

# ASX ANNOUNCEMENT



ANDROMEDA METALS LTD (Andromeda, ASX: ADN)

10 November 2021

## DEFINITIVE FEASIBILITY STUDY UPDATE

### Summary

- Good progress has been made on the Definitive Feasibility Study (DFS) incorporating the high value Great White CRM™ and Great White PRM™ products.
- Significant optimisation work and scenario analysis is being conducted to unlock maximum shareholder value at Great White, including analysis of the optimal CRM™ and PRM™ product mix along with the potential incorporation of low start-up cost DSO prior to construction of a wet processing plant.
- Compared to the PFS, the inclusion of the new higher value PRM™ product in addition to the CRM™ product has required material changes to the mine plan, processing plant and logistics but creates a diversified, de-risked project with more avenues to market.
- The Mining Lease Application approval process is continuing with a response from the regulators anticipated later this year.
- The proposed Minotaur transaction and resultant consolidation of Great White ownership provides enhanced development optionality, which will be considered in the DFS, but will also impact timing of release.
- Pleasing progress continues to be made across Andromeda's other initiatives with studies underway on other higher value products including HPA, concrete and cosmetics.
- In order to optimise the multi-product DFS, further time is required to incorporate all of the advantages of 100% ownership and complete further scenario and optimisation analysis on product mix to ideally balance NPV, funding and risk.
- DFS release deferred to calendar Q1 2022.

**Andromeda Metals Limited**  
ABN: 75 061 503 375

#### Corporate details:

ASX Code: ADN  
Cash (30 Sept 2021): \$46.17m  
Issued Capital:  
2,461,552,046 ordinary shares  
85,495,000 unlisted options  
23,139,475 performance rights

#### Directors:

**Rhod Grivas**  
Non-Executive Chair  
**James Marsh**  
Managing Director  
**Joe Ranford**  
Operations Director  
**Andrew Shearer**  
Non-Executive Director  
**Melissa Holzberger**  
Non-Executive Director

#### Company Secretary:

**Andrea Betti**

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## Executive Summary

Andromeda Metals Limited (ASX: ADN, **Andromeda** or the **Company**) is pleased to provide an update on the progress the Company has made on the Great White Kaolin Project (**Great White**) DFS, the impact of the recently announced proposed transaction with its Great White joint venture partner, Minotaur Exploration Limited (**Minotaur**) and potential Great White ownership consolidation (10 November 2021 ASX announcement "Andromeda and Minotaur to Combine Creating a Leading Australian Industrial Minerals and Technology Company"), the optimisation work and scenario analysis currently being undertaken as part of the DFS, the DFS timetable and some of Andromeda's other higher value initiatives outside of Great White.

### DFS Update

Andromeda has undertaken significant work on the DFS and has made considerable progress since securing its major paints and coatings product (PRM™) offtake agreement in June 2021, as well as its previously announced premium ceramic product (CRM™) offtake agreement in March 2021.

Andromeda's offtake agreement with Jiangsu Mineral Sources International Trading Co. Ltd (**MSI**) has provided the Company with the opportunity to produce and sell a higher value PRM™ product in addition to CRM™. This diversified product mix has required some fundamental changes to the single product Pre-Feasibility Study (**PFS**) released in June 2020. In order to facilitate the production of both CRM™ and PRM™, significant changes have been made to the mine plan, processing plant and transport logistics. As such, the DFS is not a simple update nor capable of simple comparatives to the PFS, but rather a new bottom-up study which has required and continues to require significant work and analysis to understand the optimal development pathway and product mix.

As foreshadowed in Andromeda's 21 June 2021 "Diversified Product Strategy for Great White Kaolin Project" announcement, one key consequence of incorporating the flexibility to produce the higher value PRM™ product in addition to CRM™ product, is increased upfront capital expenditure to account for a multi-product processing plant. Whilst this change increases the upfront expenditure requirement, the overall project economics may benefit from several factors including:

- Stronger early cash flow from the incorporation of a second and higher value refined product (PRM™);
- A multi-phased processing plant development approach, reducing the upfront capital expenditure burden and associated funding requirement. Second phase growth is expected to be supported by project cash flow;
- A processing plant optimised to produce a diversity of products for different applications, currently being studied by the Company;
- Full control over product production quality to ensure consistent premium grades
- The potential early inclusion of a lower capital expenditure Direct Shipping Ore (**DSO**) production component. Andromeda has made considerable progress with potential DSO offtake partners over the last three months and the inclusion of DSO would provide solid early cash flow, which could be deployed to fund the capital cost of the process plant; and
- Potentially more attractive finance terms (if debt finance is required) due to the existence of binding offtake agreements and lower project risk due to the diversified product base.

Andromeda is continuing to work through various development scenarios, the optimal product mix balance, the timing of any DSO inclusion, further offtake opportunities and the optimisation of costs to balance risk, funding, Investment Rate of Return (IRR) and Net Present Value (NPV).

## Combination with Minotaur

The announced potential acquisition of Minotaur, (10 November 2021 ASX announcement "Andromeda and Minotaur to Combine Creating a Leading Australian Industrial Minerals and Technology Company") and resultant consolidated and simplified ownership structure of Great White, has potential to provide Andromeda with full Great White development optionality and greater project funding alternatives.

Consolidating the ownership of Great White (and Natural Nanotech) provides Andromeda with the optionality to explore a number of different project development scenarios not previously considered in the PFS or existing DFS.

With Andromeda and Minotaur now having jointly announced an unanimously recommended transaction, the Andromeda team is now focused on understanding which potential development scenarios unlock the greatest value for Andromeda (and accepting Minotaur) shareholders. To fully understand, optimise and incorporate these scenarios into the DFS, further time is required.

## Other Initiatives

In addition to the considerable progress made on the DFS and the announced proposed acquisition of Minotaur, Andromeda has continued to pursue some of its other initiatives.

Currently, additional studies are underway on other higher value products including High Purity Alumina (**HPA**), concrete (both rheology modifiers (**HRM**) and supplementary cementitious material (**SCM**) and cosmetics. Whilst it was not Andromeda's intention to incorporate these products into the DFS due to their early-stage nature, the studies are progressing well, and the extended DFS completion date may allow incorporation of one or more of these.

## DFS Timetable

Andromeda has made the decision to delay the release of the DFS to calendar Q1 2022 to incorporate the following:

- The bottom-up work required for a multi-product (CRM™ plus PRM™) development;
- Further analysis of the benefits of DSO incorporation;
- Further analysis on the optimal product mix;
- The value versus risk trade-off; and
- The optionality that comes with 100% ownership of Great White.

In deciding to delay the release of the DFS, Andromeda had to balance the drawbacks of a timetable delay with the benefits of ownership consolidation, further project value optimisation and the inclusion of other opportunities, all factors capable of unlocking significant value for Andromeda (and Minotaur) shareholders.

## DFS Progress Summary

**Approvals** - Following public consultation on the Mining Lease Application, the Company provided a formal response to all comments raised on 15<sup>th</sup> July 2021 to the regulator, South Australia's Department for Energy and Mining (**DEM**). DEM is currently assessing the Application. As the Company feels the public comments were in line with standard community questions, it sees the assessment as routine and maintains correspondence with DEM on progress. The previously advised timeline was for a decision on the Mining Lease Application to be received from DEM in late 2021. The next stage will be following DEM providing the Mining Lease Conditions, the Company can complete the second stage of the approvals and submit the Program for Environmental Protection and Rehabilitation (**PEPR**). Land access negotiations are at an advanced stage following several recent meetings between the company and landowners.

**Metallurgical understanding** – Significant work has been undertaken to concentrate and refine the Great White kaolin to produce the PRM™ product. Laboratory test work confirming refining and recoveries of the Great White kaolin have been very successful. Recommissioning and upgrading the pilot plant to replicate the proposed flow chart has occurred and batches of refined PRM™ have been supplied to our off-take partners.

**Geological update** – Additional exploration work has supported Andromeda's confidence in the high quality of the Great White Deposit. The findings of the metallurgical investigations have been used to update the block model to include additional fields to target the PRM™ feed.

**Mining** – Using the updated geological model, the mine plan has been reviewed and is being rescheduled to accommodate the new product mix for PRM™, CRM™ and DSO options. To target the PRM™ feed, the starter pit location has been moved to the North in an area called the Dorsal fin.

**Infrastructure** – To incorporate the PRM™ product, in addition to the CRM™ product, certain site facilities required a redesign, specifically the processing plant. The new flow sheet provides for production of the PRM™ and CRM™ concurrently with a focus on quality and recovery. Ancillary infrastructure, offices, sheds, water treatment and fuel storage designs are currently being finalised to DFS standard.

**Processing** - Several scenarios for mine production and processing have been considered to provide the best project balance. Understanding the refining and recovery resulted in a larger phase 1 plant size of 300,000tpa which provides for the optimised production of products at the specification required to fulfil the current customer offtakes.

**DSO** - A parallel study is being undertaken to establish the economics of DSO (direct shipping ore) mining, logistics and timing. DSO provides for an opportunity to bring cashflows forward into the project at an earlier stage, which could then be deployed to the capital cost of the processing plant.

**Funding** - Engagement with debt financiers is continuing, whilst recognising the project requirement for finance could be significantly diminished through the inclusion of DSO.

Further details of the progress on the DFS are set out in the following section.

## DFS Progress

The Andromeda team is dedicated to delivering a robust DFS while the Company continues its progression on the journey from explorer to developer and ultimately to operator/producer.

The team has invested significant time building on existing customer contacts while developing new relationships in accordance with the developing sales strategy for Great White production. With the majority of prospective customers based offshore, COVID has presented challenges, but with international travel and business returning to normal we are looking to accelerate the development of our sales channels.

As part of Andromeda's strategy to expand our reputation for quality kaolin products both geographically and functionally, we have produced and delivered representative samples of all products under consideration to both local and international laboratories and customers for testing on quality and application. This process has also been impacted in the COVID environment, but we are now seeing most testing facilities reopening which is allowing this process to continue appropriately to approach a conclusion with most counterparties.

The extensive work undertaken to understanding the Mineral Resource, refining, recovery, and product specification is vital in the nuanced product categories in which Andromeda operates, and the team is confident that Great White is now positioned to produce high quality products as required by customers to be supplied into the markets identified. We also believe we are well positioned to generate and satisfy new markets to further unlock the value in the Great White Mineral Resource.

As we progress through the different stages, we are continuing to monitor macro financial risks, approval risks, the community relations and social license to operate risks, the economic downturn/uncertainty/inflationary risks, access to capital risks, including liquidity, controlling operating and capital costs, environmental risks, and the access to key talent risks.

### 1 Offtake Contracts:

In June of this year, Andromeda announced that it had signed a substantial legally binding offtake agreement with MSI for sales of 70,000tpa +/- 10% of 'Great White PRM™' (refined ultra-bright high-purity kaolin) product for an initial term of 5 years at a price fixed for the first 3 years (*refer ADN ASX announcement dated 10 June 2021 titled "Significant Binding Offtake Agreement Signed for Great White Kaolin Project"*). The Great White PRM™ is a premium grade which will be manufactured for applications in the coatings and polymers markets. 'Great White PRM™' will be separate to 'Great White CRM™' which will be halloysite-kaolin produced to meet the requirements of high-end ceramic manufacturers. A 5,000tpa legally binding offtake agreement was previously signed with a Japanese porcelain producer (*refer ADN ASX announcement dated 17 March 2021 titled "First Customer Binding Offtake Signed for Great White Project"*).

The securing of these two substantial binding offtake agreements was a significantly positive development for Great White as it represents approximately two-thirds of Phase 1 production for the initial plant capacity as is being evaluated under the DFS and has the potential to underwrite the business. The diversification of products into PRM™ and CRM™ allows flexibility of sales and production and reduces single-product risk.

MSI is an active trading company, with a well-established network of suppliers and customers across industrial minerals and has indicated that they have longer-term demand for additional quantities of both Great White PRM™ and Great White CRM™, providing added confidence to the Company that demand for Great White refined material from a planned Phase 2 processing

plant currently exists at an attractive selling price. Discussions around the formalisation of additional supply with MSI are continuing.

There is also encouraging interest from several other customers for the Great White CRM™ product within China and elsewhere throughout Asia. Negotiations are in progress for offtake agreements with the intention of having binding contracts for the sale of 100% of forecast Phase 1 production capacity in place (approx. 41,000tpa of CRM™ remaining), with several potential customers in the process of finalising detailed approval testing.

In June 2021, Andromeda announced that the planned focus of Phase 1 of the DFS was to immediately construct the onsite processing plant resulting in initial sales being of refined material with Direct Shipping Ore (**DSO**) being a secondary consideration. Subsequent discussions with potential customers have indicated that market dynamics have changed significantly, which has resulted in significant shortages and therefore demand for DSO products to be refined in China. As a result, work is in progress on refreshing the concept of incorporating DSO, which remains an option to incorporate into the DFS. Several companies have recently been provided samples of DSO from the Bulk Sample program for testing and over 100 tonnes of this have been evaluated by several potential customers with excellent results. Once Company representatives are able to re-enter China, it is anticipated that negotiations around these products can be quickly concluded, and a decision on incorporation into Phase 1 of the DFS can be appropriately made. The mining approvals submitted provide for DSO supply and the option presents an opportunity to generate early cash flows which could substantially reduce capital requirements.

Numerous project scenarios are being evaluated on size, product mix, and timing of each stage. DSO potentially provides significant benefits in that it substantially reduces upfront capex requirements, and its inclusion is being evaluated alongside the option for early production of high-quality refined product. For further detail see Section 10 of this document.

## 2 Approvals

The mining lease application for Great White was lodged with the South Australian Department for Energy and Mining (**DEM**) on 25 February 2021 (refer ADN ASX announcement dated 1 March 2021 titled "*Mining Lease Application Submitted for Great White Kaolin Project*"). The application outlines the proposed development of a shallow open pit mine, wet-processing plant and supporting infrastructure at the Great White Deposit which was in line with the PFS completed in the first half of 2020 (refer ADN ASX announcement dated 1 June 2020 titled "*Pre-Feasibility Study Further Improves Poochera Halloysite-Kaolin Project Economics*").

A statutory public consultation period was open until 29 April 2021. Sixteen (16) public submissions were received with most being very supportive of the proposed project. The submission was assessed to have satisfied the requirements of the terms of reference (**TOR**) as the information required to be addressed in a mining lease application, however further clarification was requested on certain aspects. The Company provided a formal response to all matters raised following the public consultation process on 15<sup>th</sup> July 2021. The Response Document was reviewed by DEM and published online in September 2021. DEM's assessment team are currently evaluating the proposal. It is anticipated that following the completion of the assessment the Mining Lease conditions will be provided by DEM. Once the Mining Lease Conditions are received, work on the program for environmental protection and rehabilitation (**PEPR**) can be completed. Correspondence from DEM is that their assessment is ongoing, and completion is expected before the end of the year with provision of draft lease conditions. Ongoing correspondence does not indicate any red flags. The Company intends to finalise financing and

commence construction of Great White in an expeditious manner following receipt of all required approvals.

### 3 Site Infrastructure

Site infrastructure includes the services required to undertake production of Great White Kaolin. Specifically, the access, water and power required to support an efficient operation. Site facilities including the processing plant, offices, sheds, water treatment and fuel storage are included in the design and layouts being developed by Primero Engineering under Andromeda direction.

#### 3.1 Power

Electrical power is required for the kaolin processing and support the administrative services on site. Significant work has been completed to allow selection of the optimal power source. Both mains connection and site generation options have been investigated, including diesel generators, renewable energy options, and gas turbines. A gas turbine is considered the likely decision to power the base load required by the plant. This choice is underpinned by the efficiency achieved when connected to the kaolin drying equipment. The co-generation solution provides for the high oxygen gas exhaust to be reused in the drying facility which provides a conservative estimate of 60%-80% reduction in gas used for drying. Andromeda sees that this option is a short-term solution and has plans to align the gas requirements with Andromeda's environmental initiatives at a time in the future. The gas turbines can be converted to hydrogen in-line with achieving zero carbon targets. A supplementary solar power system is being considered for ancillary requirements.

#### 3.2 Roads

The proposed upgrade to the local council Poochera - Port Kenny Road has been progressed with a detailed survey and geotechnical sampling. The existing road does not meet the required design specifications for road curvature or crest angles. A redesign has been undertaken by Tonkin Consulting to realign the vertical and horizontal alignment to meet the requisite specifications of the Australian Road Research Board (**ARRB**) Unsealed Roads Manual. This work provides for a substantial increase in the safety standard of the road. Engineering design work for the upgrade was provided to the District Council of Streaky Bay (**DCSB**) and this has now progressed the next stage of detailed design. Andromeda was advised not to immediately seal the Poochera-Port Kenny Road, but to upgrade the existing unsealed road to a safe design and maintain the road in a serviceable condition whilst the road is new and being further compacted by the mine traffic. It is proposed that a maintained unsealed road is a better solution for the early stages of the Project and the Company has committed to funding ongoing maintenance to ensure that it remains in a safe and stable state. Ongoing coordination with DCSB regarding road maintenance programs and any associated road closures which may be required.

An upgraded design for the intersection with the sealed Streaky Bay Road and Poochera – Port Kenny Road have been completed and supplied to the Department for Infrastructure and Transport for review and approval.

The mine access road location was finalised for inclusion in the Mining Lease Proposal and Miscellaneous Purposes Licence applications. The location was chosen in consultation with the landholders and provides to shortest route to port which provides for a lower carbon solution with the reduced transport route contributing to a lower emission level. The access road design has been completed.

A bulk sample of calcrete was taken from the proposed mine site and crushed to determine the aggregate yield and road building suitability with initial results supporting the use of the local material for the road construction.

It was requested by the community that haul trucks be stopped when the school bus runs, and Andromeda has committed to stopping haulage trucks on Poochera – Port Kenny Road during school bus times.

### **3.3 Water**

Water supply solutions have been progressed with SA Water. Water supply is a highly contentious issue across the Eyre Peninsula due to the limitations of the existing infrastructure and supply. The Company has committed to installing the required infrastructure to access water from the regional Tod Reservoir main pipeline. SA Water have confirmed there is sufficient water capacity available in the main, however the reticulation from that point is at full capacity. SA Water and the Company are committed to no adverse impacts to water supply or reduction in pressure to existing users as a result of the Company's water requirement. An engineered design has been completed which includes the connection to the Tod Main supply in Poochera, a new supply pipeline to the Great White Project with a tank and booster pump to maintain existing supply. The proposed water supply includes the installation of an additional supply line to the Poochera-Port Kenny Road intersection. With the supply to the mine, the new line may provide additional water supply capacity for use by existing users from that point. The company continues to work with SA Water on the advancement of an appropriate solution.

## **4 Mining**

The mining aspect of Great White is relatively simple with a shallow pit and soft, predominantly free dig material using a conventional excavator and truck combination. The strip ratio is low with modest mining rates whereby a key objective will be management of in-pit grade and quality control to prevent dilution or contamination. Operational controls are being developed based on the detailed understanding and modelling of the Mineral Resource and refining process.

Significant additional investigation has been undertaken to define optimal feed specification to provide the high-purity, ultra-bright PRM™ feed blend. To ensure best possible operating outcomes, this process also necessitated revision of the mine design and schedule that is now being finalised to support the production of the Great White PRM™ refined product. The high quality of the Great White kaolin Mineral Resource provides for production of PRM™ and other high-end products targeted by Andromeda's marketing team.

With the finalised Great White PRM™ specification the requirements for feed material were reviewed in relation to the geological parameters in the block model. Due to the high quality and brightness of the in-situ Great White kaolin within the Mineral Resource, the Andromeda team has designed a mining plan which allows production of Great White PRM™ feed from within the previously optimised Great White CRM™ life of mine pit design, which allows best possible operating cost conditions by producing both feed materials from one area. A focus on reduced iron and lower halloysite ore resulted in adjusting the location of the starter pit from the south-western area of the deposit to the north (colloquially called the Dorsal area). Once the pit design was finalised and metallurgical recovery for the Great White PRM™ was understood the mine was re-scheduled at 300,000tpa feed blend. The increased mining rate allows co-production of both feed materials and has little impact on the pre-processing or de-sanding requirements and allows for stockpiling, to provide a constant plant feed. The new mining schedule provides a high-purity,



ultra-bright material feed blend, from the Dorsal starter pit. The high-quality feed provides for the significant benefit of parallel production of both refined PRM™ and CRM™ products.

The updated mine plan and production requirements are in line with previous expectations associated with the straight CRM™ feed material, but the new design provides for flexibility in mining and provides confidence in quality control.

## 5 Processing

A key to Andromeda's competitive advantage is its ability to provide market leading products, and additional studies carried out since June have provided confidence in the ability to supply ultra-high quality kaolin refined products. Additional refining and dewatering test work have been completed to establish the process flow sheet and equipment requirements. This work included the blunging and recovery estimates to determine the geological parameters for modelling and support of the mine design. Additional refining and dewatering stages have been included in the plant design to produce the Great White PRM™ as the previous design focussed only on the ceramic Great White CRM™ product and did not contain the flexibility of producing further high-end kaolin products. The new design is planned to provide for a full high-end product mix as required and refining test work carried out in certified laboratories has driven the engineering and process design. In the iterations of combining feed capacity and recovery it was determined that a higher feed rate is better suited to producing the new product mix with a plant size of 300,000tpa being suitable to fulfil the current customer offtakes. It is recognised that the recoveries on a laboratory scale are conservative due to inefficiencies associated with batching and it is expected that once operational, the designed plant will have upside opportunities on production. For Phase 1 the plant is designed to operate at a feed rate of 300,000tpa, with a nominal output of 120,000tpa of refined products (PRM™ plus CRM™) with a further 25,000tpa of concentrated kaolin material outside existing offtake specifications, which could be suitable for other lower-value applications.

The increase in plant size to 300,000tpa in Phase 1 was necessary to allow co-production of both PRM™ and CRM™ products and is a moderate increase in feed rate from the previous 250,000tpa (an additional 140tpd). The optimisation and re-evaluation of the process flow sheet indicated that more refined product could be produced by reducing the straight recovery of PRM™ and making a second product that meets the CRM™ specification. While the individual recovery to PRM™ is less, the combined recovery and therefore, value of the two products, is greater. Within the new processing design there is little impact on the requirements regarding mining or de-sanding equipment in the front end of the plant. Expansion (Phase 2) to full capacity is anticipated with an increased feed rate up to 600,000tpa. The expansion timing for Phase 1 and 2 is currently under review as part of the DFS financial analysis and project de-risking.

Initial logistics discussions with offtake partners MSI contemplated delivery of PRM™ product in 25kg bags. A study was undertaken into the inclusion of a milling and bagging facility to allow for the delivery of PRM™ in this form. Following a logistics review which considered 22 options for combinations of onsite milling and bagging, bulk transport and offsite bagging, road, rail and shipping, an optimal solution for both parties was identified which outlines the provision of a refined noodled product from Great White with MSI offtake partner milling and bagging upon delivery. MSI have agreed in principle to receive the product in this form and discussions are ongoing to appropriately amend the agreement to align with the selected logistics of the Great White CRM™ product which provides both capital benefits and operational flexibility to the project.

## 6 Process Design Engineering

During the period of metallurgical test work for PRM™, Primero Engineering (Primero) has continued with the design for the processing plant to provide costs for the DFS. Prior to the inclusion of PRM™ sales channels, significant progress was made on design of the CRM™ wet processing/refining plant, with an initial design review being undertaken to analyse the design and provide for a fit for purpose plant. Given the specialised nature of the product, the addition of PRM™ required additional engineering processes to finalise the flow sheet as described above. Preliminary capital costings follow completion of flowsheet and layout engineering, and are currently being produced for consideration in the DFS. Primero is completing a draft engineered design and initial budget costs for the PRM™ Phase 1 wet-processing plant, which is being reviewed in parallel by the Company's project team along with Ammjohn (Andromeda's consulting engineers) to provide input for the DFS design. The review includes analysis of equipment suppliers, individual costs, and quantity surveying.

If considered on a like-for-like basis, it is likely that a process plant with the ability to reliably manufacture high quality and high value Great White PRM™ and CRM™ concurrently will require additional capital compared to the PFS process plant which solely produced an unrefined CRM™ concentrate. Part of this is the identification and specification of the components. To enable the plant to be built and commissioned in good time, the list of long lead items is being finalised ready for procurement. This will require some part-payments for those items ahead of construction commencement however, it is not planned to order any capital items prior to attaining the Mining Lease approval from the South Australian Department for Energy and Mining and confirmation of the final phasing of the project.

Once the DFS is completed, the next step will be to progress towards further detailed design and construction. To advance the engineering design to a level sufficient for construction, the Company is looking to engage an early contractor involvement (**ECI**) agreement before leading into an engineering, procurement, construct (**EPC**) agreement. The ECI provides for control over the next stage of detailed engineering and contractor involvement on guaranteeing a higher level of confidence in costing and performance. This approach allows more control over outcome risk and does not increase the design process as the design is required in going directly into an EPC. To execute the project, construction and commissioning in the shortest possible time, inclusion of ECI provides for a higher level of success. With the increase in refining complexity, compared to the proposed sand washing plant of the PFS, it is anticipated that the plant will have a construction time of approximately nine months.

## 7 Direct Shipping Ore

The scenario where DSO is not produced prior to the upfront construction of a wet refining facility requires bringing forward capital expenditure for construction of the plant compared to the DSO/concentrating scenario considered by the PFS. This option provides for improved control over product quality while building Andromeda's Great White kaolin brand and reputation. However, as discussed elsewhere in this release, recent market changes leading to increased demand for DSO have led to a parallel study being undertaken to re-analyse the economics around details of DSO mining, logistics and timing. If selected, production of DSO provides for an opportunity to bring cashflows forward into the Project at an earlier stage, resulting in a reduced requirement for additional development capital.

To provide for all production scenarios, the DSO production option will be included in the PRM™ rerun of the mining schedule and as with the refined product there are several logistics options being considered.

Several companies have been provided with samples of DSO from the Bulk Sample program for testing and over 100 tonnes have been processed at commercial scale with the results confirming the quality of this as a premium feed material.

## 8 Distribution (Logistics/Ports)

Logistics options have been reviewed and a preliminary scope of work issued to suitable transport groups to supply budget pricing. The three ports in the region (Whyalla, Thevenard and Lucky Bay) provide viable solutions. DSO would be shipped in bulk as a loose material as compared to refined products that need to be sealed in bulka bags to protect the quality for shipping as break-bulk in the holds of ships. Access to Port Adelaide was considered for the option to package into 25kg bags when containerisation is required, but this is no longer necessary although it could provide flexibility with shipment size and opens up destination port options for future high value products such as pure halloysite. Thevenard provides the closest (lowest road cost) option for DSO and in addition to the other established port facilities on Eyre Peninsula for the bulka bags, the company is excited about several new proposed port developments which will likely offer attractive opportunities for our projects. Discussions with all the potential ports is well advanced. The proposals are currently being assessed and incorporated into the DFS.

## 9 Funding

Engagement with debt financiers is continuing – building on initial discussions with potential providers (Both commercial Banks and specialist fund providers). Engagement will be maintained with key target financiers ahead of a more formal engagement following completion of the DFS.

A vital component of financing Great White is the extensive due diligence on all aspects of the project. To allow swift advancement of financing options post completion of the DFS, Andromeda has commenced these due diligence workstreams where possible. This includes extensive analysis on operational and financial capabilities of the major binding offtake partners Jiangsu Mineral Sources International Trading and Jiangsu Holly International. This is progressing well and will be used for the Bankable Feasibility Study (BFS) which will follow the DFS. The timing between the BFS and DFS is envisaged to be relatively short due to the significant amount of engagement with potential debt providers undertaken. Independent Technical and Marketing consultants have been engaged to provide information on other aspects of the project which will also be required by prospective lenders and investors.

## 10 Project development options under consideration

### Option 1

The PRM™/CRM™ option has favourable early revenue from high value products, but IRR is likely to be impacted because of higher upfront capex requirement. The underlying characteristics of this option are a higher capital intensity from start-up combined with higher margin product sales.

## Option 2

Option 2 brings in DSO. Several scenarios combining PRM™/CRM™ and DSO are under consideration, with analysis of timing/phasing of the DSO with the plant construction.

The underlying benefit of this option is a lower capital intensity in the initial stages of the project with production and sale of DSO product commencing following site establishment. Early cash flows would then be used to support finance options for the construction of the processing plant.

Work is continuing on determining the optimal development path as we continue to assess the value and risk trade-offs, we will continue to monitor and adjust to market developments prior to making a final decision to optimise shareholder value.

## Concrete

Work is continuing on the potential use of HRM™ (specially selected halloysite-kaolin) as a rheology modifier product for the concrete industry following the patent successfully being lodged by Andromeda for this application and gaining concrete industry certification. Additional testing has further improved results with several significant potential customers expressing interest in purchasing the product as soon as it is available. The HRM™ is consistently outperforming existing commercial solutions and showing the ability to reduce concrete costs, lower carbon footprint and improve performance. A bulk sample is now being processed at the Streaky Bay pilot plant for product approval testing by numerous potential customers including some global concrete companies.

A study is being carried out on the HRM™ opportunity in parallel to the DFS which includes some detailed geological work to assign HRM™ properties to the existing Mineral Resource. This has entailed some very specialised analysis to fully understand the strong effect this HRM™ material is demonstrating. Andromeda believes this product has the potential for significant demand in the construction industry and offers higher value with minimal processing. There is also a significant domestic market for such a product in addition to the global opportunity.

## High Purity Alumina

In May, Andromeda advised that it had signed a Memorandum of Understanding (MoU) with AEM Technologies Inc, part of the Advanced Energy Minerals group (**AEM**) and entered an initial 90-day exclusivity period to explore a HPA licencing transaction that includes testing Andromeda kaolin feed, process feasibility studies and potential licensing and marketing arrangements (refer ADN ASX announcement dated 28 May 2021 titled "Andromeda Signs High Purity Alumina MoU with AEM Technologies Inc"). This was extended in September (refer ADN ASX announcement dated 22 Sep 2021 titled "Andromeda Progresses HPA Strategy Following Positive Testing Results") after results from AEM's HPA pilot test facility in Canada confirmed Great White halloysite-kaolin as a premium grade feed material for the HPA production process.

AEM's Cap Chat HPA Process Plant, located in Quebec Canada, uses its patented process to make 99.99% ("4N") and 99.999% ("5N") pure high purity alumina. With proven technology and extensive patents, Cap Chat is recognised as environmentally friendly with its focus on reducing reagent consumption and transitioning to a near "zero carbon emission" energy consumption plant. The facility is the only one globally that can produce 4/5N HPA from a kaolin feed. Having commissioned the plant in 2020, AEM is now in offtake discussions with potential customers around the world and is currently producing and selling 4N and 5N HPA under the SupALOX™ brand ([www.supalox.com](http://www.supalox.com)).

The MoU was signed with AEM to enable kaolin samples from Andromeda's projects on the Eyre Peninsula to be evaluated using AEM's proven proprietary process to determine its suitability for HPA manufacture, and potentially lead to the construction by Andromeda of a HPA plant under a licencing agreement with AEM, which could also include the marketing of HPA manufactured product by ADN through AEM's global distribution network. AEM are also progressing a UK Government funded study to build an HPA plant in the UK that is scheduled to be completed in March 2022, and this will provide valuable information for any potential Australian plant.

Due diligence work is continuing with three sector leading consultants being engaged and a visit to the AEM Canadian operations by Andromeda has been undertaken last week.

Andromeda is also conducting separate HPA flowsheet studies using three leading metallurgical consultants focussing on the ability to be able to use the uniquely high purity of the halloysite-kaolin along with a novel approach to some aspects of the process. It is planned to incorporate the ability to refine rare earth elements (**REEs**) which occur in high levels within the Great White Resource and surrounding deposits as well as creating a waste product of high-purity silica.

Pleasing progress is being made by Andromeda with regards to its HPA studies, however, the timelines for this new opportunity makes it unlikely to allow incorporation into the DFS.

### **Cosmetics**

During September 2021 a bulk sampling exercise was carried out to extract large amounts of high purity halloysite as well as the Great White HRM™ concrete additive.

Some of this high-purity halloysite material is scheduled to be processed in the Streaky Bay pilot plant. This will then be used in the Natural Nanotech Carbon Capture demonstration plant planned to commence commissioning during Dec 2021.

The remainder is planned to be processed by conventional means to produce a large batch of cosmetic grade halloysite-kaolin to be used for cosmetics related approvals in China. A small sample of this was tested earlier this year with very positive results and the Chinese cosmetic industry represents a very large, high-value market. Market research indicates approx. 40,000t/pa of potential business with potential sales prices in the range of US\$1000 – US\$3000/t.

## Great White Kaolin Project

The Great White Kaolin Project covers two main geographic areas of interest, both situated in the western province of South Australia (Figure 1). The current main area of focus for the Project is on the Eyre Peninsula which comprises four tenements and is located approximately 635 km west by road from Adelaide and 70 km east from Streaky Bay (Figure 2).

Figure 1 - Project Location Plan

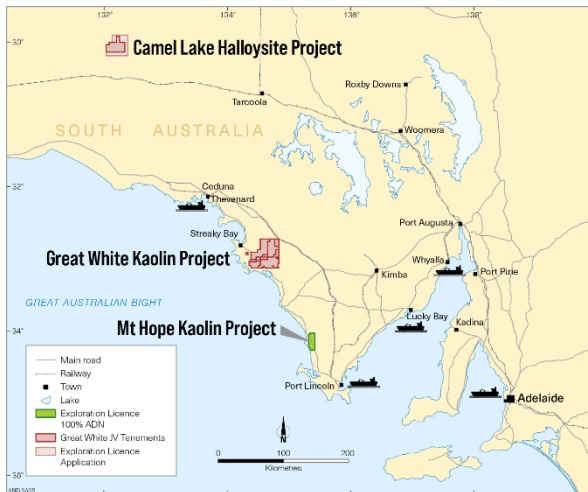
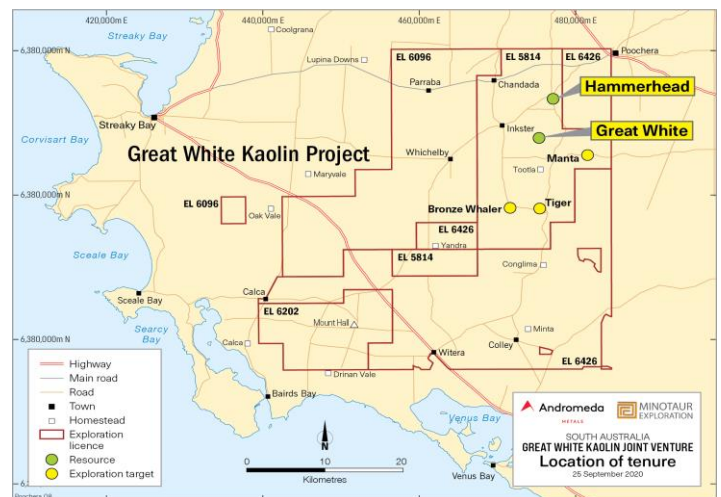


Figure 2 - Great White Project



## Tenements

High quality halloysite-kaolin occurrences exist extensively across the Great White Project area making this a region of global significance for the mineral and capable of supporting a considerable long-life mining operation.

Andromeda also holds a 100% interest in the Mount Hope Kaolin Project which is located approximately 160 km southeast of Great White.

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**Competent Person's Statements**

Information in this announcement has been compiled by Mr James Marsh a member of The Australasian Institute of Mining and Metallurgy (AusIMM). Mr Marsh is an employee of Andromeda Metals Limited who holds shares and options in the company and has sufficient experience, which is relevant to the style of mineralisation, type of deposits and their ore recovery under consideration and to the activity being undertaken to qualify as Competent Persons under the 2012 Edition of the 'Australasian Code for reporting of Exploration Results, Mineral Resources and Ore Reserves' (JORC Code). This includes Mr Marsh attaining over 30 years of experience in kaolin processing and applications. Mr Marsh consents to the inclusion in the report of the matters based on the information in the form and context in which it appears.

**Forward Looking Statements**

Some of the statements contained in this report are forward looking statements. Forward looking statements, include, but are not limited to, statements concerning estimates of tonnages, expected costs, statements relating to the continued advancement of Andromeda's projects and other statements that are not historical facts. When used in this report, and on other published information of Andromeda, the words such as 'aim', 'could', 'estimate', 'expect', 'intend', 'may', 'potential', 'should' and similar expressions are forward looking statements. Although Andromeda believes that its expectations reflected in the forward-looking statements are reasonable, such statements involve risks and uncertainties and no assurance can be given that actual results will be consistent with these forward-looking statements.

Various factors could cause actual results to differ from these forward-looking statements include the potential that Andromeda's project may experience technical, geological, metallurgical, and mechanical problems, changes in market prices and other risks not anticipated by Andromeda. Andromeda is pleased to report this summary of the Study in a fair and balanced way and believes that it has a reasonable basis for making the forward-looking statements in this announcement, including with respect to any mining of mineralised material, modifying factors, production targets and operating cost estimates.

Authorised for release by the Board of Directors of Andromeda Metals Ltd