Appendix U Safety in Design Register

	Client Name	Ashburton District Council]	Location	Ash	burton						SID Review Team		
	Project Name	ATC 2nd Bridge DBC]	Date	Thursday,	June 30, 2022								
	Project Number	r 310205125]	Project Component		All								
SID Facilitator Ali Siddiqui]	Design Stage	[DBC							
		PRELIMIN	ARY HAZARD IDENTIFICATION				RISK ASSESS	MENT	PROPOSED MITIGATION			RESID	UAL RISK ASSESSMENT	[
F	Ref Area / Activity	Hazard Category	Hazard Sub Category	Nature of hazard	Possible effect of hazard	Consequence	Likelihood	Assessed Risk	Proposed Treatment / Remedial Action	Hierarchy of Control	Consequence	Likelihood	Assessed Risk	No
	1 General / Whole Site	Existing_Services	Underground - Electricity		Electrocution, damage,	Major	Possible	н	Request updated service plans and on site location of	Control (Engineering)	Major	Unlikely	м	This c

		NARY HAZARD IDENTIFICATION				RISK ASSESS	MENI	PROPOSED MITIGATION				UAL RISK ASSESSMEN				HANDOVER	
Ref Area / Activity	Hazard Category	Hazard Sub Category	Nature of hazard	Possible effect of hazard			Assessed Risk	Proposed Treatment / Remedial Action	Hierarchy of Control	Consequence		Assessed Risk	Nature of Residual Risk	Phase Affected		Remarks	Owner
General / Whole Site	Existing_Services	Underground - Electricity	Unidentified underground services	Electrocution, damage, power outages	Major	Possible	н	Request updated service plans and on site location of services. Service provider stand over used during excavation phase.	Control (Engineering)	Major	Unlikely	м	This can still happen	Construction	Active		Contractor
2 General / Whole Site	Existing_Services	Aboveground- Electricity	Plant strike	Electrocution, damage, power outages	Major	Possible	н	Positive marking of overhead cables (tiger tails, buntings etc). Service provider stand over used during excavation phase. Propying of poles in accordance with utility providers' requirements when excavating nearby.	Control (Engineering)	Major	Unlikely	м	This can still happen	Construction	Active		Contractor
General / Whole Site	Access_and_Traffic	Traffic circulation	Construction works cause detours to be in place	Drivers confusion, restriction on access to properties, long detour routes	n Minor	Possible	м	Ensure road closure and detours are in place for minimal amount of time. Make sure TMP considers detour route suitability keeping local residents informed of progress and times and duration of detours and restrictions.	Control (Engineering)	Minor	Unlikely	L	This can still happen	Construction	Active		Contractor
General / Whole Site	Access_and_Traffic	Access and Egress from Site or Adjacent Properties	Limited space to undertake work may restrict access or necessitate difficult traffic management	e Traffic crashes due to r unexpected movements	Major	Possible	н	Undertake detailed planning and sequencing of works for all site access points (SAPs) including haul routes, equipment circulation, traffic management planning, worker pedestrian routes, work exclusion zones and selecting plant that is suitable for the available work space. Ensure access to private properties is clear and unambiguous.	Control (Engineering)	Major	Unlikely	м	Risk remains if there is failure to adopt controls and follow planned work methods.	Construction	Active		Contractor
General / Whole Site	Access_and_Traffic	Traffic circulation	Wider safety impacts of traffic using the Chalmers Avenue second bridge	Safety improvements would be expected on the SH through travel reductions. However, a diversion of traffic onto the local road network could increase the safety risk on other parts of the network.		Possible	м	Designer to consider network safety, ongoing monitoring post construction, and potential local road mitigation required particularly if only part of the corridor through to Grahams Road is constructed.	Control (Engineering)	Minor	Possible	м	There can still be general hazards associated with traffic on roads	Operations	Active		ADC
General / Whole Site	Access_and_Traffic	Traffic Management Requirements	Maintenance repairs to damaged flexible barrier requires maintenance personnel to work near live traffic	Struck by passing vehicles	Catastrophic	Possible	н	Where flexible barriers are used, a safe repair methodology should be developed (pre-planned) such that it is ready when routine or emergency repairs are required.	Substitute	Moderate	Very Unlikely	L	Risk remains if barrier is installed that requires maintenance and there is failure to adopt safe TTM controls	Maintenance	Active		Maintenance Contractor
7 General / Whole Site	Ground_Stability	Steep / Unstable Slopes	Slips, falls, rolling equipmen	t Broken limbs, crush injuries	Catastrophic	Possible	H	Design to consider the angle of slopes and ensure steep slopes are either maintenance free (or have fall protection mitigation - e.g. fencing).	Isolate	Moderate	Very Unlikely	L	Slip or fall would be limited due to design (shallow) slope and fall protection mitigation	Maintenance	Active		Maintenance Contractor
B General / Whole Site	Hazardous_Construction	Temporary works (e.g. propping, jacking, bracing)	Potential collapse during construction	Crush injuries	Catastrophic	Possible	н	Undertake appropriate design for all temporary works giving consideration to all potential loading situations (e.g. including wind and seismic)	Control (Engineering)	Moderate	Very Unlikely	L	Residual risk largely managed assuming temporary works design is adeauate	Construction	Active		Contractor
General / Whole Site	Hazardous_Construction	Pressure systems (e.g. concrete pumping)	Pressure hose failures	Flying debris, broken limbs	Catastrophic	Possible	н	Plan all pumping activities and use appropriate safe work methods. Ensure all pumping equipment (pipes, pumps, connections) are well maintained	Control (Engineering)	Moderate	Very Unlikely	L	If pumping equipment is well maintained and appropriate safe working methods adopted then the residual risk is minimal	Construction	Active		Contractor
0 General / Whole Site	Hazardous_Construction	Working around mobile plant	Limited space to undertake work may put workers in close proximity to moving plant	e Hit/struck by moving plant	Catastrophic	Possible	H	Undertake detailed planning and sequencing of construction works including haul routes, equipment circulation, traffic management planning, pedestrian routes, work exclusion zones and selecting plant that is suitable for the available work space.	Control (Engineering)	Major	Unlikely	м	Risk remains if there is failure to adopt controls and follow planned work methods.	Construction	Active		Contractor
1 General / Whole Site	Maintenance_Refurbishment_Repair	Maintenance Access (e.g. for cleaning, removal / replacement of plant)	Completed works will require maintenance access throughout the service life of both the roads and structures	Traffic crashes, traffic delays, pedestrian/cyclist injuries	Major	Possible	н	Design to include access arrangements for all future routine maintenance activities and that maintenance site access points (SAPs) and parking bays are located in logical areas, allow for the type and size of plant requiring access, and can be accessed in a way that does not pose a hazard to passing traffic and public	Isolate	Moderate	Very Unlikely	L	Risk remains if there is failure to adopt controls and follow planned work methods.	Maintenance	Active		Maintenance Contractor
2 General / Whole Site	Maintenance_Refurbishment_Repair	Lighting (e.g. bulb replacement)	Lighting maintenance may necessitate working at height in difficult to access areas (e.g. above the bridge parapet over the Ashburton River)	Falls from height, dropped objects	Catastrophic	Possible	н	Designer to consider how bulbs will be maintained and utilise LED bulbs that have long maintenance intervals. Develop appropriate procedures for working at heights.	Control (Engineering)	Moderate	Very Unlikely	L	Risk remains if there is failure to adopt controls and follow planned work methods.	Maintenance	Active		Maintenance Contractor
6 General / Whole Site	Landscaping	Maintenance of landscaping	Maintenance of landscaping may necessitate working in difficult to access areas	Traffic hazard	Catastrophic	Possible	H	Designer to consider how landscaping will be maintained e.g., use of appropriate landscaping for various scenarios (e.g., minimal maintenance, landscaping on steep slopes, low maintenance shrubs and ground cover on moderate slopes, grasses restricted to flat areas that are easy and safe to access).	Control (Engineering)	Moderate	Very Unlikely	L	Risk remains if there is failure to adopt controls and follow planned work methods.	Maintenance	Active		Maintenance Contractor
4 General / Whole Site	Hazardous_Environment	Contaminated Ground / Land (tar, arsenic, metals, etc)	Locating unidentified old dump and waste sites on rural land		Major	Likely	н	Discussions with landowners, searching ECAN database for HAIL sites, contingency plans in place for the safe removal and disposal of hazardous waste	Control (Engineering)	Moderate	Possible	м	This can still happen.	Construction	Active		Contractor
5 General / Whole Site	Proximity	Fragile foundations / roofs / buildings (inc rot)		Unexpected falling of trees across work site causing crushing and injuries to work staff	s Major	Likely	H	Ensure arborist assesses trees. Earthworks are kept at safe distance from trees which are to remain in place. Undertake tree clearance works prior to full establishment on site to separate work streams.	Control (Engineering)	Major	Unlikely	м	This can still happen.	Construction	Active		Contractor
6 General / Whole Site	Working_Conditions_or_Location	Noise	Noise during construction from operating plant and equipment	Issues with surrounding	Moderate	Likely	н	Establish standard working hours. Only use plant with mufflers and low noise equipment, limit operations to day time hours for noisy operations / plant	Control (Engineering)	Minor	Possible	м	This can still happen.	Construction	Active		Contractor
General / Whole Site	Working_Conditions_or_Location	Vibration	Vibration during construction from operating plant and equipment	Issues with surrounding neighbors, damage to property, public perception, media	Moderate	Likely	Н	Complete pre-work inspections / putting Complete pre-work inspections / surveys of properties that are close to the construction site. Ensure plants which create vibration are kept at safe distance away from fragilie structures. Limit operations to day time hours.	Control (Engineering)	Minor	Possible	м	This can still happen.	Construction	Active		Contractor
Roads	Existing_Services	Underground - Watermain	Known high pressure underground watermain in the area. Could result in unexpected high pressure water 'explosion'	watermain	Major	Possible	н	Services investigation at detailed design stage to identify location and depth of watermain. Design to consider relocation / isolation prior to construction works. Realigned watermain to be located in safe and easily maintainable location (e.g. relatively shallow and clear of live traffic). Construction methodology to include safe work method for working around the watermain (where required) e.g. exclusion areas, etc.	Isolate	Minor	Unlikely	L	Residual risk largely managed by service location before works begin.	Construction	Active		Contractor
9 Roads	Existing_Services	Underground - Wastewater / Stormwater	Biological	Illness, damage to services, contamination of surrounding environment	, Moderate	Possible	м	Services investigation at detailed design stage to identify location and depth of sewer. ADC to discuss sewer location with project team to ascertain extents of relocation / protection works.	Eliminate	Moderate	Very Unlikely	L	Residual risk largely managed as realigned service would be outside the impact area of the project.	Construction	Active		Contractor

Name	Company	Name Company							

С	lient Name Ashburton District Council			Location	Ash	burton						SID Review Tea	m Name	Company		Name Company
Pro	pject Name ATC 2nd Bridge DBC			Date	Thursday	June 30, 2022										
	ect Number 310205125		-	Project Component		All										
				Project Component												
SID	D Facilitator Ali Siddiqui			Design Stage	e C	DBC										
20 Roads	Proximity	Restricted Working Room / Access	Working in urban areas will limit available space to undertake work and puts workers in close proximity to moving plant and equipment	Hit/struck by moving plant	Catastrophic	Possible	н	Design to confirm (via constructability reviews) that there is at least one safe way of constructing the works, given the tight working room. Communicate this methodology to contractors. Contractors to undertake defailed planning and sequencing of construction. Tim planning, pedestrian routes, equipment circulation. Tim planning, pedestrian routes, equipment acirculation. The selecting plant that is suitable for the available work space. Establish safe work methods for high risk activities such as reversing, refueling using technology (e.g. cameras, slew locks, etc.) and spotters where appropriate.	Control (Engineering)	Major	Unlikely	м	Risk remains if there is failure to adopt controls and follow planned work methods.	Construction	Active	Contractor
21 Roads	Proximity	Separation between adjacent moving plant/machinery	Working in urban areas will limit available space to undertake work and puts workers in close proximity to moving plant and equipment	Hit/struck by moving plant	Catastrophic	Possible	H	Undertake detailed planning and sequencing of construction works including haut routes, equipment circulation. TM planning, pedestrian routes, work exclusion zones and selecting plant that is suitable for the available work space. Establish sofe work methods for high risk activities such as reversing, refueling using technology (e.g. cameras, slew locks, etc.) and spotters where appropriate.	Control (Engineering)	Major	Unlikely	м	Risk remains if there is failure to adopt controls and follow planned work methods.	Construction	Active	Contractor
22 Roads	Confined_Spaces	Excavations / Tunnels / Trenches	Trench collapse during construction	Asphyxiation, drowning	Catastrophic	Possible	н	Design to consider space required (working room) to install trench shields and where this is not possible/practical, consider trenchless methods (e.g.	Isolate	Moderate	Very Unlikely	L	Potential for collapse mitigated where shields are employed.	Construction	Active	Contractor
23 Roads	Confined_Spaces	Manholes	Stormwater works require the installation of manhole and large diameter culver at varying depths	s	Catastrophic	Possible	н	pipe jacking). Locked manholes to restrict access to planned events with appropriate equipment. Manholes to exclude rungs so A-Frames are needed along with appropriate breathing apparatus.	Isolate	Moderate	Very Unlikely	L	Potential for asphyxiation/drowning mitigated by planned access	Maintenance	Active	Maintenance Contractor
24 Roads	Confined_Spaces	Pipes	Stormwater works require the installation of varying diameter culverts at a varying depths - this could create a confined space	Asphyxiation, drowning, collapse	Catastrophic	Possible	н	Design to also consider likely storm event flows (and velocities), potential for scour and the value of providing a stilling/detention basin within the system. Access into the new system to be restricted to planned activities. Appropriate venting to be provided where this is helpful.	Isolate	Moderate	Very Unlikely	L	Potential for asphyxiation/drowning mitigated by planned access	Maintenance	Active	Maintenance Contractor
25 Bridges	Working_Near_Water	Work over Water	Building a bridge over the River will necessitate working over water	Falling into the river, drowning	Catastrophic	Unlikely	м	Contractor to adopt construction sequence that minimises the amount of working above water. Pre fab elements to maximise use of safety features (e.g. incorporated anchor points, fitting of safety barriers before caroing into place). Safe work method to be developed for working above water. Emergency response plan for falls into water e.g. recovery boat. Consider use of personal flotation device.	Isolate	Moderate	Very Unlikely	L	Risk remains if there is failure to adopt controls and follow planned work methods.	Construction	Active	Contractor
26 Bridges	Working_Near_Water	Bank/Slope Instability	Piling and heavy lifting (craning) may be required in the vicinity of the river bank and mid-river channels	Instability, toppling cranes, crush injuries, drowning	Catastrophic	Possible	н	Design to minimise placing cranes near the edge of the river bank (e.g. use a bigger crane from further away, or use a different method). Where crane platforms cannot be avoided, undertake appropriate temporary works design to engineer a stable platform.	-	Moderate	Very Unlikely	L	Little residual risk of toppling assuming temporary works consider all uses and loading needs of the lifting platform (and the crane lifting capacity is not exceeded)	Construction	Active	Contractor
27 Bridges	Hazardous_Construction	Heavy lifting	Dropped loads, toppled cranes	Crush injuries	Catastrophic	Possible	н	Undertake appropriate design for all lifting works giving consideration to all potential loading situations (e.g. including wind and seismic). Ensure appropriate exclusion zones are used under loads.	Control (Engineering)	Moderate	Very Unlikely	L	Residual risk largely managed assuming lift planning is adequate	Construction	Active	Contractor
28 Bridges	Working_at_Height	Lifting / Cranes / Working under suspended loads	Bridge construction will require lifting of large prefabricated elements	Hit/struck by falling object	Catastrophic	Possible	н	Undertake appropriate design for all lifting works giving consideration to all potential loading situations (e.g. including wind and seismic). Ensure appropriate exclusion zones are used under loads.	Isolate	Minor	Unlikely	L	Residual risk largely managed assuming lift planning is adequate	Construction	Active	Contractor
29 Bridges	Working_at_Height	Falling from height	Bridge construction will require working at height	Falls from height	Catastrophic	Possible	н	Exclusion zones due seed unique rodus. Contractor to adopt construction sequence that minimises the amount of working at height. Maximise the use of pre fab elements. Maximise use of safety features (e.g. incorporated anchor points, fitting of safety barriers before canning into place). Safet work method to be developed. Personnel to be suitably trained and wear fall restraints. Emergency procedure to be developed.	Control (Engineering)	Moderate	Very Unlikely	L	Risk remains if there is failure to adopt controls and follow planned work methods	Construction	Active	Contractor
30 Bridges	Working_Near_Water	Flood Plains / Risk of Flooding	Ashburton River and Tinwald flood plains are known to flood	Instability, drowning, injury from dislodged material/plant, etc	Catastrophic	Possible	н	Met service weather warning system is in place. Contractor to have site specific weather monitoring and emergency plan for securing the works and leaving the site before any predicted extreme flood event occurs.	Isolate	Moderate	Very Unlikely	L	Unsecured material or plant may cause damage to the works or 3rd party assets, but should not harm individuals if they have been evacuated from site	Construction	Active	Contractor
31 Bridges	Working_Conditions_or_Location	Seismic Activity	Site located in active seismic region	Collapse of works, falls, crush injuries	Catastrophic	Very Unlikely	м	Design to consider the impact of a design level earthquake during construction. Construction work methods to consider the potential for an earthquake and include suitable controls, emergency procedures, etc.	Control (Engineering)	Major	Very Unlikely	м	An earthquake event is impossible to predict or control. Focus on planning for and 'what if' scenario of an earthquake event.	Construction	Active	Contractor
32 Bridges	Utility Services	Maintenance Access	New bridge will require installation of services which will require maintenance. This may create confined spaces or necessitate working at height	Asphyxiation, drowning, falls from height	Catastrophic	Possible	н	Services design to consider maintenance requirements and eliminate hazards where possible. Where high risk activities cannot be avoided (confined spaces, working at height, etc) then safe work methods/processes to be put in place and uncontrolled/unplanned access restricted.		Moderate	Unlikely	м	Risk remains if services design cannot eliminate maintenance risks and/or there is failure to adopt the prescribed controls.	Maintenance	Active	Maintenance Contractor
33 Bridges	Maintenance_Refurbishment_Re	pair Maintenance Access (e.g. for cleaning, removal / replacement of plant)	Bridge across the river will	falls from height, toxicity, crush injuries	Catastrophic	Possible	H	Design to consider maintenance requirements and eliminate hazards where possible - e.g. eliminate bearings and joints where possible/practical, provide safe jacking points where bearings are needed, design scour protection that avoids the need for diving inspections, use non toxic materials, provide flat areas where scatfold platforms/cherry pickers are required for access. Where high fisk activities carnot be avoided (confined spaces, waking at height, etc) then safe work methods/processes/training to be provided.	Isolate	Moderate	Unlikely	м	Risk remains if design does not eliminate maintenance risks and/or there is failure to adopt the prescribed controls.		Active	Maintenance Contractor
34 Bridges	Demolition	Future Hazards	Construction of new river bridge may introduce new infrastructure that is difficul to deconstruct in the future	t debris	, Major	Possible	Н	Detailed design phase should consider the future demolifion hazards of the structures being designed/built. Where the potential demolifion of the future structure is deemed to create a unique or difficult demolifion challenge, then the designer should consider how it can be safely demolished.	isolate	Moderate	Unlikely	м	Unknowns of future demolition will still exist and documented procedures might be difficult to locate at the end of service (100 years)	Demolition	Active	Contractor
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