

Table of Contents

Executive Summary		i
1.0	Introduction	9
1.1	Overview of the Project	9
1.2	Objectives and benefits of the Project	10
1.3	Proponent	10
1.4	Purpose of the draft Environmental Impact Statement	10
1.5	Overview of the draft Environmental Impact Statement	11
1.6	Terms of Reference	13
2.0	Project Description	14
2.1	Site description	14
2.1.1	Site locality	14
2.1.2	Land use	16
2.1.3	Tenure	18
2.1.4	Zoning	18
2.2	Facility Features	19
2.2.1	Overview	19
2.2.2	Project footprint	21
2.2.3	Reclamation and ground improvement	23
2.2.4	Navigation channel and manoeuvring basin	23
2.2.5	Wet berths	23
2.2.6	Ship lift system	23
2.2.7	Vessel transfer system	24
2.2.8	Wash down bay	24
2.2.9	Dry berths	24
2.2.10	Blast and paint facility	24
2.2.11	Road access	25
2.2.12	Ancillary facilities	25
2.2.13	Wastewater and water treatment	27
2.2.14	Stormwater management	27
2.2.15	Waste management	27
2.2.16	Spill management	28
2.2.17	Biosecurity	28
2.2.18	Utilities	28
2.3	Design	30
2.4	Construction	30
2.4.1	Site preparation	31
2.4.2	Dredging options	31
2.4.3	Construction material transport	34
2.4.4	Land reclamation and revetments	34
2.4.5	Service installation	35
2.4.6	Ship lift and marine structures	35
2.4.7	Corrosion protection	35
2.4.8	Machinery and equipment	36
2.4.9	Vehicular traffic	37
2.4.10	Vessel movement	37
2.4.11	Construction timeframe and workforce	37
2.5	Operation	38
2.5.1	Facility utilisation	38
2.5.2	Vehicular traffic	39
2.5.3	Vessel movement	39
2.5.4	Facility maintenance	39
2.5.5	Maintenance dredging	39
2.5.6	Operational timeframe and workforce	39
2.6	Decommissioning and rehabilitation	40
2.7	Summary of key components of Project	40

2.8	Assessment of alternatives	41
2.8.1	East Arm master planning	41
2.8.2	Site selection	42
2.8.3	Assessment of design alternatives	42
2.8.4	Design refinement	43
3.0	Strategic and Statutory Framework	45
3.1	Approval Process	45
3.1.1	Referral to the Northern Territory Government	45
3.1.2	Referral to the Commonwealth Government	45
3.2	Legislative Framework	46
3.2.1	Commonwealth Legislation	46
3.2.2	Northern Territory Legislation	48
3.2.3	Local Government Plans and Policy	51
3.3	Policy and Guidelines	52
3.3.1	Northern Territory Environment Protection Authority Guidelines	52
3.3.2	Other Policies and Guidelines	55
3.4	Post Environmental Impact Statement Approvals	67
4.0	Environmental Setting	71
4.1	Climate and atmospheric characteristics	71
4.1.1	Temperature	72
4.1.2	Rainfall	73
4.1.3	Relative humidity	73
4.1.4	Wind direction and speed	74
4.1.5	Cyclonic activity	76
4.1.6	Sea level rise	76
4.2	Air quality	77
4.3	Marine environment	77
4.3.1	Marine coastal processes	78
4.3.2	Water and sediment quality	78
4.3.3	Marine ecology	78
4.4	Terrestrial environment	79
4.4.1	Landforms, geology and soils	80
4.4.2	Groundwater	80
4.4.3	Surface water	81
4.4.4	Preliminary Site Investigation	83
4.4.5	Unexploded Ordinance	83
4.4.6	Terrestrial Ecology	83
4.5	People and communities	89
4.5.1	Darwin	90
4.5.2	Palmerston	90
4.5.3	Litchfield	90
4.6	Socio-economic environment	90
4.6.1	Northern Territory Economy	90
4.6.2	Maritime industry	91
4.6.3	Labour force	91
4.7	Historic and cultural values	91
4.7.1	Larrakia connections	91
4.7.2	Aboriginal heritage	92
4.7.3	European heritage	92
5.0	Stakeholder Consultation	93
5.1	Introduction	93
5.2	Objective of engagement	93
5.3	Consultation methodology	94
5.3.1	Consultation with Aboriginal custodians	94
5.3.2	Early works dredging	95
5.3.3	Consultation as part of Environmental Impact Statement development	95
5.3.4	Additional consultation by the ship lift team	96
5.4	Major themes of consultation process	96

	5.5	Consultation during the public review process	100
	5.6	Future consultation with stakeholders	100
6.0		Assessment Methodology	101
	6.1	Summary of approach	101
	6.2	Environmental factors and objectives	102
	6.2.1	Preliminary key environmental factors	102
	6.2.2	Assessment of preliminary key environmental factors	102
	6.2.3	Other environmental factors	104
	6.3	Significance assessment	104
	6.3.1	Preliminary risk identification process	104
	6.3.2	Risk assessment workshop	104
	6.3.3	Risk review and refinement process	105
	6.4	Technical studies	105
	6.5	Cumulative impacts	107
7.0		Marine Environmental Quality	108
	7.1	Introduction	108
	7.2	Policy and guidance	111
	7.2.1	Beneficial uses and water quality objectives for Darwin Harbour	111
	7.3	Assessment methodology	112
	7.4	Existing environmental values	113
	7.4.1	Climate	113
	7.4.2	Geology, landform and soils	113
	7.4.3	Coastal processes	114
	7.4.4	Marine water quality	116
	7.4.5	Hydrocarbons	122
	7.4.6	Marine sediment quality	122
	7.4.7	Waste and pollution	126
	7.4.8	Dredged material settlement ponds	128
	7.4.9	Surveys and studies undertaken	128
	7.5	Potential impacts and risks	129
	7.5.1	Marine water quality	129
	7.5.2	Marine sediment	136
	7.6	Mitigation and management	136
	7.7	Statement of residual risk	138
	7.8	Monitoring and reporting	140
	7.8.1	Routine monitoring the operating dredge and pipelines	140
	7.8.2	Routine monitoring within onshore dredged material placement ponds	140
	7.8.3	Routine monitoring adjacent to reclamation works	140
	7.8.4	Routine monitoring of stormwater discharges to Darwin Harbour	141
	7.8.5	Spill event monitoring	141
	7.8.6	Reporting	141
8.0		Marine Flora and Fauna	142
	8.1	Introduction	142
	8.2	Legislation, policy and guidance	144
	8.3	Assessment methodology	145
	8.4	Existing environmental values	145
	8.4.1	Marine communities of Darwin Harbour	145
	8.4.2	Marine communities of the Project area	147
	8.4.3	Protected marine species	150
	8.4.4	Introduced marine pests	155
	8.5	Potential impacts and risks	156
	8.5.1	Impacts from Project activities	156
	8.5.2	Habitat alteration	158
	8.5.3	Turbidity generated by material placement for reclamation	158
	8.5.4	Sedimentation	159
	8.5.5	Modified coastal processes	160
	8.5.6	Underwater noise and vibration	160
	8.5.7	Contaminant inputs during construction and operation	163

	8.5.8	Introduction of marine pests	164
	8.6	Mitigation and management	164
	8.7	Statement of residual risk	166
	8.8	Monitoring and reporting	169
9.0		Air Quality and Greenhouse Gases	170
	9.1	Introduction	170
	9.2	Policy and guidance	171
	9.2.1	Project air emissions	172
	9.2.2	Adopted air quality goals	173
	9.3	Assessment methodology	174
	9.3.1	Air quality	176
	9.3.2	Greenhouse gas	181
	9.4	Existing environmental values	183
	9.4.1	Meteorology	183
	9.4.2	Air quality	186
	9.4.3	Adopted background concentrations	187
	9.4.4	VOC screening assessment	188
	9.5	Existing emission sources	189
	9.6	Sensitive receptors	190
	9.6.1	Sensitive land uses	190
	9.6.2	Modelled receptors	190
	9.6.3	Water-based receptors	193
	9.7	Assessment of impacts	193
	9.7.1	Air quality modelling results	193
	9.7.2	Greenhouse gas emissions	206
	9.8	Mitigation and management	209
	9.9	Air quality monitoring	210
	9.10	Assessment of residual risk	210
10.0		Social, Economic and Cultural Surroundings	213
	10.1	Introduction	213
	10.2	Policy and guidance	215
	10.3	Assessment methodology	216
	10.3.1	Social	216
	10.3.2	Cultural	219
	10.4	Existing social, cultural and economic environment	220
	10.4.1	People and communities	221
	10.4.2	Social infrastructure and services	221
	10.4.3	Economics and jobs	222
	10.4.4	Cultural identity	225
	10.4.5	Healthy land and seas	226
	10.4.6	Living environment	227
	10.5	Mitigation and management	229
	10.6	Statement of residual risk	231
	10.7	Monitoring and reporting	236
11.0		Other Environmental Factors	238
	11.1	Terrestrial Environmental Quality	238
	11.1.1	NT EPA objectives relating to terrestrial environmental quality	239
	11.1.2	Existing environmental values	239
	11.1.3	Potential impacts and risks	239
	11.1.4	Mitigation and management	240
	11.1.5	Statement of residual risks	242
	11.1.6	Monitoring and reporting	243
	11.2	Terrestrial flora and fauna	243
	11.2.1	NT EPA objectives relating to terrestrial flora and fauna	243
	11.2.2	Existing environmental values	243
	11.2.3	Potential impacts and risks	245
	11.2.4	Mitigation and management	246
	11.2.5	Statement of residual risks	247

	11.2.6	Monitoring and reporting	248
11.3		Inland Water Quality and Hydrological processes	248
	11.3.1	NT EPA objectives relating to surface water and hydrology	248
	11.3.2	Existing environmental values	248
	11.3.3	Potential impacts and risks	248
	11.3.4	Mitigation and management	249
	11.3.5	Statement of residual risks	251
	11.3.6	Monitoring and reporting	252
11.4		Human Health	252
	11.4.1	NT EPA objectives relating to biting insects	252
	11.4.2	Existing environmental values	252
	11.4.3	Potential impacts and risks	253
	11.4.4	Mitigation and management	254
	11.4.5	Statement of residual risks	255
	11.4.6	Monitoring and reporting	256
12.0		Cumulative Impacts	257
	12.1	Introduction	257
	12.2	Assessment methodology	257
	12.3	Marine environmental quality	264
	12.4	Marine flora and fauna	265
	12.4.1	Mangroves	265
	12.4.2	Soft sediments	265
	12.4.3	Underwater noise and vibration	265
	12.5	Air quality and greenhouse gases	266
	12.6	Social economic and cultural surroundings	266
	12.7	Conclusions	267
13.0		Environmental Management Framework	269
	13.1	Purpose of the Environmental Management Framework	269
	13.2	Outline of the Environmental Management Framework	270
	13.3	Supporting documents	271
	13.3.1	Social Impact Management Plan	271
	13.3.2	Noise and Vibration Management Plans	272
	13.3.3	Traffic Management Plans	273
	13.3.4	Dredging and Dredge Spoil Placement Management Plan	273
	13.3.5	Erosion and Sediment Control Plans	273
	13.3.6	Marine Spill Response Plan	274
	13.3.7	Biosecurity Management Plan	274
	13.3.8	Heritage Management Plan	274
	13.4	Construction Environmental Management	275
	13.4.1	Key roles and responsibilities	275
	13.4.2	Inductions and training requirements	275
	13.4.3	Incidents, notifications and emergencies	276
	13.4.4	Environmental documents and records management	277
	13.4.5	Performance management	277
	13.4.6	Inspections, monitoring and auditing and reporting	278
	13.4.7	Complaints management	279
	13.4.8	Environmental factor management measures	279
	13.4.9	Marine environmental quality	280
	13.4.10	Marine flora and fauna	282
	13.4.11	Air quality and greenhouse gases	283
	13.4.12	Terrestrial environmental quality	284
	13.4.13	Terrestrial flora and fauna	286
	13.4.14	Surface water and hydrological processes	287
	13.4.15	Human health	288
	13.5	Operational Environmental Management	289
	13.5.1	Key roles and responsibilities	289
	13.5.2	Inductions and training requirements	289
	13.5.3	Incidents, notifications and emergencies	290

	13.5.4	Environmental documents and records management	290
	13.5.5	Performance management	291
	13.5.6	Inspections, monitoring and auditing and reporting	291
	13.5.7	Complaints management	293
	13.5.8	Proposed factor management measures	293
	13.5.9	Marine environmental quality	294
	13.5.10	Marine flora and fauna	295
	13.5.11	Air quality and greenhouse gases	296
	13.5.12	Terrestrial environmental quality	298
	13.5.13	Terrestrial flora and fauna	300
	13.5.14	Surface water and hydrological processes	301
	13.5.15	Human health	302
14.0		Conclusions	303
	14.1	Marine Environmental Quality	303
	14.2	Marine Flora and Fauna	303
	14.3	Air Quality and Greenhouse Gases	304
	14.4	Social, Economic and Cultural Surroundings	304
	14.5	Environmental management	304
	14.6	Concluding remarks	305
15.0		References	306