

PNCC Pedestrian and Cycle Bridge Project: Safety in Design (SiD) CHAIR 1 Workshop: Palmerston North 25th May 2016

Part A: Safety Hazard Identification							Part B Safety Hazard Treatment					Part C: Safety Hazard Residual Risk Management							
Project work element	Ref	Date reported	Safety hazard description	Project stage	Current design treatment	Current hazard rating (RAG)	Hazard owner	Can the safety hazard be eliminated	Treatment measures proposed to eliminate or reduce safety hazard	Revised hazard rating (RAG) when treatment completed	Date treatment achieved	Status Active/ Closed	Description of safety hazard following treatment	Revised hazard rating (RAG)	Proposed future hazard management plan	Project stage	Hazard owner	Status Active/ Closed	
River and Waterway	001	25th May 2016	Personnel safety planning, specifically working near water, existing services, manual handling, falls from bridges etc	Construction	Specific Hazard identification in Tender document, P&G costs increased to allow for H&S requirements, design allows maximum prefabrication and lifting into place.	1	Opus	No	Special conditions in contract	1									
Bridge and Structures	002	25th May 2016	Approved barrier design on bridges/culverts at 1.2m high does not allow for cyclists/horse riders?	Operation/Maintenance	Design is 1.4m high rails, complies with Austroads best practise guideline. Horse use is excluded from bridge	3	Opus	Yes	1.4m handrail	3									
Community and Safety	003	25th May 2016	Increased number of people at the river	Operation/Maintenance	Create improved river level access near bridge location by river bank both sides. Include information sign about river access and safe river swimming.	3	Opus	No	Install information board on river swimming	3									
Community and Safety	004	25th May 2016	People jumping off the bridge causing death or drowning	Operation/Maintenance	Due to the lack of incidents and injury on the existing Fitzherbert bridge this risk is considered low. The 1.4m non climbable rail will deter people from jumping. No further action considered necessary.	3	Opus	No	1.4m handrail	3									
Community and Safety	005	25th May 2016	Fishing. Potentially fall off bridge. Blocks other users	Operation/Maintenance	The 4.2m to 5m width does allow for standing pedestrians or fishing. It is uncertain how popular this activity will be. Suggest it is monitored post opening and may need to be restricted during peak flow times	2	PNCC	Yes	Requires monitoring post construction	3									
Community and Safety	006	25th May 2016	People wanting to ride their horses across the bridge	Operation/Maintenance	Provide a river crossing point for horses to swim over river and access and egress both sides. Signs to inform users than Horses are not permitted over bridge, Bylaw required.	1	PNCC	Yes	Bylaw restricting Horses and signage	3									
Community and Safety	007	25th May 2016	Fish Passage - risk of rescue of fish	Operation/Maintenance	Pile diameter restrictions of fish insignificant. Will need to comply with fish spawning restriction. Be stated in construction contract. Any temporary river diversion works for piling will need to allow fish passage.	3	Opus	No	Likely consent requirements	3									
Community and Safety	008	25th May 2016	High Fall risk- drown or death	Operation/Maintenance	Suitable Safety Rails, refer SID Refs 1 and 2 above.	2	All	Yes	1.4m handrail	3									
River and Waterway	009	25th May 2016	Fire Risk - Wild fires in the bush	Operation/Maintenance	Ensure infrastructure fire resistant materials	3	All	Yes	Paths, railing and bridge not constructed from Wood.	3									
River and Waterway	010	25th May 2016	Tree felling and maintenance	Operation/Maintenance	Vehicle access provided along both banks to permit suitable equipment for operation. Paths can be closed as alternative routes exist. Grassed batter slopes designed at suitable gradient for mowing. Where slopes steeper then planted with low mow vegetation.	2	PNCC	No	Mowing slopes achieved and vehicle access provided	3									
Community and Safety	011	25th May 2016	Cable under river - hazard during piling, demolition etc	Construction	Work closely with Powerco to ensure cables located well and ensure at least a 30m buffer between cable zone and bridge.	2	Opus	No	Accurate location of cables and buffer zone	3									
Community and Safety	012	25th May 2016	Public Health sewer fails - river takes pollution downstream	Operation/Maintenance	Possible sewer on bridge	2	PNCC	Yes	No Sewer on bridge	3									
River and Waterway	013	25th May 2016	Pollution of groundwater. Change to flow artesian	Operation/Maintenance	Unknown issues as no bores to establish groundwater depth. Investigate issue as part of geotechnical investigation	2	Opus	Yes	Geotechnical test and modelling	3									
River and Waterway	014	25th May 2016	Scour - swim holes and stability	Operation/Maintenance	Unknown as Hydrologic modelling not completed.	1	PNCC	Yes	Hydrologic modelling and geotechnical tests on material	3									
River and Waterway	015	25th May 2016	Aggradation - new beaches and flood levels	Operation/Maintenance	Unknown as Hydrologic modelling not completed. Jumping from bridge warning signs	2	Opus	Yes	Hydrologic modelling and geotechnical tests on material	3									
Bridge and Structures	016	25th May 2016	Lateral Movement (Seismic)	Operation/Maintenance	No geological testing of material for lateral spreading. Propose rock columns in design to ensure abutments stable in seismic event. Risk could have damage to ramps but acceptable risk and easily reinstated. Risk public could be trapped on structure.	2	Opus	Yes	Geotechnical test and modelling	3									
Community and Safety	017	25th May 2016	Mowing Banks	Operation/Maintenance	Ensure all grass banks meet minimum gradient of 1 in 2.	3	PNCC	Yes	Mowing slopes achieved and vehicle access provided	3									
Bridge and Structures	018	25th May 2016	Performance - Hydro	Operation/Maintenance	Hydrologic modelling still being undertaken. Still a risk may need to increase stop bank height up river of bridge.	2	PNCC	Yes	Hydrologic modelling and geotechnical tests on material	3									
Bridge and Structures	019	25th May 2016	Performance - Structural	Operation/Maintenance	Comply with bridge design manual agreed importance level 2 Will need to check during detailed design steel structure movement or dynamic stability.	2	Opus	Yes	Structural design meets Standards	3									
Community and Safety	020	25th May 2016	Construction at heights	Construction	As per SID item 001	1	Opus	Yes	Construction contract conditions	1									
River and Waterway	021	25th May 2016	Stormwater operation, sweeping and maintenance	Operation/Maintenance	Bridge designed to take light mow vehicle loading.	3	PNCC	Yes	Design low maintenance	3									
Community and Safety	022	25th May 2016	Boats colliding with piers	Operation/Maintenance	Piers will be designed for impact loads	2	All	Yes	Structural design allows for impact	3									
River and Waterway	023	25th May 2016	River flood plain - path trapped by exit points Flooding / flooding during construction	Operation/Maintenance	Work with PNCC and Horizons to have protocol to close paths and structure for public safety in flood events	2	All	No	Protocol to close pathways in Floods	3									
Bridge and Structures	024	25th May 2016	Damage to structure - impact scour, unsafe bridge	Operation/Maintenance	Design Piers for maximum scour depth, will be modelled once we have insitu river material testing.	2	Opus	Yes	Hydrologic modelling and geotechnical tests on material	3									

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Bridge and Structures	053	25th May 2016	Joints - trip hazard, potential to move	Operation/Maintenance	Install rubber smooth bridge joints	2	Opus	Yes	Low profile smooth joint	3								
Bridge and Structures	054	25th May 2016	Transporting the precast slabs to site	Construction	4.2m wide slab sections can be moved as over sized loads.	2	Opus	Yes	design jointing of precast sections that can be transported. Early contractor involvement	3								
Bridge and Structures	055	25th May 2016	Railings / barriers - height, removal, snagging, wind/ noise	Construction	Width has 0.6m shy distance both sides for cyclists, meets required safety height of 1.4m.	2	Opus	Yes	1.4m curved rails	3								
Bridge and Structures	056	25th May 2016	Utilities / Services - Pipes to bridge, installation of gas, lighting, ducts etc	Construction	Powerco will extend ducts beyond bridge on both banks. Water main will be installed and blanked at both ends at road/path edge for future connection.	1	Opus	Yes	No access required for Powerco ducts, will allow depth of box sections to be reduced to 1.2m for 4.2m width.	3								
Community and Safety	057	25th May 2016	Protests during construction	Construction	Site will be managed by construction fencing around the site at both ends.	3	PNCC	No	Contract requirement for site fencing	3								
Community and Safety	058	25th May 2016	Padlocks onto bridge	Operation/Maintenance	This is a PNCC policy matter has no effect on structure of bridge. Railing would not suit attaching padlocks. Could consider a location of mesh on the bridge in the shape of a heart for padlocks.	3	PNCC	Yes	Consider mesh area for fixing padlocks in a controlled way	3								
Community and Safety	059	25th May 2016	Throwing stuff off	Operation/Maintenance	Low frequency of river use means this activity low risk. Good visibility	3	PNCC	Yes		3								
Community and Safety	060	25th May 2016	Homeless under bridge	Operation/Maintenance	The abutment covered area will be planted and sloped to make this activity undesirable.	3	PNCC	Yes	Planting and landscaping to prevent this	3								
Community and Safety	061	25th May 2016	Poor car parking lighting and night use of unit bridge	Operation/Maintenance	Consider lighting car park	2	PNCC	Yes	Consider lighting car park	3								
Bridge and Structures	062	25th May 2016	Machinery, earthworks, pier construction / drilling, unauthorised access to construction site	Construction	Site will be managed by construction fencing around the site at both ends.	2	All	Yes	Contract requirement for site fencing	3								
Bridge and Structures	063	25th May 2016	Lightening Protection	Construction	Bridge will be suitably earthed for lightening strikes	3	Opus	Yes	Bridge earthed	3								
Bridge and Structures	064	25th May 2016	Explosions - terrorists	Operation/Maintenance	Public infrastructure terrorist risks extremely low.	3	PNCC	No		3								
Bridge and Structures	065	25th May 2016	Maintenance access for power ducts	Operation/Maintenance	Powerco have confirmed no access required. Service all ducts from each end. Maximum length between chambers 350m.	2	Opus	Yes	No access required for Powerco ducts.	3								
Bridge and Structures	066	25th May 2016	Maintenance access for structural inspection	Operation/Maintenance	Manholes provided at each end of each box section.	2	Opus	Yes	Maintenance inspections can be done by drones	3								
Bridge and Structures	067	25th May 2016	Decommissioning of Bridge	Demolition	Materials of bridge concrete and steel recyclable. Bridge can be removed in sections. Good access for maintenance and decommissioning.	3	Opus	Yes	Materials suitable to simple dismantling	3								