



Tivan Limited Submission
to the Senate Environment
and Communications References
Committee *Inquiry into the
Middle Arm Industrial Precinct*

31 October 2023

Tivan Limited (“Tivan” or “the Company”) welcomes the opportunity to address the Senate Environment and Communications References Committee *Inquiry into the Middle Arm Industrial Precinct*. For ease of reference, our submission refers to the Middle Arm Sustainable Development Precinct (“MASDP”).

Tivan’s submission addresses the following terms of reference:

- (a) the development of Darwin’s Middle Arm Industrial Precinct, the role and funding intentions of the Northern Territory and Commonwealth governments;
- (b) the likely and intended future uses of the site as well as the industries and supply chains that would benefit from those plans;
- (c) any climate, environmental, health or cultural heritage impacts as a result of developing the harbour and the industries seeking to establish themselves at Middle Arm;
- (d) the conduct, process and implications of the proposed strategic environmental assessment for Middle Arm;
- (e) engagement and advocacy by industries and their representatives throughout the Middle Arm proposal, including with First Nations groups and communities, and adherence to the principles of free, prior and informed consent; and
- (f) any other related matters.

Tivan is pleased to provide further information to the Inquiry if requested.

Background

Tivan is an ASX listed (ASX: TVN) critical minerals company, headquartered in Darwin.

Our mission is to facilitate the energy transition through the development of large-scale, onshore, renewable value chains focused on the deployment of Vanadium Redox Flow Batteries (“VRFB”) for long duration energy storage. Tivan adheres to circular economy principles (see Figure 1), and is strongly aligned with Federal Government’s objectives in the Critical Minerals Strategy¹, to:

- > create diverse, resilient and sustainable supply chains through strong and secure international partnerships;
- > build sovereign capability in critical minerals processing;
- > use our critical minerals to help Australia become a renewable energy superpower; and
- > extract more value from our resources onshore, which creates jobs and economic opportunities, including for regional and First Nations communities.

Tivan owns two large vanadiferous titanomagnetite (“VTM”) deposits in Australia: the Speewah Vanadium-Titanium-Iron Project (“Speewah”) located 110km southwest of Kununurra in Western Australia, and the Mount Peake Vanadium-Titanium-Iron Project (“Mount Peake”) located 230km north of Alice Springs in the Northern Territory, Australia.

Tivan’s flagship project is Speewah. Speewah is the largest, highest grade vanadium resource in the world, and provides Tivan with a durable competitive advantage through project development milestones, and onward to operations. The Project comprises mining, beneficiation and processing operations integrated at the Speewah mine site. Tivan views a conventional ‘Salt Roast’ pathway as the optimal approach to commence commercialisation of Speewah, and to achieve Australia’s first sustainable production of vanadium.

¹ For Tivan Limited’s submission to the Critical Minerals Strategy published in February 2023 please refer to: <https://tivan.com.au/wp-content/uploads/2023/06/Submission-Documents-5-FA-2.pdf>



The Company's longer-term technology pathway for the development of its VTM projects is through an evolved mineral processing technology referred to as TIVAN+. This critical technology has been developed by Tivan and CSIRO over the past decade, and aims to facilitate three revenue streams from VTM resources: titanium, vanadium and iron. Tivan and CSIRO are working in close collaboration to advance TIVAN+ as a sovereign capability for Australia, including through the development of a large-scale Pilot Plant.

Tivan has reached agreement with the Northern Territory ("NT") Government to locate its first industrial scale TIVAN+ Processing Facility ("TPF") at MASDP. In support, Tivan is engaged with local stakeholders on an ongoing basis, and with local regulatory bodies including the NT Environmental Protection Authority and the Department of Environment, Parks and Water Security. Tivan remains deeply engaged in project facilitation processes at MASDP with multiple agencies of the NT Government including Investment Territory, Infrastructure NT, Department of Industry, Tourism and Trade, the Department of Infrastructure, Planning and Logistics and Land Development Corporation. Alternative sites for the TPF remain under consideration.

In October 2023, Tivan agreed a Letter of Intent with Larrakia Energy, a majority owned joint venture of Larrakia Development Corporation ("LDC") at MASDP². LDC is an Aboriginal organisation representing the Larrakia people, the Traditional Owners of the lands and waters in and surrounding Darwin. The Agreement provides for the supply of up to 30 MW of renewable energy from 2026, in support of Tivan developing a large-scale Vanadium Electrolyte Facility at MASDP. This landmark agreement is a major step forward in developing the renewable value chain for long duration energy storage across northern Australia.

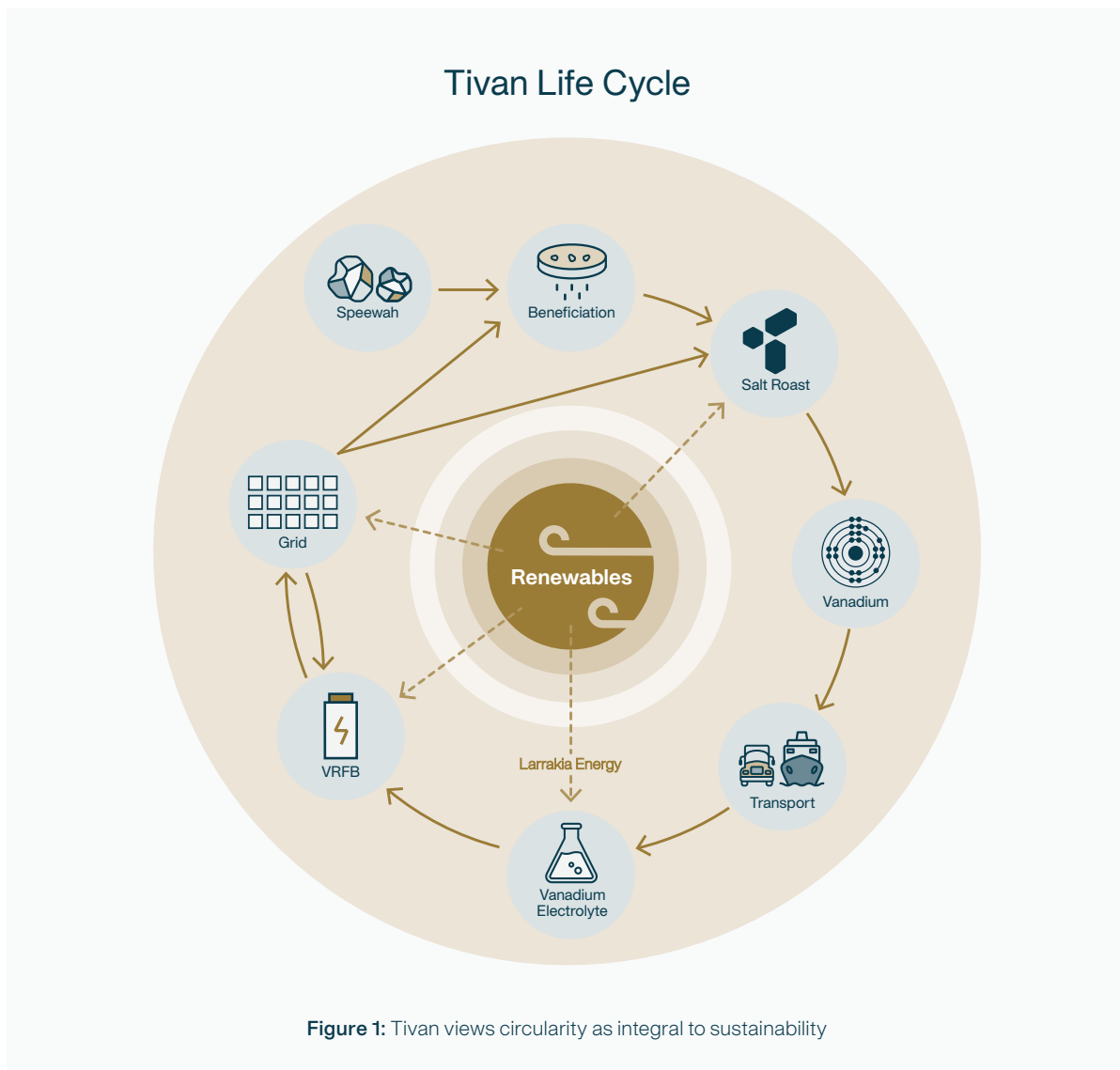


Figure 1: Tivan views circularity as integral to sustainability

² See ASX announcement of 30 October 2023:



Terms of Reference

(a) the development of Darwin's Middle Arm Industrial Precinct, the role and funding intentions of the Northern Territory and Commonwealth governments;

Tivan is strongly supportive of MASDP, including the Federal government's planned \$1.5bn equity investment. This reflects:

- > The strategic importance of MASDP to northern Australia as an industrial zone with distinct comparative advantages, including proximity to:
 - > existing infrastructure
 - > an urbanised workforce
 - > product markets in Asia
- > Sophisticated master planning, allowing for the benefits of common use infrastructure to be maximised, and for environmental impacts to be minimised, inclusive of air emissions and waste management
- > The strong governance regime proposed by the NT Government, including through the Strategic Environment Assessment pathway, providing regulatory clarity in support of private sector investment
- > The strong capabilities of existing businesses and proponents at the Precinct, providing scope for commercial synergies to be achieved and for principles of circularity to be advanced - a single colocated industrial precinct is more likely to bring the economies of scale required to deliver faster pathways for all proponents and utility providers to commercial viability
- > The fiscal constraints faced by the NT Government, with the lowest ratio of own-sourced revenue of any State or Territory in Australia, providing a strong justification for Federal government involvement
- > The opportunity that MASDP has to create employment and business opportunities that are forward-facing and integrated with community and generational expectations
- > The opportunity that MASDP has to diversify the NT economy away from its significant dependency on the hydrocarbon industry
- > The opportunity that MASDP has to advance the energy transition by facilitating large-scale common use renewable infrastructure and technologies, in support of the Northern Territory's zero emissions target

(b) the likely and intended future uses of the site as well as the industries and supply chains that would benefit from those plans;

Tivan's development plans at MASDP include:

- (a) Vanadium Electrolyte Facility, the largest outside of China, provisionally scoped at 500 MWh/year of production (2026 onward)
- (b) TIVAN+ Processing Facility, to process magnetite concentrate from Speewah for the production of three commercial grade commodities: titanium, vanadium and iron (2029 onward)

In parallel, and to support project facilitation, Tivan is planning to construct a large-scale Pilot Plant for the TIVAN+ technology in collaboration with CSIRO, provisionally located at East Arm in Darwin.

Tivan's developments at MASDP are each to be powered by renewable energy, with respective offtakes in place with Larrakia Energy (up to 30 MW) and Sun Cable (200-300 MW)³.

The development of Tivan's large-scale Vanadium Electrolyte Facility is a critical step toward establishing a renewable energy value chain at MASDP. A secure, cost-effective and sustainable supply of vanadium electrolyte is a necessary intermediate staging point in facilitating the large-scale deployment of VRFB.

VRFB are widely viewed as a preferred technology for long duration energy storage. The advantages of VRFB include:

- > Longevity: extended lifespan of greater than 25 years, with minimal performance degradation
- > Cycle: capability for greater than 20,000 cycles
- > Discharge: capability for full discharge without shortening battery life
- > Duration: long duration optimised up to 12 hours of energy storage and power output
- > Cost-competitive: lower maintenance and long life provides for lower levelised cost of renewable energy storage

³ See ASX announcement of 5 April 2023: <https://tivan.com.au/wp-content/uploads/2023/06/61144246.pdf>

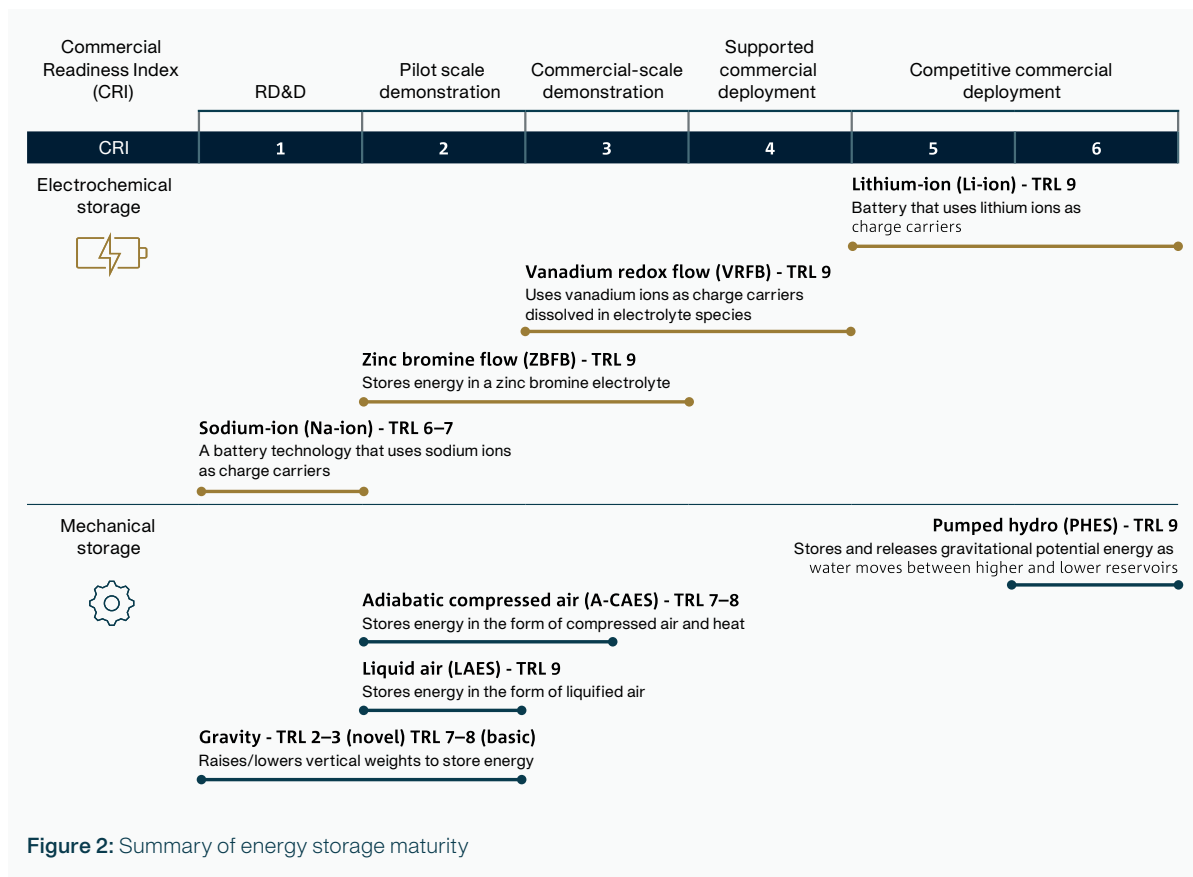


- > Safety: use of aqueous electrolyte removes susceptibility of thermal runaway events
- > Recyclability: vanadium electrolyte can be reused and recycled indefinitely

VRFB are elemental, using only vanadium oxides as a feedstock, thereby avoid the complex chemistries in short duration lithium-ion batteries. This characteristic provides an opportunity for the entire renewable energy value chain to be developed in Australia, reducing sovereign dependency in the rollout of critical national infrastructure.

VRFB are a mature technology that are widely deployed on a commercial basis (over 200 installations globally). The largest VRFB value chain is in China, established by Dailan Rongke Power Co Ltd. CSIRO’s Renewable Energy Storage Roadmap, published in March 2023⁴, highlights the advanced commercial readiness of VRFB.

The principal inventor of VRFB is Professor Maria Skyllas-Kazacos from the School of Chemical Sciences and Engineering at the University of New South Wales. Professor Skyllas-Kazacos is a member of Tivan’s Technical Advisory Group.



Tivan has evaluated alternative locations for its first Vanadium Electrolyte Facility. The following factors are in favour of MASDP:

- > Scaleable local demand for long duration energy storage, with multiple industrial users forming a demand hub
- > Structure of the Northern Territory’s electricity market (ie, independent of the National Energy Market) providing an opportunity for grid integration
- > Short supply chain for vanadium oxides from Speewah
- > Proximity to multiple large-scale solar projects
- > Opportunity to advance circularity principles within the Precinct, including through retrofitting of renewable technologies to existing facilities in support of emissions reduction targets
- > Advanced master planning of the Precinct, inclusive of environmental assessments
- > Capability for deployment of VRFB to remote micro-grid locations across northern Australia
- > Alignment with Federal Government objectives of sovereign capability and downstream supply chain
- > Federal Government equity investment to support common use infrastructure

⁴ Available at: <https://www.csiro.au/en/work-with-us/services/consultancy-strategic-advice-services/csiro-futures/energy-and-resources/renewable-energy-storage-roadmap>



The phased in capacity of Tivan's proposed Vanadium Electrolyte Facility reflects:

- > Expected demand profile for long duration energy storage at MASDP and regional locations
- > Baseline projected vanadium oxide production from the Speewah Project
- > Global peer analysis of vanadium electrolyte facilities
- > Technical considerations, including operating ranges for the state of charge of VRFB
- > Infrastructure requirements and related logistical considerations

Tivan's TPF is planned at a later development phase. While it is a potential supply of vanadium oxides within MASDP, its production will also target export markets in Asia.

Tivan views the development of a local renewable value chain at MASDP as the precursor for the emergence of large-scale green industries across northern Australia, such as minerals processing, hydrogen, data centres and agriculture. These industries require the provision of dispatchable renewable energy at a globally competitive price. This is achievable given the competitive advantage of the Northern Territory's vast solar resource and the development of long duration energy storage via VRFB as a technologically superior sovereign capability.

(c) any climate, environmental, health or cultural heritage impacts as a result of developing the harbour and the industries seeking to establish themselves at Middle Arm;

Tivan's development plans have been designed to minimise impact on Darwin Harbour and to maximise the use of existing marine and terrestrial infrastructure. In February 2023 Tivan secured a "Do Not Deal" commitment with the NT Government in respect of the Southern Lode of Section 1817, Hundred Ayers in the MASDP, also referred to as Wirraway Estate⁵. This is a landlocked allotment of ~150 hectares, as shown in Figure 3.

Tivan's planned Vanadium Electrolyte Facility has a relatively small footprint of less than 10 hectares and does not require access to produce wharves. Environmental impacts are modest.

The TPF is a larger industrial facility with significantly greater infrastructure requirements, including power, water and waste management. Tivan has proposed the use of the existing deepwater port at East Arm for shipping, supported by a rail shunt to MASDP and rail spur adjoining Wirraway Estate to the south of the Elizabeth River Bridge. The environmental impacts of this Facility are more significant, given its scale and complexity, and include impacts on air and water.

Discussions with the NT Environmental Protection Agency over the past year have focused on information sharing and identification of key risk factors, as well as on the appropriate regulatory pathways for environmental approval at MASDP. This includes the potential for the TPF to be included within the scope of the Strategic Environmental Assessment ("SEA") of the MASDP. These discussions are ongoing and may result in Tivan joining the SEA at the Supplemental phase.

Tivan has also engaged EcOz, a Darwin based environment consultancy firm, to support the planning processes for its TIVAN+ Pilot Plant and the TPF at MASDP.

In the management of impacts, Tivan supports a hierarchy of control to first "avoid", second "mitigate", and last "offset". Our planning with NT Government for the proposed TIVAN+ Processing Facility to use existing marine infrastructure at the Port of Darwin at East Arm is a primary example of this framework.

As regards to cultural heritage, Tivan holds an Authority Certificate issued by the then Aboriginal Areas Protection Authority in 2019 in respect of the Southern and Northern Lodes of Wirraway Estate. This relates to development plans of previous management involving Mount Peake.

Tivan recognises the unique cultural significance of Darwin Harbour to the local community and to its traditional owners, the Larrakia. Tivan is committed to development pathways that maximise common use infrastructure, minimise environmental impacts and support the energy transition, while delivering local social, cultural and economic benefits.

⁵ See ASX announcement of 14 February 2023: <https://tivan.com.au/wp-content/uploads/2023/06/61136306.pdf>



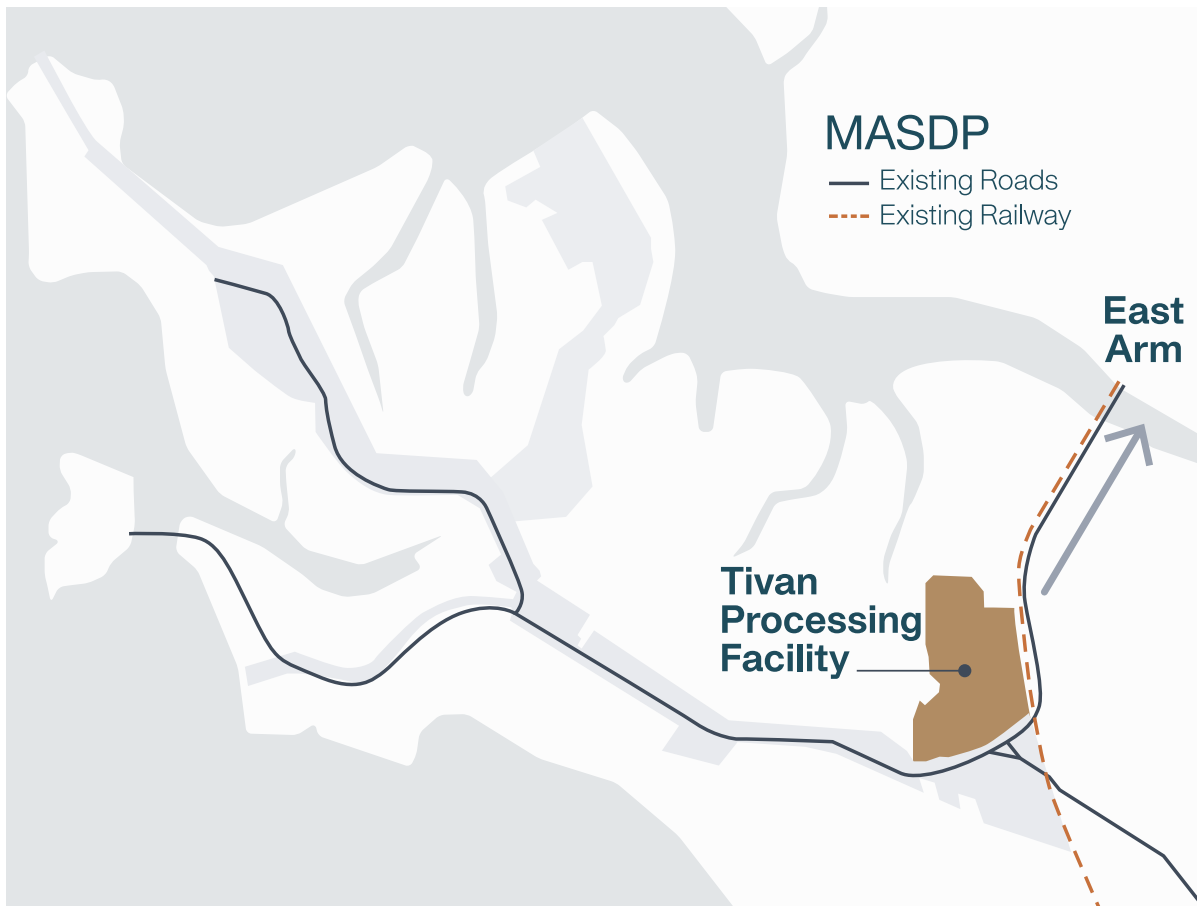


Figure 3: The Tivan Processing Facility is planned at Southern Lode, Wirraway Estate

(d) the conduct, process and implications of the proposed strategic environmental assessment for Middle Arm;

The SEA is a framework under the Environment Protection Act 2019 (NT) to facilitate environmental protection and planning outcomes for proponents in a common precinct accounting for their impacts on a cumulative basis. Impacts of the MASDP on matters of national environmental significance will also be assessed by a strategic assessment under Part 10 of the Environment Protection and Biodiversity Conservation Act 1999 (Cth), under a Strategic Assessment Agreement between relevant Ministers of the Territory and the Commonwealth.

As noted above, Tivan relocated its plans for the TPF to MASDP in February 2023. As such, Tivan is not formally part of the SEA. Tivan has nonetheless contributed to master planning with the NT Government throughout 2023, including regularly scheduled meetings with the Department of Infrastructure, Planning and Logistics, to identify any and all impacts that may not align with the Sustainable Outcomes framework or the limits likely to be conditioned under the SEA. Identification and mitigation of impacts early in the design phase results in the preferred outcomes for all parties and the ability for Tivan to be formally incorporated into the SEA at an appropriate time in the future.

Through these interactions, Tivan understands the SEA to be a highly rigorous and well-advanced process. The level of planning and assessment is expected to provide the local community with a transparent and robust process in progressing the required environmental approvals for MASDP.



(e) engagement and advocacy by industries and their representatives throughout the Middle Arm proposal, including with First Nations groups and communities adherence to the principles of free, prior and informed consent; and

Tivan relocated its corporate headquarters to Darwin in April, to “further differentiate our corporate profile and value propositions, as we continue to deepen relationships with key stakeholders, including in community, government and First Nations⁶. Tivan’s approach to community engagement is holistic, inclusive and on the ground. It is supported by policies of forthright and timely communications, and a commitment to transparency principles, as part of good governance.

Tivan is committed to progressive and differentiated principles in respect of Traditional Owners, that extend beyond the prevailing norm of Free, Prior and Informed Consent (“FPIC”). Our framework emphasises principles of inclusion and participation, inclusive of risk-sharing, thereby fostering an environment where a durable alignment of interests may be achieved (see Figure 4).

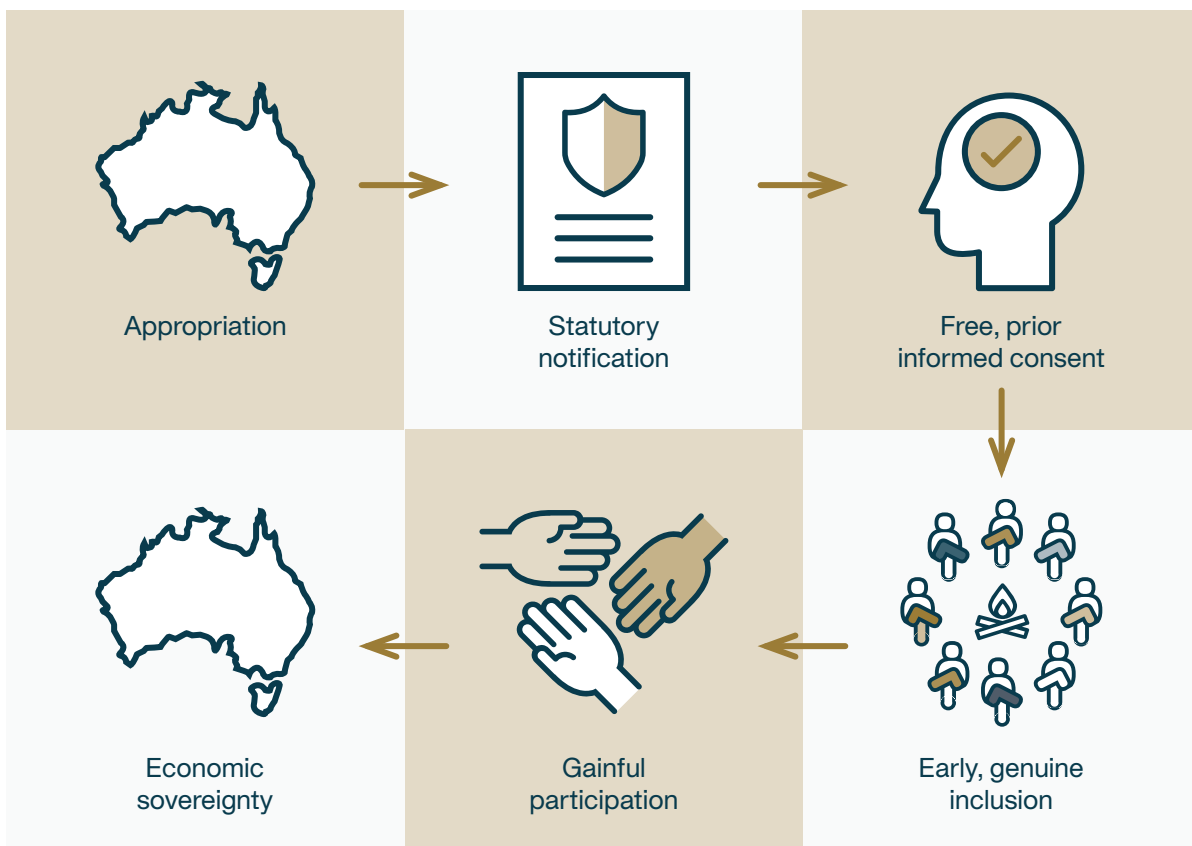


Figure 4: Tivan's framework in respect of Traditional Owners

Tivan highlighted the distinction between FPIC and Inclusion in its submission to the Critical Minerals Strategy in February, as follows:

From consent to inclusion

The application of FPIC concepts are largely focussed on processes related to land access, mandated activities, compliance with regulation, agreements and approvals. These processes can be an experience of passive receipt of information in a situation of unbalanced power dynamics and unbalanced financial resources.

Inclusion is a broader concept which acknowledges the importance of involving First Nations peoples across the life of mine, from exploration to development to operations and closure. Inclusion is attendant to social impact, and to delivering more sustainable outcomes for companies and communities. Inclusion implies 'making room' and has a wider reach than concepts like engagement and consultation with First Nations people.

⁶ See ASX announcement of 20 April 2023: <https://tivan.com.au/wp-content/uploads/2023/06/61146019.pdf>



First Nations inclusion centres around:

- > *how we improve settings to make equal room for the ‘other’ through sense of place, partnerships, impacts, ideas, innovation and influence;*
- > *building and fostering trusting relationships between First Nations people and non-Indigenous peoples;*
- > *creating a respectful environment to explore, learn, and communicate with a community that has been underrepresented for a long time in history; and*
- > *educating future generations about truth and reconciliation.*

As the critical minerals sector takes shape it is crucial that it heeds the past failures of the resource sector and strives for the holistic inclusion of First Nations peoples and communities at all stages of development.

Tivan’s approach with Traditional Owners is firmwide, extending to its strategic interests in the East Kimberley and its exploration portfolio in central Australia.

The landmark agreement reached between Tivan and Larrakia at MASDP reflects these principles and a shared vision of the renewable energy transition across northern Australia. The following comments were made at the time:

Comment from Chair of Larrakia Development Corporation and Larrakia Energy

Mr Mark Motlop commented:

“Larrakia have cared for and protected our traditional lands, waters and skies since time immemorial. As development on Larrakia Country continues to expand, the Larrakia Development Corporation’s vision is to harness the power of renewables to lessen that impact and ensure Country continues to be protected.

Along with our joint venture partners in Larrakia Energy we look to a future that offers Larrakia and the people of the Northern Territory opportunities for employment, business creation and a landscape that continues to provide us all with our unique Territory lifestyle”.

Comment from Executive Chairman of Tivan

Mr Grant Wilson commented:

“On behalf of the Board, I extend my thanks to Larrakia for this opportunity to work together, furthering Tivan’s aim of developing a full cycle renewable value chain in Australia. Our agreement is based on a shared vision of harnessing the power of renewables, and grounded by a shared respect of country, culture and community.

Our agreement supports the prioritisation of renewable infrastructure at the Middle Arm Sustainable Development Precinct, thereby lessening impact and providing a sustainable development pathway for all concerned. Tivan looks forward to continuing to play a constructive role in supporting planning and development at the Precinct.

This partnership underscores Tivan’s commitment to meet community expectations in all our proposed activities. We are advancing the renewable value chain for long duration energy storage in rapid time, including with local and global counterparts. Today’s announcement will add further momentum to these initiatives, and provide an opportunity for MASDP to emerge at the global forefront of renewable technologies and the energy transition.

Our agreement also reflects Tivan’s ongoing commitment to building genuine, inclusive and participatory relationships with Traditional Owners throughout Australia. Through the durable alignment of interests much can and will be achieved. We will tread gently on Larrakia Country, in the spirit of partnership, and always with deep respect”.



(f) any other related matters.

Tivan is pleased to be a major proponent at MASDP and excited by the prospects for the Precinct in transforming northern Australia in the following ways:

- > Supporting the energy transition locally enroute to legislated Net Zero targets
- > Supporting the development of forward-facing export industries
- > Supporting local employment opportunities and business creation
- > Supporting the inclusion and gainful participation of Traditional Owners

Tivan views the Federal Government's planned equity investment as a vital facilitatory source of funding for the Precinct. Tivan supports the funds being used for common use infrastructure that is fit for purpose and that supports timely pathways and coordinated sequencing for project delivery. To this end, Tivan recently submitted infrastructure requirements and updated project development timelines to the NT Government to assist in planning and development of the Precinct.

Tivan views the optimal development pathway for MASDP as prioritising common use terrestrial works, including the development of the local transmission and grid network, in conjunction with required marine infrastructure. This pathway will pull forward private sector investment and assist the Precinct in earning and maintaining a social licence with the local community in Darwin, whilst delivering social, cultural and economic benefits.

It follows that Tivan supports a reprioritisation of the planned Federal equity investment in favour of scopes of work for common use terrestrial infrastructure to support the optimal development pathway at MASDP and thereby the energy transition.





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a critical minerals company

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