HILL END GOLD LIMITED

ACN 072 692 365

ASX Code: HEG, HEGOC

14 June 2018

Pre-feasibility Study finds Yendon High Purity Alumina Project generates outstanding financial returns

Low production costs underpin exceptional margins, resulting in potential EBITDA** of $133m/annum

Results of the Pre-feasibility Study

Annual HPA Production	**8,000 tpa +99.99% Al_2O_3**
Capital Cost*	**$271 million (incl contingencies of $53m)**
Capital Cost per t of HPA	**$33,875 based on 8,000 tpa HPA**
Average Cost of Production	**$7,668 /tonne of HPA**
Forecast Sale Price	**$25,200 /tonne**
Average EBITDA	**$133m per annum**
Payback Period	**4.1 years**
Project NPV @ 10%	**$692m**
IRR	**34%**

*All monetary amounts contained in this release are in US dollars

Hill End Gold Ltd (HEG) is pleased to announce that a Pre-feasibility Study (PFS) of its Yendon High Purity Alumina Project (Yendon) in Victoria is technically and financially robust.

The PFS demonstrated that Yendon delivers strong financial returns, underpinned by a low capital cost of $271 million on projected annual production of 8,000 tonnes of HPA grading 99.99% aluminium oxide.

Production costs are expected to be extremely competitive at just $7,668 a tonne. This will ensure Yendon enjoys robust margins, approaching 70%, based on a conservative sale price of $25,200/t.

The internal rate of return is forecast to be 34 per cent.

Hill End believes the revenue assumptions contained in the PFS are conservative. This view is supported by the test work which showed that HPA produced from kaolin mined at Yendon comfortably exceeds the 99.99% alumina specification and pricing assumed in the PFS.

** Average over the current 38 year project life

The price of HPA rises as purity increases, meaning that revenue from HPA produced from Yendon may exceed that assumed in the PFS.

HEG intends to conduct further test work on the HPA produced from Yendon to establish if a 99.999% (5N) specification can be achieved. Insights gained from test work undertaken for the PFS have provided confidence that the steps needed to produce 5N HPA can be incorporated in the process flow diagram for Yendon.

In light of these outstanding results, Hill End will now commence planning for a Definitive Feasibility Study (DFS) on Yendon.

Hill End Managing Director Martin McFarlane said, "The PFS showed Yendon was well-placed to meet the growing demand for high purity alumina, including that from the lithium battery industry."

"The outlook for the HPA market is very strong, with the rapid growth witnessed over the past decade expected to continue due to the solid outlook for LEDs and other markets for synthetic sapphire derived from HPA, as well as the booming market for lithium batteries," Mr McFarlane said.

"To satisfy the rapid growth forecast in HPA demand, new production capacity is required".

"The PFS shows Yendon is on track to help meet that demand with a high quality product produced at a low cost."

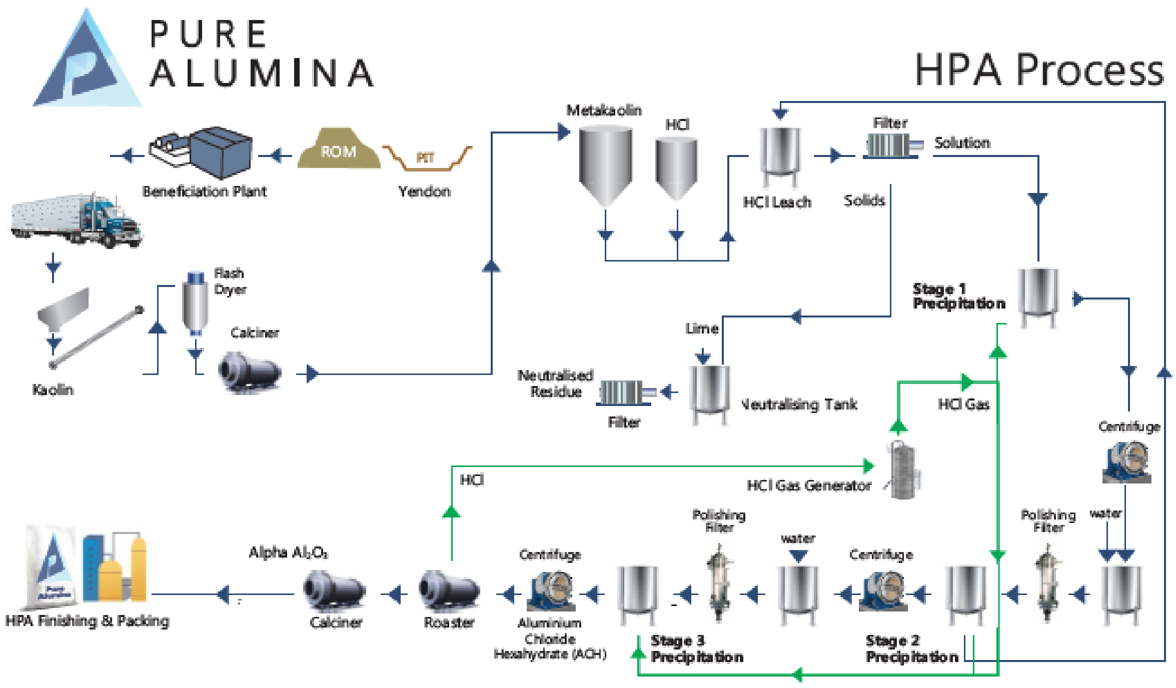
Mr McFarlane said "Hill End would now use the information derived from the PFS to help secure offtake agreements for Yendon over the coming year.

To facilitate this, planning is underway to construct a locked-cycle pilot plant to enable commercial samples of Yendon HPA to be trialled by potential customers.

The PFS is underpinned by:

- a substantial high-grade kaolin resource near Ballarat, Victoria that contains low levels of deleterious impurities;
- a shallow open pit mine design with low stripping ratios, which can be efficiently contract mined without blasting, crushing or grinding;
- simple beneficiation by screening the kaolin ore at the mine site to remove 57% of the ore mass comprising mainly coarse silica, upgrading the ore to a 35% kaolin concentrate for transport to the hydrometallurgical process facility (HPF);
- significant metallurgical test work which has defined a robust chemical process to convert Yendon kaolin to HPA. This process is based on the industry-standard process derived from the US Bureau of Mines published and public data customised by Hill End specifically for the Yendon orebody;
- confirmation via this developed chemical process that Yendon kaolin can produce high purity alumina exceeding 99.99% alumina;
- development of a simple and effective process flow diagram using commercially proven, and largely "off the shelf", operations that result in competitive capital and operating costs to produce HPA with low environmental impact; and
- adoption of a conservative HPA selling price of $25,200/ tonne for 99.99% HPA over the life of the project, which is at the bottom end of the current HPA market price range as established by independent market analyst Roskill.

The Defined Process Flow Sheet



A risk and opportunity analysis was completed as part of the PFS. This resulted in a very high level of confidence in the ability of the process path to produce HPA to the necessary specification on a reliable basis. A number of opportunities were identified that may enhance revenue and / or reduce capital and operating costs. A focus going forward will be to fully investigate these opportunities to capture the benefits.

Definitive Feasibility Study

The outcomes of the PFS provides significant encouragement to commence a Definitive Feasibility Study (DFS) immediately. The scope of the DFS will be developed over the next quarter in conjunction with Primero, BHM and other key consultants. The key focus of the DFS will be:

- metallurgical and engineering design studies, including the development of a locked cycle pilot plant;
- location study to optimise the operating conditions for the project;
- detailed construction and commissioning plan;
- advance discussions with potential offtake partners; and
- engagement with potential funders to work through the DFS process.

An updated project schedule is outlined below:

Objective	Delivery Date
Define DFS scope	Q3 2018
Deliver DFS and pilot plant	Q3 2019
Secure project funding	Q1 2020
Construct Yendon HPA project	Q3 2022
Commission Yendon HPA project	Q4 2022

Martin McFarlane
Managing Director

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Forward-looking Statements

This announcement contains forward-looking statements which are identified by words such as 'anticipates', 'forecasts', 'may', 'will', 'could', 'believes', 'estimates', 'targets', 'expects', 'plan' or 'intends' and other similar words that involve risks and uncertainties. Indications of, and guidelines or outlook on, future earnings, distributions or financial position or performance and targets, estimates and assumptions in respect of production, prices, operating costs, results, capital expenditures, reserves and resources are also forward-looking statements. These statements are based on an assessment of present economic and operating conditions, and on a number of assumptions and estimates regarding future events and actions that, while considered reasonable as at the date of this announcement and are expected to take place, are inherently subject to significant technical, business, economic, competitive, political and social uncertainties and contingencies. Such forward-looking statements are not guarantees of future performance and involve known and unknown risks, uncertainties, assumptions and other important factors, many of which are beyond the control of the Company, the directors and management. We cannot and do not give any assurance that the results, performance or achievements expressed or implied by the forward-looking statements contained in this announcement will actually occur and readers are cautioned not to place undue reliance on these forward-looking statements. These forward-looking statements are subject to various risk factors that could cause actual events or results to differ materially from the events or results estimated, expressed or anticipated in these statements.

Yendon High Purity Alumina Prefeasibility Summary

Project Scope and Conclusions

Hill End Gold Limited (HEGL) acquired 100% of Pure Alumina Pty Ltd (PA) in August 2017. PA in turn owns 100% of Yendon kaolin deposit. HEGL is seeking to understand the viability of processing kaolin sourced from Yendon into high purity alumina (HPA) to supply the global HPA market (HPA project). To this end HEGL has appointed Primero as lead engineer to undertake a pre-feasibility study (PFS) of HEGL's HPA project.

The principal objectives of the PFS were to:

- Demonstrate that Yendon kaolin can be converted to HPA that exceeds the minimum requirements of the 99.99% HPA market;
- Define a chemical process route to convert Yendon kaolin to HPA based on the industry standard process derived from the US Bureau of Mines published and public data and establish and optimise critical process parameters to enable a process flow diagram to be developed.
- Develop a mechanical equipment list and from this estimate capital and operating costs for the kaolin to HPA process;
- Create a financial model to evaluate the feasibility of the project; and
- Develop the risks and opportunities arising from the study and identify further work that may be undertaken.

The results of the PFS indicated that:

- That 99.99% HPA can be produced from the Yendon kaolin;
- The technology chosen for the processing route is simple, with proven unit operations and with low operating costs and low environmental impact;
- The Project yields a positive NPV (US$692 million) project, with an IRR of 34%;
- That the primary risks associated with the Project are associated with the processing technology, permitting and the market, all of which are being addressed in the next phase of the Project.

Introduction

Hill End Gold Limited (HEGL) acquired 100% of the Pure Alumina Pty Ltd High Purity Alumina (HPA) Project, which has rich kaolin deposits on tenements near Ballarat, Victoria. HEGL has completed resource drilling of the initial deposit at Yendon, outlining substantially more kaolin than was identified from previous drilling in the 1980s. HEGL engaged Primero Group (Primero) to coordinate the production of a Pre-Feasibility Study to allow an assessment of the viability of the Project.

Contributors to the Study have been SRK Consulting (Australasia) Pty Ltd (SRK), Mining Plus, BHM Process Consultants Pty Ltd ("BHM"), Solution Development and Erias Group (Erias). Laboratories conducting work for the Study under the guidance of BHM have been ALS and LabWest. The contributions are as summarised as follows:

Study Contributions

Ownership and Leases	HEGL
Geology	SRK
Resource model	SRK
Mine design, scheduling and mining cost estimates	Mining Plus
Preliminary metallurgical test work	BHM
Metallurgical interpretation	BHM
Mining geotechnical Commentary	SRK
Corse reject facility allowance	Mining Plus
Hydrological Commentary	SRK
Environmental assessment	Erias Group
Process plant design	Primero/BHM
Infrastructure design	Primero
Project implementation	Primero
Capital cost estimation	Primero
Operating cost estimation	Primero/Mining Plus
Risk assessment	Primero / HEGL
Financial analysis	Primero / HEGL

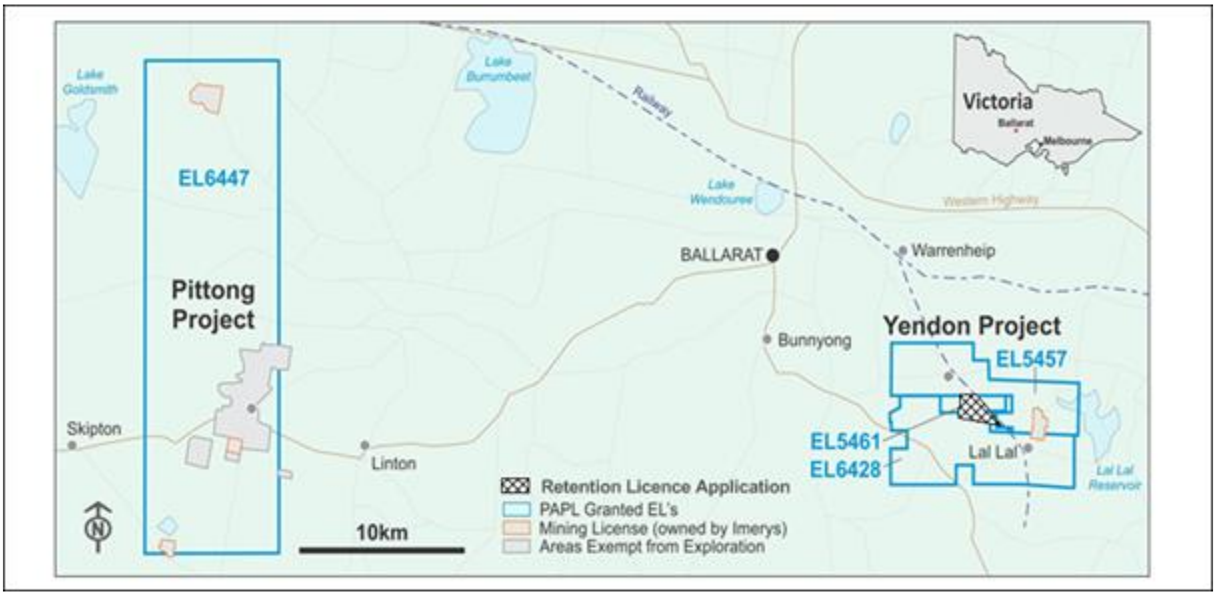
Project Background

The Yendon kaolin deposit is located approximately 2 km southeast of the township of Yendon, and approximately 20 km southeast of the city of Ballarat in the Central Highlands region of central Victoria, Australia. The state capital, Melbourne, is located approximately 80 km to the east. The site is easily accessible by a network of sealed roads in the area. A railway line, which acts as the main passenger and freight line between Geelong and Ballarat, skirts the project area to the northeast.

The HPF site is currently nominated as being in Altona, Victoria. Altona is a suburb of Melbourne, Victoria, Australia, 13 km south-west of Melbourne's Central Business District, located within the City of Hobsons Bay local government area. Altona recorded a population of 10,762 at the 2016 census. Altona is a large suburb consisting of low density residential in the south-eastern half, with mixed industry in the north-western half. The HPF will be in the industrial area, with access to local services and employing staff from the local community.

Geography and Climate

The HPA Project site is located near Ballarat, Victoria at Pittong and Yendon in areas where kaolin mining and processing has occurred for decades.



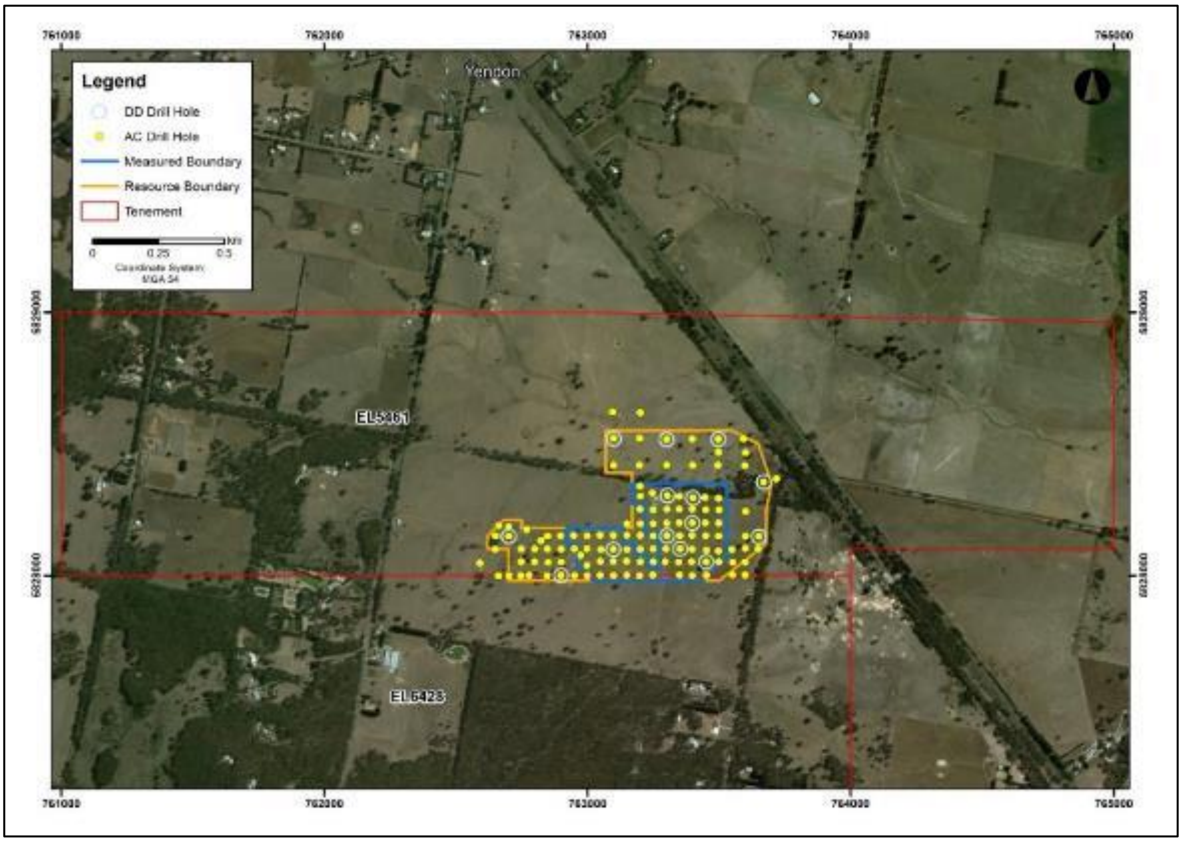
Location plan of Yendon kaolin project area

The project site has a moderate climate with four distinct seasons. The mean daily maximum temperature for January is 25.5 °C while the mean minimum is 11.2 °C. In July, the mean maximum is 10.2 °C; mean July minimum is 3.0 °C.

The mean annual rainfall is 693 millimetres with August being the wettest month (75 mm). The Yendon area experiences cyclical drought and heavy rainfall. The annual average rainfall in the catchment varies from 700 mm to 900 mm, gradually increasing form south to north with increased elevation. The wettest period is winter and spring.

<u>Site Topography</u>
Topography in the area is characterised by flat to undulating plains.

<u>Tenure</u>
The majority of the defined Mineral Resources are contained within Exploration Licence EL5461, with a very small amount (<1%) extending into EL6428, which is the adjoining lease to the south. The tenement boundaries, drill coverage, and resource extents are presented in the map below. HEGL advised that EL 5457 and 5461 are 100% owned by PAPL while licences EL6428 and 6447 are currently subject to transfer by agreement (dated 11 September 2017), from the original licensee, Mr P Sterling, to PAPL. HEGL also advised that steps to finalise and register the transfer of these licences will occur 1 year after granting as permitted under the statutory requirements of the Victorian Mineral Resources (Sustainable Development) Act (MRSDA), 1990).



Yendon kaolin Project tenement and resource area

Fiscal Regime and Taxation

Taxable income from mining operations is subject to income tax at the rate of 30% of taxable income. All capital expenditure and pre-production costs may be depreciated. Any financial loss resulting from mining operations of a licensee in an accounting year may be carried forward and deducted from gross income in the next ten accounting years.

GST on local sales is presently 10% and on export sales is 0%. There is a state royalty of 2.75% payable on the net market value of the kaolin being mined.

Geology

SRK Consulting (Australasia) Pty Ltd (SRK) has prepared a resource model and Mineral Resource estimates for the Yendon kaolin deposit, which is located approximately 20 km south east of Ballarat, Victoria. Hill End Gold Limited (HEGL) plans to use the kaolin as feedstock to produce high purity alumina (HPA) and to use the resource model and estimates as inputs to a pre-feasibility study (PFS) that it is currently conducting. The estimates represent the maiden Mineral Resource for the deposit in HEGL's project area.

The aluminous clay at Yendon has been formed by the ancient natural weathering of underlying granites and is comprised largely of silica/quartz ($SiO2$) and kaolinite. The profile changes with depth, from fully kaolinised to partially kaolinised to unweathered adamellite. In most parts of the project area, the kaolin is covered by approximately 2–3 m of overburden, which typically comprises a mix of transported clays and silts, with some minor occurrences of residual clays derived from the Pleistocene basalts that covered parts of the weathered adamellite. For estimation control, the profile has been sub-divided into the following horizons:

- Transported
- Kaolinised adamellite

- Decomposed adamellite
- Saprock

The Mineral Resource estimates were prepared using the data collected from a total of 121 aircore holes drilled by HEGL in 2017. The aircore drilling was performed on section lines that were oriented parallel to the MGA 94 grid. A nominal drill spacing of 50 m x 50 m was used in the priority target area, and this was increased to 100 m x 100 m in the peripheral areas to the north. All drill holes were planned and assumed to be vertical.

The drilling was performed using a track-mounted Mantis 200 drill rig fitted with an 86 mm diameter aircore drill bit. Drilling continued until HEGL's project geologist considered that the base of the fully leached, kaolin-rich material had been encountered, or where sample recovery was judged to be unacceptable. The average hole depth was approximately 13 m.

The samples were taken over 1 m intervals, with the entire sample collected into a bag placed beneath the cyclone underflow. Field splits were taken from the samples collected from the kaolinised and decomposed adamellite horizons and submitted for laboratory test work.

A total of 15 HQ3 diamond core holes were drilled, with all core holes twinning existing aircore holes. A total of 72 core samples, with a nominal length of 150 mm, have been used for density determination. At the time of reporting, none of the core samples had been submitted for geochemical testing.

Based on the results from preliminary metallurgical test work commissioned by HEGL, it is expected that the feedstock for the HPA process plant will comprise only material with a <63 µm particle size. In order to enable estimates of the HPA feedstock grades to be included in the resource model, the resource delineation drill samples were wet-screened, and only the <63 µm size fraction was assayed. Sample preparation and geochemical analyses were conducted by LabWest Mineral Analysis Pty Ltd (LabWest) at its NATA-accredited laboratory based in Malaga, WA. Each sample was oven-dried and weighed, and a 500 g split was wet-screened down to a final sieve size of 63 µm. The fine fraction was oven-dried and weighed, and an aliquot submitted for analysis using fused bead laser ablation inductively coupled plasma (LA-ICP) analysis, with the following analytes included in the analytical suite:

Al_2O_3, CaO, Fe, K_2O, MgO, MnO, Na_2O, P_2O_5, S, SiO_2, and TiO_2.

All constituents were reported in oxide form, apart from iron and sulphur, which were expressed in elemental form. Loss on ignition (LOI) was determined using thermogravimetric analysis (1000 °C). Mass recovery was estimated as the dry weight of the fine fraction divided by the dry weight of the crude sample.

Density tests were conducted on selected core samples using water immersion techniques. The samples, which were typically 150 mm in length, were oven-dried, weighed, and sealed prior to water immersion.

Field duplicates were collected at a frequency of 1:20 and included in the laboratory submissions. Other quality assurance / quality control (QA/QC) procedures included laboratory duplicates, certified reference materials (CRMs), and internal reference materials (IRMs), all of which were inserted by the laboratory.

All spatial data used for resource estimation are reported using the MGA 94 Zone 54 grid system based on Australian height datum. The drill hole collar locations were surveyed after drilling by a local contractor using RTK-DGPS equipment. All holes were shallow and assumed to be vertical, and downhole surveying was not performed. Several spot height readings were also taken over the project area to produce a 1 m interval topographic map of the resource and surrounding area.

All samples were collected on 1 m intervals and compositing was therefore not required. The geochemical dataset only contains assay data for the <63 µm fraction of each sample. These were converted to in situ grades for grade modelling. Statistical and geostatistical analyses were conducted, with the results used to assist with the selection of the estimation procedures and parameters.

The resource estimates were prepared using conventional block modelling techniques, with a single 3D model framework covering the entire deposit. Drill spacing and kriging neighbourhood analysis (KNA) were used to assist with the selection of a parent cell of 15 m x 15 m x 1 m (XYZ). Sub-celling was not applied. The model cells were flagged using the domain wireframes. A digital elevation model prepared from the topography data was used to remove cells located above the current surface.

Prior to grade estimation, the model cells were transformed relative to local datum planes, such that cells within similar parts of the weathered profile were assigned similar elevations. Identical transforms were applied to the drill hole data so that the original geometric relationship between the samples and model cells was retained.

Local estimates were prepared for all constituents included in the analytical suite. Ordinary kriging (OK) was used for grade interpolation and all domain contacts were treated as hard boundary constraints. Estimates were made into the discretised parent cells. A three-pass search strategy was implemented using discoid-shaped search ellipsoids, with orientations and dimensions primarily based on the variography studies. Octant searching and *keyfield* restrictions were invoked for additional estimation control. Default grades, which were equivalent to the average grades of the estimation datasets, were assigned to any cells that did not receive estimated grades. Extrapolation was limited to approximately half of the drill spacing. After estimation, the model cells were back-transformed to their original locations.

The concentrate grades were back-calculated from the in-situ grades of the material expected to report to concentrate. The model contains both the in situ and the concentrate grades, with only the latter used for resource reporting. Model validation included the following:

- Visual comparisons of the sample and model cell grades
- Local and global statistical comparisons of the sample and model cell grades
- Major oxide total comparisons
- An assessment of the estimation performance data.

The resource classifications have been applied based on a consideration of the confidence in the geological interpretation, the quality and quantity of the input data, the confidence in the estimation technique, and the likely economic viability of the material.

Classifications were only assigned to the grade and tonnage estimates for kaolinised adamellite material. The material contained within the SAP, TRAN and SAP domains was not included in the

Mineral Resource inventory because the estimates were based on limited data and/ or there was little likelihood of economic viability.

A classification of Measured Mineral Resource was applied to estimates for kaolinised adamellite located in sub-regions with a uniform drill coverage of 50 m. A classification of Indicated Mineral Resource was applied to estimates for kaolinised adamellite located in sub-regions with a uniform drill coverage of between 50 m and 100 m.

The main constituent of interest is alumina (Al_2O_3). There are several other elements that can have a detrimental effect if not removed via processing on the HPA purity. However, none of these are present at concentrations that would require exclusion from the feedstock or significant control during processing, and, for this reason, none have been applied as a resource reporting constraint. Mass recovery has not been used as a reporting constraint because it appears to be relatively uniform for the kaolinised adamellite material, and washing does not represent a significant component of the total processing cost.

A 30% Al_2O_3 grade has been selected as a resource cut-off grade. This value represents the lower bound of the high-grade material within the deposit. The selection of the 30% Al_2O_3 grade enables HEGL to maximise the quality of the kaolinised material selected for subsequent processing whilst maintaining the high mass recovery/ yield of the target <63 µm mass fraction. A summary of the Yendon kaolin Mineral Resource estimates is presented in the table below.

Yendon Mineral Resource Estimates – January 2018

Class	Tonnage (Mt)		<63 µm concentrate grades (%)								
	In situ	Concentrate*	Mass recovery	Al_2O_3	CaO	Fe	K_2O	MgO	Na_2O	SiO_2	TiO_2
Measured	1.73	0.75	43.13	35.08	0.08	0.79	0.19	0.09	0.16	47.84	1.13
Indicated	1.95	0.84	43.14	34.33	0.07	0.85	0.25	0.10	0.17	48.94	1.12
Total	3.68	1.59	43.14	34.68	0.08	0.82	0.22	0.10	0.17	48.42	1.12

Notes:

1. The estimates are based on a block cut-off concentrate grade of >= 30% Al_2O_3. The concentrate is defined as the portion of the in-situ tonnage with a particle size of <63 µm that is expected to be recovered as the feedstock for the HPA process. The estimates were derived from model file RESM010218.dm.

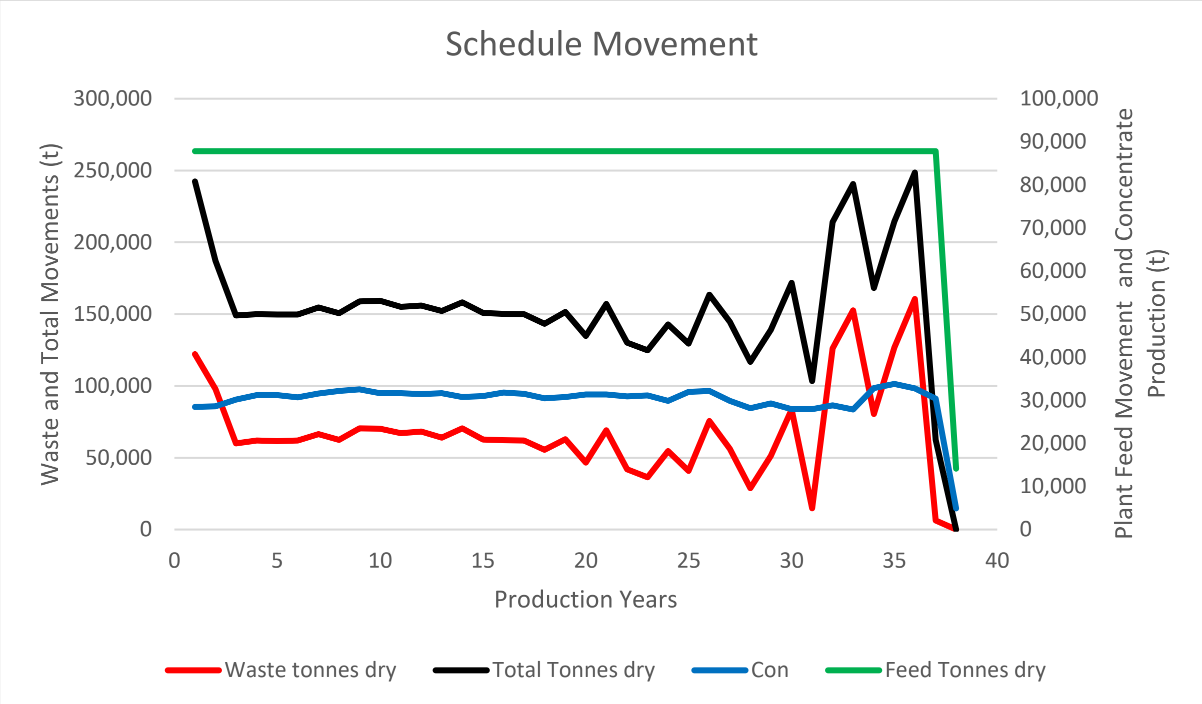
2. The Mineral Resource estimates were prepared from the datasets provided by HEG in late 2017 – early 2018, and represent the drilling and analytical test work completed up until the end of 2017. The resource estimates are classified in accordance with the 2012 edition of The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code 2012).

3. All information within this release relating to Maiden JORC (2102) Kaolin Resource for the Yendon HPA Project as referred to in the above table are appended from the ASX market release "Initial Kaolin Resource" dated 12 February 2018. HEGL confirms that it is not aware of any new information or data that materially affects the information included in the relevant market announcement and all material assumptions and technical parameters underpinning the estimates continue to apply and have not materially changed.

Mining

Mining Plus was commissioned to conduct a mining study on the Yendon Kaolin deposit, 15km south east of Ballarat, as an economic source of Kaolin for high purity alumina production.

Mining Plus found the deposit could be mined economically to produce kaolin. The deposit has been assumed to campaigned mined by a fleet of 90t rigid body mine haul trucks and 120t excavator for a campaign of 2-4 weeks annually. Overburden has been utilised to build a storage facility for coarse plant rejects on the north west of the site. Kaolin once mined is sent to run of mine stockpile with a nominal capacity of 130kt allowing storage of the nominal 90Kt/a plant feed and an additional 40kt of material to enhance blending of the plant feed.
Mine scheduling targeted 8kt/a of high purity alumina (HPA) product. The schedule was undertaken in annual increments and been based around a series of mining area polygons. There are 56 polygons nominally 200m x 45m.



Mining Schedule by Year – Year 1 production is forecast to start from Q4 2022 as per the delivery schedule. Permitting and construction of the mine is scheduled to occur prior to this time.

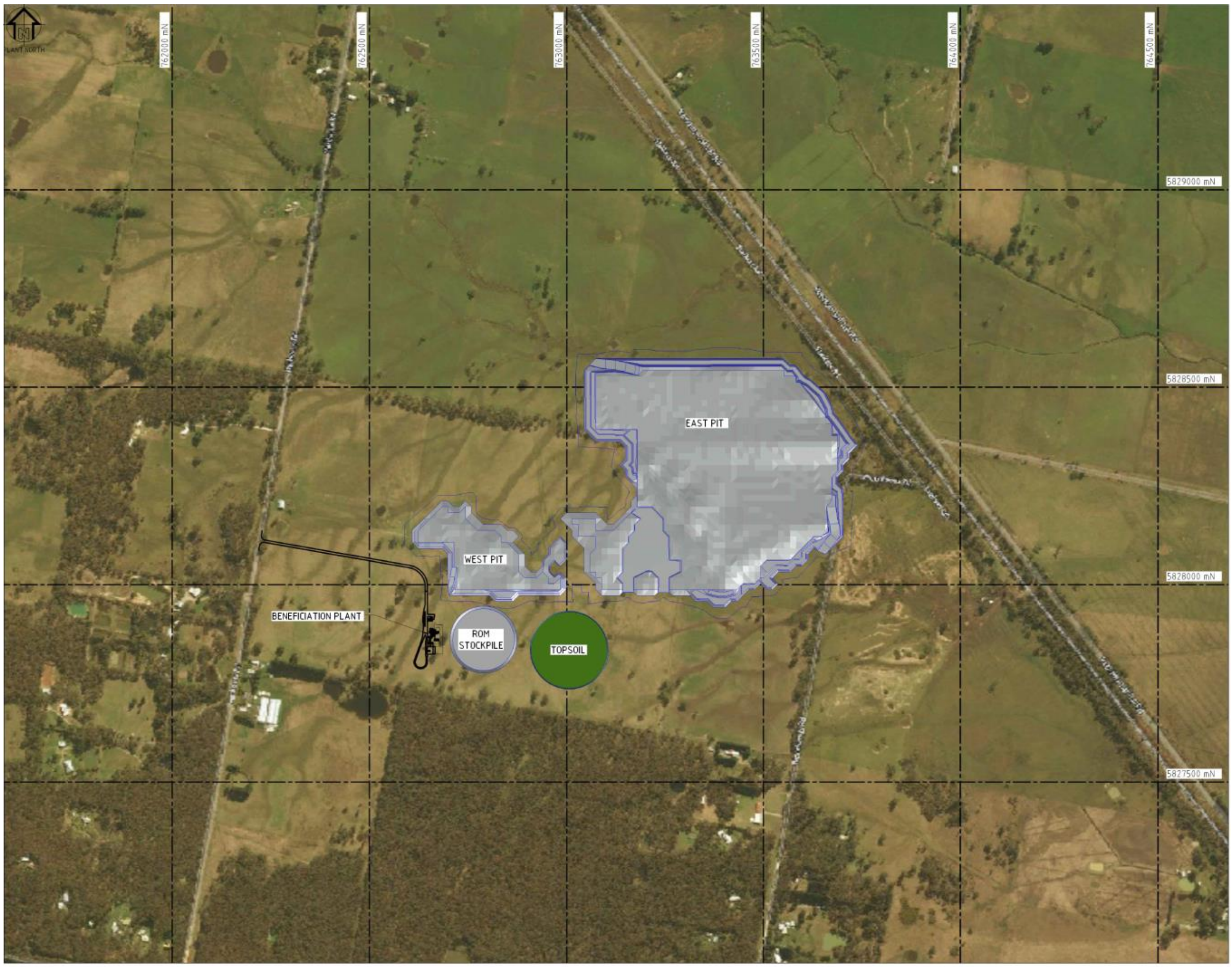
The selected pit shell was pushback 7 from the 45m minimum width optimisation equivalent to pit shell 15 from the optimisation, as the shell to design around.

Comparison of Selected Whittle Pit Shell and Whittle Pushback

Pit Shell/Pushback #	Feed Input (t)	Waste (t)	Total (t)	Strip Ratio (:1)	Mass Recovery (%)	Concentrate Al2O3 (%)
Shell 15	3,308,000	2,425,000	5,733,000	0.73	43.14	36.51
Pushback 7	3,308,000	2,425,000	5,733,000	0.73	43.14	36.51

The mining costs include the costs for:

- clearing and grubbing of mine, stockpiles and reject storage facility
- mining overburden
- construction of the reject storage facility
- mining plant feed
- plant feed
- coarse reject haulage to reject storage facility.



Yendon High Purity Project Layout, Pits, Waste Landforms, stockpiles and Geotechnical Risk Zone

Metallurgy

BHM Process Consultants were engaged to undertake metallurgical test work on a kaolin deposit with the view to produce HPA of >99.99% Al_2O_3 using a proprietary flowsheet. As a part of the preliminary test work a marketing sample was generated to verify that HPA could be produced from Yendon kaolin using the process and the data from this preliminary test work was used to set the scope for the subsequent PFS test work programme.

The selected flowsheet for the marketing sample is reasonably expected to be very similar, if not identical, to the actual process flowsheet. The process consists of physical separation of the fine kaolin from coarser material, calcination of the kaolin, dissolution in concentrated hydrochloric acid and crystallisation of aluminium chloride hexahydrate (ACH). The ACH would then go through cycles of dissolution-crystallisation until the purity was sufficiently high to proceed to calcination of the ACH to HPA.

The process conditions selected in making the marketing sample were believed to be close to optimal based on prior experience and literature information. However, the aim of the process was to produce a sample of HPA with limited consideration given to the recovery of aluminium or the final process flowsheet where significant recycling of solutions will be used.

For the Pre-Feasibility Study a bulk sample was made up from 414 sections of core from 31 drill holes to give a composite of ~425kg. The ore was attritioned using ~1kWh/t and screened at 63µm to give 42% of the mass in the undersize containing 35.3% Al_2O_3 representing a kaolin concentration of ~89%. Settling of the undersize showed flocculation and thickening were successful at increasing the solids density to ~18% w/w, well below the density where any rheological problems were expected to occur. After filtration, the ore was calcined at 600°C for 90min in a furnace resulting in the formation of metakaolin. The metakaolin was leached in concentrated hydrochloric acid for 45 min starting at 70°C. The reaction was exothermic and careful control is required to prevent azeotropic boiling. The typical extent of aluminium leaching was 90%. Iron leach extractions were similar to the aluminium and represents the major impurity in the system. Silica leaching was <1% but still gave ~20ppm in solution. Longer leach times than 45min resulted in more silica dissolution with no additional Al or Fe.

The filtered solution had HCl gas injected to precipitate aluminium chloride hexahydrate ($AlCl_3.6H_2O$, ACH). This proved highly successful with recoveries of >90% Al easily achieved whilst leaving impurities in the solution. The ACH crystals were washed, redissolved in ultrapure water and reprecipitated using HCl gas. The purification stage was repeated to give a total of three redissolutions. The final ACH was washed using concentrated HCl to remove surface impurities.

The purified ACH was calcined for 4h at 1150°C to convert it to HPA. The final analysis of the HPA is provided in table below.

Final HPA analysis

Parameter		Value	Units
HEGL Pure Alumina Sample Analysis			
Major Metal Impurities	Ca, Cr, Cu, Fe, K, Mg, Na, Ni, Sc, Si, Ti, V	43.70	ppm
Minor Metal Impurities	all others measurable	10.47	ppm
Total Metal Contaminants		54.17	ppm
Chloride Reading		10.00	ppm
Al2O3 Purity grade		99.9936%	

The table below provides the recommended Chinese Standard for reporting HPA purity as significant metal oxides, followed by minor impurity elemental disclosure, and is considered the measure for reporting a > 99.99% alumina purity.

Chinese Standard for reporting HPA purity

HPA CORE ELEMENTS TO REPORT - RAW ELEMENTS			
Element	***Value***	***Units***	***Measurement Method***
Al	**99.9921%**		ICP -OES
Ca	0.884	ppm	ICP-MS
Fe	18.29	ppm	ICP-MS
K	1.65	ppm	ICP-MS
Mg	2.76	ppm	ICP-MS
Na	11.77	ppm	ICP-MS
Si	<1	ppm	ICP-MS
Loose Density	TBD	g/cc	
Tapped Density	TBD	g/cc	
Surface area	TBD	m2/g	BET
PSD d50-80	TBD	um	laser
Additional Recommended Elements			
Element	***Value***	***Units***	***Measurement Method***
Cl	<30	ppm	ICP-MS
Cu	<1	ppm	ICP-MS
Pb	0.175	ppm	ICP-MS
S	<10	ppm	ICP-MS
Ti	0.00083	ppm	ICP-MS
Zn	1.64	ppm	ICP-MS
Total Reportable Impuriti	**79.17**	ppm	

HPA CORE ELEMENTS TO REPORT - OXIDE CONVERTED			
Element	***Value***	***Units***	***Measurement Method***
Al	**99.9904%**		ICP -OES
Ca	1.236716	ppm	ICP-MS
Fe	26.14	ppm	ICP-MS
K	1.99	ppm	ICP-MS
Mg	4.57	ppm	ICP-MS
Na	15.85	ppm	ICP-MS
Si	<1	ppm	ICP-MS
Loose Density	TBD	g/cc	
Tapped Density	TBD	g/cc	
Surface area	TBD	m2/g	BET
PSD d50-80	TBD	um	laser
Additional Recommended Elements			
Element	***Value***	***Units***	***Measurement Method***
Cl	<10	ppm	ICP-MS
Cu	3	ppm	ICP-MS
Pb	1.154	ppm	ICP-MS
S	<1	ppm	ICP-MS
Ti	0.283	ppm	ICP-MS
Zn	2.62	ppm	ICP-MS
Total Reportable Impurities	**95.85**	ppm	

The information in this release that relates to the Metallurgy is based on work performed by ALS Metallurgy Pty Ltd based on the design of and under the supervision of BHM Process Consultants Pty Ltd. Dr Nicholas J Welham of BHM Process Consultants Pty Ltd is a Fellow of The Australasian Institute of Mining and Metallurgy and has sufficient experience that is relevant to the hydrometallurgical processes under consideration to qualify as a competent person, has reviewed and accepted the work performed by ALS Metallurgy Pty Ltd for this PFS.

All information within this release relating to the Maiden JORC (2102) Kaolin Resource for the Yendon HPA Project is appended from the ASX market release "Initial Kaolin Resource" dated 12 February 2018. HEGL confirms that it is not aware of any new information or data that materially affects the information included in the relevant market announcement and all material assumptions and technical parameters underpinning the estimates continue to apply and have not materially changed.

Process Plant

The HEGL HPA plant is designed to produce ~8 000 t/a of 99.99% high purity alumina from Yendon kaolin, via treatment first through a beneficiation plant situated adjacent to the mining area in Yendon, Victoria, then a Hydrometallurgical Processing Facility situated in Altona, Victoria.

Mined ore - fed by a front-end loader (FEL) into a feed bin – is conveyed to a trommel screen to remove the +2 mm fraction. The trommel undersize flows onto a sizing screen to remove the +1 mm fraction. Both oversize streams are directed to an oversize bunker. The undersize material is pumped to a two-stage cyclone circuit to recover the – 63 mm product stream.

The – 63 mm material is thickened, centrifuged, dried and then stored in a storage hopper prior to being trucked to the Hydrometallurgical Processing Facility. Process water is recovered in the plant from the thickener and re-used in the plant.

The beneficiated kaolin is transported in a series of screw conveyors and a sizer to a flash dryer and rotary calciner for calcination to metakaolin. After calcination the metakaolin is cooled and de-agglomerated before feeding into the hydrochloric acid leach circuit. The leach produces an impure aluminium chloride solution that is filtered to separate the solid unreactive silica for disposal and produce a pregnant leach solution (PLS) for purification.

The PLS flows to a precipitation tank where the injection of hydrochloric acid gas results in the precipitation of aluminium chloride hexahydrate (ACH) crystals. The crystals are separated from the solution in a centrifuge and most of the centrate directed to the iron removal plant. The crystals are redissolved in high purity water, polish-filtered and then re-precipitated in a second precipitate circuit (a replicate of the first one) to ensure maximum impurity removal.

A final (third) precipitation followed by dual-stage centrifuging produces the final, pure ACH product which is fed to buffer storage bins. This pure ACH is roasted and calcined (using indirect heating) to produce alumina. The final purity (99.99%) is attained by employing 2-stage high purity water wash-centrifuge to wash any adsorbed HCl off the surface of the crystals prior to drying and packaging the HPA product.

The plant relies on a dual pressure Anhydrous HCl Acid Gas Generator to recycle the various gaseous and aqueous HCl streams and produce the HCl gas required in the precipitation vessels.

A high purity water purification plant is also required to purify water used in the finishing section of the plant.

Residual solid streams are neutralised and filtered. The major residual stream is silica, which will be washed and returned to the mine site for disposal. Washings and acidic streams from the remainder of the process will be filtered, and the calcium chloride solids will be disposed of in an engineered disposal site.

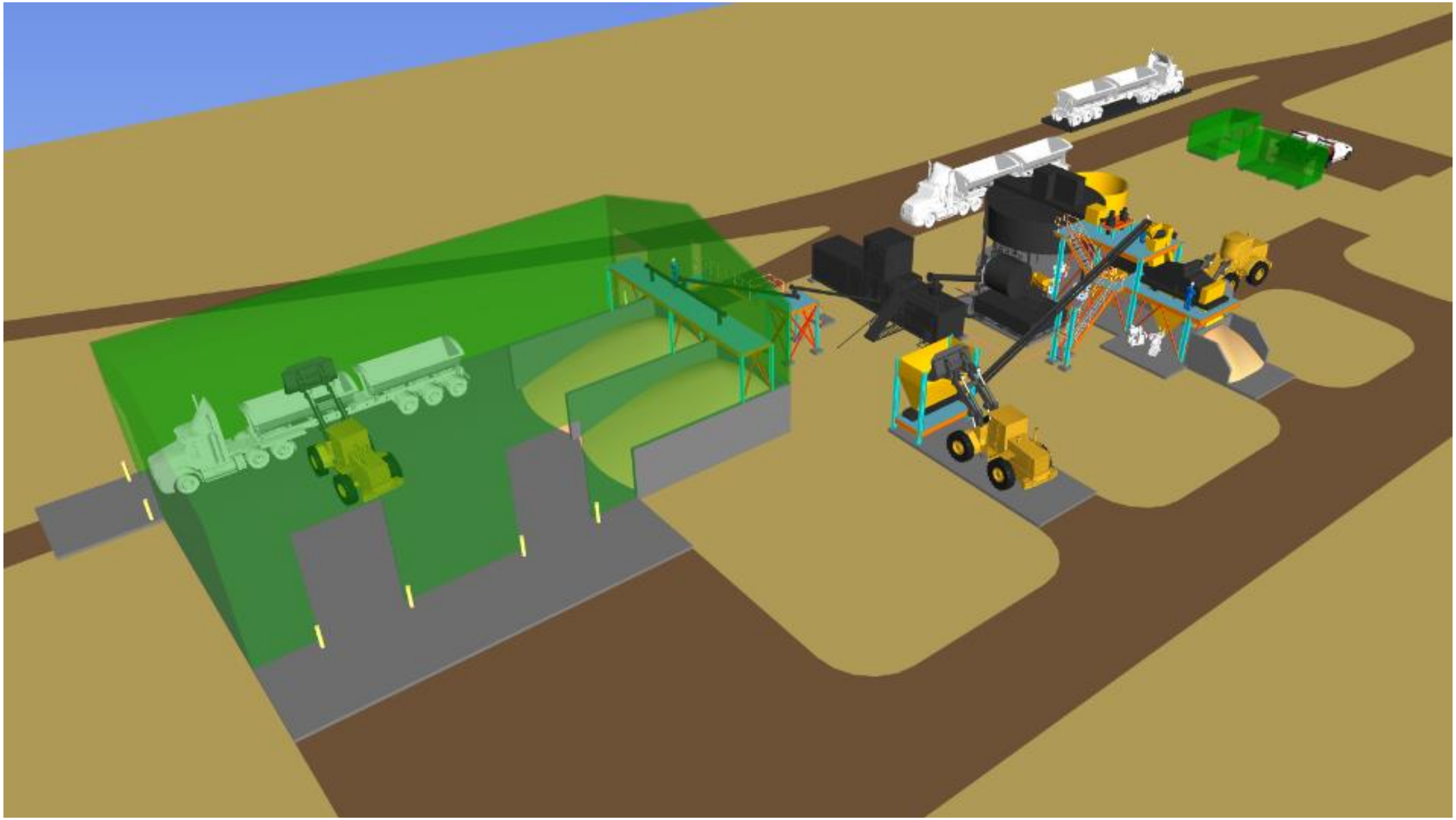
The process design is based on the beneficiation circuit operating daily for 10 h/day, 365 days per annum with a total availability and utilisation of 90%. The process design basis for the HPF assumes continuous operation (24 h/day, 365 days/annum) with a total availability and utilisation of at least 80%. The design basis is summarised in the following table:

Summary of Process Design Basis

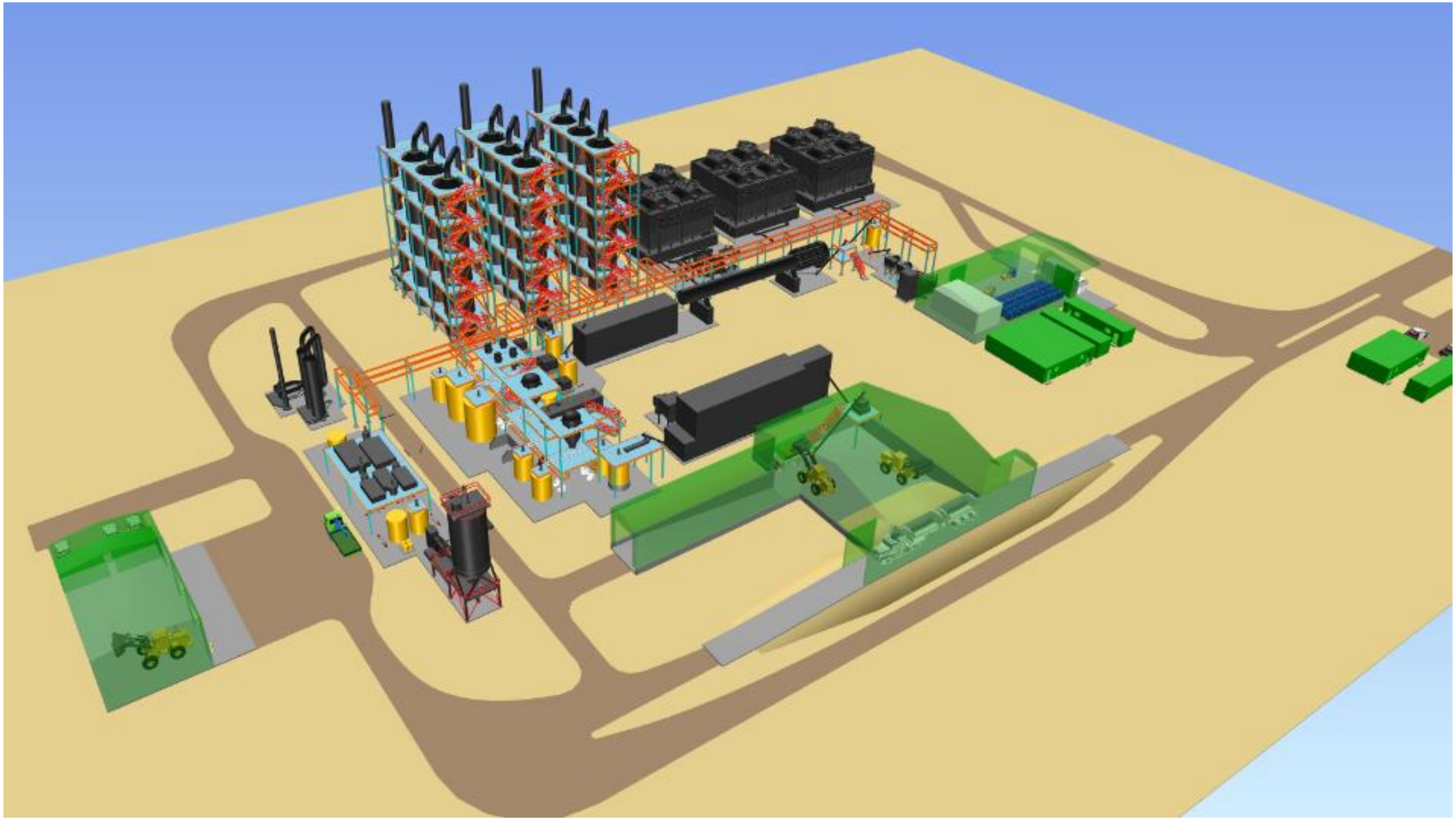
Parameter		Units	Beneficiation Plant		Hydrometallurgical Plant	
Operating Hours		h/day	10		24	
		days/annum	365		365	
Availability			90%		80%	
Actual Operating Hours		h/annum	3285		7008	
Nominal			tph	tpa	tph	tpa
Feed	Dry tonnage		23.7	77 697	3.9	27 194
	Al_2O_3 grade		13%		35%	
	Al_2O_3 tons		3.1	10 101	1.4	9 596
	Recovery	Mass Pull	35%			
		Al_2O_3 recovery	95%		75%	
Product	Dry tonnage		8.3	27 194		
	Al_2O_3 grade		35%			
	Al_2O_3 tons		2.9	9 596	1.0	7 197
Design Factor			15%			
Design			tph	tpa	tph	tpa
Feed	Dry tonnage		27.2	89 352	4.5	31 273
	Al_2O_3 grade		13%		35%	
	Al_2O_3 tons		3.5	11 616	1.6	11 035
	Recovery	Mass Pull	35%			
		Al_2O_3 recovery	95%		75%	
Product	Dry tonnage		9.5	31 273		
	Al_2O_3 grade		35%			
	Al_2O_3 tons		3.4	11 035	1.2	8 276^

^ The first 18 years of HPA production is assumed to come from the measured category of the resource estimate with the balance of the 38 years HPA production assumed to come from the indicated category of the resource estimate.

The beneficiation process plant and the hydrometallurgical processing facility are shown in the images below.



Beneficiation Plant



Hydrometallurgical Processing Facility

Support Facilities and Services

Access

The Project site is well serviced by public roads. The location of the HPF has not yet been finalised, this study has assumed a base case location of Altona, which is serviced by two major highways and is designed for high frequency large vehicle traffic.

Coarse Rejects Storage

The proposed coarse rejects storage facility (CRSF) site is located to the west of the pit. The facility will be constructed in stages to store a total of 2,561,000 t, using suitable mine waste being placed as part of the mining operations.

The coarse nature of the tailings indicates a relatively high permeability and the geochemical assessment indicates no potential to form acid.

Bores will be established to monitor seepage and the wall will be surveyed regularly. The facility will be fenced and capped at the end of its life to minimise water ingress.

Power and Gas Supply

Power supply to both beneficiation plant and HPF will be from grid supply. There is a 220KV transmission line from Ballarat to Geelong that passes to the west of the beneficiation plant location which will provide supply to this location. The industrial location of HPF will facilitate access to high voltage power required for this operation, with the Greater Melbourne and Geelong hub supplied by 220 kV.

Natural gas will be extensively used in the processing facilities and is accessible in Altona from the pipeline operated in the area by APA. Further investigation will be required in the next phase of the project to establish if gas offtake is possible in Altona.

Water Supply

Water at the beneficiation plant will be sourced from groundwater via bores, licenced by Southern Rural Water. Water at the HPF will be sourced from local scheme water and will be purified within the process plant for use in making the final product.

Accommodation

All staff will be residential, and no accommodation camp has been allowed for in the estimate.

Site Buildings

Minimal site building will be required at the beneficiation plant, with allowances made for flat-pack type buildings, transported in containers and assembled on site. Larger facilities located at the HPF such as the workshop and warehouse will be made up of steel structures. Specialised buildings such as the plant control rooms will be prefabricated in shipping containers and brought to site fully assembled. MCC rooms will likewise be prefabricated and pre-wired inside shipping containers, with the wiring tested in the factory before despatch, to minimise site work.

Communications

The two sites are not remote, and existing public communications systems will be utilised for most communication.

A two-way radio system will be installed at the sites, covering the mine operations and beneficiation plant and an additional system for the HPF.

Fuel Storage

A 20-kL diesel storage tank will provide approximately two weeks supply for the mine and beneficiation plant.

The facility will be bunded with unloading pumps, light vehicle and heavy vehicle rapid fill bowsers. Mining trucks will refuel at the plant site, but other mining equipment and remote generators will be refuelled by a service truck.

Mobile Equipment

In addition to the mining fleet, two 4WD vehicles have been allowed for in the beneficiation plant and two will be provided for use by the HPF and administration department as well as one 20-seater bus to transfer staff around the HPF site.

Two 5 t trucks with hoists will be provided to carry light freight at the two sites respectively.
Other equipment to be provided to the operations include one mobile crane, portable stand-by generators and lighting towers, diesel welders, an Integrated tool carrier / forklift for reagent bag handling and two small FEL / Bobcats for plant clean-up, one at each site.

Environmental and social setting

The project site lies within a rural landscape of relatively flat open farming country, typical of the open volcanic plains of the area. Yendon and the surrounding area had a population of 307 people at the 2016 census, with 52% male, 48% female and no indigenous people. The median age of the population is 40 years. There were a total of 116 dwellings, with an average of 2.7 people per household.

The nature of the proposed development involves land clearing and mineral extraction and processing activities that are familiar to the industry and for which good practice management and mitigation measures have been developed and are well understood. As such and given the existing modified condition of the site in an area with a long history of mining, many of the environmental and social impacts associated with mining operations are not expected to be significant.

Project Implementation

The contracting strategy has not yet been defined for the Project, however the capital cost estimate has assumed an EPCM approach, with horizontal packaging. A small Owner’s team will supervise the EPCM Engineer, and under this arrangement the Owner will pay for all direct costs of plant, equipment, materials, supply, fabrication and installation as approved by the Engineer. The Engineer will not derive any profit from this direct expenditure.

With significant infrastructure work being carried out in Victoria, it has been assumed that there will be ample resources, the preliminary implementation plan is based on the use of a locally based trade workforce.

The most likely source of construction materials will be Australia, potentially with steel sourced from China.

Construction Material Sources

Description	Origin
Concrete materials	Cement: Australia Aggregate, sand: Local sources
Steelwork / Platework / Tankage	China, Australia, Indonesia
Piping and Valves	South Africa, Australia or Europe
Mechanical and Electrical equipment and Materials	Various international suppliers
Building Supplies	South Africa, Australia

The project schedule is governed by the lead time for the Acid Regeneration facility. Other early activities necessary will be procurement and construction of the Rotary Calciner.

The overall Project is estimated to take 28 months to commissioning from HEGL decision to build.

Operations

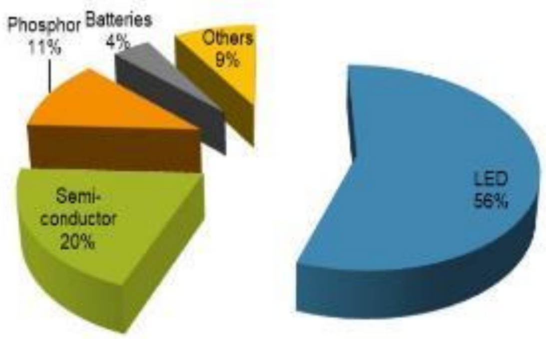
A core group of experts will be recruited for the initial training and management of the operation. The HPF will require specialised skills and a small number of key operations level personnel will receive approximately four months pre-operations training followed by at least three months experience on the plant during testing and commissioning.

Staff will be employed on a residential basis, both sites have accommodation suitable for the workforce required. Continuous shift personnel in both the mine and process plant will have a two weeks on / one week off roster. Allowance has been made in estimating staff numbers for annual and sick leave needs.

Marketing

HPA Demand

The total demand for HPA is estimated at 24,700t in 2016, which has grown sharply since 2013 from a level of 16,400t. In 2017, it is estimated that growth in LED, electronics (semiconductor) and batteries will push demand up to 27,900t. The largest market is LED production, accounting for around 56% of HPA supply in 2016, whilst semiconductors represented 20%. Other key markets are phosphors and Li-ion batteries, which accounted for 11% and 4% of the market in 2016 respectively, as shown in Figure 2.6.



Source: Roskill

Global HPA Demand by application 2016 (total 24.7 kt)

HPA Supply

The production of HPA has expanded significantly over the last 15 years, with the main suppliers accounting for two thirds of global production. To date there hasn't been the incentive in the market for significant innovation in the production process due to the relatively small size of the market.

Price Forecast

Pricing is dependent on several factors related to the physical and chemical characteristics of the HPA. Different end use markets have specific requirements, and the regional supply / demand balance is also important. As an industrial mineral, pricing is done on a bilateral basis. There is no central market or benchmark price. Roskill estimates that global HPA prices in 2017 ranged from US$25-35/kg for 4N grade, US$48-60/kg for 5N and US$160-170/kg for 6N.

While the demand outlook for HPA generally is very positive, demand for higher purity HPA products is expected to grow most rapidly. The exacting requirements of the high-tech applications that use HPA require the lowest level of impurities possible for their efficient operation. The assay results that have been achieved as part of this PFS indicate that HEGL's HPA project will potentially produce a product at the upper end of the 4N spectrum. As higher specification HPA generates a significant price premium this may result in a significant additional revenue over what has been assumed in this study.

There are a range of views on the outlook for HPA price amongst the various independent industrial mineral market commentators from very bullish to a moderate decline over time. Roskill are at the conservative end of forecasters, anticipating a slow decline in HPA price of approximately 3.5% pa, due to the pricing pressure from end users being pushed down the supply chain.

Given this range of views on HPA price, HEGL has elected to use a long-term forecast price of USD 25,200/t for 4N HPA. Selecting this price at the bottom of the current market range for 4N HPA HEG believes is a conservative approach in light of the strong demand fundamentals for the markets that we are targeting, the expected quality of our product and for a new entrant seeking to establish itself in the HPA market.

Operating Cost Estimate

Operating costs have been developed using the plant parameters specified in the process design criteria. The operating cost estimate presented in this section includes all direct costs associated with the Project to allow production of HPA.

Annual operating costs and costs per tonne of ore and per tonne of HPA produced have been developed and are summarised in the tables below. The operating cost estimate has been developed based on an annual production of HPA of up to 8 000 t/annum.

Mine and beneficiation Plant Operating Cost Summary (± 25%, 2Q18)

COST CENTRE	Total Cost		
	US$/year	US$/t ore	US$/tonne HPA
Mining	1,748,310	20.89	230.42
Kaolin Beneficiation	1,706,548	20.39	224.92
General & Administration	759,472	9.08	100.10
TOTAL	4,214,329	50.37	555.43

Hydrometallurgical Processing Facility Operating Cost Summary (± 25%, 2Q18)

Labour	12,939,643	154.64	1,705.40
Operating Consumables	17,664,134	211.10	2,328.06
Energy	12,688,866	151.64	1,672.34
Maintenance Materials	6,555,993	78.35	864.05
Waste Disposal	856,100	10.23	112.83
General & Administration	3,261,877	38.99	429.91
TOTAL	53,966,613	644.95	7,112.59

Overall Operating Cost Summary (± 25%, 2Q18)

COST CENTRE	Total Cost		
	US$/year	US$/t ore	US$/tonne HPA
GRAND TOTAL	58,180,942	695.32	7,668

Capital Cost Estimate

The purpose of the capital cost estimate is to provide substantiated costs which can be utilised to assess the economics of the Project. The capital costs are presented in United States of America dollars (US$) as at the second quarter 2018 (2Q18) to an accuracy of ± 25%.

The Project capital cost estimate is summarised in the table below.

The following items are specifically excluded from the capital cost estimate:

- Sunk costs, including pre-feasibility and feasibility costs.
- Exchange rate variations and escalation.
- Any environmental requirement not identified in the scope of the estimate.
- Mining capital is captured in the contract mining costs

Capital Cost Estimate Summary (US$, 2Q18, ±25%)

Mine and Beneficiation plant	$ 20,257,225
Engineering & Design	$ 16,317,079
Contractor Management	$ 3,732,525
Construction	$ 25,862,760
Mechanical Equipment	$ 92,813,954
Piping	$ 20,614,397
Electrical	$ 22,991,531
Equipment & Tools	$ 3,382,271
Contingency	$ 50,260,825
Owners Costs	$ 14,767,536
Total Capex	**$ 271,000,103**

Financial Analysis

Economic evaluation of the HPA Project has been based upon:

- Capital Cost Estimate prepared by Primero Group.
- Mine Schedule and cost estimates prepared by Mining Plus.
- Estimated operating costs, Owners capital costs and sustaining capital costs were calculated based upon budget quotations or on detail provided by HEGL.
- Product Prices based upon guidelines provided by HEGL.

A simple cash flow model gave the results in the table below.

Results of financial analysis

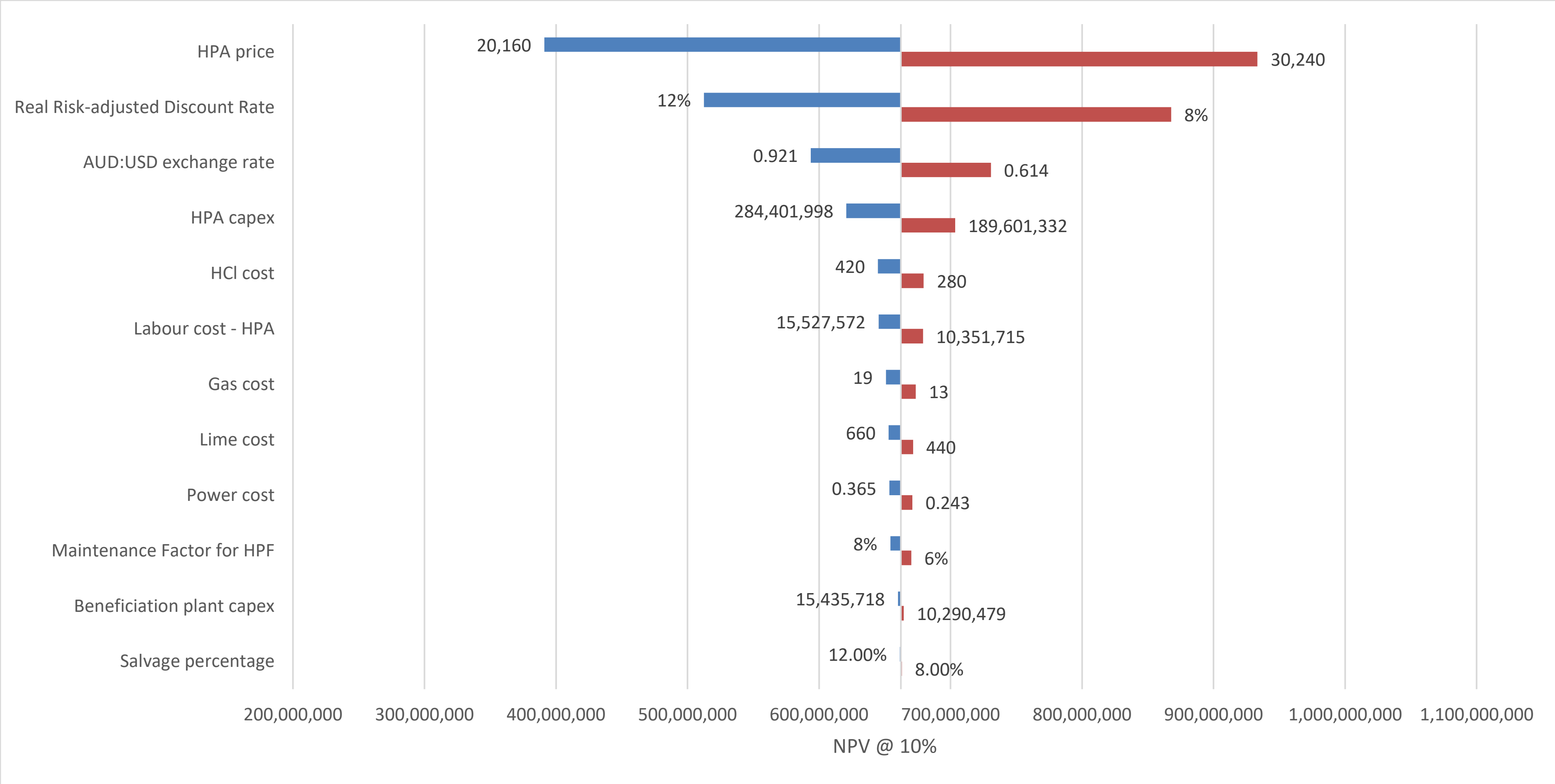
Parameter	Unit	Quantity
Total Mined	tonnes/million	5.82
Ore Milled	tonnes/million	3.26
Strip Ratio		0.78
Al_2O_3 grade	%	13.00
Contained Al_2O_3	tonnes	424,233
Recovery Al_2O_3	%	69.752
Recovered Al_2O_3	tonnes	295,912
HPA Price	$/tonne	25,200
Revenue from HPA Sales	US$ million	7,457

	US$ Million	$/tonne HPA sold	$/t Processed	$/t Mined
Mining Cost	68.18	230	20.89	11.71
Beneficiation Plant cost	96.17	325	29.47	16.51
HPF Plant Operating cost	2,105	7,113	644.95	361.38
Operating Cost	2,269	7,668	695.32	389.60
Royalties	2.22	7.49	0.68	0.38
Total Cash Cost	2,271	7,676	696	389.98
Earnings Before Interest Taxes (EBIT)	4,960	16,762	1,520	851.66
NPV (10.0%)	691.83			
IRR	34%			

The results reported are for 100% of the Project and exclude any funding.
The results are highly sensitive to the HPA price, as shown in Sensitivity Analysis below, based on the parameters listed in the table below.

Project Sensitivity Parameters

Input variable	Base Value	Units
Power cost	0.304	$/kWh
HPA price	25,200	US$/tonne
Salvage percentage	10.00%	%
Labour cost – HPA	12,939,643	USD/annum
AUD: USD exchange rate	0.768	0
Beneficiation plant capex	12,863,098	USD
HPA capex	237,001,665	USD
Lime cost	550	AUD/tonne
HCl cost	350	AUD/tonne
Maintenance Factor for HPF	7%	% of supply value
Real Risk-adjusted Discount Rate	10%	%
Gas cost	16	$/GJ



Project Sensitivity

Risk Analysis

A high-level risk analysis focussed on risks facing the Project, from the points of view of health and safety, environment and financial risks. The review endeavoured to identify major risks that could place the Project in jeopardy, to allow these to be addressed early in the planning process. The review procedure categorised risks according to the severity of the consequences of an event, the likelihood of it occurring and the control measures in place.

Resource Risk

Resource risk is viewed as minor, the resource estimate has been carried out to JORC standards and the defined aluminous clay resources are more than adequate to meet the Company's requirements for the foreseeable future.

Technology Risk

This has been identified as the main risk in the project. Although most unit operations utilised in the proposed flow sheet are well understood and proven processes, and bench scale test work has produced 4N HPA, there is a significant amount of work to accomplish to achieve scale-up to commercial scale. The Company intends undertaking pilot-scale optimisation test work during the DFS phase.

Market Risk

Available forecasts suggest an extremely strong market for HPA, with expected shortfalls requiring new capacity to come on-stream. However current supply is concentrated amongst a relatively small number of suppliers the reaction to increased supply from new market entrants remains to be gauged. HEGL has engaged two highly experienced marketing consultants to focus on the key Asian markets of China, Japan and South Korea. A structured marketing campaign has commenced to ensure that a broad range of customers across the product spectrum of HPA markets and trading houses are engaged.

Permitting Risk

Permitting is a significant consideration for the Project. This is mitigated by the small scale of the proposed Yendon clay mine, which should be a positive in the approvals process and by the existence of a fully operational kaolin mine in a neighbouring tenement.
The proposed location of the HPA plant in an established industrial park which is host to several chemical industries should be positive for the permitting process.
Permitting risk is also mitigated by the generally benign nature of reagents, products and waste.

Financing Risk

HEGL currently does not have sufficient funds to construct and commission the Yendon HPA project. Due to the strong economic results from the PFS, HEGL believes there are reasonable grounds to expect that sufficient funding will be available to finance the A$271M capital development cost of the project. A number of funding sources may be available to HEGL, including but not limited to:

- access to debt finance facilities;
- access to equity funding from capital markets; and
- funding from other sources such as potential off-take agreements, equipment suppliers and / or government business development financing.

Securing funding is not normally contemplated at the PFS stage of a project. HEGL's funding requirements depend on numerous factors, including the completion of a Definitive Feasibility Study.

Competent Person's Statement

The information in this statement that relates to the Mineral Resource estimates is based on work done by Rod Brown of SRK Consulting (Australasia) Pty Ltd.

Rod Brown is a member of The Australasian Institute of Mining and Metallurgy and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration, and to the activity he is undertaking, to qualify as a Competent Person in terms of The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code 2012 edition).

The information in this statement that relates to the geology, drilling, and sampling is based on work done by Mike Ware.

Mike Ware is a fellow of The Australasian Institute of Mining and Metallurgy and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration, and to the activity he is undertaking, to qualify as a Competent Person in terms of The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code 2012 edition).