

TNG LIMITED

DRAFT ENVIRONMENTAL IMPACT
STATEMENT

DARWIN PROCESSING FACILITY

TABLE OF CONTENTS AND GLOSSARY

TABLE OF CONTENTS

LIST OF APPENDICES	XXXIV
LIST OF FIGURES.....	XXXV
LIST OF TABLES	XXXVII
GLOSSARY 1 – PROJECT TERMINOLOGY	XLII
GLOSSARY 2 – ACRONYMS, ABBREVIATIONS AND DEFINITIONS.....	XLII
GLOSSARY 3 – LIST OF UNITS	XLV
1. INTRODUCTION AND GENERAL INFORMATION	1
1.1 Project Overview.....	1
1.2 Draft EIS Structure	5
2. THE PROPOSANT	6
2.1 General Information	6
2.2 Company Structure	6
2.3 TNG's Environmental History and Performance	9
2.3.1 Other TNG Proposals Undergoing Environmental Assessment	9
2.3.2 Corporate Governance.....	9
2.3.3 Environmental Policy	10
2.3.4 Environmental Management System.....	10
3. REGIONAL SETTING.....	11
3.1 Project Site.....	11
3.2 Project area tenure and zoning	13
3.2.1 Land uses.....	13
3.3 Reasonably Foreseeable Future Activities	17
3.4 Biophysical Setting	17
3.4.1 Climate	17
3.4.2 Bioregion	23
3.4.3 Topography	23
3.4.4 Land Units	25
3.4.5 Sensitive environments.....	27
4. PROPOSAL DESCRIPTION	29
4.1 Proposal History.....	29
4.2 Context.....	29

4.2.1	Products	29
4.2.2	Project Benefits	30
4.2.3	Future proposals/activities	31
4.2.4	Consequences of Not Proceeding with the Project	31
4.3	Alternatives.....	31
4.3.1	Alternative Locations for the Project Components.....	31
4.3.2	Alternative Processing Methods	33
4.3.3	Alternative Infrastructure Designs and Layout	33
4.3.4	Alternative Environmental Management Techniques	33
4.3.5	Alternative Energy Sources – Power Supply	35
4.3.6	Alternative Decommissioning and Rehabilitation Methods	35
4.4	Layout of the Processing Facility.....	36
4.5	Site Preparation and Construction Phase	36
4.5.1	Site Preparation	36
4.5.2	Temporary Facilities and Laydown Areas	38
4.5.3	Earthworks	38
4.5.4	Vegetation Clearing.....	39
4.5.5	Processing Facility Construction	40
4.5.6	Construction Materials Required.....	40
4.5.7	Construction Equipment	41
4.5.8	Construction workforce	42
4.5.9	Traffic (road and rail)	42
4.5.10	Construction Phase Waste Streams	43
4.6	Operational Phase (Production Process and Operation)	43
4.6.1	Traffic	43
4.6.2	Feed Stockpile	45
4.6.3	Processing	45
4.6.4	TIVAN® Process	47
4.6.5	Titanium Pigment Plant.....	48
4.6.6	Oleum Plant	50
4.6.7	Oxygen Plant	50
4.6.8	Steam	50
4.6.9	Cooling	50
4.6.10	Air.....	50

4.6.11	Materials Handling and Storage.....	51
4.6.12	Infrastructure	52
4.6.13	Water Requirements and Management	53
4.6.14	Power Supply	55
4.6.15	Communications	55
4.6.16	Operational Phase Waste Streams	55
4.6.17	Workforce	57
4.7	Decommissioning and Rehabilitation	57
4.7.1	Closure objective and completion criteria	57
4.7.2	Future land use	58
4.7.3	Decommissioning activities.....	58
4.7.4	Rehabilitation activities.....	61
4.7.5	Unexpected closure	61
4.7.6	Future Land Tenure.....	61
5.	APPROVAL AND REGULATORY FRAMEWORK	62
5.1	Environmental Impact Assessment.....	62
5.2	Environmental Assessment Guidelines.....	64
5.3	Other Approvals.....	65
5.3.1	Commonwealth Legislation	65
5.3.2	Current Agreements	72
6.	STAKEHOLDER ENGAGEMENT AND CONSULTATION.....	74
6.1	Consultation Approach	74
6.1.1	Principles of Stakeholder Engagement	74
6.1.2	Objectives of Engagement	74
6.1.3	Methods of Consultation	74
6.2	Key Stakeholders.....	75
6.3	Targeted Consultation	76
6.3.1	Social Impact Assessment	76
6.3.2	Other Key Stakeholders	77
6.4	Consultation Outcomes	78
6.5	Future engagement opportunities.....	81
7.	KEY ENVIRONMENTAL FACTORS.....	84
7.1	Environmental Factors and Objectives	84
7.1.1	Risk Assessment	85

7.2	Environmental Factor: Terrestrial Environmental Quality	86
7.2.1	NT EPA Objective	86
7.2.2	Technical Studies.....	86
7.2.3	Existing Environment	86
7.2.4	Potential impacts and risks	93
7.2.5	Acid Sulfate Soils	95
7.2.6	Mitigation and management	96
7.2.7	Monitoring and reporting	99
7.2.8	Statement of residual impact.....	101
7.3	Environmental Factor: Terrestrial Flora	102
7.3.1	NT EPA Objective	102
7.3.2	Technical Studies.....	102
7.3.3	Existing Environment	103
7.3.4	Potential Impacts and risks	116
7.3.5	Mitigation and management	121
7.3.6	Monitoring and reporting	123
7.3.7	Statement of Residual Impact.....	124
7.4	Environmental Factor: Terrestrial Fauna	125
7.4.1	NT EPA Objective	125
7.4.2	Technical Studies.....	125
7.4.3	Existing Environment	126
7.4.4	Potential impacts and risks	139
7.4.5	Mitigation and Management	143
7.4.6	Monitoring and Reporting	144
7.4.7	Statement of Residual Impact.....	145
7.5	Environmental Factor: Hydrological Processes.....	146
7.5.1	NT EPA Objective	146
7.5.2	Technical Studies.....	146
7.5.3	Existing Environment	146
7.5.4	Potential impacts and risks	159
7.5.5	Mitigation and management	162
7.5.6	Monitoring and reporting	162
7.5.7	Statement of residual impact.....	163
7.6	Environmental Factor: Inland Water Environmental Quality	164

7.6.1	NT EPA Objective	164
7.6.2	Technical Studies.....	164
7.6.3	Existing Environment	165
7.6.4	Potential impacts and risks	170
7.6.5	Mitigation and management	173
7.6.6	Monitoring and reporting	175
7.6.7	Statement of residual impact.....	177
7.7	Environmental Factor: Marine Environmental Quality.....	178
7.7.1	NT EPA Objective	178
7.7.2	Technical Studies.....	178
7.7.3	Marine Environmental Quality Standards.....	179
7.7.4	Existing Environment	183
7.7.5	Potential impacts and risks	186
7.7.6	Mitigation and management	197
7.7.7	Monitoring and reporting	208
7.7.8	Statement of residual impact.....	214
7.8	Environmental Factor: Benthic Habitat And Communities.....	215
7.8.1	NT EPA Objective	215
7.8.2	Technical Studies.....	215
7.8.3	Existing Environment	215
7.8.4	Potential impacts and risks	226
7.8.5	Mitigation and management	232
7.8.6	Monitoring and reporting	233
7.8.7	Statement of residual impact.....	235
7.9	Environmental Factor: Marine Fauna	236
7.9.1	NT EPA Objective	236
7.9.2	Technical Studies.....	236
7.9.3	Existing Environment	236
7.9.4	Potential impacts and risks	242
7.9.5	Mitigation and management	245
7.9.6	Monitoring and reporting	247
7.9.7	Statement of residual impact.....	248
7.10	Environmental Factor: Air Quality And Greenhouse Gases	249
7.10.1	NT EPA Objective	249

7.10.2	Technical Studies.....	249
7.10.3	Existing Environment - Air Quality	249
7.10.4	Existing Environment - Greenhouse Gases	254
7.10.5	Existing Environment – Climate Change	255
7.10.6	Potential Impacts and Risks	256
7.10.7	Mitigation and Management	259
7.10.8	Monitoring and Reporting	259
7.10.9	Statement of Residual Impacts	261
7.11	Environmental Factor: Social, Economic and Cultural Surroundings.....	262
7.11.1	NT EPA Objective	262
7.11.2	Technical Studies.....	262
7.11.3	Existing Environment and Values.....	262
7.11.4	Project Economic Details	272
7.11.5	Assessment of Opportunities.....	274
7.11.6	Potential Impacts and Risks	275
7.11.7	Mitigation and Management	284
7.11.8	Monitoring and Reporting	286
7.11.9	Statement of Residual Impact.....	288
7.12	Environmental Factor: Human Health And Safety	289
7.12.1	NT EPA Objective	289
7.12.2	Existing Environment	289
7.12.3	Potential Impacts and Risks	290
7.12.4	Mitigation and Management	294
7.12.5	Monitoring and Reporting	296
7.12.6	Statement of Residual Impacts	298
8.	ENVIRONMENTAL OFFSETS.....	299
8.1	Consideration of Offset Principles	299
8.2	Assessment of Significant Residual Impacts	300
9.	ECOLOGICALLY SUSTAINABLE DEVELOPMENT	319
10.	CONCLUDING STATEMENT.....	322
11.	REFERENCES	323
	Chapter 1 References	323
	Chapter 2 References	324
	Chapter 3 References	325

Chapter 4 References	326
Chapter 5 References	327
Chapter 7.1 References	330
Chapter 7.2 References	331
Chapter 7.3 References	332
Chapter 7.4 References	333
Chapter 7.5 References	335
Chapter 7.6 References	336
Chapter 7.7 References	337
Chapter 7.8 References	338
Chapter 7.9 References	340
Chapter 7.10 References	342
Chapter 7.11 References	343
Chapter 7.12 References	344
Chapter 8 References	345
Chapter 9 References	346
12. APPENDICES	347

LIST OF APPENDICES

- Appendix A: Terms of reference and general guidance
- Appendix B: Persons involved in preparing the EIS
- Appendix C: TNG Environmental Policy
- Appendix D: Environmental Management Plan
- Appendix E: Environmental Management Commitments by TNG
- Appendix F: Socio-Economic Impact Assessment
- Appendix G: Risk Assessment
- Appendix H: Technical Report for Soils
- Appendix I: Acid Sulfate Soils Management Plan
- Appendix J: Biological Report
- Appendix K: Fire Management Plan
- Appendix L: Biodiversity Management Plan
- Appendix M: Technical Report for Hydrogeology
- Appendix N: Technical Report for Hydrology and Coastal Assessment

- Appendix O: Technical Report for Hydrodynamic Modelling of Discharge
- Appendix P: Technical Report for Pollutant Outfall Modelling
- Appendix Q: Technical Report for Marine Environmental Quality
- Appendix R: Marine Environmental Quality Monitoring and Management Plan
- Appendix S: Technical Report for Benthic Habitats and Communities
- Appendix T: Technical Report for Marine Fauna
- Appendix U: Technical Report for Air Quality
- Appendix V: Technical Report for GHG Emission Inventory
- Appendix W: Economic and Social Impact Management Plan
- Appendix X: Traffic Impact Assessment
- Appendix Y: Traffic Management Plan
- Appendix Z: Noise Impact Assessment
- Appendix AA: Emergency Response Plan
- Appendix BB: Biting Insects Management Plan

LIST OF FIGURES

Figure ES1: Location of Darwin Processing Facility – NT context.....	iii
Figure ES2: Location of Darwin Processing Facility – National context.....	iv
Figure ES3: Lot 1817 and the Darwin Processing Facility Site Layout.....	viii
Figure 1-1: Location of the Darwin Processing Facility – National context	3
Figure 1-2: Location of Darwin Processing Facility – NT context	4
Figure 2-1: Corporate structure of TNG Limited	7
Figure 2-2: Organisation structure of TNG Limited	8
Figure 3-1: Locations of interest in the vicinity of the Project.....	12
Figure 3-2: Lot 1817 and Northern Territory Planning Scheme Layers	14
Figure 3-3: Lot 1817 and land use in the vicinity of the Project	15
Figure 3-4: Previously disturbed vegetation of the Project area.....	16
Figure 3-5: Köppen climate classification (Source: Bureau of Meteorology)	18
Figure 3-6: Mean monthly maximum and minimum temperatures – Darwin airport (Source: BoM)	19
Figure 3-7: Mean monthly rainfall and 30 year mean (1981-2010) – Darwin airport (Source: BoM)	20
Figure 3-8: Mean monthly 9am and 3pm relative humidity (%) – Darwin airport (Source: BoM)	20
Figure 3-9: Mean daily evaporation and 30 year mean (1981-2010) – Darwin airport (Source: BoM).....	21
Figure 3-10: Wind roses for the Project area based on TAPM-CALMET modelling for the Year 2017	22

Figure 3-11: Site topography	24
Figure 3-12: Land units of the Project area	26
Figure 3-13: Sites of conservation significance surrounding the Project area	28
Figure 4-1: Alternative Darwin Processing Facility sites	34
Figure 4-2: Lot 1817 and the Darwin Processing Facility layout.....	37
Figure 4-3: Possible routes used to access the Darwin Processing Facility	44
Figure 4-4: Darwin Processing Facility process flow diagram	46
Figure 4-5: Titanium pigment Processing Facility Process flow diagram.....	49
Figure 4-6: Overall Processing Facility water balance	54
Figure 5-1: Location of extractive resources licences at Lot 1817.....	73
Figure 7-1: Geology of the Project area.....	90
Figure 7-2: Acid Sulfate Soils of the Project area (Source: NRETAS 2008).....	92
Figure 7-3: Biological study area.....	104
Figure 7-4: Vegetation associations and the proposed development envelope	107
Figure 7-5: Previously disturbed vegetation of the study area	108
Figure 7-6: Locations of conservation significant flora and large habitat trees	110
Figure 7-7: Weeds of National Significance and weeds listed under the NT <i>Weeds Management Act</i> in the study area	115
Figure 7-8: Fauna habitat in the study area.....	134
Figure 7-9: Hydrological features of Project area	148
Figure 7-10: Storm tidal inundation mapping scenarios	150
Figure 7-11: Concentrated flowpaths through the Project site.....	152
Figure 7-12: Dry season conceptual hydrogeological site model	157
Figure 7-13: Wet season conceptual hydrogeological site model.....	158
Figure 7-14: Flow paths in relation to proposed infrastructure	160
Figure 7-15: Surface water and ground water sampling locations	166
Figure 7-16: Levels of Ecological Protection associated with the Project	182
Figure 7-17: Wastewater outfall locations assessed for the Darwin Processing Facility.....	187
Figure 7-18: Elizabeth River outfall plots showing plume oscillation (Source: Baird 2019b)	191
Figure 7-19: East Arm outfall showing dilution discharged wastewater (Source: Baird 2019b)	192
Figure 7-20: 80 th and 90 th percentiles for temperature during the wet season	193
Figure 7-21: Temperature profile of the cross sectional area during discharge	194
Figure 7-22: Environmental Quality Framework as applied to the Darwin Processing Facility	199
Figure 7-23: Contingency management action for the commissioning phase	202

Figure 7-24: Post-commissioning wastewater quality validation contingency management	204
Figure 7-25: Contingency management framework for routine wastewater discharge quality	206
Figure 7-26: Contingency management framework for ongoing marine environmental quality monitoring	207
Figure 7-27: Environmental monitoring framework including elevation points when certain EQC are exceeded.....	209
Figure 7-28: Ongoing marine environmental quality monitoring sampling locations.....	212
Figure 7-29: The Project development envelope, the study area and the mapped intertidal and subtidal BHC	217
Figure 7-30: BHC mapping of Darwin Harbour prepared for the Ichthys Project (Geo Oceans 2011a)	218
Figure 7-31: Schematic profile diagram of the typical pattern of mangrove zonation in Darwin Harbour ...	220
Figure 7-32: GeoOceans 2011 Darwin Harbour BHC mapping outside of the Elizabeth River area	229
Figure 7-33: Mixing height [TAPM-CALMET, 2017]	251
Figure 7-34: Sensitive receptor locations adopted for modelling assessment.....	253
Figure 7-35: Local Government areas located within the greater Darwin area	265
Figure 7-36: Industries of employment, Palmerston LGA	266
Figure 7-37: Industries of employment, Bellamack NT	267
Figure 7-38: Occupation statistics, Bellamack NT.....	268
Figure 7-39: Sensitive receptor locations surrounding the Project site	271
Figure 7-40: Indicative artist impression of the Darwin Processing Facility	282

LIST OF TABLES

Table ES1: Darwin TIVAN® Processing Facility – summary	v
Table ES2: Darwin TIVAN® Processing Facility – proposed extent of physical elements	vii
Table ES3: Environmental Factors and objectives against which the Project impacts must be assessed	ix
Table ES4: Technical studies conducted by TNG to inform the EIS.	ix
Table ES5: Summary of potential impacts, proposed mitigation and outcomes	x
Table 3-1: Proximity of the Project to locations of interest	11
Table 3-2: Land units of the site (Department of Environment and Natural Resources, 2000)	25
Table 4-1: Development areas.....	36
Table 4-2: Materials required for the whole construction period.....	41
Table 4-3: Indicative construction vehicle fleet.....	42
Table 4-4: Average Project water requirements	53
Table 4-5: Closure objectives and completion criteria for the Project	58
Table 6-1: Key stakeholders for the Darwin Processing Facility	75

Table 6-2: Stakeholder and community engagement conducted as part of the SEIA	77
Table 6-3: Summary of feedback provided by stakeholders between 2016 – 2019	78
Table 6-4: Ongoing stakeholder consultation methodology	81
Table 7-1: Environmental Factors and objectives against which the Project impacts must be assessed	84
Table 7-2: Environmental Factors not requiring further assessment	85
Table 7-3: Terrestrial environmental quality studies undertaken for the Project.....	86
Table 7-4: Assessment criteria for soil quality.....	93
Table 7-5: Preliminary conceptual Site model	94
Table 7-6: Mitigation measures for terrestrial environmental quality	97
Table 7-7: Monitoring actions for terrestrial environmental quality	99
Table 7-8: Other inspection and reporting for terrestrial environmental quality	100
Table 7-9: Biodiversity studies undertaken for the Project	102
Table 7-10: Vegetation association descriptions and condition of the study area	105
Table 7-11: Potential impact pathways for flora	116
Table 7-12: Impacts to vegetation associations as part of the proposed clearing in the development envelope	117
Table 7-13: Sensitive and significant vegetation in the development envelope	118
Table 7-14: Conservation significant flora in the development envelope.....	119
Table 7-15: Flora and vegetation – potential impacts and mitigation measures	121
Table 7-16: Monitoring actions for terrestrial flora.....	123
Table 7-17: Other inspections and reporting for flora and vegetation	124
Table 7-18: Fauna studies undertaken for the Project	125
Table 7-19: Potential impact pathways for fauna	139
Table 7-20: Loss of habitat for conservation significant fauna	140
Table 7-21: Conservation significant fauna at risk from loss of habitat quality	141
Table 7-22: Fauna – potential impacts and mitigation measures	143
Table 7-23: Monitoring actions for terrestrial fauna and habitat	144
Table 7-24: Other inspection and reporting for terrestrial fauna and habitat	145
Table 7-25: Hydrological/ hydrogeological studies undertaken for the Project.....	146
Table 7-26: Tidal submergence statistics.....	147
Table 7-27: Storm tide statistics	149
Table 7-28: Elizabeth River peak flood level predictions (Cardno, 2014)	149
Table 7-29: Groundwater levels – May 2019.....	154
Table 7-30: Summary of hydraulic test analysis	155

Table 7-31: Potential impact pathways for hydrological processes	159
Table 7-32: Mitigation measures for hydrological processes	162
Table 7-33: Monitoring and reporting for hydrological processes	163
Table 7-34: Inland environmental water quality studies undertaken for the Project	164
Table 7-35: Surface water quality baseline results.....	168
Table 7-36: Summary of groundwater field parameters	169
Table 7-37: Summary of groundwater quality parameters	169
Table 7-38: Potential pathways for impact on inland water environmental quality.....	171
Table 7-39: Mitigation measures for inland water environmental quality.....	173
Table 7-40: Monitoring and reporting for inland water environmental quality.....	175
Table 7-41: Other inspection and reporting for inland water environment environmental quality	175
Table 7-42: Marine environmental quality studies undertaken for the Project.....	178
Table 7-43: Beneficial uses and environmental quality objectives applicable to the Darwin Harbour region	180
Table 7-44: Limits of acceptable change allocated to levels of ecological protection as defined by NRETAS (2010) and adapted from ANZG (2000)	181
Table 7-45: Potential pathways for impact on marine environmental quality.....	186
Table 7-46: Wastewater design specification compared with the environmental quality criteria for contaminants.....	188
Table 7-47: Wastewater design specification compared with the environmental quality criteria for temperature and salinity	189
Table 7-48: Mitigation measures for marine environmental quality impacts	197
Table 7-49: Ongoing marine environmental quality monitoring components.....	210
Table 7-50: Ongoing marine environmental quality monitoring sampling locations, descriptions and justification for the sites	211
Table 7-51: Additional monitoring, inspections and reporting for marine environmental quality	213
Table 7-52: Benthic habitat and communities studies undertaken for the Project	215
Table 7-53: Mapping unit classifications, total area and relative composition of intertidal benthic habitat and community within the study area.....	219
Table 7-54: Habitat classifications, total area and relative composition for each subtidal BHC within Elizabeth River	223
Table 7-55: Community classifications, total area and relative composition of subtidal BHC within "high confidence" areas of Darwin Harbour	225
Table 7-56: Potential impact pathways for benthic habitat and communities	226
Table 7-57: Area of intertidal BHC proposed for removal	227

Table 7-58: Subtidal BHC classes, area and proportion of the disturbance footprint for the discharge pipeline installation within the Elizabeth River	228
Table 7-59: Benthic habitat and communities – potential impacts and mitigation measures.....	232
Table 7-60: Monitoring and reporting for benthic habitat and communities	233
Table 7-61: Other inspection and reporting for benthic habitat and communities	234
Table 7-62: Marine fauna studies undertaken for the Project	236
Table 7-63: Marine fauna studies undertaken in the vicinity of the Project area	237
Table 7-64: Potential impact pathways for marine fauna	243
Table 7-65: Marine fauna and fauna habitat potential impacts and mitigation measures	246
Table 7-66: Monitoring and reporting for marine fauna and marine fauna habitat	247
Table 7-67: Monitoring and reporting for marine fauna and marine fauna habitat	247
Table 7-68: Air quality and greenhouse gas studies undertaken for the Project	249
Table 7-69: Annual Stability class distribution predicted [TAPM-CALMET, 2017].....	250
Table 7-70: Project air quality goals	252
Table 7-71: Assigned air quality background level for the Darwin Processing Facility.....	254
Table 7-72: Potential impact pathways for air quality, GHG emissions, and climate change.	257
Table 7-73: Air quality and GHG – potential impacts and mitigation measures	259
Table 7-74: Monitoring activities for air quality and GHG.....	260
Table 7-75: Other inspections and reporting for air quality and GHG.....	261
Table 7-76: Social, economic and cultural studies undertaken for the Project	262
Table 7-77: Details the population growth between 2011 and 2016.....	269
Table 7-78: Key outcomes of the interim financial model.....	273
Table 7-79: Potential pathways for impact on social, economic and cultural surrounds.....	276
Table 7-80: Predicted construction noise levels – neutral climatic conditions	278
Table 7-81: Predicted construction noise levels – worst climatic conditions.....	278
Table 7-82: Predicted operational noise levels	279
Table 7-83 Predicted rail noise levels	279
Table 7-84: Social, economic and cultural aspects – potential impacts and mitigation measures	284
Table 7-85: Monitoring for social, economic and cultural impacts	286
Table 7-86: Reporting and other inspections for social, economic and cultural impacts	287
Table 7-87: Potential pathways for human health impacts.....	290
Table 7-88: Human health - potential impacts and mitigation measures	294
Table 7-89: Other inspections and reporting for human health	297
Table 8-1: Consideration of offset principles.....	300

Table 8-2: Offset calculation table.....	301
Table 9-1: The principles of ecologically sustainable development, as outlined in the EPBC Act (DEWHA 2010b)	319

GLOSSARY 1 – PROJECT TERMINOLOGY

Term	Meaning
The Project, Darwin Processing Facility, Processing Facility	The proposed construction and operation of the Darwin TIVAN® Processing Facility.
The Project area, can also be referred to as the Site	Lot 1817, Hundred of Ayers, Middle Arm Industrial Precinct, Wickham, NT. The Project area is approximately 507 hectares (ha) of which 40 ha is mangrove forest and intertidal zone, and 467 ha is terrestrial land.
Concentrate	Magnetite concentrate from the Mount Peake mine site.
Development Envelope	That part of the Project area that will be impacted by any development activities. The envelope, in hectares, includes the proposed buildings, infrastructure, associated access roads and services. The Development Envelope is approximately 264 ha.
Direct Environmental Impact	Impact caused by direct interaction of the Project with the Environment, at the same time and in the same place as construction and/ or operation activities are occurring.
Environmental Aspect	Element of an organisation's activities, products or services that can interact with the environment.
Indirect Environmental Impact	Impact which is not a direct result of construction and/or operation activities. Generally occurs outside of the Development Envelope and may be realised through relatively complex pathways. Sometimes referred to as second or third level impacts, or secondary impacts.
Proponent	TNG Limited.
Northern peninsula	Northern part of Lot 1817, location of support infrastructure for the Processing Facility.
Southern peninsula	Southern part of Lot 1817, location of the major parts of the Processing Facility, along with some support infrastructure.

GLOSSARY 2 – ACRONYMS, ABBREVIATIONS AND DEFINITIONS

Abbreviation	Meaning
AAPA	Aboriginal Areas Protection Authority
AASS	Actual Acid Sulfate Soils
ABS	Australian Bureau of Statistics
AHD	Australian Height Datum
ANZG	Australian and New Zealand Guideline
ASS	Acid Sulfate Soils
BCF	Burrell Creek Formation
BHC	Benthic Habitat and Communities
BMP	Biodiversity Management Plan
BoM	Bureau of Meteorology
BU	Beneficial Use
CBD	Central Business District
CH ₄	Methane
Cl ₂	Chlorine gas
CO	Carbon monoxide
CO ₂	Carbon dioxide

Abbreviation	Meaning
CO ₂ eq	Carbon dioxide equivalent
CoPC	Contaminant of Particular Concern
CR	Critically Endangered
CSM	Conceptual Site Model
DD	Data Deficient
DENR	Department the Environment and Natural Resources
DLRM	Department of Land Resource Management
DO	Dissolved Oxygen
DoEE	Department of the Environment and Energy
DPIR	Department of Primary Industry and Resources
DVG	Default Value Guideline
EA Act	Environmental Assessment Act 1982
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement, comprises: <ul style="list-style-type: none"> • Draft EIS (subject to public exhibition), • Supplement (addressing written comments of the Draft EIS) • Further info requested by NT EPA
EMP	Environment Management Plan
EN	Endangered
Environmental Factors	Aspects of the environment as defined by the NT EPA
EP Act	Environment Protection Act 2019
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPBC Regulations	Environment Protection and Biodiversity Conservation Regulations 2000
EQC	Environmental Quality Criteria
EQG	Environmental Quality Guideline
EQI	Environmental Quality Indicators
EQO	Environmental Quality Objectives
EQS	Environmental Quality Standard
ESCP	Erosion and Sediment Control Plan
ESD	Ecologically sustainable development as defined in Australia's National Strategy for ESD (1992)
Fe	Iron
Fe ₂ O ₃	Iron (III) oxide / Ferric oxide
FMP	Fire Management Plan
GHG	Greenhouse gas
GSD	Gross Domestic Product
GSP	Gross State Product
HAT	Highest Astronomical Tide
HCl	Hydrochloric acid
HD	Highly Disturbed
HEV	High Ecological Value

Abbreviation	Meaning
IBC	Intermediate Bulk Container
IBRA	Interim Biogeographic Regionalisation for Australia
LAT	Lowest Astronomical Tide
LEP	Level of Ecological Protection
LGA	Local Government Area
LNG	Liquid Natural Gas
Ma	Marine
MAH	Monocyclic Aromatic Hydrocarbons
Mi	Migratory
MNES	Matters of National Environmental Significance, as listed under the EPBC Act
MSDS	Material Safety Data Sheet
NAG	Net Acid Generation
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NES	(matters of) National Environmental Significance,
NHMRC	National Health and Medical Research Council
NO ₂	Nitrogen dioxide
NOI	Notice of Intent
NPUG	Non-potable Groundwater Use Guidelines
NRETAS	NT Department of Natural Resources, Environment, The Arts and Sport
NT	Northern Territory
NT EPA	Northern Territory Environmental Protection Authority
NTG	Northern Territory Government
NTU	Nephelometric Turbidity Unit
NWQMS	National Water Quality Monitoring Strategy
N ₂ O	Nitrous oxide
MEQMMMP	Marine Environmental Quality Monitoring and Management Plan
O ₃	Ozone
O2M	O2 Marine Consultants
PAH	Polynuclear Aromatic Hydrocarbons
PASS	Potential Acid Sulfate Soils
POL	Petrol, oil and lubricants
PV	Photovoltaic
ROV	Remotely operated vehicle
SEIA	Socio-Economic Impact Assessment
ESIMP	Economic and Social Impact Management Plan
SMD	Slightly to Moderately Disturbed
SO ₂	Sulfur dioxide
SO ₃	Sulfur trioxide
SoCS	Sites of Conservation Significance
TDS	Total Dissolved Solids

Abbreviation	Meaning
TiO ₂	Titanium dioxide
TOR	Terms of Reference; as prepared by the NT EPA for the proposed Project identifying the matters to be addressed in the EIS
TDS	Total dissolved solids
TIVAN®	TIVAN® leach circuit – TNG’s proprietary TIVAN® Process is a hydro-extraction process designed to produce very high-purity vanadium pentoxide, titanium dioxide and iron oxide
TNG	TNG Limited
TPH	Total Petroleum Hydrocarbons
TPWC Act	Territory Parks and Wildlife Conservation Act 2000 (NT)
TRH	Total Recoverable Hydrocarbons
TSF	Tailings Storage Facility
UTM	Universal Transverse Mercator
VA	Vegetation Association
V ₂ O ₅	Vanadium pentoxide
VU	Vulnerable
WQO	Water Quality Objective
WQPP	Darwin Harbour Water Quality Protection Plan

GLOSSARY 3 – LIST OF UNITS

Unit	Meaning
%	Percentage
°/oo	Per-mile
°	Degree
GL	Gigalitre
GL/yr	Gigalitres per year
ha	Hectare
kL/h	Kilolitre per hour
km	Kilometre
kPa	Kilopascals
kW	Kilowatt
L/s	Litres per second
m	Metre
mbgl	Metres below ground level
mg/L	Milligram per litre
mm	Millimetre
ML	Megalitre – million litres
m/d	Metre per day
m/m	Metre per metre
Mt	Million tonnes

Unit	Meaning
MWh	Megawatt hour
mv	millivolts
m/y	Metre per year
m^3/hr	Metres cubed per hour
PJ/y	Petajoules per year
$\mu\text{g/L}$	Micrograms per litre
$\mu\text{s/cm}$	Microseconds per centimetre
t	Tonne (1 t = 1000kg)
tpa	Tonnes per annum
tpd	Tonnes per day
tph	Tonnes per hour
vpd	Vehicles per day