

Risk Register - EIS: Construction Risks

Project name:	Townsville Ocean Terminal
Project number:	QL00704

Created by:	Matt Smith
Date created:	16 Mar 07
Revised by:	Matt Smith
Date revised:	14 Nov 07

Reference	Risk	Potential consequences	Original risk			Proposed risk treatment	Residual Risk			Construction Phase Action plans												
			Likelihood	Consequence	Risk Rating		Likelihood	Consequence	Risk Rating	EMP Element(s)	SBMP	RUMP	Detailed Design	Construction Works Contract								
4.1 Climate																						
CL1	Strong winds caused by tropical cyclones or low pressure systems	Injury or death. Destruction/damage to buildings and infrastructure.	Possible	Major	High	Building and infrastructure designed to withstand extreme weather. Design category for cyclone rating and breakwaters and land masses designed for Q100 event. Construction Phase Disaster Action Plan includes early warnings for evacuation of personnel and equipment.	Possible	Major	High	16	x											
CL2	Flooding caused by storm surge	Destruction/damage to buildings and infrastructure	Possible	Major	High	Building and infrastructure designed to withstand extreme weather. Design category for cyclone rating and breakwaters and land masses designed for Q100 event. Construction Phase Disaster Action Plan.	Possible	Minor	Low	16	x											
CL3	Flooding caused by heavy rainfall	Destruction/damage to buildings and infrastructure	Possible	Major	High	Building and infrastructure designed to withstand extreme weather. Design category for cyclone rating and breakwaters and land masses designed for Q100 event. Construction Phase Disaster Action Plan.	Possible	Minor	Low	16	x											
CL6	Extended wet weather during construction	Construction programme delays	Possible	Major	High	Site secured and site personnel and equipment relocated to safe refuge. Site remediation works post event.	Possible	Moderate	Moderate	5,15												
4.2 Land																						
LA1	Degradation of water quality due to erosion	Degradation of water quality	Possible	Minor	Low	Site fully bunded and contained. Sedimentation and erosion control measures in place under EMP.	Possible	Minor	Low	6												
LA2	Unstable slopes and structures due to soil instability	Destruction/damage to buildings and infrastructure	Possible	Moderate	Moderate	Geotechnical Analysis for design of slopes and batters. Specific design parameters for retaining and revetment works.	Possible	Moderate	Moderate	6												
LA3	Degradation of water quality due to existing contaminants in sediment	Degradation of water quality	Possible	Moderate	Moderate	Site fully bunded and contained. Sedimentation and turbidity control measures in place under EMP.	Possible	Moderate	Moderate	5												
LA4	Acidification of water due to acid sulphate soils	Degradation of water quality	Rare	Moderate	Negligible	Site fully bunded and contained. Sedimentation, turbidity control and treatment measures in place under EMP.	Rare	Moderate	Negligible	5,10												
LA5	Collapse of new revetment walls during construction stage	Damage to equipment, risk to personnel, construction delays	Unlikely	Moderate	Low	Level 1 construction supervision - appropriate design based on investigation and analysis	Rare	Major	Low		x											
LA6	Failure of depressurization system through sand layers while excavating canals	Sudden instability with destruction/ damage to infrastructure and equipment and risk to personnel	Rare	Moderate	Negligible	Monitoring of depressurization system through construction as identified in EMP.	Rare	Moderate	Negligible		x											
LA7	Potential high seepage rates through existing southern revetment wall	Additional pumping requirements	Unlikely	Moderate	Low	Additional depressurization wells along southern revetment wall	Unlikely	Moderate	Low		x											
LA8	Slow consolidation of stockpiled organic soft clay in parkland area	Short-term consolidation of reclaimed parklands	Possible	Moderate	Moderate	Monitoring of settlement rates additional surcharge/ wick drains, minor remediation grading works.	Possible	Minor	Low		x											
LA9	Difficulty in compaction of fill	Construction staging method delays / site trafficability issues, increased resultant settlements / instability	Rare	Moderate	Negligible	Level 1 construction supervision - appropriate placement compaction methods.	Rare	Moderate	Negligible		x											
LA10	Shallow sand beds not identified during site investigation	Higher seepage rates, instability	Rare	Moderate	Negligible	Monitoring during construction stage. Construction of additional extraction wells as required	Rare	Moderate	Negligible	5												
LA11	Poor installation of HDPE/Bentonite liner in breakwaters and bunds	Increased seepage rates/ erosion of breakwaters and bunds	Possible	Moderate	Moderate	Close construction stage control of HDPE / Bentonite placement. Additional dewatering wells.	Possible	Moderate	Moderate		x											
LA12	Puncture of HDPE/Bentonite liner	Increased seepage rates/ erosion of breakwaters and bunds	Likely	Minor	Moderate	Close construction stage control of HDPE / Bentonite placement over sand bedding. Additional dewatering wells.	Possible	Moderate	Moderate		x											
LA13	Under estimated modelling assumptions for seepage	Higher pumping requirements	Unlikely	Moderate	Low	Monitoring during construction stage, construction of additional extraction wells as required	Unlikely	Moderate	Low	5												
LA14	Inability to move / handle organic soft clay material	Construction staging method delays	Possible	Major	High	Undertake trials of equipment and handling techniques proposed by contractor	Possible	Minor	Low		x											
LA15	Imported select fill not suitable to purpose	Construction staging method delays, material performance issues	Possible	Moderate	Moderate	Level 1 supervision of imported fill. Additional investigation and testing of source material for suitability	Possible	Moderate	Moderate			x										
LA16	Large rock fill for access construction road fails to penetrate fully through organic soft clay	Localized and potentially abrupt settlements of surface	Possible	Major	High	Level 1 supervision of construction methodology	Possible	Moderate	Moderate		x											
LA18	Abutment instability of temporary Ross Creek bridge	Temporary closure of haul route and material access to site	Possible	Major	High	Geotechnical investigation and analysis of abutments and appropriate design	Possible	Moderate	Moderate		x											
LA19	Poor water quality in basin upon rewatering of site	Turbidity issues	Likely	Moderate	High	Controlled, low velocity rewatering of site, monitor turbidity, open areas progressively cell by cell	Possible	Moderate	Moderate	5												
LA20	Inexperienced earthworks contractor	Time delays	Unlikely	Major	Moderate	Selection of experienced contractor with experienced personnel on site	Unlikely	Moderate	Low												x	

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4.3 Traffic and Transport																																																		
TT1	Accidental spill from material transfer	Destruction/damage to environment from material spill	Rare	Insignificant	Negligible	Material spill and erosion control measures in place under EMP.	Rare	Moderate	Negligible	14,6																																								
TT2	Traffic incidents with existing Road Users	Injury to existing road user	Unlikely	Major	Moderate	Haul routes and Site Traffic Management Plan	Unlikely	Major	Moderate	4																																								
TT3	Noise associated with haul routes	increased road noise	Likely	Moderate	High	Haul routes and Site Traffic Management Plan	Likely	Moderate	High	4,1																																								
TT4	Degradation of traffic and transport infrastructure	damage to infrastructure	Possible	Moderate	Moderate	Remediation or repair to damaged infrastructure	Possible	Moderate	Moderate			x																																						
TT5	Increased site traffic impeding public access	Reduced existing access for pedestrians and cyclists	Possible	Minor	Low	Short term impact. Selection of haul routes to minimise impacts.	Possible	Minor	Low	4																																								
4.4 Non-transport infrastructure																																																		
IN1	Ergon Energy unable to provide sufficient capacity to service TOT	Power supply insufficient, infrastructure upgrade required	Rare	Insignificant	Negligible	Design loadings calculated and liaison with authorities to provide sufficient lead times for upgrades	Unlikely	Moderate	Low			x																																						
IN2	Telstra unable to provide sufficient telecom service TOT	Telecom service insufficient, infrastructure upgrade required	Rare	Insignificant	Negligible	Design loadings calculated and liaison with authorities to provide sufficient lead times for upgrades	Rare	Moderate	Negligible			x																																						
IN5	Existing civil infrastructure unable to provide sufficient capacity	Infrastructure upgrade required	Unlikely	Moderate	Low	Design loadings calculated and sufficient capacity included in design (water, sewerage)	Unlikely	Moderate	Low			x																																						
IN6	Reduction in water quality caused by stormwater runoff	Degradation of water quality	Unlikely	Moderate	Low	stormwater management in accordance with project SWMP	Unlikely	Minor	Low	6																																								
4.5 Waste																																																		
WA1	Excessive material and services resources use during construction	Depletion of natural resources	Possible	Moderate	Moderate	Waste reduction and recycling in accordance with the waste hierarchy in the EPP Waste	Possible	Minor	Low	13																																								
WA3	Emission of liquid wastes to waterways due to poor practices in waste containment, waste transport and stormwater control	Deterioration of water quality and ecological values in aquatic ecosystems	Possible	Major	High	Stormwater management in accordance with project SWMP, hazardous materials management in accordance with project EMP, waste minimisation and management in accordance with the project EMP	Unlikely	Minor	Negligible	6,14,13																																								
WA4	Emission of solid wastes to land due to poor practices in waste containment, waste transport and stormwater control	Recreational and amenity impacts	Possible	Moderate	Moderate	Waste minimisation and management practices for storage and disposal of solid waste in accordance with the project SWMP and EMP	Unlikely	Minor	Negligible	13,6																																								
WA5	Emission of dust and particulates to air due to poor construction practices	Human health and amenity impacts	Possible	Moderate	Moderate	Air quality control measures during construction in accordance with the project EMP.	Possible	Minor	Low	2																																								
4.6 Water Resources																																																		
WR1a	Release of turbid waters during site dewatering	Impacts on seagrasses and ecological communities in Cleveland Bay.	Likely	Moderate	High	Control of dewatering under the EMP, three indicative discharge areas are highlighted adjacent to each of the breakwaters. Preferred locations in rank order are discharge to Ross Creek, discharge adjacent to northern breakwater, discharge adjacent Strand breakwater	Unlikely	Minor	Negligible	5																																								
4.7 Coastal Resources																																																		
CE1	Extreme Storm Tide Event - to 100 year ARI	Destruction/damage to equipment and infrastructure	Possible	Minor	Low	The 100 year ARI is the "Designated Storm Tide Event" (as defined by EPA). Site secured and site personnel and equipment relocated to safe refuge. Site remediation works post event.	Possible	Minor	Low	16,15	x																																							
CE2	Extreme Storm Tide Event - greater than 100 year ARI	Destruction/damage to equipment and infrastructure	Rare	Catastrophic	Moderate	The 100 year ARI is the "Designated Storm Tide Event" (as defined by EPA). Site secured and site personnel and equipment relocated to safe refuge. Site remediation works post event.	Rare	Major	Low	16,15	x																																							
CE3	Extreme Waves - to 100 year ARI	Destruction/damage to equipment and infrastructure	Possible	Minor	Low	Marine infrastructure structurally designed to accommodate 100 year ARI cyclone waves with minimal damage. Site secured and site personnel and equipment relocated to safe refuge. Site remediation works post event.	Possible	Minor	Low				x																																					
CE6	Extreme Waves - greater than 100 year ARI	Destruction/damage to equipment and infrastructure	Rare	Catastrophic	Moderate	Marine infrastructure structurally designed to accommodate 100 year ARI cyclone waves with minimal damage. Site secured and site personnel and equipment relocated to safe refuge. Site remediation works post event.	Rare	Major	Low	16,15	x																																							
CE7	Breakwater failure	Destruction/damage to equipment and infrastructure	Rare	Major	Low	Marine infrastructure structurally designed to accommodate 100 year ARI cyclone waves with minimal damage. Site secured and site personnel and equipment relocated to safe refuge. Site remediation works post event.	Rare	Major	Low				x																																					
4.8 Air																																																		
AI5	Emission of dust and particulate matter from construction activities	Amenity impacts on existing residents in the vicinity of the project site	Possible	Moderate	Moderate	Air quality control measures in accordance with the project EMP	Possible	Minor	Low	2																																								

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4.9	Visual Amenity and Lighting																		
VL1	No Risks Identified				#N/A				#N/A										
4.10	Noise and Vibration																		
Construction Noise																			
NV6	Construction noise impact on existing residential and retail areas	Annoyance, resident complaints	Possible	Moderate	Moderate	Establish complaint hotline, preparation of construction noise and vibration management plan, execution of noise and vibration management and minimisation	Possible	Minor	Low	1									
NV7	Increase in road traffic noise at residences along public roads during construction	Annoyance, resident complaints, Council/DMR may refuse permission to use proposed haulage routes due to unreasonable noise levels.	Possible	Moderate	Moderate	Establish complaint hotline, select haul routes with minimum number of properties affected, maintain and operate equipment efficiently	Possible	Moderate	Moderate	1,4									
NV8	Noise from construction impacts on marine life.	Physical and behavioural impacts on mammals in vicinity of project site.	Possible	Major	High	Visual survey of site to detect noise sensitive species prior to commencement of construction works. Dispersal of noise sensitive species using motorised vessel.	Possible	Moderate	Moderate	1,7									
Construction Vibration																			
NV9	Vibration impact from construction equipment on existing residences	Human discomfort, complaints to Council	Unlikely	Moderate	Low	Establish complaint hotline, minimise duration of impacting works.	Unlikely	Minor	Negligible	1									
NV10	Vibration impact from construction equipment on existing residences	Structural damage to nearby buildings	Unlikely	Major	Moderate	Carry out dilapidation report. Establish complaint hotline. Minimise duration of impacting works.	Unlikely	Moderate	Low		x								x
NV11	Vibration impact from construction equipment on Casino and Entertainment Centre	Human discomfort, complaints to Council	Possible	Moderate	Moderate	Establish complaint hotline, preparation of construction noise and vibration management plan, vibration monitoring	Possible	Minor	Low	1									
NV12	Vibration impact from construction equipment on Casino and Entertainment Centre	Structural damage to nearby buildings	Possible	Major	High	Carry out dilapidation report. Establish complaint hotline, preparation of construction noise and vibration management plan, vibration monitoring	Possible	Moderate	Moderate	1									
4.11	Nature Conservation																		
NC1	Sediment destabilisation through changes in sediment transport regime (e.g. dredging in adjacent areas)	Seagrass impacts	Likely	Major	Extreme	Use of silt curtains during dredging and dredge protocols contained in project EMP	Likely	Minor	Moderate	7,5									
NC2	Light attenuation through, for example, increased turbidity associated with dredging activities	Seagrass impacts	Possible	Major	High	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Possible	Minor	Low	7,5									
NC3	Nutrient enrichment leading to increased macroalgal growth (e.g. effluent discharge)	Seagrass impacts	Unlikely	Major	Moderate	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Moderate	Low	7,5									
NC4	Contamination from spill (oil, chemicals)	Seagrass impacts	Possible	Major	High	Spill contingency procedures contained in project EMP. Controlled via fully bunded site.	Unlikely	Minor	Negligible	14									
NC5	Contamination from disturbed contaminated sediments	Seagrass impacts	Unlikely	Major	Moderate	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Minor	Negligible	7,5									
NC6	Noise pollution (impact on organisms relying on seagrass beds)	Seagrass impacts	Almost Certain	Major	Extreme	Visual survey of site to detect noise sensitive species prior to commencement of construction works. Dispersal of noise sensitive species using motorised vessel.	Unlikely	Minor	Negligible	7,1									
NC7	Smothering through garbage and debris accumulation	Seagrass impacts	Unlikely	Major	Moderate	Waste control measures contained in project EMP. Waste controlled via fully bunded site.	Unlikely	Moderate	Low	13									
NC9	Light attenuation through turbidity	Coral reef impacts	Possible	Major	High	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Possible	Minor	Low	7,5									
NC10	Sediment deposition	Coral reef impacts	Possible	Major	High	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Possible	Moderate	Moderate	7,5									
NC11	Nutrient enrichment leading to increased macroalgal growth	Coral reef impacts	Unlikely	Major	Moderate	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Minor	Negligible	7,5									
NC12	Contamination and mortality from spill (oil, chemicals)	Coral reef impacts	Possible	Major	High	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Minor	Negligible	7,5									
NC13	Contamination from disturbed contaminated sediments	Coral reef impacts	Unlikely	Major	Moderate	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Minor	Negligible	7,5									
NC14	Smothering through garbage and debris accumulation	Coral reef impacts	Unlikely	Moderate	Low	Waste control measures contained in project EMP. Waste controlled via fully bunded site.	Unlikely	Moderate	Low	13									

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NC16	Sediment deposition / burial	Benthic community impacts	Possible	Minor	Low	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Minor	Negligible	7,5									
NC17	Nutrient enrichment leading to increased macroalgal growth	Benthic community impacts	Unlikely	Minor	Negligible	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Minor	Negligible	7,5									
NC18	Contamination and mortality from spill (oil, chemicals)	Benthic community impacts	Possible	Moderate	Moderate	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Minor	Negligible	7,5									
NC19	Contamination from disturbed contaminated sediments	Benthic community impacts	Unlikely	Moderate	Low	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Minor	Negligible	7,5									
NC21	Smothering through garbage and debris accumulation	Benthic community impacts	Unlikely	Moderate	Low	Waste control measures contained in project EMP. Waste controlled via fully bunded site.	Unlikely	Moderate	Low	13									
NC22	Effects of reduction in water quality	Fish and fisheries impacts	Possible	Moderate	Moderate	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Moderate	Low	7,5									
NC23	Impacts on food resources (e.g. benthic communities)	Fish and fisheries impacts	Possible	Major	High	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Moderate	Low	7,5									
NC24	Contamination and mortality from spill (oil, chemicals)	Fish and fisheries impacts	Possible	Major	High	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Minor	Negligible	7,5									
NC25	Noise pollution (impact on organisms relying on seagrass beds)	Fish and fisheries impacts	Almost Certain	Minor	High	Visual survey of site to detect noise sensitive species prior to commencement of construction works. Dispersal of noise sensitive species using motorised vessel.	Possible	Minor	Low	7,1									
NC26	Disturbance to breeding and nursery habitats	Fish and fisheries impacts	Likely	Moderate	High	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Possible	Moderate	Moderate	7,5									
NC28	Smothering of habitat through garbage and debris accumulation	Fish and fisheries impacts	Unlikely	Moderate	Low	Waste control measures contained in project EMP. Waste controlled via fully bunded site.	Unlikely	Moderate	Low	13									
NC29	Hazard to fisheries through accumulated garbage	Fish and fisheries impacts	Unlikely	Major	Moderate	Waste control measures contained in project EMP. Waste controlled via fully bunded site.	Unlikely	Moderate	Low	13									
NC31	Effects of reduction in water quality	Impacts on Bowling Green Bay	Unlikely	Moderate	Low	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Moderate	Low	7,5									
NC32	Contamination and mortality from spill (oil, chemicals)	Impacts on Bowling Green Bay	Unlikely	Major	Moderate	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Minor	Negligible	7,5									
NC33	Noise pollution	Impacts on marine mammals and reptiles	Almost Certain	Major	Extreme	Visual survey of site to detect noise sensitive species prior to commencement of construction works. Dispersal of noise sensitive species using motorised vessel.	Possible	Moderate	Moderate	7,1									
NC35	Harmful marine debris	Impacts on marine mammals and reptiles	Likely	Major	Extreme	Waste control measures contained in project EMP and informative signage.	Possible	Moderate	Moderate	13									
NC36	Impacts on food resources (e.g. seagrass beds)	Impacts on marine mammals and reptiles	Possible	Major	High	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Moderate	Low	7,5									
NC37	Contamination and mortality from spill (oil, chemicals)	Impacts on marine mammals and reptiles	Possible	Major	High	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Minor	Negligible	7,5									
NC38	Contamination / reduction in breeding and nursery habitats	Impacts on marine mammals and reptiles	Possible	Major	High	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Possible	Moderate	Moderate	7,5									
NC39	Effects of reduction in water quality	Impacts on marine mammals and reptiles	Possible	Moderate	Moderate	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Moderate	Low	7,5									
NC40	Harmful marine debris	Protected bird species	Likely	Major	Extreme	Waste control measures contained in project EMP and informative signage.	Possible	Moderate	Moderate	13									
NC41	Contamination / reduction of breeding areas	Protected bird species	Possible	Major	High	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Possible	Moderate	Moderate	7,5									
NC42	Impact on food resources	Protected bird species	Possible	Moderate	Moderate	Use of silt curtains during dredging and dredge protocols contained in project EMP. Controlled dewatering of fully bunded site.	Unlikely	Moderate	Low	7,5									
4.12	Cultural Heritage																		

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CH1	Negative impacts on Aboriginal cultural values	Diminished cultural significance of Cleveland Bay and local waterways.	Unlikely	Moderate	Low	Cultural monitoring and site inspection program to be implemented during development of the site. Training of construction contractors and staff.	Rare	Insignificant	Negligible	10									
CH2	Disturbance of sites that may remain in sub-tidal deposits	Negative impact on archaeological record.	Unlikely	Moderate	Low	Implementation of a protocol in the event of a find of cultural significance and appropriate management actions in consultation with the Traditional Owners.	Rare	Insignificant	Negligible	10									
CH3	Negative impacts on local environmental values	Diminished Aboriginal use of the area for cultural practices such as fishing and foraging.	Unlikely	Moderate	Low	Review of expert environmental reports by Traditional Owners.	Rare	Insignificant	Negligible	7,10									
4.13	Social																		
SO1	Air quality impacts during construction	Adverse impacts on amenity and liveability	Possible	Major	High	Air quality control measures in accordance with the project EMP	Possible	Minor	Low	2									
SO1a	Noise impacts during construction	Adverse impacts on amenity and liveability	Possible	Major	High	Establish complaint hotline, preparation of construction noise and vibration management plan, execution of noise and vibration management and minimisation	Possible	Minor	Low	1									
SO3	Increased marine traffic	Impacts on existing recreational uses	Rare	Insignificant	Negligible	Planned barge movements provided to TPA and harbour master.	Rare	Minor	Negligible		x								
SO4	Increased vehicular traffic	Impacts on existing and future residents	Possible	Moderate	Moderate	Provide density plans as part of EIS submission to enable government authorities to plan for service upgrades with maximum lead times	Possible	Moderate	Moderate	4									
SO5	Reduced public amenity during construction	Construction related activities will generate some amenity impacts on the Strand thereby reducing amenity for users	Likely	Minor	Moderate	Short term impact. Selection of haul routes to minimise impacts.	Likely	Minor	Moderate	4									
SO6	Reduced public access to recreational space and facilities during construction	Inability of previous users to access old breakwater (e.g. recreational anglers)	Almost Certain	Minor	High	Safety considerations must come to the fore during construction and public access to the breakwater would be inappropriate	Almost Certain	Insignificant	Moderate	16									
SO13	Environmental degradation	Degradation of the marine environment in particular during construction	Unlikely	Major	Moderate	Adhesion to environmental protocols contained in project EMP. Controlled impacts via fully bunded site.	Unlikely	Moderate	Low	7									
SO15	Increased dust, noise and congestion along haulage routes	Residential and road user disamenities resulting from sustained periods of quarry materials haulage	Possible	Moderate	Moderate	Short term impact. Selection of haul routes to minimise impacts.	Possible	Minor	Low	4									
4.14	Health and Safety																		
HS3	Construction traffic	Increased traffic on haul roads and noise nuisance impacts on existing businesses, schools and residences	Likely	Moderate	High	Establish complaint hotline, select haul routes with minimum number of properties affected, maintain and operate equipment efficiently	Possible	Moderate	Moderate	4									
HS4	Public health and safety	Impacts on public H&S during construction	Unlikely	Major	Moderate	Adequate signage and fencing to secure the site and prevent unauthorised access.	Unlikely	Major	Moderate	16									
HS6	Construction health and safety	Health and Safety impacts on construction workforce	Unlikely	Major	Moderate	Construction contractor to implement WH&S measures.	Unlikely	Major	Moderate	16									
4.15	Economy																		
EC1	Potential impact on existing labour markets	Inability of existing workforce to provide adequate skills and labour	Unlikely	Moderate	Low	Encouragement of suitable labour force into local market.	Unlikely	Moderate	Low										
EC2	Potential impacts on existing housing and accommodation stock (during construction)	Inability of existing accommodation to cope with increased demand	Possible	Moderate	Moderate	Expected labour force will be drawn from existing local workforce.	Possible	Minor	Low										
EC5	potential impact on future regional development resulting from use of significant quantities of quarry materials	Inability of future projects to source sufficient volumes of quarry materials from local sources (resulting in increased costs and project delays)	Rare	Moderate	Negligible	Roseneath Quarry has been specifically re-opened to supply materials for this project. Significant reserves still exist in the vicinity to provide material for future developments.	Rare	Moderate	Negligible										
EC7	potential impact on existing marine users during construction	Impairment of operations of existing Ross Creek users	Rare	Minor	Negligible	Ensure production schedules are consistent with existing user requirements	Rare	Minor	Negligible		x								
4.17	Other																		
Construction Methodology																			
CM1	Sand Lenses Slip Failure	Destruction of Property	Possible	Moderate	Moderate	Geotechnical Analysis for design of slopes and batters. Specific design parameters for retaining and revetment works. Level 1 construction supervision.	Possible	Moderate	Moderate		x								
CM2	Percolation and Dewatering	Work Site Flooding	Likely	Moderate	High	Monitoring of depressurization system through construction as identified in EMP. Reduced Working Cells.	Possible	Moderate	Moderate	5	x								
CM3	Dewatering Equipment Failure	Work Site Flooding	Rare	Moderate	Negligible	Level 1 construction supervision. Reduced Working Cells.	Rare	Moderate	Negligible	5	x								
CM4	HDPE / Bentonite Membrane Failure	Work Site Flooding	Likely	Moderate	High	Monitoring of depressurization system through construction as identified in EMP. Reduced Working Cells.	Possible	Moderate	Moderate		x								

Risk Register - EIS: Construction Risks

Project name:	Townsville Ocean Terminal
Project number:	QL00704

Created by:	Matt Smith
Date created:	16 Mar 07
Revised by:	Matt Smith
Date revised:	14 Nov 07

Reference	Risk	Potential consequences	Original risk			Proposed risk treatment	Residual Risk			Construction Phase Action plans												
			Likelihood	Consequence	Risk Rating		Likelihood	Consequence	Risk Rating	EMP Element(s)	SBMP	RUMP	Detailed Design	Construction Works Contract								
CM5	Wonky Holes	Work Site Flooding	Possible	Moderate	Moderate	Monitoring of depressurization system through construction as identified in EMP. Reduced Working Cells.	Possible	Moderate	Moderate	5	x											
CM6	Spoil Disposal unsuitable as fill material	Movement of Materials Off Site and Treatment	Almost Certain	Minor	High	Agreement with Port Authority to receive materials to enable relocation and treatment.	Almost Certain	Minor	High	17	x											
CM7	Parklands Settlement	Destruction of Property (landscape element)	Almost Certain	Minor	High	Site remediation works post event.	Almost Certain	Insignificant	Moderate		x		x									
CM8	Green Topped Breakwaters	Destruction of Property	Possible	Moderate	Moderate	Marine infrastructure structurally designed to accommodate 100 year ARI cyclone waves with minimal damage. Site secured and site personnel and equipment relocated to safe refuge. Site remediation works post event.	Possible	Moderate	Moderate	5	x		x									
CM9	Green Topped Seawall	Destruction of Property (landscape element)	Possible	Minor	Low	Marine infrastructure structurally designed to accommodate 100 year ARI cyclone waves with minimal damage. Site secured and site personnel and equipment relocated to safe refuge. Site remediation works post event.	Possible	Minor	Low	5	x		x									
CM10	Sheet Pile Failure	Destruction of Property	Unlikely	Moderate	Low	Site fully bunded post sheet pile installation. Site remediation works post event.	Unlikely	Moderate	Low		x		x									
CM11	Loss of Construction Equipment	Destruction / Loss of Equipment Property	Rare	Insignificant	Negligible	Construction contractor to implement WH&S measures. Site remediation works post event.	Rare	Insignificant	Negligible		x		x									
CM12	Construction Equipment Failure	Destruction / Loss of Equipment Property	Unlikely	Insignificant	Negligible	Site remediation works post event.	Unlikely	Insignificant	Negligible		x											
CM13	Construction WH&S Risks	Injury or Loss of Life	Possible	Major	High	Construction contractor to implement WH&S measures.	Possible	Major	High	16	x											

Extreme	5
High	35
Moderate	40
Low	23
Negligible	14
	<u>117</u>

Extreme	0
High	4
Moderate	34
Low	47
Negligible	32
	<u>117</u>