

FINAL Options Workshop Report Phase II

Cyclone Pam Road Reconstruction Project

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ADB Project No. 49319
Cardno Project No. AC85900



Prepared for
Ministry of Infrastructure and Public Utilities

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Contact Information

Cardno Emerging Markets

Level 11
Green Square North Tower
515 St Pauls Terrace
Fortitude Valley
Queensland
Telephone: +61 7 3369 9822
Facsimile: +61 7 3369 9722
rhys.thomson@cardno.com.au
www.cardno.com

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Executive summary

The Options Workshop for the Cyclone Pam Road Reconstruction Project (CPRRP) was held on 23 March 2017. The workshop was hosted by Public Works Department (PWD), facilitated by the design and supervision consultant (DSC) for the Project, Cardno, and was attended by PWD engineers and managers, ADB representatives and various representatives from government.

The purpose of the workshop was to update and inform stakeholders on the progress of the Project, and to hold discussions about the suitability of the options developed for each site under the Phase II scope of works. Background to the workshop was provided by information gathering from site, communities and stakeholders. This led the DSC's development of possible options at each identified location. Objectives, relative priority, options and costings were completed for each site ahead of the workshop.

The method at the workshop was to present this background and then present and open discussion on the suitability of options for the sites.

Several key issues were raised during the workshop, presented below.

- > The option selected at each site must genuinely address the overall purpose of the Project – to build back better after TC Pam, in such a way that a similar event will not cause the same asset damage, loss of connectivity and associated socioeconomic hardship
- > Economic value of a new structure at Prima must be weighed against the value of securing the key point of vulnerability on the ring road at Epule
- > Further considerations for Tassiriki:
 - Consult with PVUDP on their drainage basin strategy, their water quality monitoring and their use of fibrecrete for footpaths
 - Meet Department of Lands regarding their drainage policy for future subdivisions
 - In developing the infiltration basin, avoid the creation of a mosquito breeding area and a safety hazard
- > Speed management required for both Ulei and Tanoliu 2-lane structures
- > At Epule, all options, except reuse of the existing alignment, will induce land use issues

These comments have led to a revision of options, prioritisation and costings since the workshop. The outcomes, preferred option and estimated costs are presented in **Section 4**. The preferred is summarised below.

ID	Site	Option description	Preferred option	Estimated cost of preferred option (USD)
BR01	Prima	Construct series of flood relief culverts and raise the road. Retain Phase I bridge refurbishment works	2	500,000
BR03	Tanoliu	Replace existing bridge with a 2-lane, triple cell concrete box culvert with footway	2	280,000
BR04	Epule	New bridge on alignment (Option 3)	3	2,800,000
RD04	Tassiriki Road Upgrade	Base option for pavement and drainage reconstruction, plus footpaths, bus bays, intersection improvements and landscaping	Base + all	4,800,000
BR08	Ulei Bridge	Replace existing bridge with a 2-lane, single cell concrete box culvert with footway	2	180,000

ID	Site	Option description	Preferred option	Estimated cost of preferred option (USD)
CT11	Saama Culvert	Lined drain and twin cell pipe culvert	2	50,000

The current funding envelope is USD 8.5 million, noting that this must incorporate a fee of up to USD 500,000 for supervision and consulting during construction as well as an estimated USD 1.5 million of general item costs. The total cost of the preferred options is estimated at USD 8.53 million. The feasibility study, detailed cost estimates and economic analysis are yet to be undertaken.

During feasibility and the economics analysis, it may become apparent that the recommended options based on economic rates of return, will sum to more than the available funding. At this point, the government and ADB may need to discuss the possibility of additional funding or reducing the scope.

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1 Introduction

1.1 Background

The Cyclone Pam Road Reconstruction Project (CPRRP, the Project) aims to accelerate economic and social recovery in Vanuatu’s Cyclone Pam-affected provinces. The development objective is to restore socioeconomic activities of people around the Efate ring road to pre-cyclone levels.

The Project is being funded by the Asian Development Bank (ADB) and the Government of the Republic of Vanuatu (the “government”) under a loan and grant agreement.

Cardno Emerging Markets (Australia) is the design and supervision consultant (DSC) for the Project, working as a Project Management Unit (PMU) inside the Public Works Department (PWD) of the Ministry of Infrastructure and Public Utilities (MIPU). Cardno is delivering services in detailed design preparation, construction supervision and monitoring and evaluation for what is now known as Phase I. Tenders for Phase I civil works are currently under evaluation.

Cardno was requested to undertake feasibility and design services for Phase II. This requires support to PWD during the feasibility and detailed design stages for:

- > Consideration of revised scopes of works at Prima, Tanoliu and Epule
- > Assessment of three new sites, at Tassiriki, Ulei and Saama

1.2 Options Workshop

Phase II feasibility study commenced on 13 March 2017. To provide transition between gathering of raw data and performing detailed site assessments for the feasibility study, data has been assimilated and translated into possible works options at each site. This provides shape to the potential scope of work at each site, which in turn provides an adequate level of detail for concept design, social and environmental assessments.

The options development process took into account the views of the community, stakeholders and each consulting discipline. Following a briefing to the Vaturisu Council on 17 February 2017, initial community consultations took place at Epule, Emua and Tanoliu on 21 March 2017.

By integrating the information and ideas shared in these meetings, three options were developed for each site. The next step in the process was to consult with government stakeholders in more detail, about the feasibility and suitability of each option. To achieve this, an Options Workshop was held on 23 March 2017 in PWD’s Conference Room.

1.3 Invitees

The list of invitees for the Options Workshop is tabled below. A list of attendees is included as **Appendix B**.

Table 1-1 Options Workshop invitees

Name	Organisation	Name	Organisation
Tony Amos Sewen	MFEM	Chris Marlow	MIPU
Henrickson M.	MFEM	Paula Baleilevuka	MIPU
Gregoire Nimbtkik	DSPPAC	Uravo Nafuki	MIPU
Flora Bani	DSPPAC	David Gibson	Climate Change
Charley Namaka	DSPPAC	Reedly Alfred Tari	DEPC
Nancy Wells	ADB consultant	Jean Marc Pierre	Lands

Richard Farrell	ADB consultant	Brooks Rakau	Geology and Mines
Samuel Namuri	MIPU	Michel Kalworai	Shefa Provincial
James Hakwa	MIPU	Cardno feasibility and design team	Cardno
Harold Allanson	MIPU		

2 Purpose of workshop

The purpose of the Options Workshop was to:

- > Update stakeholders on the progress of the Project
- > Present options that are being considered at each site for Phase II
- > Hear from stakeholders
- > Understand the most likely option for each site and the issues related

The workshop was designed as the key to the transition between data gathering and the assimilation of the data into scopes of work.

Expected outcomes from the workshop were to achieve:

- > A common understanding of the status of the Project
- > Stakeholder highlighted issues
- > Understanding of the most likely option for each



Figure 2-1 Options Workshop in progress

3 Methodology

3.1 Activities prior to workshop

Prior to the Options Workshop, several preparation activities were required. These activities were part of the ongoing development of the Phase II scope. These activities fall into four categories, described below.

- > Information gathering – find what's there
- > Site prioritisation – determine what's most important
- > Options development – explore what's possible
- > Costing – estimate what it will cost



Figure 3-1 Community consultation at Epule village, 21 March 2017

Information gathering – Following the Phase I experience, much information was already known about the communities, challenges, issues and limitations that are relevant to developing the scope of works. Further specific information was gathered about communities through community consultation. These communities described the type of community facilities that would be appreciated and expressed interest in being involved in the project further.

Information about the ground conditions was taken through topographical surveys and geotechnical investigations. These investigations are ongoing and only very preliminary information was available at the time of the workshop. Traffic data was obtained during Phase I, by conducting a traffic count at three locations on the ring road and holding interviews with some drivers. Data was acquired on economics, previous projects and poverty.

Government agencies, ministries and other project teams were consulted to enable integration of the Project with current programs. Several site visits have been conducted since Cardno's mobilisation. Various matters of importance to each specialist have been investigated at the sites.



Figure 3-2 Engineering inspections at Ulei Bridge

Site prioritisation – for Phase I, a multi-criteria analysis was developed and implemented, to enable a process of site prioritisation to be followed. For Phase II, the disparate grouping and objectives at the six sites did not lend itself to this mode of evaluation.

Notwithstanding, the relative importance of the six sites was discussed at the workshop. This included accounting for the connectivity and socio-economic well-being of the Efate community, the existing condition at each site, accounting for environment, social, climate change, extent of TC Pam damage, engineering feasibility and economics.

The outcome of this discussion prioritised the sites as follows:

1. Tassiriki road upgrade – road is in poor condition and forms the connection of the ring road to the east of Port Vila. It is vulnerable to disaster risk, through flooding and tsunami. It's importance to the development of the Korman Stadium precinct was also noted
2. Epule bridge– the existing bridge is a temporary bridge structure of unknown origin and design life. It is deteriorating and as such, presents a key point of vulnerability for the connectivity of the ring road
3. Prima floodplain – the road to the east of the existing bridge is vulnerable to flooding
4. Tanoliu – as an aging single lane structure within a village, improvements to pedestrian and traffic safety are required, as well as structure longevity and coastal protection
5. Ulei – similar to Tanoliu and adjacent to a school
6. Saama – frequent minor flooding occurs

Options development – Being informed by the information gathered, options were developed for each site. These options were not classified into three categories, A, B and C, as for Phase I, but were simply listed according to complexity and cost of the works. Each option included elements of Build Back Better (BBB).

To guide the development of options, the objective of works at each site was established. This facilitated strategic thinking to be applied across a range of sites as well as focussing the discussion of alternatives. Building on the BBB concept, common strategies applied were safety improvements, securing connectivity, increasing structure longevity and enhancing community amenity. Each option developed was checked back against the established site objective, to ensure that it achieved the purpose, to a greater or lesser extent.

Since the workshop, further comments have been taken under consideration, combined with further information gathered, and options have been further improved and are presented in this report in Section 4.

Costing – Prior to the Options Workshop, the options were subjected to a preliminary costing exercise. The intention of this costing was to inform attendees of the approximate cost of each option in order to best understand the impact of choosing one option over another. This information, combined with an understanding of the initial site prioritisation, formed the basis for establishing preferences for options at each site.

The rates for the costing were taken from a combination of current market rates in Vanuatu and across the Pacific as well as the rates presented by bidders in the Phase I tender submissions.

Funding – The approach adopted regarding the available funding envelope, is that the current quantum of funding is now considered to be an ultimate upper limit. The envelope makes the following assumptions:

- > All monies scheduled for Phase I are consumed by the Phase I works
- > Some savings will be made by deleting the Phase I scope for Tanoliu and Epule, releasing approximately USD 350,000
- > USD 500,000 to be allocated for supervision and consulting services
- > An allowance for interest costs
- > Estimates of construction costs include USD 1.5 million for general items at this stage, until the procurement methodology is resolved

The available funding for civil works will therefore be approximately USD 8.5 million and is subject to currency fluctuations. The current estimate of construction costs is USD 8.53 million, plus 1.5 million of general items, for a total of USD 10.03 million.

During feasibility and the economics analysis, it may become apparent that the recommended options based on economic rates of return, will sum to more than the available funding. At this point, the government and ADB may need to discuss the possibility of additional funding or reducing the scope.

3.2 Method at the workshop

The workshop followed a process to transport attendees into a position of knowledge about the project, in order to enable them to comment with confidence on the works options being proposed. This was essential to achieving the purpose of the workshop, which was to obtain attendees considered opinions on the validity and suitability of the options at each site.

The workshop took place in two phases: information sharing from the Project team to attendees, followed by a presentation and discussion of options. The following presentations were made to share information:

- > Funding envelope
- > Priority sites
- > Options with cost estimates ($\pm 25\%$)
- > Participants – comment on issues and preferred option

To supplement the information, the following handouts were also provided to all attendees:

- > Epule alignment options
- > Draft road cross-sections for Tassiriki

The options discussion, with cost estimates ($\pm 25\%$) occupied the majority of the time at the workshop. Options at all six sites were presented. Participants were encouraged to take notes and provide any comments or preferences for the options.

4 Outcomes

Comments and suggestions from the workshop have been reviewed and integrated into the ongoing development of Phase II. The key comments from the workshop are summarised below:

- > The option selected at each site must genuinely address the overall purpose of the Project – to build back better after TC Pam, in such a way that a similar event will not cause the same asset damage, loss of connectivity and associated socioeconomic hardship
- > Economic value of a new structure at Prima must be weighed against the value of securing the key point of vulnerability on the ring road at Epule
- > Consider the possibility of using the relief culverts for irrigation on the Prima floodplain
- > Further considerations for Tassiriki:
 - Consult with the Port Vila Urban Development Project (PVUDP) on their drainage basin strategy, their water quality monitoring and their use of fibrecrete for footpaths
 - Meet Department of Lands regarding their drainage policy for future subdivisions
 - In developing the infiltration basin, avoid the creation of a mosquito breeding area and a safety hazard
 - Low maintenance options for drainage
 - Allow for pedestrian access during construction
 - Consultation required to confirm relocation of markets during construction
- > Low maintenance options are important for Ulei and Tanoliu structure replacements
- > Speed management required for both Ulei and Tanoliu 2-lane structures
- > At Epule, all options, except reuse of the existing alignment, will induce land use issues
- > Land use downstream of Saama to be confirmed

Since the workshop, further discussions with Acting Director General, MIPU and ADB were held, to confirm that the new bridge option at Prima is not a priority for PWD. However, a new structure at Epule is a priority, as it is seen as the most vulnerable link on the ring road. This was used to finalise the options, presented in **Table 4-1** below.

Further information was gathered from the community during the week of 27 March 2017. The market sellers, business owners and PVUDP current and former project staff were all consulted. Costings were also reviewed, in line with modifications to the options and site prioritisation. This has been collated and is presented below as a summary of the outcomes of the workshop. This indicates the current status of Phase II. The preferred options presented below do not pre-empt the economic analysis, but will be used to focus resources and investigative efforts during the feasibility study.

Table 4-1 Updated options, priorities and costings

ID	Site	Purpose of works	Option 1	Option 2	Option 3	Preferred option	Cost Estimate (USD)
BR01	Prima	(a) Improve flood immunity of the road by assessing broader catchment	Phase I works – Scour protection to abutments, increase waterway capacity, restore damaged handrail, reconstruct guardrail to current standards. Vegetation control and foot path continuity Replace corroded deck panels	Flood relief culvert, approximately 100m east of the existing Prima bridge	New through-truss bridge which is higher and longer than the existing	1+2	500,000
BR03	Tanoliu	(a) Improve road and pedestrian safety (b) Increase structure longevity (c) Improve connectivity security	Phase I works – Provide suitable coastal and abutment scour protection and new guardrails each side and across bridge. Add footway. Remove the existing paint protection system from steel beams and repaint with a suitable marine grade protection system	Two lane, triple cell reinforced concrete box culvert with footway	Replace the bridge with a new two-lane concrete structure (bridge or box culvert). Includes footway and all scour and coastal protection	2	280,000
BR04	Epule	(a) Eliminate point of vulnerability in the ring road (load limit, aging temporary structure)	Phase I works – Undertake improvements to the bank protection at both abutments and replace timber deck. Retrofit cantilevered walkway	New bridge on existing alignment (Option 1)	New bridge on alternative alignment (Option 3)	3	2,800,000
RD04	Tassiriki Road upgrade	(a) Upgrade road to urban standard (b) Provide pedestrian facilities (c) improve road safety	2x3m lanes, 1m shoulder, kerb and gutter, footpath one side, drainage	Include intersection layout, pedestrian facilities, bus bays and landscaping	N/A	2	4,800,000

ID	Site	Purpose of works	Option 1	Option 2	Option 3	Preferred option	Cost Estimate (USD)
BR08	Ulei Bridge	(a) Widen to 2 lanes (b) Reduce maintenance burden	Concrete plank deck replacement	Single cell box culvert	New bridge	2	180,000
CT11	Saama culvert	Improve flood immunity	Line drains to prevent blockage by vegetation	Option 1 plus augment existing culvert with additional pipes	N/A	2	50,000

Appendix A – Agenda



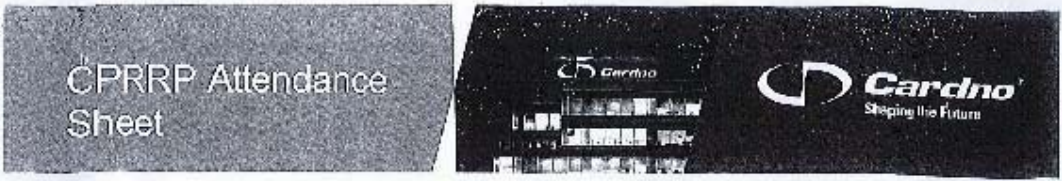
Date: Thu 23 March 2017

Time: 9am – 12:30pm

Location: PWD Conference Room

Invitees:			
Tony Amos Sewen	MFEM	Chris Marlow	MIPU
Henrickson M	MFEM	Paula Baleilevuka	MIPU
Gregoire Nimbtik	DSPPAC	Uravo Nafuki	MIPU
Flora Bani	DSPPAC	David Gibson	Climate Change
Charley Namaka	DSPPAC	Reedly Alfred Tari	DEPC
Nancy Wells	ADB consultant	Jean Marc Pierre	Lands
Richard Farrel	ADB consultant	Brooks Rakau	Geology and Mines
Samuel Namuri	MIPU	Michel Kalworai	Shefa Provincial
James Hakwa	MIPU	Cardno feasibility and design team	Cardno
Harold Allanson	MIPU		
Time	Agenda		Who
9:00	Welcome and introductions		MIPU A/DG
9:10	Purpose of the Workshop		Cardno
	Objectives, method, expected outcomes		
9:15	Phase II scope		Cardno
	Background, overview, progress to date, program		
	Funding		
	Priorities		
10:00	MORNING TEA BREAK		
10:15	Options at each Site		Cardno
	Tassiriki, Epule, Saama, Ulei, Tanoliu, Prima		
	Safety, climate change adaptation, Build Back Better, gender		
12:30	Meeting close and LUNCH		
1:00	Any additional IWG agenda items		

Appendix B – Attendance



Purpose of Meeting: Option WS and IWG #6 Location: PWD Big Conference Room
Date of Meeting: 23rd March 2017 Time of Meeting: 9:00 am - 2:45 pm

Name	Position	Email address	Signature
Valentine Theraijoh	Contract Chief	valentine.theraijoh@wki.com.au	
Tony Ata	Safeguards	tony5444@gmail.com	
Leo Drynan	Economics	leo.drynan@delm.com.au	
Rhys Thomson	Hydrologist	rhys.thomson@delm.com.au	
Christy Haruel	Safeguards (Sec)	haruelc@gmail.com	
Jason Andrews	Env. & Social Affair	jandrews@delm.com.au	
URARO NARUKI	"	uraru.naruki@vanuatu.gov.vu	
KETHI DENYER	BRIDGE ENGINEER	kethi.denyar@cardno.com.au	
Douglas Mouton	CARDNO Env. & Social Sp.	douglas.mouton@cardno.com.au	
JOANNA MAHIT	FINANCE / ADMIN OFFICER	joannamahit@cardno.com.au	
KEN MUNRO	DTH/Procurement Cardno	ken.munro@cardno.com.au	
ANTOIN RIGNOIR	ROAD ENGINEER Cardno	antoin.rignoir@cardno.com.au	
Charlie Nauroko	Senior Policy Analyst - Infrastructure	charlie.nauroko@delm.com.au	
Mwetu Sanyal	Assistant Marketing Inspector	sanyal@pwc.com.au	

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Purpose of Meeting: Option WS and IWG #6	Location: PWD Big Conference Room
Date of Meeting: 23rd March 2017	Time of Meeting:

Name	Position	Email address	Signature
BENJAMIN TITUS	Geography & Mining	btitus@vanuatu.gov.vu	
Richard Farrell	VP MU - Project Management Advisor	r.farrell@vanuatu.gov.vu	
Nancy Wells	Sr Consultant ADD	wells@adbrg	
JAMES HAWKA		j.hawka@vanuatu.gov.vu	
David Spring	Team leader	dspring@cardno.au	

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Appendix C – Presentations
