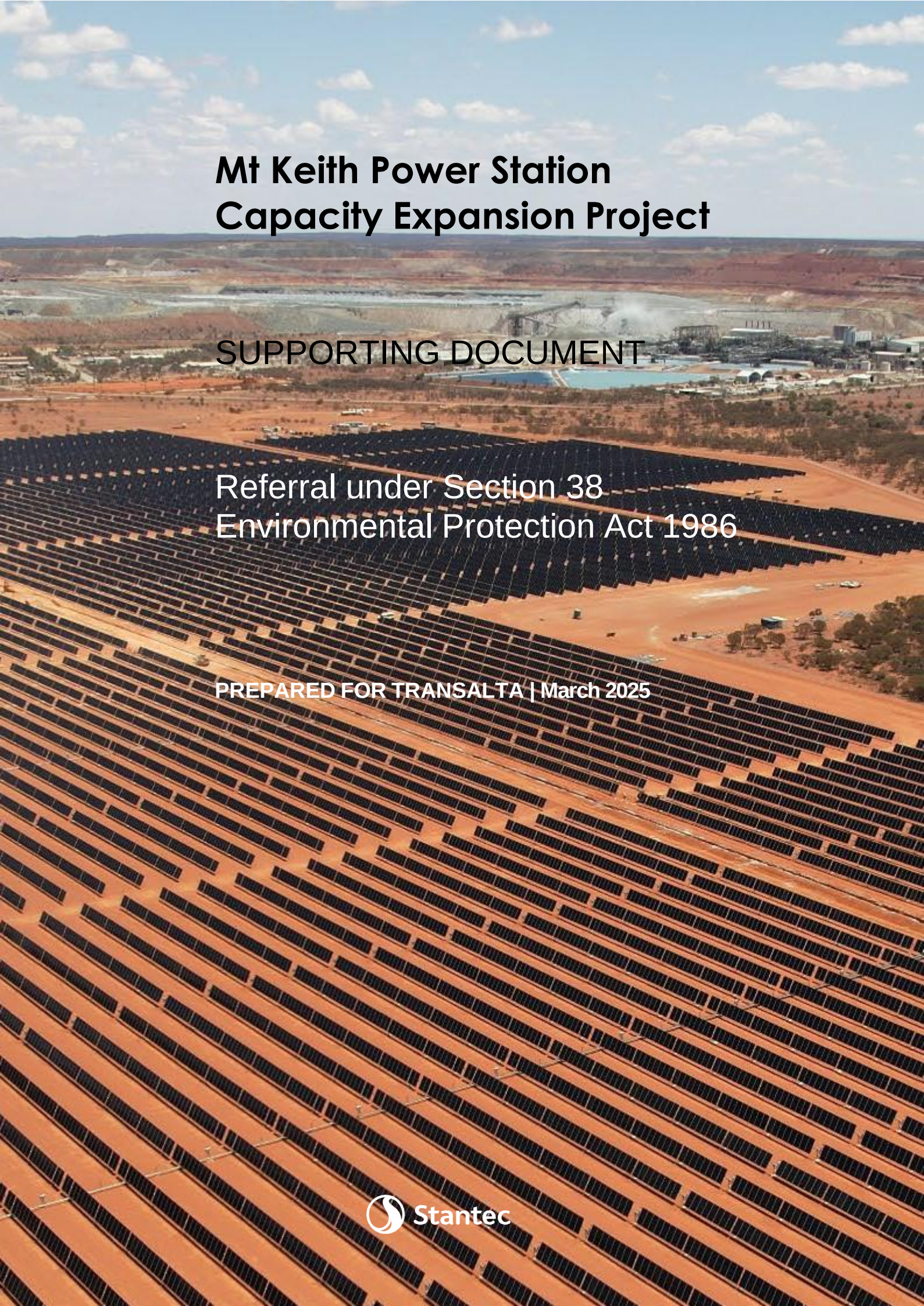

Mt Keith Power Station Capacity Expansion Project

SUPPORTING DOCUMENT

Referral under Section 38
Environmental Protection Act 1986

PREPARED FOR TRANSALTA | March 2025

Stantec

Executive Summary

TransAlta proposes to construct, operate and maintain up to 150MW of gas reciprocating engines at BHP Nickel West's (NiW) Mt Keith operations mine site (NMK) to meet NiW's expanded processing capacity and future growth. The Mt Keith Power Station Capacity Expansion Project (the Proposal), subject to internal and external approvals, will be connected to TransAlta's existing off-grid Southern Cross Energy North (SCEN) network. It should be noted that the NiW operations are temporarily suspended.

NiW is the world's leading nickel supplier to the battery metals market, with over 85% of its nickel sold to global battery material suppliers. As a future-facing commodity, nickel is essential to a decarbonising world. This Proposal aims to reduce reliance on TransAlta's existing legacy gas and diesel generation and thereby reduce total emissions, improve reliability and facilitate a greater penetration of renewable energy generation in the future to support NiW's nickel production growth targets.

In the absence of this Proposal, the use of TransAlta's legacy gas and diesel generation on the SCEN network to meet NiW's growth would result in an overall annual emissions increase of up to 68% per annum from 2023 levels by 2032, or an increase of 215,009 tonnes of carbon dioxide equivalent per annum (tCO_2-e). This potential increase in emissions is inconsistent with the decarbonisation targets of both BHP and TransAlta and accordingly TransAlta has sought to reduce its reliance on its legacy plant.

TransAlta's Proposal would result in the displacement of TransAlta's more greenhouse gas (GHG) intensive legacy diesel and gas generation currently licensed for operation on the SCEN network, which produced emissions of 352,657 tCO_2-e in 2020, and with the addition of solar generation, reduced this to approximately 315,000 in 2023. The proposal on its own would result in an additional 151,901 tCO_2-e in 2032 (20% less than would be produced by the current gas and diesel generation). However, this proposal does not provide power exclusively to Mount Keith, but into the SCEN, and in comparison, the proposed changes to the SCEN network, which will include development of future renewable energy sources as part the energy mix when NiW comes out of temporary suspension of production, would reduce the reliance total network emissions to 186,259 tCO_2-e by 2032, of which this Proposal is forecast to contribute 164,380 tCO_2-e.

The Proposal is an integral part of TransAlta's energy plan for NiW and supports the continued long-term development of a hybrid renewable energy network to decarbonise NiW's operations. The Proposal will prepare the grid to support additional renewable energy generation, such as the future development of renewable generation (subject to internal and external approvals) to supplement TransAlta's 38MWdcp Northern Goldfields Solar Project. These projects would result in an emission reduction of at least 24% per annum by 2030, when compared to 2023 levels (see Table 4-4).

TransAlta acknowledges the Western Australian Government's target of net zero emissions by 2050. Although the exact pathway to achieve net zero GHG emissions is subject to uncertainty, TransAlta proposes to align the GHG emissions reduction trajectory for the Proposal with recent Safeguard Mechanism reforms. This will establish an enforceable, annual baseline for the Proposal, relevant to the existing Safeguard Mechanism facilities, aligned with Australia's 2030 and 2050 emission reduction commitments. TransAlta will continue to evaluate the GHGMP to take into consideration technological advancements, legislative amendments, and decarbonisation opportunities as they evolve.

TransAlta's longer term aspirations envisage the ongoing addition of renewable energy technology to supplement the existing energy developments, leading to a continued displacement of thermal generation and a net zero emission achievement on the SCEN network by 2050. A summary of the emissions produced under TransAlta's existing diesel and gas turbine generation, relative to TransAlta's proposal into the SCEN network is outlined below.

Year	**Business-as-usual (BAU)** (Current diesel, gas turbine generation & solar)		**Proposal** (additional150MW of gas reciprocating engines)		**Addition of Future Renewables** Renwables –(Subject to internal and external approval)	
	Annual Emissions tCO_2-e	**Change vs Baseline** %	**Annual Emissions** tCO_2-e	**Change vs Baseline** %	**Annual Emissions** tCO_2-e	**Change vs Baseline** %
2023	315,000		-	-	-	-
2030	455,922	45%	425,732	35%	237,825	-24%
2032	509,315	61%	466,901	48%	186,259	-41%

The Proposal would add reliability to the network, critical for the introduction of further renewable generation, and would

be built over at least 2 stages. Up to 100 MW of gas reciprocating engines are anticipated to be constructed in 2028 and up to an additional 50MW of gas reciprocating engines is anticipated to be constructed by 2032.

TransAlta has given due consideration to the Environmental Protection Authority's (EPA) environmental factors as set out in the '*Statement of environmental principles, factors, objectives and aims of EIA*' (Environmental Protection Authority 2021). The only factor considered by TransAlta to be a key environmental factor for the Proposal is GHG emissions, as the Proposal exceeds the EPA's GHG threshold for assessment of 100,000 $tCO_{2\text{-}e}$. No vegetation clearing would be required to execute the Proposal as the new gas reciprocating engines and associated infrastructure would be located on brownfield sites within the existing NMK mine site.

TransAlta is the exclusive power provider to NiW for its NMK operations. This Part IV Referral and associated GHG Management Plan (**Appendix B**) include measures to minimise GHG emissions from the Proposal and have been prepared in collaboration with NiW to align with both party's decarbonisation strategies. This Proposal is supported in full by NiW, who has committed to the meeting the commitments made under the Proposal (subject to internal and external approvals), as outlined in **Appendix D**.

This document provides the supporting information for formal referral of the Proposal under section 38 of the *Environmental Protection Act 1986* (the EP Act). The scope of this referral is limited to the construction and operation of up to 150MW of new gas reciprocating engines located within the NMK mine site.

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Abbreviations, Acronyms and Definitions

Acronym	Enter Full Name
AHD	Australian Height Datum
ARI	Average Recurrence Interval
AS	Australian Standard
ASS	Acid Sulphate Soil
BC Act	Biodiversity Conservation Act 2016
BESS	Battery Energy Storage System
BoM	Bureau of Meteorology
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon dioxide
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change Energy, the Environment and Water
dcp	Direct current peak
DE	Development Envelope
DISER	Department of Industry, Science, Energy and Resources
DJTSI	Department of Jobs, Tourism, Science and Innovation
DMA	Decision making authority
DMIRS	Department of Mining, Industry Regulation and Safety
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
EMS	Environmental management system
EPA	Environmental Protection Authority
EP Act	Environmental Protection Act 1986
EPBC	Environment Protection and Biodiversity Conservation
ERA	Economic Regulation Authority
ETA	Environmental Technologies and Analytics
Ga	Gigaannum

Acronym	Enter Full Name
GHG	Greenhouse gas
GHGMP	Greenhouse gas management plan
Gj	Gigajoules
Ha	Hectare
HFC	Hydro fluorocarbons
IPCC	Intergovernmental Panel on Climate Change
KPS	Kalgoorlie Power System
LNG	Liquefied Natural Gas
NLN	Nickel West Leinster Operations
LULUCF	Land use, land-use change and forestry
MCP	Mine Closure Plan
NMK	Nickel West Mt Keith Operations
MNES	Matters of National Significance
Mtpa	Million tonnes per annum
MW and MWh	Megawatt and Megawatt Hour
MWdcp	Megawatt direct current peak
MWe	Megawatts electricity
MUR	Murchison
N_2O	Nitrous oxide
NGER Act	National Greenhouse and Energy Reporting Act
NiW	BHP Nickel West
NO_x	Oxides of Nitrogen
NPI	National Pollutant Inventory
NVIS	National Vegetation Information System
OWS	Oily Water Separator
PFC	Perfluorocarbons
PM	Particulate Matter
PMS	Power Management System
PV	Photovoltaic

Acronym	Enter Full Name
SAG	Semi-autogenous Grinding
SCEN	Southern Cross Energy North
SEP	Statement of Environmental Principles, Factors and Objectives
SF_6	Sulphur hexafluoride
SOMP	Small Operations Mining Proposal
SO_x	Oxides of Sulphur
$tCO_{2\text{-}e}$	tonnes of CO_2 equivalent
TransAlta	TEC Desert Pty Ltd and TEC Desert No.2 Pty Ltd in partnership as Southern Cross Energy
TEC	Threatened Ecological Community
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
USGS	US Geological Survey
WA	Western Australia

1 Introduction

TransAlta proposes to develop the Mt Keith Power Station Capacity Expansion Project (the Proposal), including the construction, operation and maintenance of up to 150MW of gas reciprocating engines (subject to internal and external approvals). The Proposal is to be located at BHP Nickel West's (NiW) Mt Keith operations mine site (NMK) and is required to meet NiW's expanded processing capacity and future growth. The Proposal would connect to TransAlta's existing off-grid Southern Cross Energy North (SCEN) network and be utilised in preference to legacy power supply infrastructure currently connected to the network. The Proposal would allow the SCEN to be progressively decarbonised over time (**Figure 1-1**).

TransAlta operates the SCEN, which will be one of WA's largest off-grid hybrid systems of electricity generation and transmission lines. The SCEN network supplies electricity to NiW operations at NMK and Leinster (NLN) in the Northern Goldfields region of WA.

Currently, the SCEN power system consists of firm diesel generators and gas turbines with sufficient capacity to supply the current peak demand for NiW's nickel mining at NMK and NLN. BHP has set a medium-term GHG emission reduction target to reduce operational GHG emissions by at least 30% from FY2020 levels by FY2030, and net zero operational GHG emissions by 2050. In support of this target, NiW is investing in renewable energy in partnership with TransAlta to diversify generation options in parallel with this Proposal. TransAlta was engaged by NiW to develop and construct a 27.4MWdcp solar farm at NMK and a 10.1MWdcp solar farm with a 10.76MW Battery Energy Storage System (BESS) at NLN, referred to as the Northern Goldfields Solar Project, to assist in meeting BHP's decarbonisation targets. These projects are now operating.

This Proposal will provide firming generation to augment TransAlta's SCEN renewable power sources, which include two solar photovoltaic (PV) farms and a BESS. In order to meet future emissions reductions targets further development of renewable energy sources will be developed in the future.

The Proposal will displace inefficient, legacy generation at the NMK site, support future mining operations, and potential load growth. As an off-grid network supporting a large 24/7 mining operation, firm generation is required to be consistently available to ensure there is redundancy to meet loads when renewables are not able to operate.

The Proposal will be constructed in multiple stages:

- **Stage 1**: Will commence when NiW emerge from the current temporary suspension of production and will consist of up to 100MW of gas reciprocating engines (likely to be eight engines), associated emission stacks, engine hall, workshop, site offices, a diesel blackstart generator, a transformer, onsite gas yard and pipeline, balance of plant and associated electrical and mechanical infrastructure, roads, fences, and other supporting infrastructure as required.
- **Stage 2**: Will commence 2 years following the resumption of production and will consist of up to 50MW of gas reciprocating engines (likely to be four engines) and associated infrastructure to meet new load growth and displace legacy generation at the NMK site. Future firm generation requirements are based on the forecast future load provided by NiW. Also included in Stage 2 will be an expanded engine hall and new electrical and mechanical infrastructure to support the additional gas reciprocating engines.

This Referral Supporting Document (RSD) refers specifically to the Proposal which includes the installation, integration, commissioning and operation of the new gas reciprocating engines and associated infrastructure within TransAlta's existing SCEN network at NMK (**Figure 1-2**).

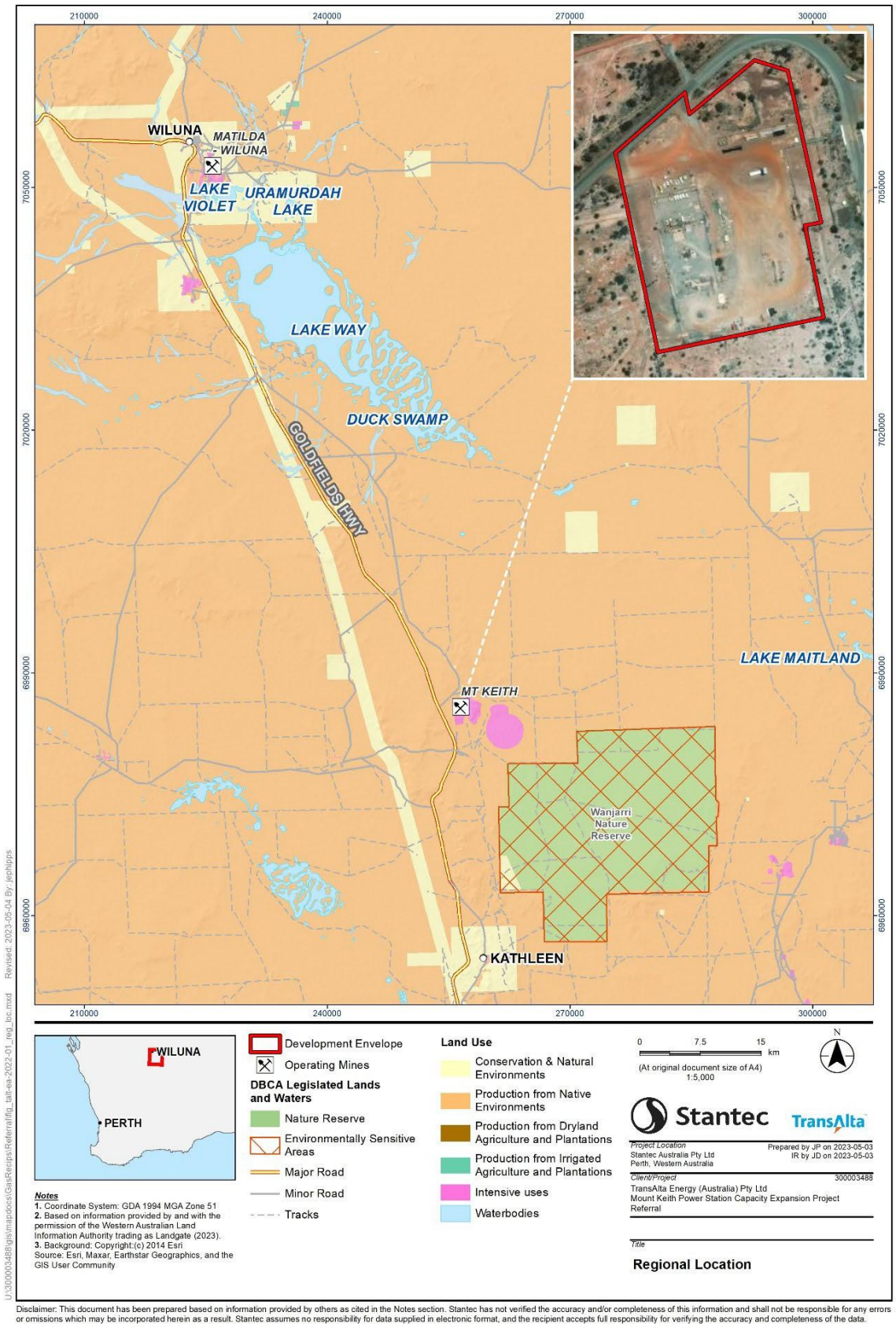

Figure 1-1: Regional Location

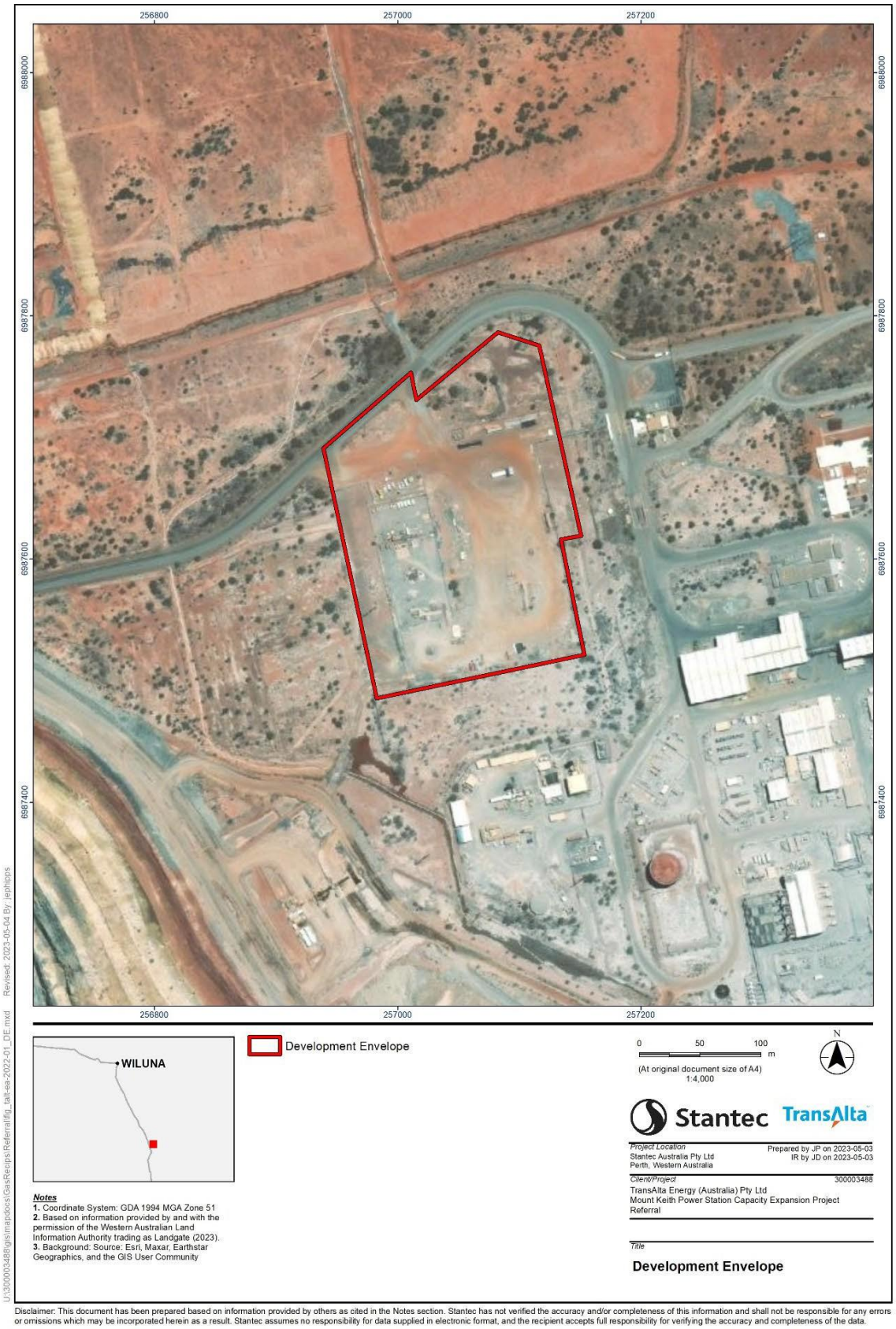

Figure 1-2: Proposal Development Envelope

1.1 Purpose and Scope

This document provides the supporting information for referral of the Proposal under section 38 of the *Environmental Protection Act 1986* (the EP Act) to the Environmental Protection Authority (EPA). The referral form and the supporting information have been prepared in accordance with the Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual Administrative Procedure 2021 and consider the following:

- Statement of Environmental Principles, Factors and Objectives (Environmental Protection Authority 2021g)
- Instructions for the referral of a Proposal to the Environmental Protection Authority under section 38 of the *Environmental Protection Act 1986* (Environmental Protection Authority 2021f).

The scope of this referral is limited to the construction and operation of up to 150MW of gas reciprocating engines located within the NMK site.

1.2 Proponent

TEC Desert Pty Ltd & TEC Desert No.2 Pty Ltd in partnership as Southern Cross Energy (TransAlta).

1.2.1 Company Details

TEC Desert Pty Ltd & TEC Desert No.2 Pty Ltd in partnership as Southern Cross Energy.

ACN 084 695 661 & ACN 084 953 088

1.2.2 Proponent Representative

Haakon Nielssen
Project Approvals & Stakeholder Relations Manager
Parmelia House, Level 2, 191 St Georges Terrace
Perth WA 6000
haakon_nielssen@transalta.com
0427 419 273

1.2.3 Referral Contact

As above.

1.3 Environmental Impact Assessment Process

The Mt Keith mine was assessed under Part IV of the *EP Act* at the level of Consultative Environmental Review and approved in 1990 under Ministerial Statement 117. Subsequently, a further Ministerial Statement (MS 415) was issued to regulate an upgrade of the NMK tailings storage facility. This Proposal will be constructed within a previously cleared area of the Mt Keith mine site.

The Proposal overlaps the Mt Keith Debottlenecking Mining Proposal (REG ID 102534 approved 20 May 2022 and REG ID 113219 approved 25 Oct 2022). It also overlaps with a Mining Proposal to construct and operate two 132kV substations and the construction of a new 132kV transmission line to connect these substations located to the west and east of NMK (ID 106322 dated 5 April 2022).

The Proposal includes the construction and operation of up to 150MW of new gas reciprocating engines that are expected to result in forecast annual greenhouse gas emissions of 164,380 $tCO_{2\text{-e.}}$ Although the Proposal will result in an overall decrease in emissions compared to business as usual (BAU), due to the Proposal's annual emissions, when taking into account the reductions required by the Safeguard Mechanism, of up to 237,825 $tCO_{2\text{-e,}}$ it was referred under Part IV of the EP Act to allow the EPA to determine whether the Proposal requires formal assessment.

1.4 Proposal Justification and Alternatives

1.4.1 Benefits of the Proposal

The following factors have influenced TransAlta's plans to develop this Proposal:

- The strategic partnership between TransAlta and NiW in the Northern Goldfields
- Rising global demand for nickel, resulting in an increase in nickel mining and processing at NiW's NMK site
- Increase in firm power generation required for nickel mining and processing infrastructure with lower emissions
- Future proofing NMK mining operations based on a range of NiW load scenarios
- Climate change driving calls for a sustainable, decarbonised power supply.

These factors are discussed in more detail in the following sections.

1.4.1.1 TransAlta and BHP Nickel West Partnership

TransAlta has had a long-standing partnership with BHP Nickel West, dating back to the 1990s. Under this partnership TransAlta develops, constructs, and operates tailor made energy solutions to support the mining operations of NiW. In 2020, TransAlta and NiW extended until 2038 the Power Purchase Agreement (PPA) that provides TransAlta with exclusive rights to provide power for NiW operations in the Northern Goldfields. The PPA extension heralds a new era of renewable energy generation for TransAlta's Australian operations with the first renewable energy project commissioned under the PPA, being the 38MWdcp Northern Goldfields Solar Project, which commenced in 2023.

Under the PPA, TransAlta supplies electricity generation to meet NiW's load using its current generation fleet. TransAlta's capacity to add new generation to the SCEN network is driven by the investment decisions made by NiW, based on a number of factors including NiW's forecasted growth and resulting load requirements, and decarbonisation objectives.

This Part IV Referral and associated Greenhouse Gas Management Plan (GHGMP) (**Appendix B**) include measures to minimise GHG emissions from the new gas reciprocating engines and have been prepared in collaboration with NiW to align with both party's decarbonisation strategies.

TransAlta and NiW have a commitment to invest in future renewables and new technologies to achieve emission reductions. Aligned with BHP and TransAlta's decarbonisation emission reduction targets, both parties have committed to the continued assessment of renewable energy projects to achieve these GHG objectives. This Proposal is supported in full by NiW, who has committed to the obligations under the Proposal (subject to internal and external approvals), as outlined in **Appendix D**. TransAlta has also made a commitment to reaching net zero emissions globally by 2045 to ensure the ongoing decarbonisation of the project in line with its commitments under the GHGMP.

1.4.1.2 Increased Global Demand for Nickel

Global demand for nickel as a future-facing commodity and a strategic resource is forecast to increase substantially. In February 2022, nickel was added to the United States Geological Survey's (USGS) critical minerals list due to its characterisation as being essential to the economic or national security of the United States (United States Geological Society 2022). Locally, Western Australia is currently the sole producer of nickel in Australia and accounts for 7% of the world's production. In 2020-21, nickel was Western Australia's fourth most valuable mineral sector, worth $3.5 billion (Department of Mines Industry Regulation and Safety 2022).

Globally, more than 80% of nickel is used to make alloys such as stainless steel due to its toughness, strength, rust resistance and various other electrical, magnetic and heat-resistant properties. These alloys are used for many purposes such as in construction, the chemical industry, cars, household products (such as utensils and washing machines), propeller shafts, scientific and surgical equipment, pipelines, and aircraft engines (Geoscience Australia 2022).

Nickel is also increasingly being used in batteries, including rechargeable nickel-cadmium batteries, nickel-metal hydride batteries and lithium-ion batteries used in electric and hybrid vehicles. A lithium-ion battery for an electric car contains around 40kg of nickel. Demand for nickel is rising due to rapid growth in the adoption of electric vehicles, as governments commit to decarbonising their economies.

TransAlta's client, NiW, is the world's leading supplier of nickel for batteries and other emerging technologies that support global decarbonisation. Over 85% of NiW's nickel is sold to global battery material suppliers.

Due to this rising demand, nickel mines, including NiW's NMK, have a rising demand for electricity supply to support the expansion of mining operations.

1.4.1.3 Increased Power Demand

It should be noted that the Proposal supplies power into an existing energy network, the SCEN, and as such is not exclusively powering the Mount Keith site. The SCEN provides power to a number of sites in the goldfields and also has power supplied to it from solar generation and other legacy gas turbines at Leinster.

NiW's NMK site operations require a power system that can reliably provide firm generation to power NiW's operations 24 hours per day, 7 days per week, as it is part of an off-grid network that supports an operational mine site. Unlike other newly proposed hybrid off-grid networks in Western Australia that propose diesel generation to meet peak loads when renewables are unavailable, the Proposal can leverage the existing Mt Keith lateral pipeline, owned by the APA Group, that provides natural gas to NMK. As a result, gas reciprocating engines can be used as firm supply with much lower GHG emission output when compared to diesel generation and existing less efficient generation.

NiW is expanding mining operations at NMK to meet rising demand for nickel. Critically, the NMK concentrator facility will be expanded by installing new stockpile feed conveyors and a third semi-autogenous (SAG) mill. This expansion in operations is expected to add over 30MW of new load to the SCEN power system up until and including 2025. This load is associated with the SAG mill and other growth projects as instructed by NiW. In the absence of the Proposal, this will result in increased emissions as new load is met with existing licensed generation over time.

This provides an immediate (Stage 1) requirement for firm generation to meet this increase in load growth at lower emissions, from the current average load in 2020 of 621,619 MWh to approximately 799,788 MWh in 2028. All growth is forecast to occur at NMK. TransAlta currently holds two Part V Operating Licenses for generation at the NMK site that would allow existing gas and diesel generation to meet this load, with resulting GHG emissions of 423.887 $tCO_{2\text{-}e}$ within the SCEN network in 2028. Stage 1 of the Proposal would ensure up to 100MW of gas reciprocating engines are available at NMK to meet the increased loads, with resulting forecast GHG emissions of 394,301 $tCO_{2\text{-}e}$ for the generation on the SCEN network, leading to an overall reduction in emissions of at least 29,586 $tCO_{2\text{-}e}$ compared to using existing generation. This emission signature is based on the most likely gas reciprocating engine being selected for the Proposal, as well as no additional renewables in operation at this time. If a larger capacity engine is used there will be an increased reduction in emissions at NMK as more of the less-efficient legacy generation will be displaced.

The Proposal also seeks approval for up to 50MW of additional gas reciprocating engines (Stage 2) to support expected load growth from NiW's medium-term growth aspirations, connection of third-party loads, potential electrification and other projects that may result in a substantial increase to the current forecast load from FY2028 onwards. This would result in an overall reduction in emissions of 42,414 $tCO_{2\text{-}e}$ compared to using existing generation.

Based on current forecasts, future load growth at NMK is assumed to occur in 2028-2029 at a total average load of 1,000,018 MWh, remaining consistent out to 2050. If future load growth is less than expected within the modelling, this will result in subsequently lower emissions. There are a range of scenarios currently being contemplated by NiW and TransAlta, such as electrification of the mining fleet, that would significantly increase load requirements.

1.4.1.4 Future Load Uncertainty

NiW anticipates future load growth at its NMK site, comprising transformational load projects and potential fleet electrification post-2027. In addition, third parties may also seek connection to the SCEN power system under a power purchasing agreement with NiW, which will further increase future loads on the network.

Given the long-term nature of these projects, future load projections at NMK remain uncertain, with the level of uncertainty increasing across greater time horizons. TransAlta has developed a model that provides a forecast annual load profile to provide the most accurate and conservative assessment of future loads and generation requirements at the NMK site. This model and the GHG emission forecast estimation was independently reviewed by Preston Consulting as part of their peer review of the GHGMP (**Appendix B**). Load growth is subject to a range of factors and actual changes in load may occur at different times compared with the forecast.

Under BHP's decarbonisation strategy, scope 2 emission reductions are expected to play a major role in contributing to achieving this target. If forecast loads are higher, there will be a greater requirement for renewables to ensure 2030 targets are achieved. The size and degree of renewable energy projects that will need to be constructed across 2025-2030 will be proportionate to any future load growth to ensure that the total reduction in GHG emissions at NMK will be in line with the obligations outlined in this Proposal.

1.4.1.5 Climate Change Goals and Targets

TransAlta is a global leader in clean electricity and is actively decarbonising its network in alignment with the goal of globally achieving net zero emissions by 2045. TransAlta announced its strategy to accelerate its transition away from coal to gas and renewables generation in 2017, and by 2021 it had reduced its global GHG emissions by 61% from 2005 levels. TransAlta's goal for 2026 is a 75% reduction in emissions from 2015 levels. This is in line with BHP, which has set a medium-term target to reduce operational GHG emissions by at least 30% from FY2020 levels by FY2030 and aims to

achieve net zero operational GHG emissions by 2050.

TransAlta has prepared a tailored energy plan for the SCEN network that identifies suitable renewable energy projects and initiatives that provide a carbon reduction pathway out to 2030. This plan will be continually adapted to provide a suitable pathway to 2050 that is aligned with TransAlta's and NiW's commitments to net zero and TransAlta's obligations made in this Proposal. TransAlta has already begun implementing this plan with the planning and construction of the following assets:

- **Renewable Generation**: 38MWdcp of solar at Mt Keith and Leinster as part of the Northern Goldfields Solar Project;
- **Energy Storage**: 10.76 MW Battery Energy Storage System (BESS) constructed at Leinster as part of the Northern Goldfields Solar Project; and
- **Firming Generation**: Without grid support, any renewable generation in an off-grid environment must be supported by firming generation to support intermittent interruptions in renewables until storage technology is feasible and proven to be able to cover any such shortfall. This generation is proposed to be provided by highly efficient gas reciprocating engines (this Proposal) to enable the phasing out and displacement of legacy thermal generation assets to meet loads with lower emissions.

1.4.2 Options and Alternatives Considered

As part of project planning, alternative options for power generation were considered, including a "no development" scenario, location alternatives, and alternative technologies. It should be noted that this Proposal relates to firming generation only. This firming generation is an enabling technology to support renewable sources which have already been approved (solar PV farms and battery storage) or are being considered (wind turbines, future solar and storage) for the SCEN network. Within this context, it is not yet economically feasible to utilise renewable technologies to provide the firm generation required to meet the around-the-clock load requirements of NiW.

The option analysis is detailed in Table 1-1.

Table 1-1: Proposal Alternatives Analysis

Options analysis			
Option	**Location**	**Technology**	**Environmental Outcome**
Preferred Option Stage 1: **100MW of new gas reciprocating engines**	The preferred location for the installation of the new gas reciprocating engines was determined to be the existing NiW mining lease on a brownfields portion of the site previously used as a laydown yard. This site was preferred for the following reasons: • No clearing is required for the installation of the gas reciprocating engines. • Site has direct access to infrastructure required to enable a gas and electricity connection. • Preferred site was determined in consultation with NiW as the underlying tenement and mine site owner because it did not create a conflict with the company's mining operations or future expansion plans. • No known heritage values within the site.	The preferred technology was determined to be gas reciprocating engines, for the following reasons: • Gas reciprocating engines are capable of operating at low loads for extended periods of time and are therefore the most efficient generation to support an increased penetration of renewables, providing network system stability and a pathway to phase out legacy thermal generation assets. • The new gas reciprocating engines can be started or stopped quickly in accordance with load fluctuations. • Gas reciprocating engines are extremely efficient engines with a very low average heat rate of ~8.3 GJ/MWh. In comparison, the current efficiency of the existing power station achieves a heat rate of ~12 GJ/MWh. A lower heat rate results in an improved emission intensity and an approximate 30% reduction in GHG per MWh. • Gas reciprocating engines have the capability to run on a hydrogen blend fuel which may further decrease the emissions footprint in the future.	The proposed option was selected based on the overall reduction of environmental risk: • No clearing is required, which minimises potential impacts to flora and vegetation, landforms, terrestrial environmental quality, terrestrial fauna, and social surroundings (such as sites of Aboriginal and European Heritage significance). • Load forecasting shows that gas reciprocating engines would result in an 29,586 $tCO_{2\text{-}e}$ reduction on 2028 GHG emissions levels when compared to utilisation of existing generation infrastructure. • The use of gas reciprocating engines ensures a greater potential to decarbonise the NMK site and allow for a high future penetration of renewable energy.
Preferred Option Stage 2: **50MW of new gas reciprocating engines**	The preferred location was determined to be co-located with the existing 100MW of gas reciprocating engines on a previously disturbed brownfield site or at the current location of existing generation at the NMK site.	• As an extension of the above, firm generation will be required in the future to support NiW nickel mining operations. The current most economical and efficient technology to achieve this is additional gas reciprocating engines. • Additional gas reciprocating engines are dependent upon the forecast loads at the NMK site as well as the level of renewable penetration into the network. • Expanding the initial gas reciprocating engine power station removes the need to duplicate some infrastructure and ensures spares parts, tools,	As an extension of the above, the proposed option was selected based on the overall reduction of environmental risk: • The use of new gas reciprocating engines will allow for partial displacement of existing generation at the NMK site under the current load forecast. Under regular operating conditions the new efficient gas reciprocating engines will be dispatched prior to using the existing diesel and gas generation, therefore meeting loads at lower GHG emissions. At

Options analysis			
Option	**Location**	**Technology**	**Environmental Outcome**
		operations and maintenance schedules are largely unchanged.	times, new gas generation will fully displace all existing generation. • Load forecasting shows that gas reciprocating engines would result in a 42,414 tCO_2-e reduction on 2032 GHG emissions levels when compared to utilisation of existing generation infrastructure.
Utilise existing Mt Keith power station **(i.e., the 'no development' option)**	Current Mt Keith Power Station sites for L7348/1999/10 (diesel generators) and L8801/2013/1 (gas turbines)	• The existing Mt Keith Power Station operates under licenses L7348/1999/10 (diesel generators) and L8801/2013/1 (gas turbines) issued under Part V of the *Environmental Protection Act 1986* (EP Act). These two operating licences allow for a combined capacity of 114MW which exceeds the current NiW load. Additional approvals would therefore not technically be required to increase the output of this generation to meet NiW's additional requirements. • Utilising the existing NMK fleet to meet the increased load, in the absence of any new generation, would result in an overall increase in emissions of 29,586 tCO2-e per annum in 2028 and 42,414 tCO2-e per annum in 2032. • However, the existing generation fleet is aging, less efficient and materially less reliable than the proposed gas reciprocating engines and therefore present an increased likelihood of outages, black starts and excess diesel generation resulting in worse environmental outcomes. • Additionally, maintaining the current generation fleet will lead to higher costs over time for TransAlta and NiW due to increasing operation and maintenance costs	• No clearing is required which minimises potential impacts to flora and vegetation, landforms, terrestrial environmental quality, terrestrial fauna, and social surroundings (such as sites of Aboriginal and European Heritage significance). • The use of this aging, inefficient plant to meet new loads is not aligned with the decarbonisation goals of TransAlta, BHP or the WA state target. This option would lead to increased emissions of GHG, together with other air pollutants including Oxides of Nitrogen (NOx), Oxides of Sulphur (SOx), Carbon Monoxide (CO) and Particulate Matter (PM), resulting in a higher environmental impact, both immediately and over time. • If the Proposal does not proceed, these less efficient diesel generators and gas turbines will continue to operate, presenting an overall increase in GHG emissions over time. • In the absence of other forms of generation, the existing NMK generation fleet must be

Options analysis			
Option	**Location**	**Technology**	**Environmental Outcome**
		associated with aging assets and the increasing cost of diesel as a fuel source.	contractually made available to meet new NiW loads, resulting in an increase in emissions of at least 29,586 tCO2-e per annum in 2028 and 42,414 tCO2-e per annum in 2032.
Combined cycle aeroderivative gas turbines	This gas turbine would be located at the same site as the preferred option and would occupy a smaller footprint than the preferred gas reciprocating engine solution; however, as the site is highly disturbed brownfield, location was not seen as critical to the decision-making process.	• This technology option consisted of TM2500 combined cycle aeroderivative gas turbines, including steam turbines that would utilise gas fuel to provide firm generation to meet the increased load. • This power station would have a higher overall emissions output as it would not have the flexibility of a fleet of gas reciprocating engines when dealing with changes in load and renewable resources. Specifically, in periods when there are high levels of renewables such as wind and solar generation, sufficient spinning reserve would need to be maintained to enable the power station to load match during cloudy or calm periods, and all gas turbines operate relatively inefficiently at low loads. • The potential need to have one of the existing gas turbines online when net loads approached the capacity of the new system would result in increased emissions when compared to the preferred option, which can operate independently of gas turbines. • Gas reciprocating engines have much faster start times and can also be switched on and off quickly as conditions permit, enabling them to operate more efficiently, more often. • The total emissions intensity of other pollutants such as NO_x, SO_x, CO and PM would also be higher due to the gas turbine being less efficient than gas reciprocating engines, particularly at partial loading.	• No clearing is required which minimises potential impacts to flora and vegetation, landforms, terrestrial environmental quality, terrestrial fauna, and social surroundings (such as sites of Aboriginal and European Heritage significance). • This technology would result in overall higher emissions of GHG, NO_x, SO_x, CO and PM, compared to gas reciprocating engines.
Open cycle gas turbines	This gas turbine would be located at the same site as the preferred option and would occupy a smaller footprint than the preferred gas reciprocating engine solution; however, as the site is highly disturbed brownfield, location was	• The open cycle gas turbines have a larger engine that would require a higher level of spinning reserve, or pro-active load shedding, to maintain the system, resulting in higher emissions. • This power station would have a higher overall emissions output and intensity as it is less efficient	• No clearing is required which minimises potential impacts to flora and vegetation, landforms, terrestrial environmental quality, terrestrial fauna, and social surroundings (such as sites of Aboriginal and European Heritage significance).

<table>
<tr><th colspan="4">Options analysis</th></tr>
<tr><th>Option</th><th>Location</th><th>Technology</th><th>Environmental Outcome</th></tr>
<tr><td></td><td>not seen as critical to the decision-making process.</td><td>overall and would not have the flexibility of a fleet of gas reciprocating engines when dealing with changes in load and renewable resources.
• The total emissions intensity of other pollutants such as NO_x, SO_x, CO and PM would also be higher due to the gas turbines being less efficient than gas reciprocating engines.</td><td>• This technology would result in overall higher emissions of GHG, NOx, SOx, CO and PM compared to gas reciprocating engines.</td></tr>
<tr><td>Alternative diesel generation</td><td>The diesel power station would be located at the same site as the preferred option and would occupy a similar footprint than the preferred gas reciprocating engine solution; however, as the site is highly disturbed brownfield, location was not seen as critical to the decision-making process.</td><td>• Diesel reciprocating engines could be dispatched reasonably effectively; however, they are less efficient, significantly more costly to operate due to fuel cost and more GHG intensive, which makes them less attractive for a transition to net zero.
• The higher emissions of diesel generators compared to gas reciprocating engines can be seen through a basic comparison of emissions estimation for 100,000 Gigajoules (GJ) produced by either diesel or natural gas via pipeline, according to the National Greenhouse Factors (Australian Government 2021). As outlined below, diesel produces roughly 36% more emissions than natural gas.
<table><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Diesel oil</td><td>6990</td><td>10</td><td>20</td><td>7020</td></tr></table>• This is further supported by studies conducted by Strezov and Cho (2020) to determine the environmental impacts of Australian power stations fuelled by various sources including the fossil fuels hard coal, brown coal, diesel, coal seam methane and natural gas. Diesel fuel was found to be the third most impactful fossil fuel source (after brown and hard coal) in terms of impacts on ecosystems and human health. Natural gas was</td><td>• No clearing is required which minimises potential impacts to flora and vegetation, landforms, terrestrial environmental quality, terrestrial fauna, and social surroundings (such as sites of Aboriginal and European Heritage significance).
• This technology would result in overall higher emissions of GHG and an overall increased impact on ecosystems and human health.
• This technology would also result in higher emissions of NOx, SOx, CO and PM compared to gas reciprocating engines.</td></tr>
</table>

Options analysis			
Option	**Location**	**Technology**	**Environmental Outcome**
		determined to have the lowest environmental impact of all fossil fuels in the study (Strezov and Cho 2020).	
Alternative renewable energy facility (wind, solar & battery)	A number of locations are being actively investigated for renewable energy generation across the SCEN network to support the decarbonisation targets of TransAlta and BHP.	• TransAlta currently has two solar farms and a battery energy storage system included in the SCEN network. Renewables will play a large role in the future decarbonisation of the network as significant new investment will be required to reach net- zero by 2050. • This Proposal is being developed alongside renewables as part of a network energy plan. This Proposal fulfills the immediate requirement to add new, efficient firm generation and spinning reserve to the system to ensure sufficient firm generation is available to meet the increased load and to maintain system security. • Existing renewable energy technology of wind and solar is unable to provide firm power to meet NiW's 24/7 mining operations when the wind or solar resource is unavailable. • Existing battery storage technology is economically unattractive to provide long-term firm power to cover variability in solar and wind.	• Vegetation clearing will be required to accommodate a new solar or wind facility of sufficient scale which may result in impacts arising from loss of flora, vegetation, habitat, or fauna, or impacts related to Aboriginal heritage, landforms, or terrestrial environmental quality. • This technology will result in an overall reduction in CO2, NOx, Sox, CO and PM across the SCEN network.
Alternative brownfield site at Mt Keith	Alternate sites were considered at NMK including to the east of current mining operations and on adjacent mining tenure. However, all sites considered would require clearing or would conflict with existing NiW mining operations, plant or future expansion plans. Alternate sites also required construction of elevated support pads with potential for impact on hydrology and the surrounding environment.	• Gas reciprocating gas engines or future gas generation as mentioned above. • Logistical issues and potential for new disturbance due to the relocation of existing infrastructure.	• Vegetation clearing or relocation of existing infrastructure would be required. This may result in impacts arising from loss of flora, vegetation, habitat, or fauna, or impacts related to Aboriginal heritage, landforms or terrestrial environmental quality.

Options analysis			
Option	**Location**	**Technology**	**Environmental Outcome**
Alternative brownfield sites at Leinster	Possible sites were considered at the NLN site on NiW mining lease ML255SA. However, the placement of the Proposal in this area was not considered feasible at this time due to the larger portion of the load being required by NMK.	• Gas reciprocating gas engines or future gas generation as mentioned above. • Logistical issues and potential for new disturbance due to the relocation of existing infrastructure.	• Vegetation clearing or relocation of existing infrastructure would be required. This may result in impacts arising from loss of flora, vegetation, habitat, or fauna, or impacts related to Aboriginal heritage, landforms or terrestrial environmental quality.
Alternative greenfield sites	Greenfield sites were considered for the new power station site. All greenfield options were considered unsuitable due to the availability of brownfield sites which would not require clearing.	• Gas reciprocating gas engines or future gas generation as mentioned above.	• Vegetation clearing required which may result in impacts arising from loss of flora, vegetation, habitat, or fauna, or impacts related to Aboriginal heritage, landforms or terrestrial environmental quality.

1.5 Proposal Description

The key characteristics of the Proposal are summarised in **Table 1-2** and **Table 1-3**.

Table 1-2: Proposal Summary

Proposal Title	Mt Keith Power Station Capacity Expansion Project
Proponent Name	TEC Desert Pty Ltd & TEC Desert No.2 Pty Ltd in partnership as Southern Cross Energy
Short Description	The Proposal will be a component of TransAlta's existing Southern Cross Energy North (SCEN) network supplying power to BHP Nickel West (NiW) and potential third-party operators. The Proposal is to construct and operate up to 150MW of gas reciprocating engines to be used in preference to the use of legacy power generation equipment in the Northern Goldfields region of Western Australia. The Proposal will be located on brownfields sites within NiW's existing Mt Keith operations (NMK).

Table 1-3: Proposal Key Characteristics

Element	Location	Proposed Extent/Capacity/Range
Physical Elements		
Power station elements including, but not limited to: • Gas-fired reciprocating engines • Exhaust stacks • Transformers • Blackstart generator • Auxiliary transformers • Radiators • Gas pipeline and infrastructure • Cabling • Lube oil centrifuge Supporting infrastructure including, but not limited to: • Oil storage tanks • Buildings • Roads • Fences • Oily water separator • Sewage pumping station • Bunded area for storage and handling of chemicals	Within **Figure 1-2** DE	No vegetation clearing is required for the development of the Proposal. The new gas reciprocating engines and associated infrastructure will be constructed on an already disturbed NiW laydown yard within the NMK mine site.
Construction Elements		
Not applicable		
Operational Elements		
Gas-fired Power Station	Within **Figure 1-2** DE	Up to 150MW of gas reciprocating engines to be built in stages
Key infrastructure	Within **Figure 1-2** DE	Exhaust stacks, at a suitable height above ground level to avoid health impacts. Each stack will be fitted with sampling ports in accordance with Australia Standard (AS) 4323.1

Element	Location	Proposed Extent/Capacity/Range
Supporting infrastructure	Within **Figure 1-2** DE	• Diesel Blackstart Generator with day tank self-bunded in accordance with Australian Standards. • Transformer(s) • Maintenance oil tank(s) • Oil make up tank(s) • Roads with necessary culverts • Used oil tank(s) • Waste oil tank(s) • Oily water separator(s) (OWS) • OWS waste oil collection tank(s) • Automated sewage pumping station • Gas yard, associated equipment and pipeline • Bunded areas for storage and handling of oils, lubricants and chemicals • Synchronous condenser operation • Ancillary and other required infrastructure
Water supply		TransAlta will utilise the water supply from NiW's NMK and surrounding areas that is sourced from adjacent borefield areas developed in caprock and paleochannel units to meet process water requirements at NMK. No groundwater abstraction is required in relation to this Proposal. Water for dust suppressions will be supplied from existing sources.
Proposed Elements with greenhouse gas (GHG) emissions		
Construction Elements		
Scope 1	31,670 tCO_2-e in the proposal's lifetime with 13,373 tCO_2-e in 2026, 6,442 tCO_2-e in 2027 and 11,855 tCO_2-e in 2028	
Scope 2	None – as an off-grid network all electricity is generated on-site and accounted for in Scope 1	
Scope 3	Total GHG emissions: 19,663 tCO_2-e	
Operation Elements		
Scope 1	GHG emissions of this Proposal are expected to be up to 164,380 tCO_2-e per annum (see section 4). Emissions from the gas reciprocating engines will increase to displace legacy generation on the SCEN network within decarbonisation targets. Total GHG emissions for the Proposal are 1,380,405 tCO_2-e based on an operational life to 2050.	
Scope 2	None – as an off-grid network all electricity is generated on-site and accounted for in Scope 1	
Scope 3	Total GHG emissions: 73,298 tCO_2-e (peak year 7,503)	
Rehabilitation		
Rehabilitation will be undertaken in accordance with the upcoming Small Operations Mining Proposal – Mine Closure Plan		
Commissioning		
The estimated forecast key milestones for construction and commissioning of the initial 100MW gas recips capacity are: Construction: H1 2026 Commence commissioning: H2 2028		
Decommissioning		
Decommissioning will be undertaken in accordance with the upcoming Small Operations Mining Proposal – Mine Closure Plan		

Element	Location	Proposed Extent/Capacity/Range
Other Elements which affect extent of effects on the environment		
Proposal time	Expected Proposal life	29 years
	Construction phase	2 years
	Operations phase	25 years
	Decommissioning phase	2 years

Table 1-4: Summary of potential impacts, proposed mitigation and proposed environmental outcomes

Key Environmental Factor	
Potential impacts	GHG emissions
Mitigation hierarchy	**Avoid:** The Proposal has avoided any new vegetation clearing through locating the power station within an existing cleared area and reducing emissions outputs through using more efficient technology. **Mitigate:** GHG is mitigated through the GHG Management Plan.
Residual impacts, including assessment of significance	In the absence of the Proposal, NiW new load growth must be met by existing approved generation, which would result in total emissions of 423,887 tCO_{2-e} in 2028. The Proposal, along with planned renewables, would result in an overall reduction in GHG emissions of 186,062 tCO_{2-e} compared to predicted 2028 emissions, should existing generation be used to meet new loads. The EPA considers annual emissions in excess of 100,000 tCO_{2-e} to be significant. The residual impact is therefore considered significant; however, the Proposal forms part of a wider power network and will contribute to the overall decrease in emissions of that network.
Proposed environmental outcomes	GHG Management Plan to achieve deep and substantial reductions by 2030 and net zero by 2050. Compliance with relevant Safeguard Mechanism Baseline requirements, including Default Decline Rates.
Assessment of offsets	N/A

1.6 Local and Regional Context

The Proposal is located in the Northern Goldfields of Western Australia, approximately 92 km north of Leinster and approximately 80 km south of Wiluna, within the Shire of Wiluna.

1.6.1 Climate

The climate of the Murchison region is semi-arid with long, hot, dry summers and short cool winters. The closest Bureau of Meteorology (BoM) weather station to Mount Keith which documents long-term (1994-2022) climate data is Leinster Aero (station number 012314). The mean annual rainfall recorded at Leinster Aero is approximately 250 mm with the majority received between December and April each year (Bureau of Meteorology 2022) (**Figure 1-3**). The hottest maximum temperatures occur between November and March, with the highest mean maximum reaching 37°C, while the coldest minimums occur between May and August with mean minimums nearing 6°C (Bureau of Meteorology 2022) (**Figure 1-4**).

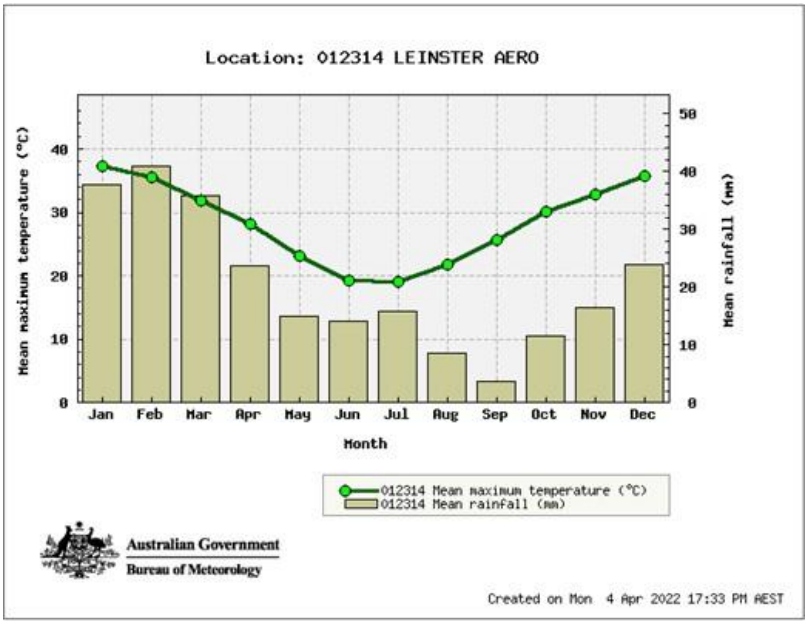

Figure 1-3: Mean Maximum Temperature and Mean Rainfall – BOM Station Leinster Airport

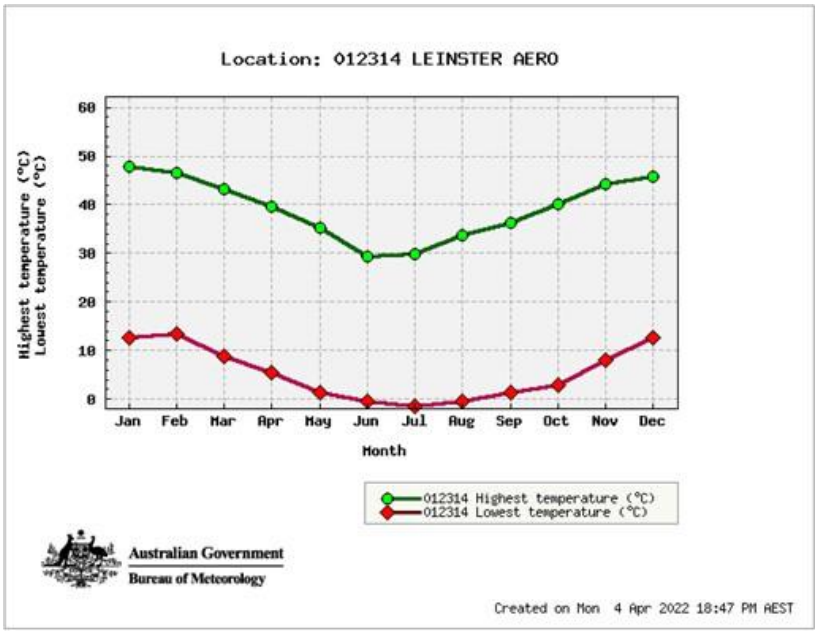

Figure 1-4: Highest and lowest temperatures – BOM Station Leinster Airport

1.6.2 Bioregion

The Proposal area is located within the Northern Goldfields region, in the Murchison Biogeographic Region and the East Murchison (MUR1) subregion. The MUR1 subregion generally consists of broad plains of red desert sands and red-brown soils, with some mesas and breakaways (Cowan 2001). Internal drainage results in the formation of salt-lake systems. Vegetation is dominated by mulga woodlands often rich in ephemerals, however, hummock grasslands, saltbush shrublands and samphire shrublands also occur. Key threats to flora within the subregion include grazing, changed fire regimes, habitat clearing and degradation due to mining.

1.6.3 Land systems

A regional survey was undertaken in the Murchison region between 1985 and 1988 by the Department of Agriculture (now the Department of Primary Industries and Regional Development) and the Department of Land Administration (now Landgate), to develop a comprehensive description of biophysical resources and assess the vegetation composition and soil condition within the region (Curry *et al.* 1994). Similar surveys have been conducted within parts of the Murchison region to further characterise the area (Hennig 2009; Mabbutt *et al.* 1963). Information from these surveys has been used to classify and map the land systems of the Murchison region according to similarities in landform, soil, vegetation, geology, and geomorphology.

Based on this mapping, the Proposal occurs within the Jundee System (**Table 1-5**).

Table 1-5: Land Systems Occurring in the Premises Area

Land System	Description
Jundee	Hardpan plains with variable gravelly mantles and minor sandy banks supporting weakly groved mulga shrublands

1.6.4 Geology

1.6.4.1 Regional geological setting

The Proposal area occurs at the northern end of the Yilgarn Craton in the Eastern Goldfield Province. The Yilgarn Craton, with an age of approximately 2.5 billion years (Griffin 1990), encompasses a large portion of the Western Australian landmass of 657,000 km^2. The Eastern Goldfield Province is a typical Archaean granite-greenstone terrain characterised by large areas of granitic lithology and generally narrow, linear belts of greenstone (Griffin 1990).

The Mount Keith Ultramafic Complex occurs within the Agnew-Wiluna greenstone belt (Hill *et al.* 1990). The Agnew Wiluna greenstone belt comprises the northern portion of the Norseman-Wiluna greenstone belt, which has a strike length of approximately 650 km. The Agnew-Wiluna greenstone belt trends in a north-northwest–south-southeast direction and is bounded by large to terrane-scale faults and granitoid bodies.

1.6.4.2 Local Geology

The greenstone sequence in the Mount Keith area includes three ultramafic horizons, locally designated the Mount Keith, Cliffs, and Monument ultramafic units. These three ultramafic horizons can be traced 30 km north of Mount Keith to the Honeymoon Well nickel deposit and 9 km south to the Cliffs-Charterhall nickel deposit (Rosengren *et al.* 2005).

The Proposal area lies across geological units characterised by intercalated mafic and/or felsic volcanic rocks:

- Volcanic and volcaniclastic felsic rocks, undivided; andesite to rhyolite, minor basaltic andesite; local fragmental textures; metamorphosed; and
- Fine to very fine-grained mafic rock with minor ultramafic rock, undivided; metamorphosed.

1.6.5 Soils

Alluvial soils and sands mantle the granitic greenstone units of the Yilgarn Craton. Underlying the soils in low areas is a red-brown siliceous hardpan (Curry *et al.* 1994).

The Atlas of Australian Soils was compiled by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in the 1960s to provide a consistent national description of Australia's soils. It comprises a series of ten maps published at a scale of 1:2,000,000 (with contributing data being mapped at scales from 1:250,000 to 1:500,000), along with explanatory notes (CSIRO 2022). Based on this mapping, the Proposal area occurs across one soil unit as described in **Table 1-6**.

Table 1-6: Soil landscape units occurring in the NMK area

Soil-landscape units	Description
BE8	Partially dissected pediments extending out from areas of unit Fa7; there may be a surface cover of gravels; earthy loams are dominant; (Gn2.11 and Gn2.12) with red-brown hardpan at shallow depth are also present as well as small areas of (Dr2.72) and (Dr2.52) soils.

A review of the CSIRO Australian Atlas of Acid Sulfate Soils (ASS) data indicates that the Proposal area lies within an area of extremely low probability of occurrence of ASS. ASS has not been detected in any soil investigations undertaken in the surrounding areas (Strategen-JBS&G 2022).

1.6.5.1 Regional hydrology

The drainage system in the region consists of numerous waterways cutting through rocky hills prior to discharging into local salt lake systems. NiW's NMK, which includes the Proposal area, is located in the upper reaches of a catchment that drains to the east into the Lake Maitland catchment and eventually into Lake Maitland, approximately 50 km east of the Mt Keith site. The Mt Keith sub catchment (21,900 hectares (ha) contributes to a larger catchment (142,800 ha) that contributes to Lake Maitland. Lake Maitland is an ephemeral lake and dries to clay pans in the dry season (Strategen-JBS&G 2022).

1.6.5.2 Local Surface Hydrology

Drainages in the Goldfield Region are ephemeral responding to rainfall events. At other times, the drainage channels are dry with the exception of possible isolated low-lying damp lands and swamps. Following significant rainfall, the main drainage channels typically carry large discharges, possibly for a few days. In the main channels, minor drainage flows may persist for a few weeks.

Drainage from the NMK site, including the Proposal area, and surrounding natural catchments passes to the north of the Wanjarri Nature Reserve and does not enter this reserve. The site is located at the confluence of a number of natural (original) drainage channels, at a surface elevation of about 540m Australian Height Datum (AHD). Upstream catchment diversion drains are in place to divert the northern and southern catchments around the site, to minimise the potential for flood impacts on mine infrastructure. These diversion structures are designed to convey a 1:100 Average Recurrence Interval (ARI) critical duration rainfall event (Strategen-JBS&G 2022).

1.6.5.3 Stormwater Drainage

Stormwater drainage at the NMK site, including the Proposal area, is managed by existing contours and engineered diversion channels around the site (Strategen-JBS&G 2022).

1.6.6 Hydrogeology

The hydrogeology of the Proposal area is typical of the Goldfields region, with three main aquifer types: weathered and fractured bedrock, including siliceous caprock; palaeo channels; and shallow alluvial aquifers. Aquifer recharge is relatively low due to the low rainfall, high evaporation, heavy soils and well-developed vegetation cover and internal drainage. Most groundwater in the region is brackish or saline, with potable groundwater occurring in small, elevated areas where recharge conditions are favourable (Strategen-JBS&G 2022).

Water supply to the NMK (inclusive of the Proposal area) is sourced under existing NiW groundwater licences from adjacent borefield areas developed in caprock and paleochannel units to meet process water requirements. **Figure 1-5** shows the surface hydrology in the vicinity of the Proposal.

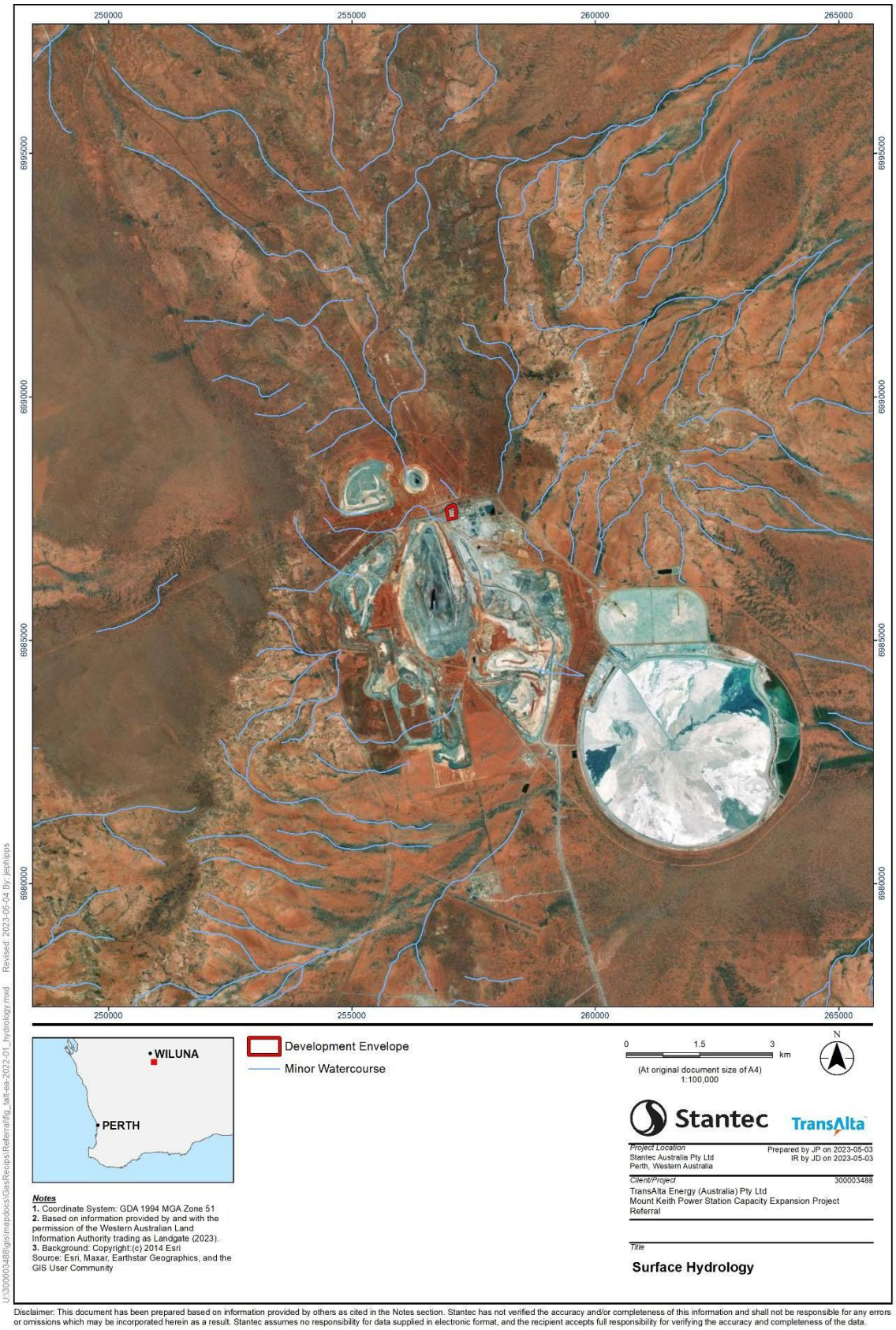

Figure 1-5: Surface Hydrology in the Vicinity of the Proposal

1.6.7 Flora, vegetation and fauna

The Proposal area is within the Austin Botanical District, which is a part of the Eremaean Province and is predominantly composed of mulga low woodlands (*Acacia aneura* and close relatives) on plains, mulga scrub on hills, tree steppe of *Eucalyptus* spp. and *Triodia basedowii* on sand plains (Beard 1990). Beard broadly mapped the vegetation of Western Australia in terms of vegetation associations, including the Proposal area (Beard 1976), and (Shepherd *et al.* 2002) reinterpreted and updated the mapping to reflect the National Vegetation Information System (NVIS) standards and to take into account extensive clearing that had occurred since (Executive Steering Committee for Australian Vegetation Information 2003).

Based on updated mapping by Shepherd *et al.* (2002), the Proposal area occurs across the Wiluna 18 vegetation system association which is characterised by low mulga woodland. Clearing of this vegetation system association has been minimal, with 98% of the original vegetation remaining at the time of mapping (Biologic Environmental Survey 2020). While the vegetation is largely intact, the level of protection offered to this vegetation system associations is low, with only 1.1% of its extent located within the State Reserve System (Biologic Environmental Survey 2020). The closest threatened ecological community is Violet Range (Perseverance Greenstone Belt) vegetation complexes (banded ironstone formation) which is 16.3 km to the south of the Proposal. The nearest priority flora is *Tribulus adelacanthus* (P3) which is 1.28km northeast of the site (**Figure 1-6**).

No vegetation clearing is required for the Proposal and therefore no direct impacts resulting from vegetation clearing flora, vegetation fauna individuals and associated habitat are expected. No significant indirect impacts are anticipated to the flora, and vegetation and fauna and associated habitat surrounding the Proposal area.

No threatened fauna has been recorded within the Proposal area. A pair of Peregrine Falcons (*Falco peregrinus*) which are listed as “Other Specially Protected” under the *Biodiversity Conservation Act 2016* (BC Act) were recorded flying overhead within the surrounding area. The Peregrine Falcon occurs in most habitats, from rainforest to arid habitats, including coastal and alpine regions. This species is known to occur across Australia, but not common in any areas of its Australian range. It prefers coastal and inland cliffs for nesting, or open woodlands near water. Preferred nesting habitat for this species occurs at higher elevation which would coincide with the location of the Proposal area. The species was not observed to land or utilise the broader survey area (Strategen-JBS&G 2022). As the Proposal area has been previously cleared, the Proposal will not result in a significant impact to the species or its preferred habitat.

No excavation, dewatering or groundwater drawdown is required for the construction or operation of the Proposal therefore no loss of subterranean fauna or associated habitat is expected as a result of the Proposal.

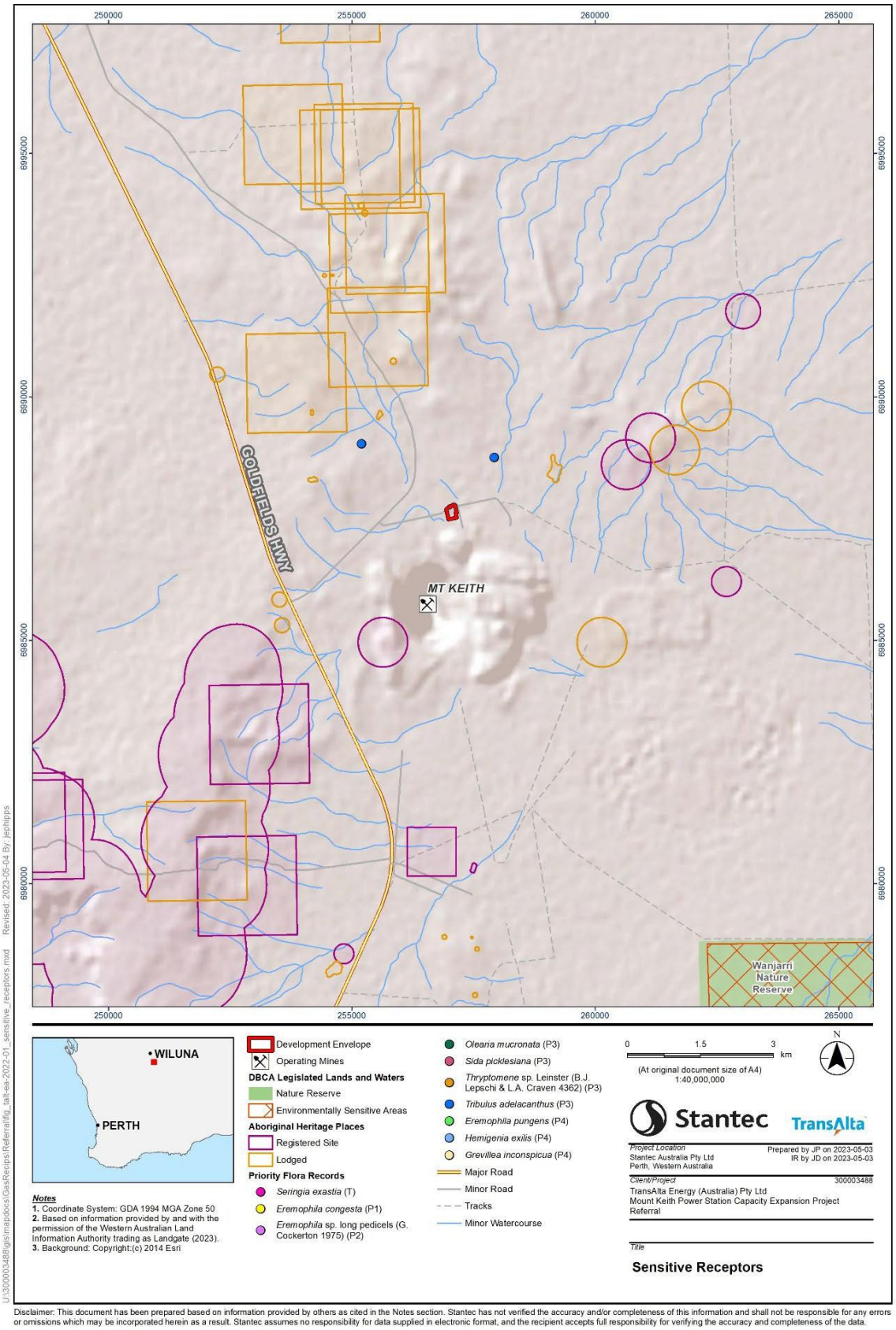

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Figure 1-6: Sensitive Receptors in the Vicinity of the Proposal

1.6.8 Conservation reserves

The nearest conservation reserve is the Wanjarri Nature Reserve which is located approximately 10 km from the Proposal area (**Figure 1-1** and **Figure 1-6**) and is also classed an Environmentally Sensitive Area. The Wanjarri Nature Reserve is the only reserve in the northern part of the Eastern Goldfields and is listed by the Australian Heritage Commission on the Register of the National Estate. The arid zone conservation reserve is dominated by extensive undulating sandplains with sand dunes, with breakaways and low granite hills numerous within the Reserve. The key vegetation component is spinifex grasslands with mulga complexes occurring mainly in the western third of the Reserve.

The Reserve has high conservation values within the landforms represented (although not all the regional landforms occur within it) and is an important area for research into the biology and habitat requirements of a range of animals, particularly birds. It is recognised that the value for nature conservation is limited by the pastoral and mining activities on land surrounding the Reserve (CALM 1996).

Due to the distance of the Nature Reserve from the Proposal, there will be no direct or indirect impacts to the Wanjarri Nature Reserve.

1.6.9 RAMSAR wetlands

The nearest RAMSAR wetland is Lake Warden which located approximately 667 km to the south of the Proposal. Due to the distance, no direct or indirect impacts are expected as a result of this Proposal.

1.6.10 Existing Projects and Development

Existing mining operations within approximately 50 km of the Proposal include (**Figure 1-7**):

- Mt Keith Nickel Mine, tailings storage and satellite (BHP NiW)
- Cliffs Nickel Mine (BHP NiW)
- Cosmos Nickel Mine (Western Areas Ltd)
- Bellevue Underground Gold Mine (Bellevue Gold Ltd)
- Bronzewing Mine (Northern Star Resources Ltd)
- Wiluna Uranium Project – Centipede, Lake Way and Lake Maitland (Toro Energy Ltd)
- Yeelirrie Uranium Mine (Cameco Australia Pty Ltd)
- Matilda Gold Mine (Wiluna Mining Corporation)
- Yandal Gold Mine (Yandal Resources Ltd).
- Lake Way Sulphate of Potash Project (Piper Preston Pty Ltd).

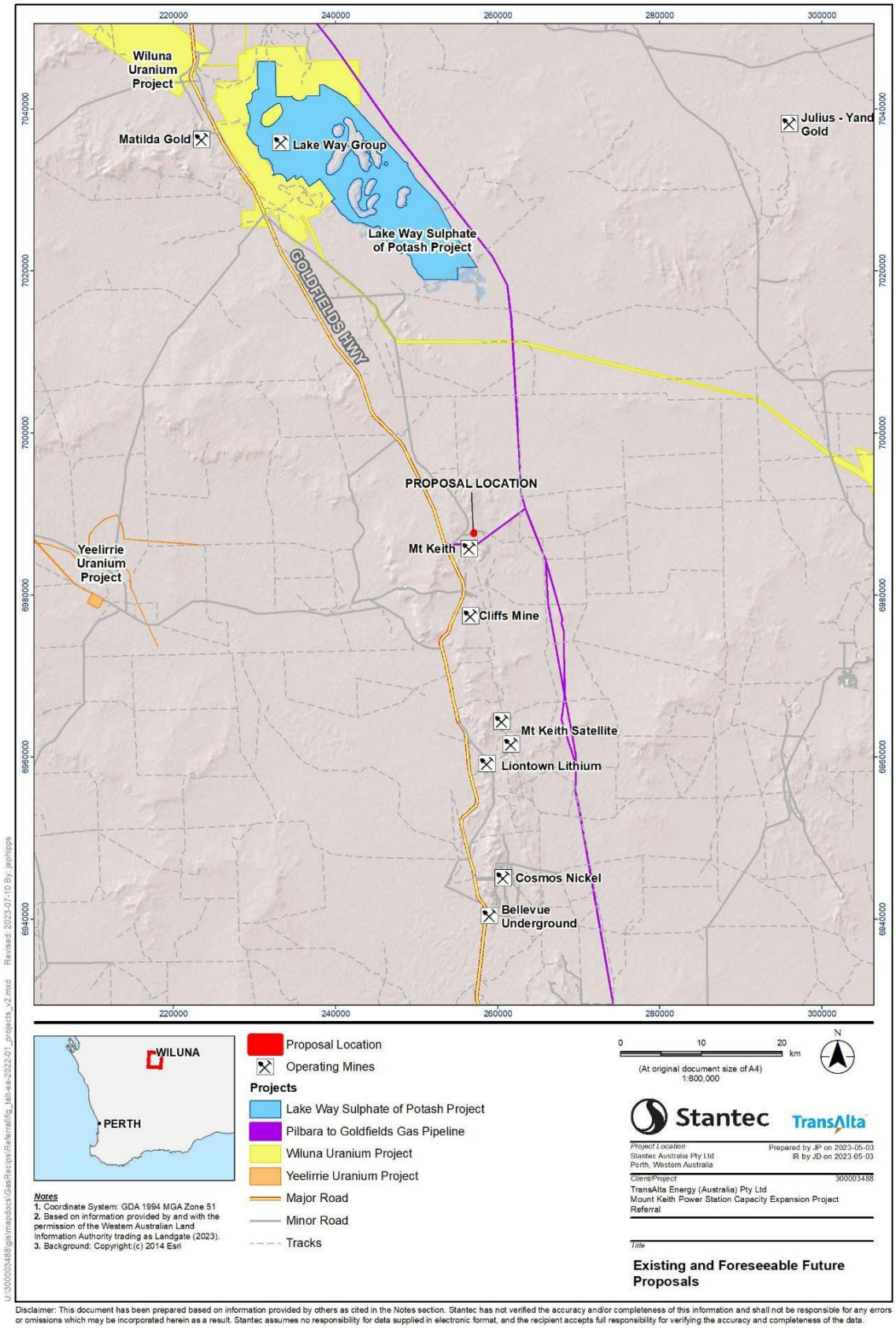

Figure 1-7: Existing and Foreseeable Proposals in Proximity to the Proposal

2 Legislative Context

The Proposal is submitted for assessment under Part IV of the EP Act. The Proposal is not being referred for assessment under the EPBC Act. The content, format and EIA presented in this document have considered the following EPA guidance:

- Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures (Environmental Protection Authority 2021a)
- Statement of environmental principles, factors and objectives and aims of EIA (Environmental Protection Authority 2021g)
- How to identify the Content of a Proposal: Instruction and template (Environmental Protection Authority 2021c)
- How to prepare an Environmental Review Document: Instructions (Environmental Protection Authority 2021d)
- Environmental outcomes and outcomes-based conditions: Interim Guidance (Environmental Protection Authority 2021b)
- How to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans: Instructions (Environmental Protection Authority 2021e).

2.1 Environmental Protection Act 1986

In WA, the principal legislation governing environmental assessment of development proposals is the EP Act. The EIA of development proposals is undertaken by the EPA in accordance with Part IV Division 1 of the EP Act and the Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016 (Environmental Protection Authority 2021a).

Any proposal likely to have a significant environmental effect on the environment should be referred to the EPA under s. 38 of the EP Act. The EPA will decide whether or not to assess the proposal, and if it is to be assessed, will determine the level of assessment of the proposal and any further proposal-specific information required. The EPA will assess the proposal based on referral information, additional assessment information where required, and submissions, if information is made available for public review.

The assessment report sets out what the EPA considers are the key environmental factors identified in the course of the assessment, the EPA's recommendations as to whether or not the proposal may be implemented, and the conditions and procedures to which implementation should be subject. The Minister for Environment considers the EPA's report and any public appeals before determining, in consultation with other Ministers, whether the proposal should be allowed to proceed, and, if so, under what conditions.

The Proponent has undertaken pre-referral consultation with EPA regarding the EIA of the Proposal. TransAlta understands that as the GHG emissions of this proposal, when considered in isolation, are in excess of 100,000 $tCO_{2\text{-}e}$ per annum and require assessment by the EPA. The predicted outcome of the impacts on GHG emissions results is a net environmental benefit (and less emissions) compared to the operation of the existing gas turbines and diesel generators. TransAlta is therefore of the view that GHG emissions will be able to be managed with the implementation of a site-specific GHG Management Plan. The Proponent anticipates that the Proposal will be assessed under Part IV of the EP Act based on referral information.

2.2 Environment Protection and Biodiversity Conservation Act 1999

The Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool was accessed in May 2022 to determine the presence of Matters of National Environmental Significance (MNES) on the Proposal area (**Appendix B**).

It was determined the Proposal will not have a significant impact on any MNES and therefore the Proposal is not being referred under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act).

2.3 National Greenhouse and Energy Reporting Act 2007

The NGER Act 2007 requires facilities that emit more than 100,000 tCO2-e/year to report their emissions under the safeguard mechanism. This mechanism was developed as a part of the Emissions Reduction Fund (ERF) that incentivises companies to avoid increases in their annual emissions above a business-as-usual (BAU) level (or baseline).

Reforms to the Safeguard Mechanism came into effect on 1 July 2023. TransAlta currently report emissions from the Mount Keith and Leinster Power Stations and will be subject to these reforms. As part of these reforms, emitters will be required to reduce emissions by 4.9% per year, with emissions also to be measure on a 5-year totals and a rolling 5-year average. The intent is to assist Australia in meeting its target of a 43% reduction of emissions below 2005 levels by 2030.

2.3.1 NGER (Safeguard Mechanism) Rule 2015

Relevant existing Safeguard Mechanism Facilities managed by Tec Desert Pty Ltd are detailed in table XX-XX below.

Table 1-1 Relevant Safeguard Mechanism Facilities

Facility Name	Responsible emitter	Production Variable
Mount Keith Power Station	TEC DESERT PTY LTD	Megawatt hours of electricity generation default emissions intensity of 0.619t CO2-e applicable
Leinster Power Station	TEC DESERT PTY LTD	Megawatt hours of electricity generation default emissions intensity of 0.566t CO2-e applicable

As required by the Safeguard Mechanism Reform, enforced from 1 July 2023, both facilities will transition from a calculated baseline to a production-adjusted baseline during the FY23 reporting period.

2.4 Environmental Principles and Factors

Table 2-1 shows how the EP Act principles have been considered in the development of this Proposal.

Table 2-1: EP Act Principles Consideration

Principle	Consideration with respect to the Proposal
1. The precautionary principle Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In application of this precautionary principle, decisions should be guided by: a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and b) an assessment of the risk weighted consequences of various options.	TransAlta has assessed the risk and identified potential impacts early in the process to enable planning for avoidance and minimisation. The preferred location of the Proposal does not require vegetation clearing and TransAlta has sought to minimise greenhouse gas emissions by using high efficiency gas reciprocating engines during Stage 1 and keeping options open for the most appropriate form of gas power generation technology for Stage 2.
2. The principle of intergenerational Equity. The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.	The Proposal will maintain and enhance the health of the environment for future generations by reducing the need to use the current aging, greenhouse gas intensive turbines and diesel generation. The new gas generation will not only reduce greenhouse gas emissions but will support the increased use of the SCEN's renewable energy sources.
3. Principles relating to improved valuation, pricing and incentive mechanisms a) Environmental factors should be included in the valuation of assets and services.	Environmental factors have been included in the valuation of assets and services within the Proposal through:

b) The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement. c) The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste. d) Environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solution and responses to environmental problems.	• Consideration of environmental impacts and emission when determining power station location, infrastructure, and specifications. • There is currently no $CO_{2\text{-}e}$ pricing mechanism in place in Australia, however annual prescribed premises fees will be payable under the EP Act for the discharge of other air emissions generated. • Development and implementation of the GHG Management Plan (**Appendix B**). Compliance with the *National Greenhouse and Energy Reporting Act, 2007* (NGER Act) and NGER (Safeguard Mechanism) Rule 2015.
4. The principle of the conservation of biological diversity and ecological integrity. Conservation of biological diversity and ecological integrity should be a fundamental consideration.	The Proposal will ensure that conservation of biological diversity and ecological integrity will be maintained by avoiding the need for vegetation clearing and locating the Proposal within an already cleared area.
5. The principle of waste minimisation. All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.	TransAlta is committed to undertaking activities with efficient use of natural resources such as energy and water, reducing waste and minimising emissions to air. Waste generation will be minimised during all phases of the Proposal by implementing the hierarchy of waste controls: avoid, minimise, reuse, recycle and safe disposal, using licensed Controlled Waste contractors when required. The efficiency of the proposed gas reciprocating engines and the integration of renewables will avoid substantial quantities of air emissions. The gas reciprocating engines feature closed cooling systems to minimise the production of wastewater and are designed to ensure minimal production generation of waste hydrocarbon.

2.5 Other Approvals and Regulations

2.5.1 Land Tenure

The development envelope (DE) for the Proposal intersects tenements M53/56, L53/118, L53/121 and the Mt Keith Pastoral Lease (LPL N049448). The Proposal will be developed on Miscellaneous License L53/271 granted to TEC Desert Pty Ltd and TEC Desert No.2 Pty Ltd (trading as Southern Cross Energy), a subsidiary of TransAlta. The purpose of this new licence is for a road, a power line, a pipeline, a power generation and transmission facility and a workshop and storage facility and will support the Proposal. Table 2-2 outlines the tenement holders that are impacted.

Table 2-2: Tenement Holders

Tenement	Holders
M53/56	BHP Nickel West Pty Ltd
Misc. Licence L53/271	TEC Desert Pty Ltd & TEC Desert No.2 Pty Ltd
L53/118	TEC Desert Pty Ltd & TEC Desert No.2 Pty Ltd
L53/121	TEC Desert Pty Ltd & TEC Desert No.2 Pty Ltd
Mt Keith Pastoral Lease LPL N049448	BHP Nickel West Pty Ltd. Partially managed under a sublease to Bundarra Contracting Pty Ltd, however BHP NiW operations are excluded from the sublease

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

Figure 2-1: Land Tenure

2.5.2 Other approvals required

The Proposal will require approval under the *Mining Act 1978* (Mining Act) due to the Proposal being developed on Mining Act tenure. TransAlta will prepare and submit a Small Operations Mining Proposal (SOMP) in accordance with the Statutory Guideline for Mining Proposals in Western Australia, March 2020 (Department of Mines Industry Regulation and Safety 2020).

Licensing of the construction and operation of the TransAlta power station is required under Part V of the EP Act, in the form of a works approval.

An amendment to TransAlta's Electricity Generator Licence (EGL13) will be required as the Proposal is for generation with a capacity greater than 100MW. This amendment is required by the Economic Regulation Authority (ERA) under the *Economic Regulation Authority Act 2003*. The decision-making authorities (DMAs) for the Proposal are listed in **Table 2-3**

Table 2-3: Decision making authorities

Decision making authority	Legislation or Agreement regulation the activity	Approval required (and specify which proposal element the approval is related to)	Whether and how statutory decision-making process can mitigate impacts on the environment? (Yes/No and summary of reasons. Include a separate line item for each relevant impact, and discuss how the EPA's factor objective will be met)
Minister for Environment	*Environmental Protection Act 1986*	Section 38	Yes GHG emissions will be managed with the implementation of a site-specific GHG Management Plan.
Minister for Mines and Petroleum	*Mining Act 1978*	Small Operations Mining Proposal (SOMP)	Yes A SOMP will be submitted to DMIRS as well as a program of works to address construction works.
Director General, Department of Water and Environmental Regulation (DWER)	*Environmental Protection Act 1986*	Part V Works Approval & Licence	Yes Assessment of construction and operation of a prescribed premises
Economic Regulation Authority (ERA)	*Economic Regulation Authority Act 2003*	Electricity Generator Licence Amendment	Yes To construct and/or operate one or more generating works

3 Stakeholder Engagement

TransAlta is a principled company that lives up to its commitments and values the strong relationships it has built with its Indigenous neighbours, communities, stakeholders, governments, industry, landowners, and host landowners in the areas where it operates. TransAlta works diligently to develop an understanding of the priorities and interests of the people in the areas where it operates to better inform planning efforts. This is further supported by TransAlta's high standards for engagement and consultation across all its operations and new developments.

Stakeholder and Indigenous peoples' feedback are important to TransAlta to strengthen business decisions and to help build lasting positive relationships.

3.1 Key Stakeholders

TransAlta is committed to effective engagement and meaningful consultation with all stakeholders, including Indigenous stakeholders, governmental agencies and communities. Key stakeholders relevant to the Proposal include:

- Tjiwarl Aboriginal Corporation RNTBC
- Environmental Protection Authority (EPA)
- Department of Water and Environmental Regulation (DWER)
- Department of Mines, Industry Regulation and Safety (DMIRS)
- Economic Regulation Authority
- Energy Policy WA
- Shire of Wiluna
- BHP Nickel West
- Mt Keith Pastoral Station
- APA Group.

3.2 Stakeholder Engagement Process

Stakeholder engagement on this Proposal began in 2021 through discussions with key stakeholders and NiW. As the primary underlying tenement holder, NiW has led stakeholder engagement in line with BHP's guideline "Our Requirements for Community and External Engagement" and "Global Indigenous Peoples Policy" with support from TransAlta. Both parties are committed to engaging openly with all identified stakeholders throughout and beyond the approvals process. NiW and TransAlta work with the communities in which they operate and with governments to contribute to economic and social development. As part of the Proposal's approvals, NiW and TransAlta have engaged with stakeholders in a clear and timely manner to ensure that the potential aspects and benefits of the Proposal and the approvals required to successfully undertake the Proposal are communicated, considering the interests of and impacts on its stakeholders. TransAlta will undertake ongoing consultation throughout the life of a project with various stakeholders as required.

Stakeholder engagement has included presentations with key regulatory authorities and potentially affected parties to provide information on the Proposal, planned studies and to request feedback. The format of engagement has included virtual and in person meetings, correspondence and surveys undertaken with the native title holders. The focus of this engagement is on identifying stakeholders and informing them about the Proposal and its impacts to the environment and their land tenure or operations. Through NiW, TransAlta has established key relationships with stakeholders that will enable ongoing dialogue through the construction and operation of the Proposal to ensure expectations are met.

A summary of the stakeholder engagement and consultation undertaken to date with specific relevance to the Proposal is provided in Section 3.3. Consultation with the key stakeholders listed is ongoing and will be undertaken on either a regular or ad-hoc basis, depending on the nature of the relationship and the progression of the Proposal.

3.3 Stakeholder Consultation Outcomes

Consultation with the key stakeholders is ongoing and will be undertaken on either a regular or ad-hoc basis in the lead up to and following submission of the relevant project approval documentation, depending on the nature of the relationship and the progression of the project's approvals

Table 3-1 outlines consultation undertaken with stakeholders on specific issues.

Table 3-1: Stakeholder consultation summary

Stakeholder	Date	Topic/Concerns raised	Proponent response/outcome
BHP Nickel West	29/10/2021	NiW provided direction to TransAlta to pursue development of the Proposal in order to ensure generation is available to meet forecast load growth.	TransAlta commenced development of the Proposal.
Tjiwarl Aboriginal Corporation RNTBC	9/02/2022	TransAlta provided input into NiW's relationship meeting with the Tjiwarl Aboriginal Corporation RNTBC and presented the Proposal as a new project to the Tjiwarl Aboriginal Corporation RNTBC for consultation and feedback.	Provided to the Tjiwarl Aboriginal Corporation RNTBC for information; no issues raised.
Tjiwarl Aboriginal Corporation RNTBC	30/03/2022	Formal engagement and notification provided to the Tjiwarl Aboriginal Corporation RNTBC through NiW, on the basis that the Proposal constitutes an "Infrastructure Interest" under NiW's Indigenous Land Use Agreement and Comprehensive Agreement with the Tjiwarl Aboriginal Corporation RNTBC.	40 business days' advance notice provided by NiW to Tjiwarl Aboriginal Corporation RNTBC in relation to the Proposal.
Mt Keith Pastoral Sublessee	30/03/2022	Courtesy notification of geotechnical drilling planned within the Mt Keith Pastoral Lease, noting that the area is not part of the sublease.	No issues raised; site visit has been organised with the Mt Keith sublessee.
APA	1/04/2022	Meeting held to discuss requirements for the design of the Proposal around the Mt Keith Lateral Gas Pipeline and future gas requirements	APA requirements incorporated into project design.
Energy Policy WA	29/04/2022	Meeting held to inform Energy Policy WA of the Proposal and to seek feedback on the environmental approvals required.	Engagement with the EPA and DWER recommended.
EPA/DWER	4/05/2022	Meeting held to discuss the requirements for a Part IV Referral and Part V assessment.	Ongoing engagement with the EPA recommended.
EPA	15/06/2022	Correspondence provided on current and future policy regarding how GHG emissions are assessed under Part IV.	Further direction provided by EPA.
DWER	12/08/2022	Meeting to discuss Part V approvals pathway, required information and how GHG emissions from the Proposal will be assessed.	Confirmation that a Works Approval is required and recommend further engagement with the EPA.
EPA	7/09/2022	Meeting with EPA Deputy Chair who confirmed a Part IV Referral would be required for the Proposal including a GHGMP and its scope.	Confirmation that a Part IV Referral is required for the Proposal. For a complete understanding of GHG emissions, the GHGMP should be applied to all generation and loads on the SCEN rather than just the Proposal
Tjiwarl Aboriginal Corporation	20/10/2022	TransAlta provided input into NiW's relationship meeting with the Tjiwarl Aboriginal Corporation RNTBC and progress of development for the Proposal.	Provided for information to the Tjiwarl Aboriginal Corporation RNTBC; no issues raised.
DMIRS	15/11/2022	Submission of miscellaneous licence.	Application made
APA	11/01/2023	Update on progress of the Proposal and timeframe for gas connection	For information
EPA	6/04/2023	NiW meeting with EPA Chair and DWER representatives to discuss the Proposal, scope and submission timing	Further direction provided by EPA
EPA	25/05/2023	Pre-referral meeting to introduce and discuss the Part IV referral documentation.	Feedback provided by EPA for incorporation into the documentation.

Tjiwarl Aboriginal Corporation RNTBC	July 2023	Formal provision of the referral documentation, including the opportunity to review and provide feedback as required under NiW's Indigenous Land Use Agreement and Comprehensive Agreement with the Tjiwarl Aboriginal Corporation RNTBC.	20 business days' advance notice provided by NiW to Tjiwarl Aboriginal Corporation RNTBC in relation to the Proposal.
Tjiwarl Aboriginal Corporation RNTBC	19/072023	Formal presentation on the Proposal to Tjiwarl Aboriginal Corporation RNTBC.	Proposal update to the Tjiwarl Aboriginal Corporation RNTBC; no issues raised.
EPA			

4 Environmental Factors and Objectives

The environmental factors and objectives adopted by the EPA are outlined in the '*Statement of Environmental Principles, Factors and Objectives*' (SEP) (Environmental Protection Authority 2021g). The following preliminary key environmental factor has been identified as being relevant to the Proposal:

- Greenhouse Gas

Other environmental factors identified in the SEP are considered either not relevant to the Proposal or are unlikely to result in a significant impact (refer **Section 6**).

4.1 Greenhouse Gas

4.1.1 EPA Objective

The environmental objective of the EPA's Greenhouse Gas Emissions factor is *to minimise the risk of environmental harm associated with climate change by reducing greenhouse gas emissions as far a practicable* (Environmental Protection Authority 2023). The guideline identifies a threshold of 100,000 tonnes of CO_2 equivalent ($tCO_{2\text{-}e}$) per year of GHG emissions from a proposal will be assessed. The guideline relates to seven categories of greenhouse gases covered by the United Nations Framework Convention on Climate Change (UNFCCC) Reporting Guidelines on Annual Inventories, including the following gases:

- carbon dioxide (CO_2)
- methane (CH_4)
- nitrous oxide (N_2O)
- sulphur hexafluoride (SF_6)
- hydro fluorocarbons (HFCs)
- perfluorocarbons (PFCs)
- Nitrogen trifluoride (NF_3)

4.1.2 Relevant Policy and Guidance

The following policies and guidance are considered the current environmental policy and guidance that is relevant to the assessment of the Proposal for this factor:

- Environmental Factor Guideline – Greenhouse Gas Emissions (Environmental Protection Authority 2020).
- Western Australian Climate Policy (Department of Water and Environmental Regulation 2020)
- *National Greenhouse and Energy Reporting Act 2007* (NGER Act)
- National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015
- Carbon Credits (Carbon Farming Initiative—Avoided Clearing of Native Regrowth) Methodology Determination 2015 (Australian Government 2018)
- Greenhouse Gas Emissions Policy for Major Projects (Government of Western Australia 2019)
- Technical Guidance Mitigating Greenhouse Gas Emissions Western Australia: Environmental Protection Authority (Environmental Protection Authority 2019)
- Statement of Environmental Principals, Factors and Objectives (Environmental Protection Authority 2021g)
- Instructions on how to prepare an Environmental Review Document (Environmental Protection Authority 2021d).

4.1.3 Receiving Environment

The proposed power station will be located predominately on M53/56, with intersects on L53/118, L53/119, L53/121 and the Mt Keith Pastoral Lease (LPL N049448). The area also intersects the new miscellaneous licence which has been applied for by TransAlta and is currently pending (**Figure 2-1**).

GHG emissions are a key contributor to climate change, with the effects of a changing climate predicted to be significant in Western Australia (Department of Water and Environmental Regulation 2019). The Government of Western Australia is committed to achieving net-zero emissions by 2050 as outlined in the Western Australian Climate Policy (Department of Water and Environmental Regulation 2020).

According to recent government reports, Australia's 2022 emissions for the year to March were a 1.5% increase from the previous year, with total estimated emissions of 487.1 million tonnes CO_2-e (Australian Government 2022a). This represents a decrease of 21.6% compared to the 2005 baseline year outlined in the Paris Agreement.

Key factors driving Australia's long-term emission trends outlined by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) in its recent March quarterly report (Australian Government 2022a) include:

- Ongoing reductions in emissions from the electricity sector as renewable fuel sources displace coal as a fuel source
- Increasing emissions from stationary energy (excluding electricity) due to growth in Liquefied Natural Gas (LNG) exports
- Increasing emissions from transport emissions, despite the decrease in 2020 due to COVID-19;
- Increasing fugitive emissions from fuel extraction in the coal, crude oil and natural gas sub-sector largely due to the growth of the LNG industry
- Decreasing agricultural emissions due to declining stock populations
- Significant reductions in land use, land-use change and forestry (LULUCF) emissions due to reductions in land clearing and soil carbon improvements.

4.1.3.1 Environmental Studies

An internal assessment has been undertaken by TransAlta's engineers to understand and determine GHG emissions for the Proposal. This assessment is discussed in Table 4-1.

Table 4-1: Studies for Greenhouse Gas Emissions

Study	Findings
Stantec 2023 Greenhouse Gas Management Plan (Appendix B)	The estimation of GHG emissions showed that the SCEN network will produce a peak 237,821 $tCO_{2\text{-}e}$ in 2028 (124,678 from the Proposal) and an estimated 2,633,195 $tCO_{2\text{-}e}$ between 2028 and 2050 (1,380,405 $tCO_{2\text{-}e}$ from the Proposal). Construction activities for the Proposal will lead to 31,670 $tCO_{2\text{-}e}$ of emissions.

4.1.4 Potential Environmental Impacts

Climate change has the potential to cause impacts across Western Australia and it is recognised that there are inherent links between the GHG Emissions factor and other environmental factors through effects on climate.

The potential impacts from GHG emissions associated with the Proposal relate to the contribution to global GHG concentrations from Scope 1 emissions. Scope 1 GHG emissions associated with the Proposal include:

- Construction of the Proposal
- Up to 150MW of gas reciprocating engines by 2032.

A detailed emissions inventory is provided in Table 4-2. The emissions inventory covers Scope 1 and 3 emissions. As the project itself is electricity production, there is no consideration for Scope 2 emissions. Note that these emissions are conservative and do not include additional future emissions reduction and offset measures to be taken by TransAlta to achieve its target of net zero greenhouse gas emissions by 2050 (Section 1.5).

Modelled emissions for the Proposal assume a partial continued use of legacy gas generation for operational purposes. Where legacy gas generation usage is reduced or ceases, actual emissions from the Proposal may increase by an amount equivalent to the displaced emissions from the legacy generation, and not exceeding forecast peak Scope 1 emission levels for the SCEN network. In this scenario however, total overall Scope 1 and 3 emissions will be lower than current modelled levels due to the use of more efficient generation.

The Proposal will consist of gas reciprocating engines, exhaust stacks and associated infrastructure with an estimated forecast operational annual unmitigated Scope 1 greenhouse gas emissions of up to 164,380 tCO_2-e. This represents approximately 0.21% of Western Australia's GHG emissions, based on 2020 data of 82.12 $MtCO_2$-e. Predicted lifetime Scope 1 emissions are 1,380,405 tCO_2-e based an operational life out to 2050.

TransAlta has calculated Scope 3 emissions would be on average 12,441 tCO_2-e per annum and 286,120 tCO_2-e for the life of the proposal unmitigated, and 73,298 tCO_2-e (3,185 tCO_2-e per annum average) with required Safeguard Mechanism reductions. Scope 2 emissions would be zero for this proposal as it is a power generator and therefore not sourcing power with associated Scope 2 emissions.

Table 4-2: Estimated GHG emissions inventory for the Proposal

Timeframe	Scope 1 (tCO_2-e)	Scope 2 (tCO_2-e)	Scope 3 (tCO_2-e)	Total (tCO_2-e)
Annual	Construction (peak 2026): 13,373 $tCO_{2\text{-}e}$	Out of Scope	8,304	187,455
	Operation (modelled peak 2050): 164,380 $tCO_{2\text{-}e}$		3,185	
Life of Proposal	Construction: 31,670 $tCO_{2\text{-}e}$	Out of Scope	19,663	1,463,909
	Operation: 1,380,405 $tCO_{2\text{-}e}$		73,298	

4.1.5 Mitigation

The proposed mitigation measures to address potential impacts to greenhouse gas emissions as a result of the Proposal and the predicted outcome are provided in Table 4-3.

Table 4-3: Mitigation Measures and Predicted Outcomes

Potential Impact	Mitigation Measures	Predicted Outcome
Contribution to global GHG emissions which will perpetuate impacts of climate change.	A Greenhouse Gas Management Plan (GHGMP) has been prepared (**Appendix B**) to detail the proposed management actions for the NMK site and SCEN network. TransAlta currently reports emissions, in accordance with NGER and National Pollutant Inventory (NPI) requirements, separately for its Mt Keith Power Station and Leinster Power Station operating sites. It should be noted that as power generation at NMK feeds into a larger network, it is appropriate to provide the GHGMP at network scale rather than for the NMK site. TransAlta proposes to align the GHG emissions reduction trajectory for the Proposal with recent Safeguard Mechanism reforms, as detailed in the GHGMP.	A path for net zero by 2050 for the SCEN network is outlined in the GHGMP, which details that any emissions from the network that cannot be reduced will be offset. The plan also details that deep and substantial reductions will be made to the SCEN by 2030. This will be achieved by the installation of the gas reciprocating engines that will facilitate a deeper penetration of renewable energy into the network.

The Proposal will minimise the increase in overall GHG emissions of the Mt Keith Power Station, where otherwise less efficient existing generation would be used to meet the increased NiW load. It should be noted that the Proposal forms part of a wider energy network, the SCEN, and provides firm generation with a more flexible power source than existing generation at NMK, allowing renewable energy to be added to the SCEN network to mitigate GHG emissions. As such, the net impact of this Proposal will be a GHG reduction of up to 343,750 tCO_{2-e} per annum on the SCEN network, due to the displacement of existing diesel and gas generation with more efficient gas reciprocating engines and renewables (**Table 4-4**).

Table 4-4: Modelled emissions for current power station and the Proposal

	Emissions Intensity (SCEN) tCO_{2-e} /MWh	Annual Emissions (as required by Safeguard Mechanism) tCO_{2-e}	Annual change compared to 2023 Emissions tCO_{2-e}	Annual Emissions (Gas recips proposal) tCO_{2-e}	Annual change compared to 2023 Emissions tCO_{2-e}	Annual BAU Emissions tCO_{2-e}	Annual change (renewables) compared to BAU Emissions tCO_{2-e} (%)
2023 (current diesel, gas turbine and solar generation)	0.53	315,000 (165,136 from Mount Keith)	-	-	-	-	-
2028 (after 100MW gas reciprocating engines installed)	0.47 (0.43 for recips)	237,825 (recips representing 109,867)	-77,825 (-24%)	394,301	79,301 (25%)	423,887	-186,062 (-44%)
2030 (after 100MW gas reciprocating engines and installed)	0.27 (0.43 for recips)	206,955	-108,045 (-34%)	425,732	110,732 (35%)	455,922	-248,697(-55%)
2032 (after 150MW gas reciprocating engines)	0.27 (0.43 for recips)	186,259 (recips representing 164,380)	-128,791 (-41%)	466,901	172,205 (55%)	509,315	-323,056 (-63%)

*Note: Load demand increases across time, which is reflected in the increased annual emissions and the annual change in 2030, however, the benefit of installation of the gas reciprocating engines can be seen in the emissions intensity. All scenarios include emission reductions from the 38MWdcp Northern Goldfields Solar Project and also from future renewable energy sources to meet Safeguard Mechanism reduction targets.

Compared to the continued use of TransAlta's existing diesel and gas turbine generation, which would produce emissions of 423,887 tCO_2-e per annum in 2028 and 509,315 tCO_{2-e} per annum in 2032:

- Without renewables, the emissions from The Proposal would be 394,301 tCO_2-e per annum in 2028 and 466,901 tCO_2-e per annum in 2032. An increase of 25% and 35% respectively.
- The addition of 100MW of gas reciprocating engines in Stage 1 under this Proposal in 2028, along with renewables, would result in total SCEN emissions of 237,825 tCO_2-e per annum, representing a 24% decrease in emissions compared to 2023.
- In order to meet reductions required by the Safeguard Mechanism by 2030 total SCEN emissions will be reduced to 206,955 tCO_2-e per annum, representing a 34% decrease in emissions compared to 2023.
- The addition of a further 50MW of gas reciprocating engines in Stage 2, combined with energy generation from renewable energy sources by 2032, to meet reduction targets set by the Safeguard Mechanism, results in total SCEN emissions of 186,259 tCO_2-e per annum in 2032, representing a 41% decrease in emissions compared to 2023.

4.1.6 Assessment and significance of residual impacts

Peak annual greenhouse gas emissions from the Proposal are modelled at 164,380 tCO_2-e. The Proposal along with renewables will provide a net reduction in GHG emissions to atmosphere of 343,750 tCO_2-e to supply the required additional power to meet the current NiW load forecast. **Table 4-4** outlines the reduction in total annual GHG emissions. This **residual impact is considered significant** as the modelled total GHG emissions (164,380 tCO_2-e) will exceed the

100,000 tCO_2-e/year and as such, will require a Greenhouse Gas Management Plan (Section 6.2 and **Appendix B**).

4.1.6.1 Benchmarking against comparable Proposals

Emissions intensity at a particular facility is a measure of the tonnes of GHG emitted per MWH (t CO_2-e/MWH) and is a helpful gauge that can be used to benchmark and compare against other power facilities/networks. Publicly available data of similar projects provide information on the annual scope 1 emissions and annual facility electricity generation. Emissions intensity is calculated as the following:

$$\text{Emissions intensity} = \frac{\text{Scope 1 emissions}}{\text{Annual electricity generation}}$$

The modelled emissions intensity for the Proposal (for the gas recips in isolation) has been calculated as 0.43 t CO_2-e/MWH, with:

- Forecast peak annual scope 1 emissions as up to 164,380 t CO_2-e
- Forecast electricity generation per annum as up to 379,200 MWh

To provide a perspective on the Proposal's likely impact, **Table 4-5** below compares the emissions intensity of the TransAlta Proposal with other comparable power stations in Western Australia. The comparison in **Figure 4-1** illustrates how the Proposal performs in the low range of emissions intensity for the amount of CO_2 emitted per MWH that is produced annually at each power facility investigated.

Table 4-5: Emissions intensity benchmarks

Entity	Facility	Year	Source.	Annual Electricity Generation (MWH)	Scope 1 annual emissions (tCO_2 -e)	Emissions Intensity (t CO_{2-e}/t MWH)
Newgen Kwinana Holdings	Kwinana Gas Fired Power Station	2021	CER 2021	2,027,187	795,750	0.39
Alcoa Australian Holdings	Alinta Pinjarra Generation Facility	2021	CER 2021	1,594,393	1,086,799	0.68
International Power (Australia) Holdings	Kwinana Cogeneration Plant	2021	CER 2021	780,046	403,342	0.52
BHP Group	Yarnima Power Station	2021	CER 2021	747,514	343,639	0.46
Electricity Generation and Retail Corporation	Kwinana Power Station	2021	CER 2021	669,920	354,786	0.53
Electricity Generation and Retail Corporation	Pinjar Gas Turbine Station	2021	CER 2021	559,454	497,194	0.89
Pioneer Sail Holdings	Port Hedland Power Station	2021	CER 2021	551,410	412,528	0.75
Rio Tinto	Paraburdoo Power Station	2021	CER 2021	535,802	288,095	0.54
Rio Tinto	Yurralyi Maya Power Station	2021	CER 2021	497,731	290,340	0.58
TransAlta Energy (Australia)	South Hedland Power Station	2021	CER 2021	422,105	220,840	0.52
Rio Tinto	West Angelas Power Station	2021	CER 2021	375,500	209,637	0.56
Pioneer Sail Holdings	Wagerup Power Station	2021	CER 2021	334,356	184,745	0.55
TransAlta Energy (Australia)	Mt Keith Power Station	2021	CER 2021	314,526	189,293	0.60
Fortescue Metals Group	Solomon Power Station	2021	CER 2021	300,671	183,646	0.61
Rio Tinto	Cape Lambert Power Station	2021	CER 2021	293,389	171,661	0.59
Pioneer Sail Holdings	Newman Power Station	2021	CER 2021	291,052	202,430	0.70
TransAlta Energy (Australia)	Kambalda Power Station	2021	CER 2021	284,226	155,829	0.55
TransAlta Energy (Australia)	Kalgoorlie Power Station	2021	CER 2021	279,941	156,822	0.56
TransAlta Energy (Australia)	Leinster Power Station	2021	CER 2021	271,879	151,147	0.56
Goldfields Power	Parkeston Power Station	2021	CER 2021	261,661	146,132	0.56
Default Emission Intensity	-	2015	Schedule 2, Safeguard Mechanism Rule	-	-	0.539
TransAlta Energy (Australia)	Mt Keith Power Station Capacity Expansion Project	Peak year	Appendix B	379,200	164,380	0.43

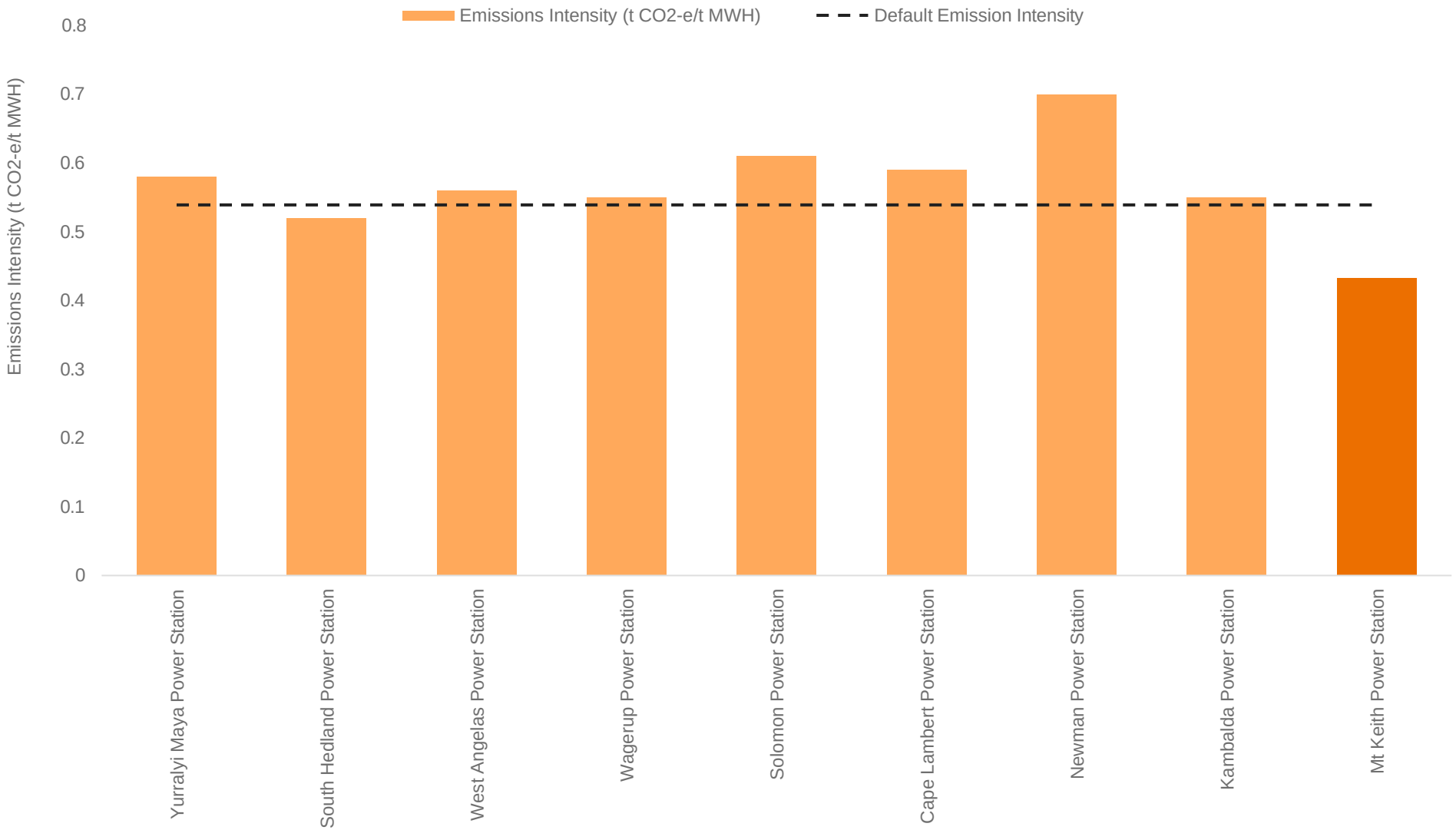

Figure 4-1 Emissions intensity for gas power stations of comparable capacity in WA based on 2020-2021 reported figures compared to peak emissions estimated in 2030 for the Proposal

4.1.6.2 Cumulative Environmental Impacts

The proposal is not considered to significantly increase GHG emissions to the state's GHG inventory. The proposal will contribute an additional 0.21% of Western Australia's total yearly emissions (Table 4-6).

The Proposal will contribute to Australia's GHG emissions during its operational life. However, these emissions will result in minimal increase to Australia's GHG emissions in comparison to other similar power stations.

Table 4-6: Impact of Scope 1 emissions

Location	FY2020 Scope 1 GHG Emissions (tCO_2-e)*	% Contribution of the WA State Emissions (82.12 Mtpa)**	% Contribution of the National emissions (536.5 Mtpa)***
Kwinana Gas Fired Power Station	2,027,187	2.47	0.38
Alinta Pinjarra Generation Facility	1,594,393	1.94	0.3
Kwinana Cogeneration Plant	780,046	0.95	0.15
Yarnima Power Station	747,514	0.91	0.14
Kwinana Power Station	669,920	0.82	0.12
Pinjar Gas Turbine Station	559,454	0.68	0.10
Port Hedland Power Station	551,410	0.67	0.10
Paraburdoo Power Station	535,802	0.65	0.10
Yurralyi Maya Power Station	497,731	0.61	0.09
South Hedland Power Station	422,105	0.51	0.08
West Angelas Power Station	375,500	0.46	0.07
Wagerup Power Station	334,356	0.41	0.06
Mt Keith Power Station	314,526	0.38	0.06
Solomon Power Station	300,671	0.37	0.06
Cape Lambert Power Station	293,389	0.36	0.05
Newman Power Station	291,052	0.35	0.05
Kambalda Power Station	284,226	0.35	0.05
Kalgoorlie Power Station	279,941	0.34	0.05
Leinster Power Station	271,879	0.33	0.05
Parkeston Power Station	261,661	0.32	0.05
Predicted emissions from Mt Keith Power Station Capacity Expansion Project	164,380	0.20	0.03

* CER 2020 Safeguard Facility data
** Climate Snapshot Municipal data 2020
** DISER National Greenhouse Accounts 2019
^ Estimated annual average emissions (Appendix B)

4.1.7 Environmental Outcomes

The proposed mitigation measures to address potential impacts from greenhouse gas emissions ensure the Proposal can be managed such that the EPA's objective 'To reduce net greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change' can be met. This will be achieved as the Proposal is part of a broader power generating network that supplies multiple mining operations and is implementing technology that, unlike the existing gas and diesel energy generation, will be run at a reduced output as more renewable energy is added to the network. The proposed mitigation measures will also allow TransAlta to contribute to meeting the requirements of the reforms to the Safeguard Mechanism. The relevant EPA and Commonwealth policy and guidance and predicted outcomes is detailed in Table 4-7.

Table 4-7: Policy and guidance

Environmental Factor	EPA policy and guidance EPA and other State or Commonwealth policy or guidance, if relevant	Predicted Outcome
GHG emissions	The environmental objective of the EPA's Greenhouse Gas Emissions factor is to reduce net greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change (Environmental Protection Authority 2020).	Based on predicted, modelled GHG emissions for the construction and operation phases of the Proposal (up to 164,380 tCO_2-e per annum) and the measures taken to minimise impacts from GHG emissions as well as the decarbonisation of the SCEN network over time, TransAlta acknowledge that GHG emissions will be in excess of 100,000 tCO_2-e and as such the factor requires assessment. TransAlta considers that greenhouse gas emissions can be managed through the addition of increased renewable energy capacity on the SCEN network which will displace gas power generation and supply a substantial part of the increased power load that is required to expand MKO, reducing the network's emissions by 34% by 2030 and achieving net zero emissions by 2050. The EPA's objective for this factor can therefore be met.
GHG emissions	Safeguard Mechanism (NGER Act 2007)	TransAlta considers that greenhouse gas emissions can be managed through the addition of increased renewable energy capacity on the SCEN network which will displace gas power generation, assist in meeting increased power, and reduce the network's emissions by 34% by 2030. These projects will also assist in maintaining the emissions profile of the Mount Keith and Leinster Power Station facilities at, or below, the relative Safeguard Mechanism Baselines.

5 Other Environmental Factors or Matters

In addition to the key environmental factor of Greenhouse Gas Emissions, TransAlta has given due consideration to the EPA's other environmental factors as set out in the '*Statement of environmental principles, factors, objectives and aims of EIA*' (Environmental Protection Authority 2021g).

The environmental factors of Benthic Communities and Habitat, Coastal Processes, Marine Environmental Quality and Marine Fauna were not considered relevant to the Proposal because the Proposal Area is not located within proximity to the marine environment.

The environmental factors of Flora and Vegetation, Landforms, Subterranean Fauna, Terrestrial Environmental Quality, Terrestrial Fauna, Inland Waters, Air Quality and Social Surrounds were not considered to be key environmental factors. The Proposal is to be located on a previously disturbed area on the existing NiW mine site. No excavation, dewatering or groundwater drawdown or clearing of vegetation is required for the Proposal. Therefore, 'Threatened' flora taxa, fauna taxa or ecological communities protected under either the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (C'th) or the State *Biodiversity Conservation Act 2016* (WA), nor any taxa or communities listed by the State Department of Biodiversity, Conservation and Attractions (DBCA) as 'priority', do not occur within the Development Envelope and will not be impacted by the Proposal.

Social surroundings and Human Health were not considered to be key factors in relation to the Proposal. The Proposal constitutes an "Infrastructure Interest" under NiW's Indigenous Land Use Agreement and Comprehensive Agreement with the Tjiwarl Aboriginal Corporation RNTBC. Through NiW, TransAlta has established key relationships with stakeholders, including the Tjiwarl Aboriginal Corporation RNTBC, that will enable ongoing dialogue through the construction and operation of the Proposal to ensure expectations are met. Furthermore, the Proposal does not coincide with any 'Registered' site or object of Aboriginal heritage under s.5 or s.6 of the *Aboriginal Heritage Act 1978* (WA), nor any other place, record or object of known Aboriginal cultural significance.

The Proposal is considered unlikely to result in a significant impact to these other environmental factors, and accordingly they were not subject to detailed environmental assessment. These other environmental factors will be managed to ensure no significant impact will result from the Proposal (**Table 5-1**).

Table 5-1: Other environmental factors

Factor	Objective	Receiving Environment	Potential Environmental Effect	Management and Predicted Outcomes
Flora and Vegetation	To protect flora and vegetation so that biological diversity and ecological integrity are maintained.	• The Proposal is to be located on the existing NiW mine site. • No Threatened Ecological Communities (TECs), Threatened or Priority Flora recorded.	• No vegetation clearing is required and therefore no loss or fragmentation of vegetation will occur. • No degradation or alteration of flora and vegetation from indirect impacts are anticipated from generation of dust, altered fire regimes, or altered hydrological regimes. • Potential indirect impact due to introduction or spread of weed species during construction.	• During construction the EPC Contractor will implement its own procedures to manage site works. • TransAlta will implement procedures within its Total Safety and Environmental Management System (TSMS) at the site to minimise the risk of introducing or spreading weed species during operation. • The Proposal will not impact the biological diversity or ecological integrity of flora and vegetation. **Based on their being no requirement for clearing of vegetation and the implementation of mitigation measures to reduce indirect impacts (i.e. spread of weeds), it is considered that the EPA objective for the environmental factor of ''Flora and Vegetation' can be met.**
Landforms	To maintain the variety and integrity of significant physical landforms so that environmental values are protected.	• The Proposal is to be located on the existing NiW mine site. • No significant physical landforms located within DE.	• No excavation or alteration of significant landforms will be required.	The Proposal will not impact the variety or integrity of any significant physical landforms, therefore environmental values will be protected. **Therefore, it is considered EPA objective for the environmental factor of 'Landforms' can be met.**
Subterranean Fauna	To protect subterranean fauna so that biological diversity and ecological integrity are maintained.	• The Proposal is to be located on the existing NiW mine site.	• No excavation, dewatering or groundwater drawdown required therefore no loss of individuals or habitat.	The Proposal will not impact the biological diversity or ecological integrity of subterranean fauna. **Therefore, it is considered that the EPA objective for the environmental factor of 'Subterranean Fauna' can be met.**
Terrestrial Environmental Quality	To maintain the quality of land and soils so that environmental values are protected.	• The Proposal is to be located on the existing NiW mine site.	• No vegetation clearing required therefore no removal of vegetation cover. • Proposal activities will not result in erosion or salinity impacts to land or soils. • No excavation required therefore no disturbance of potential Acid Sulfate Soils. • Potential indirect impact to soil quality due to contamination from hydrocarbon or chemical leaks or spills.	• TransAlta will implement the Soil and Ground Water Protection procedure within its Total Safety and Environmental Management System (TSMS) around storage and handling or Environmentally Hazardous Substances Containment. • The Proposal will not impact the environmental values of land or soil. **Therefore, it is considered that the EPA objective for the environmental factor of 'Terrestrial Environmental Quality' can be met.**
Terrestrial Fauna	To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.	• The Proposal is to be located on the existing NiW mine site. • No Threatened Fauna recorded. • One Priority Fauna recorded: Peregrine Falcon (*Falco peregrinus*) – Other Specially Protected (BC Act): A pair were recorded flying overhead the Development Envelope. The species was not observed to land or utilise habitat within the broader survey area and it is unlikely to utilise or rely on habitat within the Development Envelope (Strategen-JBS&G 2022).	• No direct impacts resulting from vegetation clearing will occur and therefore no loss, degradation, or fragmentation of fauna habitat is expected. • No indirect impact resulting in the degradation or alteration of fauna habitat from generation of dust, altered fire regimes, or altered hydrological regimes is expected. • Potential for indirect impact to fauna habitat resulting from the introduction or spread of weed species during construction.	• TransAlta will implement the operational controls around weed management as part of its Total Safety and Environmental Management System (TSMS). • The Proposal will not impact the biological diversity or ecological integrity of terrestrial fauna. **Therefore, it is considered EPA that the objective for the environmental factor of 'Terrestrial Fauna' can be met.**
Inland Waters	To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.	The Proposal is to be located on the existing NiW mine site.	• Operational water use will be 7,000L/week under maximum scenarios which will be supplied from the existing NiW mine process water allocation. • Stormwater drainage at the NMK site is managed by existing contours and engineered diversion channels around the site. • Surface and groundwater hydrological processes will not be altered by this Proposal. • Potential indirect impact to surface and/or groundwater due to contamination from hydrocarbon or chemical leaks or spills.	• TransAlta will implement the Soil and Ground Water Protection procedure within its Total Safety and Environmental Management System (TSMS) around storage and handling or Environmentally Hazardous Substances Containment. • The Proposal will not impact hydrological regimes and quality of groundwater and surface water, therefore environmental values will be protected. **Therefore, it is considered that the EPA objective for the environmental factor of 'Inland Waters' can be met.**
Air Quality	To maintain air quality and minimise emissions so that environmental values are protected.	The proposed power station will be located within the NMK site. The power station has been modelled individually as well as cumulatively. Dust emissions will be generated during construction from earthworks and machinery movement, however are not considered	• The Proposal will not significantly impact Air Quality or environmental values.	TransAlta will be submitting a Works Approval application; it is anticipated that an Operating Licence will outline mitigation and monitoring required with respect to Air Quality and Noise. A noise study was undertaken by Stantec which measured the likely individual and cumulative noise impacts on the nearest

Factor	Objective	Receiving Environment	Potential Environmental Effect	Management and Predicted Outcomes
		to be significant. Dust mitigation measures will be implemented during construction and road works. Emissions will also occur from mobile plant or generators on site. The main emissions from the Proposal will be nitrogen oxide, carbon dioxide, sulphur dioxide and particulates. Modelling has indicated that emissions during commissioning and operations will not exceed 25% of any applicable guidelines at receptor locations, even under worst case scenarios. In addition to this, air emissions are unlikely to impact on the annual average PM_{10} or $PM_{2.5}$ in the region. Modelling has indicated that total cumulative downwind concentrations of particulates would not be distinguishable through an ambient air quality monitoring program.		sensitive receptor - the Mount Keith Mining Village some 7km to the south of the proposal. This study found that noise levels are expected to comply with noise criteria during both daytime and night time hours with the maximum level at the mining village being 28 dB(a) which is within the 35 dB(a) limit. An air quality study was undertaken by Environmental Technologies & Analytics, which looked at the cumulative impacts of the proposed power station and Mount Keith mining operations on the Mount Keith Mining Village. This modelling demonstrated that, at the mining village, the concentrations of NO_2, CO, and SO_2 were below the assessment criteria for all modelled scenarios. $PM_{2.5}$ concentrations were below the assessment criteria for most models. Where models showed higher $PM_{2.5}$ levels, the emissions profile was dominated by existing mining operations with the proposed power station predicted to contribute less than 1% of the assessment criteria value. Potential impacts to air quality will be mitigated through: • Minimising gaseous air emissions through energy efficiency by using gas rather than diesel as the fuel source • Designing the project based on appropriate specifications that ensure onsite air quality impacts will comply with regulatory requirements • Using stacks that are designed to ensure a release height for emissions that will result in appropriate dispersion. The following measures to manage air quality impacts will be implemented: • Maintain efficiency and reduce fuel consumption by switching individual power generation units off to avoid running multiple units at a low load • Conduct routine stack tests to ensure that operations are running efficiently, and emissions are being minimised. Due to siting the proposal is expected to cause negligible noise impacts to the surrounding environment. The emissions from the Proposal (a prescribed premises) can be managed under Part V of the EP Act through a Works Approval and Licence. Both the Noise and Air Quality studies are included as Appendices to this referral supporting document. **Based on the predicted effect of the Proposal from gaseous air emissions and negligible impacts expected from noise, subject to the implementation of the identified mitigation and management measures, and emissions from the Proposal can managed through Part V of the *Environmental Protection Act 1986*, it is considered that the EPA objective for the environmental factor of 'Air Quality' can be met.**

Social Surroundings	To protect social surroundings from significant harm	The NMK area and surrounds have been extensively surveyed both archaeologically and ethnographically since 1989. The Native Title holders, the Tjiwarl Aboriginal Corporation RNTBC, have been and will continue to be regularly consulted regarding activities within the NMK area. Two cultural heritage values have been identified within the wider NMK area. Specific locations of cultural heritage values are confidential as requested by Tjiwarl Aboriginal Corporation RNTBC. These sites are located approximately 4km from the NMK site boundary. There are no known sites of European heritage within close proximity to the Premises (Strategen-JBS&G 2022).	• No heritage sites will be impacted by the Proposal. • Due to the remote location of the NMK site and absence of nearby sensitive receptors, there will be no impact on other aspects of social surroundings.	• Through NiW, TransAlta will continue ongoing engagement with the Tjiwarl Aboriginal Corporation RNTBC in relation to the proposed activities in accordance with its obligations under the Comprehensive Agreement and Indigenous Land Use Agreement. **Based on the outcomes of heritage surveys, regular and ongoing consultation with Tjiwarl Aboriginal Corporation RNTBC and that no heritage sites will be impacted by the Proposal, it is considered that the EPA objective for 'Social Surroundings' can be met and the Proposal will not result in significant harm to social surroundings.**
Factor	**Objective**	**Receiving Environment**	**Potential Environmental Effect**	**Management and Predicted Outcomes**
		The closest population centres to the Proposal area are Wiluna located approximately 80km north, and Leinster located approximately 92 km south.		

6 Offsets

The predicted significant residual environmental impacts associated with the Proposal and in relation to the Western Australian offsets policy framework is detailed in subsequent sections.

6.1 Biodiversity Offsets

The Proposal will be constructed within an area that has been assessed and cleared as part of the NiW mining operation activities. No clearing of native vegetation is required as for the construction or operation of the Proposal and no impacts are anticipated to conservation significant species; therefore, no biodiversity offsets have been considered for this Proposal.

6.2 Carbon Offsets

The Proposal will form part of our reporting obligations for the Mt Keith Power Station. As the existing Mt Keith facility already produces more than 100,000 $tCO_{2\text{-}e}$ during a financial year there is a requirement to report emissions against the National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015 (the Rule).

Mt Keith Power Station has been determined to meet the criteria for a transitional calculated baseline that covers a three-year period to 30 June 2024 and prepared in accordance with the Rule. TransAlta nominates the default intensity for electricity generation of 0.539 $tCO_{2\text{-}e}$/MWh benchmarked by Australian Government to industry best-practice and in accordance with Schedule 2, Part 26 of the Rule.

The new gas reciprocating engines will be displacing existing generation from the Mt Keith Power Station, including diesel generation and less efficient gas generation, and will contribute to an overall lower emissions intensity. As a result of the Proposal, the Mt Keith Power Station will not contribute to increasing the emissions intensity of the facility above the default intensity benchmark and will therefore not create additional requirements to offset emissions.

After all measures of the EPA's mitigation hierarchy (avoid, mitigate, rehabilitate) have been implemented to reduce GHG emissions caused by the Mt Keith Power Station Capacity Expansion Project, the residual GHG emissions (scope 1) will need to be offset to meet emissions reductions targets by 2050. If offsets are required for all or some of its scope 1 GHG emissions, TransAlta will apply the integrity principles of the International Carbon Reduction and Offset Alliance (ICROA) to source and use credible offset units. TransAlta will only use credible offsets which have been validated, verified or registered.

7 Holistic Impact Assessment

Where the combination of the environmental effect of two or more environmental factors or values has the potential to result in a significant impact, a holistic impact assessment is required (Environmental Protection Authority 2021d). Only one environmental factor, Greenhouse Gas Emissions, is considered significant in relation to this Proposal and therefore a holistic impact assessment is not required.

8 Cumulative Environmental Impact Assessment

Cumulative environmental impacts are the successive, incremental, and interactive impacts on the environment of a proposal with one or more past, present and reasonably foreseeable future activities (Environmental Protection Authority 2021d).

The greenhouse gas emissions as a result of this proposal will cause a small increase in the State (0.4%) and Commonwealth (0.07%) total emissions.

TransAlta considers there will be no other cumulative impacts from the Proposal that require assessment, mitigation, or management based on the following:

- The Proposal is located within the operational NiW mine site. No vegetation clearing will be required and therefore there will be no cumulative impacts arising from loss of flora, vegetation, habitat, or fauna, or cumulative impacts related to landforms, or terrestrial environmental quality.

- Surface water will be managed by existing contours and engineered diversion channels around the site, therefore there will be no cumulative hydrological impacts.
- Operational water requirements will be supplied from the existing NiW mine process water allocation, therefore there will be no cumulative hydrogeological impacts or impacts to subterranean fauna.
- Noise and air quality modelling has demonstrated that negligible additional impacts are expected, therefore there will be no cumulative social surroundings impacts related to noise.
- No cumulative impacts on Aboriginal heritage sites are expected, as no sites will be impacted by this Proposal.

9 Conclusion

TransAlta's Proposal to install new highly efficient gas reciprocating engines is a critical step towards achieving the company's decarbonisation goals, whilst in turn supporting its customer, NiW, to increase the production of nickel required to achieve decarbonisation on a global scale. To meet the increasing demand for nickel, NiW will require a guaranteed, continual source of power generation. Firming generation is therefore required to augment TransAlta's renewable power sources under construction on the off-grid SCEN network, including two solar PV farms and a battery energy storage system, and to provide a reliable power system for the further introduction of other renewable energy generation sources.

Whilst this Proposal exceeds the EPA's threshold for assessment of 100,000 $tCO_{2\text{-}e}$ per year of GHG emissions, these emissions need to be considered within the context of the overall reduction in greenhouse emissions that will result from the displacement of TransAlta legacy greenhouse-gas intensive thermal generation assets. Installation of the Proposal, in combination with the addition of the Northern Goldfields Solar Project in 2023, will assist in meeting NiW's new loads while also reducing GHG emissions.

Emission reductions post 2028 associated with the Proposal will be subject to baseline decline rates prescribed in the NGER (Safeguard Mechanism) Rule 2015 (s32). The NGER Act and Safeguard Mechanism now provide a contemporary, robust, transparent and enforceable legislative regime to deliver GHG emissions reductions commensurate to Australia's international obligations and when applied to the proposal, will meet the EPA's greenhouse gas emission reduction objective. The Safeguard Mechanism will therefore be the most appropriate legislative framework to drive the substantial emissions reductions expected by the EPA through the implementation of the supporting GHGMP.

When compared to the modelled emissions from the use of TransAlta's legacy diesel and gas generation to meet NiW's existing and new loads in 2028, the use of new gas reciprocating engines as an alternative result a reduction in emissions by 2032, from 165,136 tCO2-e to 97,644 tCO2-e per year, and achieving Net Zero by 2050. This reduction is achieved while at the same time providing a substantial amount of additional power to enable the expansion of operations at NMK. Together with the Proposal, the addition of renewable energy generation reduction to meet Safeguard Mechanism targets reductions against 2023 emissions from the SCEN, are forecast to be 206,955 tCO2-e per year (34%) in 2030, and 186,259 tCO2-e per year (41%) by 2032.

Given this overall reduction in the GHG emissions on the SCEN network, TransAlta has confidence that its Proposal meets the objective of the EPA's Greenhouse Gas Emissions factor, '*to reduce net greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change'* (Environmental Protection Authority 2020). TransAlta is of the view that the Proposal can be regulated under Part IV of the EP Act and greenhouse gas emissions can be effectively managed with the implementation of the Greenhouse Gas Management Plan.

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