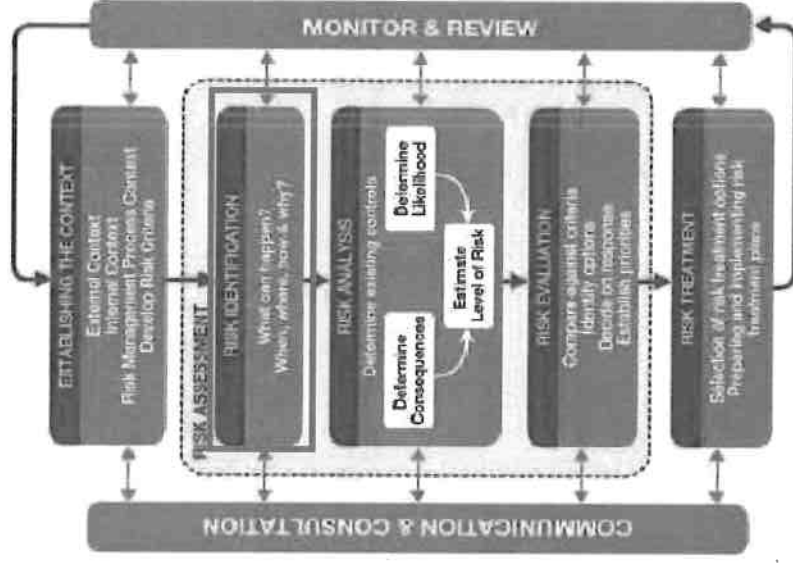
AS/NZS ISO 31000:2018 Risk Management

1. Establishing Context – Slightly Customised ACTIA Template
2. Risk Identification – Review Draft Risk Register (previously circulated). We are going to initially focus on the 22 identified risks/ opportunities that are:
 - **Procurement related** – That can potentially be mitigated through the procurement risk strategy
 - **Priority** – based on their inherent risk rating
3. Analyse likelihood and consequence
4. Evaluate existing controls that are currently in place that either reduces the likelihood of a risk event occurring or minimises the potential for impact arising from that event
5. Treat Risks – Who is best placed to manage the risk ? (Principal or supply chain) Briefly discuss possible risk management strategies. E.g. Eliminate, Transfer Accept etc
6. Review “Other risks” not categorised as “Procurement risks” and determine if they should be included
7. Identify any new risks and follow the above process (allow 30mins for step 6 & 7)

Risk Identification

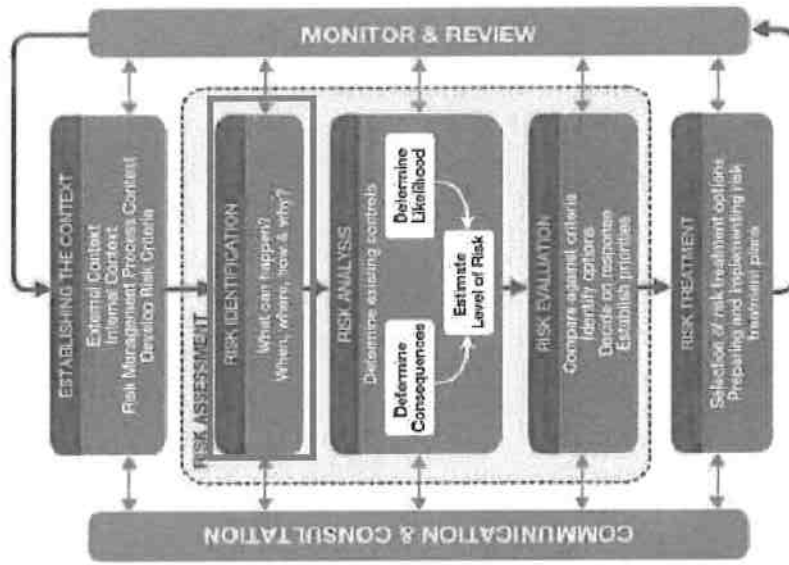


Risk Identification



- Risk Identification – Use of the Draft Risk Register (previously circulated and included all identified risks and opportunities).
- We are going to initially focus on risks/ opportunities that are:
 - Procurement related – That can potentially be mitigated through the procurement risk strategy
 - Have been ranked by their inherent risk rating
- By exception- amend where necessary the risk or opportunity:
 - Description
 - Source
 - Impact/ Outcome
 - Risk Owner

Risk Identification

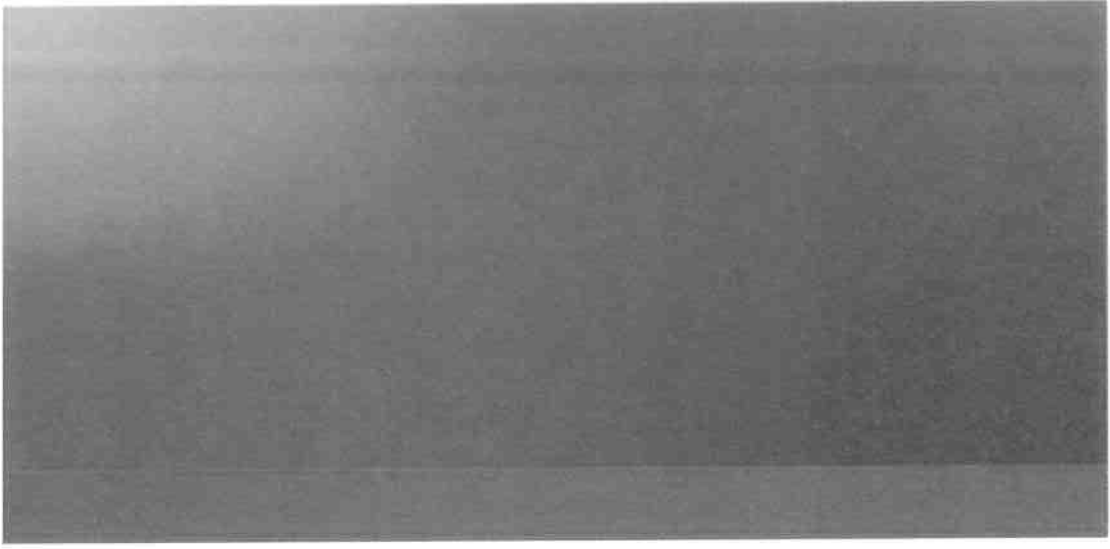


Risk Categories
Assets
Business, Processes and Systems
Commercial
Compliance / Regulation
Contractual
Cultural Heritage
Constructability / Technology
Environment
Financial
Procurement
General Management Activities
Operational
Legislation
People
Products and Utility Services
Project Delivery / Scope of Works
Records Management
Reputation and Image
Security & Health Safety
Service Delivery - Normal Operations
Stakeholder Management / 3rd Party
Strategic
Traffic Management

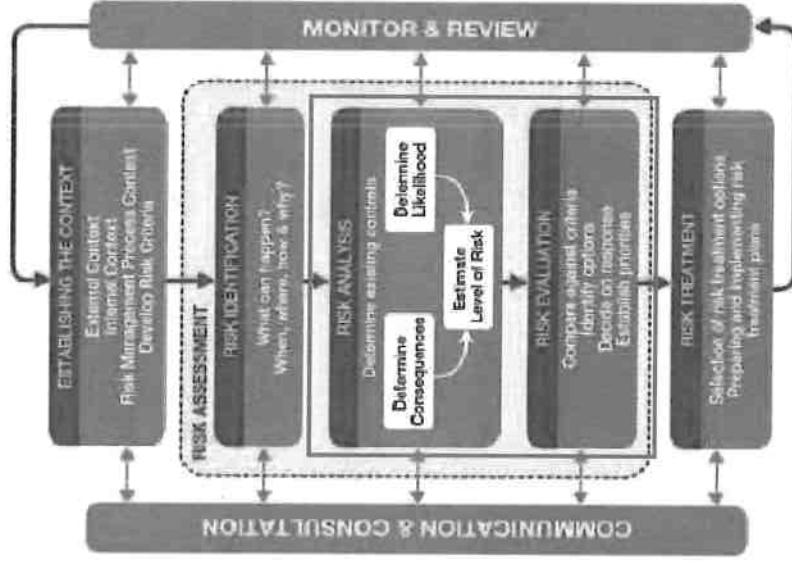
Risk Identification

Risk Reference Number	Procurement Related Risk	Risk Category	The Risk: (There is a risk that.....)	Source (The impacts are....)	Impact / Outcome (Categories Impacted on Consequence Matrix)	Risk Owner	Risk Controls in place / Potential Mitigation Options
6	Yes	Financial	Design option selected for the Lanyon Drive Intersection exceeds the assigned and available budget.	- The selected option from the MCA process has a higher cost than expected falling outside the assigned budget - Insufficient funds remain in the Monaro Hwy Upgrade Program for the Isabella Intersection and the Hume Intersection portions.	Financial Project Delivery / Scope of Works	Stuart Oxborrow	- Robust Multi Criteria Analysis procedure in place - Ongoing costs estimation during design development allows potential budget blowout identified early and design changes made.
7	Yes	Financial	Submitted responses to tender are in excess of approved budget resulting in delays to project or reworking of scope.	- Additional budget has to be sourced as economic conditions have changed since allocation of budget. - a direct result of Community, environmental, or political changes since release of RfT. - scope creep by respondents	Financial Project Delivery / Scope of Works	Stuart Oxborrow	- Detailed Cost Estimate to be developed in support of Budget submission. - Scope statement and cost estimate to be aligned.

Risk Analysis



Risk Analysis & Evaluation



- Review and confirm risk controls currently in place or potential mitigation options
- Review each risks consequence (using matrix)
- Review each risks likelihood (using matrix)
- Confirm risk ranking

Risk Analysis & Evaluation - Unmitigated

Risk Reference Number	The Risk: (There is a risk that...)	Source (The impacts are...)	Impact / Outcome (Categories Impacted on Consequence Matrix)	Risk Owner	Risk Controls in place / Potential Mitigation Options	Unmitigated Risk Rating		
						Consequence (1-5) 1-Insignificant 2-Minor 3-Moderate 4-Major 5-Catastrophic	Likelihood of Consequence (1-5) 1-Rare 1-5% 2-Unlikely 6-20% 3-Possible 21-50% 4-Likely 51-90% 5-Almost Certain >91%	Inherent Risk Rating
6	Design option selected for the Lanyon Drive Intersection exceeds the assigned and available budget.	- The selected option from the MCA process has a higher cost than expected falling outside the assigned budget - Insufficient funds remain in the Monaro Hwy Upgrade Program for the Isabella Intersection and the Hume Intersection portions.	Financial Project Delivery / Scope of Works	Stuart Oxborough	- Robust Multi Criteria Analysis procedure in place - Ongoing costs estimation during design development allows potential budget blowout identified early and design changes made.	4	5	Extensive
7	Submitted responses to tender are in excess of approved budget resulting in delays to project or reworking of scope.	- Additional budget has to be sourced as economic conditions have changed since allocation of budget. - a direct result of Community, environmental, or political changes since release of RfI. - scope creep by respondents	Financial Project Delivery / Scope of Works	Stuart Oxborough	- Detailed Cost Estimate to be developed / support of Budget submission. - Scope statement and cost estimate to be aligned.	4	1	Medium

Risk Consequence Matrix – Part 1

Consequence of risk in the most normal form				
	1 - Insignificant	2 - Minor	3 - Moderate	4 - Major
Assets	Loss or destruction of assets up to \$2,000.	Loss or destruction of assets \$2,000 to \$10,000.	Loss or destruction of assets \$10,000 to \$100,000.	Loss or destruction of assets greater than \$5M.
Compliance/Regulation	Non-compliance with work policy and standard operating procedures which are not legislated or regulated.	Numerous instances of non-compliance with work policy and standard operating procedures which are not legislated or regulated.	Non-compliance with work policy and standard operating procedures which require self-reporting to the appropriate regulator and immediate rectification.	Operations shut down by regulator for failing to comply with relevant guidelines / legislation and /or significant non-compliance with internal procedures which could result in failure to provide business.
People	Injury or ailments not requiring First Aid treatment and/or psychological injury managed by staff support services.	Minor injury or requiring First Aid treatment or short term injury (less than four weeks incapacity for work) and/or psychological injury resulting in reduced ability to perform tasks requiring treatment from a health professional.	Serious injury causing hospitalisation or medium term reversible disability (four weeks or more incapacity for work) or multiple medical treatment cases and/or psychological injury resulting in reduced ability to perform tasks requiring ongoing support from GP/health professional.	Death or multiple life threatening injuries and/or multiple injuries causing major life altering impairment and/or psychological injury resulting in inability to perform tasks requiring ongoing significant psychological treatment.
Environment	Limited effect to something of low significance and/or effects are limited to a small area with rapid recovery.	Transient, minor effects and/or minor effects to environment and/or disturbance of native vegetation or waterways.	Moderate, short-term environmental harm to environment and/or disturbance of native vegetation or waterways.	Long term environmental harm and/or widespread or severe impacts to environment, threatened species and/or long term effects on ecological community or native vegetation or waterways.
Financial	1% of Budget or <\$5k (Assume \$200m Total for Monaro Highway Upgrade Project Budget)	2% of Budget or <\$50k (Assume \$200m Total for Monaro Highway Upgrade Project Budget)	>5% of Budget or <\$500k (Assume \$200m Total for Monaro Highway Upgrade Project Budget)	>10% of Budget or <\$5m (Assume \$200m Total for Monaro Highway Upgrade Project Budget)
Service Delivery	Loss of or interruption to non-critical/no-core services up to 3 days. No disruption to services	Interruption of core services affecting critical infrastructure (eg law & order, public safety, health) or cessation of core/critical service essential to business continuity for up to 3 days. Minor disruption to services for up to 1 month	Cessation of core services affecting critical infrastructure (eg law & order, public safety, health) or cessation of core/critical service essential to business continuity for up to 3 days. Total cessation of service for up to 1 to 2 months	Total cessation of core services affecting critical infrastructure (eg law & order, public safety, health) or cessation of core/critical service essential to business continuity for more than 1 week and/or disruption over subsequent months involving a major facility
Reputation	Delays < 1 Week Minor changes during construction to achieve works.	Delays > 1 week Minor redesign to complete works	Delays 1 month to 3 months An element of the project cannot be delivered without redesign	Delays > 6 months or failure to complete. Failure to provide constructible final project resulting in abandonment of project.
Project Delivery / Other	RFI's required to confirm scope of works	Small variations for additional works to achieve Principal's requirements.	An element of the Principal's project requirements are not delivered by the Project	Project fails to deliver the Principal's requirements.

Risk Consequence Matrix – Part 2

		Consequence of risk in the most normal form			
		1 - Insignificant	2 - Minor	3 - Moderate	4 - Major
Consequentiality / Delivery / Technology	Delays < 1 week Minor changes during construction to achieve works.	Delays < 1 week Minor changes during construction to achieve works.	Delays > 1 week Minor redesign to complete works delivered without redesign	Delays 1 month to 3 months An element of the project cannot be delivered without redesign	Delays 3 to 6 months. Significant elements of the project cannot be delivered without redesign.
	RFI's required to confirm scope of works	RFI's required to confirm scope of works	Small variations for additional works to achieve Principal's requirements.	An element of the Principal's project requirements are not delivered by the Project	Project fails to deliver the Principal's project requirements.
	Minor misunderstanding of 3rd party / stakeholder requirements during design process. Rework of design required	Minor misunderstanding of 3rd party / stakeholder requirements during design process. Rework of design required	Failure to understand 3rd party or stakeholder requirements results in delays for approvals	Failure engage and / or to provide any provision for a 3rd party or stakeholder impacted by the project. Minor variations at construction to add additional requirements	Failure engage and / or to provide any provision for any 3rd parties or stakeholders impacted by the project. Lack of provision results in failure to provide future services / requirements
	Information & Records Management	Interruption to ICT systems, electronic records and data access less than 1/2 - 1 day and/or system breach to business administration system with no personal or classified information stored.	Interruption to ICT systems, electronic records and data access 1/2 - 1 day and/or system breach to business administration system with some identifiable information but non-client threatening (data access known).	Significant interruption (but not permanent loss) systems and data access 1-7 days and/or system breach to business administration system with some identifiable information but non-client threatening (data access unknown).	Complete, permanent loss of or electronic records and/or data, or loss of access to ICT systems and data for more than 7 days and/or systems breach to business administration system with identifiable/classified information stored but non-client welfare threatening.
	Reputation & Image	Internal review and/or minor dissatisfaction across a small number of demographic groups or stakeholders Internal Review Answers required through Access Canberra Ministerial required	Scrutiny required by internal committees or internal audit to prevent escalation and/or moderate dissatisfaction across a small number of demographic groups or severe stakeholders. Scrutiny required by internal committees or internal audit to prevent escalation. Ministerial Newspaper article / in media	Local media scrutiny (1 week) and/or scrutiny required by external committees or ACT Auditor General's Office or inquest, etc and/or dissatisfaction across a few demographic groups or multiple stakeholders. Local media scrutiny (1 week) and/or scrutiny required by external committees or ACT Auditor General's Office, or inquest, etc Minister direction	Adverse finding from Assembly Inquiry or Commission of inquiry or sustained adverse international media and/or loss of public confidence in Govt or Public Service forcing changes to the machinery of Govt Assembly Inquiry or Commission of inquiry or adverse national media.
Cultural & Heritage	Low-level repairable damage to commonplace structures.	Low-level repairable damage to commonplace structures.	Mostly repairable damage to items of cultural and/or heritage significance.	Significant damage to items of cultural and/or heritage significance.	Irreparable damage to or loss of highly valued items of cultural and/or heritage significance.
	Minor errors in systems or processes requiring corrective action and/or minor delay without impact on overall schedule and/or insignificant impact on business outcomes and strategic objectives and/or negligible disruption to services or non-essential subsidiary services.	Minor errors in systems or processes requiring corrective action and/or minor delay without impact on overall schedule and/or insignificant impact on business outcomes and strategic objectives and/or negligible disruption to services or non-essential subsidiary services.	Policy procedural rule occasionally not met and/or services do not fully meet need and/or minor impact on business outcomes and strategic objectives and/or non-essential or subsidiary services experience minor disruptions.	One or more key accountability requirements not met and/or inconvenient but not client welfare threatening and/or moderate impact on business outcomes and strategic objectives and/or a number of objectives not met, minor or subsidiary services impaired.	Strategic business outcomes processes fail, control infrastructure failure, critical business objectives not met. Unable to deliver necessary critical services.

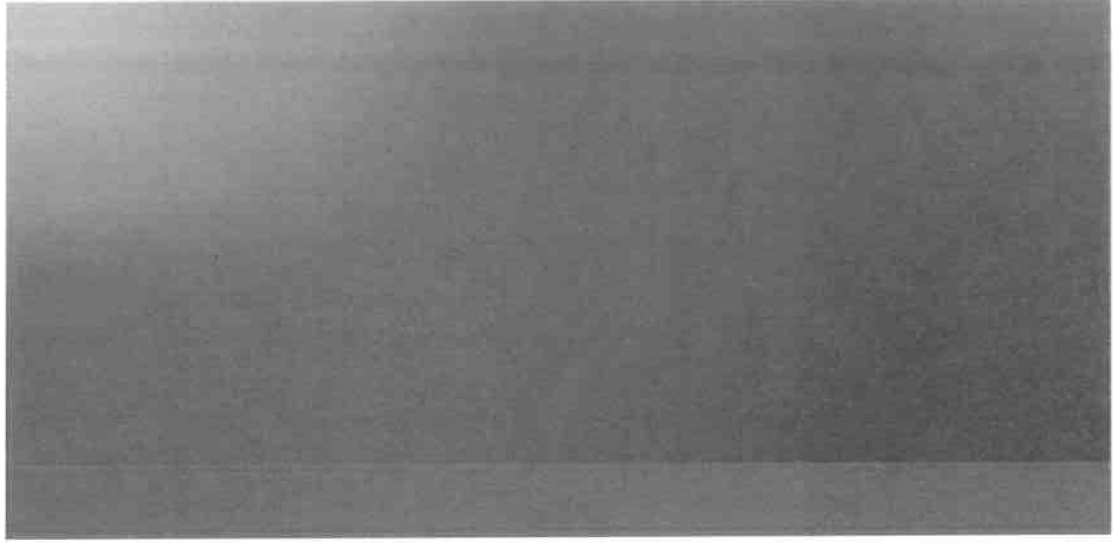
Risk rating matrix - Likelihood

Likelihood of Consequence		Frequency		Matrix	1	2	3	4	5
		Is expected to occur in most circumstances	Once in a quarter or more						
Almost Certain	Likely	Will probably occur	Once every 1 - 5 years	5	Medium	High	High	Extreme	Extreme
Possible	Unlikely	Could occur but doubtful	Once every 5 - 20 years	4	Medium	Medium	Medium	High	Extreme
Rare		May occur but only in exceptional circumstances	Once every 20 - 100 years	3	Low	Medium	Medium	High	Extreme
				2	Low	Medium	Medium	High	High *
				1	Low	Low	Medium	Medium	High *

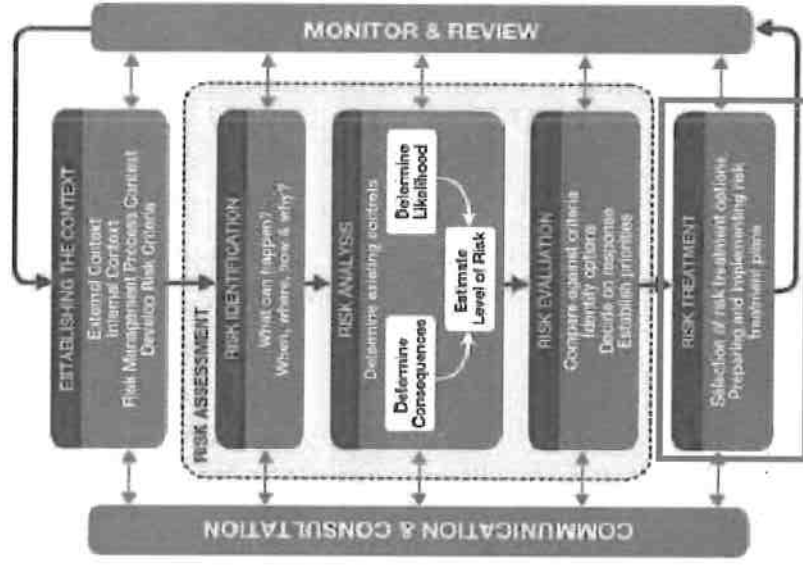
Risk Control Effectiveness		Guide
Control Effectiveness		
Adequate		Controls are well designed and operating effectively in treating the root cause of the risk. Additional controls exist to appropriately manage consequence. Nothing further to be done except review and monitor the existing controls. Controls are largely preventative and management believes that they are effective and reliable at all times.
Room for Improvement		Some deficiencies in controls have been identified how ever most controls are designed and implemented effectively in treating some root causes of the risk. While some preventative controls exist, controls are largely reactive. There are opportunities to improve the design/implementation of some controls to improve operational effectiveness.
Inadequate		Significant control deficiencies identified. Either controls do not treat root cause or they do not operate effectively. Controls, if they exist are just reactive. Management has little confidence on the effectiveness of the controls due to poor control design and/or very limited operational effectiveness.

Priority for Attention/Action				
Priority	Indicative Escalation *	Indicative Action Plan *	Authority for Action	Optional Considerations
Extreme	Within 24 hours	1 month or sooner	DG & DDG (CEO or equivalent)	Chair ARMC Director WH&S
High	Within 7-14 days	2 months or sooner	Senior Executive or equivalent (DDG/ED/Head)	Director WH&S
Medium	Within 1-3 months	3 months or sooner	Executive/Business Unit Head/Manager	WH&S Team
Low	1-3 months in course of normal business	3-6 months or sooner	Team Leader/Supervisor	WH&S Team

Risk Analysis



Risk Treatment



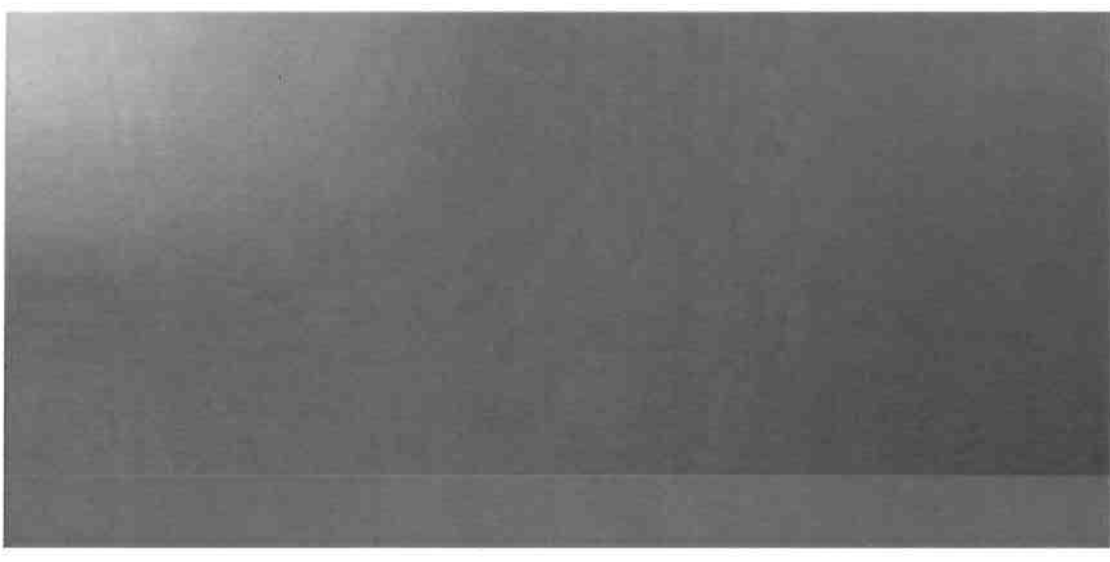
- Treat Risks – Who is best placed to manage the risk ?
 - Principal, Contractor, Shared, Other
- Identify potentially most appropriate risk mitigation strategies.
 1. Eliminate the risk
 2. Transfer the risk
 3. Share the risk and monitor
 4. Accept the risk and monitor
 5. Accept the risk, treat and monitor
 6. Treat the risk and transfer residual
 7. Further investigate risk
 8. Treat risk and own
 9. Treat risk and share
- Note – Post workshop complete:
 - Detailed risk mitigation treatment
 - Determine by whom and by when

Risk Treatment

Risk Reference Number	The Risk: (There is a risk that...)	Risk Controls Options	Unmitigated Risk Rating		Party best placed to manage risk Principal / Contractor / Shared / Other	Mitigation Strategy (Preferred)	Mitigation Next Steps (Outside of workshop)	By Whom	By When
			Consequence (1-5) 1-Insignificant 2-Minor 3-Moderate 4-Major 5-Catastrophic	Likelihood of Consequence (1-5) 1-Rare 1-5% 2-Unlikely 6-20% 3-Possible 21-50% 4-Likely 51-80% 5-Almost Certain >91%					
6	Design option selected for the Lanyon Drive intersection exceeds the assigned and available budget.	- Robust Multi Criteria Analysis procedure in place - Ongoing costs estimation during design development allows potential budget blowout identified early and design changes made.	4	5	Principal	7 - Further investigate risk to understand more.			
7	Submitted responses to tender are in excess of approved budget resulting in delays to project or reworking of scope.	- Detailed Cost Estimate to be developed in support of Budget submission. - Scope statement and cost estimate to be aligned.	4	1					

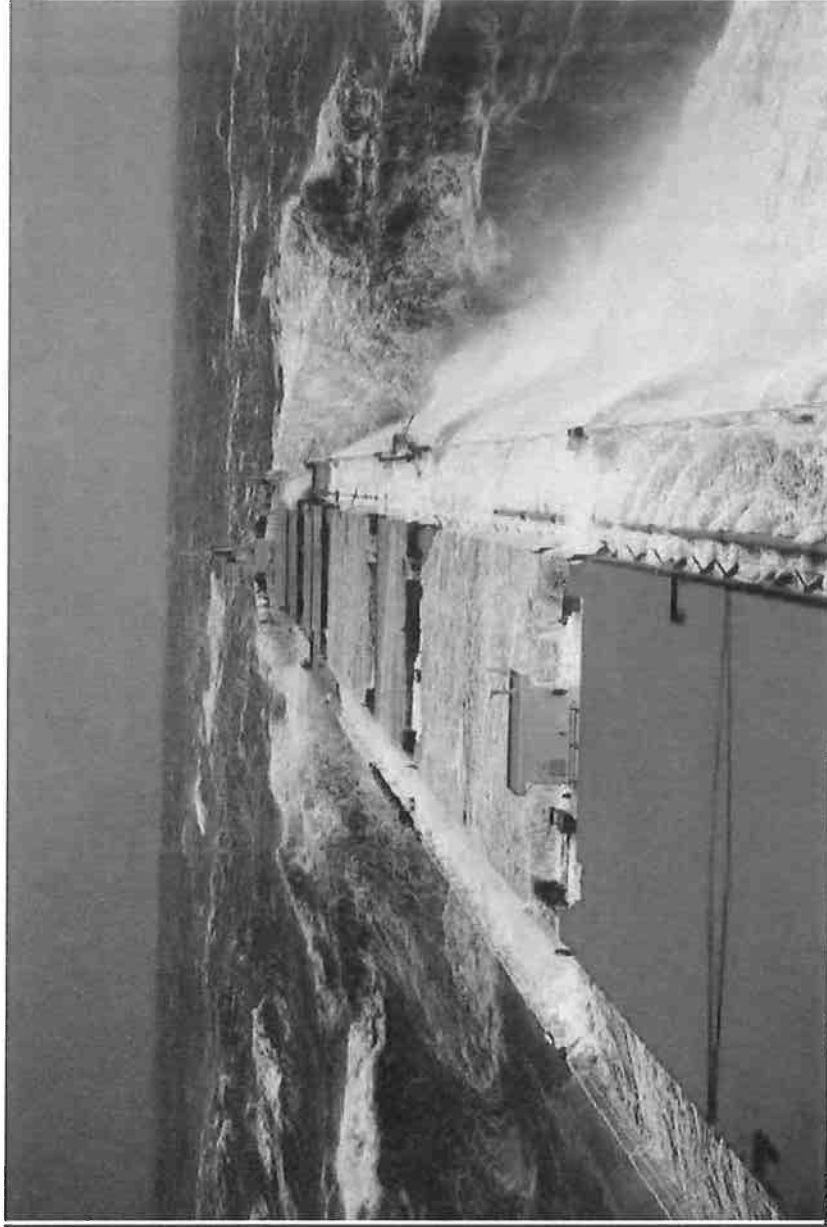
Lets start

We have about 3 mins per risk



Break.....Remember....

If you think
its under
control, it can
get worse.....

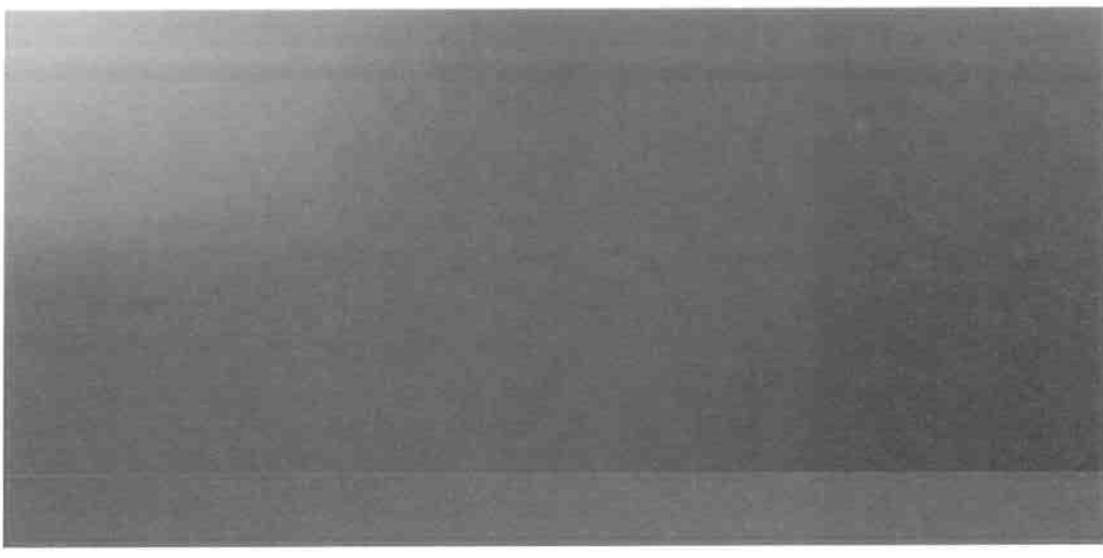


..much
worse!!

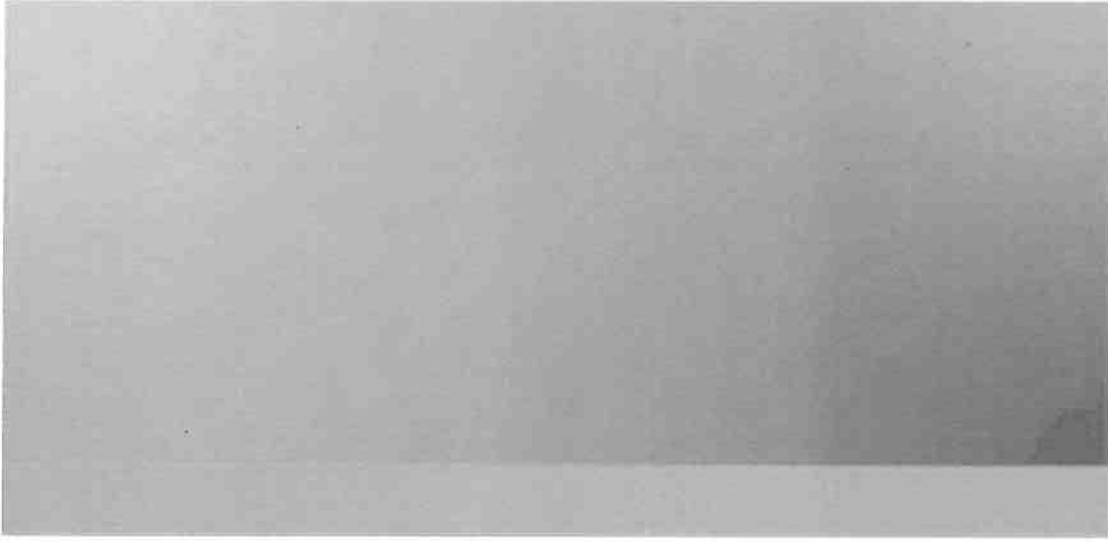


Review remaining Risks

Identify new risk



Wrap up and next steps



Thank you

Jonathan Key
15th April 2020



ACT Government Confidential

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ACY Government Confidential

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Risk Register Risk Number	Risk Category	The Risk (What is the risk?)	Cause (What is the cause?)	Effect (What is the effect?)	Impact / Outcome (What is the impact / outcome?)	Risk (What is the risk?)	Risk Rating			Priority (What is the priority?)	Mitigation Strategy (What is the mitigation strategy?)	Responsible (Who is responsible?)	Status (What is the status?)	Comments (What are the comments?)
							Current Risk	Residual Risk	Transfer Risk					
13	Project Delivery / Scope of Works	Major Contractor insolvency delays or disrupts the project	Contractor insolvency Poor Contractor selection	Contractor insolvency Poor Contractor selection	Commercial Reputation	Start Overlook	4	1	Medium	Shared	5 - Assess the risk, limit and monitor	Shared	5 - Assess the risk, limit and monitor	24/4 - The risk of contractor insolvency is a material risk of the project. Development and approval of detailed Procurement Plan (as part of Project Plan) which considers contractor type, program requirements, location, operational strength, financial resources, and other factors for Contractor selection.
14	Project Delivery / Scope of Works	Unperformed contract administrator (SOW/TPM) for the scale and nature of the project	Lack of suitably qualified personnel in local market	Contractor insolvency Poor Contractor selection	Commercial Reputation	Start Overlook	4	2	Medium	Principal	6 - Treat the risk and transfer residual	Principal	6 - Treat the risk and transfer residual	24/4 - The risk of contractor insolvency is a material risk of the project. Development and approval of detailed Procurement Plan (as part of Project Plan) which considers contractor type, program requirements, location, operational strength, financial resources, and other factors for Contractor selection.
15	Security & Health Safety	Major safety incidents impact project during construction	Poor site management, inadequate resources, inexperienced Contractor, Repetitive	Contractor insolvency Poor Contractor selection	Commercial Reputation	Start Overlook	4	3	Medium	Shared	6 - Treat the risk and transfer residual	Shared	6 - Treat the risk and transfer residual	24/4 - The risk of contractor insolvency is a material risk of the project. Development and approval of detailed Procurement Plan (as part of Project Plan) which considers contractor type, program requirements, location, operational strength, financial resources, and other factors for Contractor selection.
16	Reputation and Image	Major environmental incidents impact project during construction	Poor site management, inadequate resources, inexperienced Contractor, Repetitive	Contractor insolvency Poor Contractor selection	Commercial Reputation	Start Overlook	4	4	Medium	Contractor	6 - Treat the risk and transfer residual	Contractor	6 - Treat the risk and transfer residual	24/4 - The risk of contractor insolvency is a material risk of the project. Development and approval of detailed Procurement Plan (as part of Project Plan) which considers contractor type, program requirements, location, operational strength, financial resources, and other factors for Contractor selection.
17	Contractual	Unperformed design or construction of works leads to significant rework or additional scope	Unperformed design Poorly defined Contractor responsibilities Regulators / stakeholders	Contractor insolvency Poor Contractor selection	Commercial Reputation	Start Overlook	4	2	Medium	Other	6 - Treat the risk and transfer residual	Other	6 - Treat the risk and transfer residual	24/4 - The risk of contractor insolvency is a material risk of the project. Development and approval of detailed Procurement Plan (as part of Project Plan) which considers contractor type, program requirements, location, operational strength, financial resources, and other factors for Contractor selection.
18	Schedule Management / Sub Party	Site agreements increase labour costs and hence project costs	Political climate Responsibility for increased labour costs not defined in Contract	Contractor insolvency Poor Contractor selection	Commercial Reputation	Start Overlook	4	4	Medium	Contractor	6 - Treat the risk and transfer residual	Contractor	6 - Treat the risk and transfer residual	24/4 - The risk of contractor insolvency is a material risk of the project. Development and approval of detailed Procurement Plan (as part of Project Plan) which considers contractor type, program requirements, location, operational strength, financial resources, and other factors for Contractor selection.
19	Project Delivery / Scope of Works	Unperformed Contractor for the scale and complexity of the project's awarded contract	Contractor insolvency Poor Contractor selection	Contractor insolvency Poor Contractor selection	Commercial Reputation	Start Overlook	4	2	Medium	Shared	6 - Treat the risk and transfer residual	Shared	6 - Treat the risk and transfer residual	24/4 - The risk of contractor insolvency is a material risk of the project. Development and approval of detailed Procurement Plan (as part of Project Plan) which considers contractor type, program requirements, location, operational strength, financial resources, and other factors for Contractor selection.
20	Project Delivery / Scope of Works	Inadequate resources for the technology required on the project to deliver the requirements of Submissions and Deliverables	Inadequate resources of Principal Inadequate resources of Submitter	Contractor insolvency Poor Contractor selection	Commercial Reputation	Start Overlook	4	2	Medium	Principal	6 - Treat the risk and transfer residual	Principal	6 - Treat the risk and transfer residual	24/4 - The risk of contractor insolvency is a material risk of the project. Development and approval of detailed Procurement Plan (as part of Project Plan) which considers contractor type, program requirements, location, operational strength, financial resources, and other factors for Contractor selection.
21	Business, Processes and Systems	Contract program is too complex or too simple to be used effectively for example to track EOTs	Contract program is too complex or too simple to be used effectively for example to track EOTs	Contractor insolvency Poor Contractor selection	Commercial Reputation	Start Overlook	4	2	Medium	Principal	6 - Treat the risk and transfer residual	Principal	6 - Treat the risk and transfer residual	24/4 - The risk of contractor insolvency is a material risk of the project. Development and approval of detailed Procurement Plan (as part of Project Plan) which considers contractor type, program requirements, location, operational strength, financial resources, and other factors for Contractor selection.

Risk Register	Risk Category	The Risk (How is it likely to happen?)	Source (The impact is...)	Impact / Outcome (Describe the potential for harm to the Government)	Risk Owner	Current Risk Rating				Mitigation Strategy (How-to)	Mitigation Lead (Should be available)
						Consequence (1-5)	Exposure (1-5)	Probability (1-5)	Overall Risk Rating		
13	Business Processes and Systems	ACT Gov responsiveness in the use of non standard ACT forms of contract results in delays, costs, client dissatisfaction and reputational damage.	Non standard contract forms of contract results in delays, costs, client dissatisfaction and reputational damage.	General Business Activities	Start/Champion	3	2	2	Medium	5 - Treat the risk and own	Principal
14	Operational	Availability of ACT Gov services and critical personnel to deliver the ACT Gov services is at risk.	Reduced staff effort, understaffing, loss of critical personnel, loss of critical information, loss of critical data, loss of critical systems.	General Business Activities	Start/Champion	3	4	4	High	8 - Treat the risk and own	Principal
15	Operational	Changes to scope are required post contract award resulting in delays, additional costs, client dissatisfaction and reputational damage.	Complexity, uncertainty, potential, internal pressures/decisions.	Contract Management	Start/Champion	2	3	3	Medium	8 - Treat the risk and own	Shared
16	Operational	Ability to provide timely responses to RFI.	Personnel or consultant not engaged, responsibilities not clearly identified, too budget allocation, Commission approval process.	Contract Management	Start/Champion	2	2	2	Medium	8 - Treat the risk and own	Shared
17	Project Delivery / Scope of Works	Discovery of compromised skill sets in delay and/or cost and/or quality.	Insufficient staff, insufficient / preliminary and detailed understanding of contract, poorly defined Contract responsibilities, Potential for design / drawing of waste including alterations.	Contract Management	Start/Champion	3	1	1	Medium	9 - Treat the risk and share	Shared
18	Compliance / Regulation	Traffic Management is not suitable resulting in disruption to the project.	RFI priority describes performance requirements for temporary traffic management.	Contract Management	Start/Champion	3	2	2	Medium	9 - Treat the risk and share	Contractor
19	Project Delivery / Scope of Works	Design doesn't take into account identified operational constraints resulting in inefficient design.	RFI does not provide all known operational information, Clarity of responsibility of ground conditions not clearly articulated.	Contract Management	Start/Champion	4	2	2	High	6 - Treat the risk and transfer residual	Shared
20	Contractual	People deliver responsibilities for design lead to disputes.	Handshake between the RFI design provided at tender and the detailed design responsibility not clearly defined.	Contract Management	Start/Champion	3	2	2	Medium	6 - Treat the risk and transfer residual	Principal
21	Project Delivery / Scope of Works	Design doesn't deliver the ACT Government's project objectives.	RFI for "DEC" phase does not clearly specify detailed outcomes, RFI for "DEC" phase does not understand design intent and outcomes of PIP phase.	Contract Management	Start/Champion	4	2	2	High	6 - Treat the risk and own	Principal

[illegible]

* Risk
To help assess the consequences and likelihood of a risk:
1. Consequence: What will be the consequences if the risk materialises in the most normal form? Where there are many consequences, those the one that has the highest economic impact.
2. Likelihood: What is the likelihood of the consequences occurring?
3. When identifying, analysing and rating risk, consideration should be given to the likelihood of the risk materialising in the most normal form and the suggested examples of frequency and consequences.

* Priority for Action
When a risk is identified, it is essential to take action as soon as possible to reduce the risk. The priority for action should be based on the likelihood of the risk materialising and the consequences if it does. The suggested timing of action should be based on the likelihood of the risk materialising and the consequences if it does. The suggested timing of action should be based on the likelihood of the risk materialising and the consequences if it does.

		Consequence of risk in the most normal form				
		1 - Insignificant	2 - Minor	3 - Moderate	4 - Major	5 - Catastrophic
Assets		Loss or destruction of assets up to \$2,000.	Loss or destruction of assets \$2,000 to \$10,000.	Loss or destruction of assets \$10,000 to \$100,000.	Loss or destruction of assets \$100,000 to \$5M.	Loss or destruction of assets greater than \$5M.
Compliance/Regulation		Non-compliance with work policy and standard operating procedures which are not legislated or regulated.	Numerous instances of non-compliance with work policy and standard operating procedures which are not legislated or regulated.	Non-compliance with work policy and standard operating procedures which require self-reporting to the appropriate regulator and immediate rectification.	Restriction of business operations by regulator due to non-compliance with relevant guidelines and / or significant non-compliance with policy and procedures which threaten business delivery.	Operations shut down by regulator for failing to comply with relevant guidelines / legislation and / or significant non-compliance with internal procedures which could result in failure to provide business outcomes.
People		Injury or ailments not requiring First Aid treatment and/or psychological injury managed by staff support services.	Minor injury or requiring First Aid treatment or short term injury (less than four weeks incapacity for work) and/or psychological injury resulting in reduced ability to perform tasks requiring treatment from a health professional.	Serious injury causing hospitalisation or medium term reversible disability (four weeks or more incapacity for work) or multiple medical treatment cases and/or psychological injury resulting in reduced ability to perform tasks requiring ongoing support from GP/health professional.	Single life threatening injury (including loss of limbs) or multiple serious injuries causing hospitalisation and/or permanent disability and/or psychological injury resulting in reduced ability to perform tasks requiring additional psychological treatment.	Death or multiple life threatening injuries and/or multiple injuries causing major life altering impairment and/or psychological injury resulting in inability to perform tasks requiring ongoing significant psychological treatment.
Environment		Limited effect to something of low significance and/or effects are limited to a small area with rapid recovery.	Transient, minor effects and/or minor effects to environment and/or disturbance of native vegetation or waterways.	Moderate, short-term environmental harm to environment and/or disturbance of native vegetation or waterways.	Significant, medium-term environmental harm to environment and/or disturbance of native vegetation or waterways.	Long term environmental harm and/or widespread or severe impacts to environment, threatened species and/or long term effects on ecological community or native vegetation or waterways.
Financial		1% of Budget or less (Assume \$200m Total for Monaro Highway Upgrade Project Budget)	2% of Budget or less (Assume \$200m Total for Monaro Highway Upgrade Project Budget)	>5% of Budget or less (Assume \$200m Total for Monaro Highway Upgrade Project Budget)	>10% of Budget or less (Assume \$200m Total for Monaro Highway Upgrade Project Budget)	>25% of Budget or less (Assume \$200m Total for Monaro Highway Upgrade Project Budget)
Service Delivery		Loss of or interruption to non critical/no-core services up to 3 days. No disruption to services.	Interruption of core services affecting critical infrastructure (e.g. law & order, public safety, health) or cessation of core/critical service essential to business continuity for up to 3 days. Minor disruption to services for up to 1 month.	Cessation of core services affecting critical infrastructure (e.g. law & order, public safety, health) or cessation of core/critical service essential to business continuity for up to 3 days and/or disruption for a week. Total cessation of service for up to 1 day and subsequent disruption of 1 to 2 months.	Cessation of core services affecting critical infrastructure (e.g. law & order, public safety, health) or cessation of core/critical service essential to business continuity for up to 3 days and/or disruption over subsequent weeks. Total cessation of service for up to 7 days and subsequent disruption of 2 to 3 months.	Total cessation of core services affecting critical infrastructure (e.g. law & order, public safety, health) or cessation of core/critical service essential to business continuity for more than 3 weeks and/or disruption over subsequent months. Total cessation of service for more than 1 week and disruption over subsequent months involving a major facility.
Construction / Policy / Technology		Delays < 1 Week Minor changes during construction to achieve works.	Delays > 1 week Minor redesign to complete works.	Delays 1 month to 3 months An element of the project cannot be delivered without redesign.	Delays 3 to 6 months. Significant elements of the project cannot be delivered without redesign.	Delays > 6 months or failure to complete. Failure to provide constructible final project resulting in abandonment of project.
Information & Records Management		Minor misunderstanding of 3rd party / stakeholder requirements during design process. Rework of design required.	Failure to understand 3rd party / stakeholder requirements results in delays for approvals.	Failure engage and / or to provide any provision for a 3rd party or stakeholder impacted by the project. Minor variations at construction to add additional requirements.	Failure engage and / or to provide any provision for most 3rd parties or stakeholders impacted by the project. Significant variation during construction to include requirements.	Failure engage and / or to provide any provision for any 3rd parties or stakeholders impacted by the project. Lack of provision results in failure to provide future services / requirements.
Information & Records Management		Interruption to ICT systems, electronic records and data access less than 1 day and/or system breach to business administration system with some identifiable information but non-client threatening (data access known).	Interruption to ICT systems, electronic records and data access 1/2 - 1 day and/or system breach to business administration system with some identifiable information but non-client threatening (data access known).	Significant interruption (but not permanent loss) of systems and data access 1-7 days and/or system breach to business administration system with some identifiable information but non-client threatening (data access unknown).	Complete, permanent loss of some electronic records and/or data, or loss of access to ICT systems and data for more than 7 days and/or systems breach to business administration system with identifiable/classified information stored but non-client welfare threatening.	Complete, permanent loss of or inability to recover/reconstruct all records and data and/or total loss of confidence in data/record integrity and/or systems breach to Govt or business critical systems with client and/or business welfare threatened.
Reputation & Image		Internal review and/or minor dissemination across a small number of demographic groups or stakeholders. Answers required through Access Canberra Ministerial required.	Scrutiny required by internal committees or internal audit to prevent escalation and/or moderate dissemination across a small number of demographic groups or stakeholders. Scrutiny required by internal committees or internal audit to prevent escalation. Ministerial Newspaper article / in media.	Local media scrutiny (1 week) and/or scrutiny required by external committees or ACT Auditor General's Office, or inquiry, etc. Ministerial direction.	Intense public, political and media scrutiny (1 week) and/or Minister / Chief Minister involvement and/or dissemination across a large range of demographic groups and stakeholders. Intense public, political and media scrutiny. E.g. ongoing front page headlines, TV, etc.	Adverse finding from Assembly Inquiry or Commission of Inquiry or sustained adverse international media and/or loss of public confidence in Govt or Public Service forcing changes to the machinery of Govt. Assembly inquiry or Commission of Inquiry or adverse national media.
Cultural & Heritage		Low-level repairable damage to commonplace structures.	Mostly repairable damage to items of cultural and/or heritage significance.	Significant damage to items of cultural and/or heritage significance.	Permanent damage to structures or items of cultural and/or heritage significance.	Irreparable damage to or loss of highly valued items of cultural and/or heritage significance.
General Business Activities		Minor errors in systems or processes requiring corrective action and/or minor delay without impact on overall schedule and/or insignificant impact on business outcomes and strategic objectives and/or negligible disruption to services or non-essential subsidiary services.	Policy procedural rule occasionally not met and/or services do not fully meet need and/or minor impact on business outcomes and strategic objectives and/or non-essential or subsidiary services experience minor disruptions.	One or more key accountability requirements not met and/or inconsistent but not client welfare threatening and/or moderate impact on business outcomes and strategic objectives and/or a number of objectives not met, minor or subsidiary services impaired.	Significant impact on business and / or strategic objectives and/or strategies not consistent with Government's agenda and/or trends show service is degraded and/or key service delivery impaired.	Strategic business outcomes processes fail, control infrastructure failure, critical business objectives not met. Unable to deliver necessary critical services.

Priority	Action	Frequency	Risk	Impact	Control	Effectiveness
High	Within 24 hours	Once a year or more	High	High	High	High
Medium	Within 7-14 days	Once a year or more	Medium	Medium	Medium	Medium
Low	Within 1-3 months	Once a year or more	Low	Low	Low	Low

Priority	Action	Frequency	Risk	Impact	Control	Effectiveness
High	Within 24 hours	Once a year or more	High	High	High	High
Medium	Within 7-14 days	Once a year or more	Medium	Medium	Medium	Medium
Low	Within 1-3 months	Once a year or more	Low	Low	Low	Low

Priority	Action	Frequency	Risk	Impact	Control	Effectiveness
High	Within 24 hours	Once a year or more	High	High	High	High
Medium	Within 7-14 days	Once a year or more	Medium	Medium	Medium	Medium
Low	Within 1-3 months	Once a year or more	Low	Low	Low	Low

11. Appendix B – Phase 2 Report - Delivery Models Review

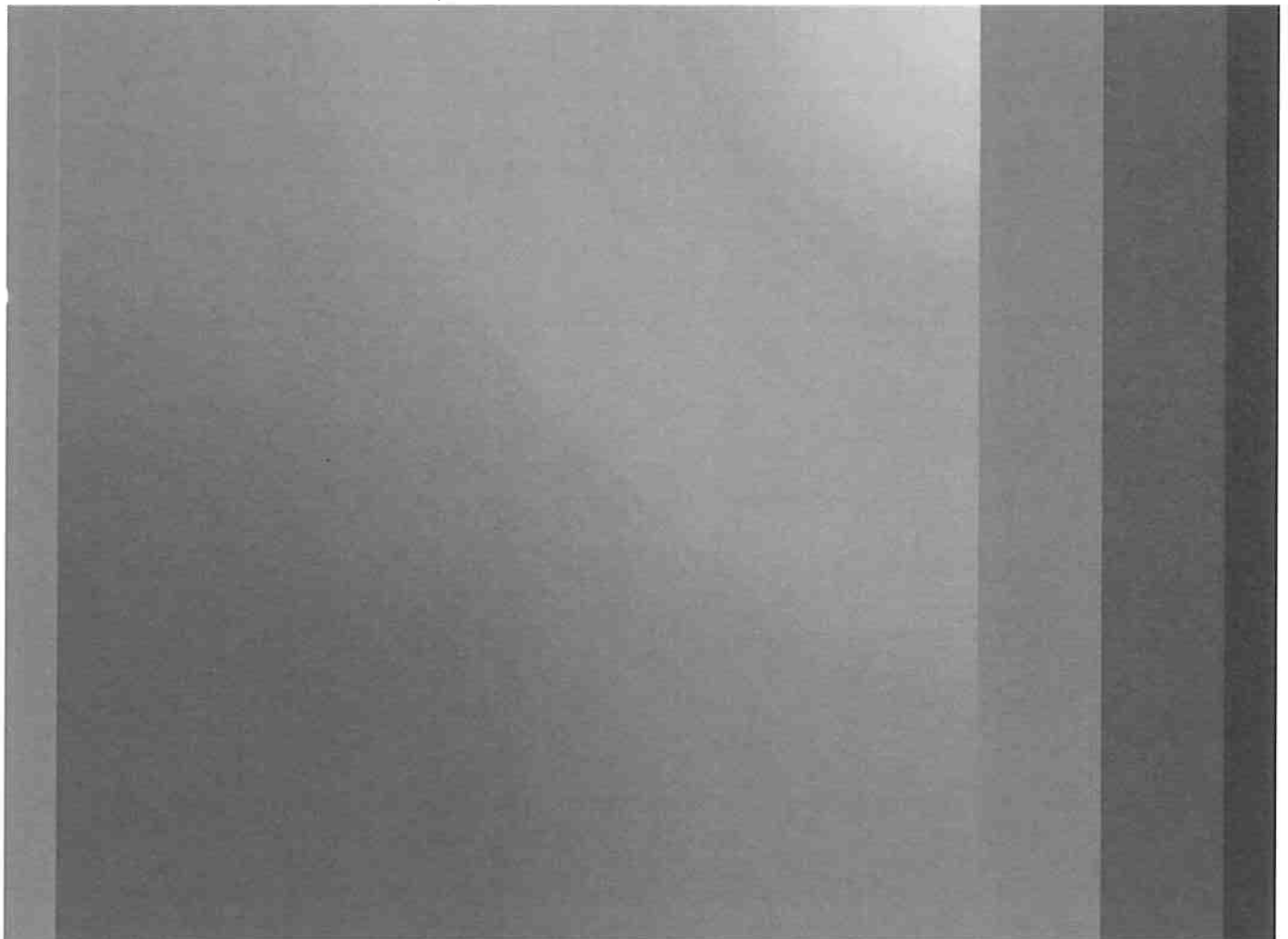


Monaro Highway Upgrade Program

Phase 2 - Review of Delivery Models

10/7/2020

3524.300



Monaro Highway Upgrade Program

Project No: IA224400
 Document Title: Phase 2 - Review of Delivery Models
 Document No.: IA224400-PR-PR-00X
 Revision: F
 Document Status: Final
 Date: 10/7/2020
 Client Name: Transport Canberra and City Services - TCCS
 Client No: 3524.300
 Project Manager: Jonathan Key
 Author: Jonathan Key
 File Name: Monaro Highway Upgrade Program_Procurement Strategy_Draft_14

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Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
A	24/04/2020	Draft	Jonathan Key			
B	15/05/2020	Draft – For comments	Jonathan Key			
C	22/5/2020	Draft – Incorporating Mark Anslow comments	Jonathan Key		Mark Anslow	
D	1/7/2020	Draft - Incorporating Stuart Oxborrow comments	Jonathan Key		Mark Anslow	
E	9/7/2020	Draft – DCM model removed from recommended models	Jonathan Key		Mark Anslow	
F	10/7/2020	Final	Jonathan Key		Mark Anslow	

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Executive Summary

To achieve the project objectives, an appropriate well considered procurement strategy has been developed. This strategy supports the delivery of an effective long-term road solution that provides asset whole of life value for money. The strategy considers appropriate risk transfer between contractors, consultants and other service providers.

The procurement delivery strategy includes a degree of flexibility to accommodate and take advantage of changes that may occur over the project lifecycle including any changes in funding and other market factors.

In Phase 1, we conducted a Risk Study to understand the risk profile of the Monaro Highway Lanyon Drive Interchange project. The following report concludes Phase 2 which is a Procurement Options and Delivery Model Study. The objective of the study was to review the potential procurement options and delivery models suitable for the project and identify a short list of delivery models for further consideration as part of the Phase 3 Multi Criteria Analysis.

Procurement Options and Delivery Models Reviewed

The following 12 delivery models have been reviewed during Phase 2 of the study:

- Traditional Construct Only
- Design & Construct - Performance Specification, Design & Construct (PSD&C)
- Design & Construct – Develop, Design & Construct (DD&C)
- Design & Construct – Design, Novate & Construct (DN&C)
- Design, Construct Maintain (DC&M)
- Design, Construct, Maintain, Operate (DCMO)
- Alliance
- Project Management Agreement / Construction Management (PMA/ CM)
- Managing Contractor (MC)
- PPP Availability
- PPP Boot
- Early Contractor Involvement / Early Tender Involvement (ECI/ETI)

Delivery Models to be considered for Phase 3 Multi Criteria Analysis

The review of the delivery models recommends the following 6 models to be considered in the Phase 3 'Multi Criteria Analysis':

- Traditional (Construct Only)
- Design & Construct - Performance Specification Design and Construct (PSD&C)
- Design & Construct - Design, Develop and Construct (DD&C)
- Design & Construct - Design, Novate and Construct (DN&C)
- Project Management Agreement (PMA/CM)
- Managing Contractor (MC)

The use of Early Contractor Involvement (ECI) or Early Tender Involvement (ETI) can then be considered in conjunction with the selected delivery model(s).

1. Terms and Definitions

Terms and Definitions, including acronyms referred to in this report appear in the following table: document. Terms and definitions

Term	Definition
ACT	Australian Capital Territory
ACTIA	Australian Capital Territory Insurance Authority
CM	Construction Management
DCMO	Design, Construct, Maintain and Operate
DC&M	Design, Construct Maintain
DD&C	Design & Construct – Develop, Design & Construct
DN&C	Design, Novate and Construct
D&C	Design and Construct
DP	Delivery Partner
ECI	Early Contractor Involvement
EOI	Expression of Interest
ETI	Early Tender Involvement
GCS	General Contract Sum
GMP	Guaranteed Maximum Price
GOV	Government
IDP	Infrastructure Delivery Partner
KPI	Key Performance indicator
O&M	Operations and Maintenance
MC	Managing Contractor
MCA	Multi Criteria Analysis
NPV	Net present value -
PMA	Project Management Agreement
PDS	Procurement Delivery Strategy
PPP	Private Public Partnership
RMP	Risk Management Plan
RFT	Request For Tender
RR	Risk Register
SAF	Single Assessment Framework
TCCS	Transport Canberra and City Services
TOC	Total Outturn Cost
WHS	Work Health and Safety

2. Background

2.1 Project Overview

Jacobs has been commissioned by Infrastructure Delivery Partners Group (IDPG) on behalf of the ACT Government (Transport Canberra and City Services, (TCCS)) to deliver feasibility and preliminary design services for the Monaro Highway Upgrade Program, Hume, ACT. The project includes assessment and preliminary sketch plan (PSP) design of suitable upgrade options for the Monaro Highway between the Alexander Maconochie Centre and Isabella Drive, including grade separation of Lanyon Drive and Isabella Drive at the Monaro Highway. The project also includes examining the upgrades to Johnston Drive further to the south and, the preparation of PSP designs for two heavy vehicle lay-bys.

The Monaro Highway is a key arterial route connecting to the Majura Parkway at the northern end and continuing south to Cooma and then on to intersect with the Princes Highway in Victoria. Within the ACT it also provides part of the key link between Queanbeyan and the Canberra City, and is a key connection between southern suburbs and the industrial areas of Hume and Fyshwick.

In November 2019 the Federal and ACT Governments announced that construction of the project would commence during the 2020/21 financial year, approximately one year earlier than originally planned. The Lanyon Drive interchange was subsequently identified as the preferred location for an early works package, and a feasibility stage layout was chosen to progress to PSP. The PSP design for Lanyon Drive is currently underway by Jacobs. The following figure shows the key feature of the Lanyon Drive Interchange.



Figure 1 – Monaro Highway Lanyon Drive Interchange scope of works

2.2 Project Success Criteria

The following high-level project success criteria for the project includes:

Project Delivery

- No WHS incidents during construction;
- Achieve value for money in delivery, (the project budget for entire Monaro Upgrade is \$200m);
- Substantial works commencing on site before June 2021;
- Deliver the scheme with minimum impact on local heritage and the environment;
- Address and incorporate stakeholder concerns, where possible; and
- Meet policy guidelines, (e.g. Local Industry Participation Policy, Secure Local Jobs, Indigenous Participation).

Project Performance Outcomes

- Increase posted road speed to 100kph (in line with the rest of Monaro highway);
- Improve travel times in AM and PM peaks for current and future (2031 and 2041) traffic demands; and
- Minimal impact to existing traffic during construction.

3. Procurement Options and Delivery Study

In addition to the feasibility and preliminary design services, Jacobs has been commissioned to undertake a Procurement Options and Delivery Model Study specifically for the Lanyon Drive Interchange. Jacobs were engaged to provide:

- Evaluation and assessment of risks associated with the nature of the works and staging;
- Evaluation and assessment of procurement and delivery models for the construction of the Lanyon Drive Interchange;
- Multi criteria analysis (evaluation of selected delivery models v weighted selection criteria e.g. budget and schedule certainty, flexibility for changes, whole of life cost, innovation etc); and
- Market sounding for the project (key players, market capacity, market appetite);
- Reporting of findings and advice to identify the most appropriate delivery model (while minimising Territory risks, maximising value for money and enabling early works to commence).

The key output being the recommendation of a delivery model to progress to EOI/ RFT phase.

3.1 Methodology

Jacobs have structured the study into five phases.

Kick-Off Phase. Initial review of information provided by TCCS and confirmation of objectives and deliverables.

Phase 1 is the Risk and Opportunity Assessment Phase. In this Phase we reviewed the existing strategic risk register. We developed the risk assessment methodology using ACTIA guidelines to assess the program risks, site risks and delivery risks. Through a desktop study and a workshop, we captured new risks, assessed their risk rating and identified potential mitigation strategies for each risk with particular focus on procurement related risks. The same approach was taken for potential opportunities.

Phase 2 is the Delivery Models Phase. In this phase we reviewed the possible delivery models and procurement options available. We compared the advantages and disadvantages of each delivery model and provided guidance on the applicability of each based on the project's unique factors and the ACT government's risk appetite. This phase resulted in a delivery model shortlist for inclusion in Phase 3 Multi Criteria Analysis and Sounding.

Phase 3 is the Multi Criteria Analysis (MCA) Phase. The MCA generates a ranking of the shortlisted delivery models in order of preference based upon the predetermined criteria and agreed weightings for each criterion.

Phase 4 is the Market Analysis and Sounding Phase. A key component of the ACT Government Single Asset Framework process is undertaking market sounding to identify key players, determine market capacity, determine market appetite and consider whether there is enough competition to drive value for money outcomes. This is conducted through a market analysis exercise, and consultation with the various industry bodies, and incorporates identified comments on identified issues which may affect the procurement strategy.

Phase 5 is the submission of the Draft Report to the TCCS Project Management Group for review. The report recommends a preferred delivery model or models based on the assessment. A final report is to be issued following feedback.

3.2 Key features of the Monaro Highway Upgrade Program Procurement Strategy

The key features of the Monaro Highway Upgrade Program that applied to our consideration of potential contracting models are:

- **Certainty of Scope** . Scoping of the Project is being determined progressively, so that it is clearly defined and able to be effectively and efficiently priced by the private sector once 'works packages' are ready for procurement.
- **Timing** . There are specific timing imperatives around some, if not all work packages, and the subsequent award of contracts. This will therefore drive a need for accelerated delivery models, so that adequate planning can occur to reduce risk to TCCS.
- **Risks or uncertainties** . Wherever possible, there will be no key Program risks or uncertainties retained by TCCS; but note that the private sector will seldom accept this aspirational outcome and this may lead to the application of models where some or most of the delivery risk is retained by the TCCS. The one exception to this may be areas where upgrade work is within a 'live and regularly used' traffic thoroughfare or operating environment.
- **The nature of the key elements of design and construction work associated with the project are well understood by our potential suppliers; with a reasonable level of competition in the market, (i.e. design and construction, supply of materials etc.) and therefore should be regarded as 'low risk' to the project.**

4. Delivery Model Overview

4.1 Potential Models

There is a broad range of infrastructure capital works delivery models that may be considered for the Monaro Highway Lanyon Drive Interchange project. In this Phase, we will short list several delivery models that that may be suitable, principally driven by the delivery requirements of the project and its risk profile.

In Phase 3, the objective of the Multi Criteria Analysis will be to identify the delivery model (s) that most align with the project profile. These are the models assessed as being able to be managed appropriately by IDPG/TCCS and are likely to deliver the best 'value for money'.

There are a number of ways to categorise the different delivery models. The ACT Government SAF Business Case Guide refers to 3 classes:

- Traditional models,
- Flexible/ relationship Models, and
- Integrated models

as explained in the table below:

Model Type	Models
Traditional Models These delivery models envisage the transfer of price risk with low to medium levels of integration.	• Construct Only: Design consultancies and construction contracts that are procured separately. Construction is generally procured when 'for construction' designs are available. • Design & Construct (D&C): An integrated design and construction outcome is simultaneously procured. Generally, at preliminary design. • Design Construct Maintain: A design & construct with an integrated maintenance contract. The maintenance contracts are typically 5 to 15 years.
Flexible or Relationship Models These delivery models are suitable for projects where 'price risk' cannot be or can only partially be transferred. Relevant where scope is unknown or variable.	• Project Management Agreement (PMA) Appointment of a project manager with trades engaged by the PM TCCS. • Managing Contractor (MC): Appointment of lead contractor to potentially establish a management framework. The lead contractor provides a central contact point and procures and manages sub-contractors directly. Typically established with incentives and management fees. • Alliance: Government contracts delivered on an 'open book' process where each party shares or suffers pain dependent upon the success of the project. Pricing is established through collaboratively developed Target Outturn Cost ("TOC"). Can be procured on a competitive basis.
Integrated Model:	• Design Construct Maintain Operate (DCMO): Involves a D&C bundled with maintenance and operations (usually for a period of between 10 to 30 years).

These are delivery models that are suitable from complex projects and involve a bundling of services:	• PPP (Availability) Fully financed by a Public and Private industry partnership and involves a D&C bundled with maintenance and operations (usually for a period of between 25 to 40 years). • PPP (Build Own Operate Transfer(BOOT)): Same as PPP (Availability) but also includes revenue risk transfer.
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Table 1 ACT Government SAF Business Case Guide Delivery Models

In preparing this report, the following source documents have been used for reference:

- ACT Government SAF Business Case Guide 2016 v2.1.
- ACT Guidelines for Public Private Partnerships.
- Building and Construction Procurement Guide, Principles and Options 2014 – Austroads & Australasian Procurement and Construction Council.
- Guide to Project Delivery 2014 – Austroads.
- National Public Private Partnership Guidelines 2008 – Australian Government Dept of Infrastructure and Regional Development.
- National Framework for Traditional Contracting 2015, Australian Government Dept of Infrastructure and Regional Development.
- National Alliance Contracting Guidelines, Early Contractor Involvement 2015 - Australian Government Dept of Infrastructure and Regional Development.
- Technical guidance Procurement strategy guideline 2013 – Victoria Department of Treasury & Finance.
- Jacobs – Project Contracting Strategies white paper 2018.

The ACT Government SAF Business Case Guide categorises delivery models differently to the other publications listed above. For completeness, the table below highlights the differences.

Delivery Types	Delivery Models
Self-Perform	Directly Managed by the Owner (Owner self performs).
Traditional Models	Construct only.
Design & Construct Models	Design and Construct (variants being Design Novate Construct & Develop Design & Construct). Design, Construct and Maintain. Design, Construct, Maintain and Operate.
Managed Models	Project Management Agreement & Construction Management. Managing Contractor.
Collaborative / Relationship Delivery Models	Early Contractor Involvement. Alliance.
Privately Finance Models Public Private Partnership	PPP (Availability). PPP (BOOT).

Table 2 Delivery Models categorised by delivery types

Table 2 includes two delivery models that do not feature in Table 1; they are:

- Directly Managed by the Principal. Used where Principal's in-house agency resources have the capability to undertake work e.g. typically small construction, rehabilitation or maintenance. Within TCCS this could fall under Gov Works.

For the purpose of this study, we discounted this option because the project is too large.

- Early Contractor Involvement (ECI). A two-stage relationship-style delivery model, generally structured to resemble a project alliance model during the first stage and a D&C model during the second. This

delivery model is specifically designed to achieve a collaborative relationship. Optimisation of cost and constructability outcomes are sought by the involvement of construction contractors during the design, development and delivery of the project.

Each procurement model has its own strengths, weaknesses and characteristics suiting different conditions and circumstances. Delivery models are often combined to create a hybrid delivery model. On large projects, sections of the project may be packaged separately resulting in the use of several different contracts and delivery models. These different approaches and their interfaces need to be reflected in the procurement strategy.

Section 5 outlines these common procurement approaches. It provides an overview of the characteristics of each delivery model; including their:

- Typical contract structure,
- Typical delivery sequence, and
- Suitability based on the SAF Business Case Guidance Notes is explained in Section 4.2

Appendix A tabulates a comparison of each delivery model. It includes:

- Advantages & disadvantages,
- Contract value guidance,
- Contract forms,
- Typical procurement process,
- Value for money,
- Pricing mechanism,
- Risk allocation (Design, Construction, Quality, Time, Maintenance & Operations),
- Contract administration, and
- Potential for innovation.

4.2 ACT Government SAF Business Case Guidelines Commercial Assessment Criteria

ACT Government SAF Business Case Guidelines provides the commercial criteria used by ACT Government to select the appropriate delivery model following an assessment of the project risks. They set out how the project risk will be managed by the delivery model. There are five main assessment areas; as follows:

Criteria	General comments	Typical questions
Time to Market	Certain delivery models lend themselves to rapid procurement and delivery, whereas, others require many months of preparatory work to bring to market. In broad terms, higher value & more complex projects suit delivery models with long lead times.	Is the delivery model suitable for rapid procurement? What is the best model to accommodate time constraints? Are there critical deadlines?
Flexibility	Certain delivery models are more tolerant to changes in scope and uncertainties than others. Financed models require a transaction/ change control process in their own right for any significant scope changes. Flexible delivery models are structured in a way that facilitate delivery and price certainty mechanisms where uncertainty prevails; this could be for any of the following reasons: • Innovation is needed in design and the outcome is uncertain. • Geotechnical uncertainty. • Scope is still being developed. • Time pressures and interdependencies. • Latent conditions i.e. aging pipes, etc.	Is the delivery model flexible and can it easily accommodate uncertainty and variation?

Criteria	General comments	Typical questions
	- Contamination. - Complex and unresolved stakeholder issues.	
Price Certainty	Certain delivery models are more tolerant to changes in scope and uncertainties than others. Financed models however require a formal contract transaction.	What pricing mechanisms can be introduced to get price certainty? How important is price against time? What is the value for money balance between time, cost and scope?
Risk Transfer	Certain delivery models are better placed to manage certain types of risk. What is are the critical risks to be transferred.	To what extent is the delivery model suitable to the transfer of risk to the contractual counter party? Who is the most suitable party to manage the risk?
Innovation and Incentive	Several delivery models drive innovation through incentives. This is typically done through incentives associated with the transfer of certain risks i.e. revenue or through performance-based payment mechanisms embedded in the delivery model.	To what extent does the delivery model drive innovation and incentive to the other party?

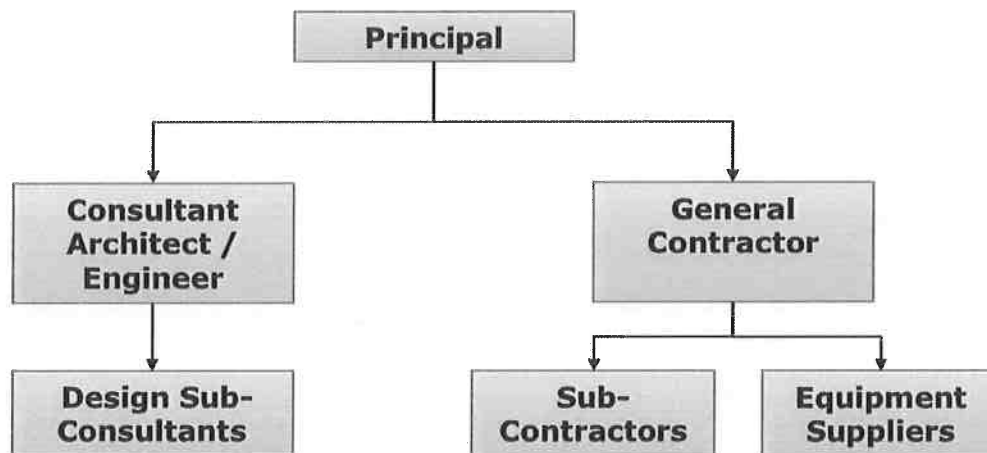
Table 3 SAF Business Case Guidelines Commercial Assessment Criteria

5. Delivery Models

5.1 Traditional Models – Construct Only Model

5.1.1 Construct Only Model Overview

Figure 2 Typical Construct Only structure :



Typical sequence:



The Construct Only model is generally regarded as the most commonly used delivery model for the delivery of infrastructure projects in Australia. It is often referred to as 'Traditional' or 'Design – Bid – Build/ Construct' since each of these phases is undertaken separately. This type of model is typically used for both 'minor works' and relatively simple 'major works' projects.

The Principal has responsibility for the project design and engages a design team to develop the design documentation or prepares it 'inhouse'. The Principal then separately procures a contractor to deliver the construction component of the project. The design documentation forms part of the tender specification for this procurement process. In this model, the Principal carries the full design risk in terms of timeliness of issue, completeness, accuracy, clarity, quantities, interfaces, constructability, maintainability, functionality, durability and general fitness for purpose of the design. Other than to the extent that warranties, damages or similar regimes can be obtained from designers and are ultimately found to be enforceable.

The contractor competitively tenders a contract price for the works. The contract price is subject to any adjustments, such as variations, provided for in the contract. Irrespective of the actual cost of the works, the contractor is entitled to be paid the contract sum as agreed between the parties prior to commencing the works. In practice, the construct-only contract may exceed the original contract price if the project is not properly planned and managed by the Principal. In this model, the Principal remains responsible throughout the construction and defects periods for the appropriateness of the design.

Accountability is sometimes an issue with this delivery model. For example, if the Principal has broken the works down into discipline packages or scope packages for delivery, and if there is a failure to deliver required outcomes, it is often difficult to determine if it is a design, supplier or construction issue. By separating

responsibilities, the Principal is left dealing with this interface and with multiple entities who will all most likely and at least initially, deny responsibility, i.e. the designer will blame constructor and vice versa.

The Construct Only delivery model is generally used for projects where:

- The scope is well-defined and there is little likelihood of scope increase or wholesale changes to the project requirements;
- There is limited opportunity for bundling construction services & maintenance to creating 'whole-of-life' project efficiencies;
- There is little incentive or need for innovation from the contractor; and/or
- There is enough time to complete design documentation prior to tendering.

Typical contract forms for a Traditional (Construct Only) delivery model are AS2124, AS4000 and GC21. Noting that GC21 also offers a platform for a Develop, Design and Construct model as discussed in Section 0.

5.1.2 Effectiveness of the Traditional (Construct Only) delivery model against the SAF Business Case Guidelines Procurement Drivers Evaluation Criteria

Table 4 below describes how the Construct Only delivery model performs against the assessment criteria detailed in the SAF Business Case Guidelines Guidance Notes.

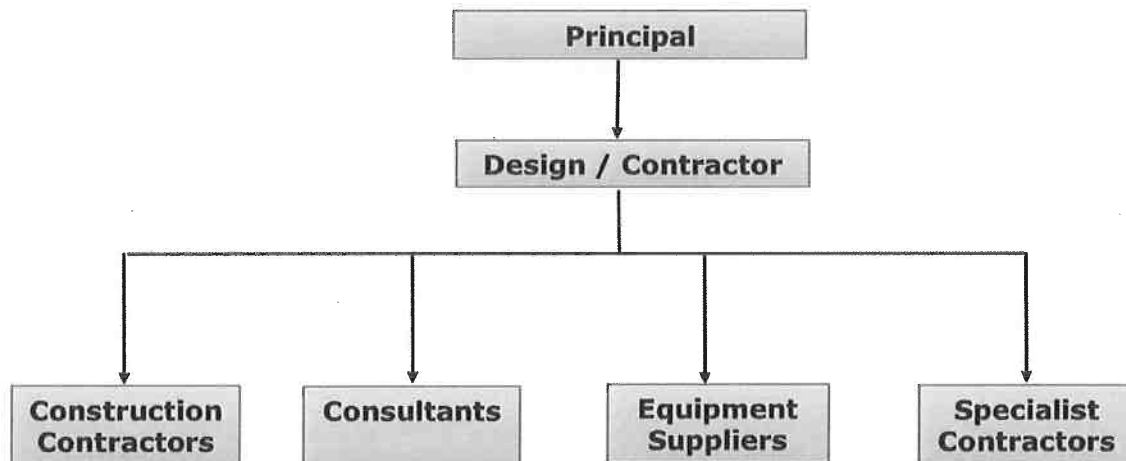
SAF Criteria	Effectiveness	Comment
Risk Transfer	Medium	Could be rated higher if lump sum pricing used, although design risk will remain.
Time to Market	Short / Medium	For construction works, enables design work to progress ahead of construction tendering.
Flexibility	Medium to High	Medium to high flexibility because the government controls the design process for an extended period. Changes to scope after construction commences will result in variations to the contract.
Price Certainty	Medium	Medium (better if a lump sum contract).
Innovation and Incentive	Low (to Medium if GC21 used)	Low (little opportunity to have innovation from Contractor once construction has commenced. GC21 has some ability to incentivise innovation.)

Table 4: Effectiveness of the Traditional (Construct Only) model against the SAF Business Case Guidelines Evaluation Criteria

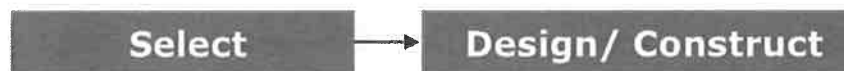
5.2 Design & Construct Models - Performance Specification Design & Construct (PSD&C) Overview

5.2.1 Overview

Figure 3 Typical Design & Construct structure:



Typical sequence:



Under a Performance Specification Design and Construct (PSD&C) model, the Principal prepares a design brief (Performance Specification) which outlines the functional and key user requirements (in performance terms) for the works. For example, the Performance Specification identifies a requirement for a bridge to carry a prescribed number of vehicles per day for a prescribed number of years, but would not detail the structural form, construction materials or appearance. The Principal then seeks tenders for completion of the detailed design, consistent with the design brief, and construction of the works described in the design brief.

The PSD&C model seeks to leverage the design and construction skills of the private sector and therefore reduce the construction risk to the Principal. Typically, a PSD&C would be used for projects where:

- The Principal performance requirements are tightly specified before tender, or do not change;
- The Principal is seeking cost effective designs; and / or
- There is limited opportunity for bundling services & maintenance to create 'whole-of-life' project efficiencies.

The PSD&C model involves the contractor taking responsibility for both design and construction in order to achieve specified performance requirements. It enables innovation by contractors for design efficiencies and potential reduced cost. The contractor takes primary responsibility for the design and specification in terms of timeliness, completeness, accuracy, clarity, quantities, constructability, maintainability, durability, functionality and general fitness for purpose to a performance specification. In the absence of term maintenance (and operation) The PSD&C model is best suited to works which can be readily verified as compliant, for which design life standards are typically long term (say 25 to 50 years), and where defects are reasonably detectable, preventative and rectification maintenance is minimal.

Typical contract forms for a PSD&C model are: AS4300, AS4902, AS4903 and GC21.

5.2.2 Effectiveness of the Design & Construct -Performance Specification Design & Construct delivery model against the SAF Business Case Guidelines Procurement Drivers Evaluation Criteria

Table 5 below describes how the PSD&C model performs against the assessment criteria detailed in the SAF Business Case Guidelines Guidance Notes.

SAF Criteria	Effectiveness	Comment
Risk Transfer	Medium	Better risk transfer than Construct Only model because the contractor owns this design risk.
Time to Market	Short	This allows procurement of contractor ahead of detailed design. Preliminary design needs to be prepared in advance of procurement.
Flexibility	Medium	Changes to scope after contract award are difficult and potentially expensive. Control of design by ACT Government is limited post contract award.
Price Certainty	Medium	Medium (lump sum price based on tender design by contractor.)
Innovation and Incentive	Medium	Medium (the contractor can integrate detailed design and construction methodology & buildability.)

Table 5: Effectiveness of the Design & Construct PSD&C delivery model against the SAF Business Case Guidelines Evaluation Criteria

5.3 Design & Construct Model -Develop, Design & Construct (DD&C) Overview

The Develop, Design and Construct (DD&C) model is a variation to the PSD&C model. The structure and tendering process are the same as the PSD&C. Under this model, the Principal prepares a schematic design (concept or preliminary design) in addition to performance specifications, thereby retaining a greater degree of control over the design output, while still transferring some of the design risk to the construction contractor.

Under a DD&C model, the contractor is required to engage its own consultants to develop the preliminary design provided by the Principal. The contractor is generally paid based on a lump sum price or tendered rates. Additional amounts are paid for variations to the Principal's requirements, but because the tender documentation is not detailed, the Principal is exposed to less risk on account of errors and omissions than under a developed design contract e.g. Construct Only model. The risk of latent conditions under the DD&C model is generally allocated to the contractor.

Projects suited to a DD&C model are those where:

- The Principal wishes to determine the preliminary design;
- There is a significant risk of delays or changes to project scope as issues are resolved with stakeholders or investigations are completed, and the Principal is best placed to manage these activities;
- The requirements for the detailed design can be clearly described, for example through established standards for products and materials, details and finishes;
- A fully detailed design introduces risks to the Principal associated with buildability or the coordination of design and construction;
- There are proprietary designs or construction processes that may offer advantages over special one-off designs; or
- The Principal does not have enough time to manage the design to completion.

5.3.1 Advantages and disadvantages of the DD&C delivery model

The advantages and disadvantages of a DD&C delivery model are similar to the PSD&C delivery model (documented in Appendix A). The list below is additional to Appendix A and specific to the DD&C delivery model.

Advantages

- The Principal can substantially determine the concept, preliminary and functional designs before a contract is awarded, reducing the likelihood of contract variations.
- The contractor has flexibility to incorporate innovations and improve buildability through the design development, potentially saving costs.
- The contractor assumes responsibility for the 'fitness for purpose' of the finished product, buildability of the detailed design and usually latent conditions.
- Project time targets can be maintained by starting construction prior to finalisation of detailed design, if necessary, at the contractor's risk.
- Tender prices do not need to include allowances for the risks of performing extensive investigation work or interacting extensively with stakeholders.
- The risk of contract claims due to errors and omissions in the design is reduced.

Disadvantages

- If the design documents supplied by the Principal are unclear or in error, the desired outcomes may not be achieved without disputes over interpretation, variations and additional expense and delays.
- Changes to the Principal's requirements during design development are likely to be costly, due to their potential to impact on the contractor's work and schedule.
- Tender prices are likely to be higher to allow for the contractor's increased risk.
- The number of potential competent tenderers is less, and tenderer interest may be reduced further due to the high cost of tendering. This can result in higher tender prices.

5.3.2 Effectiveness of the Design & Construct -Develop, Design and Construct delivery model against the SAF Business Case Guidelines Procurement Drivers Evaluation Criteria

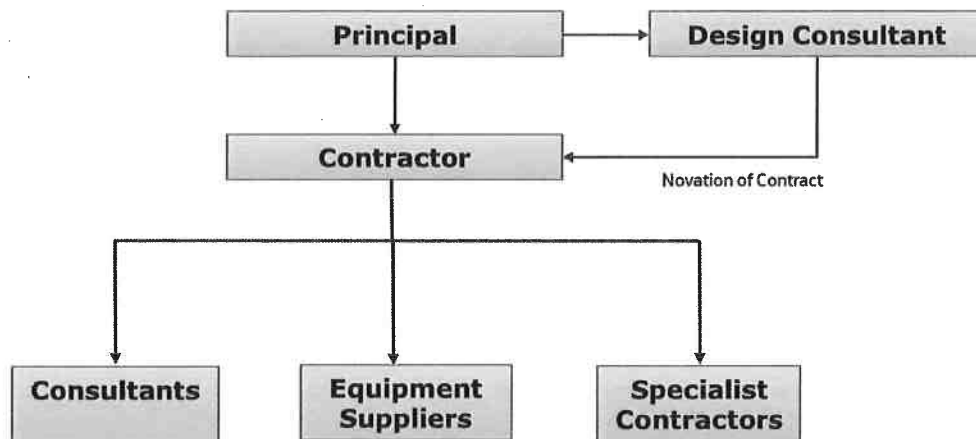
Table 6 below describes how the Design & Construct DD&C delivery model performs against the assessment criteria detailed in the SAF Business Case Guidelines Guidance Notes.

SAF Criteria	Effectiveness	Comment
Risk Transfer	Medium	Better risk transfer than Traditional (Construct Only model because the contractor owns this design risk. Design has been developed minimising risk of poor description of the project requirements.
Time to Market	Medium	Development phase of approximately a year to develop preliminary design. This allows procurement of a contractor ahead of detailed design. Preliminary design needs to be prepared in advance of procurement.
Flexibility	Medium	Higher than PSD&C because the Principal has opportunity to influence during the preliminary design development phase. Changes to scope after contract award are difficult and potentially expensive. Control of design by Principal is limited after contract award.
Price Certainty	Medium	Lump sum price based on tender design by contractor.
Innovation and Incentive	Medium	The contractor can integrate detailed design and construction methodology & buildability. Limited ability to innovate during the detailed design period.

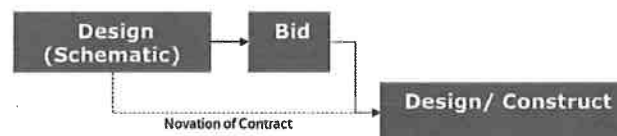
Table 6: Effectiveness of the Design & Construct DD&C delivery model against the SAF Business Case Guidelines Procurement Drivers Evaluation Criteria

5.4 Design & Construct Model -Design, Novate and Construct (DN&C) Overview

Figure 4 Typical Design & Construct DN&C structure:



Typical sequence:



The Design, Novate and Construct (DN&C) model is a further variation to the PSD&C or DD&C models. Under this model, the Principal initially engages a designer to prepare a schematic design and then, based on that schematic design, the Principal engages a D&C entity and novates the appointed designer to that D&C entity. Novation involves signing over the contractual relationship between the designer and the Principal to the D&C entity on the same terms. The initial engagement of the designer (Design Agreement), and the D&C contract, must be transparent and include provisions foreshadowing the planned novation to the D&C entity. As a result, a form of 'Novation Agreement' is generally provided in the Design Agreement and the D&C contract.

This model ensures continuity of the designer's input from project inception to completion. By novation of the designer to the D&C contractor, the Principal's appointed designer is taken on by the D&C entity at the time of construction contract award. At this stage, either the concept design, or the preliminary design is complete, and the D&C entity takes on full responsibility for the overall design including payment of the designer's fees.

A DN&C contract would typically be used where:

- The Principal wishes to control early design development;
- The project has special design needs;
- There is significant extra benefit in making the contractor responsible for all design and documentation, and giving the contractor full access to the Principal's appointed designer and its knowledge of the design issues; or
- The specification for the developed design can be clearly described, for example through established standards for products and materials, details and finishes.

DN&C is a very common model used by NSW Health Infrastructure in the design and construction of hospitals. Generally, NSW Health Infrastructure engages a designer which it then novates to the Contractor. When the Designer is awarded the contract, they are not aware of which Contractor they are going to be novated to. In some instances, this creates challenges.

5.4.1 Advantages and disadvantages of the DN&C Delivery Model

The advantages and disadvantages of a DN&C contract are similar to the PSD&C delivery model documented in Appendix A. The list below is specific to the DN&C model and additional to Appendix A and DD&C Table 6.

Advantages

- There is continuity of the designer's involvement in design and documentation throughout the project lifecycle, reducing the risk of the completed design not meeting the Principal's requirements.

Disadvantages

- The contractor and the designer prices the risk of entering into a contract with an unknown entity on terms predetermined by others;
- Potential designers may be reluctant to tender to the Principal because they are reluctant to later be contracted to an unknown contractor.
- There is potential for complex litigious problems if the relationship between designer and contractor deteriorate

5.4.2 Effectiveness of the Design & Construct – Design, Novate and Construct delivery model against the SAF Business Case Guidelines Procurement Drivers Evaluation Criteria

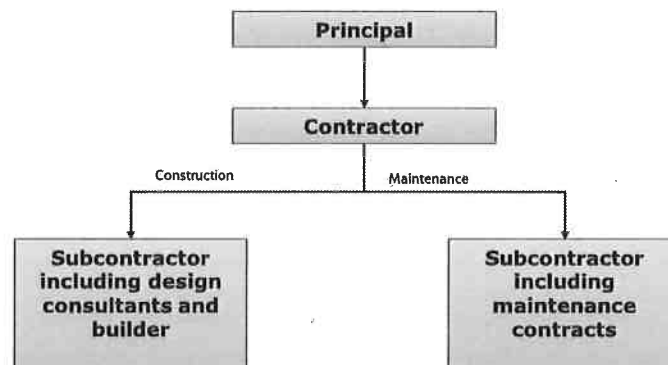
Table 7 below describes how the Design & Construct DN&C delivery model performs against the assessment criteria detailed in the SAF Business Case Guideline Guidance Notes.

SAF Criteria	Effectiveness	Comment
Risk Transfer	Medium	Better risk transfer than Traditional (Construct Only) model because the contractor owns the design risk. Design has been developed minimising risk of poor description of the project requirements. Principal design expertise is transferred to the contractor on novation.
Time to Market	Medium	Development phase of approximately a year to develop concept (or preliminary) design. This allows procurement of a contractor ahead of detailed design. Concept (or preliminary) design needs to be prepared in advance of procurement.
Flexibility	Medium	Higher than PSD&C because the Principal has opportunity to influence the design during its development phase. Changes to scope after the construction contract is let are difficult and potentially expensive. Control of design by the Principal is limited post contract award.
Price Certainty	Medium	Lump sum price based on tender design by contractor.
Innovation and Incentive	Medium	The contractor can integrate detailed design and construction methodology & buildability. Limited ability to innovate during the detailed design period.

Table 7: Effectiveness of the Design & Construct DN&C model against the SAF Business Case Guidelines Procurement Drivers Evaluation Criteria

5.5 Design & Construct Model -Design, Construct and Maintain (DC&M)

Figure 5 Typical Design & Construct DC&M structure:



Typical sequence:



The Design, Construct and Maintain (DC&M) model is a further development of any of the other D&C models. Under this model, the D&C entity is transferred the Principal's ongoing maintenance obligations, in addition to the design and construction. This generally means that project lifecycle costs can be reduced because the D&C entity takes these into account when designing and constructing the asset.

Under this model, the Principal prepares a design brief (either a Performance Specification or concept design) which outlines the functional and key user requirements (in performance terms) for the works as well as the key principles behind its operating terms. The Principal then seeks tenders for a single fixed price contract for the completion of a detailed design, construction works, operations and ongoing maintenance works. The Principal remains responsible for financing the project. The term of the maintenance component of the contracts is typically 5 to 15 years.

The DC&M model is best used where:

- There is scope for bundling maintenance with the design and construction contract to create 'whole-of-life' project efficiencies.
- It is appropriate to procure to a single entity to achieve an integrated solution.

A typical contract form for a DC&M model is bespoke or a modified GC21.

5.5.1 Advantages and disadvantages of the DC&M delivery model

The advantages and disadvantages of a DC&M delivery model are similar to the PSD&C delivery model documented in Appendix A. The list below is specific to the DC&M model and in addition to Appendix A.

Advantages

- Long term maintenance program developed up-front.
- Certainty of maintenance outcomes.
- Operator influence over design resulting in improved configuration.

- Operator and construction contractor contribution to the design process resulting in a more efficient design.
- Maintenance contract can prevent poor quality and use of low specification materials.
- Contractor normally warrants design including its 'fitness for purpose'.
- Single point of accountability for design, construction and maintenance.
- Administration efficiencies through a single contract.

Disadvantages

- More emphasis on upfront specifications to ensure project delivers to the Principal's requirements.
- Further reduction of Principal control over the design and operations.
- The best operator may not necessarily partner with the best contractor, resulting in compromise.
- May require a longer contract term than under a pure O&M contract.
- Higher procurement and bid costs.
- Extended tender period required for tenderers to assess the risks associated with design and operations.
- Principal acts as a project manager and therefore resources with the necessary skills are required.

5.5.2 Effectiveness of the Design & Construct – Design, Construct Maintain delivery model against the SAF Business Case Guidelines Procurement Drivers Evaluation Criteria

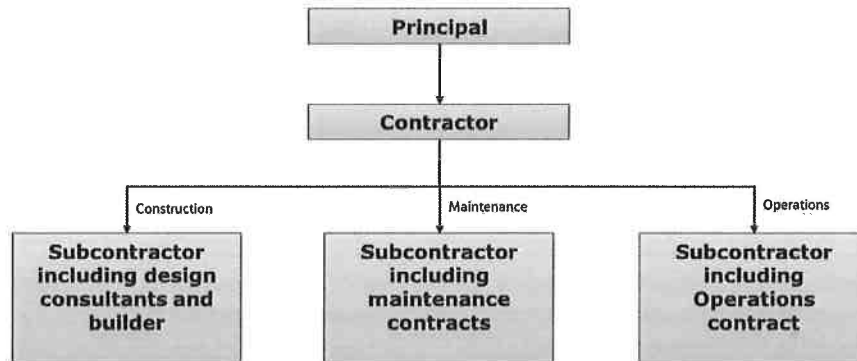
Table 8 below describes how the Design & Construct DC&M delivery model performs against the assessment criteria detailed in the SAF Business Case Guidelines Guidance Notes.

SAF Criteria	Effectiveness	Comment
Risk Transfer	Medium to High	Better risk transfer than D&C because the contractor owns this design and maintenance risk.
Time to Market	Medium	Time to market longer than D&C due to preparation of maintenance procurement documents and extended tender assessment.
Flexibility	Medium to Low	Changes to scope after construction contract award are difficult and potentially expensive.
Price Certainty	Medium	Lump sum price based on tender design by the contractor. Certainty to ongoing maintenance costs.
Innovation and Incentive	Medium	The contractor can integrate construction methodology and future maintenance into the detailed design.

Table 8: Effectiveness of the Design & Construct - DC&M model against the SAF Business Case Guidelines Procurement Evaluation Criteria

5.6 Design & Construct Model -Design, Construct, Maintain & Operate (DCMO)

Figure 6 Typical Design, Construct, Maintain & Operate DCMO structure:



Typical sequence:



The Design, Construct, Maintain and Operate delivery model is an extension of the DC&M delivery model. It contemplates design and construction and then, for a specified term, the operation and maintenance of the asset or infrastructure. It is sometimes referred to 'Build Operate Transfer' and 'Turnkey'.

In DCMO, in addition to being responsible for the design and construction of the works to the Principal's requirements, the contractor is also responsible for operating and maintaining the completed asset. The operation and maintenance period can span as much as 10 to 30 years, during which the contractor is responsible for the safe and smooth operation of the asset and may benefit from operational income. The asset itself however, remains the property of the Principal.

As work progresses, the Principal pays the contractor for undertaking the works; maintenance is also paid for by the Principal at an agreed price. At the end of the agreed maintenance and operation period, the contract may be renewed or the responsibility for operation and maintenance may revert to the Principal. Whether the contract is subject to renewal is usually stated at the tender stage.

DCMO is commonly used for projects such as light rail, motorways, tunnels, bridges and other infrastructure as well as shopping and leisure centres. DCMO contracts are typically awarded through competitive procurement under a transparent tender process. Projects are procured from the private sector in a single contract while works are typically financed by the government (although Principals can also be from the private sector). DCMO contracts are more commonly a form of Public Private Partnerships (PPP) where the finance comes from the private sector. This will be reviewed in Section 5.10.

In the case of infrastructure that does not produce operational income, such as a non-toll motorway, the contractor is paid fees by the Principal in the form of availability payments or 'shadow tolls'. With availability payments, the Principal must pay the contractor the same fees whether the facility is used or not. Such projects are therefore risky to embark upon but may nevertheless be in the Principal's interest. Shadow tolls are applied where, for whatever reason, there are no tolls exacted on the project, in which case the Principal pays the operator a per-vehicle amount as compensation for operating and maintaining the asset.

A typical contract form for a DCMO delivery model is bespoke.

5.6.1 Advantages and disadvantages of the DCMO delivery model

The advantages and disadvantages of a DC&M delivery model are similar to the PSD&C delivery model documented in Appendix A, as well as the DN&C delivery model listed above. The list below is specific to the DCMO model and is in addition to Appendix A.

Advantages

- A single source of responsibility for usually disparate functions of design, construction, maintenance and operations.
- The DCMO contractor can establish a long-term maintenance regime up-front, plus its estimated costs.
- Knowledge of methods and materials to be used allows the DCMO contractor to develop a tailored maintenance plan that anticipates and addresses potential issues thereby reducing risk and costs.
- It relieves the Principal of the time and trouble spent on O&M issues.

Disadvantages

- Long term needs must be specified up front to enable correct specifications to be developed.
- The Principal loses much of the control they usually have with traditional contracts.
- Great care is needed to ensure the correct standards are specified for design, construction, maintenance and operations, especially if the Principal is not accustomed to the process.
- Much risk is placed on the contractor, but this is usually reflected in the price.
- Prices can be excessive in the long term.
- Some contractual inflexibility, although variation and termination rights can provide flexibility.

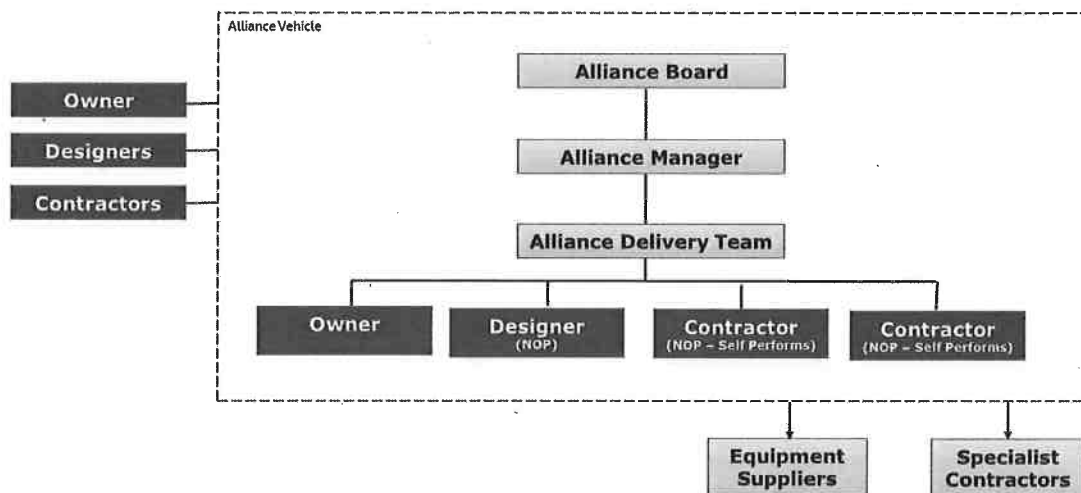
5.6.2 Effectiveness of the Design, Construct Maintain Operate delivery model against the SAF Business Case Guidelines Procurement Drivers Evaluation Criteria

The effectiveness of the DCMO delivery model is very similar to DC&M. The time to market may be slightly longer and the flexibility slightly less.

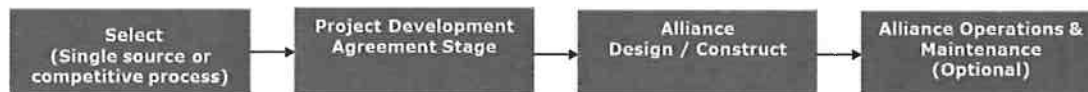
5.7 Alliance

5.7.1 Alliance Model Overview

Figure 7 Typical Alliance structure:



Typical sequence:



Alliancing is typically used to deliver larger, more complex and high-risk infrastructure projects (with capital costs exceeding \$50 million), and where the Principal has capability to contribute its skills and expertise to deliver the project. Projects suited to the alliance delivery model are generally characterised by one or more of the following factors:

- The project has risks that cannot be adequately defined or measured in the business case or prior to procurement;
- The cost of transferring risks at the procurement stage is considered too great;
- The project needs to start as early as possible before the risks can be fully identified or project scope cannot be finalised;
- The Principal has superior knowledge, skills, preference and capacity to influence or participate in the development and delivery of the project;
- There is opportunity for innovation; and
- A collective approach to assessing and managing risk may produce a better outcome.

In project alliancing, the Principal collaborates with one or more private sector parties (non-owner participants (NOPs)) to share risks and responsibilities in delivering the design and construction phase of a project. Alliancing is characterised by several key features, which generally require the parties to work together in good faith, act with integrity and make best-for-project decisions. Alliancing contract arrangements aim to achieve collective responsibility between the parties. The alliance participants work as an integrated, collaborative team to deal with key project delivery matters, share risks, responsibilities and rewards in delivering the design and construction phases of the project. The alliance contract and supporting structures promote a positive culture based on 'no-fault, no-blame' and unanimous decision making, requiring all participants to find 'best for project' solutions.

Alliancing is a complex delivery method, and success is based on the following four interdependent success factors:

- An integrated collaborative team;
- The project solution;
- The agreed commercial arrangements; and
- The agreed target outturn cost (TOC).

Typically using the alliance model, the NOPs are guaranteed reimbursement of their direct project costs and payment of corporate project overheads in an 'open-book' arrangement.

Alliancing has a collective approach to risk, which means that the Principal shares in construction and design risk (and opportunities) and is exposed to project risks that it would normally transfer to another party under other delivery models. Therefore, it is critical that the Principal has a thorough understanding of the risks it faces under the alliance contract and has appropriate capabilities and resources to manage them.

A typical contract form for an Alliance delivery model is bespoke.

Competitive Alliance

The Principal selects two proponents to compete on targets for cost, schedule and other key parameters. Through collaboration, the Principal takes the lead in providing understanding and guidance on the project objectives during scope and risk development undertaken by the proponents using a TOC development process. The Principal's decision in selecting its preferred proponent to deliver the project is based on a balanced judgement of the price and non-price attributes observed during the TOC development outcome (including the proponent's proposed project solution) and the capability of the team it offers. This includes the commercial and legal arrangements, which have a significant implication on the final actual price paid. If actual delivery exceeds agreed targets, the parties share in a pre-agreed reward ('gain share'). Conversely, if delivery does not meet agreed targets, a pre-agreed 'pain-share' formula applies.

5.7.2 Effectiveness of the Alliance delivery model against the SAF Business Case Guidelines Procurement Drivers Evaluation Criteria

Table 9 describes how the Alliance model performs against the assessment criteria detailed in the SAF Business Case Guidelines Guidance Notes.

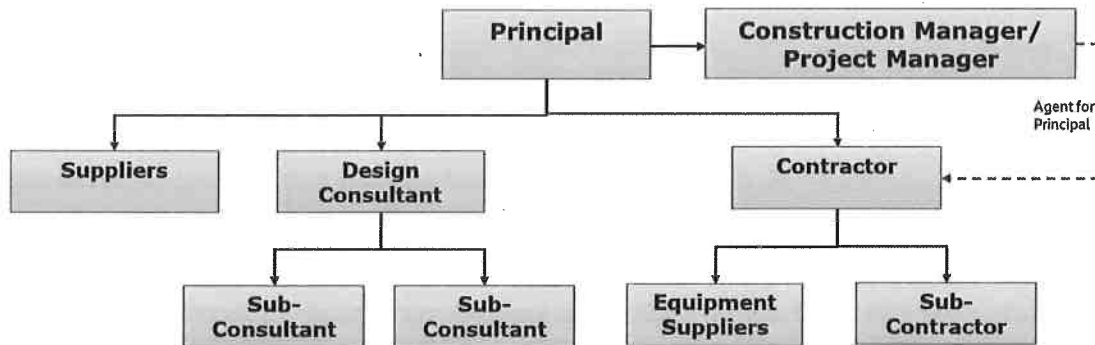
SAF Criteria	Effectiveness	Comment
Risk Transfer	Low	Risk sharing through 'pain/gain' share mechanism.
Time to Market	Medium to High	Complex procurement process.
Flexibility	High	All parties work together to achieve project requirements.
Price Certainty	Low	TOC generally unknown at time of contract award.
Innovation and Incentive	Medium to High	All parties work together to achieve 'best for project' outcome.

Table 9: Effectiveness of the Alliance model against the SAF Business Case Guidelines Procurement Evaluation Criteria

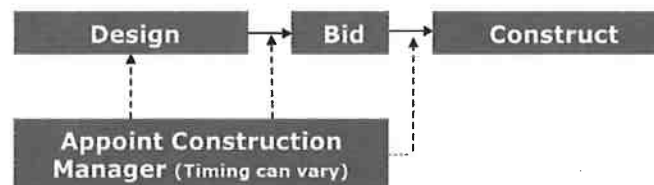
5.8 Project Management Agreement / Construction Management

5.8.1 Project Management Agreement/ Construction Management Overview

Figure 8 Typical Project Management Agreement / Construction Management structure:



Typical sequence:



The Project Management Agreement (PMA) is also commonly referred to as 'Construction Management', 'Construction Management not at risk' and 'Construction Management Agent'. It is similar in many respects to the Traditional Construct Only delivery model. The difference comes by way of the introduction of a project manager and construction manager that take the place of the general contractor in a modified role. In a typical construction management structure, the Principal contracts with a consultant to prepare a design and contract documents. Simultaneously, or subsequent to the completion of the design, the Principal will also contract with a project manager and construction manager as its agent for the management of the project.

The project manager and construction manager's role is predominantly one of Principal's advisor and administrator. In addition to assisting the Principal with procurement of the various contractors who will complete the work, the project manager and construction manager will also administer the trade contracts (a role assumed by the contractor under the Construct Only model). The project manager and construction manager may be responsible for creating the project schedule and may assist the Principal in developing the project budget. The Principal relies on the technical knowledge of the project manager and construction manager. Depending on the expertise and experience of the Principal, the project manager and construction manager may perform many of these functions with minimal oversight by the Principal.

The key difference between Construct Only and a PMA or construction management, is that the Principal retains privity with the trade contractors and therefore retains the risk for ensuring their contractual obligations are fulfilled. The project manager and construction manager act as the Principal's agent and are typically paid for the cost of the work together with an agreed fee. This structure means less risk for the project manager and construction manager, particularly in relation to defects and deficiencies within the subcontracted work. Typically, the project manager and construction manager is only liable for these deficiencies if they arose from the project manager and construction manager's failure to properly supervise or coordinate the project. For this reason, this structure is also commonly known as 'Construction Management not at risk'. However, as the Principal's agent, the project manager and construction manager must operate within the confines of the authority that the Principal has bestowed upon them. Where they exceed this authority, the Principal will hold the project manager and construction manager liable.

This structure increases the Principal's exposure to contractual risk arising from any contractual complexity of the project. Because the Principal essentially takes on the role of the general contractor, the Principal assumes the risks of the contractual relationships with the trades. In addition, the Principal often provides an indemnity to the project manager and construction manager in relation to any claims made by the subcontractors with whom the project manager and construction manager contracted as agent. Conversely, under this structure, the project manager and construction manager rarely indemnify the Principal for claims beyond those arising from the project manager and construction manager's failure to properly manage the project. The advantage of this structure is that the Principal, project manager and construction manager are, for the most part, aligned in their interests. However, because the project manager and construction manager is not directly responsible for the subcontractor's costs, there is little incentive for the project manager and construction manager to seek out all possible cost savings.

In summary, the project manager and construction manager typically:

- Provides advice, coordination, planning, cost management, supervision;
- Is paid a fee based on time or a percentage of the value of the works;
- Engages trade contractors as agent for the Principal;
- Is responsible for preliminaries for those trade contractors (e.g. crane hire, site sheds etc); and
- Does not take any cost risk or design risk although the project manager and construction manager is paid to assist the Principal with cost control and design advice.

This model is typically used for:

- Low value projects with significant uncertainty and minimal risk transfer;
- Complex projects where it is not possible for design or some elements to be started before work is undertaken by others;
- Projects where Principal needs to retain high levels of control e.g. in an operating road or rail corridor; and
- If a Contractor goes into administration mid project, it may be more efficient to complete the project through construction management than to fully document and tender the balance of the works as a single procurement package.

5.8.2 Effectiveness of the Project Management Agreement / Construction Manager delivery model against the SAF Business Case Guidelines Procurement Drivers Evaluation Criteria

Table 10 below describes how the Project Management Agreement / Construction Manager model performs against the assessment criteria detailed in the SAF Business Case Guidelines Guidance Notes.

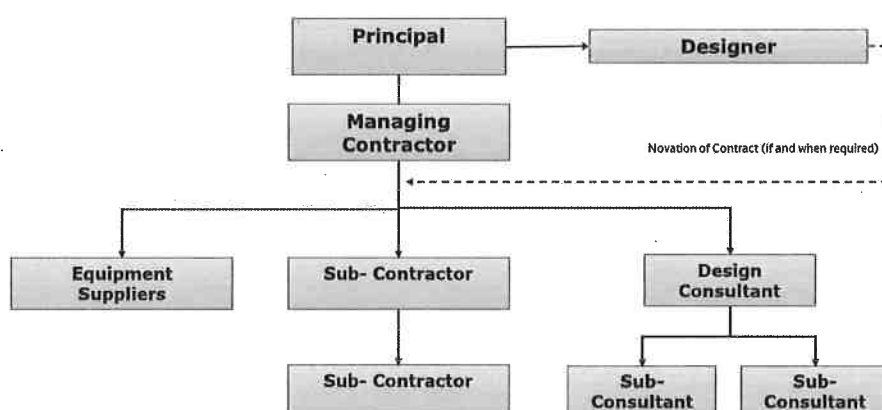
SAF Criteria	Effectiveness	Comment
Risk Transfer	Low	Principal retains most of the risk associated with the design and delivery of the project.
Time to Market	Short	Procurement of project manager and construction manager is short.
Flexibility	High	The model provides the highest level of flexibility because the Principal can control the design and construction process.
Price Certainty	Low	Final project cost is difficult to forecast
Innovation and Incentive	Low	The project manager and construction manager is not typically incentivised to innovate.

Table 10: Effectiveness of the Project Management Agreement / Construction Management model against the SAF Business Case Guidelines Procurement Drivers Evaluation Criteria

5.9 Managing Contractor

5.9.1 Managing Contractor Overview

Figure 9 Typical Managing Contractor structure:



Typical sequence:



Typically used for the construction of large complex assets. This relationship-style delivery model, based on collaborative principles, involves a contractor being engaged by the Principal as a 'managing contractor' to manage the development of the design, coordinate production of construction documentation, enter into contracts with consultants & subcontractors and manage the delivery of the works on behalf of the Principal.

The managing contractor provides advisory and management services, coordinates, creates work packages, sources and engages consultants & subcontractors and supervises the works.

The procurement of the managing contractor is typically undertaken using a competitive tender process.

The managing contractor delivery model typically includes a two-stage contractual arrangement as follows:

Stage 1

Based on a preliminary Project Brief prepared by the Principal, the design is developed collaboratively from which a guaranteed construction sum (GCS) (sometimes referred to guaranteed maximum price (GMP) is prepared and submitted). Following negotiation, if the Principal and managing contractor are unable to agree upon the GCS, the contract comes to an end and the Principal may go to procurement to complete the project. Note; in some instances, a novation variant may be used for the engagement of designers or the Principal may engage the designer directly.

Stage 2

If the GCS is accepted by the Principal then Stage 2 involves the documentation, construction and commissioning of the project. Subcontract trade packages are competitively tendered by the managing contractor in an 'open book' arrangement and only the actual cost of construction is paid up to the agreed GCS cap.

While the two-stage arrangement described above is the most common, several variants also exist including single-stage and three-stage arrangements, with pricing based on either GCS, lump sum or target cost arrangements. In some instances, the managing contractor's management fee can be lump sum or a percentage of the actual costs incurred. The managing contractor may also receive incentive payments for achieving cost and schedule targets, although these are only in circumstances where exceptional performance is required to meet project objectives. They are not typically used in 'business as usual' circumstances.

The managing contractor is typically engaged early in the project development to provide constructability input. Existing design and designers can be novated across to the managing contractor to prepare detailed designs and for the managing contractor to confirm if the cost of the design is within budget, or else the managing contractor engages consultants to complete the design. The Principal collaborates with the managing contractor on the design and delivery aspects of the project. The principal can provide input into design development and has opportunity to influence the design and construction.

This delivery model is often used on infrastructure contracts, where there are large numbers of specialist trade activities to manage and coordinate or where design progresses in parallel with construction. The Managing Contractor model is advantageous where a project requires some design flexibility due to unknown or anticipated conditions or multiple stakeholder requirements.

Under the Managing Contractor model, the Managing Contractor will carry the responsibility for time while the Principal invariably assumes responsibility for cost and interface risks; except where the Managing Contractor is incentivised to manage time, cost and performance. Cost, time and performance risk for individual contracts awarded under the control of a Managing Contractor are typically passed to the sub-contractors and suppliers doing the work. In some cases, the contract may be converted to a fixed lump sum price once the full scope, design and schedule is known and major subcontract pricing is known. The Principal's risk exposure is then limited from that point onwards.

A typical contract form for the Managing Contractor delivery model is bespoke, modified GC21. ACT Government also refers in the SAF Business Case Guidelines to the Defence Managing Contract Form.

The Managing Contractor typically:

- Is paid a management fee and incentive payments for achieving a target price, schedule and other key parameters;
- Undertakes some or all of the design activities;
- May perform some of the construction works but does not necessarily do so;
- Is responsible for preliminaries (e.g. crane hire, site sheds, supervision services etc), general project requirements (e.g. security, insurances etc) and project management (e.g. scheduling, coordinating, liaising, monitoring, reporting etc.);
- Prepares the trade packages and conducts the tenders, selects contractors in close collaboration with the Principal;
- Warrants the quality of all works; and
- Warrants the completion of the works by the date for Practical Completion.

The Managing Contractor delivery model is generally used:

- For complex or high-risk projects with uncertain scope, risks or technology;
- Where there are many or significant unknown factors, such as undefined scope, unpredictable risks and changeable project objectives, that cannot be resolved before it is necessary to let a contract in order to meet the project program;
- Where a high degree of expert Principal input is available;
- Where the interests of key participants need to be brought together early in the project;
- Where early contractor involvement is beneficial;
- When relatively fast engagement is required;
- Where completion times are tight and fixed;
- Where project threats and opportunities are complex and require management collectively by the contracting parties and other participants;
- Where there are many complex or difficult stakeholder interfaces and relationships;
- Where industry input and innovation during the design stage is desirable, for example to take advantage of emerging technology, specialist construction expertise or other opportunities; and
- Where project funding is fixed.

5.9.2 Effectiveness of the Managing Contractor delivery model against the SAF Business Case Guidelines Procurement Drivers Evaluation Criteria

Table 11 below describes how the Managing Contractor model performs against the assessment criteria detailed in the SAF Business Case Guidelines Guidance Notes.

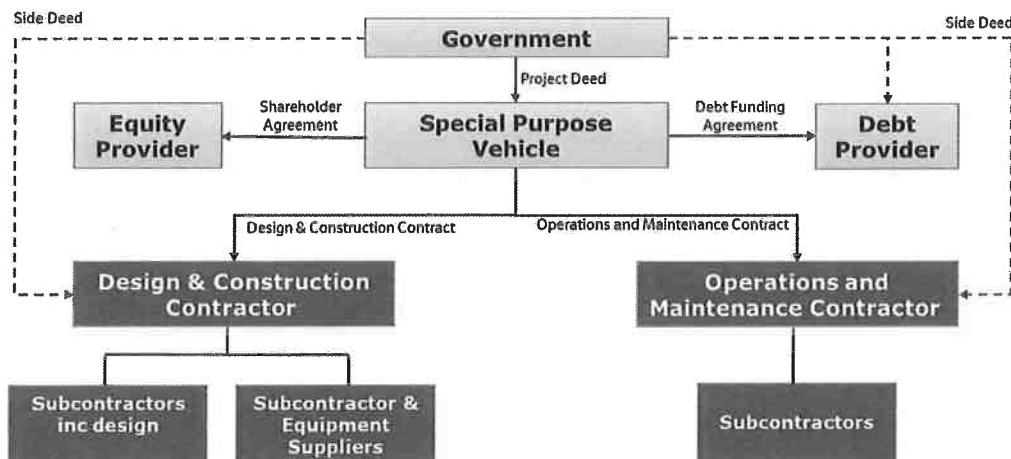
SAF Criteria	Effectiveness	Comment
Risk Transfer	Low to Medium	Principal retains most of the risk associated with the design and delivery of the project.
Time to Market	Short	Procurement of managing contractor is short.
Flexibility	High	The model provides a high level of flexibility and the Principal can influence design during the development stage.
Price Certainty	Low to Medium	Final project cost is difficult to forecast. However, the budget becomes more accurate as the design matures
Innovation and Incentive	Medium	Incentivisation can lead to innovation in both design and construction.

Table 11: Effectiveness of the Managing Contractor model against the SAF Business Case Guidelines Procurement Drivers Evaluation Criteria

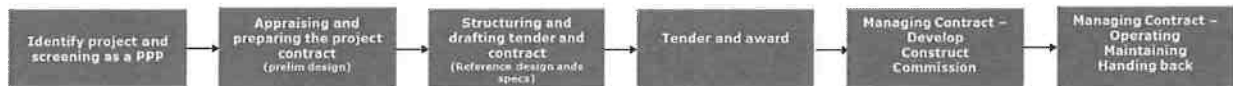
5.10 Public-Private Partnership (PPP)

5.10.1 PPP Model Overview

Figure 10 Typical PPP structure:



Typical sequence:



PPP delivery model is a long-term engagement where government or users pay the private sector (typically a consortium) to deliver infrastructure and related services. Internationally, a PPP is often referred to as a private finance initiative (PFI). The private sector provider will build the facility and operate or maintain it to specified standards over a long time period. The private provider usually finances the project.

The principal features of a PPP are:

- Provision of a service involving the creation of an asset with private sector design, construction, financing, maintenance and delivery of ancillary services for a specific period;
- A contribution by government through land, capital works, risk sharing, revenue diversion, purchase of the agreed services or other supporting mechanisms; and
- The private sector receiving payments from government (or users in economic infrastructure) once operation of the infrastructure has commenced, contingent on the private sector's performance in supplying the services throughout the asset's lifetime.

Governments typically seek 'whole-of-life' innovation and efficiencies that the private sector can deliver in the design, construction and operation phases of the project. Government's responsibilities for managing the project are therefore different from all other delivery models. Government becomes a purchaser of asset-based services that are paid for according to performance. Government allocates certain risks to the private sector, locks in 'whole-of-life' budgets and quality standards, and facilitates focus on its core business.

In a typical PPP, the private sector provider not only builds the facility but also operates or maintains it to specified standards over a long period, often 25 years or more. The Government:

- Prepares an output-based specification rather than a prescriptive specification;
- Engages a provider to deliver services over a long term (e.g. 20–35 years or more);

- Requires the private sector to design, finance, construct, maintain and operate the facility including providing ancillary services such as cleaning, security, facilities management and catering (or some combination of those functions) and takes the risk for those functions;
- Typically, does not pay the private sector until the facility has commenced operations;
- Provides payments over the term of the contract based on services delivered against the achievement of KPIs, ensuring the infrastructure is maintained over its lifetime; and
- Usually retains ownership of the asset at the end of the contract term at a specified handover quality and standard.

5.11 PPP Suitability

The National PPP Policy and Guidelines stipulate that PPPs must be considered as a procurement option when planning for any capital expenditure is estimated to be over \$50 million. The value could include bundling together a small number of similar projects. Projects of less than \$50M may also be suitable for PPP delivery if they exhibit enough value for money drivers. Projects below the capital expenditure threshold may also have a significant service component and therefore a significant 'net present value (NPV)'.

In a procurement strategy, consideration should be given to determine if there is merit in bundling the construction contract asset with services required post-construction e.g. cleaning, catering, facilities management, service delivery, operations, maintenance etc. If so, this determines if the 'value for money' drivers support PPP delivery.

The following are the key 'value for money' drivers for PPP:

- Complex risk profile and opportunity for risk transfer. More rigorous risk evaluation and transfer to the private sector the risks it is best able to manage, including those associated with providing the specified services, asset ownership and 'whole-of-life' asset management;
- Whole-of-life costing. Full integration, under the responsibility of one party, of up-front design and construction costs with ongoing service delivery, operational, maintenance and refurbishment costs. This delivers improved efficiency through 'whole-of-life' costing because design and construction become fully integrated up-front with operations and asset management;
- Innovation. Because the PPP approach focuses on output specifications, this provides a wider opportunity to use competition as an incentive for the private sector to develop innovative solutions in meeting these service specifications;
- Measurable outputs. The nature of the services enables output specifications and a performance-based contract;
- Asset utilisation. Reducing costs to government through potential third-party utilisation and through more efficient design to meet performance (e.g. service delivery) specifications;
- Better integration of design, construction and operational requirements. Ongoing operational, maintenance and refurbishment requirements become the private sector's responsibility for the contract period; and
- Competitive process. The PPP is competitively procured. Competition encourages the private sector to develop innovative means of service delivery while meeting government cost objectives.

5.12 PPP Model Types

Broadly speaking, a PPP is a model that uses a long-term, performance-based contract or concession, where appropriate risks associated with a project can be transferred cost effectively, to a private sector partner. These risks can include construction, schedule, functionality of design, financing, and the long-term performance of the asset through the optimal allocation of responsibility for operations, maintenance and rehabilitation. In some cases, PPPs can also be structured so that the private sector partner assumes demand and price risk based on the availability of an asset, e.g. road, and they can also assume varying degrees of commercial risk with respect to tolls and other types of revenue.

Road user payments. Traditionally under a concession model, characterised by the direct link between the private sector partner and the final user; the private sector partner provides a service to the public 'in place of', though under the control of, the public partner. The concessionaire can charge the general public a service fee for using the asset e.g. through paying a toll. The toll reimburses the concessionaire for the cost of building and operating the road which reverts to the public sector at the end of the concession period. The concession model is the traditional PPP method for public service provision and is important as being a 'tried and tested' PPP model.

Availability based payments. This involves the private sector partner providing and administering infrastructure for the public partner. In this model, the remuneration for the private sector partner does not take the form of charges paid by the users of the works or of the service, but of regular payments by the public partner based on the level of service provided. These payments may be fixed or variable, e.g. availability payments for the road infrastructure, or based on level of use (e.g. shadow tolls). This model embodies the notion of the private sector providing a defined level of service to the public sector.

A concession contract is typically valid for 25–35 years so that the operator has enough time to recover the capital invested and earn an appropriate return over the life of the concession. If necessary, the public partner may contribute to the capital investment cost. This can be an investment 'subsidy' (viability gap financing) to achieve commercial viability of the concession. Alternatively, governments can be compensated for its contribution by receiving a commensurate part of the toll collected.

5.13 PPP Availability delivery model overview

The Availability PPP Model involves a D&C model with a bundling of maintenance and operations usually for a period of between 25 to 35 years. Availability PPPs are typically used for social infrastructure projects that are fully, or partially, privately financed and where Government pays the private sector payments for service availability.

Governments enter into a long-term contract with the private sector (typically a consortium comprising of a contractor, operator, debt and equity financiers) to design, construct, finance, maintain and operate the infrastructure over a 25-35-year period. Government pays the consortium an availability-based payment over the contract term, subject to the facility being operated and maintained to a pre-agreed standard.

The PPP Availability form of contract would be a bespoke contract written specifically for the project.

5.14 PPP Build, Own, Operate & Transfer (BOOT PPP) delivery model overview

A BOOT PPP model is typically used for economic infrastructure projects that are privately financed and where demand risk can be transferred to the private sector. The ACT Government would contract with a Project Company (typically a consortium) to design, construct, operate and finance associated infrastructure. In return, the Project Company is granted the right to levy tolls for the use of the infrastructure either using physical tolling or shadow tolling. (user payment model).

The BOOT PPP form of contract would be a bespoke contract written specifically for the project.

5.14.1 Advantages and Disadvantages of the BOOT PPP and PPP Availability delivery models

Advantages	Boot PPP	PPP Availability
Financed outcome with no upfront cash outlay.	✓	✓
Innovation.	Extremely high	High
Financial certainty.	✓	✓
Drives quality outcomes.	✓	✓
Full integration of design, construction, financing, operational, maintenance responsibilities.	✓	
Greater transfer of risk to the private sector.	Including demand risk	Including construction and maintenance cost
Transfer of whole of life cost risk encourages efficient design and quality construction and finishes.	✓	✓
Overall design and 'fit-for-purpose' risk lies with the private sector party.	✓	✓

No payment streams.	✓	
Payments only commence following successful commissioning and are paid over time (typically matching useful economic life of the asset).		✓

Disadvantages	Boot PPP	PPP Availability
Procurement and bid costs.	Extremely high	High
High expertise required.	✓	✓
Low flexibility post financial close.	✓	✓
Contract management	Highly complex	Extremely complex
Size and value of project needs to be large to justify relatively high private sector bid and establishment costs.	✓	✓
18-24 months procurement timetable.	✓	✓
Changes to design or operations result in variations, which can be expensive to implement	✓	✓
Government potentially loses control in setting toll charges.	✓	
Requires a forecast revenue stream that can meet project financial demands.	✓	
Long term loss of operational controls		✓

5.14.2 Effectiveness of the BOOT PPP and PPP Availability delivery models against the SAF Business Case Guidelines Procurement Drivers Evaluation Criteria

Table 12 below describes how the BOOT PPP and PPP Availability model performs against the assessment criteria detailed in the SAF Business Case Guidelines Guidance Notes.

SAF Criteria	Effectiveness	Comment
Risk Transfer	High	Risk of performance, finance and operation transferred to PPP entity.
Time to Market	Long	Bespoke contract and long procurement process (up to 18 months).
Flexibility	Low	Difficult to alter requirements after procurement due to complexity of the arrangement.
Price Certainty	High	Known costs for the duration of the PPP arrangement.
Innovation and Incentive	High	PPP entity has high level of control.

Table 12: Effectiveness of the BOOT PPP and Availability PPP delivery model against the SAF Business Case Guidelines Procurement Drivers Evaluation Criteria

5.15 Collaborative Procurement Options - Early Contractor Involvement (ECI) / Early Tender Involvement

Collaborative procurement options can be considered for most delivery models to assist with mitigating procurement risks and achieving the best project outcomes. A collaborative relationship with a contractor allows an effective exchange of ideas and information leading to a shared, deeper, understanding of what the Principal wants, which in turn better informs what the responding entity offers as part of their tender response. Collaborative procurement options provide a platform for early identification of any misunderstandings or issues, and timely and pragmatic resolution of those issues. The Principal cannot collaborate alone, and the prospective entity must also engage in the process and contribute to establishing a collaborative relationship with the Principal.

Some forms of contract, for example GC21, have elements of collaboration built in to the standard form. There are, however, also opportunities to establish collaborative relationships during the tender phase when the Principal engages the market.

Collaboration is a productive feature of any effective commercial relationship. Some features of collaboration are:

- Effective collaboration does not occur because it is required by the contract but because of the leadership and capability of both participants wishing to achieve a common outcome whilst recognising that each participant has different business objectives.
- Collaboration is a means to achieving a mutual goal and is not an end in itself.
- Collaboration is enhanced when the parties have an expectation of an ongoing relationship beyond a single event or project. Best for project decisions are more likely in a repeat relationship than the self-interested decisions in a single transaction.
- Collaboration is not a substitute for competition, poor planning or inadequate Principal capability; nor does effective collaboration require financial incentive or dilution of effective project risk allocation.
- Collaboration between the Principal and the contractor does not change the nature of the underlying contract.

Opportunities for collaboration during the tender phase include Early Contractor Involvement (ECI) and Early Tender Involvement (ETI). These are further discussed in the following sections.

5.16 Early Contractor Involvement ECI Procurement Option

Early Contractor Involvement (ECI) is a collaborative procurement contract to develop a tender for the construction phase of a project.

There are many variants of ECI in use by agencies across Australia. The default model involves a competitive ECI, undertaken in 3 phases:

1. Expression of Interest (EOI);
2. Request for Proposal (RFP); and
3. Early Contractor Involvement (ECI) or Tender Phase.

The EOI phase can be an open or select tender process, with entities invited to submit an EOI response. The EOI responses are evaluated on the basis of non-price indicators such as capability, experience, financial capacity, personnel, and systems. The evaluation of the EOI is typically conducted as a desk top evaluation, resulting in a shortlist of entities to be invited to submit a proposal through the RFP process.

The RFP phase is shortlisted to ideally no more than three entities. This phase is generally more interactive than the EOI phase. During this phase, each participating entity submits a proposal to participate in the ECI phase, which is evaluated on their schedule of rates and programme, and a shortlist of two entities is identified.

In the ECI phase (or Tender Phase), the two selected entities are engaged under a services agreement (ECI agreement) to work collaboratively with the Principal (and their designers), in parallel, to deliver upfront project development work and prepare a risk adjusted price for the construction phase (generally as a lump sum contract). The participating entities each work with the Principal to develop their own design, a detailed project plan, programme and commercial proposal for the construction phase. The competition between the two entities in this stage prior to contract award drives early innovation capture and a robust tender price.

Payment for the ECI phase (or Tender Phase) is typically based on a fixed fee negotiated as part of the ECI agreement. Generally, this fee should not exceed 50% of the estimated costs incurred by the contractors for participating in the ECI phase.

The ECI agreement is a fee for service arrangement for the ECI phase only. It clearly describes the services and deliverables to be provided by the participating entities. It is tailored to the project requirements and will align

the commercial interests of the contractor with the Principal to achieve the appropriate collaboration and outcome.

In the exceptional circumstance that the Principal cannot reach an acceptable commercial arrangement with an ECI phase entities at the completion of the ECI phase, the Principal may terminate the ECI agreement and seek offers from other entities.

5.17 Early Tender Involvement ETI Procurement Option

Early Tenderer Involvement (ETI) is a collaborative procurement option to develop a tender for the construction phase of a project.

There are many variants of the ETI model in use by agencies across Australia. The key difference between ETI and ECI is that under the ETI option the Principal completes the design. That is, the participating entities do not have any design responsibility. Generally, ETI is used where the design is further developed and does not require the same degree of design development as in the ECI model.

Similarly to the ECI option, two competing entities are chosen to participate in the ETI using a 3-phase process:

1. Expression of Interest (EOI);
2. Request for Proposal (RFP); and
3. Early Tender Involvement (ETI) or Tender Phase.

Once selected for the ETI phase, the two competing entities participate in value engineering and a refinement process of the Principal's design. Often the participating entities will appoint their own sub-design consultants to provide assurance or alternatives.

Ideally, payment for the ETI phase is based on a fixed fee negotiated as part of an ETI agreement. Generally, this fee should not exceed 50% of the estimated costs incurred by the contractors.

The ETI agreement is a fee for service arrangement for the ETI phase only. It clearly describes the services and deliverables to be provided by the contractor. It is tailored to the project requirements and should align the commercial interests of both parties to achieve the appropriate collaboration and outcome.

In the circumstance that the Principal cannot reach an acceptable commercial arrangement at the completion of the ETI phase, the Principal may choose to terminate the ETI agreement and seek offers from other entities.

6. TCCS Involvement (Organisation, People and Time)

The procurement strategy needs to consider the TCCS capability, capacity and appetite for risk.

The input required by the TCCS management office is dependent on the number of work packages, the delivery model selected and complexity of the interfaces to be managed. Different models require different levels of contract management, interface management, management of risk and assurance.

'Risk appetite', desire or necessity (if supply chain will not take the risk) maybe to pursue a 'mixed delivery model' strategy. This may offer significant cost saving, but requires substantial monitoring and interface management. TCCS will need to develop a procurement strategy that considers the role of the supply chain, the packaging approach for the project scope and the residual risk to be managed by TCCS. This will provide clarity of the role for the TCCS team, the full capabilities that will be required by TCCS and when these need to be in place.

Considerations include:

Capability. The organisation possesses the governance structures, management systems, processes and routines to deliver to the chosen delivery model.

Capacity. The project is sufficiently staffed and resourced to ensure that it is lean and delivers efficiently but is also resilient enough to cope with succession planning and risks that may be presented.

Competence. Between the 'internal' personnel and externally engaged resources, the right level of knowledge and expertise exists within the project team to deliver all of the necessary activities.

Involvement. The TCCS team will change as the project moves through its lifecycle (design, construct and maintain). The length of involvement and design ownership by TCCS varies for each of the delivery models. The figure below provides a graphical representation of the length of involvement for each delivery model. Note the percentages of design development is indicative.

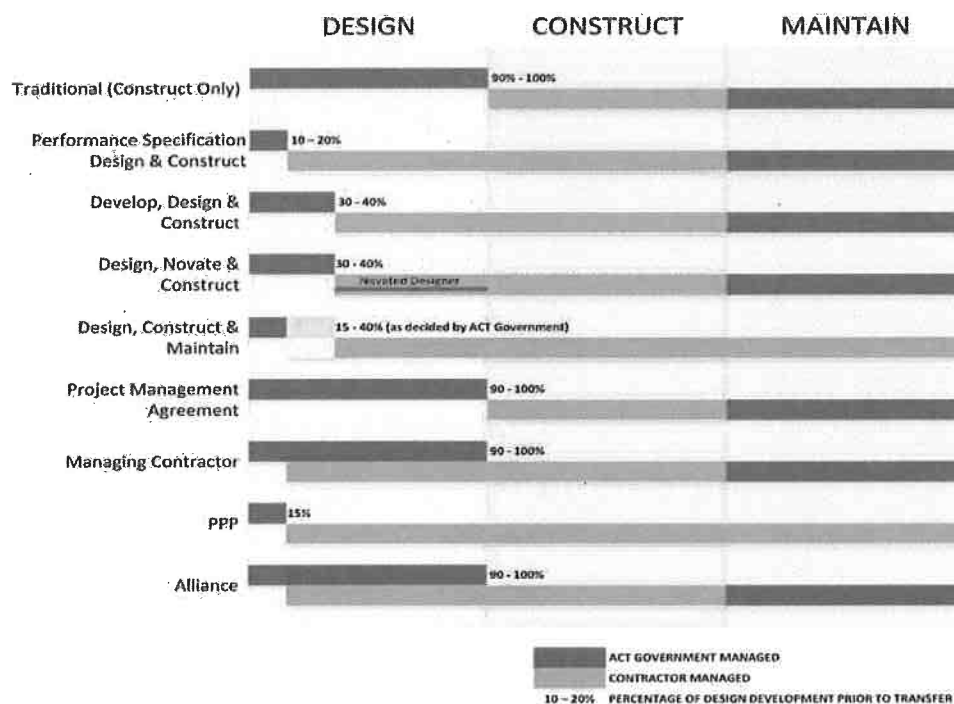


Figure 11 Length of TCCS Involvement in each delivery model

7. Risk Mitigation Strategies

The risk assessment undertaken during Phase 1 of this study resulted in nine risk mitigation strategies. These mitigation strategies describe how the risks identified in the risk register should be treated with respect to procurement and delivery of the project.

Table 13 below shows how the delivery models align with the risk mitigation strategies adopted in Phase 1

Risk Management Procurement Mitigation strategies	1 – Eliminate the risk	2- Transfer the risk	3- Share the risk	4 – Accept the risk and monitor	5 – Accept the risk , treat and monitor	6 – Treat the risk and transfer residual	7- Further investigate risk to understand more	8 – Treat the risk and own	9- Treat the risk and share
Traditional Construct Only		✓			✓	✓		✓	✓
D&C - Performance Spec, Design & Construct		✓				✓			
D&C – Develop, Design & Construct					✓	✓	✓		
D&C – Design, Novate & Construct					✓	✓	✓		
Design, Construct Maintain		✓							
Design, Construct, Maintain, Operate		✓							
Alliance	✓		✓	✓			✓	✓	✓
PMA / Construction Management			✓	✓			✓	✓	✓
Managing Contractor			✓				✓	✓	✓
PPP Availability		✓							
PPP Boot		✓							
Early Contractor Involvement / Early Tender Involvement	✓						✓		

Table 13: Delivery Model Risk Mitigation Strategies

8. Delivery Model Summary

8.1 Delivery Model Summary against SAF Business Case Guidelines Procurement Drivers Evaluation Criteria

Table 14 shows a consolidated view of the five key procurement drivers as published in the SAF Business Case Guidelines and how they apply to each model. The table also includes the following models that have been explored during this study:

- Design & Construct - Design, Develop & Construct
- Design & Construct - Design, Novate & Construct
- Early Contractor Involvement / Early Tender Involvement

Delivery Model	Time to Market	Price Certainty	Flexibility	Innovation & Incentive	Risk Transfer
Traditional Construct Only	Suitable	Indifferent	Suitable	Highly unsuitable	Indifferent
D&C - Performance Spec, Design & Construct	Suitable	Indifferent	Indifferent	Indifferent	Indifferent
D&C - Develop, Design & Construct	Indifferent	Indifferent	Indifferent	Indifferent	Indifferent
D&C - Design, Novate & Construct	Indifferent	Indifferent	Indifferent	Indifferent	Indifferent
Design, Construct Maintain	Indifferent	Suitable	Unsuitable	Suitable	Suitable
Design, Construct, Maintain, Operate	Indifferent	Suitable	Unsuitable	Highly suitable	Highly suitable
Alliance	Unsuitable	Highly Unsuitable	Highly suitable	Suitable	Highly suitable
PMA / Construction Management	Highly Suitable	Highly Unsuitable	Highly Suitable	Highly unsuitable	Highly unsuitable
Managing Contractor	Highly Suitable	Unsuitable	Suitable	Suitable	Unsuitable
PPP Availability	Highly Unsuitable	Highly Suitable	Highly Suitable	Highly suitable	Highly suitable
PPP Boot	Highly Unsuitable	Highly Suitable	Highly Suitable	Highly suitable	Highly suitable
Early Contractor Involvement / Early Tender Involvement	Highly Suitable	Indifferent	Suitable	Suitable	Indifferent

Table 14: Suitability of the SAF Business Case Guidelines Procurement Drivers for each Delivery Model

Figure 12 below is a variation on the table above. The figure shows the characteristics of each delivery model through a different lens, to assist shortlisting of delivery models taking into consideration different drivers

Figure 12 includes:

- Colour coding for Categories of delivery models – Traditional, Design & Construct variants, Relationship, Managed Models and Finance Models.
- Project complexity and collaboration requirements (these are additional procurement parameters).
- A sliding spectrum to demonstrate the relative positioning of each delivery model for each procurement driver. Note the flexibility and collaboration requirements scale has been inverted. In doing so, there is an emerging grouping of delivery model categories that assists in identifying a shortlist of delivery models for Phase 3 of the study (MCA).
- The 'dashed' curve running 'top to bottom' down the figure is a preliminary marker of potential value drivers to support shortlisting of delivery models. At this stage it is understood that time to market is a critical success driver for TCCS. Note: A fully weighted MCA will be developed in Phase 3 to support the selection of the preferred delivery model(s)

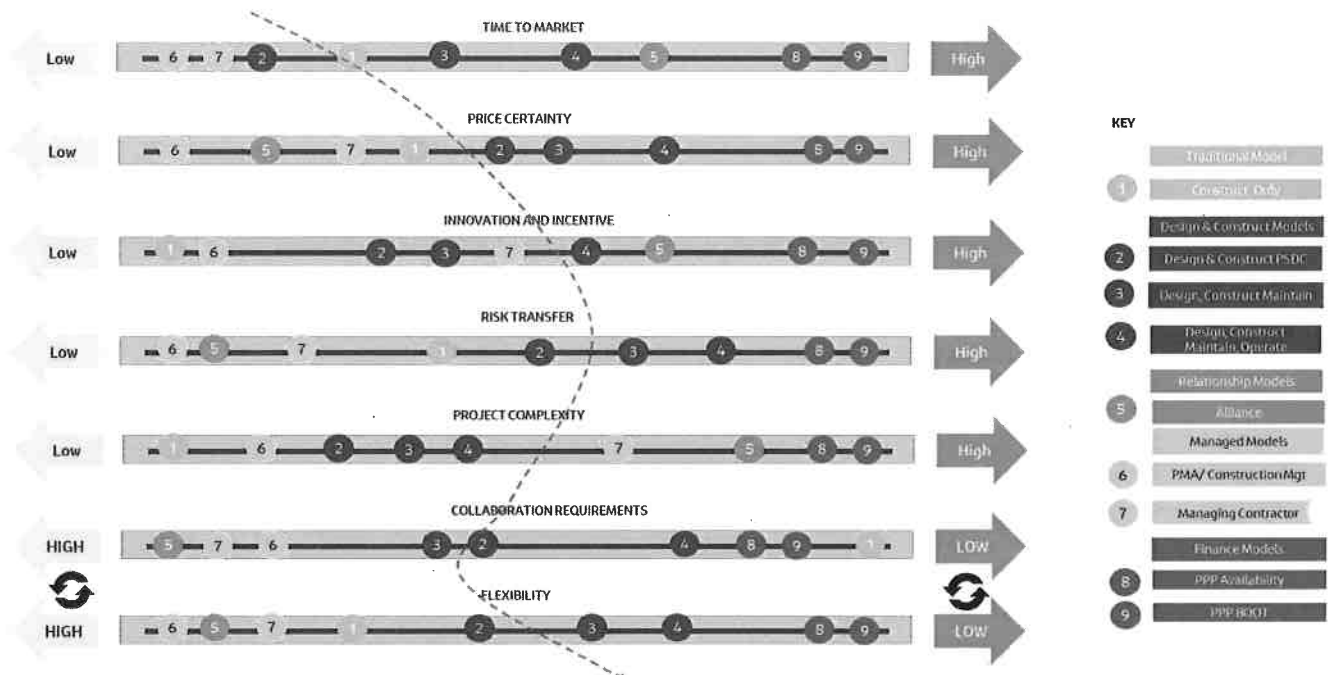


Figure 12 Comparison of delivery models against key procurement drivers

At an holistic level, Figure 12 bundles delivery models together as follows.

- PPPs are mostly on the right;
- Traditional and Managed models mostly to the left and trending towards the centre;
- Design and Construct variants are mostly around the centre; and
- The main exception is the Alliance delivery model that is spread throughout the spectrum.

For the purposes of Phase 2 and to enable shortlisting of delivery models for the Phase 3 MCA assessment, we have drawn a dashed curve running 'top to bottom' down the figure, this line represents some of the emerging drivers derived from Phase 1 (Risk and Opportunity Assessment). If time to market is a mandatory and critical criteria, then this criteria immediately rules out the PPP and Alliance delivery models because they take longer to procure than the time remaining for Monaro Interchange project procurement.

9. Conclusion & Primary Screening Recommendations

9.1 Delivery Models recommended for Phase 3 MCA

The following delivery models are recommended for consideration as part of the Phase 3 MCA. Each of these models offers risk mitigation that aligns with the mitigation strategies identified during Phase 1 (Risk and Opportunity Assessment).

- Traditional (Construct Only).
- Design & Construct - Performance Specification Design and Construct (PSD&C).
- Design & Construct – Develop, Design and Construct (DD&C).
- Design & Construct - Design, Novate and Construct (DN&C).
- Project Management Agreement (PMA)/ Construction Management
- Managing Contractor (MC).

The use of Early Contractor Involvement (ECI) or Early Tender Involvement (ETI) may also be considered in conjunction with the selected delivery model.

Considering the risks of the project, there are advantages and disadvantages for each delivery model. Following initial screening these do not result in a preferred delivery models but provide for the following delivery models to be taken into the Phase 3 MCA.

Delivery Model	Reason for inclusion	Reason to exclude
Traditional (Construct Only)	• Construction risk transfer • Construction price certainty (better if lump sum pricing) • Enables detailed design work to progress ahead of construction tendering • Provides flexibility because the government controls the design process for an extended period	• Client retains design risk • Client retains interface between design & construction • Changes to scope after construction commences will result in variations to the contract • Little opportunity for innovation from the Contractor once construction has commenced • Limited opportunity for bundling construction services & maintenance to creating 'whole-of-life' project efficiencies
Design & Construct - Performance Specification Design and Construct (PSD&C)	• Contractor owns the design risk • Procurement of contractor in advance of detailed design • Price certainty in design & construction • Likely to result in cost effective designs • Enables innovation because the contractor can integrate design and construction methodology & buildability	• Changes to scope after contract award are difficult and potentially expensive • Control of design by the Principal is limited post contract award • Limited opportunity for bundling services & maintenance to create 'whole-of-life' project efficiencies
Design & Construct – Develop, Design and Construct (DD&C).	• Principal wishes to determine the preliminary design • Principal does not have enough time to manage the design to completion • Contractor has flexibility to incorporate innovations and improve buildability	• If the design documents supplied by the Principal are unclear or in error, the desired outcomes may not be achieved • Significant risk of delays or changes to project scope as issues are resolved with stakeholders or investigations are completed

Delivery Model	Reason for inclusion	Reason to exclude
	- Enables construction to start prior to finalisation of detailed design - Risk of contract claims due to errors and omissions in the design is reduced	- Price is likely to be higher to allow for the contractor's increased risks - Fewer potential tenderers. This can result in higher tender prices
Design & Construct - Design, Novate and Construct (DN&C).	Reduces the risk of the design not meeting the Principal's requirements	- Potential price increase because the contractor and the designer price the risk of entering into a contract with an unknown entity on terms predetermined by others - Potential designers may be reluctant to tender to the Principal because they are reluctant to later be contracted to an unknown contractor - Potential for complex litigious problems if the relationship between designer and contractor deteriorate
Project Management Agreement (PMA)/ Construction Management	- Short time to market - Principal retains high level of control (noting this is advantageous given construction in conjunction with an operating road) - Used in projects where it is not possible for design or another element to be started before work is undertaken by others - High collaboration - Highly flexible	- Low price certainty - Low innovation opportunities - Low risk transfer opportunities - Used mainly on low capital value projects
Managing Contractor (MC)	- Where early contractor involvement is beneficial. Where completion times are tight and fixed. - Where there are many complex or difficult stakeholder interfaces and relationships. - High collaboration. - Highly flexible.	- Used mainly for complex or high-risk projects with uncertain scope, risks or technology. - Low risk transfer. - Difficult to set accurate cost targets with limited design details where such targets are required early in the delivery process. - The 'GMP' is negotiated at the end of stage 1 which may make it more difficult to verify value for money

9.2 List of Delivery Models recommended for rejection.

The delivery models which are not recommended for further consideration in Phase 3 of this study are:

- PPP BOOT.
- PPP Availability.
- Alliance.
- Design, Construct and Maintain (DC&M).
- Design Construct Maintain Operate (DCMO).

PPP and Alliance delivery models have been discounted at the outset because they take longer to procure than the time remaining for Monaro Interchange project procurement. PPP models have also been discounted for several reasons. Generally, the complexity of the delivery models is disproportionate to the scale of the project. TCCS has previously considered PPP delivery models, however they have not been used to deliver road and overpasses infrastructure in the ACT to date.

In the case of the Monaro Highway, TCCS has the capacity to fund the project through its normal funding mechanisms (i.e. debt and revenue), as a result, cash flow considerations are not a primary driver. Selection of a PPP delivery model for the Monaro Highway Lanyon Drive Interchange would require a robust demonstration that the project lends itself to transferring significant long-term maintenance responsibilities, bundled operations or provides confidence of revenue generation for the private sector partner. In addition, it requires substantiation of the benefit of offsetting the high costs of project establishment and the lower cost of government finance against a traditional Construct Only delivery model. Monaro Highway Lanyon Drive Interchange does not provide this platform.

The scale of the project does not warrant the benefits derived from a Design Construct & Maintain (DC&M) or a Design, Construct Maintain and Operate (DCMO) delivery models. There are significant synergies in combining and co-ordinating this work across the entire Monaro route and consequently there is no obvious benefit in combining long-term maintenance obligations with individual contracts for design and construction. The operations and maintenance components are typically managed by TCCS.

The risk profile of Monaro Highway Lanyon Drive Interchange does not warrant an Alliance delivery model because the project risks are definable and can be managed using other delivery models. Further, the complexity and time to market of an Alliance model is not suitable for a project of this scale nor is there enough time remaining for Monaro Interchange project procurement.

10. Next Steps

The next steps in the procurement study are as follows:

- Phase 3 the MCA phase. The MCA generates a ranking of the shortlisted delivery models in order of preference based upon predetermined criteria and agreed weightings for each criterion.
- Phase 4 the Market Analysis and Sounding Phase to identify key players, determine market capacity, determine market appetite and consider whether there is enough competition to drive value for money outcomes (refer to section 3 for further detail of the Market Analysis and Sounding Phase)
- Phase 5 a final procurement strategy report will be produced following completion of the market sounding process.

Appendix A. Comparison of Delivery Models

	CONSTRUCT ONLY	DESIGN AND CONSTRUCT (D&C) & VARIANTS	MANAGED		RELATIONSHIP		PPP
			CONSTRUCTION MANAGEMENT/ PROJECT MANAGEMENT AGREEMENT	MANAGING CONTRACTOR	EARLY CONTRACTOR INVOLVEMENT (ECI)	ALLIANCE	
Typical Values							
	Industry Guidance: All values. Used for both 'minor' and 'major' works. ACT Gov Guidance: <\$15m	Industry Guidance: All values, but typically for contracts valued at > \$5 m. ACT Gov Guidance: All values	Industry Guidance: All values, but typically for contracts valued at > \$10 m. ACT Gov Guidance: <\$15m	Industry Guidance: All values, but typically for contracts valued at > \$50 m. ACT Gov Guidance: >\$20m	All values, but typically for contracts valued at > \$50 m. ACT Gov Guidance: Not specified	All values, but typically for contracts valued at > \$50 m. ACT Gov Guidance: >\$120m	Typically for contracts valued at > \$50 m. ACT Gov Guidance: >\$100m PPP Availability >\$150m PPP BOOT >\$150m
Forms of Contract							
	- AS 2124 - AS4000 - GC21	- AS 4300, AS4902, AS4093 - GC21 - Design Construct Maintain GC21 modified. DCMO Bespoke	ACT Project Management Agreement	- Modified GC21 - Bespoke	- Modified GC21 - Bespoke	Bespoke	Bespoke
Use this model when							
	- The scope is defined and scope creep is unlikely. Risks are well defined, clearly understood and easily allocated. - There is little need or incentive for innovation from the contractor - There is sufficient time to complete the design documentation prior to tendering - Work is repetitive - There is limited opportunity for bundling services/ maintenance and creating whole of life efficiencies. - The project is small – medium sized and of short duration	- The owner does not need to specify their requirements in exact detail. The contractor is better placed to manage design risk - Or the Owner requirements are tightly specified before tender or do not change - Owner is seeking cost effective designs - Owners variations are unlikely. - Limited opportunity for bundling services / maintenance and creating whole of life efficiencies unless the Design & Construct and Maintain/ Operate variants are chosen	- Scope of works cannot be clearly defined early in the project. - Variations in scope or delays are likely due to uncertainties - The project is complex and it is not possible to fully design some elements that are required prior to work commencing on other elements. - The contract has incentives to reward cost and time achievements.	- Complex or high risk projects with uncertain scope, risks or technology. - Greater flexibility is required to deal with project risks. A high degree of Owner expertise and input is available. - Where ECI is beneficial.	- The project is complex, high risk and has some design unknowns. - There is a need to engage a contractor early due to scarce internal and external resources - Price and time certainty is paramount. - There is limited delivery time. - Risks can be better allocated. - The owner wishes to have maximum involvement in early development phases. - There is a risk of not obtaining competitive tenders using other procurement delivery models.	- In the delivery of complex, high risk projects. - The solution is unclear and scope creep is likely. - A high level of innovation is required. - Risks are significant, unpredictable and best managed collectively as the costs of transferring risk is prohibitive. - The owner can be closely involved and can add value. - There is a diverse and demanding range of stakeholders.	- The outputs can be clearly defined and measured, enabling an output specification and a performance based contract to be developed. - There is a strong competitive market - There is significant service component and an opportunity to bundling services. - Whole of life asset management is achievable and cost effective in a single contract package. - There is scope for innovation – the PPP approach focuses on output specifications, providing a wider opportunity to use competition as an incentive for private parties to develop innovative solutions in meeting these specifications. - There is scope to reduce Owner costs through third party asset utilisation.
Value for Money Drivers							

	CONSTRUCT ONLY	DESIGN AND CONSTRUCT (D&C) & VARIANTS	MANAGED		RELATIONSHIP		PPP
			CONSTRUCTION MANAGEMENT/ PROJECT MANAGEMENT AGREEMENT	MANAGING CONTRACTOR	EARLY CONTRACTOR INVOLVEMENT (ECI)	ALLIANCE	
	▪ Larger pool of potential tenderers which leads to increased competition ▪ Greater scope for competitive prices because of design certainty ▪ Contract value is set before construction starts	▪ The Owner requires a single point of accountability for design and construction. ▪ The Owner requires a fixed price contract ▪ Potentially, reduced overall project cost because the Contractor has the opportunity to contribute construction experience into the design, resulting in innovation and efficiencies.	▪ Where the Owner needs to retain direct control over the works	▪ Flexibility in delivery to manage uncertain risks ▪ Maximising Owner input to manage risks where appropriate ▪ Managing contractor is incentivised to achieve cost and schedule targets		▪ Cost of adversarial conduct, claims and disputes is eliminated (e.g. the "no blame" culture) ▪ Culture promotes innovation ▪ Integrated planning, design and construction process with early contractor and consultant involvement	▪ Sufficient scale and long-term nature ▪ Complex risk profile and opportunity for risk transfer ▪ Whole-of-life approach from integration of design, construction, operation and maintenance over the life of an asset, in a single project package ▪ Innovation ▪ Appropriate third-party use of facilities, reducing net cost to Owner ▪ Efficiency of contract management
General Guidelines for use							
Generally regarded as the best delivery model to use for routine, uncomplicated works of small-to-medium size and duration where: ▪ Timeframes are sufficient to comfortably complete the design and then follow up separately with the construction works. ▪ Construction innovation is not required as the design is settled and the scope well-defined. ▪ The project owner is willing to retain all of the design risk as relevant to the construction component of the delivery model. ▪ Site conditions are well known. ▪ There is likely to be a large pool of tenderers and strong competition. ▪ The project owner wishes to retain overall control of the project during construction.	The model is best used when: ▪ There is need for a high degree of cost certainty at the time of award. ▪ The project requirements are well-defined at the time of going to tender and comprehensive design, quality and finishes standards are available. ▪ Alternative and innovative design solutions are desirable, but the project owner does not want to assume all of the design risk. ▪ There is a desire for the administrative efficiency of a single point of accountability and improved integration of the design with construction, along with improved constructability outcomes. In addition to the above considerations, an expanded version of this model that includes a maintenance or operations component is best used when the project owner wants to achieve full integration of the design, construction and maintenance or operations and transfer the bulk of the maintenance and operating risks (along with the	This model is best used when: ▪ The project owner wants to retain overall control of the project, including the design aspects, to ensure flexibility to amend the design without incurring excessive cost. ▪ There are complexities that warrant the expert advice of an experienced construction manager who can coordinate and administer the delivery of the construction contracts. ▪ The works can readily be broken down into separate parts and an early commencement (or specific early works) is required.	The model is best used when: ▪ The scope is uncertain, many project risks are unknown, project management is complex, innovation is likely to be required, and early expert assistance would be advantageous with continuity throughout the delivery of the project. ▪ Project delivery timeframes are constrained. ▪ Stakeholder interfaces are complex and require specialist handling. ▪ Project owner resources to oversee the design and construction works are limited.	An ECI delivery model is attractive to contractors, due to the embedded relationship principles and overall collaborative approach. It is therefore reported to be a good model to consider in strong construction markets, when contractors can be selective about which projects they tender for (Eddie & O'Brien 2007). Project owners should also consider this model in circumstances where: ▪ The project risks are somewhat unknown, and some degree of innovation is likely to be required. ▪ Project delivery timeframes are constrained. ▪ They are interested in using a relationship model rather than a more adversarial model, but where there are insufficient resources to fully resource an alliance. ▪ There is identified value in participating in a collaborative Stage 1	This model is generally considered suitable for consideration in more extraordinary project circumstances where several of the following characteristics are present: ▪ The project scope and risks are highly uncertain. ▪ There are significant time constraints. ▪ The project is highly challenging in a technical sense. ▪ There are complex external factors e.g. political, environmental or stakeholder-related. ▪ Innovative or cutting-edge solutions are required. ▪ There is a need for flexibility in scheduling and programming etc. ▪ A collective approach is considered advantageous to the management of manage project risks and challenges. ▪ There is a desire for knowledge sharing and transfer between the parties. ▪ There is capacity to fully resource the alliance leadership team (ALT)	This model is recommended for use in circumstances where the following considerations are relevant: ▪ Complex risk profile and opportunity for risk transfer. ▪ Whole-of-life costing – full integration, under the responsibility of one party, of up-front D&C costs with ongoing service delivery, operational, maintenance and refurbishment costs. ▪ Innovation – PPP model focuses on output specifications, this provides a wider opportunity to use competition as an incentive for private parties to develop innovative solutions in meeting these service specifications. ▪ Measurable outputs – the nature of the services enables output specifications and a performance-based contract. ▪ Asset utilisation – reducing costs to government through potential third-party utilisation and through more efficient design to meet performance (e.g. service delivery) specifications.	

	CONSTRUCT ONLY	DESIGN AND CONSTRUCT (D&C) & VARIANTS	MANAGED		RELATIONSHIP		PPP
			CONSTRUCTION MANAGEMENT/ PROJECT MANAGEMENT AGREEMENT	MANAGING CONTRACTOR	EARLY CONTRACTOR INVOLVEMENT (ECI)	ALLIANCE	
	- There is need for a high degree of cost certainty at the time of award. - There are appropriately skilled and experienced resources available to administer and manage the contract.	design and construction risks) under a single contract without the need for private financing that characterises the PPP-type delivery models.			- arrangement to drive innovative outcomes and provide for knowledge transfer. - There is a need to obtain certainty of price and demonstrate transparency of price. - There are uncertain or complex interfaces, and flexibility on scheduling and delivery are required.	and alliance management team (AMT).	Competitive process – a competitive market exists and the use of a competitive process helps to encourage the private party to develop innovative means of service delivery while meeting government cost objectives.
Advantages							
	- The project owner has full control of the project, including community and other stakeholder interfaces. - The design and construction stages can proceed at times most convenient to the project owner, e.g. the design can be progressed when preferred designers are available, and the works can be tendered when there are favourable market or weather conditions and/or when budget is confirmed. - The project owner can ensure that all design issues are resolved, that design innovation is considered (where appropriate) and that the design fully meets its requirements before procuring the construction works, thereby reducing design-related risk. - The straightforward nature of the bidding process, lower cost of tendering and level of risk retention by the project owner usually encourages a competitive field at tender time. - Bids are generally less complex and costly to	- Construction can commence shortly after contract award, in anticipation of all detailed design packages being finalised. - There is high potential for innovation in the preliminary design, resulting from the contractor's input into constructability and flexibility in identifying optimum materials and construction methodologies. - There are potentially fewer disputes and more effective management of any design-related issues, due to having a single point of accountability for both the design and construction work and minimising design/construction interface risk. - There is a high degree of price certainty for both the design and construction works when a lump sum arrangement is used. - Fitness-for-purpose warranties are now commonplace and can help an owner avoid Contractors who otherwise design to minimum stated requirements- this is frequent 'battleground' between Owners and Contractors. Where a maintenance or operations component is included:	- The project owner can retain continuity of its designers. - Management and coordination risk to the project owner is reduced. - Contract administration is undertaken by the construction manager, reducing time and cost for project owners. - The project owner can still retain a high degree of control of the project with management, coordination services and general expertise contributed by the construction manager.	- A reduced level of management effort and oversight is required from the project owner. - The scope of the works can be managed to meet the project owner's budget. - Use of the model can help promote a more team-oriented approach to project delivery. - The project owner and key stakeholders can provide input into the design with less cost and risk than in many other models. - There is a high potential for efficiencies through continuity of the contractor and constructability reviews of the design. - There is an ability to flexibly stage the delivery of the works, including undertaking early works on site, prior to the final design and documentation being completed.	- There is the potential for improved potential cost and time savings. - The model provides enhanced opportunities for innovation. - The model promotes a less adversarial culture (with fewer variations and disputes) due to the inclusion of relationship principles and collaborative practices into the contractual arrangement. - There is improved integration of the design with construction under this model, together with improved constructability outcomes. - The ability to novate the project owner's designers across to the contractor, thereby ensuring continuity of design and the potential for construction to commence quickly in anticipation of all detailed design packages being finalised. - The open book approach to accounting under the contract, and the ability to	- The possibility, under the model, of attracting a wide range of proponents due to its popularity amongst potential contractors. - The model provides an ability to go to the market early, before the scope and details of the project are finalised. - There is better risk sharing than in most other models. - The likelihood of improved efficiency and innovation that can be achieved under the model. - A high degree of project owner involvement in project delivery. - The model is supported by a fully integrated project team that deals with planning, design and construction with involvement of all necessary parties. - There is maximum flexibility across all aspects of delivery, enabling fast-tracking where necessary to meet time constraints. - Participants can develop a detailed understanding of pricing and cost due to the transparent, collective contract pricing process. - The open book approach to development of the TOC and overall accounting under the contract, and the ability to have	- Full integration of design, construction, financing, operational, maintenance and refurbishment responsibilities. - Greater transfer of risk (including price risk) to the private sector at each phase. - Opportunity to develop innovative solutions. - Transfer of lifecycle cost risk encourages efficient design and quality construction and finishes – therefore certainty of maintenance standards as agreed and cost certainty as approved for a long term, e.g. 25 years. - Overall design and fit-for-purpose risk lies with the private partner. - Potential for lower cost of asset development and service provision. - Less demand on member agency resources over the long term. - Payments commence following successful commissioning. - Performance standards are in place.

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	- assess than under many other models. - There is a high degree of cost certainty at the time of award. - The model is well known and understood by industry and project owners.	- The contractor is less likely to deploy lowest-cost methods in delivering the works due to its ongoing obligations. - Defects are proactively managed due to the strict performance standards that must be maintained by the contractor during the maintenance / operating period. - As some project owners back-end payments for construction work and make them conditional on meeting operating performance targets, there is an additional incentive for performance because the contractor's capital investment is at risk (Arndt 1999).		- There are opportunities for the project owner to oversee the managing contractor's tendering processes to confirm value-for-money and verify actual subcontractor costs. - The managing contractor's pricing is usually subject to an open book approach. - Use of a Guaranteed Construction Sum helps to cap the construction cost risk for project owners. - There is a possibility of shared savings resulting from the actual construction cost coming in lower than the GCS and other incentives regimes.	- have the contractor's rates and margins independently verified to ascertain value-for-money. - Synergies arising from a high performance design and construction team. - Better integration of specific construction methods into the design. - Greater flexibility in timing and planning. - Earlier dedication of construction resources. - Earlier procurement of critical construction materials such as steel liners and precast concrete products. - Good understanding of risk by all parties. - Negotiated apportionment of risk (Swainston 2006).	- the NOPs' rates and margins independently verified to ascertain value-for-money. - There is a historical trend of good achievement against established TOCs. - The participants commit to looking for 'best for project' solutions and there is a record of strong design and quality outcomes on past alliance projects. - The model supports a high level of knowledge transfer between the participants, and provision of learning and development opportunities for individual ALT and AMT members. - Working under this model is reputed to result in increased job satisfaction for both the project owner's and NOPs' staff. - The alignment of commercial interests, plus the relationship approach and 'no blame' culture are likely to result in fewer disputes, with any disputes that do arise generally dealt with quickly by the AMT or ALT (or dispute resolution board, where relevant). - There are incentives for the parties to minimise time and cost overruns, and the ability to work cooperatively together to recover time and costs (if necessary) through innovation and other strategies deployed during the construction period.	
Disadvantages							
	Price certainty relies on the accuracy and completeness of the project owner's documentation. Where there are deficiencies and errors, the final cost may well exceed the award value.	- A longer tender period is required to enable preliminary designs to be prepared and assessed. - The cost of tendering is generally higher than under construct only delivery models, attracting a smaller pool of tenderers.	- There is no single point of accountability as the project owner must enter into numerous different contracts to deliver the works. - The bulk of the risk remains with the project owner – the	- The model is fairly specialised, so bids may be limited in some jurisdictions. - It is sometimes difficult for project owners to set accurate cost targets	Where designers are novated, the designer's primary duty transfers from the project owner to the contractor so the project owner loses an independent source of advice.	While risks are shared, it is likely that the project owner will be exposed to uncapped open-ended risk in some areas, whereas the risk of the other NOPs is generally capped.	- Success relies on well-defined functional and service specifications. - Where there are multiple concept designs being developed simultaneously during the bid

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			CONSTRUCTION MANAGEMENT/PROJECT MANAGEMENT AGREEMENT	MANAGING CONTRACTOR	EARLY CONTRACTOR INVOLVEMENT (ECI)	ALLIANCE	
	- A long lead-time may be required to progress the design and documentation in advance of construction. - The 'Request for Quotation'/'Request for Tender' documentation may be voluminous, and any errors may be used as the basis for claims. - There is a lack of a single point of accountability for project owners to deal with for design and construction, with increased interface risk - There is little or no opportunity for the contractor to have input into the constructability of the design. - The project owner retains significant risk, particularly around design and constructability. - The scope and requirements cannot be changed without a formal variation to the contract. - There have been reported impacts on morale for both contractors' staff and contract administration staff due to the challenges involved in managing potentially numerous claims, variations, issues and disputes. - The level of project owner resources required to administer the contract may be high, depending on the nature and frequency of audits, surveillance etc. required. - There is limited scope for building relationships between the parties and sharing learnings.	- The designer's primary duty is to the contractor not the project owner. - Quality outcomes of the project will reflect the extent to which the 'Principal's Project Requirements' accurately articulate the real requirements, so it is critical that these are carefully specified in the Project Brief. Contractor will generally deliver to the minimum stated requirements so as to reduce price and cost. - It may be difficult for the project owner to exert any significant level of control over the design process, and design changes that may be required during construction may be complex and expensive. - Where PPR is open to interpretation, the Contractor will assume the least cost interpretation. - The added complexity of assuming responsibility for a partially completed design may prove problematic in situations where a project owner has to take over the contract (e.g. due to a major breach or repudiation by the contractor). - Any uncertainty in the project owner's requirements may lead to claims and disputes. - There is generally a lack of any specific relationship management provisions in the contract. - A higher price may be paid for the project due to uncertainties at the time of pricing the tender and the level of risk transference to the contractor. - Where a maintenance or operations component is included: - Inclusion of a maintenance or operations component may limit the field of potential tenderers.	construction manager only performs a management and coordination role. - There is a lack of specific relationship management provisions in the contract. - The arrangements can be administratively complex and problematic in terms of liabilities, insurances etc. - There may be some uncertainty to project owners regarding final construction costs, and the construction manager's fees add an additional element of cost to the project with limited design details, where such targets are required early on in the delivery process. - The GCS is negotiated at the end of Stage 1, which eliminates the availability of a 'market test' to verify value-for-money. - The negotiation of the GCS can be protracted, leading to possible project delays. - If the GCS is not acceptable, then the project will be delayed if the project owner has to tender the delivery of the project.	- While the project owner can decide not to accept the Stage 2 offer, it is unlikely that it will exercise this right given the time invested in developing the relationship in Stage 1 and the disruptions to the project timelines from re-tendering. - High turnover of staff or major relationship breakdowns can significantly impact on performance, due to the criticality of relationships to the success of the model.	- The 'no blame, no disputes' philosophy can be problematic in that avenues for legal claims between the participants are generally limited to matters of willful default or insolvency. Other contract and negligence-related matters are commonly excluded. - There is a risk that quality outcomes may be compromised in order to meet cost targets and time demands. Additionally, re-work must be paid for, which compounds the 'pain' for all participants. - Requiring decisions by unanimous agreement of the ALT could put the legal standing of the entire alliance in jeopardy if agreement cannot be reached. Many project owners include 'deadlock breaking' clauses into their alliance agreements to ensure this does not occur. - Resourcing of ALTs and AMTs can be a difficult proposition for some project owners. - It may also be difficult to source personnel with the right personal attributes and preparedness to work in an alliance structure. - High turnover of staff (owner and/or NOPS) or major relationship breakdowns can significantly impact the alliance's performance, due to the criticality of relationships to the success of the model.	- In phase, this can require significant stakeholder resources. - Changes to design may require contract negotiations. - The ability to make a variation needs to be addressed in the contract. - Potential for higher agency tendering costs (this higher cost should be considered against savings in asset development and service provision through PPP delivery). - Requires agency skills (or consultants) for financial and technical assessment, tendering and management. - A need to educate stakeholders who are likely to be unfamiliar with this delivery model to ensure that other project success factors are not compromised.	

	CONSTRUCT ONLY	DESIGN AND CONSTRUCT (D&C) & VARIANTS	MANAGED		RELATIONSHIP		PPP
			CONSTRUCTION MANAGEMENT/ PROJECT MANAGEMENT AGREEMENT	MANAGING CONTRACTOR	EARLY CONTRACTOR INVOLVEMENT (ECI)	ALLIANCE	
	- There is a lack of incentives for innovation during the construction stage. - Lifecycle considerations may not be properly taken into account during the construction phase. - There may be a propensity toward poor stakeholder relations, due to a lack of 'ownership' by the contractor of stakeholder issues.	- Where maintenance activities are to be subcontracted, the interface risk increases. - Any uncertainty in the project owner's maintenance or operational requirements may lead to claims and disputes. - Changes of substance to design at bid can conflict with planning approvals and consents obtained on the basis of the reference design, necessitating planning delays					
Pricing Mechanism							
Generally Lump Sum and/or Schedule of Rates.	- Generally Lump Sum. - May include some Schedule of Rates components.	Construction manager paid a fee – potentially a percentage of the construction cost. Individual works and trades contracts are generally priced as lump sums or schedule of rates (paid by the construction manager or directly by the project owner).	- Pricing for Stage 1 usually on a time basis, using tendered fees and margins. - Pricing for Stage 2 generally includes payment to the managing contractor based on tendered fees and margins (typically a fixed lump sum management fee which represents the managing contractor's offsite overheads, profit and onsite overheads for any work undertaken directly) plus actual reimbursable costs for the construction work, usually up to a guaranteed contract sum. - Incentives are commonly included, tied to achieving target price and/or other nominated targets.	- Payment for Stage 1 is typically based on a fixed fee negotiated as part of the ECI agreement or made on a time basis, using agreed rates and margins. - Pricing for Stage 2 is generally a risk-adjusted lump sum, potentially with some schedule of rates components and provisional items. - Incentives are commonly included.	- The non-owner participants (NOPs) are typically guaranteed reimbursement of their direct project costs and payment of corporate project overheads in an open-book arrangement. - In addition, if actual delivery is better than the agreed targets, parties share the reward ('gain share'). Conversely, if delivery does not meet agreed targets, a pre-agreed 'pain share' formula applies.	- Payment linked to performance, with bonuses payable if performance standards are met and penalties levied if they are not. - Payment may also be based on usage, e.g. in some Build Own Operate Transfer (BOOT)-type arrangements, where the primary revenue stream is toll payments.	

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			CONSTRUCTION MANAGEMENT/ PROJECT MANAGEMENT AGREEMENT	MANAGING CONTRACTOR	EARLY CONTRACTOR INVOLVEMENT (ECI)	ALLIANCE	
Typical Procurement Process							
- Generally a single stage process involving a Request for Quotation (RFQ) or Request for Tender (RFT). May involve Expressions of Interest (EOIs) or Registrations of Interest (ROIs) for higher-value contracts. - Selection is generally based on an evaluation of price and non-price criteria (weighted heavily toward price), with some project owners taking into account past performance as part of the tender evaluation.	- Generally a two-stage process: - Stage 1 EOIs or ROIs from the open market. - Stage 2 RFT stage, during which short-listed applicants are invited to prepare and cost designs to approx. 20% completion. - A mixture of price and non-price criteria is typically evaluated at both stages. - Costs of tendering may be high - reimbursement may occasionally be offered.	Generally a single stage process involving RFT based on evaluation of price and non-price criteria (including the sum or percentage payable to the construction manager).	- Selection is generally based on an evaluation of price and non-price criteria (including the fees payable to the managing contractor). - This is generally followed by a two-stage contractual arrangement - Stage 1 involves the managing contractor working with the project owner and designers to refine the project documentation and progress the design, then submitting a price (usually a GCS) for the construction and delivery of the project under Stage 2.	- Generally a two-stage process involving RFPs from the open market, unless approval has been obtained under the National alliance contracting policy and guidelines (Department of Infrastructure and Transport 2011) to use a single-stage process. - Selection workshops are held, price and non-price criteria are evaluated and, in 'competitive' ECIs, two or more teams are selected and work independently of each other (with project owner input) to develop a preliminary design and risk adjusted price for the works. Only the successful team will proceed to Stage 1.	- Generally a two-stage process involving RFPs from the open market, unless approval has been obtained under the National alliance contracting policy and guidelines (Department of Infrastructure and Transport 2011) to use a single-stage process. - Short-listed applicants are invited to participate in selection workshops and the project owner selects two proponents to compete on targets for cost schedule and other key parameters. - Through collaboration, the project owner takes the lead in providing understanding and guidance on project objectives in the scope and risk development undertaken by the proponents through the target outturn cost (TOC) development process. - The project owner's decision in selecting its preferred proponent to deliver the project is based on a balanced judgement of the price and non-price attributes of the TOC development outcome (including the proponent's proposed project solution) and the team capability it offers. This includes the commercial and legal arrangements, etc. which have a significant implication on the final actual price paid. - If the TOC is agreed a 'Project Alliance Agreement' will be entered into by the owner and the preferred proponent, which governs the remainder of the alliance period.	- May be a two-stage process: - Stage 1 EOIs or ROIs from the open market. - Stage 2 RFP process which includes interactive workshops. - A range of technical and financial criteria are used in the evaluation and selection process - Procurement costs for all parties are generally high due to the need for expert advisers and lengthy contract negotiations. Some project owners may offer to reimburse short-listed respondents' costs¹.	

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			CONSTRUCTION MANAGEMENT/ PROJECT MANAGEMENT AGREEMENT	MANAGING CONTRACTOR	EARLY CONTRACTOR INVOLVEMENT (ECI)	ALLIANCE	
Contract Administration							
	- Construction works commonly overseen by a superintendent, principal's representative (PR) or principal's authorised person (PAP). - Resource commitment for project owners may be high depending on the degree of testing, auditing and general surveillance required.	- Construction works commonly overseen by a superintendent, PR or PAP. - Independent verifiers may be required for particular aspects of the design or construction. - Resource commitment for project owners may be high depending on the degree of testing, auditing and general surveillance required.	Construction works are overseen by the construction manager, who generally administers all individual trade contracts, with broad oversight from the project owner.	- The construction works are overseen by the managing contractor, with broad oversight by the project owner. - Resource commitment for project owners and stakeholders may be high Stage 1 due to involvement in the managing contractor's design development and procurement processes, after which the resources required to administer the works are lessened.	- Stage 1 is governed by the ECI agreement and Stage 2 is governed by a D&C agreement. - In the civil (road and bridge) sector, the following are typically included as part of the administration arrangements: - A leadership team, whose role is to monitor performance, help resolve disputes and provide general direction and leadership. - A management team, which includes the PR/PAP and contractor's project manager, which manages day-to-day project activities.	- The alliance arrangement is governed by an alliance leadership team (ALT) and alliance management team (AMT): - The ALT performs a similar role to the ECI leadership team. - The AMT performs a similar role to the ECI management team. - Independent verifiers may be engaged for particular aspects of the design or construction. - Facilitators are commonly engaged to build relationships within and across the ALT and AMT for the life of the project. - A dispute resolution board may also be established to help resolve any disputes that cannot be managed at AMT or ALT level.	- The governance arrangements in a PPP delivery model may be complex. Typically, the arrangement includes the project owner, project sponsor which may be a syndicate of banks and/or other financiers, construction contractor and/or asset operator. - The complexity of the arrangement means that project owner resources required at the front end of the project are very high but the degree of resourcing required to oversee the contractual arrangements is not generally significant once the project works are complete.

	CONSTRUCT ONLY	DESIGN AND CONSTRUCT (D&C) & VARIANTS	MANAGED		RELATIONSHIP		PPP
			CONSTRUCTION MANAGEMENT/ PROJECT MANAGEMENT AGREEMENT	MANAGING CONTRACTOR	EARLY CONTRACTOR INVOLVEMENT (ECI)	ALLIANCE	
					- In some circumstances, independent verifiers may be engaged for particular aspects of the design or construction. - A facilitator may be required to help build relationships across the team(s). - The level of resourcing is significant for all parties during Stage 1 due to the integrated nature of the project team and time commitments required to be made by senior personnel.	The time commitment required to effectively resource an alliance, including the level of commitment from senior executives, is significant.	
Potential for Innovation							
	Consideration of alternative tenders can result in some degree of innovation. However, under some standard forms of contract there is no significant potential for innovation during the construction phase.	- Strong designer / contractor relationship can result in innovative outcomes. - Where a maintenance or operations component is included, there is an incentive to develop innovative solutions to meet durability and other whole-of-life requirements.	The involvement of the construction manager at an early stage can result in strong constructability input into the design.	The project owner, contractor and designer generally work together in an integrated project team during Stage 1, which generally results in a high degree of innovation into design and its constructability.	The project owner, contractors and designer generally work together in an integrated project team during Stage 1, which generally results in a high degree of innovation into the design and its constructability.	- The competition between the two suppliers in the TOC development stage and the input from the owner drives early innovation capture and a robust tender price for the construction phase. - There is very high potential for innovation, with input from the project owner, during construction.	The long-term level of risk transfer to the private sector partner results in a very high potential for innovation, particularly at the design stage as there is a strong incentive for innovative solutions to meet durability and other whole-of-life requirements.

	CONSTRUCT ONLY	DESIGN AND CONSTRUCT (D&C) & VARIANTS	MANAGED		RELATIONSHIP		PPP
			CONSTRUCTION MANAGEMENT/ PROJECT MANAGEMENT AGREEMENT	MANAGING CONTRACTOR	EARLY CONTRACTOR INVOLVEMENT (ECI)	ALLIANCE	
Risk Allocation							
Design Risks	The risk of any design-related matters rests with the project owner, which must seek recourse from external design consultants re: design- related errors or omissions.	The contractor bears the risk of design, including warranting the design's fitness-for-purpose.	The project owner generally bears the design risk.	Typically, the managing contractor assumes responsibility for the designers, and will therefore bear design risks, including design development and documentation process risks.	Design risks are negotiated and allocated to the party best placed to control each aspect of the risk – generally the contractor.	Design risk is shared – but the NOPs' exposure may be capped as part of the 'pain share, gain share' arrangement.	The private sector partner(s) generally assumes the financing and cost risks of the design, and is required to warrant the design's fitness-for-purpose.
Construction – Costs Risks	- The contractor bears the risk under a lump sum, with the risk partially borne by the project owner under a schedule of rates, for items outside specified limits of accuracy. - The project owner generally assumes some cost risk around latent conditions and permits/approvals.	- The contractor generally bears the risk, except for some latent condition and permit-related risks. - Project owners may seek prices based on certain risks being priced 'in' or 'out' of the tenderer's final offer.	- Individual trade contractors bear the risk under lump sum arrangements, with the risk partially borne by the project owner, where there is a schedule of rates, for items outside the specified limits of accuracy. - The project owner generally assumes some cost risk around latent conditions and permits/approvals.	- The managing contractor usually takes all construction cost risks over the GCS. - The project owner generally assumes some cost risk around latent conditions and permits/ approval.	- The construction cost risk is negotiated, but largely borne by the contractor, given the time allowed in Stage 1 to investigate project risks, including constructability. - As with D&C, project owners may seek prices based on certain risks being priced 'in' or 'out' of the Stage 2 offer.	Risk is shared (including for force majeure events), but the NOPs' exposure may be capped as part of the 'pain share, gain share' arrangement.	- The private sector partner(s) generally assumes the majority of the risk, except for sovereign risk and changes to the regulatory environment, which may be retained by the project owner. - The sponsor will typically allocate significant risk to the construction contractor under a D&C, with residual risk borne by the sponsor and financiers.
Construction – Quality Risks	The contractor must construct the works in accordance with the design and specifications.	The contractor must construct the works in accordance with the approved design and the specifications.	Quality-related risks generally rest with the individual trade contractors engaged to deliver specific portions of the works.	- The managing contractor must construct the works in accordance with the approved design and the specifications. - The managing contractor warrants the quality of the works.	The contractor must construct the works in accordance with the agreed design and specifications.	Construction must meet the quality standards outlined in any agreed key result areas. The quality risk is shared between the alliance participants.	The private sector partner(s) must construct the works in accordance with the agreed design and specifications.
Construction – Time Risks	- Each party bears the risk of delays caused by it or on its behalf. - Liquidated damages provisions may apply if the contractor fails to achieve practical completion by the nominated date. - The contractor may receive an extension of time (EOT) for particular delays specified in the contract.	- Each party bears the risk of delays caused by it or on its behalf. - Liquidated damages provisions may apply if the contractor fails to achieve practical completion by the nominated date. - The contractor may receive an EOT for particular delays specified in the contract.	Time-related risks generally rest with the individual trade contractors engaged to deliver certain portions of the works, as per standard construct only arrangements.	The managing contractor takes on all construction time risks on the basis of dates agreed at the end of Stage 1 which, if not met, may result in the reduction of incentives and additional time-related costs.	- Each party bears the risk of delays caused by it or on its behalf. - Some risks that are difficult to allocate may be shared, including 'neutral' risks like force majeure, with an ability to seek time (but not costs) under the contract. - Liquidated damages may apply, and the contractor risks any early finish incentives if timeframes are not met.	All risks are shared – but the NOPs' exposure to risk may be capped as part of the 'pain share, gain share' arrangement.	- Some risks that are difficult to allocate, including 'neutral' risks like force majeure, may be shared with an ability for the contractor to seek time (but not costs) under the contract. - The remainder of the risks are allocated amongst the private sector partners, with the construction contractor bearing much of the construction time risk.

	CONSTRUCT ONLY	DESIGN AND CONSTRUCT (D&C) & VARIANTS	MANAGED		RELATIONSHIP		PPP
			CONSTRUCTION MANAGEMENT/PROJECT MANAGEMENT AGREEMENT	MANAGING CONTRACTOR	EARLY CONTRACTOR INVOLVEMENT (ECI)	ALLIANCE	
Maintenance and/or Operations Risks	Borne by the project owner.	Borne by the project owner, unless a maintenance or operations component is included in the contract.	Borne by the project owner.	Borne by the project owner, unless a maintenance or operations component is included in the contract.	Borne by the project owner.	Borne by the project owner, unless the alliance includes a maintenance/operations component.	The private sector entity assumes all maintenance, operating and demand risk.

12. Appendix C – Phase 3 Report - Multi Criteria Analysis & Workshop Presentation

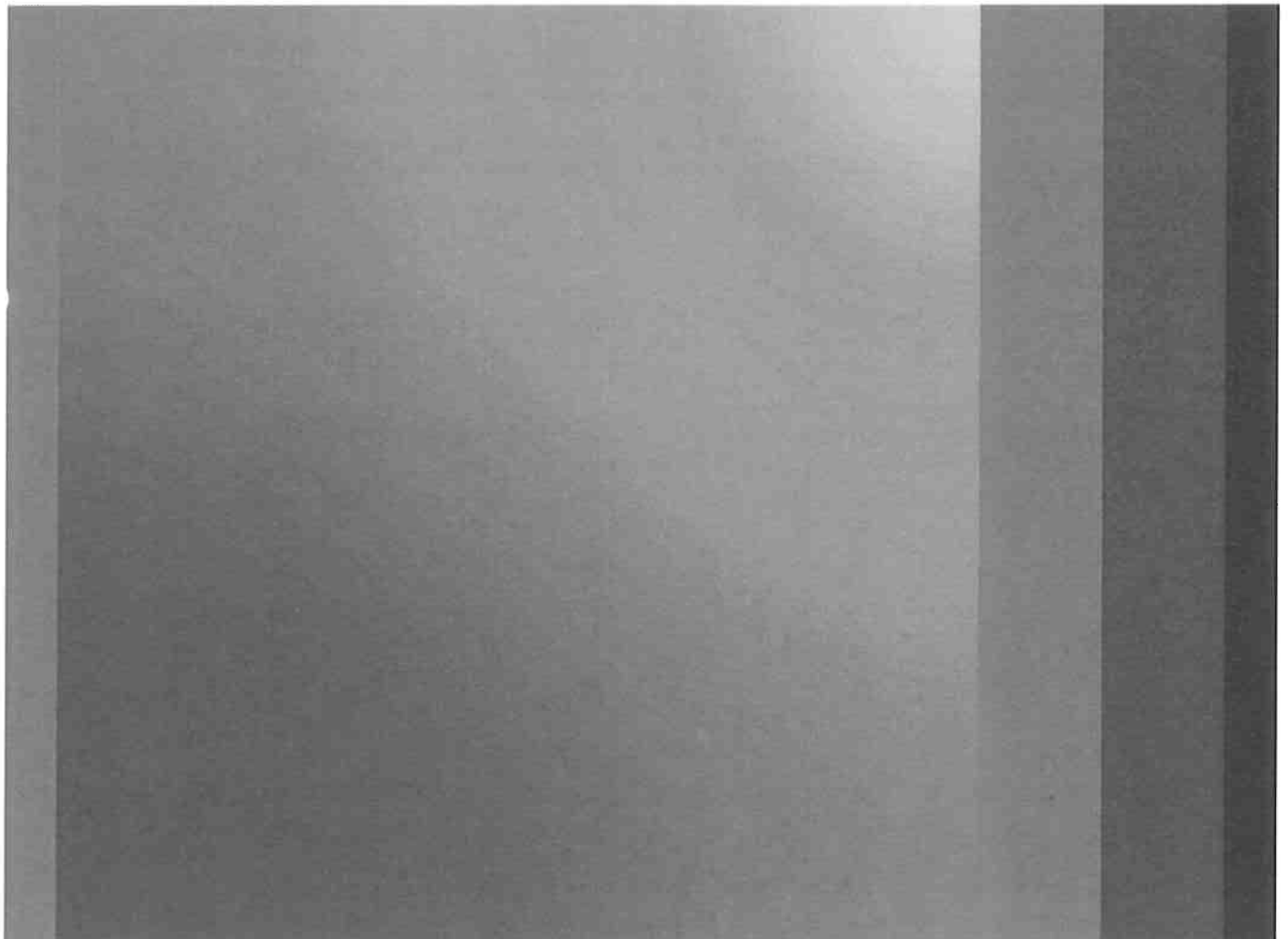


Monaro Highway Upgrade Program

Phase 3 - Delivery Models Multi Criteria Analysis

16/09/2020

3524.300



Monaro Highway Upgrade Program

Project No: IA224400
Document Title: Phase 3 - Delivery Models Multi Criteria Analysis
Document No.: IA224400-PR-PR-00X
Revision: A
Document Status: First Draft
Date: 16/09/2020
Client Name: Transport Canberra and City Services - TCCS
Client No: 3524.300
Project Manager: Jonathan Key
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File Name: Monaro Highway Upgrade Program_MCA Report_C

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Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
A	24/04/2020	Draft for Comment	Jonathan Key	Mark Anslow		
B	01/09/2020	Draft incorporating Mark Anslow comments	Jonathan Key	Mark Anslow	Randy Akroush	
C	16/09/2020	Incorporating Stuart Oxborrow review comments	Jonathan Key	Mark Anslow	Randy Akroush	

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Executive Summary

The following report concludes Phase 3 of the Procurement Options and Delivery Model Study. The objective of Phase 3 was to complete a Multi Criteria Analysis (MCA) of the proposed delivery models shortlisted in Phase 2 Report dated 10th July 2020 to determine the preferred model(s) for the delivery of Monaro Highway Lanyon Drive Interchange project (Package 1B – which is entirely within the Designated Land road corridor).

To achieve the project objectives, an appropriate well considered procurement strategy was developed in Phase 2 of this study. The aim of the strategy is to support delivery of an effective long-term road solution that provides asset 'whole of life value for money'. The strategy considered appropriate risk transfer between contractors, consultants, the client and other service providers.

Procurement Options and Delivery Models Reviewed

The six delivery models recommended in Phase 2 for inclusion in Phase 3 and confirmed at the Pre-MCA Workshop' were as follows:

- Traditional (Construct Only),
- Design & Construct - Performance Specification Design and Construct (PSD&C),
- Design & Construct – Develop Design and Construct (DD&C),
- Design & Construct - Design, Novate and Construct (DN&C),
- Project Management Agreement (PMA/CM), and
- Managing Contractor (MC).

The scale of the project does not warrant the benefits derived from the Design Construct & Maintain (DC&M) and Design, Construct Maintain and Operate (DCMO) delivery models. The operations and maintenance components are typically managed by Transport Canberra and City Services (TCCS) and therefore there is no obvious benefit in combining long-term maintenance obligations with individual contracts for design and construction.

Public Private Partnerships (PPP)(Availability and Boot) were discounted at the outset because the complexity of the delivery models is disproportionate to the scale of the project. In addition, their procurement timeframes are longer than the available time for this project. Generally, TCCS has previously considered PPP delivery models, however they have not been used to deliver road and overpasses infrastructure in the ACT to date.

The risk profile of the Monaro Highway Lanyon Drive Interchange project does not warrant an Alliance delivery model because the project risks are definable and can be managed using other delivery models. The time to market was also a factor for not proceeding with this model.

Further details and commentary around the different of the delivery models can be found in the Phase 2 Report dated 10th July 2020.

Multi Criteria Analysis

The Jacobs team developed an initial list of 15 criteria based around the project objectives. At the Pre-MCA workshop, the participants reduced the number of criteria to 7. This was predominately done by combining several of the criteria together.

The adopted MCA criteria and weightings are detailed in the table below, and further context for each criteria can be found in Section 6 of this report.

#	Criteria	Definition	Weighting
1	Risk Management – Alignment of risks	The extent to which each procurement option provides incentives to manage and reduce risks via an effective and efficient risk allocation to the parties best able to manage and price risk.	15%
2	Certainty on Time / Schedule	The extent to which each procurement option provides the greatest level of certainty to the delivery of the final and key intermediate milestones on, or ahead of time.	20%
3	Certainty on Budget	The extent to which each procurement option assists the Principal to confidently predict cost (i.e. certainty around capital costs / operating and maintenance expenditure associated with the project assets / quantum of public funding where required).	25%
4	Quality, design objectives, Operations & Maintenance	The extent to which each procurement option supports achieving the Principals performance and quality requirements.	20%
5	Flexibility including future scope & design changes	The extent to which each procurement option allows the Principal to influence scope and design at any stage (Post Award) with readily definable time and costs impacts.	10%
6	Community & Stakeholder Government	The extent to which each procurement option assists the Principal in managing community and stakeholders through the delivery of the project.	5%
7	Innovation	The extent to which a procurement option provides incentives for the private sector to introduce new or change ideas, approaches, methodologies, materials and buildability options during design & construction to achieve best project outcomes	5%

Table 1 – Adopted Multi Criteria Analysis

Multi Criteria Analysis Workshop

The MCA workshop had a good representation across the relevant departments of the ACT Government. A list of the participants is included in Attachment 1 for reference. Scoring of the delivery models against each criterion was the focus of the MCA workshop. At the start of the workshop the participants were provided with an update of the status and progress of the project.

As part of the project update, it was also explained that the MCA would exclude 'Package 1B Early Works Package – Protection and Relocation of Utilities' within the Designated Land road corridor. The utilities detailed design is currently being tendered for delivery in December 2020. Utilities construction work is targeted to commence in early 2021 (under a separate contract to the main civil works for Package 1B), with a duration of approximately 4-6 months.

A summary of each delivery model was provided to the MCA participants which was in addition to pre reading workshop notes. Each criterion was then introduced, explaining their relevance to the project, to ensure that all participants understood the context and intent. Participants were not privy to the criteria weightings at this stage to ensure that the scoring was not influenced by the relative importance of each criterion. Participants then scored each criterion against each delivery model using a defined scoring mechanism. The scoring was done

anonymously, using an online platform. The unweighted raw scoring was then presented and collectively the participants discussed the scoring distribution, especially when the data contained 'outliers'. This process was followed until each criterion was assessed.

Selected Delivery Model

The MCA process identified Develop, Design and Construct (DD&C) as the preferred model for the delivery of Package 1B of the Monaro Highway Lanyon Drive Interchange project. This model scored the highest overall weighted score. Of note, this model also scored the highest overall unweighted score.

This result was presented to the participants of the MCA workshop and there was a high level of agreement to proceed with the preferred model. There was some discussion around the fact that the opportunity to reach consensus scoring during the workshop had not been finalised, and it would be good to understand the impact of any 'outliers'. Post the workshop, a sensitivity analysis was done on the results and the Develop, Design and Construct (DD&C) model remained overwhelmingly preferred. For reference, the result of the post workshop analysis can be found in Section 6.7. Table 2 below shows the final weighted scores as per the results of the workshop:

Weighted Score			Procurement Model					
Criteria ID	Description	Weight	Construct Only	PSD&C	DD&C	DN&C	PMA	MC
			Score	Score	Score	Score	Score	Score
C1	Risk Management/ Alignment of Risks	15.0%	8.4%	9.6%	11.7%	9.3%	6.0%	8.1%
C2	Certainty on Time / Schedule	20.0%	11.6%	12.4%	15.2%	13.6%	10.4%	11.6%
C3	Certainty on Budget	25.0%	16.5%	14.5%	18.5%	18.0%	11.0%	12.5%
C4	Quality, Design Objectives, Operations & Maintenance	20.0%	15.6%	11.6%	14.8%	13.2%	11.2%	12.4%
C5	Flexibility to include future scope and design changes	10.0%	5.8%	5.4%	6.6%	5.4%	5.6%	6.2%
C6	Community and Stakeholders	5.0%	3.5%	2.7%	3.0%	3.0%	3.3%	3.5%
C7	Innovation	5.0%	2.4%	3.2%	3.4%	3.3%	2.6%	3.4%
Total		100%	63.80%	59.40%	73.20%	65.80%	50.10%	57.70%
Rank			3	4	1	2	6	5

Table 2 – Weighted Scores for each Delivery Model against each Criteria

1. Terms and Definitions

Terms and definitions, including acronyms referred to in this report appear in the following table:

Term	Definition
ACT	Australian Capital Territory
ACTIA	Australian Capital Territory Insurance Authority
CM	Construction Management
DCMO	Design, Construct, Maintain and Operate
DC&M	Design, Construct Maintain
DD&C	Develop, Design & Construct
DN&C	Design, Novate and Construct
D&C	Design and Construct
DP	Delivery Partner
ECI	Early Contractor Involvement
EOI	Expression of Interest
ETI	Early Tender Involvement
GCS	General Contract Sum
GMP	Guaranteed Maximum Price
GOV	Government
IDP	Infrastructure Delivery Partner
KPI	Key Performance indicator
O&M	Operations and Maintenance
MC	Managing Contractor
MCA	Multi Criteria Analysis
NPV	Net Present Value
PMA	Project Management Agreement
PDS	Procurement Delivery Strategy
PPP	Private Public Partnership
RMP	Risk Management Plan
RFT	Request for Tender
RR	Risk Register
SAF	Single Assessment Framework
TCCS	Transport Canberra and City Services
TOC	Total Outturn Cost
WHS	Work Health and Safety

2. Background

2.1 Project Overview

Jacobs has been commissioned by the Infrastructure Delivery Partners Group (IDPG) on behalf of the ACT Government (Transport Canberra and City Services, TCCS) to deliver feasibility and preliminary design services for the Monaro Highway Upgrade Program, Hume, ACT. The project includes assessment and preliminary sketch plan (PSP) design of suitable upgrade options for the Monaro Highway between the Alexander Maconochie Centre and Isabella Drive, including grade separation of Lanyon Drive and Isabella Drive at the Monaro Highway. The project also includes examining the upgrades to Johnston Drive further to the south, and the preparation of PSP designs for two heavy vehicle lay-bys.

The Monaro Highway is a key arterial route connecting to the Majura Parkway at the northern end and continuing south to Cooma and then on to intersect with the Princes Highway in Victoria. Within the ACT, it also provides part of the key link between Queanbeyan and Canberra City, and is a key connection between southern suburbs and the industrial areas of Hume and Fyshwick.

In November 2019, the Federal and ACT Governments announced that construction of the project would commence during financial year 2020/21, approximately one year earlier than originally planned. The Lanyon Drive interchange was subsequently identified as the preferred location for an early works package, and a feasibility stage layout was chosen to progress to PSP. The PSP design for Lanyon Drive is currently underway by Jacobs. The following figure shows the key features of the Lanyon Drive Interchange.



Figure 1 – Monaro Highway Lanyon Drive Interchange scope of works

The Lanyon Drive Interchange project has been further split into two projects which will be delivered separately. Package 1B is the works within the Designated Land road reserve and generally comprises the new southbound flyover and the main highway upgrades (and is the subject of this MCA workshop). Package 1C is the work within Territory Land, with minor associated works in Designated Land, and generally comprises the upgrades to Lanyon Drive, the highway ramps and the extension to David Warren Road.

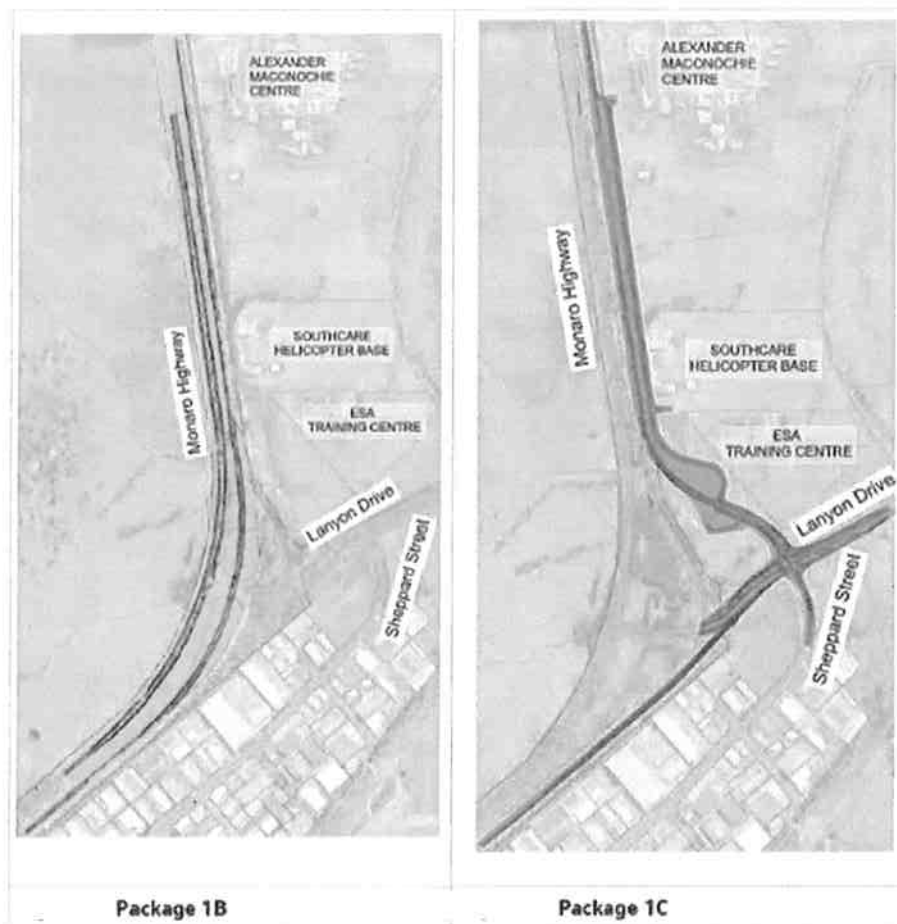


Figure 2 – Monaro Highway Lanyon Drive Interchange Scope of Works Packages

2.2 Project Success Criteria

The high-level success criteria for the project include:

Project Delivery

- No WHS incidents during construction;
- Achieve 'value for money' in delivery, (the project budget for entire Monaro Upgrade is \$200m);
- Substantial works commencing on site before June 2021;
- Deliver the project with minimum impact on local heritage and the environment;
- Address and incorporate stakeholder concerns (where possible) and
- Meet policy guidelines, (e.g. Local Industry Participation Policy, Secure Local Jobs, Indigenous Participation).

Project Performance Outcomes

- Increase posted road speed to 100kph (in line with the rest of Monaro highway);
- Improve travel times in AM and PM peaks for current and future (2031 and 2041) traffic demands; and
- Minimal impact to existing traffic during construction.

3. Procurement Options and Delivery Study

In addition to the feasibility and preliminary design services, Jacobs has been commissioned to undertake a Procurement Options and Delivery Model Study specifically for the Lanyon Drive Interchange, Package 1B. Jacobs were engaged to provide:

- Evaluation and assessment of risks associated with the nature of the works and staging;
- Evaluation and assessment of procurement and delivery models for the construction of the Lanyon Drive Interchange;
- Multi criteria analysis (evaluation of selected delivery models 'v' weighted selection criteria e.g. budget and schedule certainty, flexibility for changes, whole of life cost, innovation etc);
- Market sounding for the project (key players, market capacity, market appetite); and
- Reporting of findings and advice to identify the most appropriate delivery model (while minimising Territory risks, maximising 'value for' money and enabling early works to commence).

The key output being the recommendation of a delivery model to progress to RFT phase.

3.1 Methodology

Jacobs have structured the study into five phases.

Kick-Off Phase. Initial review of information provided by TCCS and confirmation of objectives and deliverables.

Phase 1 is the Risk and Opportunity Assessment Phase. In this phase Jacobs reviewed the existing strategic risk register. Jacobs developed the risk assessment methodology using ACTIA guidelines to assess the program risks, site risks and delivery risks. Through a desktop study and a workshop, Jacobs captured new risks, assessed their risk rating and identified potential mitigation strategies for each risk, with particular focus on procurement related risks. The same approach was taken for potential opportunities.

Phase 2 is the Delivery Models Phase. In this phase Jacobs reviewed the possible delivery models and procurement options available. Jacobs compared the advantages and disadvantages of each delivery model and provided guidance on the applicability of each, based on the project's unique factors and the ACT government's risk appetite. This phase resulted in a delivery model shortlist for inclusion in Phase 3 Multi Criteria Analysis and Phase 4 Market Sounding.

Phase 3 is the Multi Criteria Analysis (MCA) Phase. The MCA generates a ranking of the shortlisted delivery models in order of preference based upon the predetermined criteria and agreed weightings for each criterion.

Phase 4 is the Market Analysis and Sounding Phase. A key component of the ACT Government Single Assessment Framework process is undertaking market sounding to identify key players, determine market capacity, determine market appetite and consider whether there is enough competition to drive 'value for money' outcomes. This is conducted through a market analysis exercise, and consultation with the various industry bodies, and incorporates identified comments on identified issues which may affect the procurement strategy.

Phase 5 is the submission of the Draft Report to the TCCS Project Management Group for review. The report recommends a preferred delivery model or models based on the assessment. A final report is to be issued following TCCS feedback.

4. Phase 3 – Multi Criteria Analysis

4.1 Phase 3 Objective

The objective of the MCA workshop is to Identify the preferred delivery model for the Monaro Highway Lanyon Drive Interchange Project by appraising a list of selected delivery models against a set of pre-agreed project performance criteria.

4.2 Phase 3 Approach

The delivery of Phase 4 was supported by two workshops, which were facilitated by the study team. The adopted approach was to utilise a Pre MCA-workshop to confirm the selected delivery models and establish the evaluation criteria, including the criteria definitions, scoring and weightings. The second workshop focused on reaching a collective agreement on the score for each selected model against each criterion and thus the selection of a preferred delivery model.

4.3 Pre MCA-Workshop

Jacobs facilitated a Pre MCA-Workshop on 17 July 2020. Prior to the workshop, participants were provided with a preamble, draft agenda, draft list of delivery models (as per the recommendations of the Phase 3 Delivery Models Review Report), and a draft list of MCA Criteria with associated definitions and scoring. The Pre MCA-workshop agenda and participants are included in Attachment A. The Pre MCA-Workshop slides are in Attachment B.

The first part of the Pre-MCA workshop focused on ensuring collective agreement by the TCCS/IDPG representatives to the selected delivery models. The second part of the Pre-MCA workshop then focused on refining the MCA criterion and ensuring collective agreement to them by the TCCS/IDPG representatives, including the criteria definitions and scoring. Finally, the Pre-MCA workshop allowed the TCCS/IDPG representatives to agree and assign weightings to each of the MCA criterion.

The MCA criterion were then endorsed and used to carry out the MCA during the second workshop (as discussed below). The adopted MCA criterion are presented in greater detail in Section 6.3 of this report.

4.4 MCA Workshop

The MCA workshop was held on the on 18 August 2020. Prior to the workshop, participants were provided with a presentation (Attachment C (without the criteria weightings)) and a summary of the selected delivery models (Attachment D).

The MCA workshop had good representation across the relevant departments of the ACT Government. A list of the participants is included in **Attachment C** for reference. Scoring of the selected delivery models against each criterion was the focus of the MCA workshop. At the start of the MCA workshop, the participants were provided with an update of the status and progress of the project. As part of the project update, it was also explained, that the MCA would exclude Package 1B Early Works Package (protection and relocation of utilities within the designated land road corridor). The utilities detailed design is currently being tendered for delivery in December 2020. Commencement of the utilities construction works is targeting for early 2021, with a duration of approximately 4-6 months.

Each criterion was then introduced, including its relevance to the project to ensure that all participants understood the context and intent. Participants were not privy to the criteria weightings at this stage to ensure that the scoring was not influenced by the relative importance of each criterion. Participants then scored each criterion against each delivery model using a defined scoring mechanism. The scoring was done anonymously, using an online platform. The unweighted raw scoring was then presented and collectively participants discussed

the scoring distribution, especially when outliers were identified. This process was followed until each criterion was assessed.

The scoring and overall results are discussed in greater detail in Section 6 of this report.

5. Recommended Delivery Models for the MCA

The six delivery models recommended in the Phase 2 report for inclusion in Phase 3, and confirmed at the Pre MCA-Workshop, are as follows:

- Traditional (Construct Only),
- Design & Construct - Performance Specification Design and Construct (PSD&C),
- Design & Construct - Develop, Design and Construct (DD&C),
- Design & Construct - Design, Novate and Construct (DN&C),
- Project Management Agreement (PMA/CM); and
- Managing Contractor (MC).

A summary of each delivery model was given at the workshop based on a pre-reading information pack (Attachment D).

5.1 Delivery Models excluded from the MCA Workshop

The workshop facilitators explained that the delivery models listed below had been excluded from the MCA Workshop as recommended in Phase 2 Report, and confirmed in the Pre-MCA Workshop:

- Design, Construct Maintain (DC&M),
- Design, Construct, Maintain, Operate (DCMO),
- Alliance,
- PPP Availability, and
- PPP Boot.

The scale of the Lanyon Drive Interchange project does not warrant the benefits derived from the Design Construct & Maintain (DC&M) and Design, Construct Maintain and Operate (DCMO) delivery models. The operations and maintenance components are typically managed by TCCS, and therefore there is no obvious benefit in combining long-term maintenance obligations with individual contracts for design and construction.

PPP (Availability and Boot) were discounted at the outset because the complexity of these delivery models is disproportionate to the scale of the Lanyon Drive Interchange project. In addition, their procurement timeframes are longer than the available time for Lanyon Drive Interchange project

The risk profile of the Lanyon Drive Interchange project doesn't warrant an Alliance delivery model because the project risks are definable and can be managed using other delivery models. Time to market was also a factor for not proceeding with the Alliance model.

Further details and commentary around the different delivery models can be found in the Phase 2 Report dated 10th July 2020.

6. Adopted MCA Criteria

6.1 Criteria Selection

The Jacobs team completed a review of the following source documents to identify the range of potential criteria for selection and inclusion in the MCA.

- ACT Government SAF Business Case Guide 2016 v2.1.
- ACT Guidelines for Public Private Partnerships.
- Building and Construction Procurement Guide, Principles and Options 2014 – Austroads & Australasian Procurement and Construction Council.
- Guide to Project Delivery 2014 – Austroads.
- National Public Private Partnership Guidelines 2008 – Australian Government Dept of Infrastructure and Regional Development.
- National Framework for Traditional Contracting 2015, Australian Government Dept of Infrastructure and Regional Development.
- National Alliance Contracting Guidelines, Early Contractor Involvement 2015 - Australian Government Dept of Infrastructure and Regional Development.
- Technical guidance Procurement strategy guideline 2013 – Victoria Department of Treasury & Finance.
- Jacobs – Project Contracting Strategies white paper 2018.
- North East Link -Business-Case-Appendix-Procurement Options Assessment.

The Pre MCA workshop slides (Attachment B) shows the full list of criteria considered. The table below lists all the criteria that were considered and the seven that were selected. Work Health Safety and Environment were not selected because they are mandatory criteria, irrespective of which delivery model is selected.

Considered	Selected
1. Time to market	1. Risk Management – Alignment of risks
2. Time to deliver project	2. Certainty on Time / Schedule
3. Project interfaces	3. Certainty on Budget
4. Cost /Budget certainty	4. Quality, design objectives, Operations & Maintenance
5. Flexibility	5. Flexibility including future scope & design changes
6. Operational flexibility	6. Community & Stakeholder Government
7. Risk Management	7. Innovation
8. Community & Stakeholder Government	Grouped into' or 'included within' Selected Criteria
9. Work Health Safety	1. Time to market
10. Market Interest	2. Time to deliver project
11. Construction Innovation	3. Project interfaces
12. Whole of life Maintenance / Innovation	11. Construction innovation
13. Quality	12. Whole of life maintenance / innovation
14. Environmental	13. Quality
15. Simplicity	

Table 3 Criteria Considered and Selected

6.2 Selected Criteria Development

The seven selected criteria were then further developed by the Pre-MCA participants. The participants took the approach of establishing the context for each criterion and refining this into a definition statement. The scoring

definitions were then ready for use in quantitative assessment of delivery model performance against the criterion.

As outlined in Section 4, the seven criteria, draft definitions and scoring regimes were presented to the participants of the Pre MCA-Workshop. These were discussed, and weightings applied.

6.3 Adopted MCA Criteria

Table 4 below shows the 7 adopted MCA criteria with their associated definition and context. It also includes the weighting of each criteria as agreed by the ACT Government attendees at the Pre MCA-workshop.

#	Criteria	Definition	Weighting
1	Risk Management – Alignment of risks	The extent to which each procurement option provides incentives to manage and reduce risks via an effective and efficient risk allocation to the parties best able to manage and price risk. ▪ Achieves appropriate risk allocation. ▪ Risks are allocated to those best placed to manage them. ▪ Allocates those risks to the ACT Govt and appropriate to accept ▪ Aligns with ACT Govt risk profile ▪ Everyone working to identify and manage risks	15%
2	Certainty on Time / Schedule	The extent to which each procurement option provides the greatest level of certainty to the delivery of the final and key intermediate milestones on, or ahead of time ▪ Time to market - Substantial works commencing on site before June 2021 (Partially mitigated by early works packages) ▪ Interface / flexibility to support delivery timeframes of other concurrent or planned projects in the Principals 'pipe-line ▪ Early civil works package completed within 30 months of award.	20%
3	Certainty on Budget	The extent to which each procurement option assists the Principal to confidently predict cost (i.e. certainty around capital costs / operating and maintenance expenditure associated with the project assets / quantum of public funding where required). ▪ Package 1 complete under \$100m, for a total project cost of \$200m ▪ No need to go back to Treasury / Business Case (for unplanned or additional funding) ▪ Adequate contingencies allocated to cover uncertainties/ additional works ▪ Appropriate framework in contract for managing contingencies ▪ Cost of managing the delivery model	25%
4	Quality, design objectives, Operations & Maintenance	The extent to which each procurement option supports achieving the Principals performance and quality requirements. ▪ Built product meets the Principal's expectations – aesthetic and quality ▪ Final product is acceptable to receiving asset holders (Durable and defects free) ▪ Takes good consideration of operations & maintenance ▪ Does the model help with minimising 'whole of life' cost ▪ Provides certainty on design outcomes	20%
5	Flexibility including future scope & design changes	The extent to which each procurement option allows the Principal to influence scope and design at any stage (Post Award) with readily definable time and costs impacts. ▪ The extent to which each procurement option assists the Principal in managing and implementing changes to the functional and scope requirements of the project over time (particularly in relation to any variation in performance requirements e.g. required capacity of the road and changes in legislation) ▪ Allows Principal to not own the design, but be able to influence – even at a late stage including during construction ▪ Provides level of control sought by the Principal over design development- ensuring cost efficiency and constructible ▪ Ability to capitalise on identified opportunities	10%

		Tolerant to changes in scope and uncertainty	
6	Community & Stakeholder Government	The extent to which each procurement option assists the Principal in managing community and stakeholders through the delivery of the project. - Managing of Internal and external stakeholders - Assist in minimising impacts on communities – E.g. traffic - Satisfy political considerations, - Support environmental objectives, - Assist in protection of cultural assets, and - Assist's in optimising the use of natural resources.	5%
7	Innovation	The extent to which a procurement option provides incentives for the private sector to introduce new or change ideas, approaches, methodologies, materials and buildability options during design & construction to achieve best project outcomes - Manages the complexity of the design solution - Provides an environment that encourages innovation by all parties - Delivers a buildable design solution - Encourages clever design thinking - Encourages construction innovation	5%

Table 4 MCA Criteria including Definition, Context and Weighting

6.4 Scoring Regime

Participants were asked to score each of the selected delivery models against each criterion. The table below describes the spectrum of scoring. The participants scored anonymously.

Score	Definition
5	Exceeds - The Procurement Model exceeds the requirements of the Criterion.
4	Good - The Procurement Model satisfies all the requirements of the Criterion. The Procurement Model is considered a good fit against all the requirements of the Criterion.
3	Adequate - The Procurement Model Adequately satisfies the requirements of the Criterion. The Procurement Model contains few or very limited deficiencies against the Criterion, however these are considered acceptable.
2	Deficient - The Procurement Model satisfies few or very limited requirements of the Criterion. The Procurement Model is mostly deficient for use against the Criterion and unlikely to be acceptable.
1	Unacceptable -The Procurement Model does not satisfy any of the requirements of the Criterion and is unacceptable for use against the Criterion.

Table 5 MCA Criteria Scoring Spectrum

6.5 Understanding the MCA Criteria

As outlined in Section 4, to ensure that participants at the MCA workshop fully understood the context and meaning of each criterion, the facilitators provided some further background information on some of the criterion which were subject to a greater level of subjectivity. For example, the PSP design would be progressed to enough detail so that it can be handed over to any model.

This additional background information is summarised in the following sections.

6.5.1 Risk Management – Alignment of Risks

Alignment of risks relies on those scoring to understand the ACT Government risk profile. This was established in Phase 1 of the study and the MCA workshop facilitators provided the following extracts from the Phase 2 'Procurement Risk Register' to assist with facilitating a common understanding amongst participants. The data extracted and provided in Table 6 below, shows that the TCCS risk profile for this procurement activity includes a broadly normal distribution of risk allocation, that is, it is not intended that all risks identified are to be transferred to the contractor.

6.5.2 Monaro Highway Interchange ACT Government Risk Profile:

During Phase 1 Jacobs conducted a risk assessment workshop and 80 risks were identified. Each risk was reviewed and mitigated using the following strategies:

- 1) Eliminate the risk.
- 2) Transfer the risk.
- 3) Share the risk and monitor.
- 4) Accept the risk and monitor.
- 5) Accept the risk, treat and monitor.
- 6) Treat the risk and transfer residual.
- 7) Further investigate risk.
- 8) Treat risk and own.
- 9) Treat risk and share.

The table below shows the distribution of the number of risks to be transferred, owned or shared across the various categories. The list was developed prior to the 'Early Utilities Works Packages 1B' thus some of the risks noted below will be mitigated for this procurement, however, there may still be EIS issues. Note risks in 'Existing Services' in the client design are both mitigated by 'Own' and 'Share'.

Table 6 Risk Profile Summary from the Phase 1 Risk Management Workshop

6.5.3 Certainty on Time / Schedule

For the purpose of consistent assessment and scoring, agreement was reached at the MCA workshop that each selected delivery model should be assessed on the basis of 'Time to Market' with works commencing on site before June 2021, and a construction duration within 30 months of award of contract.

6.5.4 Certainty on Budget

It was acknowledged at the MCA workshop that the budget required for the selected delivery models may vary, for example a 'Project Management Agreement' would require more management costs to be included in the overall budget. For the purpose of consistent assessment and scoring, it was stated at the workshop that each model should be assessed on the basis that the budget requested aligned with the amount required for that model, and further, that it had been approved in full.

6.5.5 Scoring and Results

Table 7 shows the individual scores for each selected delivery model against each criterion. As outlined in Section 4, the scoring process was an iterative process, whereby individual participants at the MCA Workshop were requested to score each model for an individual criterion. The individual scores were entered into 'Mentimeter.com' which is an online application. During the MCA workshop it was possible for participants to see the distribution of the responses for each delivery model, but the results were anonymous. After each criterion was scored, the participants discussed the results to determine if there were any outliers. The average of the responses was entered into the MCA spreadsheet and displayed for all participants to see.

Note that participant 6 had to leave early and did not score the final criteria – Innovation.

Criteria 1: Alignment of Risk											
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Average
Traditional	2	3	2	3	3	3	3	2	3	4	2.80
D&C- Performance Specification Design and Construct (PSD&C)	3	3	3	3	4	4	4	3	4	1	3.20
D&C - Design, Develop and Construct (DD&C)	4	4	4	3	4	4	4	4	4	4	3.90
D&C - Design, Novate and Construct (DN&C)	3	2	2	3	3	3	3	4	4	4	3.10
Project Management Agreement (PMA/CM)	2	3	2	3	2	3	1	1	2	1	2.00
Managing Contractor (MC)	3	3	2	4	2	2	4	3	3	1	2.70
											2.95
Criteria 2: Certainty on Schedule											
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Average
Traditional	2	4	3	2	3	3	3	2	2	5	2.90
D&C- Performance Specification Design and Construct (PSD&C)	4	3	4	3	4	3	4	2	3	1	3.10
D&C - Design, Develop and Construct (DD&C)	4	4	4	4	4	3	4	3	4	4	3.80
D&C - Design, Novate and Construct (DN&C)	4	4	3	4	3	3	2	3	4	4	3.40
Project Management Agreement (PMA/CM)	4	2	3	5	3	2	1	2	3	1	2.60
Managing Contractor (MC)	5	3	2	5	3	2	1	3	4	1	2.90
											3.12
Criteria 3: Certainty on Budget											
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Average
Traditional	3	4	2	3	3	3	4	4	2	5	3.30
D&C- Performance Specification Design and Construct (PSD&C)	4	3	3	4	3	2	4	2	3	1	2.90
D&C - Design, Develop and Construct (DD&C)	4	4	3	4	4	3	4	3	4	4	3.70
D&C - Design, Novate and Construct (DN&C)	4	4	2	4	4	3	3	3	4	5	3.60
Project Management Agreement (PMA/CM)	1	2	2	1	3	3	2	1	2	5	2.20
Managing Contractor (MC)	2	2	2	3	3	3	2	3	4	1	2.50
											3.03
Criteria 4: Quality, Design Objectives, O&M											
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Average
Traditional	4	4	3	5	3	3	3	5	4	5	3.90
D&C- Performance Specification Design and Construct (PSD&C)	3	4	3	3	3	4	4	2	2	1	2.90
D&C - Design, Develop and Construct (DD&C)	4	3	3	4	4	4	4	3	4	4	3.70
D&C - Design, Novate and Construct (DN&C)	4	3	3	3	4	1	4	3	4	4	3.30
Project Management Agreement (PMA/CM)	3	3	3	3	3	3	2	4	3	1	2.80
Managing Contractor (MC)	4	3	3	3	3	2	4	4	4	1	3.10
											3.28
Criteria 5: Flexibility											
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Average
Traditional	2	2	1	3	4	2	3	3	4	5	2.90
D&C- Performance Specification Design and Construct (PSD&C)	4	3	4	2	3	3	4	1	2	1	2.70
D&C - Design, Develop and Construct (DD&C)	3	4	4	3	3	3	4	2	3	4	3.30
D&C - Design, Novate and Construct (DN&C)	3	4	4	2	3	3	2	2	3	1	2.70
Project Management Agreement (PMA/CM)	2	3	2	4	3	2	3	4	4	1	2.80
Managing Contractor (MC)	4	4	3	3	4	2	2	4	4	1	3.10
											2.92
Criteria 6: Community and Stakeholders											
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Average
Traditional	4	2	3	3	4	4	3	4	3	5	3.50
D&C- Performance Specification Design and Construct (PSD&C)	3	3	4	2	3	3	3	2	3	1	2.70
D&C - Design, Develop and Construct (DD&C)	3	3	4	3	3	3	3	3	3	2	3.00
D&C - Design, Novate and Construct (DN&C)	3	3	4	3	3	3	3	3	3	2	3.00
Project Management Agreement (PMA/CM)	4	3	4	5	3	2	3	5	3	1	3.30
Managing Contractor (MC)	4	4	4	5	4	2	3	5	3	1	3.50
											3.17
Criteria 7: Innovation											
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Average
Traditional	1	2	2	2	3		2	2	3	5	2.44
D&C- Performance Specification Design and Construct (PSD&C)	4	3	4	5	2		2	4	4	1	3.22
D&C - Design, Develop and Construct (DD&C)	4	4	4	4	3		3	3	4	2	3.44
D&C - Design, Novate and Construct (DN&C)	3	4	4	4	3		3	3	4	2	3.33
Project Management Agreement (PMA/CM)	2	3	2	2	4		3	3	3	1	2.56
Managing Contractor (MC)	4	4	4	3	4		3	5	3	1	3.44
											3.07

Table 7 Participant Individual Scores for each criterion

6.6 Scoring – Raw and Weighted Overall Scores

Following the scoring, the overall score for each delivery model was calculated, as shown in Table 8. It shows 3 summaries:

- Raw scores,
- Raw scores converted into percentage with and equal weighting of 14% for each criterion, and
- Final scores with the weightings selected at the Pre-MCA workshop.

Raw Score			Procurement Model					
Criteria ID	Description	Max Score	Construct Only	PSD&C	DD&C	DN&C	PMA	MC
C1	Risk Management/ Alignment of Risks	5	2.8	3.2	3.9	3.1	2.0	2.7
C2	Certainty on Time / Schedule	5	2.9	3.1	3.8	3.4	2.6	2.9
C3	Certainty on Budget	5	3.3	2.9	3.7	3.6	2.2	2.5
C4	Quality, Design Objectives, Operations & Maintenance	5	3.9	2.9	3.7	3.3	2.8	3.1
C5	Flexibility to include future scope and design changes	5	2.9	2.7	3.3	2.7	2.8	3.1
C6	Community and Stakeholders	5	3.5	2.7	3.0	3.0	3.3	3.5
C7	Innovation	5	2.4	3.2	3.4	3.3	2.6	3.4
Total		35	21.7	20.7	24.8	22.4	18.3	21.2

Raw Results Un-weighted			Procurement Model					
Criteria ID	Description	Weight	Construct Only	PSD&C	DD&C	DN&C	PMA	MC
C1	Risk Management/ Alignment of Risks	14%	8.0%	9.1%	11.1%	8.9%	5.7%	7.7%
C2	Certainty on Time / Schedule	14%	8.3%	8.9%	10.9%	9.7%	7.4%	8.3%
C3	Certainty on Budget	14%	9.4%	8.3%	10.6%	10.3%	6.3%	7.1%
C4	Quality, Design Objectives, Operations & Maintenance	14%	11.1%	8.3%	10.6%	9.4%	8.0%	8.9%
C5	Flexibility to include future scope and design changes	14%	8.3%	7.7%	9.4%	7.7%	8.0%	8.9%
C6	Community and Stakeholders	14%	10.0%	7.7%	8.6%	8.6%	9.4%	10.0%
C7	Innovation	14%	6.9%	9.1%	9.7%	9.4%	7.4%	9.7%
Total		100%	62.00%	59.14%	70.86%	64.00%	52.29%	60.57%

Weighted Score			Procurement Model					
Criteria ID	Description	Weight	Construct Only	PSD&C	DD&C	DN&C	PMA	MC
C1	Risk Management/ Alignment of Risks	15.0%	8.4%	9.6%	11.7%	9.3%	6.0%	8.1%
C2	Certainty on Time / Schedule	20.0%	11.6%	12.4%	15.2%	13.6%	10.4%	11.6%
C3	Certainty on Budget	25.0%	16.5%	14.5%	18.5%	18.0%	11.0%	12.5%
C4	Quality, Design Objectives, Operations & Maintenance	20.0%	15.6%	11.6%	14.8%	13.2%	11.2%	12.4%
C5	Flexibility to include future scope and design changes	10.0%	5.8%	5.4%	6.6%	5.4%	5.6%	6.2%
C6	Community and Stakeholders	5.0%	3.5%	2.7%	3.0%	3.0%	3.3%	3.5%
C7	Innovation	5.0%	2.4%	3.2%	3.4%	3.3%	2.6%	3.4%
Total		100%	63.80%	59.40%	73.20%	65.80%	50.10%	57.70%
Rank			3	4	1	2	6	5

Table 8 Scoring Summary

6.7 Scoring Analysis

It was observed at the workshop that, as a group, participants did not reach a consensus scoring for each criterion. Participants discussed the outliers but did not go back to do consensus scoring. One of the actions agreed at the workshop was for Jacobs and TCCS to do a sensitivity analysis on the results, to see if the scoring for the apparent preferred procurement model (the 'Develop Design and Construct' model) was affected by any anomalies in the individual scores. Post the MCA workshop Jacobs undertook two separate additional sensitivity assessments of the results.

For the first sensitivity check, individual participant(s) scores were checked to see if any were completely different to the rest of the group. It became apparent that one participant (Participant 'P10') scored the 'traditional' delivery model highest (i.e. best with a scoring of mostly 4 and 5) every time, and the 'managing contractor' model lowest (i.e. worst with a scoring of 1) every time. This suggested an inherent bias or misunderstanding of the scoring process, so the P10 scores were removed for the first sensitivity assessment.

For the second sensitivity check, the highest and lowest 'outlier' scores for each criterion were removed from the calculations to statistically 'smooth' the results.

The results of all three assessments (i.e. the initial assessment and the two sensitivity checks) are shown below.

Raw Score	Construct Only	PSD&C	DD&C	DN&C	PMA	MC
MCA Workshop Results	21.70	20.70	24.80	22.40	18.30	21.20
Excluding P10	20.35	22.28	24.96	22.50	19.08	22.86
Excluding Outliers	21.29	21.55	25.32	22.93	18.20	21.95
Raw Result Unweighted %	Construct Only	PSD&C	DD&C	DN&C	PMA	MC
MCA Workshop Results	62%	59%	71%	64%	52%	61%
Excluding P10	58%	64%	71%	64%	55%	65%
Excluding Outliers	61%	62%	72%	66%	52%	63%
Result weighted	Construct Only	PSD&C	DD&C	DN&C	PMA	MC
MCA Workshop Results	63.80%	59.40%	73.20%	65.80%	50.10%	57.70%
Excluding P10	60.13%	63.83%	72.96%	64.83%	51.19%	61.97%
Excluding Outliers	62.54%	61.94%	74.57%	67.43%	49.20%	59.57%

The tables below show the relative Ranking of each model:

Rank Raw	Construct Only	PSD&C	DD&C	DN&C	PMA	MC
MCA Workshop Results	3	2	1	2	6	4
Excluding P10	5	4	1	3	6	2
Excluding Outliers	5	4	1	2	6	3
Rank Weighted	Construct Only	PSD&C	DD&C	DN&C	PMA	MC
MCA Workshop Results	3	4	1	2	6	5
Excluding P10	5	3	1	2	6	4
Excluding Outliers	3	4	1	2	6	5

Table 9 Sensitivity Analysis Results and Overall Ranking

The results demonstrate that even considering the two sensitivity analyses, the 'Develop Design and Construct' model has the highest ranking in all assessments.

6.8 Selected Delivery Model

The MCA process identified Develop Design and Construct (DD&C) as the preferred delivery model for the delivery of Monaro Highway Lanyon Drive Interchange Package 1B. This model scored the highest overall weighted score as well as the highest for both sensitivity analyses. Of note, the DD&C model also scored the highest overall unweighted score.

The raw results obtained on the day of the MCA (ie without the sensitivity analyses) was presented to the participants of the MCA workshop and there was a collective agreement that the selected model was appropriate to the discussions held in the workshop, and that it was the appropriate delivery model for the project. In addition, TCCS subsequently provided the participants the results of the sensitivity analyses which was an action from the workshop. No further comments from the participants were received.

7. Attachments

- 7.1 Attachment A - Pre MCA-workshop agenda and participants**
- 7.2 Attachment B - The Pre MCA-Workshop slides**
- 7.3 Attachment C – MCA Workshop Slides including Participants and Scores**
- 7.4 Attachment D - Summary of the Delivery Models**

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Subject	Monaro Highway – Background, Purpose & Agenda for the Pre-MCA Workshop		
Project	Monaro Highway		
Project No.	IA224400	File	200717_MCA Meeting
Prepared by	Jonathan Key	Phone No.	+61437949941
Location	TEAMS	Date/Time	17 July 2020. Start Time 13:30 – 15:30
Invitees	Stuart Oxborrow, Nathan, Greig, Leon Mayer, Andrew Crompton, Russell Thomson, Mark Anslow, Jonathan Key		
Copies to	File		

Background, Purpose & Agenda for the Pre-MCA Workshop

Background

Jacobs has been commissioned to undertake a Procurement Options and Delivery Model Study (Study) (specifically for the Lanyon Drive Interchange), as follows:

Phase 1: Risk and Opportunity Assessment
Review the existing strategic risk register.

Phase 2: Delivery Models Phase.
Review of possible delivery models and procurement options available. In this stage we compared the advantages and disadvantages of proposed delivery models and provided guidance on the applicability of each. This phase has resulted in a delivery model shortlist for inclusion in Phase 3 Multi Criteria Analysis (refer attached Phase 2 report).

Phase 3: is the Multi Criteria Analysis (MCA) Phase.
The MCA generates a ranking of the shortlisted delivery models in order of preference based upon the predetermined criteria and agreed weightings for each criterion.

Phase 4: is the Market Analysis and Sounding Phase.
Market sounding to identify key players, determine market capacity, determine market appetite and consider whether there is enough competition to drive value for money outcomes.

Phase 5: is the submission of a Report to the TCCS Project Management Group.

The Study is now at **Phase 3** MCA. The key outputs from Phases 1 & 2 are attached for pre-reading, as follows.

- Report – Monaro Highway Procurement Study Phase 2 – Review of Delivery Models.
- Risk Register.

Purpose of the Pre-MCA workshop

This Pre-MCA workshop is preparation for a main MCA workshop to be held at a later date (date to be determined).

At this Pre-MCA workshop we will:

- review the shortlisted delivery models (from phase 2 and contained in the attached report),
- review the ACT government's risk appetite (based on the findings from phase 1 (risk register attached)),
- review and agree proposed assessment criteria and the weightings for each criterion,
- review and agree a proposed scoring framework, and
- discuss the next steps.

The outputs from this Pre-MCA workshop will then lead into the main MCA workshop. At the main MCA workshop, the now informed participants will use the tools developed at the Pre-MCA to rank the shortlisted delivery models (from **phase 2**) in order of preference based upon the now agreed criteria, weightings and scoring framework.

Pre-MCA Agenda

13:30 – 13:35 Introduction

13:35 – 14:00 Review of selected Procurement Models for MCA

14:00 – 14:15 ACT Government Risk Appetite

14:15 – 14:45 Review and select MCA Assessment Criteria

14:45 – 15:15 Assign weightings to selected MCA Assessment Criteria

15:15 – 15:25 Scoring Matrix

15:25 – 15:30 Next Steps

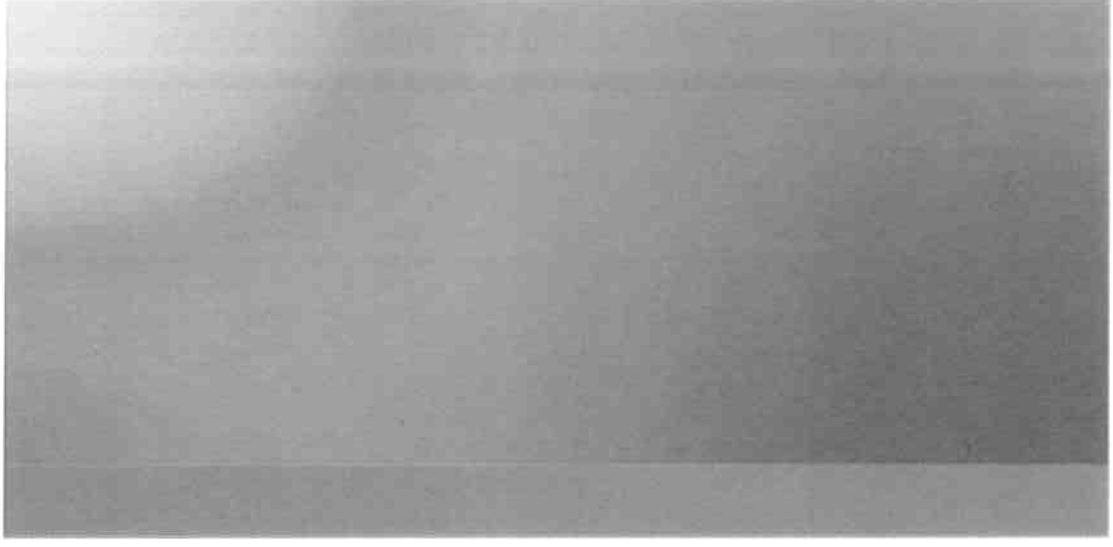
15:30 Close

Monaro Highway Upgrade Program

Procurement Study Phase 3
Multi Criteria Analysis (MCA)
Pre-MCA Workshop
17 July 2020

- 1. Introduction**
 - 2. Review and select Procurement Models for MCA**
 - 3. ACT Government Risk Appetite**
 - 4. Review and select MCA Assessment Criteria**
 - 5. Assign weightings to selected MCA Assessment Criteria**
 - 6. Scoring Matrix**
 - 7. Next Steps**
 - 8. Close**
-

Introductions



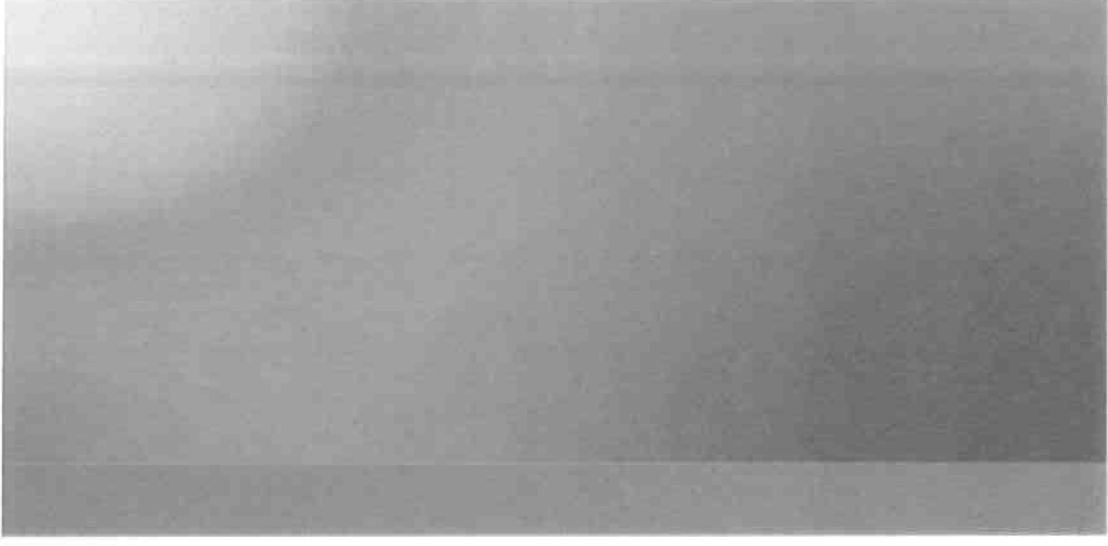
Participants

- 1. Nathan Greig – TCCS. Senior Manager, Infrastructure Delivery**
 - 2. Stuart Oxborrow – TCCS. Senior Engineer, Infrastructure Delivery**
 - 3. Leon Mayers – MPC. Project Procurement Officer**
 - 4. Andrew Crompton – Consultant/ Advisor**
 - 5. Jonathan Key – Jacobs Facilitator/ MCA lead**
 - 6. Mark Anslow – Jacobs Commercial Manager**
 - 7. Russell Thomson– Jacobs Project Manager**
-

Proposed Procurement Models

These were developed during Phase 2 of the Procurement Study

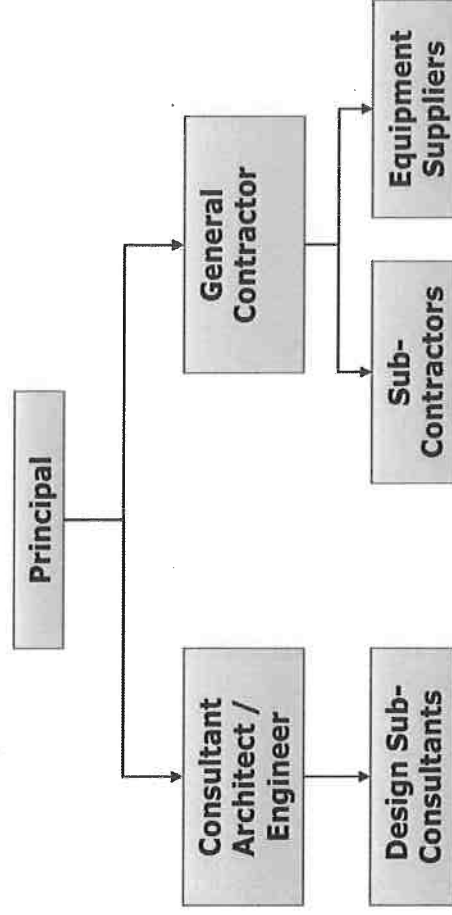
Discuss each model & select those to be included in the MCA



Procurement Models – Recommended from Phase 2 (for MCA assessment)

- Traditional (Construct Only).
- Design & Construct - Performance Specification Design and Construct (PSD&C).
- Design & Construct - Design, Develop and Construct (DD&C).
- Design & Construct - Design, Novate and Construct (DN&C).
- Project Management Agreement (PMA)/ Construction Management
- Managing Contractor (MC)

Procurement Models – Traditional Construct Only



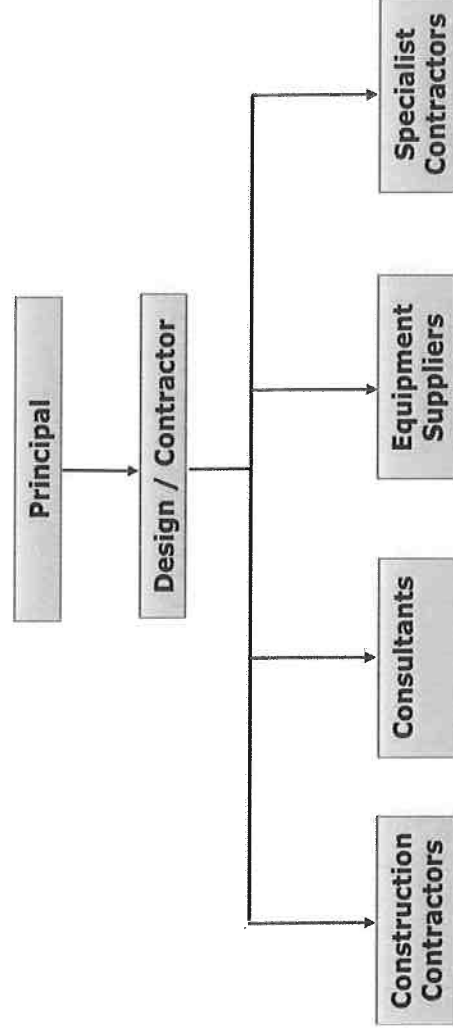
Typical sequence:



Procurement Models – Traditional Construct Only

Summary	Reason for Inclusion	Reason to Exclude
- Principal responsible for the project design - Principal engages a design team to develop the design - Contractor competitively tenders a contract price for the client designed works - Usually lump sum and / or schedule of rates	- Construction risk transfer - Construction price certainty (better if lump sum pricing) - Enables detailed design work to progress ahead of construction tendering - Provides flexibility because the government controls the design process for an extended period	- Client retains design risk - Client retains interface between design & construction - Changes to scope after construction commences will result in variations to the contract - Little opportunity for innovation from the Contractor once construction has commenced - Limited opportunity for bundling construction services & maintenance to creating 'whole-of-life' project efficiencies

Procurement Models – Performance Specification Design and Construct (PSD&C).



Typical sequence:



Procurement Models

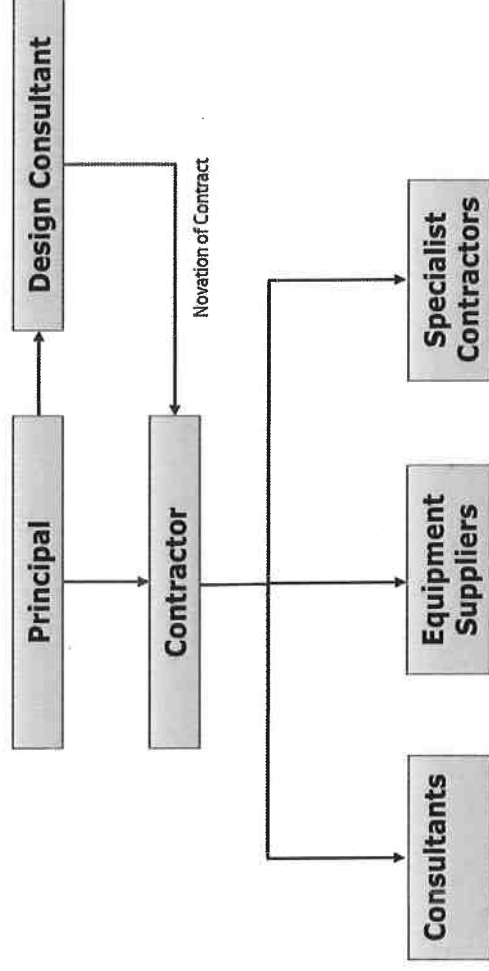
Design & Construct - Performance Specification Design and Construct (PSD&C).

Summary	Reason for Inclusion	Reason to Exclude
- Principal prepares a Performance Specification (design brief) - Contractor competitively tenders design & construction contained in the design brief - Usually lump sum	- Contractor owns the design risk - Procurement of contractor in advance of detailed design - Price certainty in design & construction - Likely to result in cost effective designs - Enables innovation because the contractor can integrate design and construction methodology & buildability	- Changes to scope after contract award are difficult and potentially expensive - Control of design by the Principal is limited post contract award - Limited opportunity for bundling services & maintenance to create 'whole-of-life' project efficiencies

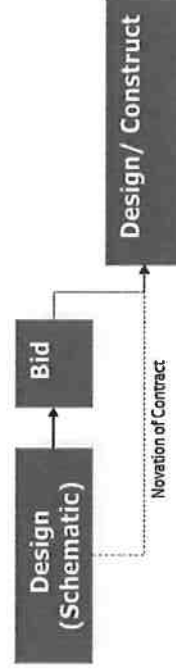
Procurement Models Design & Construct - Design, Develop and Construct (DD&C).

Summary	Reason for Inclusion	Reason to Exclude
- Principal prepares a preliminary design in addition to performance specification - Contractor competitively tenders detailed design & construction contained in the schematic design - Contractor develops the detailed design - Usually lump sum	- Principal wishes to determine the preliminary design - Principal does not have enough time to manage the design to completion - Contractor has flexibility to incorporate innovations and improve buildability - Enables construction to start prior to finalisation of detailed design - Risk of contract claims due to errors and omissions in the design is reduced	- If the design documents supplied by the Principal are unclear or in error, the desired outcomes may not be achieved - Significant risk of delays or changes to project scope as issues are resolved with stakeholders or investigations are completed - Price is likely to be higher to allow for the contractor's increased risks - Fewer potential tenderers. This can result in higher tender prices

Procurement Models – Design & Construct - Design, Novate and Construct (DN&C).



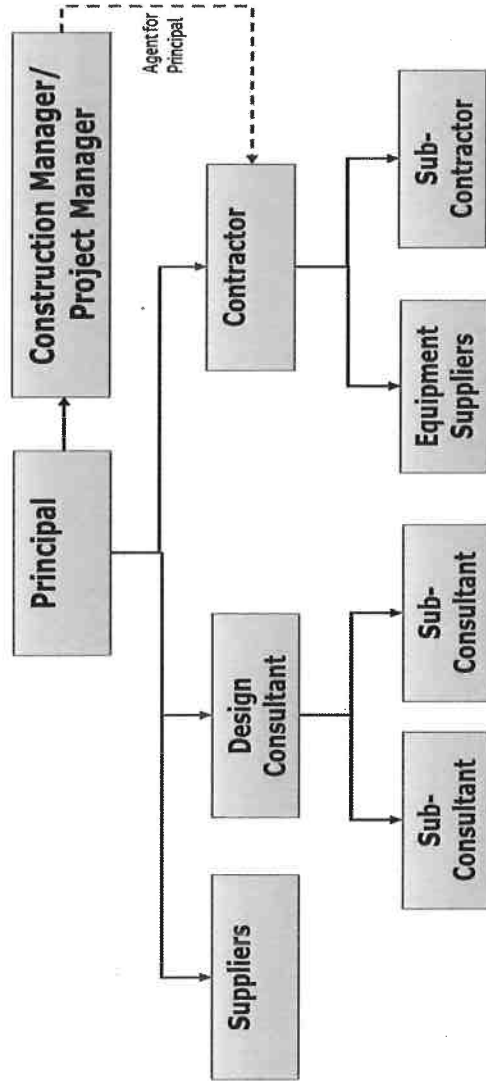
Typical sequence:



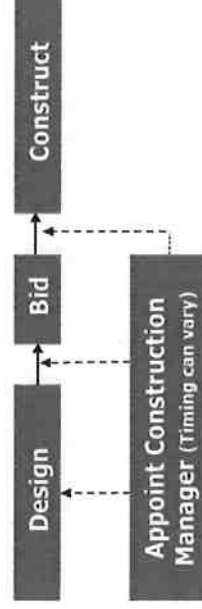
Procurement Models Design & Construct - Design, Novate and Construct (DN&C).

Summary	Reason for Inclusion	Reason to Exclude
- Principal engages a designer to prepare a preliminary design, then based on that design, the Principal competitively engages a D&C Contractor and novates the preliminary designer to that Contractor - Contractor takes on design & construction including payment of the designer's fees	Reduces the risk of the design not meeting the Principal's requirements	- Potential price increase because the contractor and the designer price the risk of entering into a contract with an unknown entity on terms predetermined by others - Potential designers may be reluctant to tender to the Principal because they are reluctant to later be contracted to an unknown contractor - Potential for complex litigious problems if the relationship between designer and contractor deteriorate

Procurement Models – Project Management Agreement (PMA) / Construction Management



Typical sequence:

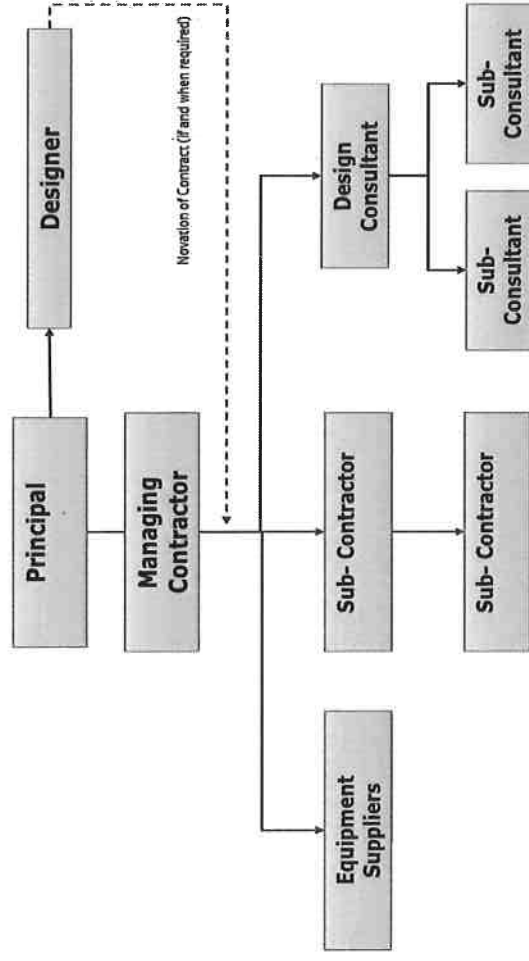


Procurement Models

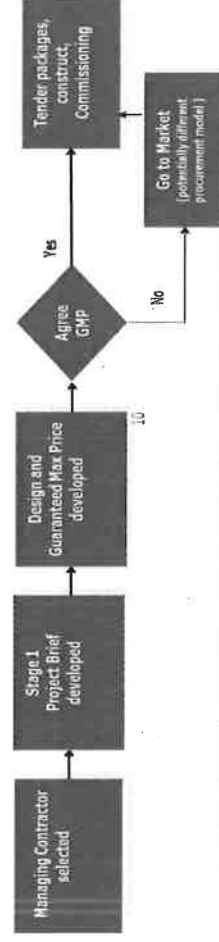
Project Management Agreement (PMA) / Construction Management

Summary	Reason for Inclusion	Reason to Exclude
- Principal engages a consultant to prepare design and contract documents. - Principal also contracts a project manager and construction manager - Project manager and construction manager's role are predominantly one of Principal's advisor and administrator	- Principal gains technical knowledge of the project manager and construction manager - Short time to market - Principal retains high level of control - Used in projects where it is not possible for design or other elements to be started before work is undertaken by others - High collaboration - Highly flexible	- Low price certainty - Low innovation opportunities - Low risk transfer opportunities - Used mainly on low capital value projects

Procurement Models – Managing Contractor (MC)



Typical sequence:



Procurement Models Managing Contractor (MC)

Summary	Reason for Inclusion	Reason to Exclude
- Principal develops project brief - Contractor engaged by the Principal as a 'managing contractor' to develop the design and then negotiate a 'Guaranteed Maximum Price' (GMP) to deliver of the works - Contractor is typically competitively procured	- Where early contractor involvement is beneficial. Where completion times are tight and fixed. - Where there are many complex or difficult stakeholder interfaces and relationships. - High collaboration. - Highly flexible.	- Used mainly for complex or high-risk projects with uncertain scope, risks or technology. - Low risk transfer. - Difficult to set accurate cost targets with limited design details where such targets are required early in the delivery process. - The 'GMP' is negotiated at the end of stage 1 which may make it more difficult to verify value for money - Used mainly on low capital value projects

ACT Government Risk Appetite

Overview of the risk assessment results undertaken during
Phase 1 of the Procurement Study

