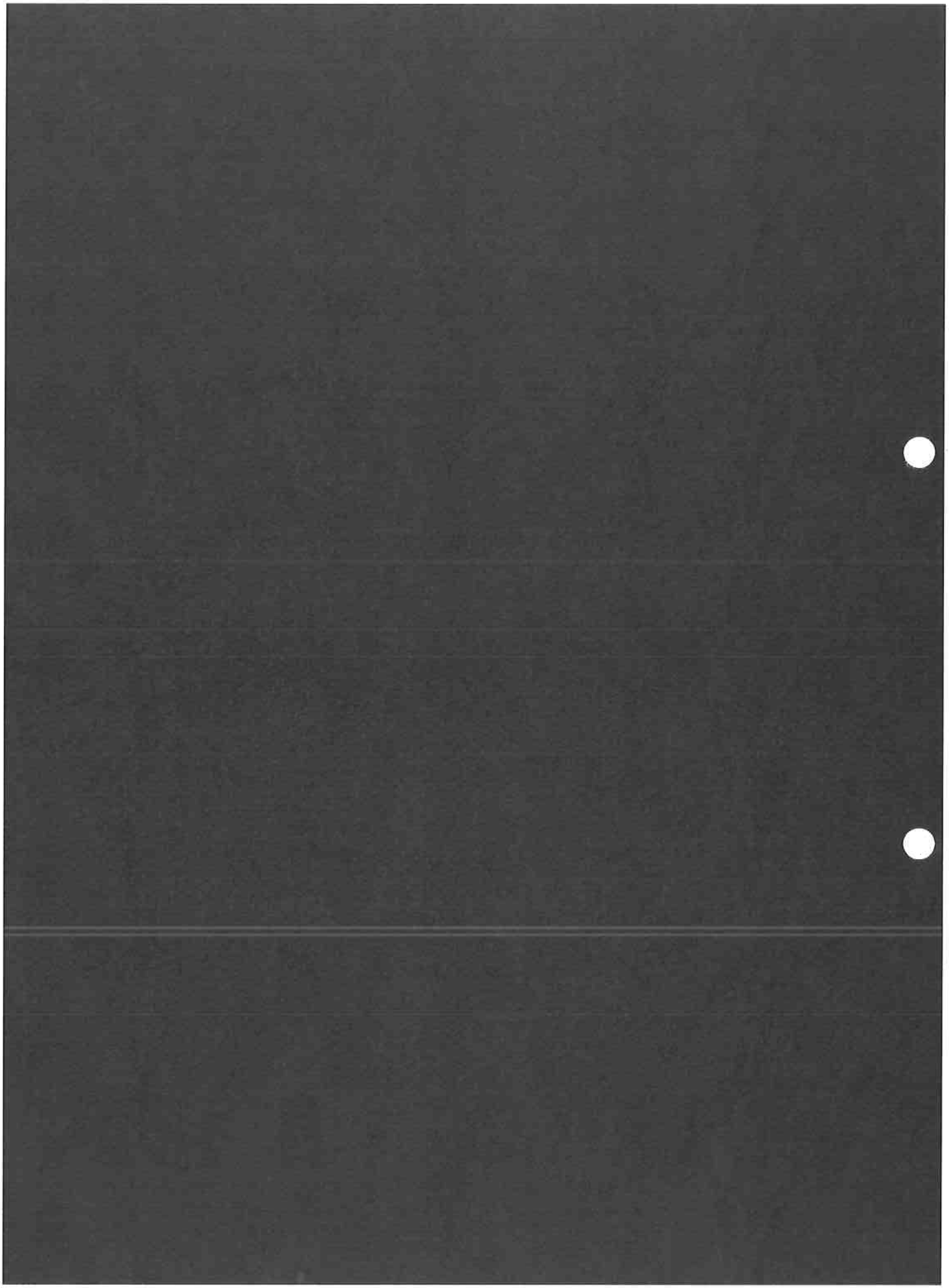
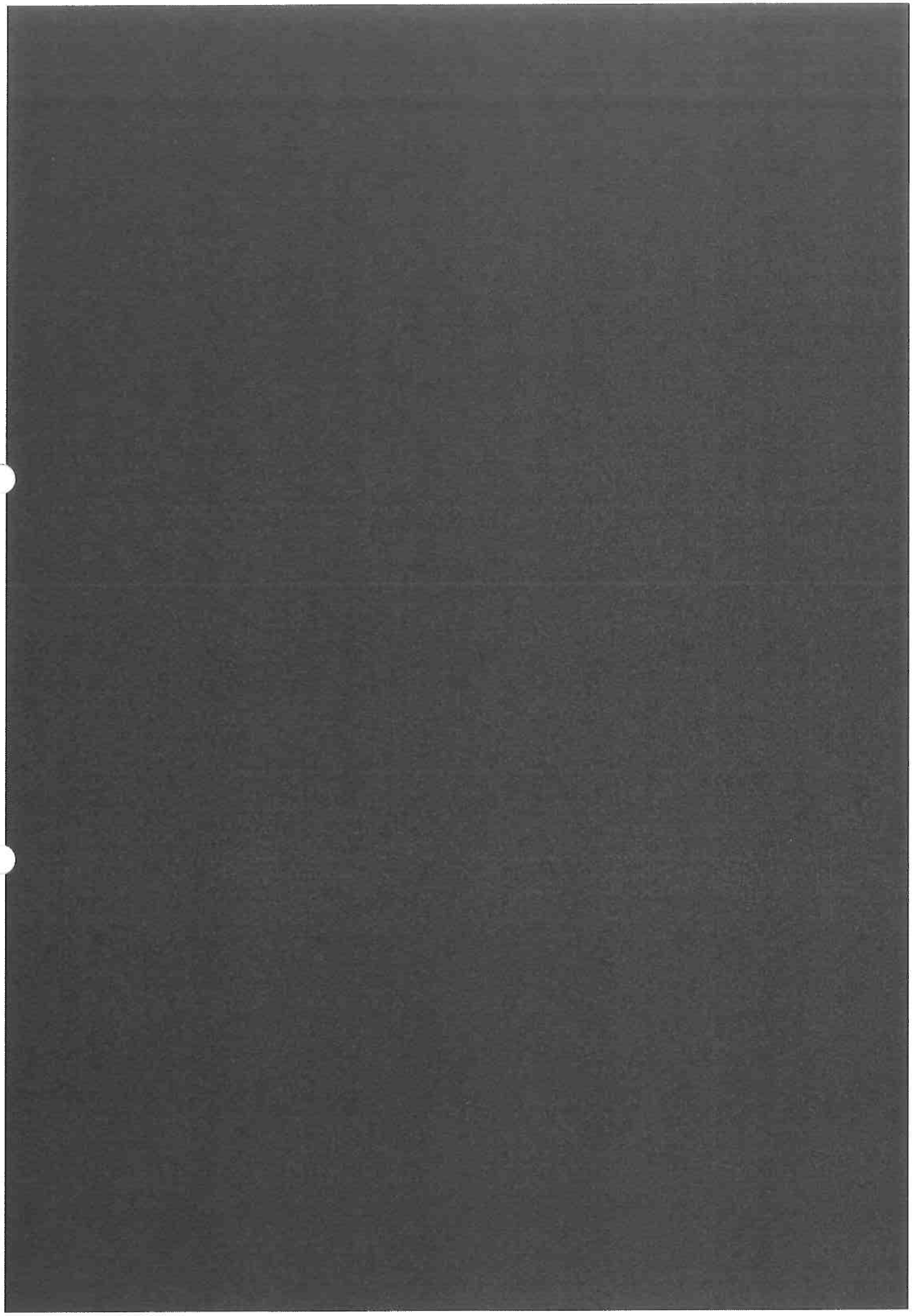
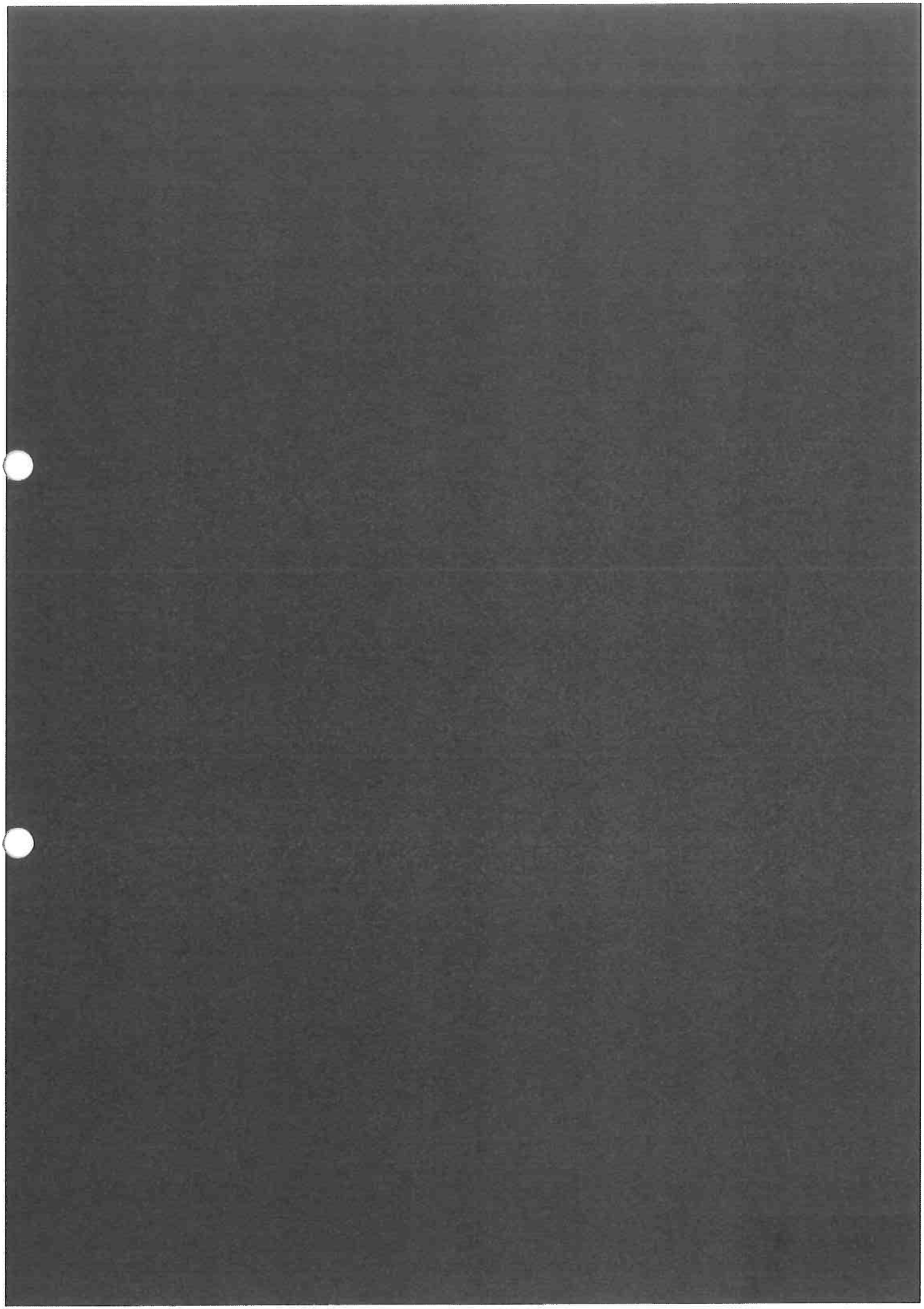
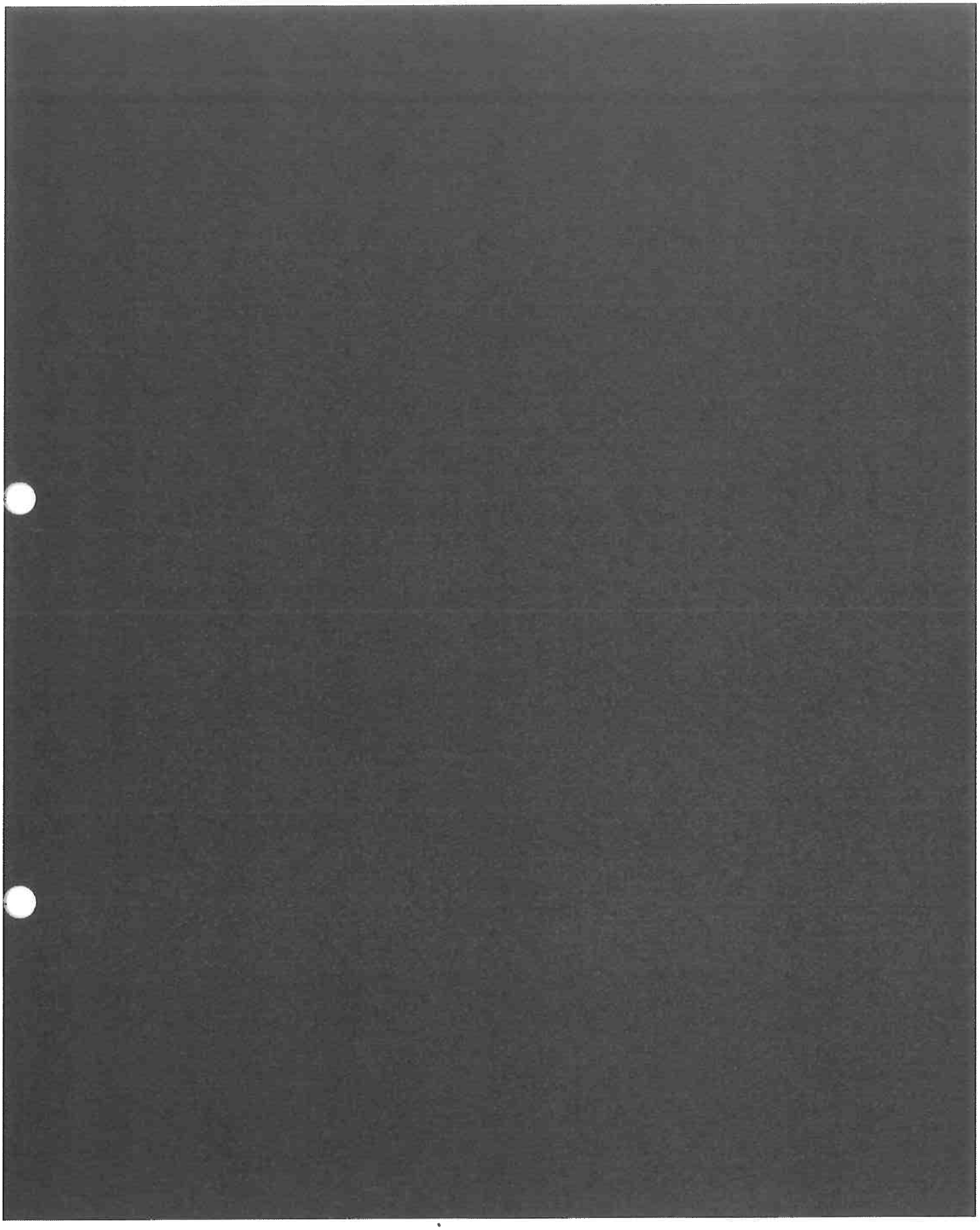
Appendix S. Cost Estimate

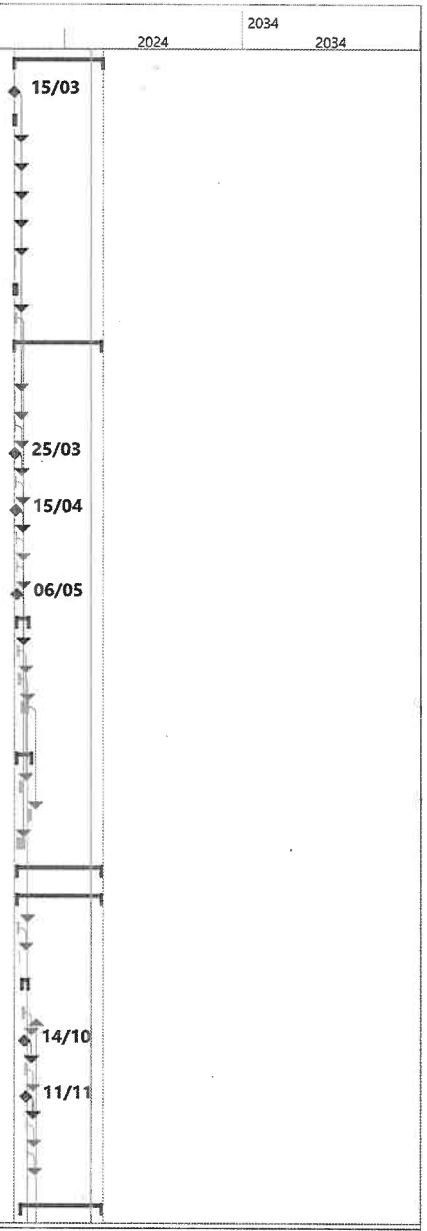








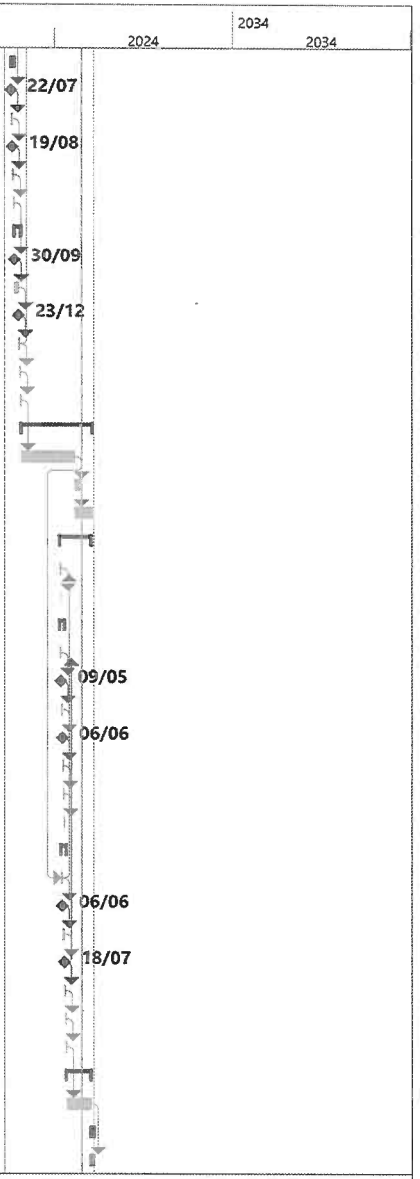
ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names
1		**Monaro Highway Upgrade - Lanyon Drive and DWR**	**1304 days**	**Mon 15/03/2**	**Thu 12/03/26**		
2		Project Commencement (post update)	0 days	Mon 15/03/21	Mon 15/03/21		
3		**Update Project Documentation**	**20 days**	**Mon 15/03/2**	**Fri 09/04/21**		
4		Update Project Plan	5 days	Mon 15/03/21	Fri 19/03/21	2	
5		Update Risk Risk	5 days	Mon 15/03/21	Fri 19/03/21	2	
6		Update Stakeholder Analysis	5 days	Mon 15/03/21	Fri 19/03/21	2	
7		Update Communication Plan	5 days	Mon 15/03/21	Fri 19/03/21	2	
8		Funding Request	20 days	Mon 15/03/21	Fri 09/04/21	2	
9		**Current Design Work (Jacobs)**	**35 days**	**Mon 15/03/2**	**Fri 30/04/21**		
10		PSP Design of Lanyon Drive (1B) and DWR (1C)	35 days	Mon 15/03/21	Fri 30/04/21	2	
11		**Consultancy Services (Lanyon Drive WA, WSUD, D&C contract, DWR detailed design)**	**1284 days**	**Mon 15/03/21**	**Thu 12/02/26**		
12		Prepare PPM - Consultancy Services	10 days	Mon 15/03/21	Fri 26/03/21	2	
13		Prepare RFT - Consultancy Services	9 days	Mon 15/03/21	Thu 25/03/21	2	
14		Release Tender - Consultancy Services	0 days	Thu 25/03/21	Thu 25/03/21	13	
15		Tender Period - Consultancy Services	15 days	Fri 26/03/21	Thu 15/04/21	14	
16		Close Tender - Consultancy Services	0 days	Thu 15/04/21	Thu 15/04/21	15	
17		Tender Assessment - Consultancy Services	10 days	Fri 16/04/21	Thu 29/04/21	16	
18		Internal Review(s) and Approval	5 days	Fri 30/04/21	Thu 06/05/21	17	
19		Award Contract - Consultancy Services	0 days	Thu 06/05/21	Thu 06/05/21	18	
20		**Consultancy Works**	**175 days**	**Fri 07/05/21**	**Thu 06/01/22**		
21		Prepare Lanyon Drive Works Approval and finalised W	30 days	Fri 07/05/21	Thu 17/06/21	19	
22		Prepare Lanyon Drive D&C Contract	40 days	Fri 28/05/21	Thu 22/07/21	21FS-15 days	
23		Detailed Design - DWR (incl. Ext'n of DWR, Off-ramp and Shephard St Intersection)	120 days	Fri 23/07/21	Thu 06/01/22	22	
24		**Approvals**	**219 days**	**Mon 03/05/2**	**Thu 03/03/22**		
25		Lanyon Drive Works Approval (and Development Appli	45 days	Fri 18/06/21	Thu 19/08/21	21	
26		DWR Development Application	60 days	Fri 10/12/21	Thu 03/03/22	23FS-20 days	
27		Adjust AMC Executive Crown Lease	120 days	Mon 03/05/21	Fri 15/10/21	10	
28		**Construction**	**1241 days**	**Thu 13/05/21**	**Thu 12/02/26**		
29		**Lanyon Drive (D&C) Construction Contracts**	**1241 days**	**Thu 13/05/21**	**Thu 12/02/26**		
30		Prepare PPM - PAP Services and D&C Contract	30 days	Thu 13/05/21	Wed 23/06/21	22FS-51 days	
31		Present to Government Procurement Board	1 day	Thu 24/06/21	Thu 24/06/21	30	
32		**Lanyon Drive - PAP Services**	**90 days**	**Fri 20/08/21**	**Thu 23/12/21**		
33		Prepare RFT - PAP	40 days	Fri 20/08/21	Thu 14/10/21	51FS-110 days	
34		Release RFT - PAP	0 days	Thu 14/10/21	Thu 14/10/21	33	
35		Tender Period - PAP	20 days	Fri 15/10/21	Thu 11/11/21	34	
36		Close Tender - PAP	0 days	Thu 11/11/21	Thu 11/11/21	35	
37		Tender Assessment - PAP	15 days	Fri 12/11/21	Thu 02/12/21	36	
38		Internal Review(s) and Approval	10 days	Fri 03/12/21	Thu 16/12/21	37	
39		Award Contract - PAP	5 days	Fri 17/12/21	Thu 23/12/21	38	
40		**D&C Construction Contractor**	**1190 days**	**Thu 22/07/21**	**Thu 12/02/26**		



Project: Monaro Highway Upgr
Date: Wed 09/07/25

Task	Project Summary	Manual Task	Start-only	Deadline	
Split	Inactive Task	Duration-only	Finish-only	Progress	
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress	
Summary	Inactive Summary	Manual Summary	External Milestone		

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Resource Names
41		**Stage 1 Tender Process**	**50 days**	**Thu 22/07/21**	**Thu 30/09/21**		
42		Release RFT Stage 1 - D&C Contractor	0 days	Thu 22/07/21	Thu 22/07/21	22	
43		Tender Period Stage 1 - D&C Contractor	20 days	Fri 23/07/21	Thu 19/08/21	42	
44		Close Tender Stage 1 - D&C Contractor	0 days	Thu 19/08/21	Thu 19/08/21	43	
45		Tender Assessment Stage 1 - D&C Contractor	20 days	Fri 20/08/21	Thu 16/09/21	44	
46		Internal Review(s) and Approval	10 days	Fri 17/09/21	Thu 30/09/21	45	
47		**Stage 2 Tender Process**	**100 days**	**Thu 30/09/21**	**Thu 17/02/22**		
48		Release Stage 2 Tender Documentation - D&C	0 days	Thu 30/09/21	Thu 30/09/21	46	
49		Tender Period Stage 2 - D&C Contractor	60 days	Fri 01/10/21	Thu 23/12/21	48	
50		Close Tender Stage 2 - D&C Contractor	0 days	Thu 23/12/21	Thu 23/12/21	49	
51		Tender Assessment Stage 2 - D&C Contractor	20 days	Fri 24/12/21	Thu 20/01/22	50	
52		Internal Review(s) and Approval	10 days	Fri 21/01/22	Thu 03/02/22	51	
53		Award Contract	10 days	Fri 04/02/22	Thu 17/02/22	52	
54		**Construction - Lanyon Drive**	**1040 days**	**Fri 18/02/22**	**Thu 12/02/26**		
55		Construction Period - Lanyon Drive	780 days	Fri 18/02/22	Thu 13/02/25	53	
56		Project Float	97 days	Fri 14/02/25	Mon 30/06/25	55	
57		Landscape consolidation	260 days	Fri 14/02/25	Thu 12/02/26	55	
58		**DWR Construction Contracts**	**461 days**	**Thu 11/04/24**	**Thu 15/01/26**		
59		Prepare PPM for PAP and Construction Contractor	20 days	Thu 11/04/24	Wed 08/05/24	70FS-41 days	
60		Present to Government Procurement Board	1 day	Thu 09/05/24	Thu 09/05/24	59	
61		**DWR - PAP Services**	**70 days**	**Fri 12/04/24**	**Thu 18/07/24**		
62		Prepare RFT - PAP	20 days	Fri 12/04/24	Thu 09/05/24	73FS-70 days	
63		Release RFT - PAP	0 days	Thu 09/05/24	Thu 09/05/24	62	
64		Tender Period - PAP	20 days	Fri 10/05/24	Thu 06/06/24	63	
65		Close Tender - PAP	0 days	Thu 06/06/24	Thu 06/06/24	64	
66		Tender Assessment - PAP	15 days	Fri 07/06/24	Thu 27/06/24	65	
67		Internal Review(s) and Approval	10 days	Fri 28/06/24	Thu 11/07/24	66	
68		Award Contract - PAP	5 days	Fri 12/07/24	Thu 18/07/24	67	
69		**DWR Construction Contractor**	**80 days**	**Fri 10/05/24**	**Thu 29/08/24**		
70		Prepare RFT - DWR Construction Contractor	20 days	Fri 10/05/24	Thu 06/06/24	55FS-200 days	
71		Release Tender - DWR Construction Contractor	0 days	Thu 06/06/24	Thu 06/06/24	70	
72		Tender Period - DWR Contruction Contractor	30 days	Fri 07/06/24	Thu 18/07/24	71	
73		Close Tender - DWR Construction Contractor	0 days	Thu 18/07/24	Thu 18/07/24	72	
74		Tender Assessment - DWR Contruction Contracto	15 days	Fri 19/07/24	Thu 08/08/24	73	
75		Internal Review(s) and Approval	10 days	Fri 09/08/24	Thu 22/08/24	74	
76		Award Contract - Consultancy Services	5 days	Fri 23/08/24	Thu 29/08/24	75	
77		**Construction DWR**	**360 days**	**Fri 30/08/24**	**Thu 15/01/26**		
78		Construction Period - DWR	360 days	Fri 30/08/24	Thu 15/01/26	76	
79		**Project Closure**	**40 days**	**Fri 16/01/26**	**Thu 12/03/26**		
80		Project Closure	40 days	Fri 16/01/26	Thu 12/03/26	78	



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Task	Project Summary	Manual Task	Start-only	Deadline
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Summary	Inactive Summary	Manual Summary	External Milestone

ACT Government

Transport Canberra and City Services

Monaro Highway Upgrade Communication Strategy

Version No: V2

Acknowledgements

This document has been derived from a template prepared by the Department of Premier and Cabinet, Tasmania.

Document Development History

Build Status:

Version	Date	Author	Reason	Sections	Comments
V1	30/06/2020	Nathan Greig	Project Planning	All	
V2	22/04/2021	Nathan Greig	Project Update	All	

Amendments in this Release:

Section Title	Section Number	Amendment Summary
All	All	Communication Strategy Update

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Introduction

Project Title

Monaro Highway Upgrade Program.

Purpose of the Communication Strategy

Communications Management is the process of developing an appropriate approach and plan for project communications based on stakeholder's information needs and requirements, and available organisational assets. The key benefit of this process is that it identifies and documents the approach to communicate most effectively and efficiently with stakeholders.

This project communication strategy outlines the protocols for communications between ACT Government staff, consultants and project stakeholders. The strategy will ensure an effective, consistent and coordinated approach to internal and external communication throughout the project lifecycle.

Background

Project Initiation

This project was initiated to allow continued growth in the ACT and surrounding region is placing increased pressure on the existing road transport network. 2019 modelling by Infrastructure Australia identified that the Monaro Highway corridor was the 5th most congested ACT route in 2016 during the AM peak, and was the 2nd most congested corridor in 2016 during the PM peak. The Monaro Highway corridor is expected to rise to 3rd most congested route by 2031.

Background

Continued growth in the ACT and surrounding region is placing increased pressure on the existing road transport network. South of the lake, there are two main orbital route that provide access to the city and areas north of Lake Burley Griffin. These are Drakeford Drive/Tuggeranong Parkway and the Monaro Highway. The Monaro Highway is used by over 40,000 vehicles a day as it passes through the Hume industrial area. The Highway in this area operates in an interrupted flow arrangement owing to traffic signals at David Warren Road, Lanyon Drive, Sheppard Street and Mugga Lane and the roundabout at Isabella Drive.

2019 modelling by Infrastructure Australia identified that the Monaro Highway corridor was the 5th most congested ACT route in 2016 during the AM peak, and was the 2nd most congested corridor in 2016 during the PM peak. The Monaro Highway corridor is expected to rise to 3rd most congested route by 2031 for the AM peak and drop to 3rd most congested route during the PM peak.

The Australian Government has provided $115.25m in funding for upgrades on the Monaro Highway subject to matching funds being allocated by the ACT Government. The Australian Government funds are currently profiled across the 20-21 through 22-23FY and in the outyears (24-25 onwards).

Increasing development in the surrounding region will exacerbate congestion on the Monaro Highway due to developments such as Googong and South Jerrabomberra.

Objectives

Program Scope

The Monaro Highway upgrade will benefit both the ACT and the broader regional transport network of NSW and provide improved links to the Canberra International Airport Freight Hub. The ACT

Government has previously recognised the need to upgrade the Monaro Highway, as well as connecting roads such as Pialligo Avenue, as part of its role managing and planning for longer term transport network requirements to support economic growth within the ACT and the southern areas of NSW.

The overall project upgrades comprise grade separation of major roads connecting the Monaro Highway (Lanyon Drive, Isabella Drive and Mugga Lane/Tralee Street) and adjustments to minor intersections (David Warren Road, Sheppard Street) to achieve reduced congestion and improved safety.

Objectives of the Communication Strategy

The objectives of this communication strategy are to ensure effective, consistent and coordinated communication is provided to internal and external stakeholders to prevent:

- important information being missed or misunderstood leading to stakeholder dissatisfaction or mistrust;
- there being a lack of support for the project across the various stakeholder groups; and
- a lack of coordination in identifying and implementing project outcomes adversely impacting the success of the project.

Target Audience

This communication strategy will be utilised by the project team to inform communication efforts throughout the project lifecycle.

While the communication strategy is specific to the initial phase of work which includes works at Lanyon Drive, the communication strategy will be amended to capture subsequent stages of works as project details are refined.

Given the nature of this project, there are a broad range of internal and external stakeholders which have been identified in the following section, a targeted communication plan will be developed to ensure all stakeholders are appropriately informed throughout the project lifecycle.

Stakeholder Identification

Stakeholder Groups

As provided at **Appendix A**, a stakeholder list has been developed and will be regularly reviewed throughout the program lifecycle.

Identified Stakeholder Group Representative(s)

To ensure continuity, a list of stakeholder group representatives and an assessment of their engagement has been developed and provided at **Appendix A**.

The list will be maintained to ensure that nominated representatives and their relevant details (i.e. contact details) remain current. This will ensure that the appropriate lines of communication remain in place throughout the project lifecycle and throughout project implementation.

Stakeholder Analysis

Purpose of the Stakeholder Analysis

The purpose of the stakeholder analysis is to gather and analyse available information to determine whose interests should be considered throughout the project lifecycle. It will seek to identify the interests, expectations, and influence of each stakeholder and relates them to the purpose of the project. It will also seek to identify stakeholder relationships (with the project and with other stakeholders) to build supportive coalitions and potential partnerships to enhance the project's chance of success, along with relationships that need to be influenced differently during each stage of the project lifecycle.

Methodology

This analysis is being undertaken to create a project environment (which includes appropriate communication measure) to allow stakeholders an opportunity to:

- Help and/or promote the project and guide successful outcomes;
- Actively engage in the alignment of project goals and expectation (including any associated plans/strategies);
- Help mitigate and address issues and conflict as they arise; and
- Build supportive coalitions and potential partnerships to enhance the project's chance of success.

The following stakeholder analysis techniques will be used to analyse the identified stakeholders:

- Stakeholder Engagement Assessment Matrix; and
- Power/Interest Grid.

Stakeholder Engagement Assessment Matrix

The engagement level of all stakeholders needs to be compared to the planned engagement levels required to successfully complete the project. Stakeholder engagement will be critical throughout the project lifecycle.

The following engagement levels are classified as follows:

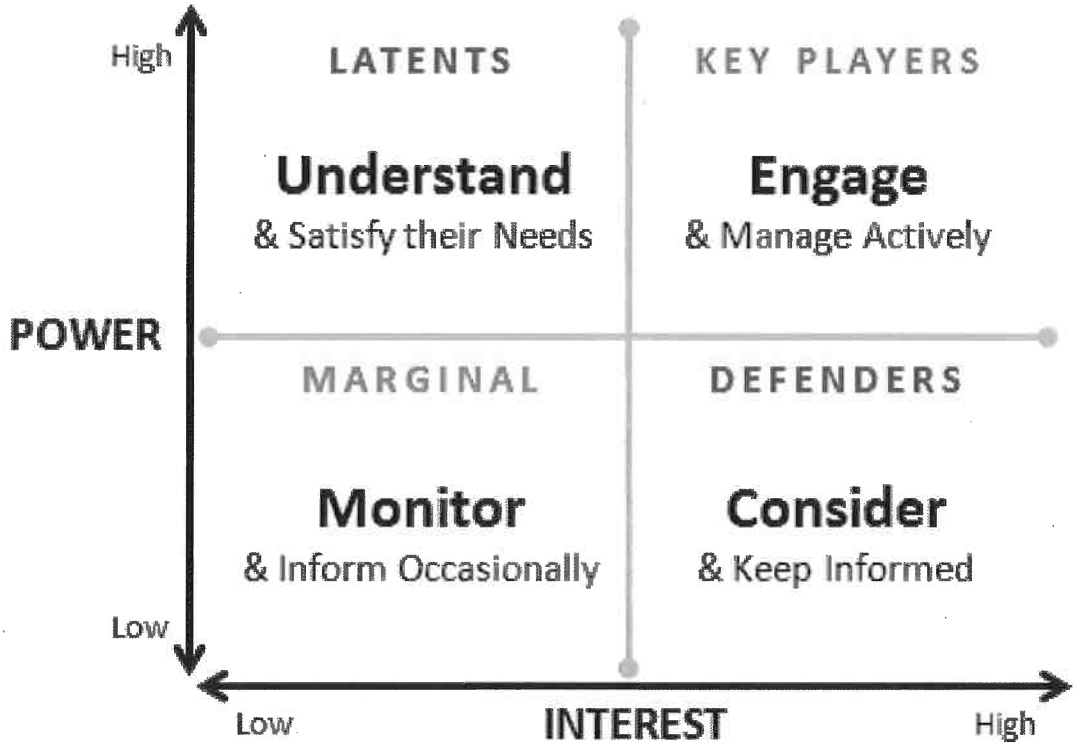
- **Unaware**. Unaware of the project and potential impacts;
- **Resistant**. Aware of the project and potential impacts and resistance to change;
- **Neutral**. Aware of the project yet neither supportive nor resistive;
- **Supportive**. Aware of the project and potential impacts and supportive to change;
- **Leading**. Aware of project and potential impacts and actively engaged in ensuring the project is a success.

The stakeholder engagement assessment matrix identifies those stakeholders that are currently ("C") involved and those whose engagement is desired ("D"). The matrix is provided at **Appendix A** (included as part of the detailed list of project stakeholders) and there is a requirement to constantly review and update the matrix to ensure remains appropriate throughout each phase of the project lifecycle.

Power Interest Grid

The Power/Interest Grid groups stakeholders based on their level of authority ("power") and their level of concern ("interest") regarding project outcomes. As show in Figure 1, this information will be used to guide the communication approach for each stakeholder.

Figure 1. Power/Interest Grid



Through the analysis, stakeholder dimensions are be categorised as follows:

- **Promoters**. High Interest High Power. Stakeholders with the largest capacity to promote the project within the business but also have the largest capacity to derail it if neglected.
- **Latents**. Low interest and high power. Stakeholders who need to be satisfied by the outcome of the project but who may not require regular attention during the project itself.
- **Defenders**. High Interest Low Power. Stakeholders who will support the project and its aims and should be given regular updates to keep them included and motivated.
- **Marginal**. Low Interest Low Power, Stakeholders who should be monitored by the project manager in case their interest or power changes but, which require almost no attention at a particular point in time.

The Power/Interest Grid for this project is provided for reference at **Appendix B**.

Targeted Communication Plan

Purpose of the Target Communication Plan

The purpose of the targeted communication plan is to ensure:

- a thorough understanding of project stakeholders;
- that communication is tailored to achieve a shared understanding;

- consistent messaging that has meaning and purpose for each stakeholder; and
- stakeholders have the opportunity to form supportive coalitions and potential partnerships to enhance the project's chance of success.

Key Messaging

Strategic Messaging

Key strategic messaging for the project includes:

- A Commonwealth investment program under the National Partnership Agreement on Land Transport Infrastructure Projects (the Agreement) has allocated $115m for the Monaro Highway upgrade. The Commonwealth investment has been allocated as part of a 50% co-contribution with the ACT Government, resulting in a total investment for the Monaro Highway of $230m
- The Monaro Highway is a key arterial route both within the ACT urban area and traversing rural areas in the ACT, NSW and Victoria. Within the ACT the Monaro Highway provides a key connection between southern suburbs and the industrial areas of Hume and Fyshwick, and also provides a part of the key link between Queanbeyan and Canberra City. The Monaro Highway is also a key component of the outer orbital route connecting to the Majura Parkway at the northern end and continuing south to Cooma and then on to intersect the Princes Highway at Cann River in Victoria's Gippsland region.
- The program comprises two key projects:
  - Monaro Highway Upgrade project; and
  - Monaro Highway Safety Improvements project.
- The Monaro Highway Safety Improvements project has seen the construction of an overtaking lane on the Monaro Highway between Old Cooma Road and Williamsdale Road and improvements at the Old Cooma Road and Williamsdale Road intersections. Works commenced in November 2019 and were completed in mid-2020. Works to rectify pavement defects were completed late-2020.
- The Monaro Highway Upgrade project will make improvements to the intersections on the Monaro Highway in the vicinity of Hume, specifically between David Warren Road and Johnson Drive. A consultant has been engaged for feasibility and preliminary designs and is currently examining options and treatments for each of the intersections within the study area. Preliminary designs for the Monaro Highway / Lanyon Drive interchange are scheduled to be delivered in the first half of 2021 and will inform a design and construction tender which is scheduled to be released late-2021/early-2022. Options for the Isabella Drive interchange and the treatment of the existing signalised intersections through Hume are currently being assessed.
- In late 2019, the Australian and ACT Governments made a joint announcement that funding would be brought forward to allow construction to commence in the 2020-21 financial year. The Monaro Highway / Lanyon Drive interchange has been identified as an early construction package with works to relocate existing services scheduled to commence in the first half of 2021. Designs are nearing completion with procurement scheduled for early to mid2021.

Methods of Communication

A range of communication methodologies are available, including:

- Oral Communication
  - Face-to-face (formal or informal discussion);

    - Phone conversations;
    - Meetings;
    - Workshops;
    - Presentations; and
    - Video/teleconference calls.
- Electronic Media:
    - Email;
    - Data transfer programs;
    - ACT Government websites; and
    - Social Media.
- Written Communication:
    - Letters;
    - Memos;
    - Notes, Posters, Flyers, Handouts and the like;
    - Reports and other such contract documentation;
    - Minutes; and
    - New letters.

Communication Protocols

Project Team

The project team for the initial phase of works summarised in **Table 1**.

Table 1. Project Team

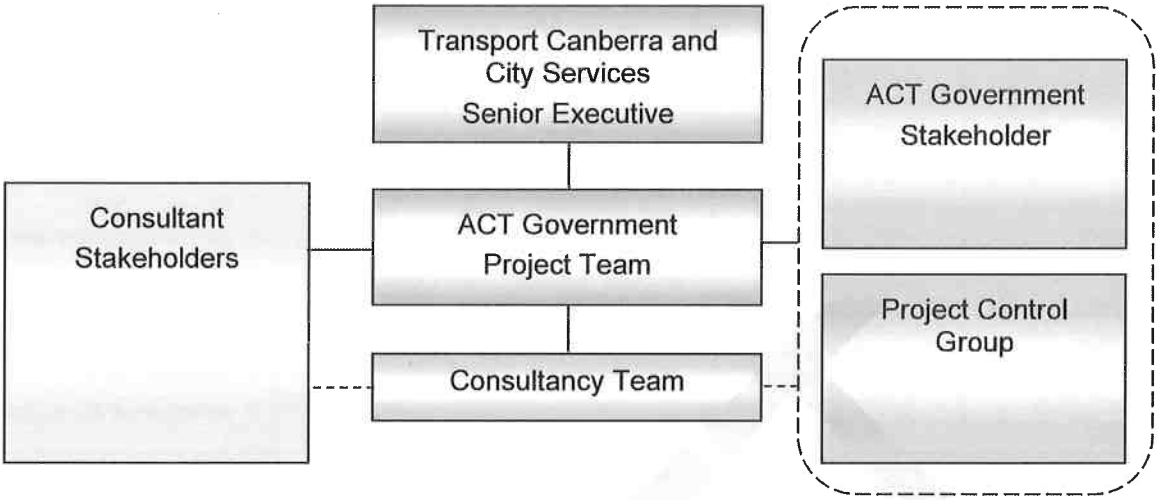
Organisation	Project Role	Name	Reporting Lines	Contact Details
Minister for Transport	Minister for Transport and City Services	Chris Steel		T. (02) 6205 1470 E. steel@act.gov.au
TCCS	Director-General, TCCS	Alison Playford	Chris Steel	T. (02) 6207 8658 E. alison.playford@act.gov.au
TCCS City Services	Deputy Director-General, TCCS	Jim Corrigan	Alison Playford	T. (02) 6207 5819 E. jim.corrigan@act.gov.au
TCCS, Infrastructure Delivery	Executive Group Manager	Meghan Oldfield	Jim Corrigan	T. (02) 6207 5716 E. meghan.oldfield@act.gov.au
TCCS, Infrastructure Delivery	Executive Branch Manager	Jeremy Smith	Meghan Oldfield	T. (02) 6207 2738 E. jeremy.smith@act.gov.au
TCCS, Infrastructure Delivery	Project Manager	Nathan Greig	Jeremy Smith	M. 0466 426 397 T. (02) 6205 5192 E. nathan.greig@act.gov.au
TCCS, Infrastructure Delivery	Project Manager	Stuart Oxborrow	Nathan Greig	T. (02) 6207 4502 E. stuart.oxborrow@act.gov.au
TCCS, Infrastructure Delivery	Project Manager	Miloje Beljic	Nathan Greig	T. (02) 6207 1664 E. miloje.beljic@act.gov.au
TCCS, Infrastructure Delivery	Project Manager	Kencho Choden	Nathan Greig	T. (02) 6207 2219 E. kencho.choden@act.gov.au
MPC	Executive Branch manager	Darren Smith	Jeremy Smith	T. (02) 6207 7431 E. Darren.smith@act.gov.au
MPC	Senior Project Manager	Stephen Baker	Darren Smith	T. (02) 6205 5094 E. Stephen.baker@act.gov.au
MPC	Contract Administrator	Leon Mayers	TCCS, Infrastructure Delivery	T. (02) 6205 8398 E. leon.mayers@act.gov.au

Project Communication Lines

The communication lines within the project team and with stakeholder that will be adopted for the initial stage of the program are shown in **Figure 2**.

The ACT Government and Consultant Stakeholder lists are to be maintained throughout the project lifecycle and discussed as project team meeting to ensure the responsible communication liaison is facilitating consultation. The lists and details of personnel who fill the role of communication liaison is provided at **Appendix A**.

Figure 2. Communication Lines



Communication Matrix

The communication matrix is provided at **Appendix B**.

In terms of the content and regularity of communication with project stakeholders, the following guidelines have been adopted:

- Promoter:
  - 2-4 weeks maximum; and
  - Promoters are to be kept informed of project progress (including any key decisions), issues, threats and opportunities.
- Latents:
  - 2-4 months maximum; and
  - Latents are to be provided with updates on the status of the project (including any key decisions) and provide approval when necessary (if required).
- Defenders:
  - 4-8 months maximum; and
  - Defenders are to provided regular detailed updates on the status of the project.
- Marginal:
  - 8-12 months maximum; and
  - Marginals are to be provided 'higher-order' updates on the status of the project; however, are to be monitored in case their interest or power changes.

Communication Record Keeping

Accurate consultation initiatives are to be recorded and appropriately stored/archived in accordance with the Territory Records Act 2002.

Verbal communication is to be documented and as a minimum include:

- date and time;
- intended purpose;
- attendees;

- content of discussions;
- issues raised;
- agreed actions;
- approvals;
- any other relevant information.

The project consultation register is to be maintained and is provided for reference at **Appendix C**.

Communication Risks

Key communication risks for inclusion in the program risk matrix include but, may not be limited to:

- Failure to consult fully and consider the opinion/reviews of relevant stakeholders leading to suboptimal outcomes and/or failure to obtain 'buy-in' throughout the project lifecycle.
- During the project lifecycle, stakeholders might change their relative position in the "Power-Interest" grid but engagement / communications do not adopt to this change leading to a poor outcome with feedback or buy-in to the project objectives.
- Different methods for engagement (such as workshops, video conferencing) do to not suit the needs of stakeholders leading to suboptimal outcomes and/or failure to obtain 'buy-in' throughout the project lifecycle.

Appendices

Appendices include:

- Appendix A – Stakeholder Assessment and Contact Details.
- Appendix B – Communication Matrix/Power Interest Grid
- Appendix C – Project Consultation Register

Appendix A: Stakeholder Assessment and Contact Details

Appendix B: Communication Matrix/Power Interest Grid

Appendix C: Project Consultation Register

Communication Strategy

Monaro Highway Upgrade Program

Attachment A

Project Team								
Stakeholder Group	**Identified Employee**	**Interest**	**Engagement Assessment**					**Contact Details**
			Unaware	**Resistant**	**Neutral**	**Supportive**	**Leading**	
Minister for Transport	Chris Steel	Minister for Transport and City Services				C		
DG TCCS	Alison Playford					C		
DDG TCCS	Jim Corrigan					C		
TCCS, Infrastructure Delivery	Meghan Oldfield. Executive Group Manager	Project Champion (and Monaro Highway PCG Chair)				C	C	
TCCS, Infrastructure Delivery	Jeremy Smith, Executive Branch Manager	Capital Works Manager				C	C	
TCCS, Infrastructure Delivery	Nathan Greig, Project Manager	Project Manager				C	C	
TCCS, Infrastructure Delivery	Stuart Oxborrow	Project Manager				C	C	
TCCS, Infrastructure Delivery	Moloje Boljic	Project Manager				C	C	
TCCS, Infrastructure Delivery	Kencho Choden	Project Manager				C		
Infrastructure Delivery Partner Group (IDPG), MPC	Darren Smith, Executive Branch Manager	Director, Civil Capital Work Manager				C	C	
MPC	Stephen Baker	Senior Project manager				C		
MPC	Leon Mayers, Project Officer	Contract Administrator				C		

Note(s):

C Currently
D Desired

Internal Communication								
Stakeholder Group	**Identified Employee**	**Interest**	**Engagement Assessment**					**Contact Details**
			Unaware	**Resistant**	**Neutral**	**Supportive**	**Leading**	
Roads ACT	TBC	Asset Owner				C		
	TBC	Traffic Management and safety – Technical Advisor				C		

	TBC	Road Maintenance – Technical Advisor				C		
ACT NoWaste	TBC	Impacted land user	C			D		
ACTPLA	TBC	Approval Entity			C	D		
ACT Heritage	TBC	Approval entity			C	D		
ACT Conservator of Flora and Fauna	TBC	Approval entity			C	D		
ACT EPA	TBC	Government regulator			C	D		
Active Travel Office	TBC	Technical Advisor			C	D		
Government Solicitors Office Responsible for amending procurement and contract documentation	TBC	Government Solicitors Office			C	D		
TCCS Legal	Kristine Scheul	TCCS, Solicitor Assist in the development of potential procurement and contract clauses			C	D		
CMTEDD, Treasury	TBC	Funding Body			C	D		
Government Procurement Board	TBC	Approval entity			C	D		
JACS (including AMC, ESA)	TBC	Impacted land user			C	D		
EPSDD	TBC	Impacted land user and input into planning approvals			C	D		

Note(s):
C Currently
D Desired

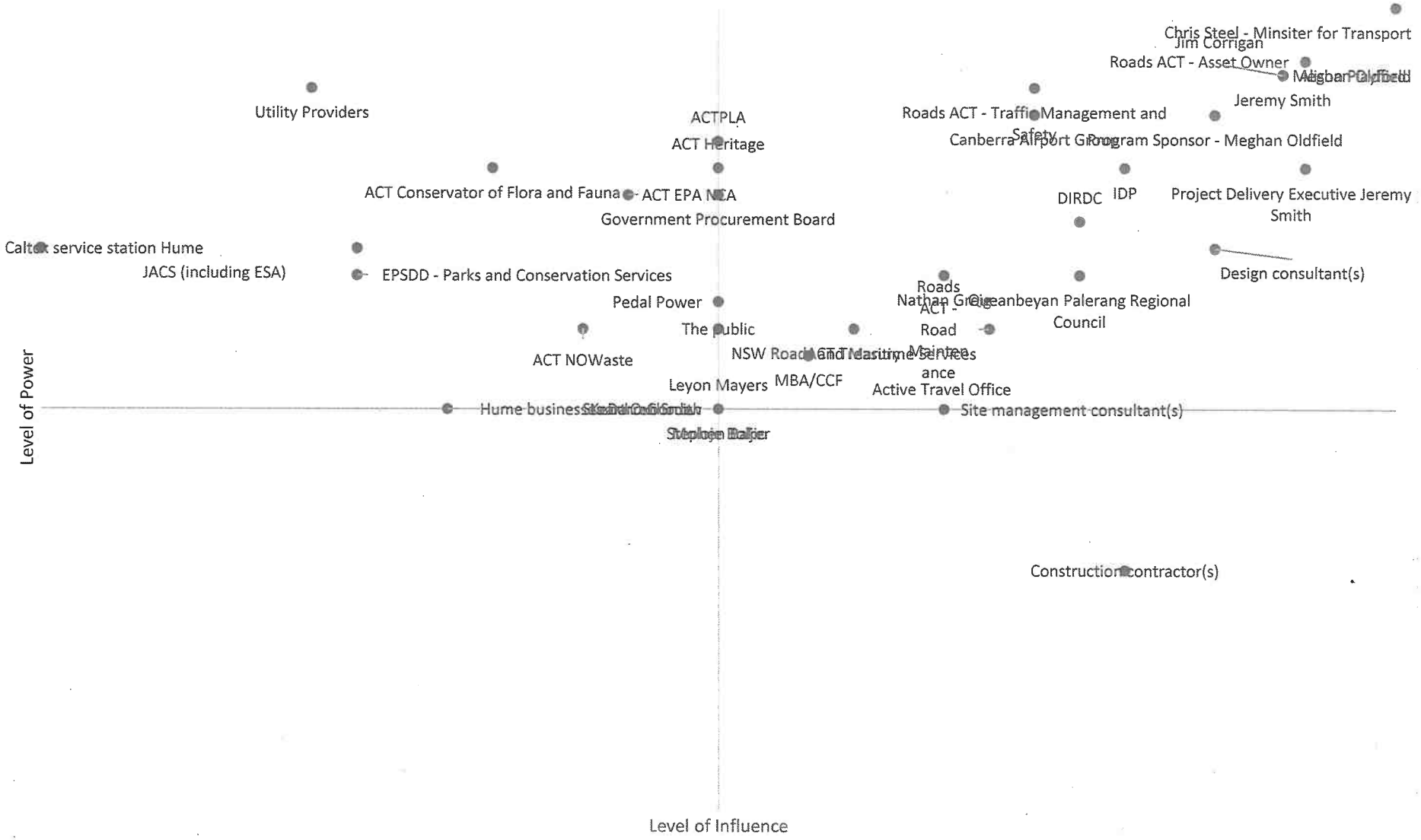
External Communication								
Stakeholder Group	**Identified Employee**	**Interest**	**Engagement Assessment**					**Contact Details**
			Unaware	**Resistant**	**Neutral**	**Supportive**	**Leading**	
Utility Providers	Various	Approval entity			C	D		
Hume Businesses	Various	Customer/opponent			C	D		
Caltex service station Hume	TBC	Customer/opponent			C	D		
MBA/CCF	TBC	Industry body/advocate			C	D		
National Capital Authority	TBC	Approval entity			C	D		

Commonwealth Government - Infrastructure Investment Division, Department of Infrastructure, Transport, Regional Development and Communication.	Commonwealth Government - Infrastructure Investment Division, Department of Infrastructure, Transport, Regional Development and Communication.	ACT Government having obligations under the existing Monaro Highway funding agreement to meet obligations of IPP				C		
Construction Industry, CFMEU	Construction Industry, CFMEU	Will be consulted as part of market sounding			C	D		
Construction Industry, Principle Contractors	Construction Industry, Principle Contractors	A key stakeholder within the construction industry relationship structure			C	D		
Construction Industry, Design Consultant	Construction Industry,	A key stakeholder within the construction industry relationship structure			C	D		
Construction Industry, Site management Consultant	Construction Industry,	A key stakeholder within the construction industry relationship structure			C	D		
Construction Industry, Sub-Consultants	Construction Industry, Sub-Consultants	A key stakeholder within the construction industry relationship structure			C	D		
Canberra Airport Group	TBC	Impacted land user			C	D		
Queanbeyan Palerang Regional Council	TBC	Adjacent Roads authority			C	D		
NSW Roads and Maritime Services	TBC	Adjacent Roads authority			C	D		
Pedal Power	TBC	Advocacy Group			C	D		
ATSIEB	TBC	Elected Body			C	D		

Note(s):

C Currently
D Desired

Stakeholder Analysis



STAKEHOLDER MANAGEMENT PLAN

	PROJECT NAME	Monaro Highway Upgrade Program								PROJECT MANAGER	Steven Hare		DATE	07/01/2019	VERSION	0.0.0
Project/Program	NAME OR GROUP	ROLE	PREDISPOSITION						ANTICIPATED INVOLVEMENT	ANTICIPATED ISSUES	MOTIVATION / DRIVERS	EXPECTATIONS OF EXCHANGE	MILESTONES	ACTIVITIES	RESPONSIBLE PARTY	DATE DUE	STATUS
Program or specific project the stakeholder is associated with	Sponsors, managers, users, etc.		Current commitment profile: **resistant, ambivalent, neutral, supportive/committed**				Support	Influence	What level of involvement is expected?	Known or potential issues	Why is the stakeholder invested in the project's success?	What is the stakeholder's predicted input?	At what point in the change effort is this stakeholder's involvement required?	What activities directly involve or impact the stakeholder?	Team member(s) responsible	Task / involvement needs to be met by	Open/closed
			-	0	+	++	X	Y									
Whole program	Chris Steel - Minister for Transport	Minister for Roads				1	15	15	Decision maker for all key decisions	Nil at present	Minister for Transport	Take decisions on significant issues, attend sod turnings, openings of works and announcements	Multiple at various times	Any attendance at sod turnings or openings	Director-General, TCCS	Ongoing	Open
Whole program	Alison Playford	Director General TCCS				1	12.5	12.5	Program responsibility	Nil at present	Responsible for the successful delivery of the program	Take decisions on important issues, attend sod turnings, openings of works and announcements	Multiple at various times	Program delivery	Deputy Director-General	Ongoing	Open
Whole program	Jim Corrigan	Deputy Director General City Services TCCS				1	12.5	12.5	Program responsibility	Nil at present	Responsible for the successful delivery of the program	Take decisions on important issues, attend sod turnings, openings of works and announcements	Multiple at various times	Program delivery	Executive Group Manager Infrastructure Delivery and Waste, TCCS	Ongoing	Open
Whole program	Meghan Oldfield	Executive Group Manager Infrastructure Delivery and Waste, TCCS				1	12.5	12.5	Program responsibility	Nil at present	Project Champion (and Monaro Highway PCG Chair)	Take decisions on important issues, attend sod turnings, openings of works and announcements	Multiple at various times	Program delivery	Executive Branch Manager TCCS	Ongoing	Open
Whole program	Jeremy Smith	Executive Branch Manager TCCS				1	12.5	12.5	Program responsibility	Program delivery responsibilities	Capital Works Manager	Take decisions on important issues, attend sod turnings, openings of works and announcements	Multiple at various times	Program delivery	Program Manager, TCCS	Ongoing	Open
Whole program	Nathan Greig	Program Manager, TCCS				1	5	5	Program responsibility	Program delivery responsibilities	Project Manager TCCS	Take decisions on day to day issues, attend sod turnings, openings of works and announcements	Multiple at various times	Program delivery	TCCS, Project Managers	Ongoing	Open
Whole program	Stuart Osborrow	Project Manager TCCS				1	0	0	Project responsibility	Project delivery responsibilities	Project Manager TCCS	Project management responsibilities	Multiple at various times	Project delivery		Ongoing	Open
Whole program	Maicie Bolic	Project Manager TCCS				1	0	0	Project responsibility	Project delivery responsibilities	Project Manager TCCS	Project management responsibilities	Multiple at various times	Project delivery		Ongoing	Open
Whole program	Kencho Choden	Project Manager TCCS				1	0	0	Project Responsibility	Project delivery responsibilities	Project Manager TCCS	Project management responsibilities	Multiple at various times	Project delivery		Ongoing	Open
Whole program	Darren Smith	Executive Branch Manager MPC				1	0	0	Procurement and contract management responsibilities	Procurement and contract management responsibilities	Civil Capital Work Manager	Procurement and Contract Administration.	Multiple at various times	Procurement activities and contract administration.	MPC Project Officer	Ongoing	Open
Whole program	Stephen Baker	Senior Project Officer, MPC				1	0	0	Procurement and contract management responsibilities	Procurement and contract management responsibilities	Senior Project Manager	Procurement and Contract Administration.	Multiple at various times	Procurement activities and contract administration.	MPC Project Officer	Ongoing	Open
Whole program	Levon Mayers	Project Officer MPC				1	0	0	Procurement and contract management responsibilities	Procurement and contract management responsibilities	Contract Administrator	Procurement and Contract Administration.	Multiple at various times	Procurement activities and contract administration.		Ongoing	Open
Whole program	Roads ACT - Asset Owner	Asset Owner				1	13	13	Review of designs and acceptance of assets	Disagreement on infrastructure priorities for delivery under this program, the need to change scope of program in order to deliver on their business objectives	They are keen to receive fit for purpose and well constructed assets	Advice on design requirements	At the completion of each stage of design for each project	Design, construction, handover	Program/Project Manager	Ongoing	Open
Whole program	Roads ACT - Traffic Management and Safety	Technical adviser			+		7	12	Review and approval of TCDs, review and approval of TTMs	Timeframes for TCD review and approval are historically very long. Resource availability and consistency of comments on TCDs may be an issue	They will have a role in managing the assets on completion	Review, comment and approval of TCDs, TTMs, traffic signal and traffic safety related aspects of design	At each stage of design for TCD's, during construction for TTMs	Design acceptance, construction	TCCS, Program and Project Manager	Ongoing	Open
Whole program	Roads ACT - Road Maintenance	Technical adviser			+		6	3	Review and approval of pavement design, street lighting, stormwater	Expectation that pavements will be constructed in deep lift AC	They inherit the assets on completion so desire low maintenance cost and well constructed assets to be delivered	Review of pavement design, streetlighting, stormwater assets and attendance at asset handovers	At each stage of design and at construction completion	Design acceptance, construction completion	TCCS, Program and Project Manager	Ongoing	Open
Whole program	IDP	Procurement agency				1	9	9	Very high providing procurement services including tender management and contract administration	Nil at present	They are funded through a payment of 4% of project value for the service they provide	Provide full suite of procurement services for the duration of the project	From inception to completion	Most activities in the delivery of the program will require PCW input	TCCS, Program and Project Manager	Ongoing	Open

Whole program	Utility Providers	Approval entity		1			-9	12	Liaise with designers and contractors, provide acceptance of proposed adjustments, provide monitoring of adjustment works	Timeframe for responding, commercial terms for relocations, resource availability for supervision, they are not subject to commercial implications if relocations are delayed, historical adversarial relationships	They are not likely to be invested in the success of the program but are likely to somewhat resistant	Provide information on asset locations, acceptance of adjustments, supervise/review physical adjustment works, provide quotes/cost estimates for adjustment works	Provision of asset locations during early design, provision of acceptance of adjustments during design, provide estimated costs for adjustments during design phase, provide formal quotes and supervision during construction	Design and construction	TCCS, Program and Project Manager	Ongoing	Open
Whole program	Hume businesses	Customer/opponent		1			-6	0	Provide feedback on proposed scheme	Expected to be somewhat resistant due to increased travel time to access business and impacts during construction	If they can understand the wider benefits from the scheme they may become invested in the project's success	Respond to community consultaton on the scheme	During the design when community consultation is undertaken	The impacts during and after construction of the scheme are expected to impact the businesses in Hume	TCCS, Program and Project Manager	At three points - during option development, PSP and then FSP stages	Open
Whole program	Caltex service station Hume	Customer/opponent		1			-15	6	Provide feedback on proposed scheme	Expected to be highly resistant due to anticipated significant reduction in business from restricted access to their site	They are unlikely to be invested in the projects success	Respond to community consultaton on the scheme and advocate for an alternative that does not detrimentally impact the business	During the design when community consultation is undertaken	The impacts during and after construction of the scheme are expected to impact the businesses in Hume	Project Manager	At three points - during option development, PSP and then FSP stages	Open
Whole program	The public	Customers		1	1		0	3	Provide feedback on proposed scheme	Expected to be mixed responses - some people that endure current congestion likely supportive, others may believe cost far exceeds benefits and be concerned about changes to accessing Mugga Lane and Hume area	Varies - some may be supportive others are likely to be resistant	Respond to community consultaton on the scheme	During the design when community consultation is undertaken	Varies - but for motorists using the Monaro Highway construction activities and associated traffic management is likely to impact on commute times	TCCS, Program and Project Manager	At three points - during option development, PSP and then FSP stages	Open
Monaro Highway improvements	ACT NOWaste	Impactea land user	1				-3	3	Provide feedback on proposed scheme	May be concerned about changes to Mugga Lane/Monaro Highway intersection and impacts on access to the MLRMC for the public and garbage trucks	They are unlikely to be invested in the projects success	Provide advice on impacts of changes to Mugga Lane/Monaro Highway intersection	During the design when community consultation is undertaken	The impacts during and after construction of the scheme are expected to impact NOWaste and its contractors	TCCS, Program and Project Manager	At three points - during option development, PSP and then FSP stages	Open
Whole program	ACT Conservator of Flora and Fauna	Approval entity	1				-5	9	Provide an Environmental Significance Opinion for projects if an EIS is not triggered. Provide advice on conservation issues to be addressed if an EIS is required	Nil at present	The stakeholder has a statutory role in protecting threatened species and ecological communities	Provide comment on and approval of environmental aspects of the projects	Prior to and during the planning approvals process	Preparation of an ESD, EIS and during the planning approvals process	Project Manager	Prior to securing planning approvals for each project	Open
Whole program	ACTPLA	Approval entity			1		0	10	Consider DA and EIS if triggered	Nil at present	They are not likely to be invested in the success of the program	Advice on DA requirements and assessment of the DA	Prior to and during the planning approvals process	Planning approvals	TCCS, Program and Project Manager	Prior to and during assessment of planning approvals	Open
Whole program	ACT Heritage	Approval entity			1		0	9	Consider DA and EIS if triggered	Nil at present	They are not likely to be invested in the success of the program	Provide advice on heritage requirements	Prior to and during the planning approvals process	Planning approvals	TCCS, Program and Project Manager	Prior to and during assessment of planning approvals	Open
Whole program	ACT EPA	Government regulator			1		0	8	Impose conditions through the development approvals and provide Environmental Authorisations for contractors	Nil at present	They will want to ensure the program progresses without causing harm to the environment	Assess Waterways Work License request and ensure contractors have an Environmental Authorisation and submit an erosion and sediment control plan	During the development approvals process and during construction	Planning approval and construction	TCCS, Program and Project Manager	During assessment of planning approval and during construction	Open
Whole program	MBA/CCF	Industry body/advocate			1		2	2	Lobby for delivery strategy that provides opportunities for local contractors to secure work	Desire for delivery strategy to allow local contractors opportunity to secure work under this program	To benefit their members through access to large civil works jobs	Advocate for local contractor involvement in delivery	Prior to issuing construction tenders	Construction tenders	TCCS, Program and Project Manager	Prior to release of construction tenders	Open
Whole program	NCA	Approval entity			1		-2	8	Consideration of Works Approval and approval of TIMs	Risk of delays due to timeframe for assessment of large projects	Stakeholder will want to see commensurate level of urban design to fit in with areas the projects are being delivered in	Consideration of Works Approval and TIM approvals	During the planning approvals stage and during construction	Planning approval submission and construction	TCCS, Program and Project Manager	Prior to submission of works approval	Open
Whole program	Active Travel Office	Technical adviser			1		5	0	Provide technical advice on proposed on road cycle lanes	Nil at present	Desire to see improvements to active travel facilities in the ACT	Advice on on road cycle lanes and treatments at intersections	During preliminary and detailed design	Design process	TCCS, Program and Project Manager	During PSP and FSP	Open
Whole program	Program Sponsor - Meghan Oldfield	Program Sponsor				1	11	11	Provide high level guidance to the program	Nil at present	They are keen to see implementation of infrastructure improvements across the ACT transport network	Involvement in program governance	Whole program for full duration	Whole program	TCCS, Program and Project Manager	Ongoing	Open
Whole program	Project Delivery Executive Jeremy Smith	Project Delivery Executive				1	13	9	Provide high level guidance to the program	Nil at present	They are keen to see implementation of infrastructure improvements across the ACT transport network	Involvement in program governance	Whole program for full duration	Whole program	TCCS, Program and Project Manager	Ongoing	Open

Whole program	Construction contractor(s)	Construction Contractor			1		9		Significant during construction	Nil at present	They will want to ensure they achieve their own desired comercial outcomes. We hope they are invested in successful delivery of the projects.	Delivery of the works	During c...tion	Construction	TCCS, Program and Project Manager	During construction	Open
Whole program	Design consultant(s)	Design Consultants			1		11	6	Significant during design and some involvement during construction	Nil at present	They will want to ensure they achieve their own desired comercial outcomes. We hope they are invested in successful delivery of the projects.	Development of design	During design and some limited involvement during construction	Design, and somewhat during construction	TCCS, Program and Project Manager	During design and then somewhat during construction	Open
Whole program	Site management consultant(s)	Site management consultants			1		5	0	Construction surveillance and contract management during construction	Nil at present	They will want to ensure they achieve their own desired comercial outcomes. We hope they are invested in successful delivery of the projects.	Oversight during construction	During construction	Construction	TCCS, Program and Project Manager	During construction	Open
Whole program	ACT Treasury	Funding body				1	3	3	Review of business cases and approval of funding	Lack of support or inability to fund program given high cost	They need to ensure the ongoing health of the ACT budget which this program will draw on	Review and approval of business cases for funding. Receipt of status reports on delivery	To secure additional design funding for Monaro Highway Upgrade, to secure construction funding for the overtaking lane and to secure construction funding for the Monaro Highway Upgrade project	Business case review process	TCCS, Program and Project Manager	Typically from July - January for funding in the subsequent FY	Open
Whole program	DIRDC	Funding body				1	8	7	Receipt of updates and approval of Federal funding	Nil at present	As the funding body they want to ensure money is spent effectively and in accordance with their organisation goals	Review and approval of Project Proposal Reports and review of progress on delivery of the program	Multiple at various times	Review of funding requests (via the Project Proposal Reports) and the delivery of the whole program	TCCS, Program and Project Manager	Ongoing	Open
Whole program	Government Procurement Board	Approval entity			1		0	8	Approval of strategic and specific procurement proposals	Nil at present	Keen to ensure procurement is effective and appropriate	Provide feedback on proposed delivery model and specific proposed procurements	Expected for Overtaking lane construction and Monaro Highway Upgrade construction. Will consider a strategic procurement plan	Large procurements	TCCS, Program and Project Manager	Prior to going to tender for procurement with estimated value of greater than $5m	Open
Whole program	JACS (including ESA)	Impacted land user		1			-8	6	Feedback on scheme - impact for emergency services vehicles, and impacts on access to ESA training facility and AMC	Expected concerns for impacts to emergency vehicle access around Hume, and concerns over increased travel time to access AMC.	They want to ensure their organisational objectives can still be effectively achieved	Expected to be somewhat resistant to changes	During the design when community consultation is undertaken	Consultation processes and final outcomes from projects	TCCS, Program and Project Manager	At three points - during option development, PSP and then PSF stages	Open
Whole program	Canberra Airport Group	Impacted land user				1	7	11	Significant interation on proposed design for Flalligo Avenue particularly in relation to future airport runway extension	Highly influential	Want to see positive outcomes for their business - ongoing ready access to the airport	Expected to be positive and supportive of the works provided the proposed works align with their expectations	Need to consult at design options stage, and then provide ongoing feedback as the design is progressed	Design options and design development	TCCS, Program and Project Manager	At design options stage (prior to option selection) and then ongoing during design development	Open
Whole program	Queanbeyan Palerang Regional Council	Adjacent roads authority				1	8	5	Feedback on design and tie into Yass Road	Have long campaigned for construction of Flalligo Duplication. Want to see jobs retained in Queanbeyan. Advocate for their residents	They will inherit some assets on Yass Road, they have long advocated for construction of Flalligo duplication and improvements to Lanyon Drive/Monaro Highway likely to offer travel benefits to Queanbeyan residents and visitors using Lanyon Drive	Supportive of program provided they have understanding of likley timing for delivery of works (may be concerned that Flalligo duplication construction is not funded)	During design development	Design development, construction that impacts traffic on Lanyon Drive	TCCS, Program and Project Manager	At PSR, FSP stages and angoing during construction	Open
Whole program	NSW Roads and Maritime Services	Adjacent roads authority			1		3	3	Feedback on adjacent road projects and programs	Concerned that the program does not close the link between Barton Highway and airport for freight movements, may not have adequate resources to provide input	There are wider benefits to be realised from ensuring that the projects are consistent with standards across the border	Respond to consultation as initiated by the project team.	Early on to establish potential collaboration on the Monaro Safety Improvements	Discussion of potential collaboration	TCCS, Program and Project Manager	30-Apr-19	Open
Whole program	EPSDD - Parks and Conservation Services	Impacted land user and input into planning approvals		1			-8	5	Provide feedback on proposed scheme and input to planning approvals	The alternative access to AMC may pass through a nature reserve which would cause concern to Parks and Conservation	Ensure projects are delivered with appropriate regard for nature conservation	Provide comment on options and design	Targetted consultation during consideration of design options for Monaro Highway Upgrade and again during design development	Design and construction	TCCS, Program and Project Manager	At design options and design development stage	Open
Whole program	Pedal Power	Advocacy group	1				0	4	Provide feedback on cycling aspects of the scheme	May advocate for greater level of cycling facilities than it is intended to provide	They want to see a high level of cycling facilities provided in the Territory	Provide input on design aspects related to cyclists	During general community consultation	Design and construction	TCCS, Program and Project Manager	At design development stage	Open
Whole Program	ATSIEB	Elected Body							Indigenous Participation measure/targets								
PREDISPOSITION TOTAL	PREDISPOSITION TOTALS		0	0	0	0											

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Monaro Highway Upgrade Project

Phase 3 Economic Analysis – Package 1

IA224400-RP-EA-204_Phase 3 Economic Analysis - Package 1 | RevA

30 March 2021

Infrastructure Delivery Partners & Transport Canberra and City Services - ACT

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Monaro Highway Upgrade Project

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Executive Summary

Jacobs has been commissioned by Infrastructure Delivery Partners (IDP) on behalf of the ACT Government (Transport Canberra and City Services - TCCS) to deliver feasibility and design services for the Monaro Highway Upgrade Program, Hume, ACT. The proposed project will improve travel efficiency and safety performance of Monaro Highway and the connecting road networks.

This report presents the economic analysis undertaken for the full Package 1 of the project. It includes a summary of the approach, inputs, assumptions, and results of the Cost Benefit Analysis (CBA).

The appraisal has been undertaken predominantly in accordance with ATAP guidance. A 30 - year appraisal period commences from the opening year of 2023. The economic appraisal considers:

- Capital costs of construction
- Operational and maintenance costs
- Travel time benefits
- Vehicle Operating Cost (VOC) benefits
- Environmental externality impacts
- Safety benefits
- Residual value

Traffic modelling has been carried out by Jacobs, with an Aimsun mesoscopic model developed for the project and is solely a motor vehicle-based demand model.

Summary of results

When discounted at 7% the full Package 1 achieves a Benefit Cost Ratio (BCR) of 1.59 and Net Present Value (NPV) of $55 million. Therefore, the project can be considered economically viable as the NPV is positive and the BCR is greater than one.

The Internal Rate of Return (IRR) for the full Package 1 is 13 percent and the First Year Rate of Return (FYRR) is 12 percent. The IRR and the FYRR are over the discount rate of 7 percent, further indicating the viability of the project option.

Table 1-1: Summary CBA results (7% discounts rate, $2020)

Summary CBA results (7% discount rate)	Full package 1
Capital cost (P50)	[redacted]
Operating costs	[redacted]
Total costs	[redacted]
Total benefits	[redacted]
NPV	$ 54.82 m
BCR	1.59
IRR	13%
FYRR	12%
NPVI	0.56

Table 1-2 shows that the majority of benefits are comprised from travel time savings (53%), VOC savings (22%) and crash cost savings (23%).

Table 1-2 Benefit stream contributions

Benefit stream	Full package 1
Travel time savings	
Vehicle operating cost savings	
Safety (crash reduction)	
Externalities	
Residual value	
Total	

When tested for uncertainty, the full Package 1 project option is expected to achieve a BCR of over one and positive NPV under all scenarios, further indicating the economic viability of the project. Therefore, from an economics perspective it is recommended this project option be taken forward to the next stage of development.

1. Introduction

1.1 Overview

Jacobs has been commissioned by Infrastructure Delivery Partners (IDP) on behalf of the ACT Government (Transport Canberra and City Services - TCCS) to deliver feasibility and design services for the Monaro Highway Upgrade Program, Hume, ACT. The proposed project will improve travel efficiency and safety performance of Monaro Highway and the connecting road networks.

This report presents the economic analysis undertaken for package 1 of the project. It includes a summary of the approach, inputs, assumptions, and results of the Cost Benefit Analysis (CBA) for the proposed package 1 project option.

1.2 Project background

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.

The project includes determination of a suitable alignment for the Monaro Highway Alexander Maconochie Centre and the southern approach to Johnson Drive, and the development of Preliminary Sketch Plans documenting the preferred alignment.

The Monaro Highway Upgrade Program is being undertaken in two main packages, as shown in Figure 1-1.

- Package 1 – Lanyon Drive Intersection. This includes works on Monaro Highway between Sheppard Street intersection and David Warren Road intersection, including upgrades to Lanyon Drive and David Warren Road.
- Package 2 – Hume and Isabella Drive intersections. This includes works on Monaro Highway between Isabella Drive intersection and Sheppard Street intersection, including upgrades to Hume Intersections (Sheppard Street, Tralee Street and Mugga Lane) and Isabella Drive Intersection.

This economic analysis is concerned only with Package 1, with Package 2 assessed in a separate report.

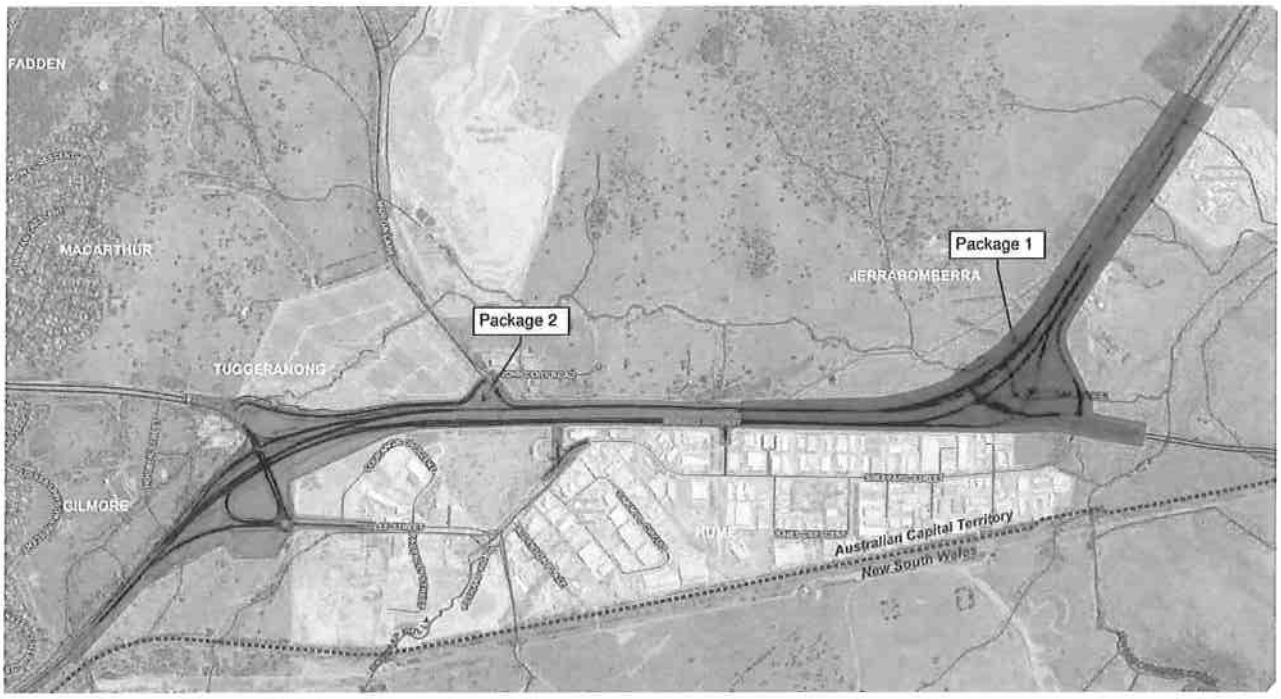

Figure 1-1: Monaro Highway Upgrade Package 1 and Package 2

The preferred strategic alignment for Package 1 was chosen at the Multi Criteria Analysis (MCA) workshop on 21 January 2020. Following this, 100% PSP designs have been developed, which form the basis for this economic analysis.

Due to the longer timeframe required for Development Approval processes compared to Works Approval within Designated Land, Package 1 is split into two sub-packages:

- Package 1B - works within Designated Land
- Package 1C - works within Territory Land.

Figure 1-2 shows Package 1B highlighted in yellow and Package 1C highlighted in green. The economic analysis in this report is carried out on the full Package 1 which includes both Package 1B and Package 1C.

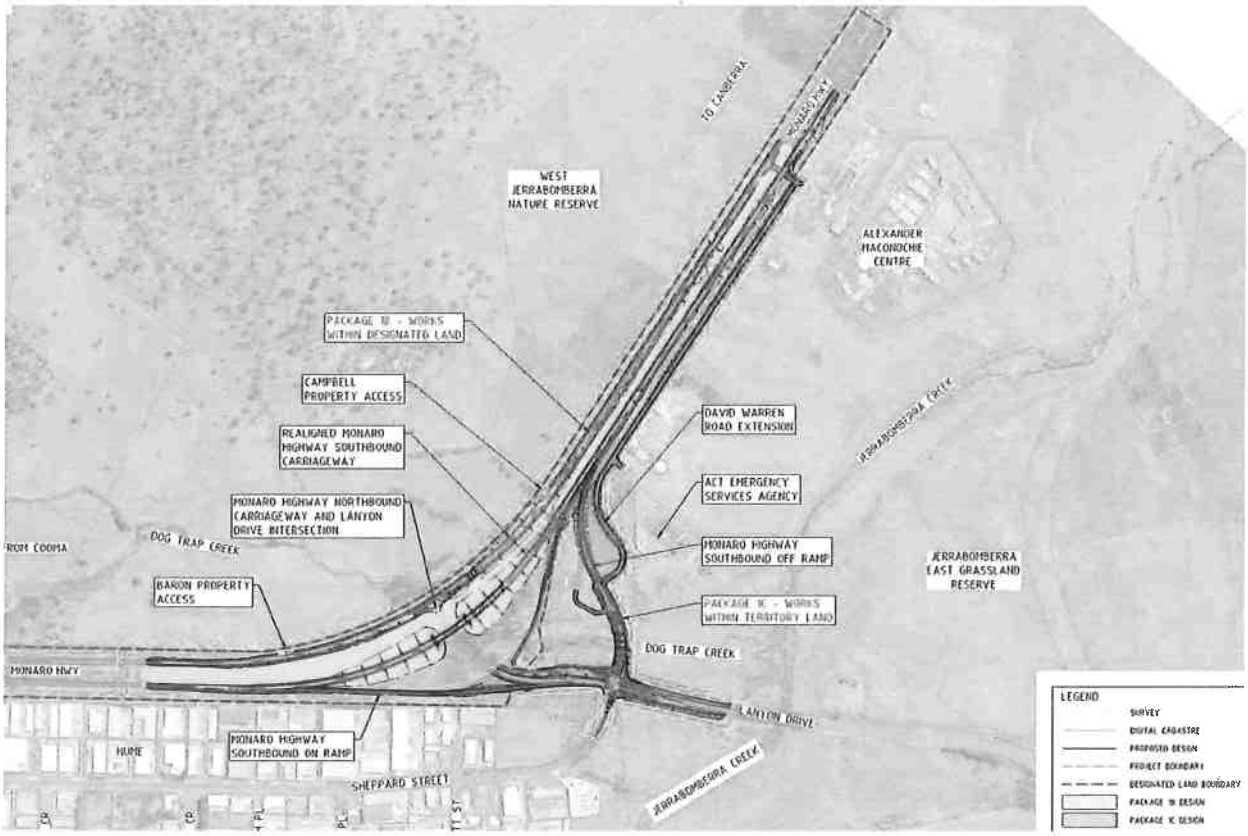

Figure 1-2: Package 1B and 1C

1.3 Project objectives

The primary project objective is to improve travel efficiency and safety performance of the Monaro Highway and the connecting road networks by:

- Improving the existing road alignment, to achieve a 100km/hr posted speed and be consistent with the highway sections north of the project area
- Removing signalised intersections on Monaro Highway to reduce congestion caused by traffic entering and exiting the highway
- Extending existing acceleration and deceleration lanes on the highway to comply with speed requirements and improve storage
- Widening of Lanyon Drive to reduce traffic congestion and allow safer turning
- Providing compliant lane, shoulder and clear zone widths for the speed environment

1.4 Report structure

The report is structured as follows:

- Chapter 1 – Introduces the project summarising the project background and objectives
- Chapter 2 – Describes the overall approach to carrying out the CBA
- Chapter 3 – Summarises the traffic model inputs including Base case and Project case definitions
- Chapter 4 – Details the methodology, assumptions and parameters applied within the CBA
- Chapter 5 – Summarises the project cost estimates

- Chapter 6 – Presents the core economic results and supporting sensitivity tests
- Chapter 7 – Outlines the conclusions that can be drawn from the results

2. Economic analysis methodology

2.1 Overview

The economic analysis is in accordance with accepted guidelines for transport projects. The analysis is conducted through a comparative CBA which assesses whether an infrastructure investment is economically viable by quantifying costs and benefits. The CBA also provides a means for optimal allocation of scarce resources through comparison of key decision criteria of competing projects.

Project benefits/ disbenefits are estimated as the difference in user, infrastructure owner and social costs between the Base Case and Project Case/s. The net impacts are measured by comparing project benefits to capital investment and ongoing expenditures.

Economic viability is measured on the magnitude of benefits compared to investment costs borne by the infrastructure manager. A project is economically viable if benefits are greater than costs. Where multiple project options are assessed, the most economically viable outcome is the option with the highest net present value (NPV).

Figure 2-1 summarises the key steps in undertaking the CBA.

Figure 2-1 Analysis methodology

The key outputs of the CBA are:

- Net present value (NPV) - the difference between the discounted or Present Value (PV) of benefits and costs. A positive NPV indicates that the project delivers net benefits to the community and is therefore economically viable.
- Benefit–cost ratio (BCR) - the PV of the quantified economic benefits divided by the PV of the quantified costs e.g. project capital and operating expenditure, plus other investments required to realise those benefits. A project is economically efficient if the BCR is above one.
- Internal Rate of Return (IRR) - the discount rate at which the PV of benefits equals the PV of costs. It provides an indication of the economic worth of an initiative without requiring specification of a discount rate. An IRR greater than the core discount rate of 7% indicates an economically worthwhile project.
- First Year Rate of Return (FYRR) – a measure of the PV of benefits achieved in the first full year of a scheme's operation divided by the capital costs incurred to achieve the benefits. It is expressed as a percentage and discounted values are used. The optimal implementation time is the first year in which the FYRR is greater than the discount rate.

Three main benefit categories are captured within the economic analysis:

1) Direct user impacts – these are the benefits enjoyed by users of the infrastructure who perceive an increase in welfare in the Project Case compared to the Base case.

2) Other benefits to society – broader benefits resulting from the investment that may impact users and non-users alike (including externality benefits).

3) Residual value – where the asset has useful life remaining post the analysis period, a residual value is included as a benefit in the final year of the analysis.

2.2 Input data

The methodology, parameter inputs and assumptions used for each benefit are detailed in Section 4.

Table 2-1 lists the various data sources that have been utilised by the economic analysis including the transport modelling outputs and cost estimates completed for the project. A range of data sources and guidance are utilised to derive parameter values applied within the CBA.

Table 2-1 Guidance

Source	Application in CBA
Traffic modelling outputs (Jacobs) *Trips, VKT, VHT, speed*	▪ Road user demand in the Base case and Project case
Capital cost estimates (Jacobs)	▪ Capital investment requirement (P50 and P90 estimates) ▪ Incremental operating expenditure ▪ Calculation of residual value
Operating and maintenance cost estimates (National Hwy Maintenance Formula Data Report 2018-19, Jacobs quantities) *Historical and proposed maintenance expenditure summaries for Federal and Barton Highway and Majura Parkway from National Hwy Maintenance Formula Data Report 2018-19*	▪ Estimates for operating and maintenance costs
ATAP guidelines *T2_cost_benefit_analysis* *Pv2_road_parameter_values* *Pv5_environmental_parameter_values*	▪ Overall approach and methodology ▪ Value of time parameters ▪ Crash valuations ▪ Vehicle operating cost parameters ▪ Environmental externality parameters
Austroads guidelines *Guide to Road Safety Part 8: Treatment of Crash Locations, AGRS08-15 (2015)*	▪ Safety analysis
Bureau of Infrastructure, Transport and Regional Economies (BITRE) guidelines *Evaluation of the National Black Spot Program (2012)*	▪ Safety analysis
TfNSW Principles and Guidelines for Economic Appraisal	▪ Fleet mix composition ▪ Asset life parameters ▪ Annualisation factor
ABS Indexes *Consumer Price Index (December 2020)* *Producer Price Index (December 2020)* *Average Weekly Earnings (May 2020)* *Survey of Motor Vehicle Use (June 2020)*	▪ Escalation of parameter values to current dollars ▪ Proportion of business/private light vehicle use

3. Traffic model inputs

3.1 Overview

Traffic modelling has been carried out by Jacobs, with an Aimsun microsimulation model developed for the project. The traffic and transport report provides detailed commentary on the model construction which was developed using the following modelling process:

1. Base model development
2. Future traffic demand forecast
3. Modelling with the project

The extent of the road network covered by the traffic model in the context of the project is shown in Figure 3-1. The is solely a motor vehicle-based demand model. The traffic modelling analysed in this report refers to Package 1 only for both the Base case and Project case with Package 2 being evaluated separately.

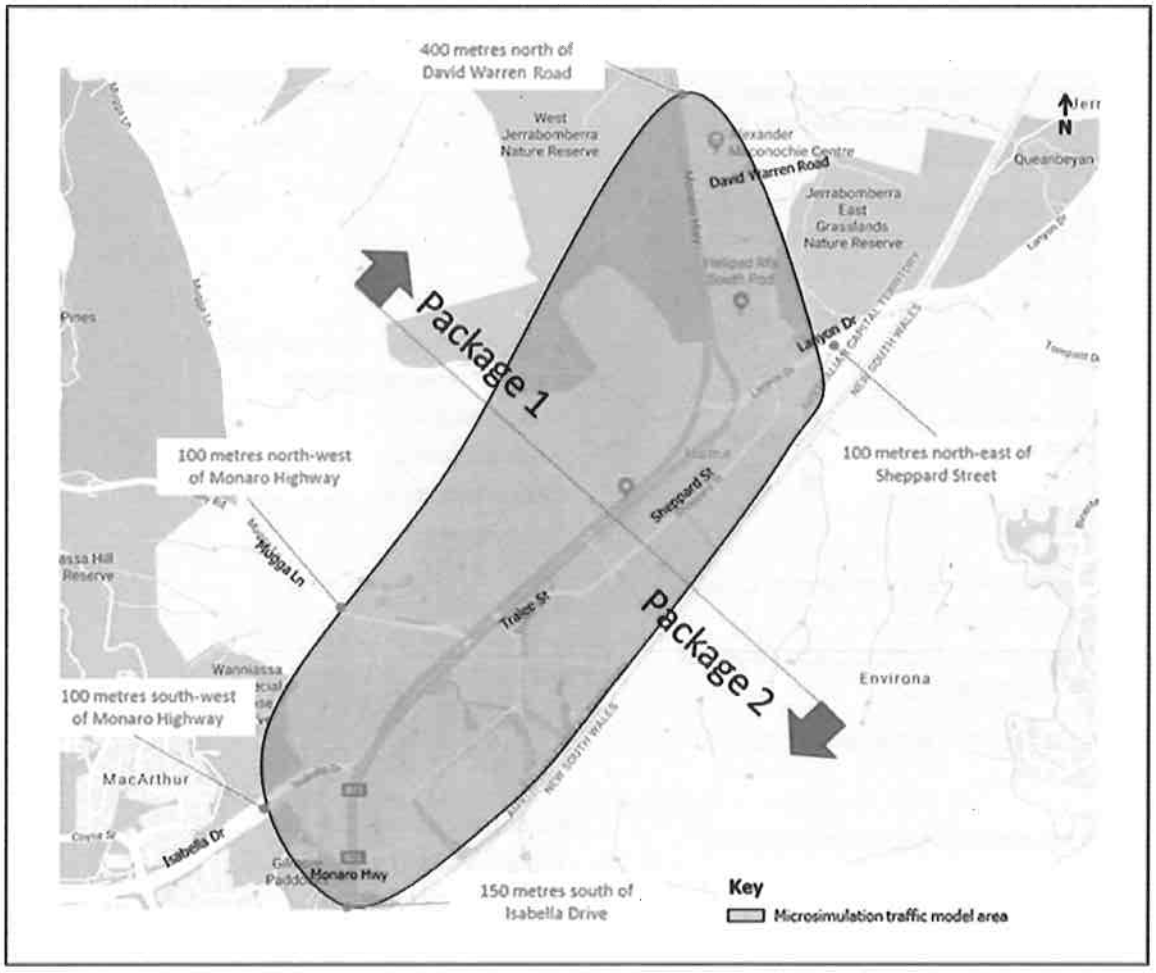

Figure 3-1: Traffic model area

The same demand estimation is applied within the Base case and project option. Differences in behavioural responses and ultimately overall network performance can be attributed to infrastructure alterations in the road network.

Outputs for the following four vehicle classes are extracted from the model:

- Light vehicles
- Medium trucks
- Large trucks
- Buses

The key outputs of the traffic model for the economic analysis are trips, vehicle-kilometres-travelled (VKT), vehicle-hours-travelled (VHT) and speed for the whole network for Peak AM (7-9am) and Peak PM (4-6pm). The modelled years are 2019, 2031 and 2041, with intermediary years interpolated in the economic model.

3.2 Expansion factors

Transport demand modelling is undertaken for peak periods, which are then expanded into daily and annual demand by applying appropriate factors. The factors consider the traffic volumes during non-peak hours and weekends relative to peak volumes, road use and location.

A peak to daily expansion factor of 3.16 has been derived from the traffic detector data used to inform the traffic modelling. Observations of traffic volumes in the peak periods of 7am-9am and 4pm-6pm are compared to the total daily volume to calculate the daily expansion factor. This is based on 7-day detector data for the following locations:

- Monaro Highway - south of David Warren Rd
- Monaro Highway - south of Isabella Dr
- Monaro Highway - south of Sheppard St
- Isabella Drive - west of Monaro Highway
- Lanyon Drive - west of Sheppard St

For comparison, TfNSW guidance provides a 'peak 4 hours to weekday' volume expansion parameter of approximately 3.6 for Sydney and 3.1 for rural.

3.3 Definition of Base case

In the CBA, costs and benefits are defined in relation to the Base case. The Base case is the business-as-usual scenario, a projection of the current situation if the proposed investment is not undertaken. It provides the counter-factual scenario that forms the basis for comparison with outcomes caused by implementation of the project option being assessed.

The Do Minimum Base case does not include any new infrastructure within the study area and assumes the current infrastructure will remain the same.

3.4 Definition of Project case

Table 3-1 describes the features of the two sub-packages which are also presented Figure 1-2. Traffic modelling has been undertaken for the full Package 1 (combined infrastructure of Package 1B and 1C) to align with the economic analysis.

Table 3-1: Sub-package project features

Package 1B	Package 1C
▪ Monaro Highway northbound carriageway retained on current alignment and levels; ▪ Widening on Monaro Highway northbound carriageway to provide extended turning lanes	▪ Extension of David Warren Road south to connect to Lanyon Drive and Sheppard Street intersection to compensate for the removal of the intersection on Monaro Highway;

to Lanyon Drive on the right-hand side of highway (exit via fast lane); ▪ Widening on Monaro Highway northbound carriageway to provide extended entry lanes from Lanyon Drive on the right-hand side of highway (entry via fast lane); ▪ Monaro Highway southbound carriageway provided on high-level embankment and new alignment to enable 100km/hr posted speed. The southbound carriageway is provided over a bridge structure above Lanyon Drive; ▪ Exit from Monaro Highway southbound carriageway to Lanyon Drive provided by an interim off ramp connecting to the existing southbound carriageway; ▪ Entry to Monaro Highway southbound carriageway from Lanyon Drive provided to the west of the signalised intersection between Lanyon Drive and Sheppard St.	▪ Intersection of Lanyon Drive and Sheppard Street amended to four-way intersection; ▪ Widening of Lanyon Drive to relieve traffic congestions and improve safety for traffic entering and leaving Monaro Highway; ▪ Exit from Monaro Highway southbound carriageway to Lanyon Drive via new off ramp; ▪ Entry to Monaro Highway southbound carriageway from Lanyon Drive via the extended on ramp; ▪ Removal of access from Monaro Highway northbound carriageway to David Warren Road/AMC. Access from Monaro Highway southbound carriageway modified to left in only; ▪ Existing southbound carriageway and Lanyon Drive intersection removed.

3.4.1 Accounting for different sub package opening years

The infrastructure included in each sub-package has different opening years, however due to the years modelled the traffic modelling assumes that all infrastructure is completed by 2031. To account for the staged delivery of infrastructure investment, benefits are phased to avoid any overstating.

The phasing is based on the opening years of the two sub-packages which are shown in Table 3-2. In 2023, only Package 1B benefits are realised, then from 2024 onwards benefits are realised for the full package 1 (combined infrastructure of Package 1B and 1C).

Table 3-2: Benefits phasing

Project option sub-package	Opening year
Package 1B	2023
Package 1C	2024

3.5 Traffic model outputs

The key demand inputs to the economic analysis for the Base case and Full package 1 scenarios are presented in Table 3-3. Bus volumes are very small due to limited public transport routes in the study area.

Table 3-3: Sum of daily AM and PM peak traffic model inputs

Scenario	Vehicle type	Statistic	2019	2031	2041
Base case	Light Vehicles	Trips	27,957	32,960	36,667
		VHT	2,584	4,867	6,649
		VKT	142,167	170,877	173,147
	Medium Trucks	Trips	1,209	1,479	1,624

Scenario	Vehicle type	Statistic	2019	2031	2041
		VHT	96	176	273
		VKT	4,688	5,796	5,977
	Large Trucks	Trips	498	586	644
		VHT	44	87	128
		VKT	2,245	2,661	2,871
	Bus	Trips	17	17	17
		VHT	1	2	1
		VKT	67	67	67
Full package 1	Light Vehicles	Trips	27,957	32,960	36,667
		VHT	2,286	4,764	6,444
		VKT	141,420	170,770	175,060
	Medium Trucks	Trips	1,209	1,479	1,624
		VHT	86	166	218
		VKT	4,632	5,735	5,984
	Large Trucks	Trips	498	586	644
		VHT	42	90	127
		VKT	2,334	2,725	2,985
	Bus	Trips	17	17	17
		VHT	1	3	7
		VKT	67	67	67

There is minimal change in VKT between the Base case and the project option as shown in Figure 3-2. The modelling results are:

- For light vehicles in full package 1, total VKT reduces by -0.5% in 2019, -0.1% in 2031 and increases by 1.1% in 2041
- For medium trucks in full package 1, total VKT reduces by -1.2% in 2019, -1.1% in 2031 and increases by 0.1% in 2041
- For large trucks in full package 1, total VKT increases by 4.0% in 2019, 2.4% in 2031, increasing further by 3.9% in 2041
    - The increase in VKT for large trucks across all traffic modelling years can be explained by the removal of right turn movements at Mugga Lane. The removal means vehicles will need to travel to the Lanyon Drive interchange to the left, leading to an increase in travel distance of several kilometres.

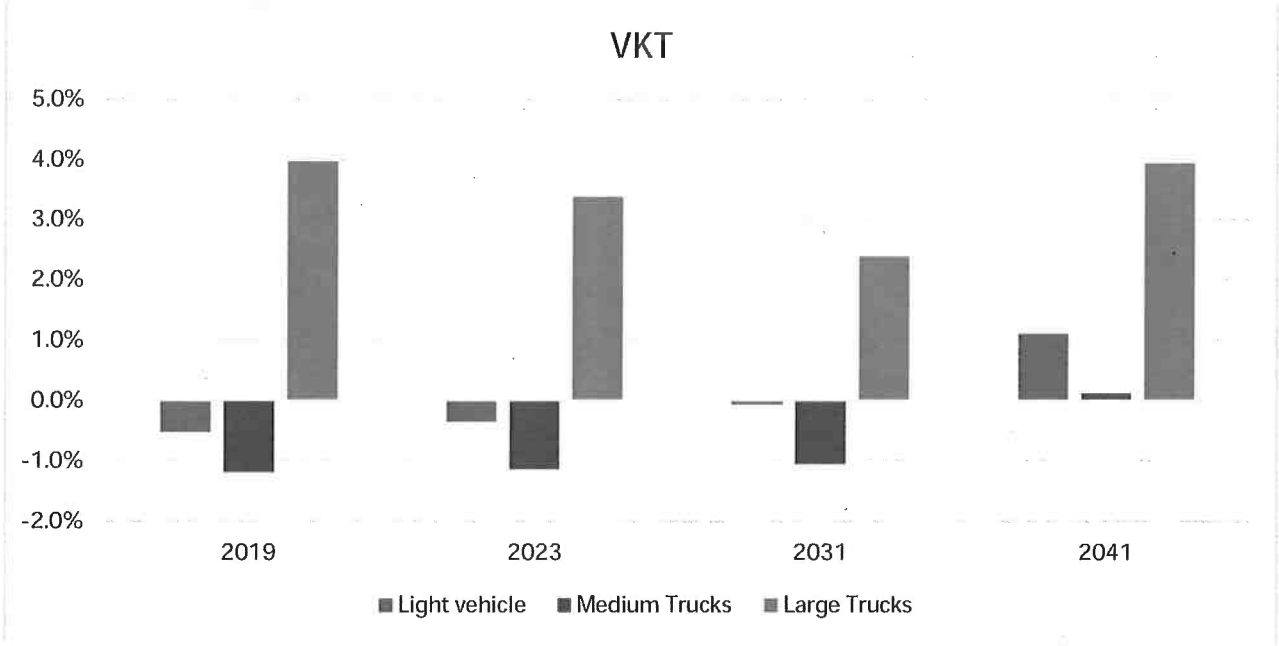

Figure 3-2: Change in VKT between Project case and Base case

There are notable change in VHT between the Base case and the project option as shown in Figure 3-3. The modelling results are:

- For light vehicles in full package 1, total VHT reduces by -11.5% in 2019, -2.1% in 2031, reducing further to -3.1% in 2041
- For medium trucks in full package 1, total VHT reduces by -10.4% in 2019, -5.6% in 2031, reducing further to -20.2% in 2041
- For large trucks in full package 1, total VHT reduces by -5.8% in 2019, increases by 3.2% in 2031 and reduces again in 2041 by -0.8%

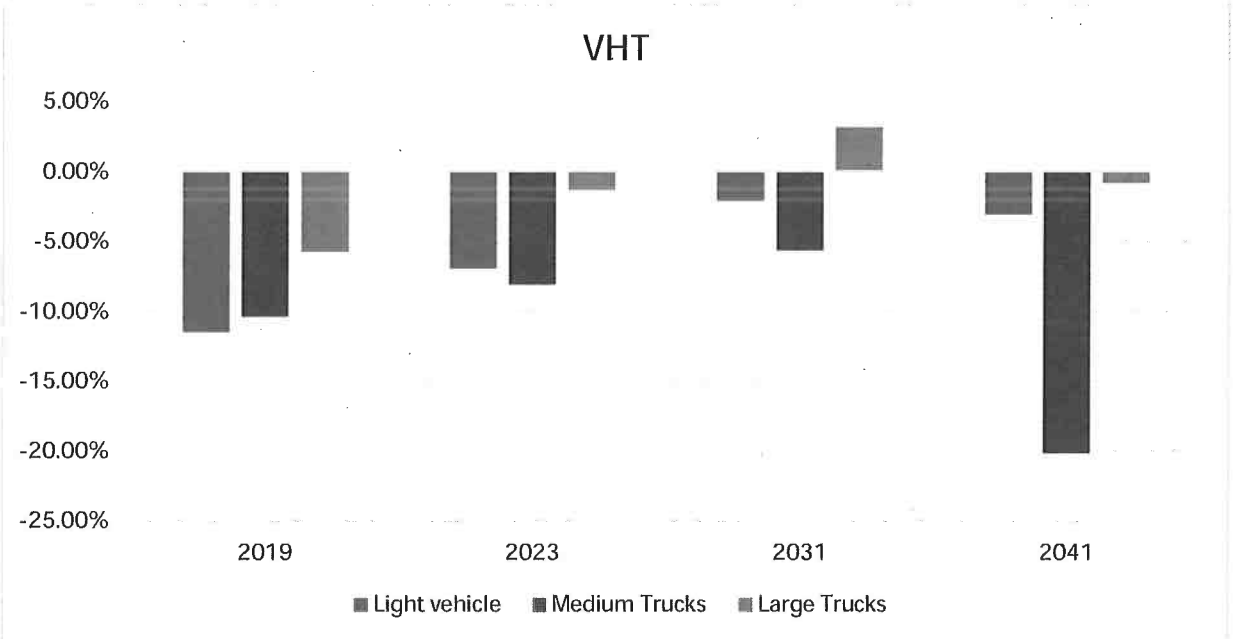

Figure 3-3: Change in VHT between Project case and Base case

4. Economic Analysis assumptions and parameters

This chapter presents the assumptions and parameters used for the overall CBA in addition to specific methodology, assumptions and parameters used to monetise the individual benefits.

4.1 General assumptions

The general economic parameters and sources are provided in Table 4-1.

Being a road project, an evaluation period of 30 years is adopted. The first year of benefits is 2023, the opening year of the first phase of infrastructure investment. The final year of the evaluation is 2052.

Table 4-1: General parameters and sources

Criteria	Parameter	Source
Opening year	Opening year of evaluation: 2023 Phased opening of infrastructure accounted	Infrastructure Delivery Partners & Transport Canberra and City Services - ACT
Price year	2020 Indices are used to adjust benefit parameter values to 2020 prices	Australian Bureau of Statistics
Evaluation period	30 years from Package 1B infrastructure opening year Evaluation end year is 2052	Jacobs
Annualisation factor	345 (central case)	TfNSW Principles and Guidelines for Economic Appraisal
4 hr peak to daily expansion factor	3.16	Derived from historical traffic counts
Road user costs	Value of passenger travel time Value of freight travel time Vehicle operating costs	ATAP
Social costs	External costs such as pollution Crash costs	ATAP
Discount rate	Primary discount rate of 7% with sensitivity tests at 4% and 10	Infrastructure Australia

4.2 Economic benefits

This section provides details of the methodology used to estimate each benefit, including how economic parameters are matched to each of the four separate vehicle classes contained within the traffic model.

4.2.1 Phasing of benefits

As discussed in Section 3.4.1, the extended construction timeline sees different opening years for Package 1B and Package 1C. To account for the staged delivery of infrastructure investment, the project option derives benefits from Package 1B alone until the opening year of Package 1C in 2024.

4.2.2 Travel time

A key objective for the project is to reduce congestion on the Monaro Highway and improve travel time savings for motorists within the local area.

Travel time benefits are calculated as the difference in VHT between the Base case and Project case multiplied by a value of time per vehicle hour for each modelled vehicle class, using the following formula:

$$Travel\ time\ benefits = \sum_{User\ type} \Delta\ Travel\ Time_{user\ type} \times Value\ of\ travel\ time_{user\ type}$$

The ATAP Road Parameter Values guidelines provide time values for 20 vehicle types[1]. These values provide the basis for the four vehicle classes in the traffic model. A weighted average value is calculated for the four classes based on TfNSW fleet composition data[2] as they are provided for the same vehicle class. This is presented in Table 4-2.

Table 4-2: Modelled vehicle classes mapped to TfNSW vehicle categories

Modelled vehicle class	ATAP / TfNSW category	% of total fleet	% of modelled vehicle class
Light vehicle	01a. Small Car Private	23.1%	29.9%
	02a. Medium Car Private	23.1%	29.9%
	03a. Large Car Private	23.1%	29.9%
	01b. Small Car business	2.7%	3.5%
	02b. Medium Car business	2.7%	3.5%
	03b. Large Car business	2.7%	3.5%
Medium trucks	04. Courier Van Utility	9.7%	53.2%
	05. 4WD Mid Size Petrol	6.9%	38.1%
	06. Light Rigid	0.6%	3.2%
	07. Medium Rigid	1.0%	5.5%
Large trucks	08. Heavy Rigid	2.0%	57.1%
	10. Artic 4 Axle	0.2%	6.4%
	11. Artic 5 Axle	0.1%	2.0%
	12. Artic 6 Axle	0.5%	12.9%
	13. Rigid + 5 Axle Dog	0.0%	0.3%
	14. B-Double	0.7%	19.6%
	15. Twin Steer + 5 Axle Dog	0.0%	0.3%
	16. A-Double	0.0%	0.3%
	17. B Triple	0.0%	0.3%
	18. A B Combination	0.0%	0.3%
	19. A-Triple	0.0%	0.3%
	20. Double B-Double	0.0%	0.3%
Bus	09. Heavy Bus	0.9%	100.0%

The ABS Survey of motor use[3] provides typical vehicle composition for passenger vehicles split by private and business usage in the ACT. These are applied to total light vehicle VHT so that approximately 10% are classified as business trips and 90% as private.

[1] ATAP PV2 Road Parameter Values, Table 12
[2] TfNSW parameter workbook, Table 18
[3] ABS Survey of motor use (2020)

Urban parameters are used, due to the setting of the study area. Table 4-3 presents the value per vehicle hour for each of the four modelled vehicle classes. Total (occupant and freight) values are used in the economic appraisal.

Table 4-3 Value of time by modelled vehicle class ($2020)

Vehicle type	Total (occupant only) $/hour	Total (occupant and freight) $/hour
Light vehicle – Private	$26.5	$26.5
Light vehicle - Business	$75.3	$75.3
Medium Truck	$34.1	$34.4
Large Truck	$28.4	$61.4
Bus	$180.1	$180.1

4.2.3 Vehicle operating costs

Vehicle Operating Costs (VOC) estimate the costs associated with the vehicles operating on the road network and include:

- Fuel and oil costs
- Depreciation of vehicles
- Incidentals (tyres, brakes, etc)
- Vehicle capital costs

VOC benefits are calculated as the difference in VOC between the Base case and Project case. The VOC for each case is calculated using either the stop-start or free flow model formula from the ATAP guidelines[4] as shown below:

$$Stop\ start\ model: c = A + \frac{B}{V}$$

$$Free\ flow\ model: c = C_0 + C_1 V + C_2 V^2$$

Where

$$A, B, C_0, C_1, C_2 = model\ coefficients$$

$$c = Vehicle\ operating\ cost\ (cents/km)$$

$$V = average\ speed\ in\ km/hr$$

As outlined in the ATAP guidelines, the stop-start model can be used for estimating the VOC on urban and sub-urban arterial roads or freeways at average speeds of less than 60 km per hour, while the free-flow model is used for estimating VOC where average journey speeds are greater than 60 km per hour. For the purposes of this analysis, the stop-start model has been used for both the Base case and Project case.

The ATAP Road Parameter Values guidelines provide free-flow coefficients for 20 vehicle types[5]. These values provide the basis for the four vehicle classes in the traffic model. A weighted average value is calculated for the four classes based on TfNSW fleet composition data as shown in Table 4-2. Table 4-4 presents the stop-start model coefficient values ($ per km) for each of the four modelled vehicle classes used in the economic analysis.

[4] ATAP PV2 Road Parameter Values, page 52
[5] ATAP PV2 Road Parameter Values, Table 35

Table 4-4: Stop-start model coefficients used to estimate VOC ($2020)

Vehicle type	A ($ per km)	B ($ per km)
Light vehicle – Private	$0.1362	$13.7301
Light vehicle - Business	$0.1362	$13.7301
Medium Truck	$0.2029	$14.5307
Large Truck	$0.8537	$35.0530
Bus	$0.6661	$47.7921

4.2.4 Environmental and other externalities

Externalities estimate the third party costs associated with use of the road network, being:

- Air pollution
- Greenhouse
- Noise
- Water
- Nature & landscape
- Urban separation
- Upstream and downstream costs

Benefits are calculated as the difference in VKT between the Base case and Project case multiplied by an externality value per vehicle VKT.

$$Externality\ benefits = \sum_{User\ type} \Delta VKT_{user\ type} \times Value\ of\ externalities_{user\ type}$$

ATAP have recently released a draft document with environmental externality parameter values per vehicle VKT[6]. These values are calculated as the mid value of the range of Austroads 2012[7] and Austroads 2014 parameter values. Urban parameters are used, due to the setting of the study area.

A separate externality value per km is calculated for each of the four modelled vehicle classes. The parameters have been applied to the modelled vehicle classes as shown in Table 4-5.

Table 4-5: ATAP externality parameter vehicle types applied to modelled vehicle classes

Modelled vehicle class	ATAP parameter vehicle type used
Light vehicle	Passenger vehicles
Medium truck	Weighted combination of: ▪ Light Commercial Vehicles (Courier Van Utility and 4WD Mid Size Petrol) ▪ Heavy Commercial Vehicles (Light and Medium Rigid)
Large truck	Heavy Commercial Vehicles
Bus	Bus

Table 4-6 presents the externality cost per km for each of the four modelled vehicle classes. Total VKT for the Base case and Project case are multiplied by the corresponding externality costs per VKT to estimate the total external cost.

[6] ATAP PV5 Environmental Parameter Values, Table 2 and 4
[7] ibid

Table 4-6 Externality values ($2020)

Vehicle type	Total externality cost ($ per VKT)
Light vehicle	$0.09
Medium Truck	$0.12
Large Truck	$0.55
Bus	$0.53

4.2.5 Safety

The project infrastructure is designed to improve road safety along the Monaro Highway. This leads to a reduction in crash costs and a resulting benefit for the Project case. Crash cost benefits are calculated as the difference in crash costs between the Base case and Project case.

$$Safety\ benefits = \sum_{User\ type} \Delta\ Total\ VKT_{user\ type} \times \Delta\ crash\ cost/VKT$$

Crash statistics are sourced from Infrastructure Delivery Partners & Transport Canberra and City Services - ACT for the period of January 2013 to December 2017 and are presented by year and crash type in Figure 4-1. It shows there were 212 crashes in total, with no fatalities and 28 injuries.

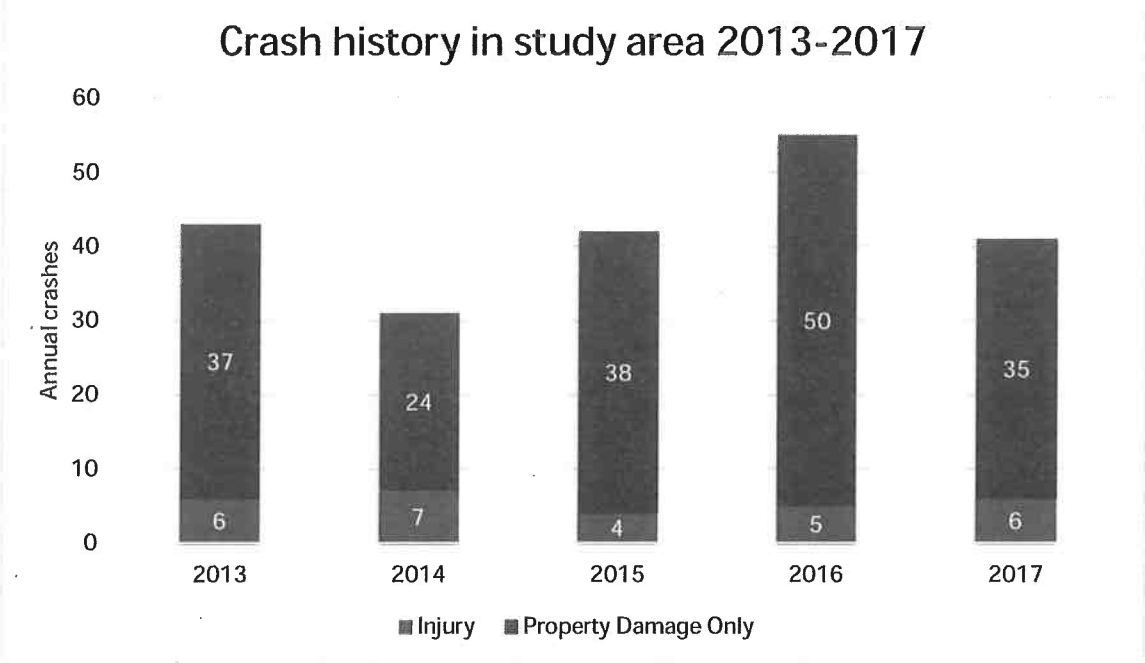

Figure 4-1 Annual crash history 2013-2017

Table 4-7 shows the crash history by crash cause for the study area. It shows that approximately two thirds of the crashes were caused by rear end collisions and that the majority of injuries are caused by rear end collisions and right-angle collisions.

Table 4-7 Crash history for Monaro highway package 1 study area (2013-2017)

Crash cause	Injury	Property Damage Only
Collision with parked vehicle	0	1
Opposite direction side swipe	0	2
Rear end collision	10	134
Same direction side swipe	1	16
Struck animal (not ridden On Road)	1	10
Overturned (On Road)	2	1
Struck object (Off Road)	4	5
No object struck (Off Road)	0	1
Struck object (On Road)	0	1
Collision while one vehicle reversing	0	2
Overturned (Off Road)	1	0
Other - Vehicle to Vehicle	0	1
Right angle collision	9	9
Right turn into oncoming vehicle	0	1
Total	28	184

Crash costs per VKT are estimated for the Base case and Project case. These are calculated by comparing 5- year historical crash data to historical VKT for the study area multiplied by corresponding urban crash costs by injury type. Historical VKT for the 2013-2018 period is estimated by linearly extrapolating the traffic modelled outputs for years 2019 and 2031. As the growth forecast is relatively flat, the VKT estimates for the historical crash period are logical.

Urban crash costs by injury type are taken from ATAP based on willingness to pay methodology.

Safety benefits for the project option have been calculated by applying appropriate crash reduction factors to the crash history (based on crash cause and location) to forecast a crash rate per VKT if the investment went ahead. Table 4-8 shows the relevant countermeasures and crash reduction factors (sourced from Austroads and BITRE) that align with the proposed infrastructure investment.

Table 4-8 Crash reduction factors for countermeasures in safety analysis

Countermeasure	Crash reduction factor	Source
Grade separation	0.5-0.8 depending on crash type	Austroads
Protected left turn	0.9	Austroads

Countermeasure	Crash reduction factor	Source
Alter road width	0.6	BITRE

Table 4-9 shows crash cost per VKT for the study area for the Base case and Project case. In the analysis these are multiplied by the VKT to estimate the total crash cost for the Base case and Project case.

Table 4-9 Crash cost per VKT values ($2020)

Base case / Project case	Crash cost per VKT
Base case	$0.13
Project case	$0.11

4.2.6 Residual value

Assets with a useful life longer than the analysis period generate a residual value benefit with the project. The straight-line depreciation method is used to calculate the remaining proportion of asset capital. Asset lives for the major category are sourced from Transport for NSW Economic Guidelines[8].

The cost items within each asset class are multiplied by the proportion of remaining useful life to obtain the residual value, as shown in Table 4-10. The residual value is added to the final year of the evaluation period.

Table 4-10 Remaining asset life of Full package 1

Asset class	Asset life	Percentage of useful life remaining for residual value estimate
Pavement	40	28%
Earthworks	150	80%
Bridge	120	76%

[8] TfNSW parameter workbook, Table 64

5. Project costs

5.1 Capital costs

Probabilistic cost estimates have been developed based on 100% PSP concept design cost plans. The methodology for estimating included:

- Assessment of the available design information
- Review of available drawings, documents, and reports
- Preparation of independent quantities
- Preparation of independent estimates of the works (all rates prepared from first principles)
- Assessment of contingency based upon available design detail
- Preparation of probabilistic estimate informed by risk appraisal

As the economic analysis is undertaken in real terms (constant dollars), estimates exclude escalation but include contingency. Costs incurred prior to November 2020 are assumed to be sunk costs and are also excluded.

The estimated total undiscounted construction costs for the proposed Full package 1 option are presented for P50 and P90 contingency levels in Table 5-1.

Table 5-1 Total undiscounted real construction costs ('000s, $2020)

Contingency level	Full package 1 costs
P50	[redacted]
P90	[redacted]

Table 5-2 presents the annual expenditure phasing and P50 expenditure for Full package 1. Capital spend after the opening year of infrastructure is to be spent on finishing costs.

Table 5-2: Phasing and P50 undiscounted construction costs by year

Calendar year	Full package 1	
	Phasing (%)	P50 expenditure ('000s $2020)
2021	3.6%	[redacted]
2022	16.4%	[redacted]
2023	31.0%	[redacted]
2024	29.2%	[redacted]
2025	15.0%	[redacted]
2026	4.4%	[redacted]

Figure 5-1 illustrates the construction costs by year and contingency level.

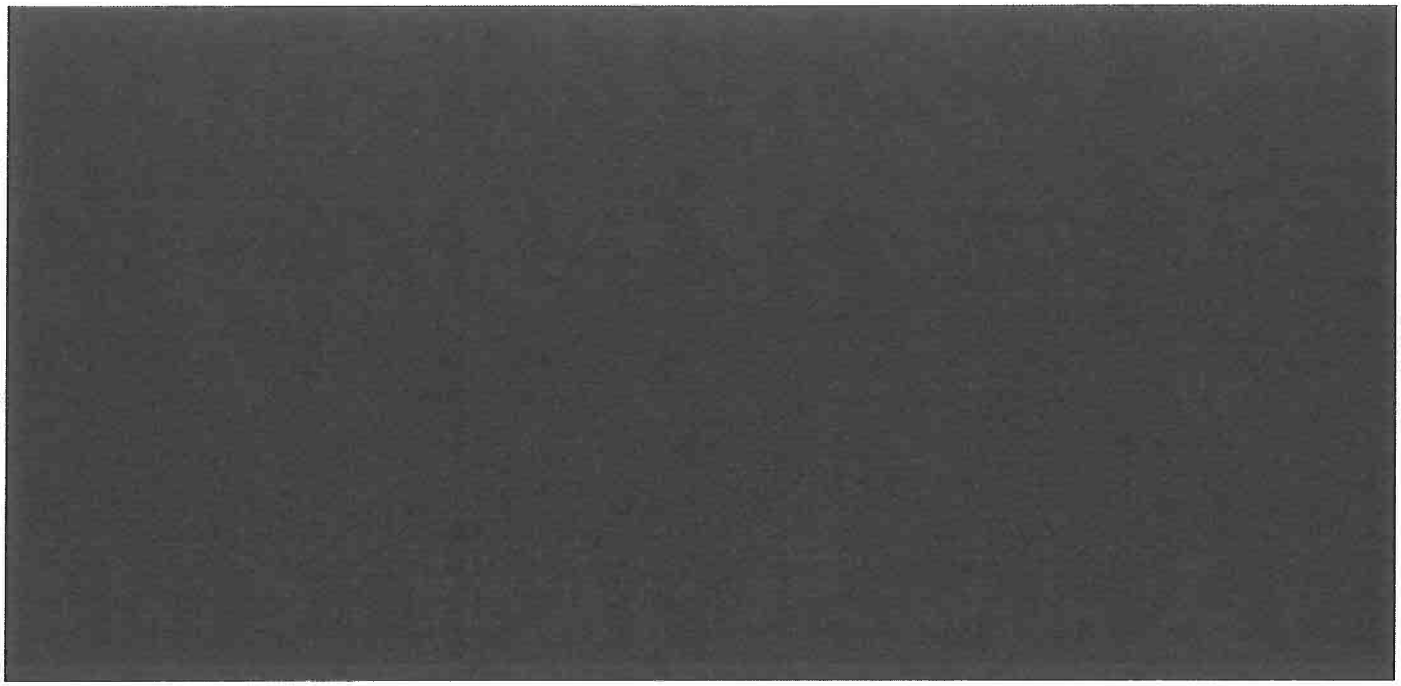

Figure 5-1 Full Package 1 construction cost ($2020)

5.2 Maintenance costs

5.2.1 Pavement

Historical and proposed maintenance expenditure for the Federal Highway, Barton Highway and Majura Parkway in the ACT have been provided for the year 2018-19. This data has been used to calculate an average operating and maintenance cost per kilometre of lane. Different rates have been calculated for Base and Project case for the first 10 years following opening and the remaining 20 years of the of the evaluation period. These annual cost rates account for routine and periodic rehabilitation. These are shown in Table 5-3. The pavement cost for non-highway pavements is assumed to be 50% of the expenditure rate of highways.

Table 5-3 Pavement operating and maintenance expenditure rate, $ per km of lane ($2020)

Operating and maintenance expenditure	Base case	Project case
First 10 years following opening	$75,464	$5,161
Remaining 20 years	$75,464	$75,464

The difference in annual maintenance costs is because of the additional kilometres of lane. The Base case is estimated to be 17.4 kilometres of lane and the Full package 1 is estimated to be 21.6 kilometres of lane as shown in Table 5-4.

Table 5-4 Kilometres of lane

Section	Base case	Project case
Highway	9.9	9.7
Non-highway	7.5	12.0
Total	17.4	21.6

5.2.2 Bridges

The annual maintenance cost for bridges has been derived from the cost of maintaining all bridges in the ACT which have been sourced from the ACT Strategic Asset Management Plan: Chapter 8C Bridges. The total bridge maintenance costs are made up of a re-rating inspection cost (per inspection) and an average strengthening cost per bridge, as shown in Table 5-5.

Table 5-5 Bridge operating and maintenance expenditure ($2020)

Operating and maintenance expenditure	Cost
Re-rating inspection cost per inspection	$2,689
Strengthening cost per bridge	$2,241

The difference in annual maintenance costs is because of the additional number of bridges. The Base case has two bridges while the Project case has four bridges.

6. Results of economic analysis

6.1 Main CBA results

Table 6-1 shows that when discounted at 7% the Full Package 1 achieves a BCR of 1.59 and NPV of $54.82 million. Therefore, the project can be considered economically viable as the NPV is positive and the BCR is greater than one.

The IRR for the full Package 1 is 13.2 percent and the FYRR is 12 percent. The IRR and the FYRR is over the discount rate of 7 percent, further indicating the viability of the project option.

Table 6-1 Summary CBA results (7% discount rate, $2020)

Summary CBA results (7% discount rate)	Full Package 1
Capital cost (P50)	[redacted]
Operating costs	[redacted]
Total costs	[redacted]
Total benefits	[redacted]
NPV	$ 54.82 m
BCR	1.59
IRR	13%
FYRR	12%
NPVI	0.56

The contribution of the various benefit streams is presented in Table 6-2, Figure 6-1 and Figure 6-2.The majority of benefits are comprised from travel time, VOC and safety, contributing a combined 98 percent of total benefits.

Table 6-2 Benefit stream contributions

Benefit stream	Full Package 1
Travel time savings	[redacted]
Vehicle operating cost savings	[redacted]
Safety (crash reduction)	[redacted]
Externalities	[redacted]
Residual value	[redacted]
Total	[redacted]

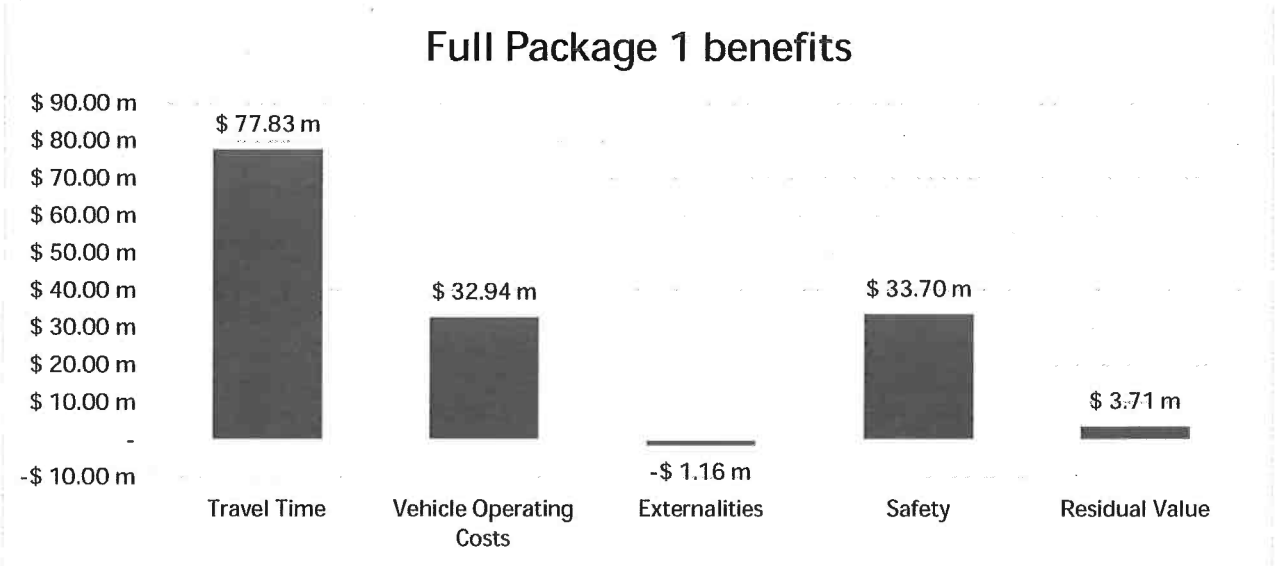

Figure 6-1 Full Package 1 benefits (7% discount rate, $2020)

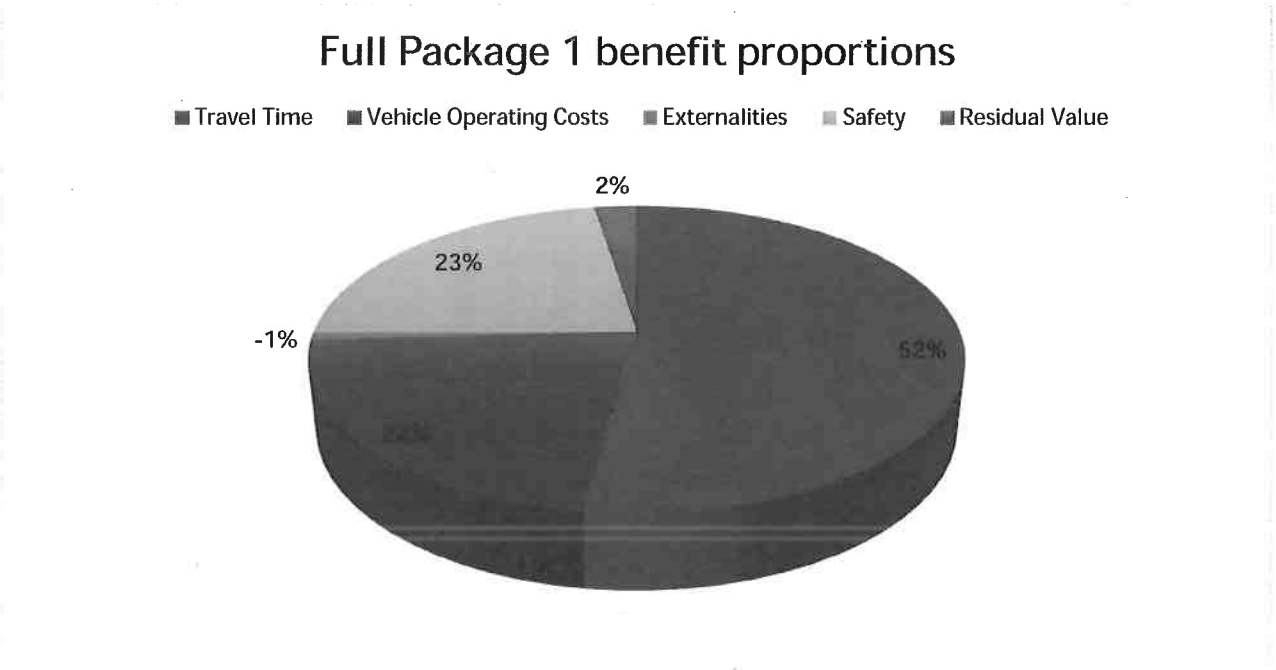

Figure 6-2 Full Package 1 benefit proportions

Figure 6-3 compares the cumulative costs and benefits over the evaluation period and Figure 6-4 illustrates the payback of the investment over the evaluation period. Total expenditure is exceeded by benefits by 2038.

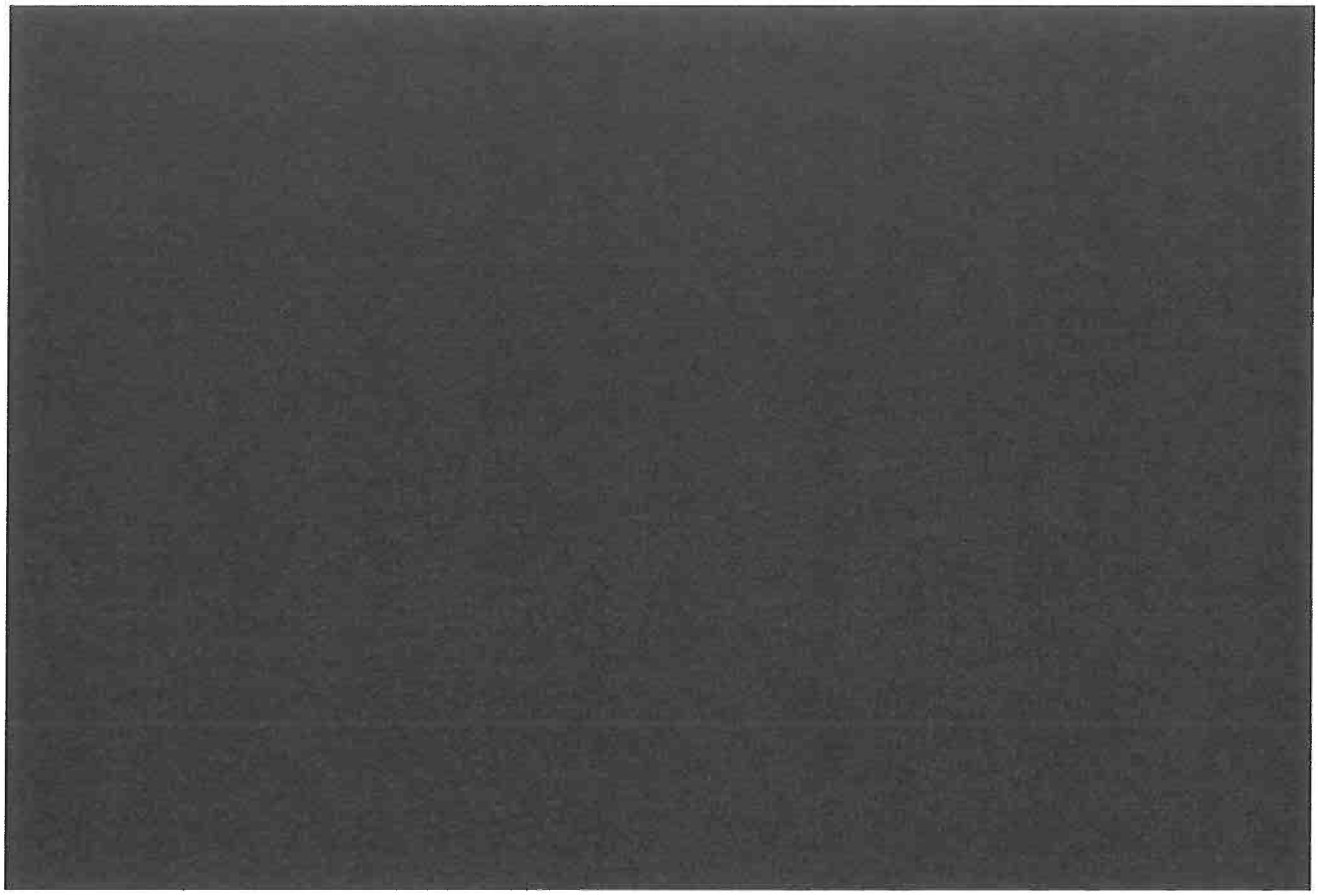

Figure 6-3 Package 1 cumulative NPV (7% discount rate, P50 costs, $2020)

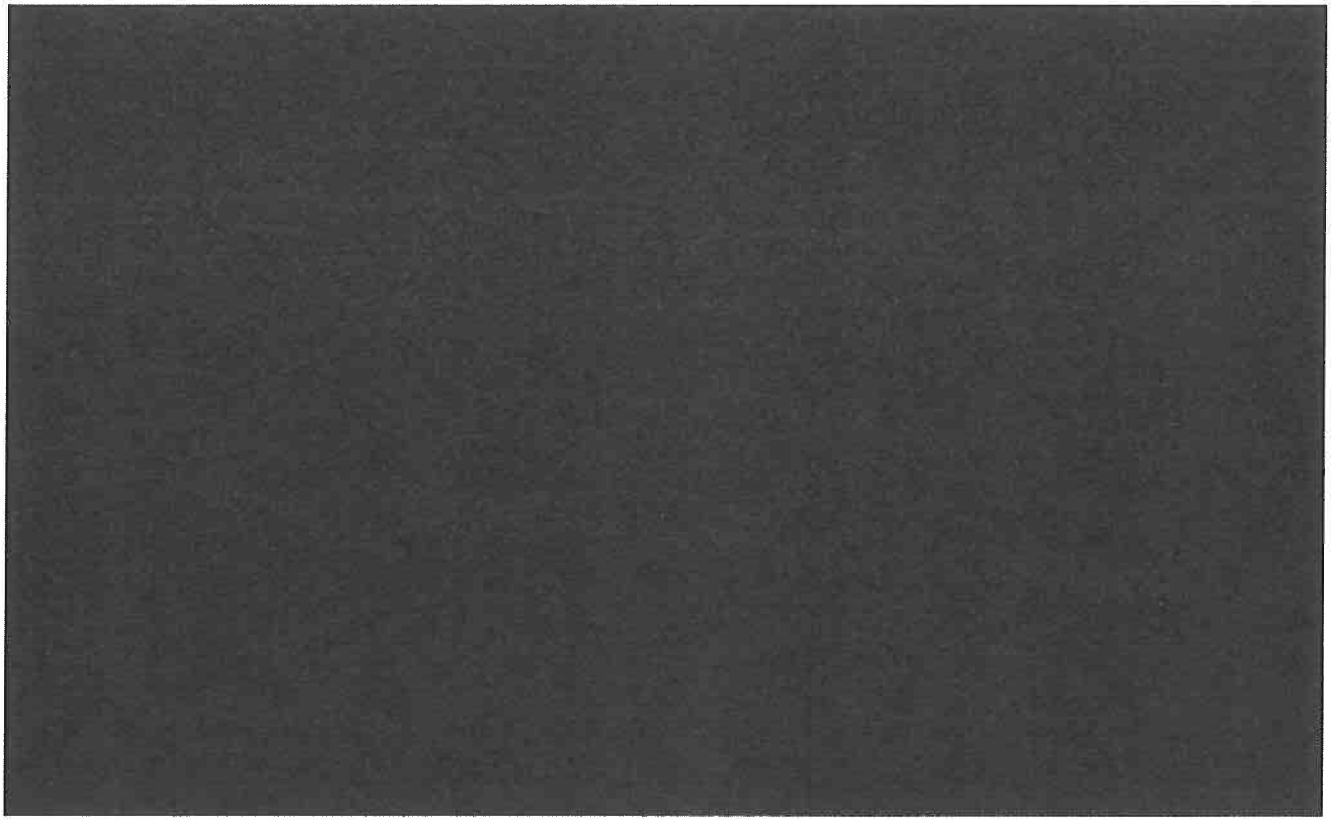

Figure 6-4 Package 1 investment payback (7% discount rate, P50 costs, $2020)

6.2 Sensitivity analysis

Sensitivity tests are undertaken to understand the range of possible outcomes given the uncertainty that is inherent in the analysis.

6.2.1 CBA results for core sensitivity test

Table 6-3 presents the key decision criteria results at discount rates of 4% and 10% with P50 cost estimates. At a discount rate of 4%, the full Package 1 achieves a BCR of 2.25 and NPV of $123.36 million. At a discount rate of 10%, the full Package 1 achieves a BCR of 1.21 and NPV of $18.46 million. The project option at both discount rates is economically viable.

Table 6-3 P50 construction costs at discount rates of 4% and 10%

Sensitivity results	4% discount rate	10% discount rate
Total costs	[redacted]	[redacted]
Total benefits	[redacted]	[redacted]
NPV	$ 123.36 m	$ 18.46 m
BCR	2.25	1.21

Table 6-4 presents the key decision criteria results for the proposed project with P90 cost estimates. At a 7% discount rate, the project option achieves a BCR of 1.51 and NPV of $49.76 million. At a 4% and 10% discount rate, the project option with P90 costs achieves a BCR of 2.13 and 1.15, respectively, and NPV of $118.21 million and $13.62 million, respectively. The project option with P90 construction costs, under all discount rates, is economically viable.

Table 6-4 P90 construction costs

Sensitivity results	7% discount rate	4% discount rate	10% discount rate
Total costs	[redacted]	[redacted]	[redacted]
Total benefits	[redacted]	[redacted]	[redacted]
NPV	$ 49.76 m	$ 118.21 m	$ 13.62 m
BCR	1.51	2.13	1.15

6.2.2 CBA results for additional sensitivity tests

Additional sensitivity tests include:

- Total costs increase by 20%
- Total costs decrease by 20%
- Benefits increase by 20%
- Benefits decrease by 20%
- Benefits decrease by 20% and total costs increase by 20%
- Benefits capped after the last year of traffic modelling (2041)

The results are presented in Table 6-5.

Table 6-5 Additional sensitivity tests (7% discount rate, P50 estimates, $2020)

Sensitivity test	NPV ($ millions)	BCR
Net Capex Increase (20%)	[redacted]	1.32
Net Capex Decrease (20%)	[redacted]	2.02
All benefits increase (20%)	[redacted]	1.91
All benefits decrease (20%)	[redacted]	1.28
Net Capex Increase and net benefits decrease (20%)	[redacted]	1.05
Benefits capped after 2041	[redacted]	1.53

All results are positive NPVs and BCRs that are greater than 1, showing economic viability under the various tests of uncertainty.

7. Conclusions

The full Package 1 project option is shown to be economically viable in the core scenario of P50 cost estimates and seven per cent discount rate. It achieves a BCR of 1.59 and NPV of $54.82 million, with the majority of the benefits coming from travel time (53%), VOC savings (22%) and safety (23%).

When tested for uncertainty, the project option is expected to achieve a BCR of over one and positive NPV in all sensitivity scenarios. These sensitivity scenarios included 4% and 10% discount rates, P90 costs and increase and decrease scenarios for capital costs and benefits.

Therefore, from an economics perspective it is recommended this project option be taken forward to the next stage of development.

Jacobs

Monaro Highway Upgrade Program

Phase 5 - Procurement Options & Delivery Model Final Report

22 February 2021

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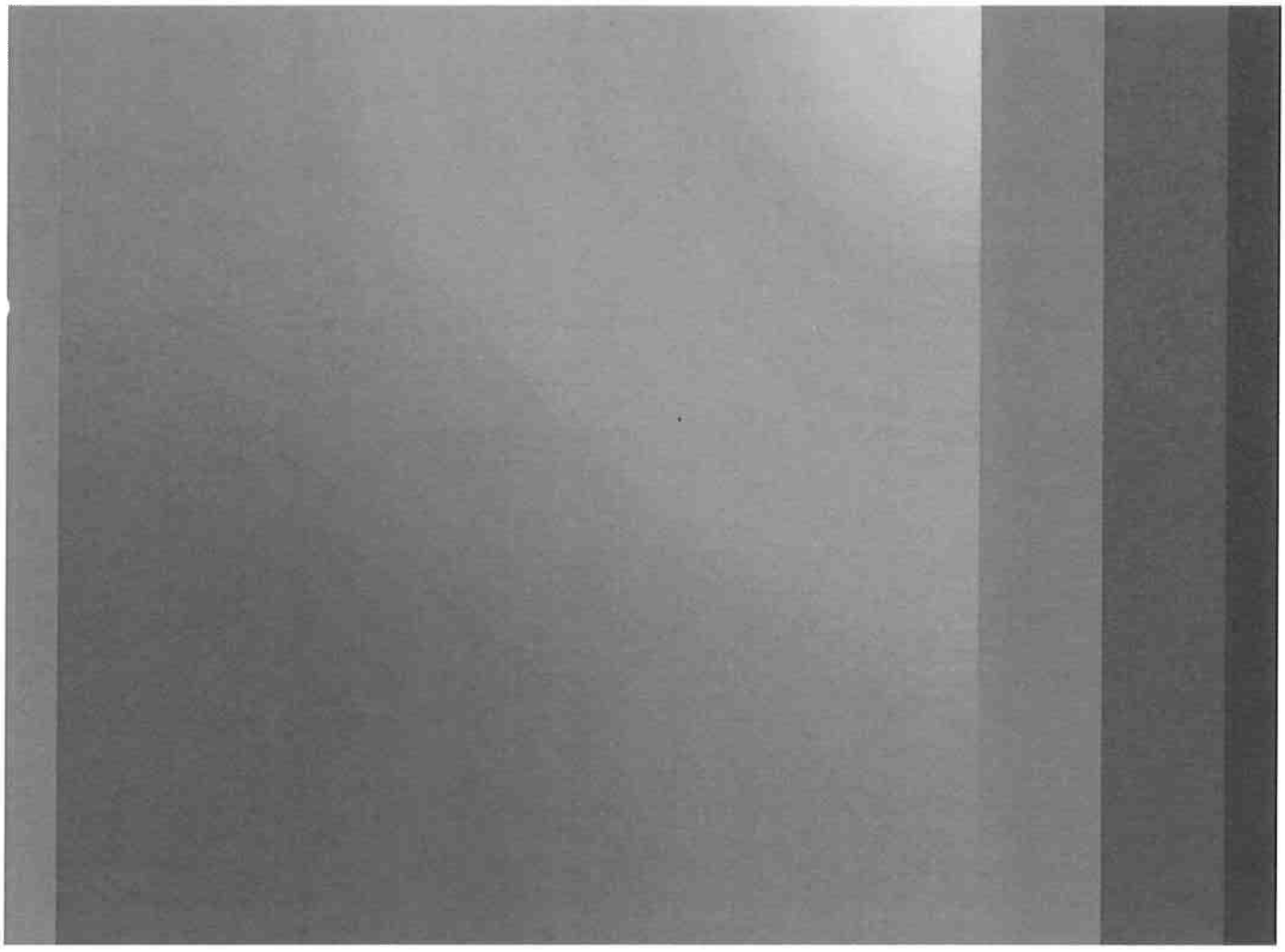

Monaro Highway Upgrade Program

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Executive Summary

Jacobs was 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 included 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 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. 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.

1.1 Study Overview

In addition to the feasibility and preliminary design services outlined above, Jacobs was commissioned to undertake a Procurement Options and Delivery Model Study specifically for the Lanyon Drive Interchange, Package 1B. Jacobs were engaged to provide the services broken down in the following phases:

- Phase 1 - Evaluation and assessment of risks associated with the nature of the works and staging;
- Phase 2 - Evaluation and assessment of procurement and delivery models for the construction of the Lanyon Drive Interchange;
- Phase 3 - 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);
- Phase 4 - Market sounding for the project (key players, market capacity, market appetite); and
- Phase 5 – Final Report., this report explaining the 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.

1.2 Methodology

Jacobs structured the study into five phases.

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

Phase 1 was 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 80 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 was the Delivery Models Phase. In this phase the Study Team reviewed the possible delivery models and procurement options available. The Study Team 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 6 delivery model shortlisted for inclusion in Phase 3 Multi Criteria Analysis and Phase 4 Market Sounding. These included:

- 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) could then be considered in conjunction with the selected delivery model(s).

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

#	Criteria	Weighting
1	Risk Management – Alignment of risks	15%
2	Certainty on Time / Schedule	20%
3	Certainty on Budget	25%
4	Quality, design objectives, Operations & Maintenance	20%
5	Flexibility including future scope & design changes	10%
6	Community & Stakeholder Government	5%
7	Innovation	5%

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.

Weighted Score			Procurement Model					
			Construct Only	PSD&C	DD&C	DN&C	PMA	MC
Criteria ID	Description	Weight	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

Phase 4 was the Market Analysis and Sounding Phase. A key component of the ACT Government Single Assessment Framework process was to undertake 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 was conducted through a market analysis exercise, and consultation with the various industry bodies including the ACT branches of the Master Builders Association (MBA), the Civil Contractors Federation (CCF) and Consult Australia (CA).

The points below summarise the key findings of the market analysis and sounding exercise for the Monaro Highway Lanyon Drive Interchange Package 1B.

- There is sufficient capacity, appetite and experience available in the ACT / NSW region to elicit a comprehensive response to a Design and Construct tender in the first half of 2021.
- There are 43 contracting organisations potentially NPS prequalified on NSW and ACT Government registers able to undertake the works.
- The DD&C approach will provide opportunities for contractors to potentially innovate in the final detailed design to align the design with their proposed methodology / equipment. This may be limited as explained in the industry response to question 18 in Section 4.3.2 of the Phase 4 report.
- The preliminary design stage of the DD&C model should include mitigation of design issues that the Government is best able to manage. These would typically include: development approvals, environmental approvals, co-ordination with utility authorities and geotechnical investigations. Industry is willing to accept some risk on contaminated soil, unexpected environmental conditions, traffic management and industrial relations issues.
- The DD&C model has traditionally mitigated cost issues when technical and constructability issues have arisen during construction.
- The DD&C model is well understood by both ACT Government and the industry.

Phase 5 is the submission of the Final Report to the TCCS Project Management Group for review. The report confirms the selected delivery model based on the above assessments. A final report is to be issued following TCCS feedback.

2. 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

3. Background

3.1 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 Procurement Option and Delivery Model Assessment). 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.

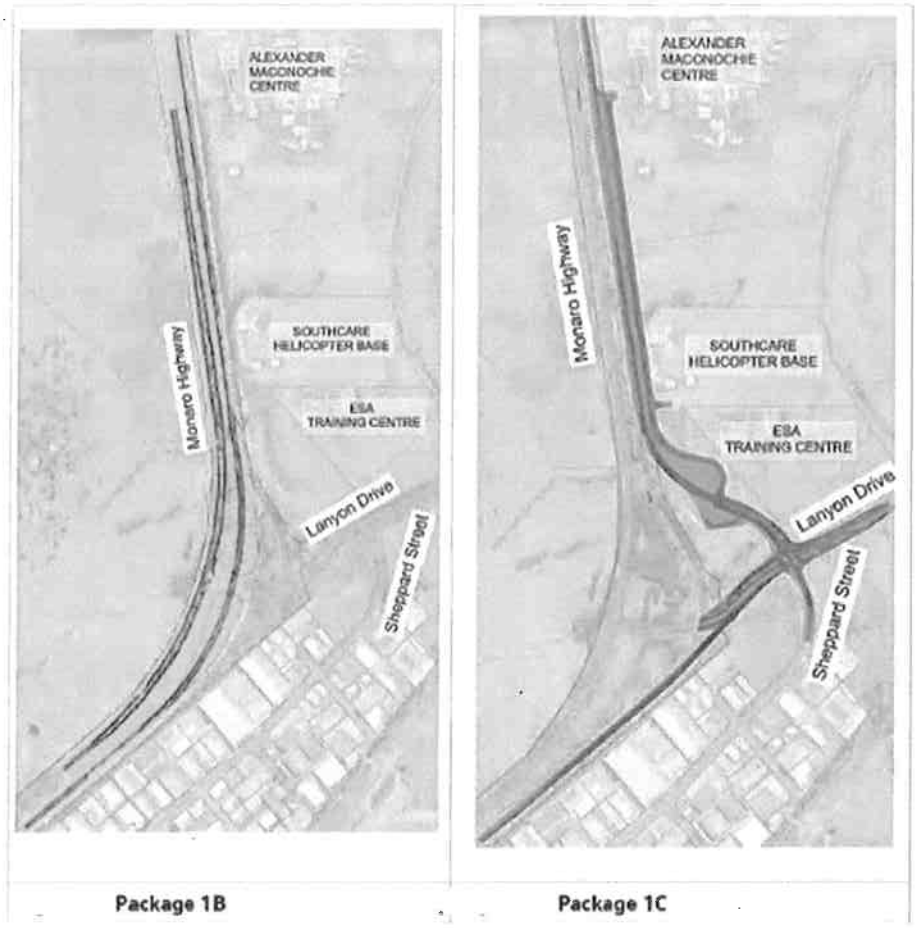


Figure 2 – Monaro Highway Lanyon Drive Interchange Scope of Works Packages

3.2 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 100km/h (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.

4. 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.

4.1 Methodology

Jacobs structured the study into five phases.

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

Phase 1 was 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 was 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 was the Multi Criteria Analysis (MCA) Phase. The MCA generated a ranking of the shortlisted delivery models in order of preference based upon the predetermined criteria and agreed weightings for each criterion and recommended a preferred procurement strategy.

Phase 4 was 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 was conducted through a market analysis exercise, and consultation with the various industry bodies, and incorporated identified comments on identified issues.

Phase 5 is the submission of the Final Report to the TCCS Project Management Group for review. This report confirms the selected delivery model based on the above assessments. A final report is to be issued following TCCS feedback.

5. Final Report

The objective of this report is to amalgamate the previous Stages into a consolidated report

This report has been structured as follows:

Section 6 provides a summary of the Phase 1 Report - Risk and Opportunity Assessment

Section 7 provides a summary of the Phase 2 Report - Delivery Models Review

Section 8 provides a summary of the Phase 3 Report - Multi Criteria Analysis

Section 9 provides a summary of the Phase 4 Report - Market Analysis and Sounding Phase

6. Summary of the Phase 1 Report - Risk and Opportunity Assessment

At the start of the project, the Study Team reviewed the available project documentation which included an initial Strategic Risk Register. The team then developed the project specific procurement risk and opportunity register in advance of a workshop.

The outcome that we hoped to achieve following the workshop was to have a risk register that specifically captured risks and opportunities to support the development of the procurement strategy for the detailed design and construction delivery phase of the Lanyon Drive Interchange component of the project. The risk register was used as part of an overall assessment to shortlist potential delivery models and to inform the weighted multi criteria analysis (MCA) phase to select a preferred project delivery model (s).

6.1 Risk Workshop Purpose

The purpose of the risk workshop was to review and assess procurement related risks associated with the delivery of the Lanyon Drive interchange. The focus of this risk workshop was to identify project risks that can be mitigated using procurement strategies. Where other, non procurement, risks were identified in the workshop they were captured for future reference.

At the risk workshop the Team undertook a qualitative assessment of the risks / opportunities based upon participants combined experience and knowledge.

The completed Risk Register and Risk Workshop Presentation is included in Appendix A.

6.2 Procurement Risk Strategies

At the risk & opportunity workshop, 80 risks were identified and reviewed. The workshop focused on reviewing the identified risks in the context of the ability for them to be mitigated through an appropriate procurement method, with the risk being maintained by the party best placed to manage them. Each risk was mitigated using one of 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

6.3 Risk Overview - Distribution of Risk Categories

The Table below shows the projects overall risk profile and ACT Government appetite based on the identified risks. The ACT would own 43 risks, transfer 20 to the designer and/or contractor and share 17 risks.

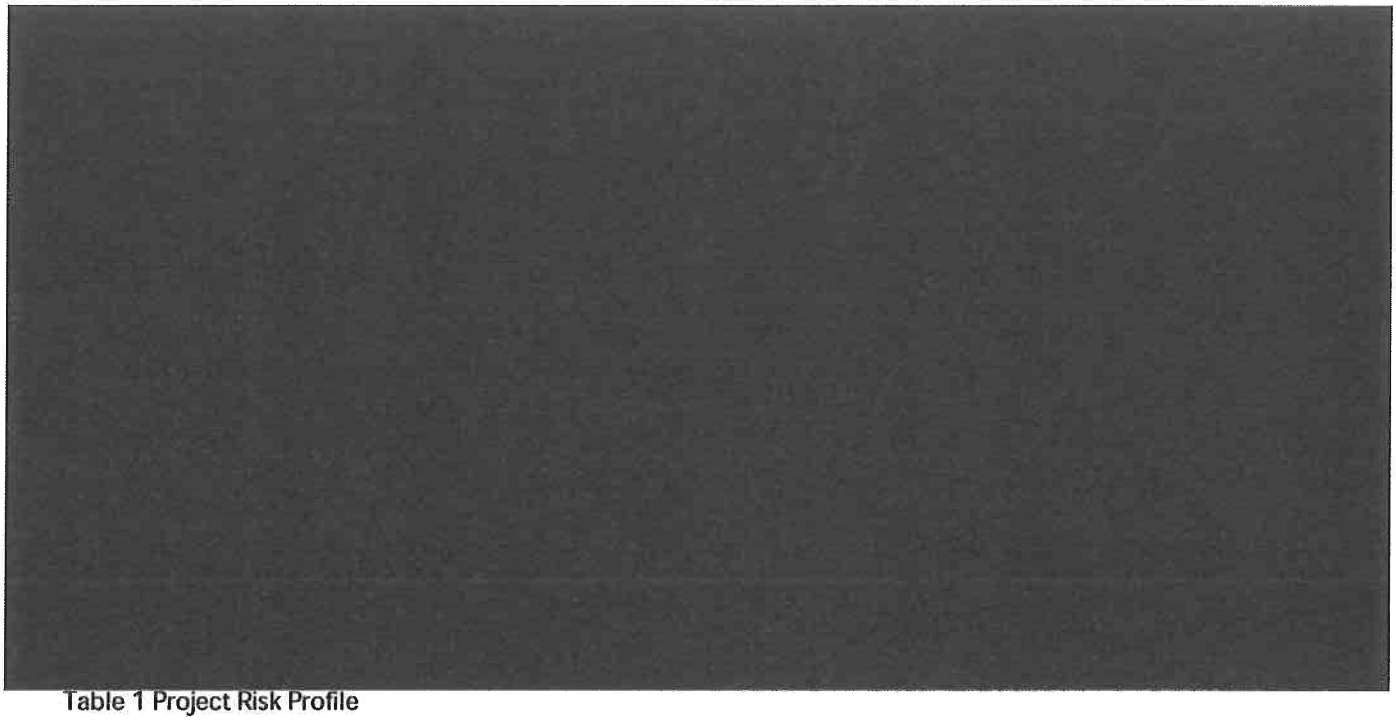
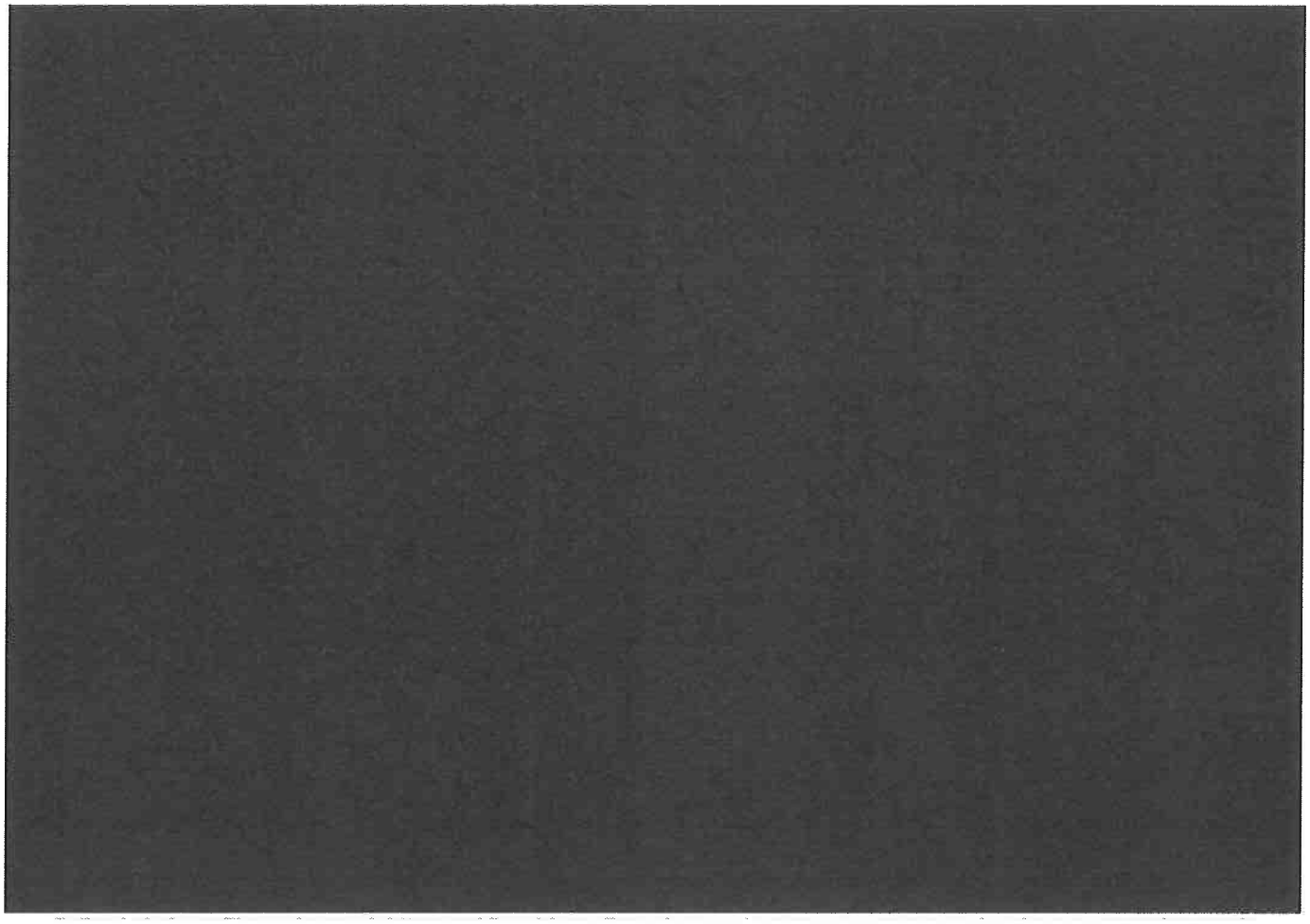


Table 1 Project Risk Profile



7. Summary of the Phase 2 Report - Delivery Models Review

To achieve the project objectives, an appropriate well considered procurement strategy had to be developed. This procurement strategy needed to support the 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 and other service providers.

The procurement delivery strategy included 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.

The objectives of the Procurement Options and Delivery Study in Phase 2 were 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.

The Phase 2 Delivery Models Review Report is in Appendix B

7.1 Delivery Models

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 needed to be reflected in the procurement strategy.

The Study reviewed the characteristics of each delivery model; including their:

- Typical contract structure,
- Typical delivery sequence, and
- Suitability based on the ACT Governments SAF Business Case Guidance Notes .

7.2 ACT Government SAF Business Case Guidelines Commercial Assessment Criteria

ACT Government SAF Business Case Guidelines provided the commercial criteria used by ACT Government to select the appropriate delivery model following an assessment of the project risks. It 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.	Is the delivery model flexible and can it easily accommodate uncertainty and variation?

Criteria	General comments	Typical questions
	• Latent conditions i.e. aging pipes, etc. • 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 2 SAF Business Case Guidelines Commercial Assessment Criteria

7.3 Delivery Models Reviewed

The following 12 delivery models were 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)

7.4 Delivery Models considered for Phase 3 Multi Criteria Analysis

The review of the delivery models recommended 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) could then be considered in conjunction with the selected delivery model(s).

The scale of the project did 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 are 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.

In Appendix A of the Phase 2 Report, there is additional detail tabulating 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.

8. Summary of the Phase 3 Report - Multi Criteria Analysis

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).

8.1 Multi Criteria Analysis

The Study 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 the Phase 3 Multi Criteria Report in Appendix C of this Report. The Presentation slides for the workshop can also be found in Appendix C.

#	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 3 – Adopted Multi Criteria Analysis

8.2 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 1of the Report MCA Report in Appendix C 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 was at the time being tendered for delivery in December 2020. Utilities construction work was 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.

8.3 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 Scoring Analysis of the Phase 3 MCA Report in Appendix C. Table 4 below shows the final weighted scores as per the results of the workshop:

Weighted Score			Procurement Model					
			Construct Only	PSD&C	DD&C	DN&C	PMA	MC
Criteria ID	Description	Weight	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 4 – Weighted Scores for each Delivery Model against each Criteria

9. Summary of the Phase 4 Report– Market Analysis and Sounding

9.1 Phase 4 Objective

The objective of Phase 4 was to complete the Market Analysis and Sounding Phase which is a key component of the ACT Government Single Assessment Framework process to undertake market sounding to identify key players, determine market capacity, determine market appetite for the preferred delivery model and consider whether there is enough competition to drive 'value for money' outcomes.

9.2 Phase 4 Approach

The study team followed the approach outlined below:

- Identified Key Players - The preliminary prequalification for Monaro Highway was assessed against the total project budget of $200m which resulted in an original prequalification level of Financial F75 Road R4 and Bridge B4. The initial analysis of the market capacity was undertaken by reviewing the ACT Prequalified Contractors Under the National Prequalification System for Civil (Road and Bridge)

- This was initially undertaken in April 2020 and reviewed in October 2020 when the revised National Prequalification System for Civil (Road and Bridge) Construction Contracts was released.

- Assessment of opportunities for local industry involvement. – Reviewing of early contractor works and other packages within Lanyon Interchange and Isabella Drive.

- Industry engagement – Engagement with the ACT branches of the Master Builders Association (MBA), the Civil Contractors Federation (CCF) and Consult Australia (CA) to undertake market sounding of the proposed Develop Design and Construct Delivery Model from the point of view of the civil engineering contractors and civil engineering designers. This was undertaken in two stages:

    - Stage 1- Questionnaire: A project briefing document and questionnaire was submitted to the three industry bodies.

    - Stage 2 - Industry Briefing Workshop: A workshop was held 18th November 2020 and attended by MBA, CCF and CA who represented civil designers and contractors. A number of suppliers also attended the workshop to get an overview of the project and determine opportunities to be involved in the project at a later stage.

9.3 Identify Key Players and Market Capacity

The preliminary prequalification for Monaro Highway Upgrade Program was originally estimated as F75 R4 & B4. The potential capacity of the market was then identified by reviewing the National Prequalification System register for the ACT Government and there were seven contractors that met this criteria. The TfNSW prequalification register was then reviewed and a further 30 prequalified Contractors were identified.

Throughout the project we revised the prequalification threshold to F50, R4 and B3 taking into consideration the specific scope of Lanyon Drive Interchange project being smaller than the whole Monaro Highway Upgrade Program and the desire to generate more opportunities to local contractors. This review prequalified a further seven contractors with 2 in the ACT and 5 from NSW. This meant that the market capacity has 43 Contractors that meet the current proposed prequalification level for the project. It should be noted that 16 (of the 43) Contractors prequalification status have already expired.

In assessing the list of National Prequalification register, a further ten Contractors were identified that were Pre-qualified in ACT/ NSW and had missed the prequalification criteria by 1 element, eg they had B2 instead of B3 but had R4 and a Financial limit of $50m or over.

9.4 Market Appetite

The questionnaire and market sounding engagement confirmed that there is a strong appetite to tender and deliver the project. The market sounding indicated a preference for Traditional/ Construct Only but were comfortable using a Develop Design and Construct (DD&C) delivery method.

9.5 Local Industry Opportunities

There are possible opportunities as a Principal Contractor for the project for ACT based contractors with the correct level of prequalification. Other opportunities for local industry involvement may be available through sub-contract works, design works and supply contracts to the Principal Contractor. During the industry briefing the participants advised that they were not too keen to partner up with T1 Contractors, they however welcomed the opportunity to team up locally. In addition, the market was very grateful to be given advance notice of the early utilities work, as well as the future projects around Package 1C at Lanyon Drive and the Isabella Interchange that will include detail design, early relocation of utilities and construction packages.

9.6 Value for money / competition

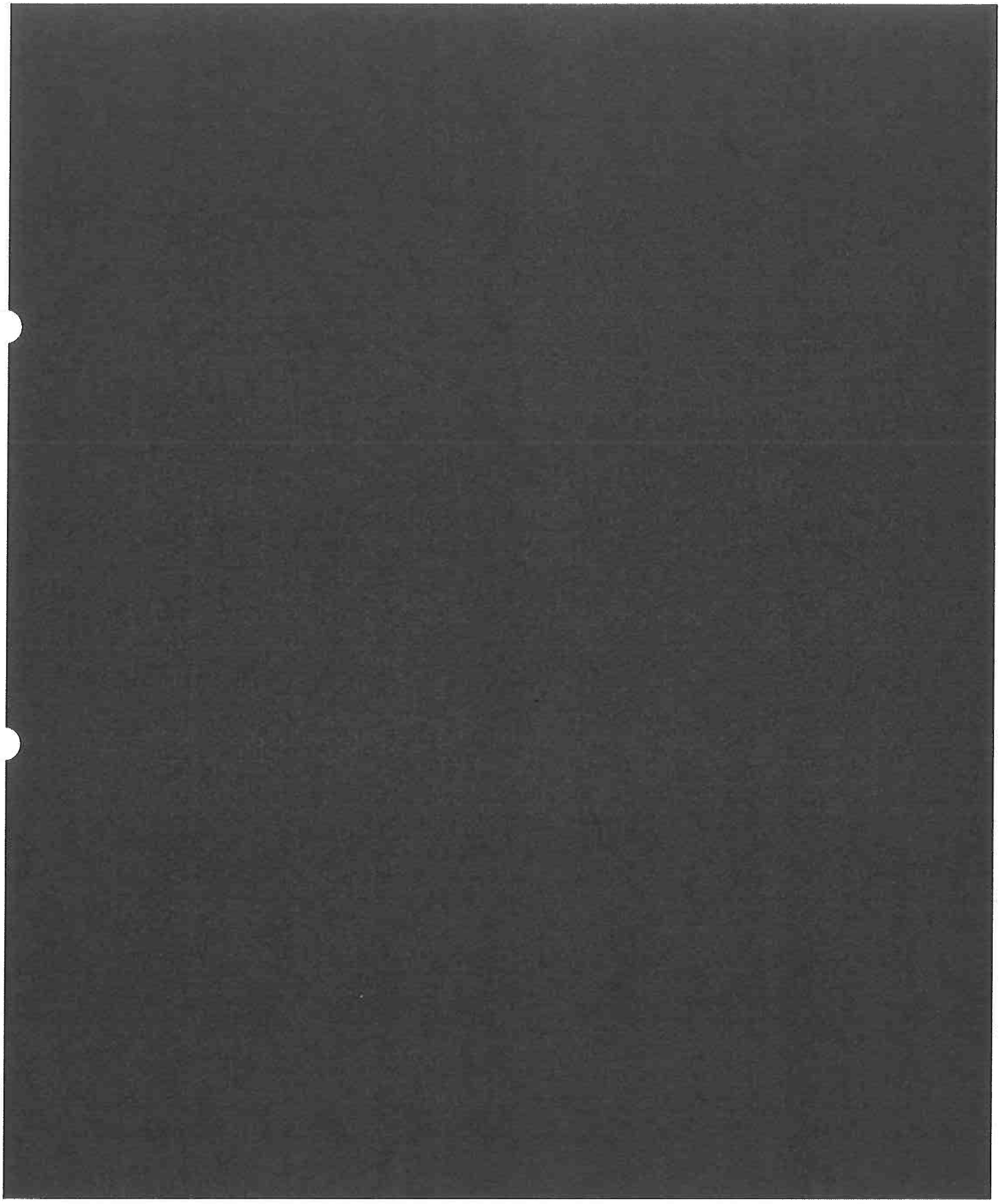
There is a potential pool of 43 civil engineering contractors who are suitably prequalified on the ACT Government and NSW NPS prequalification registers. This indicates that there is sufficient competition to achieve a value for money outcome in tendering.

9.7 Summary of market analysis and sounding findings

The points below summarise the key findings of the market analysis and sounding exercise for the Monaro Highway Lanyon Drive Interchange Package 1B.

- There is sufficient capacity, appetite and experience available in the ACT / NSW region to elicit a comprehensive response to a Design and Construct tender in the first half of 2021.
- There are 43 contracting organisations potentially NPS prequalified on NSW and ACT Government registers able to undertake the works.
- The DD&C approach will provide opportunities for contractors to potentially innovate in the final detailed design to align the design with their proposed methodology / equipment. This may be limited as explained in the industry response to question 18 in Section 4.3.2 of the report.
- The preliminary design stage of the DD&C model should include mitigation of design issues that the Government is best able to manage. These would typically include: development approvals, environmental approvals, co-ordination with utility authorities and geotechnical investigations. Industry is willing to accept some risk on contaminated soil, unexpected environmental conditions, traffic management and industrial relations issues.
- The DD&C model has traditionally mitigated cost issues when technical and constructability issues have arisen during construction.
- The DD&C model is well understood by both ACT Government and the industry.

10. Appendix A – Phase 1 Risk Register and Presentation



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Risk Management Workshop

Monaro Highway Upgrade Program

Lanyon Drive Interchange

Workshop Facilitation Guidance

- Participation – all contributions considered and included in the ideas, solution or decisions that emerge
- Cameras on please – lets make this digital workshop as real as we can
- Have patience – things may take slightly longer than normal and not as easy as being all in the same room
- Be polite and courteous to each other
- Interruptions and distractions – Please be on mute if you have a noisy background
- Parking lot – Need to maintain momentum, capture unresolved items on the Teams chat function
- Outcomes, actions and questions will be properly recorded and circulated
- We will have a break around 10:30 or when there is a natural point
- Technological issues – Backups etc

Agenda

Item		Presenter	Time
1	Login & IT check	All	08:50
2	Welcome and Introductions around the virtual room	All	09:00
3	Culture of caring moment	Jonathan Key	09:10
4	Project Overview /Introduction	Stuart Oxborrow	09:15
5	Risk Management overview and workshop context	Jonathan Key	09:25
6	Risk Identification - discuss top procurement risks prepared in advance	All	09:35
7	Risk Analysis (Quantitative) – Consequence and likelihood	All	
8	Mitigation/ Treatment Strategies -		
9	Break	All	10:30
10	Continue,	All	10:40
11	Review other "Non Procurement " risks & Identify new ones	All	11:20
12	Wrap up and next steps	Jonathan Key	11:50
13	Close		12:00

Introductions

- Name
- Organisation / department
- Role on the Monaro Highway upgrade project

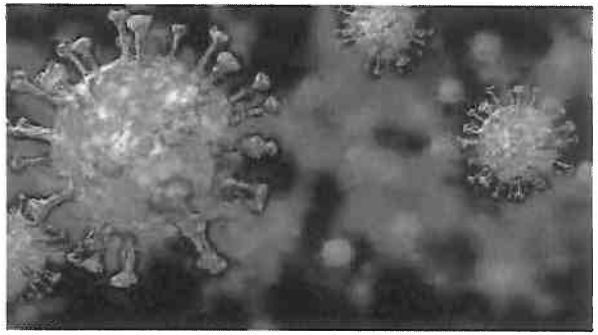
Attendees

- Stuart Oxborrow – Senior Engineer
- Nathan Greig – Senior Manager
- Leon Mayers – Project Procurement Officer
- Sri Tharan - Procurement
- Darren Smith – Director Civil Procurement
- Jeremy Smith – Exec Branch Mgr Infrastructure Delivery
- Meghan Oldfield – Exec Group Mgr Infrastructure Delivery & Waste
- Catriona Vigor - Treasury
- Elizabeth Kirkham- Treasury
- Jeff Hart – Director Capital Framework
- Ben Hubbard – Senior Director Traffic Mgt & Safety
- Kristine Scheul – Legal & Contracts
- Owen Earl – Director Infrastructure Planning
- Jerome Catbagen – Director Infrastructure Planning
- Russell Thomson – Jacobs Project Manager
- Kharina Protasiewtch – Jacobs Project Engineer
- Jonathan Key – Facilitator/ Risk lead
- Mark Anslow – Jacobs Commercial Mgt
- Joerg Saxler – Jacobs Project Mgt
- Wilhelmina Blout – Treasury - Tentative
- Neil Pincombe - Apology
- Shelly Fraser - Apology

Work Health Safety - Culture of Care

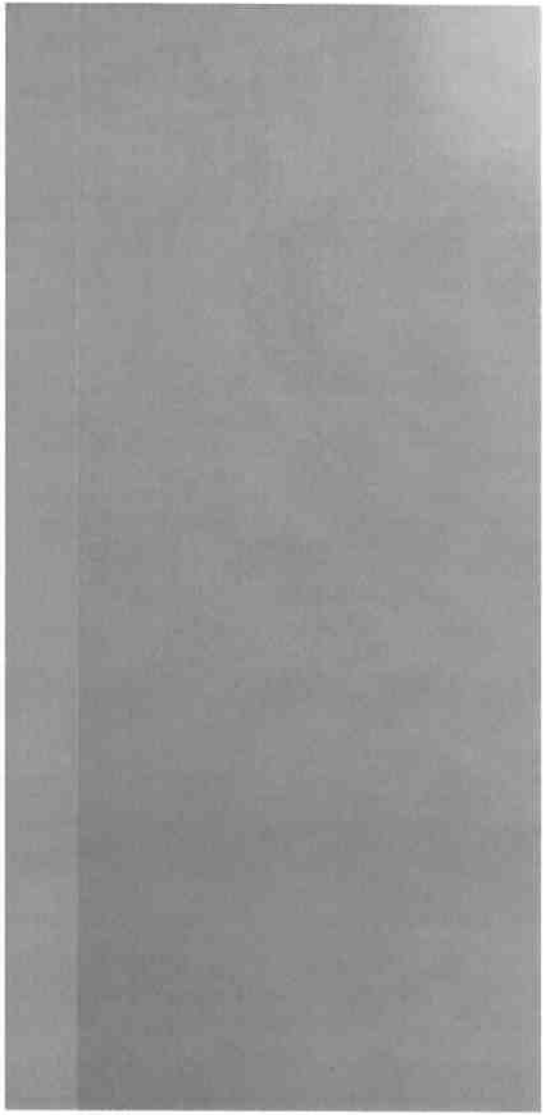
Source John Hopkins 16/4/2020 Time 06:00

	Confirmed cases	Deaths	Recovered
Global	2.034m	133k	510k
Australia	6.44k	63	2.2k
UK	99k	12.8k	365k
USA	619k	27.1k	51k
Jacobs	63	2	

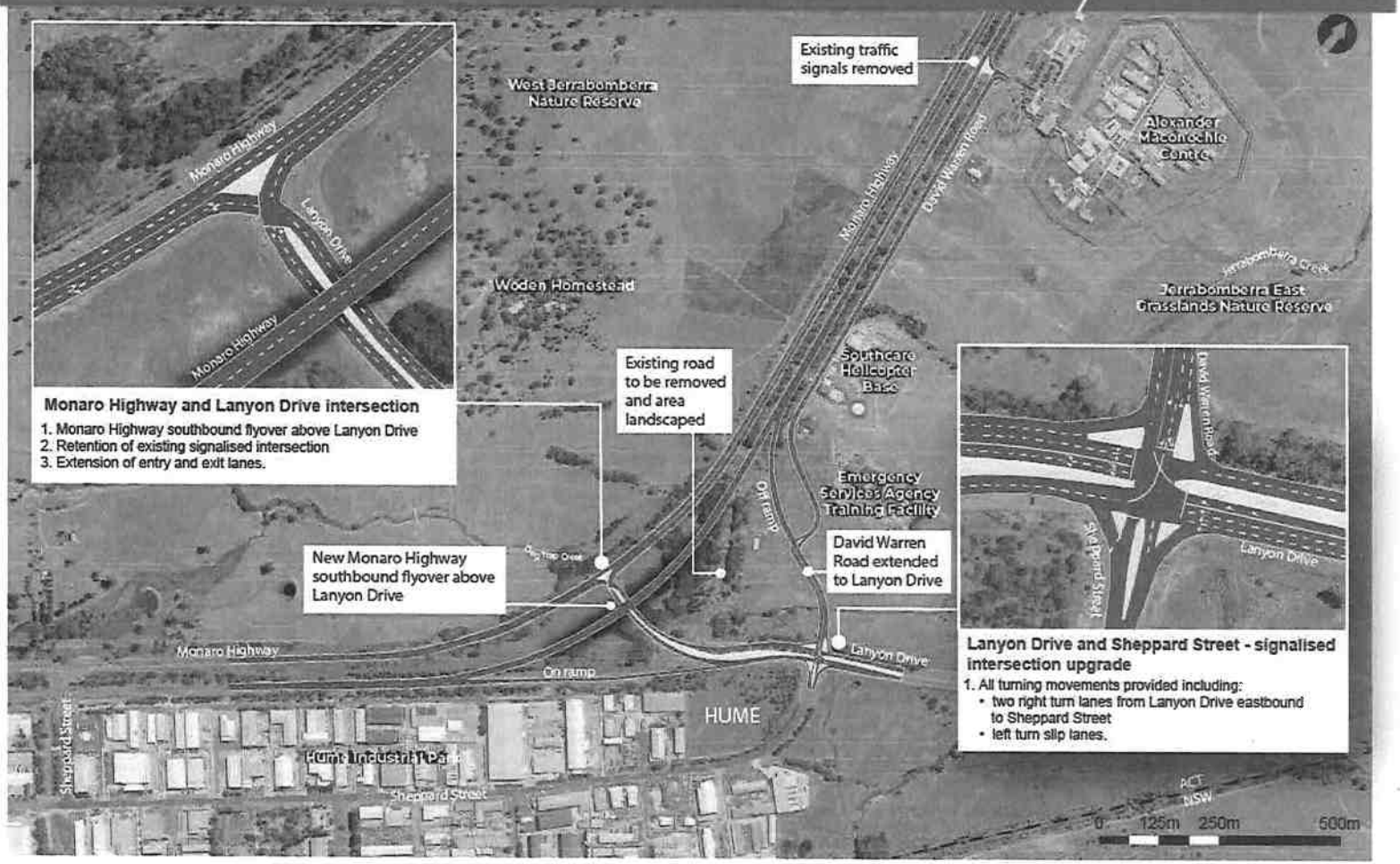


- All of us in some capacity are experiencing COVID-19 stress, anxiety or upset in our lives, and regardless of its intensity, we all need to be proactive in protecting our wellbeing and mental health at this time. There are a lot of things we can do……
- Online training courses for: Mental health support, compassion focused training, self isolation resilience, fatigue and sleep, healthy eating and physical wellbeing, working from home techniques, positive parenting
- COVID 19 negative side effects – financial stress, divorce applications, domestic violence & abuse
- COVID 19 – positive reflection – Community spirit, rainbows, teddy bears, future baby boom, fundraising, heath care and essential workers valiant effort, government and world wide agencies cooperating etc
- 260m long Albiano Magra bridge rebuilt after WW2 in Tuscany northern Italy collapsed on 8th April.
  2 minor injuries due to COVID-19 lockdown. Lack of ongoing investment and maintenance by the government and operator. (Genoa August 18, 43 Deaths).

Project overview & Success Criteria



Monaro Highway and Lanyon Drive upgrade



Project Success Criteria

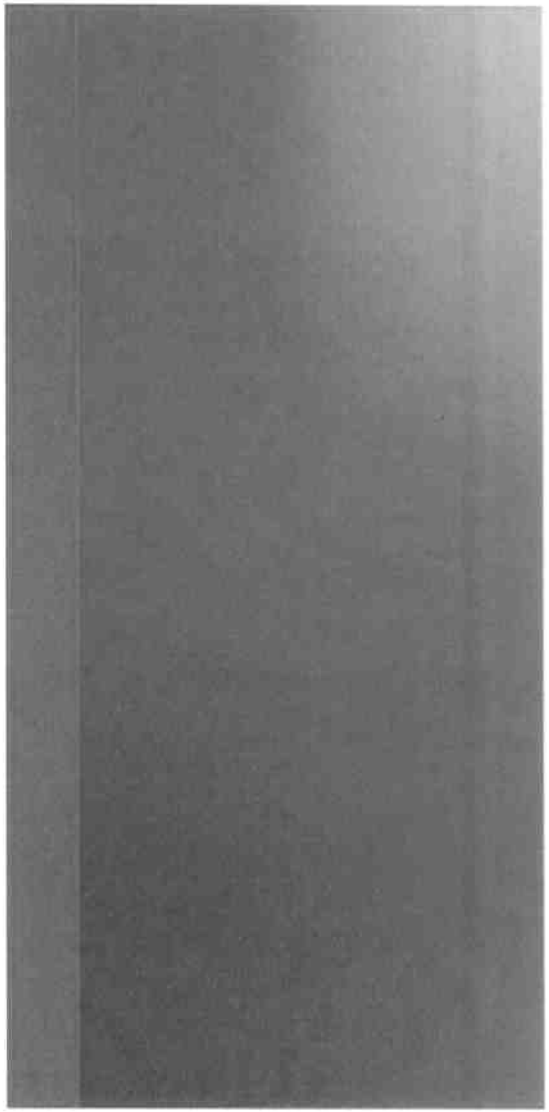
Project Delivery

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

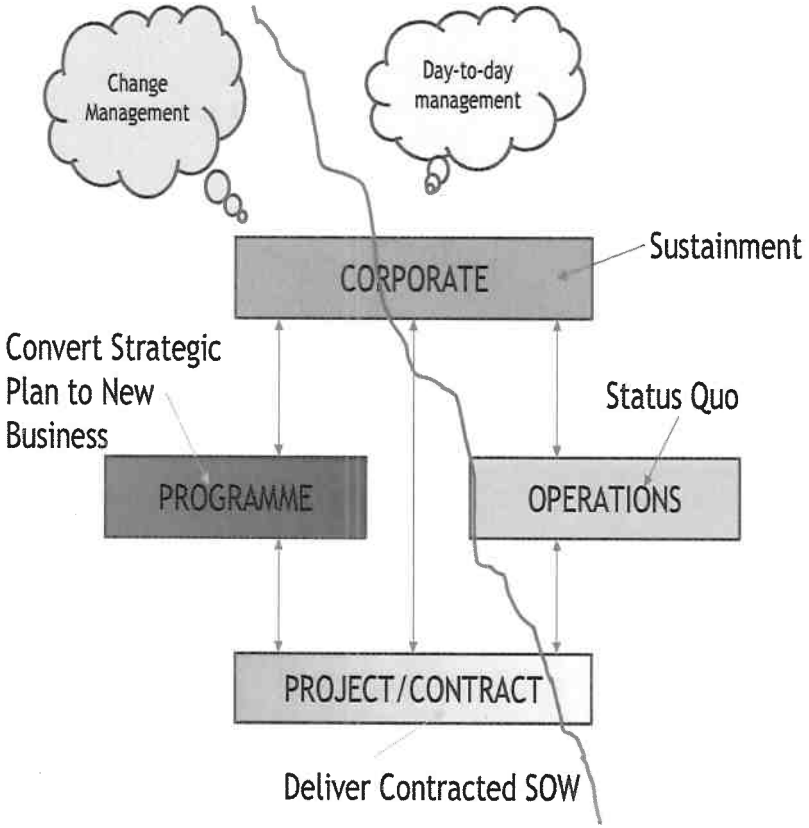
Project Performance Outcomes

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

Introduction to Risk Management



The Benefits of an Integrated Risk Model



- **Risks and opportunities are across all levels of an organisation. The risk appetite at the corporate level will determine the overall "Riskiness" at each level**

- Develop and maintain a "risk culture" that aims for a:
  - 'No Harm' approach so that no-one is harmed at work
  - zero defects or non-conformances
  - on or under planned budget and schedule
  - better than planned performance against the Project's integrated master schedule
  - meet all engineering goals
  - environmental and regulatory requirements are met safely.