

SAFETY IN DESIGN: RISK ASSESSMENT

Client Department of State Growth
Project Bass Highway - Christmas Hills Road to Deloraine
Number 24031 (Contract No. 3100B-7-13)

Date 16.07.26
Revision C



This register addresses risks arising from design decisions to persons who construct, use, maintain, alter and demolish the asset, per the Work Health and Safety Act 2012 (Tas) s22, WHS Regulations 2022 (Tas) Part 6.2 (regs 293-295) and the model Code of Practice: Safe Design of Structures. Designer planning/design-phase field risks are managed under project JSEAs. Residual risks rated above Low are to be communicated with the design and in the designer's safety report under reg 295. Hazards identified with reference to the HSE039 Safety in Design Guideword Checklist.

D	Lifecycle Stage	Hazard Consideration (Guide Words)	Potential Design Hazard Identified	Consequence(s)	Risk Assessment			Risk Control Measures	Control Type	Residual Risk Assessment			By When			Responsibility	Comment	Status
					Likelihood	Consequence	Risk Rating			Likelihood	Consequence	Risk Rating	Concept Design	Final Design	Construction			
CONSTRUCTION																		
TRAFFIC MANAGEMENT & STAGING																		
	1 Construction	Traffic	Construction under live 110 km/h traffic (~9,600 vpd, 27% heavy vehicles) for 18-24 months with no viable detour - vehicle collision with workers or plant	Multiple serious injuries or death of workers/public	Likely	Catastrophic	Possible	10-stage construction methodology developed in design to enable TM under traffic Reduced speed (40 km/h) through worksite; work fronts <=800 m Positive protection (temporary concrete/water-filled barrier) where excavation >300 mm within 2.5 m of traffic Min 3.6 m traffic lanes; shuttle flow/portable signals with <=15 min delays TMPs by accredited designers to AGTTM and DSG specifications	Isolate	Rare	Catastrophic	High		X	X	Contractor	PDR SS16.9. Contractor CMP/TMP/SWMS to further mitigate residual risk - reg 295 safety report item	Open
	2 Construction	Traffic	Junction reconstruction under traffic at Christmas Hills Rd (junction lowered ~1.5 m) and Griffins Rd - turning conflicts; emergency, school bus and business access	Collision at junction worksites Blocked emergency access Disruption to raspberry farm and transport depots	Possible	Catastrophic	Unlikely	Temporary realigned Christmas Hills Rd side track allowed for in staging before junction works Temporary accesses min 3 m with plate crossings; portable signals in high-risk phases Coordination with Tas Police and TFS; full-time property and emergency access maintained	Admin Controls	Rare	Catastrophic	High		X	X	Contractor		Open
	3 Construction	Traffic	Night works and works in fog/frost - reduced visibility at interface between public traffic and worksite	Serious injury or death	Possible	Catastrophic	Unlikely	Day works preferred where possible Where night works unavoidable, TMP to include lighting, retroreflective devices and reduced speeds Seasonal fog/ice risk considered in staging programme	Eliminate	Rare	Catastrophic	High			X	Contractor		Open
	4 Construction	Traffic	Construction haulage on live highway - ~65,100 m3 cut cart-away and ~27,150 m3 imported fill; slow plant entering/exiting worksite at 110 km/h	Rear-end and turning collisions with public traffic	Possible	Catastrophic	Unlikely	Staging designed to reuse cut rock as fill (Stage 6) to reduce haulage movements Haul routes and site access points in TMP with acceleration/deceleration provision VMS advance warning of trucks entering	Admin Controls	Unlikely	Major	High		X	X	Contractor		Open
	5 Construction	Laydown_Area	Site compound and laydown areas adjacent to live traffic (Stage 1 compound at Bengeo Rd P-turn)	Collision with parked plant/personnel Public entering compound	Possible	Major	Extreme	Compound/laydown locations nominated in staging and agreed with Client before works commence Barrier and delineation from live traffic; site security fencing	Admin Controls	Unlikely	Moderate	Medium			X	Contractor		Open
EARTHWORKS, EXCAVATION & GROUND																		
	6 Construction	Earthworks	Deep excavation for culvert extension/replacement (up to ~5 m) - trench collapse, engulfment	Worker death by engulfment Adjacent pavement collapse under traffic	Possible	Catastrophic	Unlikely	Stepped/benched excavation design per geotech; shoring or battering specified Excavation >1.5 m is high-risk construction work - SWMS required (WHS Regs 2022 (Tas) reg 291) Staged backfill with layer compaction; geotechnical supervision	Engineering	Rare	Catastrophic	High		X	X	Contractor		Open
	7 Construction	Instability	Cut batter slippage during excavation of cuts to ~8 m (Ch 3860-4230, Ch 4760-5180) - tension cracks, toe heave, seepage at legacy fill/culvert interfaces and perched water near dams	Batter collapse onto workers, plant or live traffic	Possible	Major	Extreme	2H:1V batters verified FoS >2 in design (SLIDE 2 limit equilibrium) Benches >=1.5 m wide at 1.5-2 m vertical spacing sloped inward; cut-off/toe drains installed early Visual monitoring regime (cracking, toe heave, seepage); geotechnical engineer during bulk excavation	Engineering	Rare	Major	Medium		X	X	Client or Designer	Scherzic geotechnical investigation; PDR SS16.7.1	Open
	8 Construction	Plant_and_Equipment	Plant rollover working on embankment edges, 2H:1V batters and soft ground	Operator death or serious injury	Possible	Catastrophic	Unlikely	Batters designed 4H:1V where practicable; constrained 2H:1V areas identified on drawings 400 mm rock mattress + geofabric working platforms in boggy zones (18,000 m2 provisional) ROPS plant, exclusion zones and contractor temporary-works assessment	Engineering	Rare	Catastrophic	High		X	X	Contractor	Contractor CMP and SWMS to outline methodology to further mitigate residual risk	Open
	9 Construction	Earthworks	Fill embankments to ~8 m placed over soft/boggy ground (Ch 4150-4350, Ch 5200-5800) incl. over live watercourses - instability during placement	Embankment failure during construction Worker injury; plant bogging	Possible	Major	Extreme	Benching into existing slopes designed (>=1.5 m wide, 1 m vertical, inward sloped); interface scarified/compacted 150-300 mm lifts with density testing; Level 1 AS 3798 supervision recommended Rock working platforms specified in low-lying zones	Engineering	Unlikely	Moderate	Medium		X	X	Client or Designer		Open
	10 Construction	Ground Condition	Rock excavation (dolerite/basalt, possible drill-and-blast) near dwellings and businesses at Christmas Hills junction (Ch 5000-5200)	Flyrock injury to public/workers Vibration damage to structures; noise and dust nuisance	Possible	Major	Extreme	Ripping/hydraulic breaking preferred over blasting (4,000 m3 provisional rock excavation) Dilapidation surveys of nearby residences, culverts and outbuildings before works Vibration monitoring and buffer/exclusion zones within 50 m Blast management plan and statutory approvals if blasting required	Admin Controls	Unlikely	Moderate	Medium		X	X	Designer/ Contractor		Open

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	11	Construction	Groundwater	Works within/adjacent to live watercourses and farm dams - dewatering, sudden inflow, poor water quality (berry-farm treatment pond discharge upstream); new fill acting as hydraulic barrier at frog-crossing and Griffins Rd culverts while under construction	Inundation of excavation; worker injury Embankment washout during works; environmental harm	Possible	Major	Extreme	In-stream works in dry-season/low-flow windows Embankments assessed as hydraulic barriers in design; drainage blanket/chimney drains behind batters Dewatering and diversion plans in contractor CEMP; water quality testing and EPA liaison	Engineering	Unlikely	Moderate	Medium		X	X	Designer/ Contractor	PDR SS16.4-16.5; Constructability Assessment	Open
	12	Construction	Latent_Conditions	Structural condition of existing culverts unknown prior to extension (incl. DN1500 and culverts under ~5 m fill at Ch 4200-4300) - collapse during works or under new fill	Worker injury during extension works Costly replacement discovered mid-construction	Possible	Major	Extreme	Culvert condition/structural assessment prior to extension detailing (PDR recommendation) Culvert angles unchanged in design (bespoke joints identified as high risk) Full replacement detailed where extension impractical	Engineering	Unlikely	Moderate	Medium		X	X	Client or Designer		Open
	13	Construction	Suitably Qualified Professional	Retaining structures at creek section Ch 5200-5800 (gabion / MassBloc / reinforced earth options) constructed on soft founding - geotechnical investigation excluded retaining-wall design parameters (data gap)	Wall instability during or after construction Worker injury	Possible	Major	Extreme	Supplementary geotechnical investigation for wall foundations prior to detailed wall design Suitably qualified geotechnical/structural engineer to design walls Stable founding and dry-season construction specified	Engineering	Unlikely	Moderate	Medium		X		Client or Designer	GIP exclusions - data gap disclosed with the design (s22(4) WHS Act 2012 (Tas))	Open
	14	Construction	Hazardous_Substances_Dangerous_Gods	Asbestos-containing materials (e.g. AC water main/conduits in older utility corridors) or contaminated ground encountered during excavation - no contamination or acid sulfate testing in GIP scope	Worker/public exposure to asbestos fibres or contaminants Stop-work; disposal costs	Possible	Major	Extreme	Unexpected finds protocol in specification (stop work, assess, licensed removal) Utility relocations to positively identify pipe/conduit materials before disturbance Hygienist and licensed asbestos removalist engaged if ACM confirmed; disposal to licensed facility	Admin Controls	Unlikely	Moderate	Medium			X	Contractor	GIP exclusions - contamination status unverified (data gap disclosed with the design)	Open
	15	Construction	Falling_Object	Heavy lifts adjacent to live traffic and overhead power - precast culvert units, ~40 endwalls, barrier components, retaining wall blocks	Dropped load onto workers or live traffic lane Crane contact with overhead conductors	Possible	Catastrophic	Unlikely	Precast elements sized for standard lifting plant; lifting points designed in Lift plans with exclusion zones; no lifts over live lanes (lane closure during lifts) Crane clearances to overhead lines per no-go zone requirements	Engineering	Rare	Catastrophic	High		X	X	Contractor		Open
	16	Construction	Formwork	Temporary works during construction - formwork for endwalls/spillway, trench shoring, temporary propping of power poles, temporary barriers and Christmas Hills Rd side track	Temporary works collapse onto workers Release into live traffic	Possible	Major	Extreme	Temporary works designed and certified by suitably qualified engineer (designer duty extends to temporary works per CoP) Standard proprietary systems preferred Inspection and hold points before loading	Engineering	Unlikely	Moderate	Medium			X	Contractor		Open
SERVICES & UTILITIES																			
	17	Construction	Electrical	Plant contact with live TasNetworks HV/LV overhead conductors during earthworks, haulage and barrier installation; power poles/stays destabilised by adjacent excavation	Electrocution; arc flash Pole collapse; regional power outage	Possible	Catastrophic	Unlikely	Notice to Move Infrastructure issued (Roads and Jetties Act 1935 (Tas)); TasNetworks relocations (incl. Megavar HV crossings) sequenced ahead of affected stages Design limits trenching near poles; temporary propping requirements flagged No-go zones and safe approach distances; spotters and plant height limiters near live conductors	Isolate	Rare	Catastrophic	High		X	X	Client or Designer	PDR SS12; Megavar relocation design in progress	Open
	18	Construction	Services	Underground service strike during excavation - Telstra assets both sides of highway east of Christmas Hills Rd with multiple crossings; water mains adjacent to excavations; unknown services	Worker injury Communications/water outage to community; delay	Possible	Major	Extreme	BYDA searches completed and services shown on drawings; potholing of critical crossings during design Contractor positive location (potholing/non-destructive) before excavation; permit-to-dig system Asset owner protection requirements adopted	Admin Controls	Unlikely	Moderate	Medium		X	X	Designer/ Contractor	Potholing completed for design has known limitations - contractor to verify	Open
	19	Construction	Services	Water main shutdown failure, or shutdown window insufficient for connection works	Community supply loss Flooded excavation; delay	Possible	Major	Extreme	TasWater shutdown plan adhered to; achievable shutdown periods confirmed in advance Contingency measures (e.g. accelerated concrete strength) in methodology	Admin Controls	Unlikely	Moderate	Medium			X	Contractor		Open
ENVIRONMENT & HERITAGE																			
	20	Construction	Habitat Impacts	In-stream works at platypus creek (DN1500 - resident platypus, burrow and feeding habitat confirmed; protected under Nature Conservation (Wildlife) Regulations 2021 (Tas)) and Green and Gold Frog habitat (Ch 3540-3780)	Harm to protected fauna; permit breach Works suspension; public/political sensitivity	Likely	Major	Extreme	Creek realignment eliminated in design via DN1500 cross-section departure In-stream works programmed outside platypus breeding season (Aug-Apr constraint); NRE Tas in-stream works guidelines Platypus traverse ramp specified (1:8 grade, cleats, toe below NWL) with NRE hold/witness points Frog-friendly 900x1500 RCBC crossing; fauna spotter/relocation and chytrid hygiene protocols	Eliminate	Unlikely	Moderate	Medium		X	X	Client or Designer	Platypus Traverse Ramp Spec Clause; departure application; variation for mitigation works pending	Open
	21	Construction	Vegetation Removal	Clearing encroachment into EPBC-listed Eucalyptus viminalis wet forest (critically endangered) north of highway Ch 5260-5760	Unlawful clearing; environmental harm Commonwealth enforcement; project delay	Possible	Major	Extreme	Alignment designed to avoid: curve Ch 5630 tightened 775 to 740 m; sag K=25 retained No-go zones on drawings; exclusion fencing specified; NVA mapping provided to contractor	Eliminate	Rare	Moderate	Low		X	X	Designer	ADD006 NBES NVA (Mar 2025); PDR Table 21	Closed
	22	Construction	Environmental	Erosion and sediment discharge to creek/waterways from ~65,000 m3 earthworks; concrete washout and fuel spills	Environmental harm to waterways EPA enforcement under EMPCA 1994 (Tas)	Likely	Moderate	High	IECA best-practice ESC on drawings and specification; controls scaled with cut depth Contractor CEMP; progressive stabilisation incl. 34,000 m2 hydroseeding Spill kits and refuelling controls	Engineering	Unlikely	Minor	Low		X	X	Contractor		Open

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	23	Construction	Vegetation Removal	Removal of 112 mature trees incl. 13 potentially hollow-bearing (blue-winged/swift parrot, masked owl habitat) - felling adjacent to live traffic; harm to fauna	Tree strike on vehicles/workers Harm to protected fauna	Possible	Major	Extreme	Trees identified on drawings Hollows inspected and blocked outside nesting season per DSG Tree Assessment Framework before removal Felling under traffic management	Admin Controls	Unlikely	Moderate	Medium		X	X	Contractor		Open
	24	Construction	Biological	Spread of eight declared weeds incl. St John's wort (Zone A eradication priority in Meander Valley) and chytrid pathogen by construction plant	Weed/pathogen spread Breach of Weed Management Act 1999 (Tas)	Likely	Moderate	High	Contractor Weed and Hygiene Management Plan required by specification Wash-down stations; hygiene auditing	Admin Controls	Unlikely	Minor	Low			X	Contractor	NVA Appendix; PDR Table 21	Closed
	25	Construction	Aboriginal Cultural Heritage	Disturbance of Aboriginal cultural heritage during earthworks; protected area adjacent to works; unanticipated discovery of artefacts	Damage to heritage; stop-work Breach of Aboriginal Heritage Act 1975 (Tas)	Possible	Major	Extreme	Exclusion zones and no-stockpiling requirements on drawings; areas fenced Qualified heritage advice for any excavation near protected area boundary Unanticipated Discovery Plan in specification (stop work, notify Aboriginal Heritage Tasmania); crew inductions	Admin Controls	Unlikely	Major	High		X	X	Client or Designer	Carried from SID Rev A (residual High)	Open
WORK ENVIRONMENT & PERSONNEL																			
	26	Construction	Manual_Tasks	Hazardous manual tasks - handling of pipes, ~40 endwalls, ~5.4 km of barrier components and 5.3 km fencing	Musculoskeletal injuries	Likely	Moderate	High	Design specifies proprietary driveable endwalls and standard prefabricated barrier components suited to mechanical handling Contractor mechanical aids and SWMS (WHS Regs 2022 (Tas) regs 60-61)	Engineering	Possible	Minor	Medium		X	X	Contractor		Open
	27	Construction	Fatigue	Worker fatigue - 18-24 month programme over two summers, extended TM shifts, possible night works	Errors causing injury Vehicle incidents commuting	Possible	Major	Extreme	Contractor fatigue management plan per WorkSafe Tasmania guidance Shift rostering; staging allows works predominantly in daylight	Admin Controls	Unlikely	Moderate	Medium			X	Contractor		Open
	28	Construction	Climatic_Conditions	Outdoor work exposure - UV, heat, cold/frost, fog and rapid weather change; sealing weather windows; wet-season clay subgrade degradation	Heat illness/UV harm; cold stress Failed seal or subgrade damage in unsuitable weather	Possible	Moderate	High	Seasonal programming: sealing and clay-area earthworks in suitable weather only Weather monitoring with stop-work triggers; emergency management plan Sun protection PPE; welfare facilities at compound	Admin Controls	Unlikely	Minor	Low			X	Contractor		Open
	29	Construction	Security	Unauthorised public access to worksite and open excavations outside work hours (adjacent residences and tourist businesses)	Public injury in excavation or on plant	Possible	Major	Extreme	Site fencing and secured compounds Excavations backfilled, covered or barricaded at end of shift Safety barriers between traffic and excavations >300 mm	Isolate	Unlikely	Moderate	Medium			X	Contractor		Open
	30	Construction	Emergency	Emergency response during construction - rural site ~3 km from Elizabeth Town, possible mobile black spots, worksite up to 3.8 km long with access restricted by TM	Delayed first aid/rescue response to injured worker Emergency services unable to reach incident within worksite	Possible	Major	Extreme	Emergency response plan in contractor CMP: first aid facilities at compound; emergency vehicle access maintained through all TM stages Emergency access points and assembly areas identified per stage Communications plan addressing mobile coverage gaps	Admin Controls	Unlikely	Moderate	Medium			X	Contractor		Open
	31	Construction	Commissioning	Staged traffic switches and commissioning across 10 construction stages - conflicting/obliterated linemarking, unfamiliar temporary alignments, barrier terminals in interim configurations	Driver confusion and loss of control at traffic switches Collision with interim barrier configurations	Possible	Major	Extreme	Staging design provides consistent temporary alignments at each switch Temporary linemarking/delineation plans per stage; superseded markings removed, not blacked out Interim barrier terminal treatments to standard; review of high-risk switches	Engineering	Unlikely	Moderate	Medium		X	X	Designer/ Contractor		Open
OPERATION																			
ROAD USER SAFETY - GEOMETRY & SIGHT DISTANCE																			
	32	Operation	Visibility	Median wire rope safety barrier (WRSB) restricts sight lines in service: SISD at P-turn entry/exits and at Griffins Rd / Christmas Hills Rd exits (fail 341 m @ 120 km/h, pass @ 110 km/h); overtaking-lane merge sight line on curve	Collision at junctions, P-turns and merge Run-on crashes at high speed	Possible	Catastrophic	Unlikely	Hierarchical risk-based assessment in detail design: local barrier set-back/removal, extended overtaking lane, signage and linemarking Design compliant at 110 km/h posted speed Departures documented via DSG SR Process 19	Engineering	Unlikely	Major	High		X		Designer	PDR S55.4-5.5, Tables 2 & 8; agreed in principle with DSG 15.05.25. Residual risk to be recorded in the reg 295 safety report	Open
	33	Operation	Traffic	Vertical geometry departures below desirable values in service: sag K 25-86, crest K 69-97, truck SSD <205 m (Ch 4062-4272), overtaking lane lengths 30-80 m under desirable, Christmas Hills traffic island 17 m2 vs 50 m2 desirable	Reduced sight distance and decision time for road users	Possible	Major	Extreme	Formal departures from standard via SR Process 19 with supporting risk assessments Sag K=25 retained to protect EPBC-listed vegetation Compensating treatments: signage, delineation, audio-tactile edge lines, high-PSV surfacing at junctions	Engineering	Unlikely	Moderate	Medium		X		Designer	PDR Table 2, Tables 6-8; agreed in principle DSG 15.05.25	Open
	34	Operation	Batter/Pavement Stability	Reduced cross-section in service at DN1500 (Ch 5280-5300): 2.0 m shoulder, 1.0 m verge, 1.5H:1V rock-fill batter with low-deflection barrier over ~100 m (adopted to avoid creek/platypus habitat)	Reduced recovery width for errant vehicles Barrier deflection toward steep batter	Possible	Major	Extreme	Formal departure application (accepted in principle: RFI-039; DSG Traffic Eng 17.12.25; DSG PM 05.03.26) Low-deflection barrier with 30:1 flare; 2.0 m shoulder still complies with T3 Table T3.7.1 Concrete spillway and rock protection at culvert outlet	Engineering	Rare	Major	Medium		X		Designer	24031-REP-Departure DN1500 XSection - formal approval pending (hold point). Residual risk to reg 295 safety report	Open
	35	Operation	Access and Egress	Relocated property access 5377/5381 Bass Hwy (from within Christmas Hills Rd junction functional area to ~Ch 5190) in service: 3D SISD (285 m abs min @ 110 km/h) not yet verified; CHR(S) volume justification outstanding	Collision between turning and through vehicles at the relocated access	Possible	Catastrophic	Unlikely	Relocated access designed to AGRD04A with CHR(S) (100 m slot) and LGAT TSD-R04-v3 driveway 3D SISD check is a designated hold point in detailed design; batter widening/sight benching if check fails Departure application to follow	Engineering	Rare	Catastrophic	High		X		Designer	24031-EAR-Christmas Hills Access (May 2026). Landowner agreement and possible DA outstanding	Open

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36	Operation	Access and Egress	14 property accesses within high-speed corridor in service - several with substandard sight distance, within overtaking lanes, or at barrier gaps leaving non-traversable batters unprotected (RSA F4/F5/F14/F22/F29)	Collision at accesses Errant vehicle into unprotected hazard Night-time driver confusion at driveways parallel to highway	Possible	Major	Extreme	Accesses reinstated and sealed 5 m to 19 m-semi (LGAT) or B99 templates Sight distance reviewed per access; barrier gaps minimised and terminals to standard Driveway delineation to avoid night-time confusion	Engineering	Unlikely	Moderate	Medium		X		Designer	Detailed Design RSA Table 8; client responses to be completed in the RSA response register	Open
37	Operation	Pedestrian	No pedestrian or cyclist facilities provided (State Growth direction); DDA bus stop (Ch 4560) without footpath connection or formal pull-over bays	Vulnerable road users on/adjacent to 110 km/h carriageway Rear-end collision at bus stop	Possible	Catastrophic	Unlikely	RSA findings 11 & 12 (exceed Safe System tolerable limits) referred to State Growth Bus stop constructed to SD-087-012 Scope exclusion directed by client - residual risk to be formally accepted by DSG and recorded	Admin Controls	Possible	Major	High		X		Client	RSA Table 8. Client acceptance outstanding - reg 295 safety report item	Open
38	Operation	Access and Egress	Limited breakdown/pull-over refuge where shoulders run behind continuous barrier	Stopped vehicle exposed in 110 km/h live lane	Possible	Major	Extreme	3.0 m shoulders at barrier sections Periodic safe pull-over areas identified where feasible (RSA F13) Audio-tactile edge lines to alert drivers drifting toward stopped vehicles	Engineering	Unlikely	Moderate	Medium		X		Designer		Open
39	Operation	Traffic	Wildlife (wallaby) strike along corridor	Vehicle loss of control at high speed Fauna death	Likely	Moderate	High	Wildlife signage with seasonal beacons at high-strike zones (RSA F16) 5.3 km new fencing; fauna connectivity maintained via culverts	Engineering	Possible	Minor	Medium		X		Client or Designer		Open
40	Operation	Climatic_Conditions	Black ice / freeze-thaw on shaded and elevated sections; seasonal fog	Loss of control at high speed	Possible	Major	Extreme	Pavement and seal selection accounting for freeze-thaw (RSA F7) High-PSV surfacing at junctions Ice/fog warning signage locations for DSG consideration	Engineering	Unlikely	Moderate	Medium		X		Designer		Open
41	Operation	Fatigue	Driver monotony ('corridor hypnosis') on straightened high-speed alignment	Run-off-road crashes	Possible	Major	Extreme	13.5 km audio-tactile edge lines Median WRSB and roadside barrier limit crash severity Consistent delineation; periodic visual stimuli (RSA F17)	Engineering	Unlikely	Moderate	Medium		X		Designer		Closed
42	Operation	Emergency	Continuous median WRSB restricts emergency service access/crossing and incident response on 2+1 carriageway; U-turns only at P-turns at project extremities	Delayed ambulance/fire access to crashes Extended closure of freight route during incident response	Possible	Major	Extreme	P-turns provided at both project ends for authorised U-turn movements Emergency services (Tas Police, TFS) consulted during design on access and response scenarios Incident response arrangements documented in O&M handover to DSG	Engineering	Unlikely	Moderate	Medium		X		Client or Designer	Coordination with Tas Police/TFS documented in PDR staging section	Open
43	Operation	Lighting	Road lighting limited to flag lighting at Christmas Hills Rd junction (AS/NZS 1158 category V5); no lighting elsewhere; lighting plan not yet detailed (RSA F8)	Night-time collisions at junctions and accesses Reduced conspicuity of median barrier, terminals and islands	Possible	Major	Extreme	Flag lighting designed to AS/NZS 1158 for Christmas Hills Rd junction Lighting plan completed in detailed design (RSA F8) Retroreflective delineation of barriers, terminals and islands throughout	Engineering	Unlikely	Moderate	Medium		X		Designer		Open
FLOODING & DRAINAGE																		
44	Operation	Water_Storm_Damage	Highway overtopping at DN1500 culvert (Ch 5280-5300, ~320 ha catchment) - fails DSG T8 Category 1 immunity in all 1% AEP scenarios; climate change adds ~19% peak flow by 2060; upstream catchment changes (farm dams/development) may worsen over time	Vehicles encountering floodwater at 110 km/h Closure of National Land Transport Network freight route	Unlikely	Catastrophic	Rare	T8 hydraulic and climate change assessment completed; options to DSG: increase culvert capacity or formally accept lower service category (hold point) If lower service accepted: flood warning signage and asset inspection regime Upstream dam sensitivity documented and handed to asset owner	Engineering	Rare	Catastrophic	High		X		Client	24031-REP-Hydraulic Report Rev A (10.09.25). Residual risk transferred to DSG asset management - information supplied with design per s22(4) WHS Act 2012 (Tas)	Open
45	Operation	Water	Culvert outlet scour and embankment undermining in service at DN1500 - outlet velocity ~5.6 m/s, outlet ~2.0 m above embankment toe, dispersive silt/clay soils, realigned waterway along embankment toe	Progressive embankment failure beneath live highway Downstream property damage	Possible	Major	Extreme	Concrete spillway and rock beaching (boulders graded up to 2 t) at outlet Consider lowering culvert invert to a defined waterway Approach bypass flows from raised pavement addressed in final design	Engineering	Unlikely	Moderate	Medium		X		Designer	Hydraulic Report SS4.5	Open
46	Operation	Groundwater	Embankment acting as long-term hydraulic barrier at frog-crossing culverts (Ch 3640-3700) and Griffins Rd culverts (Ch 4200-4300); fill abuts private dam wall - seepage/piping beneath highway	Embankment instability or washout under live traffic Flooding of adjoining land	Possible	Major	Extreme	Embankments assessed as hydraulic barriers in design; drainage blanket/chimney drains behind batters Flood check of culvert systems (concept catchment underestimate identified: ~300 ha vs 92 ha) Subsoil drainage network (6.5 km) specified	Engineering	Unlikely	Moderate	Medium		X		Designer	PDR SS16.4-16.5	Open
47	Operation	Water_Storm_Damage	Infilling of major longitudinal drain (Ch 5400-5780, collecting five culverts) - flow redirected into private farmland in service	Flooding/damage to adjoining property Legal liability to DSG	Likely	Moderate	High	Table drain retained/reconstructed at new batter toe in design Drain capacity and outfalls confirmed in detailed design; existing drain levels verified by infill survey	Engineering	Unlikely	Minor	Low		X		Designer		Open
48	Operation	Water	Aquaplaning and kerb flow width not yet assessed (client-directed concept-level drainage scope; no corridor flood model), incl. superelevated kerbed section Ch 5400-5800	Vehicle loss of control in rain Water ponding on carriageway	Possible	Major	Extreme	Aquaplaning analysis and kerb spread checks to be completed in detailed design Pit-and-pipe network sized accordingly Full catchment assessment recommended to DSG (PDR SS7)	Engineering	Unlikely	Moderate	Medium		X		Designer		Open
PAVEMENT & ASSET PERFORMANCE																		
49	Operation	Ground Condition	Pavement over expansive, dispersive clay subgrades (soaked CBR 1.5-5%, swell to 5%, Emerson Class 2-4) - premature failure in service	Pavement failure at 110 km/h; rough ride Increased maintenance exposure to live traffic	Likely	Moderate	High	350 mm lime-stabilised capping or Type A fill (design CBR >=7-10%) Subsurface drains at widening joints on high side; 150 mm stepped layer joints Moisture control and wet-season restrictions specified for construction	Engineering	Rare	Moderate	Low		X		Designer	PDR SS6.2; 24031-REP-Pavement Assessment Table 13	Closed

ID	Lifecycle Stage	Hazard Consideration (Guide Words)	Potential Design Hazard Identified	Consequence(s)	Risk Assessment			Risk Control Measures	Control Type	Residual Risk Assessment			By When			Responsibility	Comment	Status
					Likelihood	Consequence	Risk Rating			Likelihood	Consequence	Risk Rating	Concept Design	Final Design	Construction			
	50	Operation	Materials_of_Construction	Three pavement types with composition-change joints; 200 mm overlay over reclaimed existing pavement - differential performance at interfaces in service	Premature pavement distress at joints Hazard to road users; maintenance exposure	Possible	Moderate	High	Uniform 200 mm base course across all pavement types Subsurface drainage at pavement joints QAV inspection of interfaces before opening; DSG guidance on joint detailing	Engineering	Rare	Moderate	Low		X	Designer	Pavement Assessment Table 11	Closed
MAINTENANCE																		
MAINTENANCE																		
	51	Maintenance	Maintainability	Maintenance workers (mowing, barrier/sign repair, drain clearing) exposed to 110 km/h traffic; limited pull-over areas	Maintenance worker struck by vehicle	Possible	Catastrophic	Unlikely	1.5 m verge behind roadside barriers for maintenance access Batters designed for mechanical mowing where practicable; low-maintenance stabilisation elsewhere Maintenance TM scenarios documented in O&M information handed to DSG	Engineering	Rare	Catastrophic	High		X	Client	Carried from SID Rev A	Open
	52	Maintenance	Maintainability	WRSB repair within 3.6 m median between opposing 110 km/h traffic flows following barrier strikes; stored energy in tensioned wire ropes during release/re-tensioning	Repair crew struck by traffic Cable whip injury from stored energy release Extended periods with damaged barrier in service	Likely	Major	Extreme	MASH TL3 WRSB with standard components for rapid repair; post spacing per RSA F30 1.8 m barrier offsets provide working room Repair under lane closure TM per AGTTM Cable release/re-tensioning per manufacturer procedures by trained crews	Engineering	Unlikely	Major	High		X	Client		Open
	53	Maintenance	Confined_Space	Culvert inspection and cleaning - DN1500 is man-entry size with year-round flow and access only via private property; no formal access tracks	Confined space incident Drowning in sudden flow event	Possible	Catastrophic	Unlikely	Design maintains access to culvert openings; access arrangements with landowner to be formalised CCTV inspection preferred to man-entry Any entry per Confined Spaces CoP with permits and rescue plan	Admin Controls	Rare	Catastrophic	High		X	Client	Hydraulic Report SS5.1	Open
	54	Maintenance	Habitat_Impacts	Platypus ramp and in-stream structure maintenance - annual inspection, clearing after major floods, 5-yearly surface checks	Worker injury working in-stream Harm to platypus	Possible	Moderate	High	O&M schedule embedded in specification NRE Tas in-stream works guidelines; work outside breeding season	Admin Controls	Unlikely	Minor	Low			Client	Platypus Traverse Ramp Spec Clause SS8	Closed
	55	Maintenance	Slips_Trips_Falls	Maintenance work on steep batters (to 2H:1V) and around drains/endwalls	Falls; mower rollover	Possible	Major	Extreme	4H:1V mowable batters where practicable Low-maintenance stabilisation on steeper batters Driveable endwalls eliminate protruding hazards in clear zone	Engineering	Unlikely	Moderate	Medium		X	Designer		Closed
FUTURE ALTERATION DEMOLITION																		
FUTURE WORKS & DISPOSAL																		
	56	Alteration	Latent_Conditions	Latent conditions for future works - extended culverts with bespoke joints under deep fill, three mixed pavement types, lime-stabilised layers, reclaimed pavement beneath overlay	Unexpected hazards or structural behaviour during future alteration Incorrect assumptions by future designers	Possible	Major	Extreme	As-built records, hydraulic/geotechnical reports and departure documentation retained and supplied with the design Designer to provide information on request per s22(4) WHS Act 2012 (Tas)	Admin Controls	Unlikely	Moderate	Medium			Client		Open
	57	Alteration	Latent_Conditions	Future modification or removal of median WRSB invalidates the sight-distance and safety assumptions embedded in the design	Unrecognised reduction in safety performance after alteration	Possible	Major	Extreme	Sight-distance dependencies on barrier configuration documented in PDR and this register Any alteration to re-apply the safe design risk management process (CoP s4.4)	Admin Controls	Unlikely	Moderate	Medium			Client		Open
	58	Demolition	Latent_Conditions	Future demolition/replacement of culverts under high fill and live creek - deep excavation with flood, platypus and EPBC constraints re-triggered; disposal of lime-stabilised and reclaimed pavement materials	Worker injury during future works Environmental breach; unsuitable disposal of materials	Possible	Major	Extreme	Load paths and construction details recorded in as-built documentation Hydraulic report documents design flows for future temporary works Environmental constraints and material types mapped and retained with asset records for disposal classification	Admin Controls	Unlikely	Moderate	Medium			Client		Open