ASX ANNOUNCEMENT **17 May 2019**

POSITIVE SCOPING STUDY FOR ADVANCED GRAPHITE PROCESSING

HIGHLIGHTS

- ✓ **Positive Scoping Study illustrates opportunity for Hexagon to capture significant margins from downstream of the graphite supply chain.**
- ✓ **Scoping Study is based on a standalone advanced graphite processing plant sourcing feedstock on an arms-length commercial basis from third-party producers.**
- ✓ **Suite of end products comprises a dozen premium materials across battery and technical/industrial applications, with pricing based on direct investigations of key markets, participants, product volumes, specifications and price levels.**
- ✓ **Preferred location is in Washington State, USA based on a post-tax basis. Pre-tax, there is minimal financial advantage to the alternate site assessed in Western Australia.**

1 INTRODUCTION

Hexagon Resources Limited (ASX:HXG, **Hexagon** or **the Company**) is pleased to report on the key findings of a Scoping Study assessing the viability of the Company developing a standalone Graphite Purification and Processing Plant (**GPPP**), to manufacture high-specification graphite products.

The downstream Scoping Study examined the following implementation plan, including several option scenarios regarding site location and purification technology, involving:

- Purchase, at prevailing market prices, of all the required high-quality graphite concentrate feedstocks and freight to the GPPP;
- Sites in Geraldton, Western Australia or Chelan County, Washington State, USA;
- Utilising one of two thermal purification technologies to refine all the flake concentrate ahead of any processing;
- Three product lines comprising an Expandable Precursor line, an Industrial Applications line and a Battery Materials line;
- Producing packaged products shipped to customers, of whom 60% are estimated to be in the USA and Europe and 40% in Japan, Korea and China;
- Development of the GPPP in successive stages planned to commence in first half of 2020 and comprising:
  - ✓ Construction of a Qualification Plant, with a rated capacity of approximately 1,000 tonnes of products per year to verify product specifications can be met;
  - ✓ Scale up to a commercial scale plant with a rated capacity of approximately 20,000 tonnes of products per year; and
  - ✓ Additional expansion to approximately 50,000 tonnes of products per year.

Note – the Qualification Plant will continue to be available to either qualify new flake feedstock sources or for ongoing research.

- A product suite, which is planned to comprise approximately 12 distinct, refined, milled and sometimes shaped graphite materials to be used to make expanded graphite, battery anode material (**BAM**), conductivity enhancement materials (**CEM**), ultra-fine powders and precursor for synthetic diamonds, as well as an expanded graphite precursor.

The main participants to the Scoping Study completed by Hexagon for the GPPP were:

- GR Engineering Services Limited (**GRES**) – Included study management, engineering, design, cost estimation and compilation of the Scoping Study report document and input information.
- Hexagon – Site Location studies, input testwork studies and with support from independent consultants completed a product marketing strategy.
- Optiro – A mining industry consulting and advisory group reviewed this report to provide guidance to Hexagon on its compliance obligations with respect to the ASX Listing Rules and ASIC requirements.

2 SUMMARY OUTCOMES

A snapshot of the main outcomes of the Scoping Study, which was undertaken at +/- 30% level of estimation across the two locations modelled is presented in Table 1.

Table 1: Summary DSS Outcomes

	Financial Highlights	
	Geraldton (Australia)	Chelan County (USA)
Pre-tax NPV (10% discount)	A$0.88 to A$1.20 Billion	A$0.92 to A$1.24 Billion
Post-tax NPV (10% discount)	A$594 to A$804 Million	A$708 to A$958 Million
Pre-tax Internal Rate of Return	40% to 61%	40% to 58%
Post-tax Internal Rate Return	32% to 48%	35% to 49%
Operating Margin (EBITDA)	51%	54%
Payback period from FID (post-tax)	4 years	4 years
Payback period from full commercial production (post-tax)	2 years	2 years
Operating Cost Product (life of project)	A$2,618 / Tonne	A$2,248 / Tonne
Feedstock Price	A$2,089 / Tonne (Equivalent to US$1,504 / Tonne)	
Weighted Ave Basket Price of Products	A$8,487 / Tonne (Equivalent to US$6,110 / Tonne)	
Start-Up Capital Phase 1	A$23 Million	A$27 Million
Start-Up Capital Phase 2	A$118 Million	A$135 Million
Start-Up Capital Phase 3 (fully funded from operations)	A$139 Million	A$153 Million

Cautionary Statements

The Scoping Study referred to in this announcement has been undertaken to assess the viability of a staged advanced secondary graphite processing facility. As graphite is not a commodity and there is considerable qualification work required to establish sales contracts, Hexagon is aiming to set-up a Qualification Plant as quickly as possible, because of the time required, approximately 12 months during which qualification work needs to be undertaken, with minimal returns before an investment decision into the first phase commercial

plant can be made. The Scoping Study compares two refining technologies and two possible site locations, Australia and the USA. The Scoping Study also aims to identify the key technical issues to plan follow-up feasibility level studies, if warranted.

The operating parameters and economic estimates detailed in the Scoping Study are representative of a 100% interest in the GPPP.

The Scoping Study is based on the material assumptions discussed further below and in Appendix 2. These include assumptions about the availability of funding. While Hexagon considers all the material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the outcomes estimated by the Scoping Study will be achieved.

It is a preliminary technical and economic study of the potential viability of the GPPP. It is based on low level technical and economic assessments generally to a level of +/- 30% that are not sufficient to support any kind of financial investment or development decision. Further work is required, which includes further detailed testwork on all the process units comprising refining, milling/micronisation, spheroidisation and classification.

At this preliminary stage of assessment, Hexagon has based design and process criteria on testwork on flake graphite from the Company's jointly owned McIntosh project in Western Australia, which it considers will apply to other discrete flake sources. The McIntosh work provides a strong base case for the preferred flake type the Company is targeting. There is a deep and varied international graphite concentrate trade and at this level of study it is premature to characterise graphite concentrates from 30 to 40 producers to ultimately short-list for qualification work. The Company regards this as a reasonable assumption at this level of study given the Company has assumed a premium feedstock price to ensure it obtains its desired specifications for each product line. Furthermore, the equipment assumed in the scoping study is robust; and by varying parameters such as temperature profiles and residence time in the furnaces, and various particle dwell-time, hammer rotations and air-pressure settings in the mills, Hexagon is confident it can achieve the required specifications.

The McIntosh project may ultimately be one source of concentrates for the GPPP; however, this is subject to completion of a feasibility study at McIntosh. It is important to note that many of the world's major downstream graphite processing businesses do not own their feedstock source projects. Potentially use of the McIntosh flake could be a benefit for Hexagon but this has not been assumed in this study.

To achieve the outcomes indicated in the Scoping Study, funding in the order of A$25 million is estimated to be required to build the Phase 1 Qualification Plant, and then an additional A$130 million to get to the first commercial scale facility. A further A$150 million is required to build-out Phase 3 which is assumed can be funded from internal cashflows. This brings the total funding requirement for the Qualification, Phase 1 and Phase 2 stages to A$280 to A$315 million, for the Australian and USA sites respectively.

Investors should note that there is no certainty that the Company will be able to raise that amount of funding when needed, which is discussed further below. It is also likely that such funding may only be available on terms that may be dilutive to or otherwise affect the value of Hexagon's existing shares. It is also possible that Hexagon could pursue other 'value realisation' strategies, such as direct financing into the GPPP via a joint venture or partial sale. If it does, this could materially reduce Hexagon's proportionate ownership of the GPPP.

This announcement contains forward-looking statements. Hexagon has concluded it has a reasonable basis for providing these forward-looking statements and believes it has reasonable basis to expect it will be able to fund development of the project. However, a number of factors could cause actual results or expectations

to differ materially from the results expressed or implied in the forward-looking statements. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of this study.

3 KEY INPUTS

3.1 Location

Location is a critical input due to regionalised variability in power costs and freight logistics. Hexagon searched for low cost and stable power as this is a significant operating cost component (c. 25%). Freight costs are also a high proportion of costs (c.30%) for either graphite concentrates arriving at the GPPP or the products being shipped out as there is only a 3% to 6% loss in mass between the feedstocks and final products. Therefore, the GPPP should either be close to the upstream sources or close to key, large volume customers to reduce freight costs.

Hexagon selected the Geraldton site based on it being relatively close to the potential McIntosh source, close to Asian customers and being located on an optimum portion of the regional power grid for facilitating a combined solar grid power solution.

The Chelan County site in Washington State, USA was prioritised because of low cost, stable hydro power. Furthermore, Hexagon regards it as close to its major markets in North America and Europe.

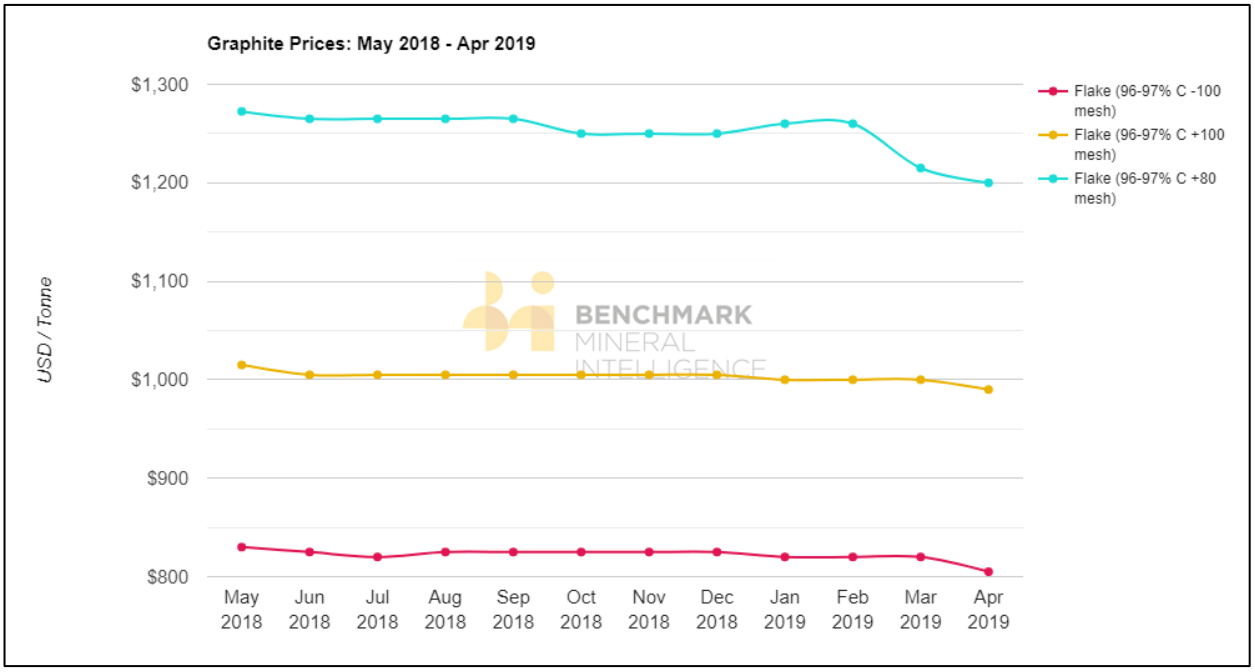
3.2 Feed Stock

The Scoping Study assumes that the GPPP will procure all graphite concentrate feedstocks on an arms-length, commercial price from a range of international sources. In time, material may also be sourced from Hexagon's 49% interest in the McIntosh Joint Venture (**MJV**), subject to completion of a positive feasibility study and achieving commercial production at McIntosh. None of the outcomes in this Scoping Study are based on feedstock from Hexagon's current projects, in particular the McIntosh Project.

The assumed input price is an average of US$1,504/t for graphite concentrate. At this assumed premium price, Hexagon is confident of procuring the exact flake types it requires to meet its intended product range from existing third-party producers. Hexagon has previously reported basket price estimates for the sale of McIntosh concentrates, consistent with the assumed input price in the McIntosh Project Prefeasibility Study (ASX release dated 31 May 2017) and in a business strategy update (ASX release dated 28 August 2018). Hexagon estimates that its assumed feedstock price is at an approximate 30% price premium to the moving average for all concentrate types tracked by Benchmark Mineral Intelligence, as shown in Figure 1, highlighting the "full-commercial" basis of this cost input.

Hexagon considers that there is enough flexibility in the process circuits to accommodate the use of a range of high-quality concentrates, on the basis of the baseline testwork undertaken on the McIntosh samples. The refining technology is well proven in commercial settings on a variety of flake types, and similarly, the milling, micronising and spheroidisation technology is applied in many operations and has been tested on African and Chinese derived flakes. There is an established global trade in graphite concentrates and the supply chain constraint is more likely in the secondary processing than in the upstream sources. Hexagon will need to seek out specific flake attributes for specific products which have now been well documented based on the McIntosh samples. This is exactly what most of the downstream graphite processing companies do, with very few of them owning mines. There are many operating graphite mines and development projects around the world, such as in Madagascar, Africa, India, North America, Brazil and Australia, which are likely to meet the raw material supply requirement for Hexagon's stand-alone GPPP.

Figure 1: Indicative Independent Flake Graphite Concentrate Prices



3.3 Sales

Testwork programs, deep industry insight from Hexagon's technical partner, NAmLab[1], as well as internal and independent market investigations, provide the basis for the product and pricing matrix in Table 2, which comprises:

- *Expandable Line* – products derived from larger sized purified flake material and being sold as an expandable precursor as a higher purity material, suitable for high-tech foils, gaskets and seals e.g. for nuclear industry or fuel cell applications.
- *Industrial Line* – products derived from mid-sized purified flake into four product segments; synthetic diamond precursor, CEM for batteries and electrodes, ultrafine grained material for specialised coatings, and mould release agent for foundries.
- *Battery Materials Line* – products derived from mainly finer-sized purified flake as well as "undersize" from the above lines consisting mainly of BAM compromising standard uncoated spherical graphite (**USG**) for lithium ion batteries anodes and some speciality spherical and ultra-fine materials for industrial uses.

The product sale prices assumed in this Scoping Study will utilise those "modelled" in Table 2 and can be broadly characterised as representing a "basket price" for product sold of approximately US$6,110.

[1] Hexagon has a strict confidentiality obligation in place to not disclose the identity of its US Technical partner and so refers to this entity as "NAmLab".

Table 2: Downstream Products and Pricing

Product	ID	Product Price US$/t[1]			Conviction Rating2
		Low	High	Modelled	
Expandable					
Std. +80#X	E1_Z3	4,500	7,500	5,000	4
	E1_Z4	3,000	3,500	3,500	5
Prem +80#X	E2_Z6	6,000	11,000	7,500	3
	E2_Z9	3,500	4,000	4,000	4
Industrial					
Std. Diamond Precursor	I1_P4	4,200	5,000	5,000	4
	I1_P6	4,200	4,200	4,200	5
Prem. Diamond Precursor	I2_P1	8,000	10,000	10,000	3
Std. CEM	I3_E3	6,000	9,000	6,500	4
	I3_E6	3,000	4,000	3,500	3
UHP-E CEM	I4_E8	4,000	14,000	5,000	5
Prem. CEM	I4_E9	9,000	19,000	9,000	3
Coating Precursor	I4_E12	15,000	22,000	18,215	4
BAM					
USG - 23	B1_L3	3,200	3,800	3,600	4
USG - 16	B1_L6	3,200	3,800	3,600	4
SG-SSP	B3_L12	15,000	18,034	15,329	4
G-SSF	B3_L13	3,000	7,000	3,250	4

1. Concentrate pricing is generally in US dollars. The assumed exchange rate is US$0.72 = A$1:00.

2. A subjective factor reflecting confidence in the assessment – 5 strong and 1 weak

Generally, the modelled prices are conservative compared to the price ranges generated from Hexagon's market studies. This conservatism reflects several marketing challenges, namely:

- Hexagon needs to achieve market penetration into a well-established, conservative market;
- In several cases, Hexagon is introducing new products into markets which have the same specifications as established products but through a different treatment route, e.g. thermal purification-which can create a marketing inertia; and
- In some situations customers will be unfamiliar with very high specifications of the Hexagon and may need some convincing of the merits of these enhanced products.

These factors are reflected in the pricing selected for modelling and into the Conviction Rating (where 5 is the strongest). Background information on the product range and underlying testwork was reported to ASX on 29 April, 2019; "Excellent Technical Outcomes Underpin Downstream Business". Further detailed market investigations, qualification and acceptance are required notwithstanding that a modelled price has been proposed.

3.4 Technical inputs

Utilisation of advanced technologies matched to the products and feedstocks planned is a key aspect of Hexagon's commercialisation strategy to establish the GPPP. However, to provide conservative base-scoping level estimates, Hexagon has used standard, well established technologies for purification, milling/micronisation and spheroidisation/classification for its technology assumptions. This generates

greater confidence in operating and capital cost estimates because in some cases for the newer technology options cost parameters were not well established.

3.4.1 Purification

The core technology at the heart of Hexagon's downstream strategy is purification, namely, thermal purification by electro-thermal fluidised bed (**EFB**) furnace. This is a dynamic, continuous process where the flake impurities are volatilised at 2,400 to 2,800°C with an overall retention rate of 1 hour through the entire pre-heat, hot-zone and cooling stages. Hexagon has undergone simulation based testwork on this technology ahead of piloting, planned when construction of the pilot furnace is completed in early Q3 2019 by NAmLab.

Alternative thermal techniques are also available, which Hexagon has characterised as "static" furnaces. The traditional form of this is the static Acheson furnace which requires approximately three weeks of residence time at c. 2,800°C. These furnaces are regarded as "established" technology, and Hexagon has tested a proprietary, modified version of this technology which has a significantly shorter residence period. This modified version of a static furnace has a greater degree of automation, as well as being commercially available and utilised.

Standard purification techniques as employed in China comprise acid leaching, utilising a suite of reagents, including hydrofluoric acid. The traditional plants in China are not regarded as environmentally clean and the process itself can leave a halide residue on products which is not acceptable for certain high-end applications. Hexagon has avoided this route.

In the Scoping Study, Hexagon has undertaken estimates of operating and capital costs for the Static Furnaces on the basis of firm purchase costs and readily available operating data. The EFB was regarded as an "add-on" because there is less confidence around the capital and operating parameters. The advantages of employing EFB furnaces include:

- Short-residence time required to volatilise the impurities;
- Uniformity of purification outcomes across the bulk feedstock; and
- The continuous nature of the operation.

There was little to separate the two technologies on either operating or capital cost comparisons. Hexagon is planning to utilise the EFB furnaces subject to piloting testwork as this technology offers greater opportunities to improve the operating metrics. On this basis, the findings and much of the assessment in this Scoping Study is "agnostic" in terms of refining technology.

3.4.2 Milling and Shaping

Post purification the main work duty is milling and/or shaping the graphite flake. The established technology from China, which dominates this aspect of graphite processing globally, comprises long lines of impact hammer mills in series to achieve the required size specifications and shapes. However, there are newer one-stage mills also available which claim higher yields and lower costs. Hexagon has tested both types and achieved good results.

The Scoping Study assumes utilisation of the traditional impact hammer mills to perform the main milling duty at the GPPP. Hexagon is more confident with this basis because of its in-house experience with these types of mills and the "firm" basis of the quotes from equipment suppliers. This likely creates higher capital and operating cost estimates compared to the "one-stage milling and one stage spheroidisation/classification" units, due to a larger operational footprint and many more units being deployed. Hexagon will continue to evaluate the one-stage mills.

4 FINDINGS

The overall finding of the Scoping Study was that the GPPP business is a highly attractive investment proposition based on an NPV range of A$880 million to A$1,240 million and an IRR range of 40% to 61% on an unleveraged pre-tax basis dependent on location and technology. The GPPP presents as a financially robust opportunity under all scenarios modelled, with only a 3% margin between the 1st and 4th ranked options. On a pre-tax basis, there is no clear preferred choice.

On a post-tax basis, the Chelan County site in Washington State, USA is a clear front-runner as shown in the comparison between Tables 3 and 4.

The Scoping Study was designed to assess four different scenarios to determine which scenarios are viable and provide some indication as to the preferred case. The four different scenarios included two different locations, one in Australia and one in the USA, and two different furnace technologies with different cost bases, flow sheets and capital requirements. A summary of the key financial outcomes for all 4 scenarios is presented in Table 3.

Table 3: Financial Estimates for each of the four scenarios

Scenario Comparison (Before Tax) Nominal					
Location	**Furnace Technology**	**NPV[1] A$ millions**	**IRR %**	**Payback[2] Yrs.**	**Rank**
Geraldton	SF	884 to 1,196	45 to 61	4	4
Chelan County	SF	921 to 1,247	43 to 58	4	1
Geraldton	EFB	892 to 1,206	40 to 54	4	3
Chelan County	EFB	918 to 1,242	40 to 54	4	2

1. *The Discount Rate for the NPV estimate is 10%.*
2. *Payback is based on the FID related to the Phase 2 construction i.e. after having run the Qualification scale plant for 1 year.*

4.1 GPPP Location

Two locations were examined for the GPPP targeting areas with low-cost power, transport and relativity to the source at McIntosh and customers in the USA, Europe and Asia. These two locations did not demonstrate significate differences on a before tax basis, but Hexagon found a significant difference when introducing corporate taxes, as the tax rate for the USA is 21% compared with the Australian Corporate tax rate of 30%. The effect on the NPV estimates can be compared in Table 4.

Table 4: Financial Estimates for each of the four scenarios on a post-tax basis

Scenario Comparison (After Tax) Nominal					
Location	**Furnace Technology**	**NPV A$ million**	**IRR %**	**Payback Yrs.**	**Rank**
Geraldton	SF	594 to 804	36 to 48	4	4
Chelan County	SF	798 to 958	37 to 49	4	1
Geraldton	EFB	597 to 807	32 to 44	4	3
Chelan County	EFB	705 to 953	35 to 47	4	2

Chelan County appears to be a clear front-runner on an after-tax basis. However, 75% of Hexagon's shareholders are Australian, and only an operation in Australia can offer these shareholders a franked dividend. Whilst the issuance of franked dividends by the Company is not guaranteed; it is a relevant consideration in the selection of locations to the value to its shareholders.

There are three other key influences that impact the choice of locations; these are foreign exchange rates, power cost stability and customer markets.

i. Foreign exchange rates influence the stability and profitability of margins and, although measures can be put in place to reduce the exchange rate impact, it cannot be ignored with sales of graphite product being predominantly in USD. By placing the plant in the USA, a more stable profit environment is maintained due to both revenues and expenditures being in USD. Refer sensitivity analysis in Figures 5 and 6 below.

ii. Power available in Chelan County is low cost, renewable hydro power within a well-established low-cost power market. By contrast, in Geraldton, Hexagon is considering a "behind the meter" renewable solution to reduce the high power costs of West Australian grid power. Hexagon has utilised the blended renewable/grid power price as proposed by an experienced third-party "build-own-operate" (**BOO**) provider; however, this is subject to changes in government legislation.

iii. Customer markets are discussed further in Section 4.3; however, the relevant issue in considering location is whether a USA based manufacturing facility will be viewed as significantly more attractive to USA (and European) customers.

Based on these variables both Chelan County and Geraldton WA are being considered further as locations for the GPPP. However, given certainty around power pricing and the marketing impact of "Made in the USA", Chelan County is edging ahead as preferred site subject to gaining more certainty around cost assumptions, permitting requirements, and market demand.

4.2 Furnace Technology

The costs between the furnace technologies result in a negligible difference on NPV across 25 years (Table 3 and 4), therefore either technology offers a viable flowsheet solution. On this basis Hexagon will be pursuing the preferred EFB furnace technology.

4.3 Product Markets and Pricing

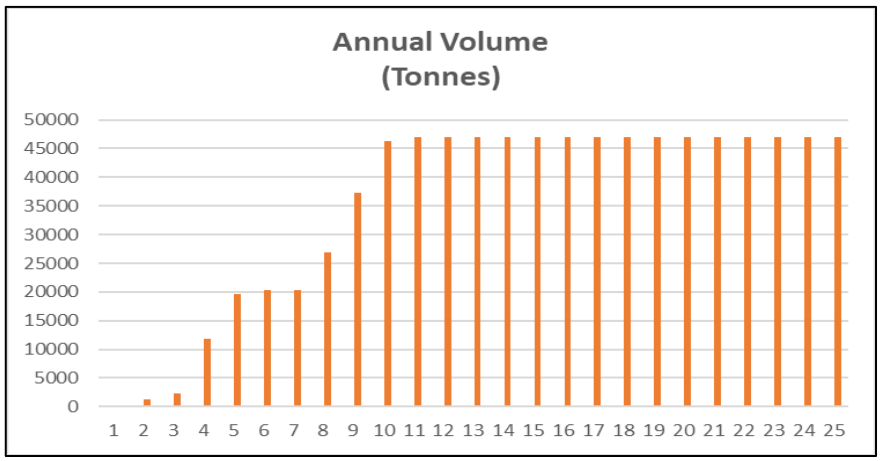
Extensive market research was conducted to understand the market demand and pricing of products that will be manufactured at the GPPP using the specific techniques as outlined in the Scoping Study. The outcomes of that work are summarised in Table 2.

The resulting average basket price across the 12 products was estimated to be US$6,110 per tonne (~ equiv. A$8,487). The high-low range for the weighted average was US$5,500 to US$9,100 per tonne of product, and the range for all the modelled prices was US$3,500 to US$18,215 per tonne product.

The market study was based on approximately 60% of the products being sold into North America and Europe and 40% into Japan, Korea and China.

The overall production profile is presented in Figure 2, with Phase 2 output of approximately 19,000 tonnes of products (20,000 tonnes processed) estimated in Year 5 and then progressively ramping up over three years to hit full output of 46,000 tonnes (49,000 tonnes processed) per year.

Figure 2: Production Ramp-up for GPPP



4.4 Unit Cost and Profitability

Unit cost margins show a profitable operation with margins as presented in Table 5.

The unit costs presented are those for the first commercial phase of operation (Phase 2), planned to produce at 20,000 tonnes per annum generating margins of approximately A$4,190 and A$4,472 per tonne of product at Geraldton and Chelan County respectively. In Phase 3, commercial production increases to approximately 49,000 tonnes per annum and the net margins grow to approximately A$4,383 for Geraldton and A$4,653 for Chelan County. These are highly robust net operating margins of 51% and 54% on revenue and 97% and 111% on costs, for Geraldton and Chelan County respectively.

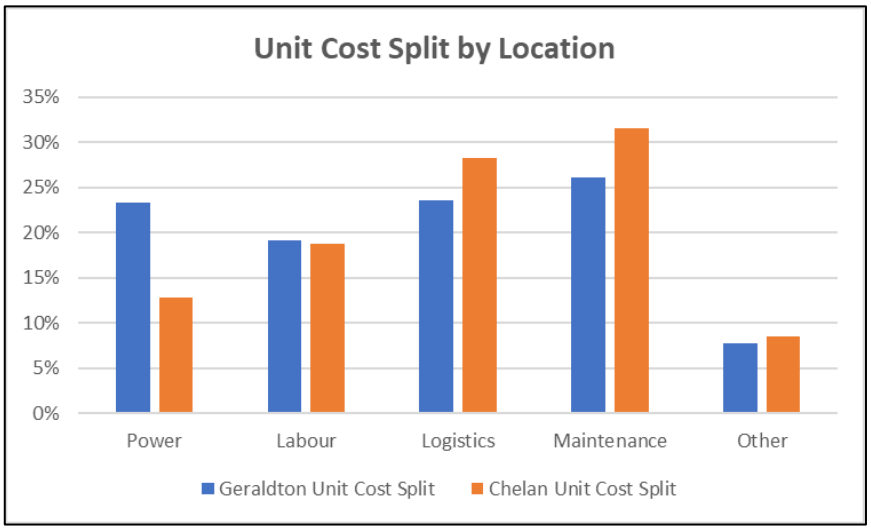
The unit cost breakdown in Table 5 highlights that Chelan County has a 15% lower operating cost profile than Geraldton. The major site related differences are power and labour costs with difference between the two locations of 111% and 23% respectively. The other cost components are broadly similar between the two sites.

Table 5: Sales and Unit Costs Breakdown by Location

	A$/Tonne produced	
	Geraldton (Australia)	Chelan County (USA)
Product Sales	**8,487**	**8,487**
Operating Power	486	230
Plant Labour	340	277
Transportation	495	514
Maintenance	547	574
Other Operating Costs	95	85
Overheads and GA	135	139
Total Operating Costs	**2,099**	**1,817**
Feedstock Cost	2,198	2,198
Total Costs	**4,298**	**4,016**
Net Margin	**4,190**	**4,472**

The highest operating cost components are transportation and maintenance (mainly furnace related) which comprise approximately 25% and 30% respectively for both locations as illustrated in Figure 3.

Figure 3: Comparison of Unit Cost split between locations



4.5 Market Acceptance and Capital Requirements

The project is designed in three phases to gain market acceptance for the various products by customers and to build-up cashflows such that the Phase 3 expansion can be fully funded from operating cashflows.

Phase 1 has been designed as a qualification phase to send product to customers while minimising the initial capital required. Phase 2 is the first commercial phase at 20,000 tonnes per annum and is planned to provide the cashflow to fully fund the development of Phase 3, the second commercial stage, where production is increased to 49,000 tonnes per annum. The final expansion phase envisages a strong demand growth profile for advanced graphite materials and notionally matches Hexagon's entire 49% equitable share of production from the McIntosh Joint Venture (**MJV**), in the hope that this will become a major feedstock source.

The capital expenditure for each development phase of the GPPP is summarised in Table 6.

Table 6: Capital Cost Estimates by Development Phase and Location

	A$/ Millions	
	Geraldton (Australia)	Chelan County (USA)
Phase 1	23	27
Phase 2	118	135
Phase 3	139	153
Total	**280**	**315**

The overall capital requirement for the GPPP business is set out in Figures 4 and 5 on a post-tax basis comparing the Geraldton and Chelan County locations. The figures illustrate that the first two years comprise the construction and operation of the Qualification Plant. Then, subject to a positive financial investment decision to proceed with the Phase 2 commercial development, an additional A$118 million would be required for the build-out plus working capital during the ramp-up. These funding challenges are discussed further in Section 5.3 below.

Figure 4: Annual Net Cashflow (post-tax) by location

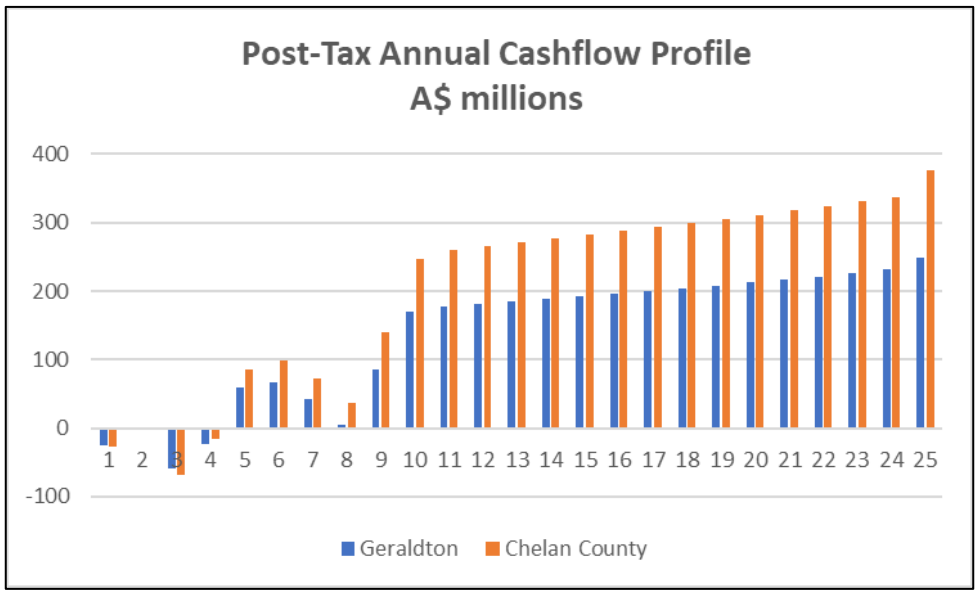


Figure 5: Cumulative Net Cashflow (post-tax) by location

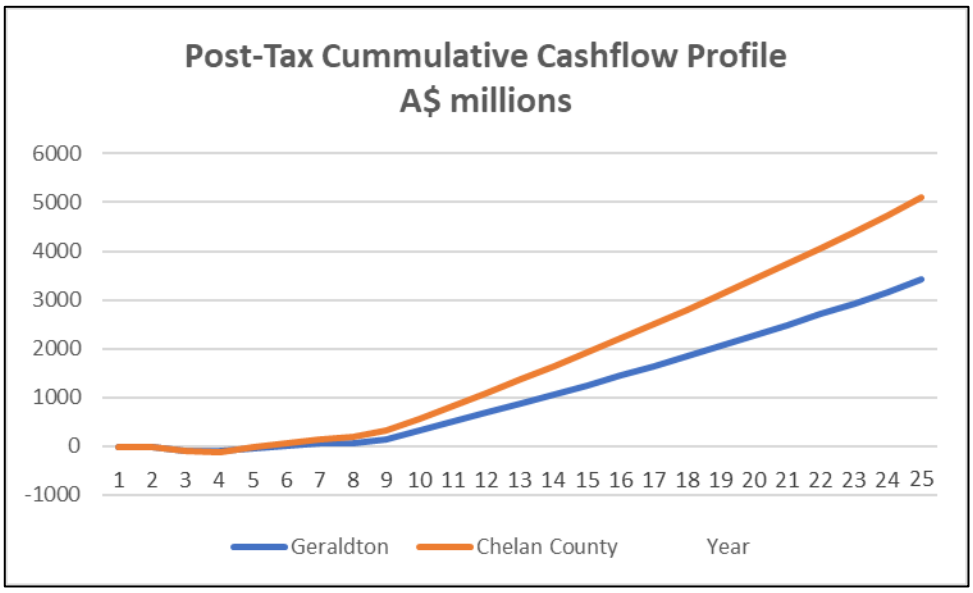


Table 7: Financial Outcome on a Phase 2 Only Basis

Scenario Comparison (after Tax) Nominal					
Location	**Furnace Technology**	**NPV[1] A$ millions**	**IRR %**	**Payback[2] Yrs**	**Rank**
Geraldton	SF	303 to 411	33 to 45	4	3
Chelan County	SF	363 to 491	34 to 46	4	2
Geraldton	EFB	309 to 417	30 to 40	4	4
Chelan County	EFB	367 to 497	31 to 41	4	1

5 ANALYSIS

5.1 Sensitivity Analysis

A standard sensitivity analysis for each of the preferred locations, Geraldton and Chelan County highlights that product price and then foreign exchange movements have the greatest impact on the NPV, as presented in Figures 6 and 7 below. The leverage on NPV estimates by % change to product price is unsurprisingly similar for both GPPP locations, as the changes to price report straight to the surplus cashflow position in either a positive or negative manner. Relevant to the risk assessments - flex of exchange rates, namely AUD:USD, impacts the Geraldton site significantly more than the USA location. In the USA, operating costs and most revenues are in USD; hence there is relatively modest sensitivity. In Australia, a significant portion of the capital costs and some operating consumable costs are in USD, which reduces NPV estimates when the USD rises relative to the AUD. However, in this circumstance, sales revenues are enhanced in AUD terms, because sales are transacted in USD. Changes to Operating Costs, Feedstock price and Capital Costs all ranked well below Product Price and Exchange Rate in terms of impact on NPV.

At this +/- 30% scoping level of confidence this level of sensitivity is regarded as adequate as it highlights the importance of understanding the product markets and pricing as well as additional risks associated with foreign exchange.

Figure 6: Sensitivity Analysis on Post-Tax NPV - Geraldton

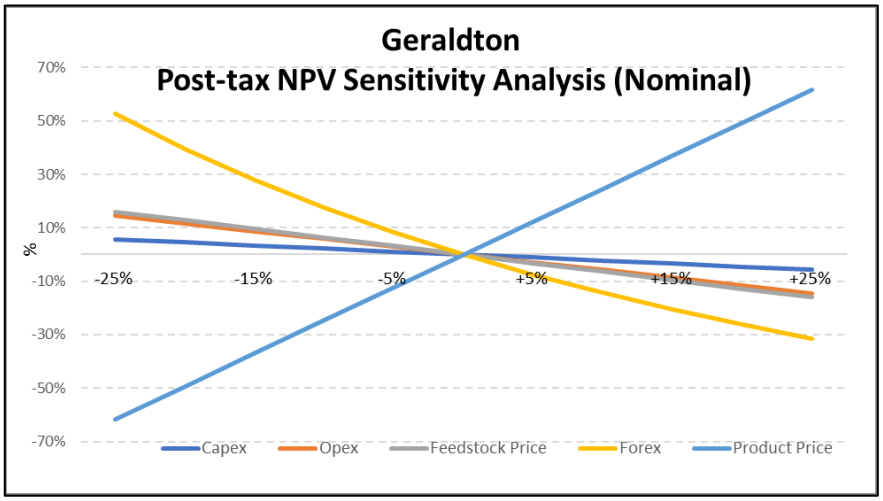
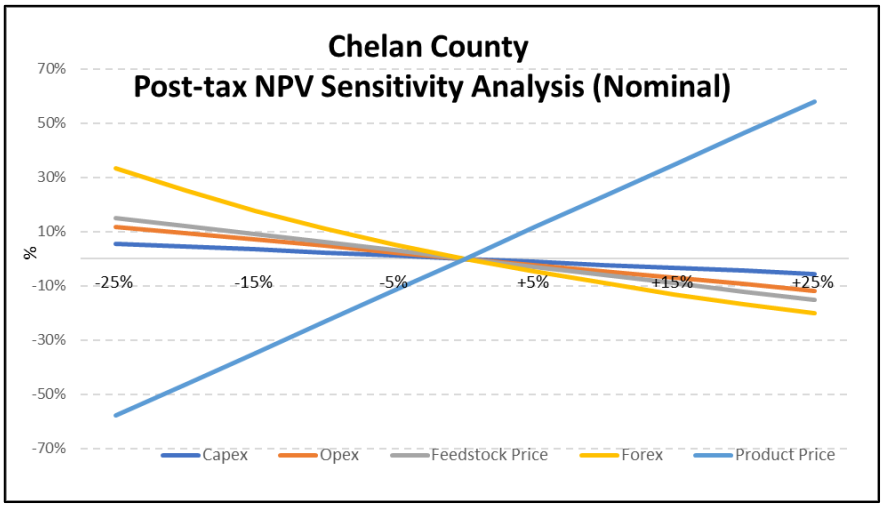


Figure 7: Sensitivity Analysis on Post-Tax NPV – Chelan County



5.2 Key risks

This section is intended to be a general discussion highlighting what Hexagon considers to be the current prime risk issues, not an exhaustive risk assessment. Broadly there are significant commercial and technical issues or risks that the Company needs to address in future studies and development plans, which are outlined below.

5.2.1 Financing

The Phase 1 financing tranche is probably the most difficult to secure but also the most critical. There is risk, particularly in the current poor market conditions that Hexagon simply cannot raise the required funding for this Phase. Funding is discussed further in Section 5.3 below.

5.2.2 Sales Agreements

Sales agreements require sufficient samples for the end user to trial, as an acceptance phase ahead of entering into a formal qualification process. Hexagon has attracted the attention of end-user groups based on the technical reports it has lodged on ASX and presented at various industry conferences. This needs to be followed up with samples and more testwork to take the GPPP plans to a feasibility level. These objectives require samples, initially significant volumes of graphite concentrate and ultimately finished product samples.

At McIntosh this is problematic, because the top of the main deposit is 20 metres beneath the surface; thus all samples to date have been generated from drill core. An additional 12 tonnes of drill core samples became available late last year and flotation testwork is in progress, but significantly more drilling and samples are required.

To mitigate this, Hexagon is able to source samples and ultimately feedstocks from other advanced projects or producers. It has also recently acquired an interest in several early stage graphite prospects in the USA; these were selected specifically on their flake attributes but also because the mineralisation is exposed and easily accessible for bulk sampling.

5.2.3 Feedstock

The majority of Hexagon's testwork to date has been undertaken on samples of McIntosh concentrate. This has highlighted a mix of diverse technical attributes making it suitable for a range of end-use applications. However, the Company considers that given the wide availability of many different flake types it will be able to procure the specific flake attributes it requires for each of its planned products, though no agreements are in place. There is enough margin in the assumed premium feedstock costs to cover any variations in operating or freight costs. McIntosh is a possible source, but to have multiple sources would de-risk source issues for customers. Furthermore, Mineral Resources at McIntosh have yet to be defined for the proposed life of the project.

Utilisation of a full-commercial feedstock price assumption leaves considerable latitude for Hexagon to follow-up on its procurement strategy for a range of feedstock sources with specific attributes suited to the particular product line specifications.

5.2.4 Other Technical Risks

- *Utilisation of a new generation of EFB Furnaces for purification of natural flake graphite.* Hexagon plans to address this by utilising a 30kg/hr pilot furnace to develop its Feasibility level parameters. This would be followed up by the Qualification scale plant (100kg/hr) and ultimately with a commercial scale (1,000kg/hr) reactor. These successive scaleup factors of 3 times and then 10 times are considered reasonable and conservative.

- *Translation of testwork on McIntosh flake to other flake sources*. The McIntosh work provides a strong base case for the preferred flake type the Company is targeting. The equipment assumed in the Scoping Study is robust and by varying parameters, such as temperature profiles and residence time in the furnaces, and various particle dwell-time, hammer rotations and air-pressure settings in the mills, Hexagon is confident it can achieve the same specifications. At this level of study, it is simply not feasible to undertake the exercise of characterising concentrate from approximately 30 to 40 different producers for qualification work. This would be undertaken in the Feasibility study.
- *Product contamination.* There is a contamination risk post purification from process (mills, classifiers, cyclones, etc.) and handling (bins, conveyors, feeders, pipes, etc.). This needs to be quantified by further testwork and piloting, but key issues will be addressed by careful consideration of the construction materials, design of clean facilities and appropriate dust-free post processing environment.

5.2.5 Other Commercial Risks

- Power prices have not been defined for the long-term, and the Geraldton location relies on building a solar farm for Phase 2 and 3;
- Freight comprises a large proportion of the operating costs, particularly for the USA Site. Freight costs are subject to fuel prices, amongst other factors, and could rise in the event of an oil price increase;
- Exporting USA furnace technologies (EFB - if those are utilised) to Australia may incur USA technology taxes as well as the associated higher cost of transporting parts and labour to support this furnace from the USA;
- Exchange rate risks include operating risk as revenue is denominated in USD and costs are denominated in AUD (for Geraldton site), also cost risk as feedstock purchases and furnaces, parts and services will be incurred in USD;
- Closing a technology Licencing deal with NAmLab for the EFB furnace technology.

These commercial risks will largely be addressed with additional investigative work, ongoing negotiations to close suitable long-term supply contracts and further development of the Company's hedging strategy linked to its actual planned currency exposures.

5.3 Funding

Funding will be required to achieve the outcomes of this Scoping Study to develop the GPPP. The initial tranche required to build the Qualification Plant is approximately A$25 – A$28 million, which is likely to be the most challenging financing tranche. Hexagon will explore ways to fund the GPPP at the "project" level, potentially seeking strategic technical or offtake partners able to contribute funding as well as enhance the GPPP business plan by contributing technical or market knowledge. The MJV with Mineral Resources Limited (**MinRes**), whereby MinRes has earned a 51% equity in the McIntosh Project and are required to fund and undertake all activities to bring the project into commercial production is an example of this transaction style. However, Hexagon has not yet considered what kind of GPPP equity could be divested nor what investment contribution might be required.

Development of Phase 1 would likely have to be underpinned by sales agreements, further endorsing the Scoping Study strategy for the GPPP. Therefore, a further consideration is that Hexagon's current market capitalisation is approximately A$40 million. Whilst funding the entire Phase 1 capital by issuing new equity at current valuations would be highly dilutive, it is not inconceivable, especially at improved equity valuations and certainly a partial equity contribution is more than likely.

The Company's Board believes that there is a reasonable basis to assume that Phase 2 funding will be available given:

- Hexagon's Board and executive team have a strong financing track record in developing projects;
- Hexagon has a proven ability to attract new capital and supportive major investors;
- Hexagon considers that this Scoping Study demonstrates the GPPP's strong potential to deliver a favourable economic return; and
- The positive financial metrics of the project and the underlying demand growth for the product suite.

Conventional bank debt is highly unlikely at this stage of the development, although some style of hybrid debt facility for a portion of the capital is possible.

In terms of funding for the Phase 2, commercial scale operation – this would be underpinned by "locked-in" sales agreements resulting from the successful operation of the Qualification Plant. Again, this could potentially be funded by a strategic partner, if one was not already secured for Phase 1. A mixture of Hexagon equity and conceivably some layered debt structures, such as debentures or conventional secured debt funding, along with a minor portion of offtake/working capital finance, is a realistic assumption. The technical risks are considerably reduced compared to a standard Greenfields development given the Qualification Plant operations, but the sales price risk would depend on the nature of the sales agreements and the credit worthiness of the entities behind them. Therefore, funding of Phase 2 would still be a challenging proposition which will no doubt be reflected in the pricing as financiers seek to be appropriately remunerated for the risks they have assessed. It should be noted that credit and equity markets can be volatile and that the required funding may only be available on terms that may be dilutive to or otherwise affect the value of Hexagon's existing shares.

In terms of funding Phase 3, the current assumption is that it is fully funded from internal cashflows. As demonstrated in Section 4.5 refer to Table 7 above, Phase 2, with no further expansions, provides an attractive investment return, and it would be entirely up to Hexagon to assess the product marketing environment to support any further investment decisions. Subject to a positive outlook, at this stage the GPPP business would be well established and capable of attracting standard corporate banking facilities to combine with its own internal cash generating capacity to fund the Phase 3 expansion.

6 FOLLOW-UP

Based on the outcomes of this GPPP Scoping Study, Hexagon plans to take the GPPP through to Feasibility Study to enable an initial financial investment decision on the development of Phase 1. The commercial and technical work streams include the following key tasks:

6.1 Commercial Tasks

- Advance discussions with potential strategic partners on the development of the GPPP.
- Liaise with Government Officials on selected locations about governmental contribution to either energy (Australia) or infrastructure/grants (USA).
- Advance negotiations with the respective land title owners and explore potential synergies with existing, adjacent industrial enterprises for sharing certain facilities or services, such as water rights, access, etc.
- Investigate alternate location in Washington state as a fall back if the above commercial negotiations are not successful, and also because often there tends to be a competitive commercial process from other Counties seeking to entice industry to their districts.

- Progress BOO energy option in Geraldton to gain greater confidence of its likelihood to be developed which is subject to the sponsor's ability to raise funds.
- Engage with the Australian Federal government on having graphite on its energy rebate scheme for exports.
- Engage a preferred logistics agent and focus on cost minimisation strategies.
- Liaise with Government regulatory bodies and key stakeholder groups on approval processes and potential concerns that need to be addressed.

6.2 Technical Tasks

- Characterisation work of potential feedstock sources to create a short-list of 10-15 preferred suppliers.
- Commence the feasibility and piloting development of larger scale of concentration production and downstream products for customers pre-qualification and acceptance phase.
- Undertake the next phase of critical assessment on technical and commercial viability (by way of a large-scale piloting programme) with reference to the two thermal purification options, and advance the EFB options to generate Feasibility level performance and cost estimates.
- As above for milling and micronising for the Industrial Line and spheroidisation for the Battery Line to generate Feasibility level data and to generate large-scale samples for qualification.
- Commence environmental studies to fully understand all emissions and carbon footprint aspects as well as baseline studies. This will feed back to the plant design and set the approvals process requirements.

7 COMPETENT PERSONS' ATTRIBUTION

Metallurgical Testwork Outcomes

The information within this report that relates to metallurgical testwork outcomes and processing of the McIntosh material is based on information provided by a series of independent laboratories. Mr. Mike Rosenstreich (Managing Director) and Mr. Michael Chan (Chief Development Officer), both fulltime employees of the Company, collaborated in planning, assessing and compiling the various testwork programs and results relevant to this announcement. A highly qualified and experienced researcher at NAmLab planned, supervised and interpreted the results of the NAmLab testwork.

8 LIST OF APPENDICES

Appendix 1 – Executive Summary (Key Extracts)

Appendix 2 – Scoping Study and Financial Modelling Assumptions

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HEXAGON
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APPENDIX 1

EXECUTIVE SUMMARY (KEY EXTRACTS)

The main participants to the Scoping Study completed by Hexagon Resources Limited (**Hexagon**) for the Graphite Purification and Processing Plant (**GPPP**) were:

- GR Engineering Services Limited (**GRES**) – Included study management, engineering, design, cost estimation and compilation of the Scoping Study report document and input information.
- Hexagon – Site Location studies, input testwork studies and with support from independent consultants completed a product marketing strategy.
- Optiro – A mining industry consulting and advisory group reviewed this report to provide guidance to Hexagon on its compliance obligations with respect to the ASX Listing Rules and ASIC requirements.

1 INTRODUCTION AND BACKGROUND

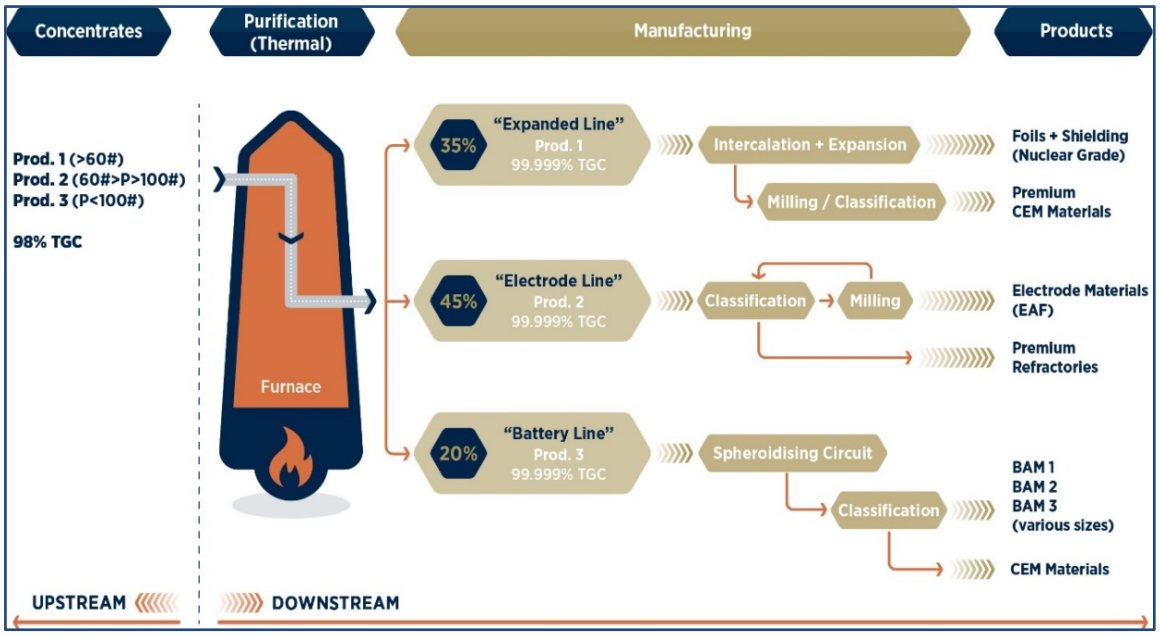
1.1 Scope

Hexagon engaged GRES to undertake a Scoping Study to assess the viability of a standalone Graphite Purification and Processing Plant (**GPPP**) manufacturing high-specification graphite products. Independent downstream graphite processing with feedstock materials purchased from a variety of sources is how the majority of the industry operates. This Scoping Study is based on a similar style of operation except Hexagon also has the opportunity to source graphite concentrates from its attributable production from the McIntosh graphite project (**McIntosh Project**), located in the East Kimberley of Western Australia.

A variety of graphite concentrates are produced and available for long-term sales contracts in China, Brazil, Mozambique, Madagascar and India (top 5 flake concentrate producers). It is a standard procedure to characterise samples from each location to determine which are better suited for Hexagon's various product needs. A potential additional source is the McIntosh Project, which is the subject of a joint venture agreement between Hexagon and Mineral Resources Limited (**MinRes**), the McIntosh Joint Venture (**MJV**). Subject to a positive feasibility study currently being undertaken by MinRes, the MJV would be focussed on mining of ore and production of graphite concentrate via flotation for despatch or sale at the "mine gate" or other designated delivery point, which Hexagon refers to as the "upstream business". MinRes will also manage all MJV operations on behalf of the joint venture on a life of mine basis.

Hexagon is focussed on the secondary processing of the graphite concentrates on a stand-alone commercial basis. The secondary processing is referred to as the downstream business targeting three broad product lines: Expanded Line, Electrode Line and Battery Line with each line incorporating a range of final products (refer Figure 1). It is important to note that the GPPP is a 100% Hexagon owned initiative and is a distinct and separate business entity from the MJV.

Figure 1: Proposed Processing Route



1.2 Proposed Site Locations

Hexagon has assessed potential locations for the downstream GPPP facilities. This is an important consideration as the location of the commercial and qualification plants should remain the same to comply with end-user's product qualification requirements.

After considering five sites across Asia, Australia and the USA, the two preferred sites for the Scoping Study were:

- Chelan County, Washington State, USA; and
- Geraldton, Western Australia, Australia.

The clear distinctions between the two downstream locations are freight and power costs. Geraldton is very close to the feedstock source which minimises freight costs while power costs at the Chelan County site are very low while being closer to potential end users.

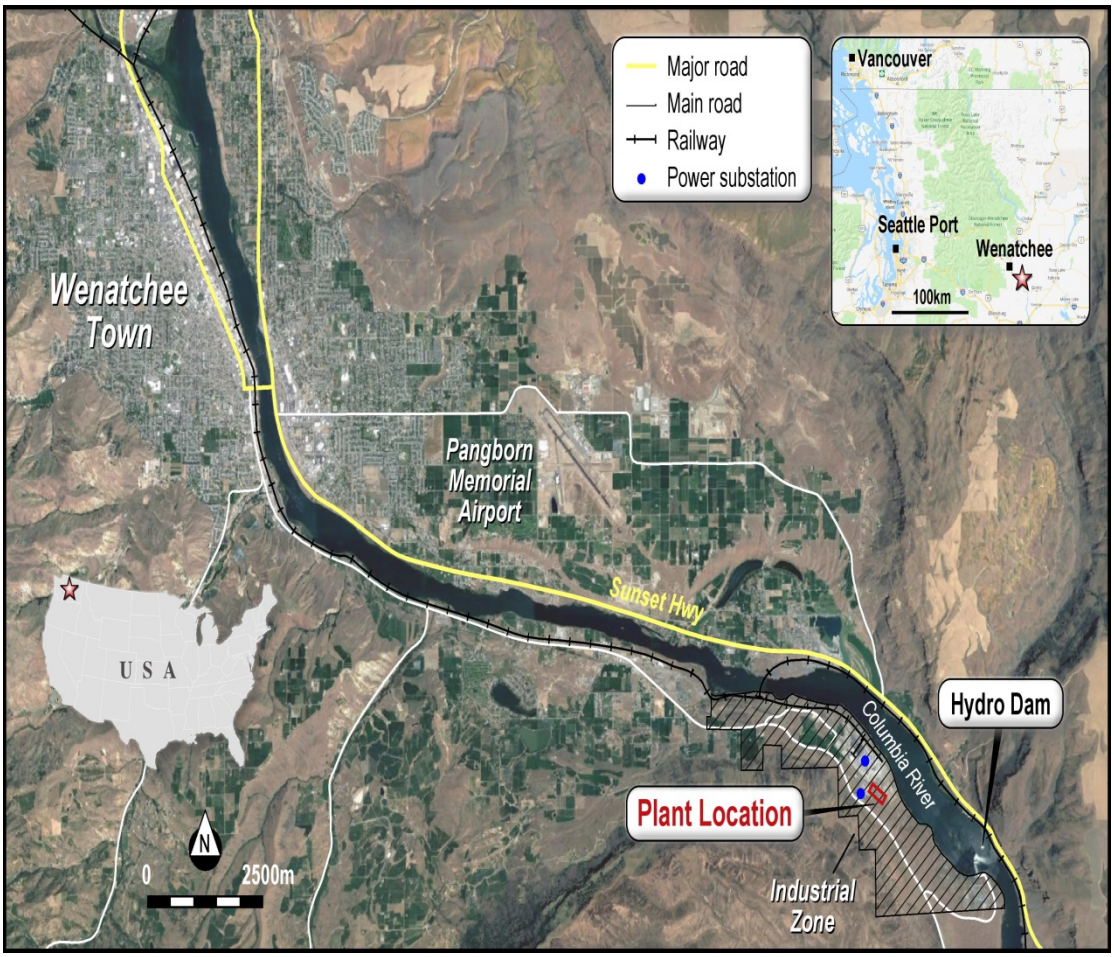
a) Chelan County, Washington State, USA

Chelan County is located in north-central Washington State, refer Figure 2.

The preferred site comprises approximately 20 acres (8 ha) within an existing metal refining precinct site located 12 km east of Wenatchee. This site is on care and maintenance and unlikely to be restarted for metals refining by the existing owner. The site of the GPPP would be adjacent to existing facilities.

The closest town is Wenatchee with a population of 30,000, located in Chelan County with a total population of 75,000. Horticulture is the dominant industry which is well serviced by established logistics to move produce to the rest of the USA or to port for export.

Figure 2: Location Plan – Chelan County, Washington State, USA



b) Geraldton, Western Australia

Geraldton is a coastal city in the mid-west region of Western Australia, 424km north of Perth, with an urban population of c. 37,000 (refer Figure 3).

The proposed Geraldton site is a Greenfield industrial site with planning approval for light industrial development. It is near the power distribution grid, sealed road access to the NW Coastal Highway and serviced with a reticulated water supply.

Relevant to this study, primary graphite concentrates will be purchased either directly from the MJV site – trucked 2,600km south on all sealed National Highway 1 or for imported feedstocks from either the Geraldton or Fremantle ports located 13km and 450km, respectively from the planned GPPP site.

Figure 3: Location Plan – Geraldton, Western Australia

2 GPPP FEEDSTOCK MATERIAL

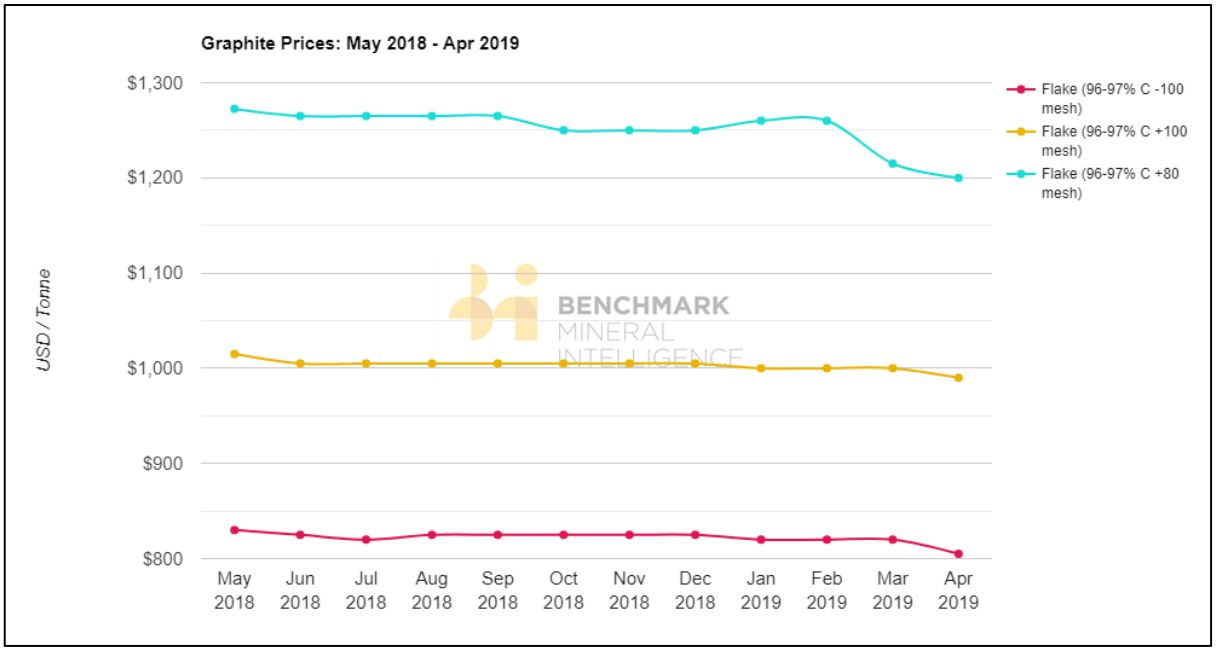
The Scoping Study assumes that the GPPP will procure all graphite concentrate feedstocks on an arms-length, commercial price from a range of international sources as well as from the MJV, subject to completion of a positive feasibility study and achieving commercial production.

The assumed input price is an average of US$1,504/t of graphite concentrate. At this premium price assumption Hexagon is confident of procuring the exact flake types it requires to meet its product range from existing third-party producers. Utilisation of this premium, commercial feedstock price, also makes it independent and distinct from any assumed MJV related site operating cost. This is an important point given that the MJV feasibility study is in progress and whilst an attractive source for Hexagon, not assured. Hexagon has previously reported basket price estimates for the MJV concentrates consistent with the assumed input price above in the McIntosh Project Prefeasibility Study (ASX Report, 31 May 2017) and in a business strategy update (ASX Report, 28 August 2018). As highlighted by Figure 4, flake concentrate price trends, Hexagon's basket price is at a c. 30% price premium to the moving average for all concentrate types highlighting the "full-commercial" basis of the assumed feedstock cost input.

Hexagon considers that there is enough flexibility in the process circuits to accommodate alternative high-quality concentrates subject to proper characterisation and qualification work of the minerals' physiochemical characteristics. The refining technology is well proven in commercial settings on a variety of flake types and similarly, the milling, micronising and spheroidisation technology is applied in many operations and has been tested on African and Chinese derived flakes. There is an established global trade in graphite concentrates and the supply chain constraint is more likely in the secondary processing than in the upstream sources. Hexagon will need to seek out specific flake attributes for specific products rather than rely on the diverse attributes that characterise some of the McIntosh deposits such as Emperor. Indeed, this

is exactly what most of the downstream graphite processing companies do, with very few of them owning mines. At present time there are many operating graphite mines and development projects around the world such as in Madagascar, Africa, India, North America, Brazil and Australia which are likely to meet and make up the requirement in raw material for Hexagon's stand-alone GPPP.

Figure 4: Indicative Independent Flake Graphite Concentrate Prices



3 SECONDARY PROCESSING TECHNOLOGY

Hexagon has established several strong technical partnerships and collaborations around proprietary technology. This includes purification, milling/micronising and spheroidisation/fine particle classification systems. Hexagon and other contributors to this Scoping Study have been extremely mindful of their respective confidentiality obligations and have duly considered the likelihood of third parties reviewing the Scoping Study report.

On this basis, the Scoping Study treats these proprietary technology components as "black boxes" in terms of technical and process descriptions, operational and maintenance requirements, battery limits and service requirements. Liaison between Hexagon and the relevant technical partners ensured that their requirements are met, and all key design information was available to complete engineering design. Given its confidentiality obligations, Hexagon has maintained a "need to know" approach on disclosing proprietary aspects of this Scoping Study.

Utilisation of advanced technologies matched to the products and feedstocks planned is a key aspect of Hexagon's commercialisation strategy to establish the GPPP. However, to provide a conservative and base-scoping level estimates, Hexagon has used standard, well established technologies, such as for purification, milling/micronisation and spheroidisation/classification for its technology assumptions. These are widely applied to many different flake varieties from a wide range of sources. This also generates greater confidence in operating and capital cost estimates because in some cases for the newer technology options these were not well established.

The testwork on the McIntosh samples along with some comparative work with other materials provides a strong base case for the preferred flake type the Company is targeting. As stated above it is assuming a premium feedstock price to ensure it obtains its desired feedstock specifications for each product line. The

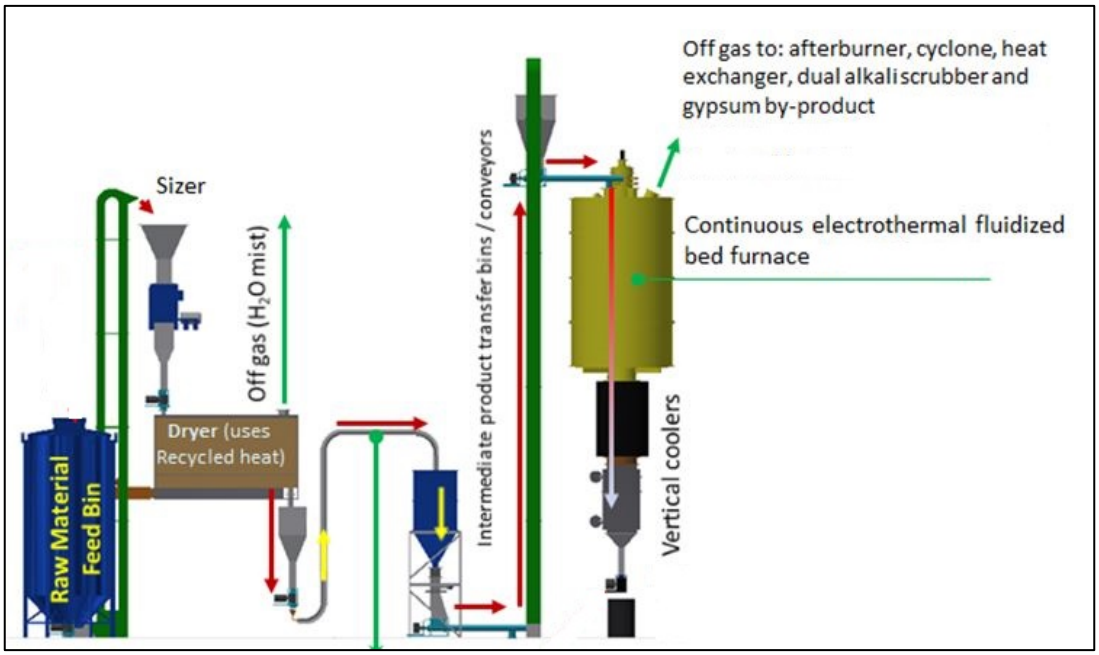
equipment assumed in the Scoping Study is robust and by varying parameters such as temperature range and residence time in the furnaces, and various particle milling residence times, rotational speed of the impact hammers and air-pressure settings in the mills, Hexagon is confident it can achieve the same specifications.

There is a deep and varied international graphite concentrate trade and at this level of study it was simply not feasible to undertake the exercise of characterising the approximately 40 different producers' concentrates to then generate a preferred supplier list of say, 15, for qualification work. This would be undertaken in the Feasibility study.

3.1 Purification

The core technology at the heart of Hexagon's downstream strategy is purification, namely, thermal purification by electro-thermal fluidised bed (**EFB**) furnace. This is a dynamic, continuous process where the flake impurities are volatilised at 2,400 to 2,800°C with an overall retention rate of one hour through the entire pre-heat, hot-zone and cooling stages as shown in Figure 5. Hexagon has undergone simulation based testwork on this technology ahead of piloting planned when construction of the pilot furnace is completed in early Q3 2019 by NAmLab.

Figure 5: Generalised EFB Flow Sheet



Alternative thermal techniques are also available which Hexagon has characterised as "static" furnaces. The traditional form of this is the static Acheson furnace which require approximately three weeks of residence time at c. 2,800°C. These are regarded as "established" technology and Hexagon has tested a proprietary, modified version of this technology which has a significantly shorter residence time. This modified version of static furnace has a greater degree of automation as well as being currently commercially available and utilised.

Standard purification techniques as employed in China comprise acid leaching, utilising a suite of reagents, including hydrofluoric acid. The traditional plants in China are not regarded as environmentally clean and the process itself may leave a halide residue which is not acceptable for certain high-end applications. Hexagon has not pursued this route.

In the Scoping Study, Hexagon has undertaken estimates of operating and capital costs for the Static furnaces which have firm purchase costs and readily available operating data. The EFB was assessed on an "add-on" basis because there is less confidence around the capital and operating parameters. For Hexagon's flake, the advantages of employing EFB furnaces include:

- Higher throughput rates, approximately 4-5 times greater than the static furnace, which means that far fewer furnaces are required in Phases 2 and 3 (four and nine respectively). This will provide many benefits such as reduced plant footprint and installation costs, lower manning requirement and a more efficient process control and instrumentation philosophy; and
- Power consumption is lower than the static furnace option by approximately 20% due to higher throughput per furnace.

The main disadvantages are:

- The electro-thermal fluidised bed furnace technology contemplated by Hexagon, is less proven than the static furnaces option and require further pilot or commercial scale up process/mechanical viability test;
- The maintenance costs are significantly higher; and
- More frequent and longer duration shutdowns are required leading to a lower furnace availability.

There was little to separate the two technologies on either cost comparisons. Hexagon is planning to utilise the EFB furnaces subject to piloting testwork and can see greater opportunities to improve the operating metrics with this technology. On this basis, the findings and much of the assessment in this Scoping Study is "agnostic" in terms of refining technology.

3.2 Milling and Shaping

Post purification the main work duty is milling and/or shaping the graphite flake. The established technology from China, which dominates this aspect of graphite processing globally, comprises long lines of impact hammer mills in series to achieve the required size specifications and shapes. However, there are newer one-stage mills also available which claim higher yields and lower costs. Hexagon has tested both types and achieved good results.

The Scoping Study assumes utilisation of the traditional impact hammer mills to perform the main milling duty at the GPPP. Hexagon was more confident with this basis because of its in-house experience with these types of mills and the "firm" basis of the quotes from equipment suppliers. This likely creates higher capital and operating cost estimates compared to the "one-stage milling and one stage spheroidisation/classification" units, due to a larger operational footprint and many more units being deployed. Hexagon will continue to evaluate the one-stage mills.

4 PROCESS PLANT

A preliminary processing route is developed for the GPPP as outlined below:

4.1 Flake concentrates unloading and storage

Graphite flakes will be delivered to the plant site via semi-trailer trucks hauling single containers packed with graphite in 1 tonne bulk bags. Containers will be de-stuffed on site by a telehandler in a fully enclosed flake concentrate receival shed. As required during processing, bags of concentrate will be retrieved from the storage area by forklift and delivered to the flake feed systems. The flakes will be delivered pneumatically to feed the purification furnaces.

4.2 Thermal Purification

Static Furnace - The graphite flake is subject to a thermal purification process to upgrade the total graphite content to above 99.99 wt%C. This thermal process takes place inside a static furnace (as the base case for the Scoping Study) and removes impurities with the application of heat (up to 2,800°C) by a graphite heating element. Each static furnace consists of a feed section, pre-heating section, a heating section, a product cooling section and a discharge section; each separated by muffles and doors to maintain and control the atmosphere and temperature. An inert gas is utilised to maintain an inert atmospheric condition within the furnace. The flakes which are contained in cylindrical or rectangular containers are conveyed throughout the length of the furnace by mechanical means, passing through various temperature zones and eventually discharged out of the other end of the furnace. The purified product discharges out of the furnace every 30 minutes, the discharge section door will open automatically, and a mechanical system will convey the product out of the furnace.

Electrothermal Fluidised Bed Furnace (EFB) (alternative option) - in addition to the Static Furnace, Hexagon has also investigated the continuous EFB furnace. This technology represents an industrial energy-efficient, low cost and environmentally benign technology. The purification process begins with pre-screening and drying the flake graphite to remove the remaining moisture. The material is then transferred to an EFB reactor which removes any impurities present in the graphite, producing a plus 99.95 wt%C interim product. The main EFB reactor comprises a vertical cylinder in which the graphite flake is fed in at the top, to cascade down by gravity. Inside the main cylinder is an inner cylindrical body and an electrode suspended from the roof of the reactor. Electrical current is run between the central electrode and the graphite cylinder crucible. While the graphite powder descends within the cylinder, inert gas is introduced from the bottom to flow upward, slowing the descent of graphite particles and inducing agitation. A DC current is supplied to the electrodes which results in electrical arcs forming between the graphite particles, which fall between the electrode bodies. The electrical arcs cause immense heat and the impurities sublime and are carried away as off-gases. The result is high purity graphite flakes (plus 99.99 wt%C) which fall to the bottom of the cylinder, where the graphite is cooled via tube heat exchangers before it is discharged out of the EFB furnace for further processing. Off-gases from the reactor are directed to a comprehensive dust precipitation and scrubbing system before getting discharged out into the atmosphere.

4.3 Downstream Production

Downstream production of the refined graphite consists of three production streams, i.e. the Expandable Precursor Line, the Industrial/Electrode Line and the Battery Material Line. The overall process route is presented in Figure 7.

Expandable Precursor Line – comprises mainly a screening and product packaging facility. The Expandable Line is fed with the refined +60 mesh flakes which are fed to a circular vibratory screen with a 250 micron aperture to remove any undersize material generated during the purification and material handling processes. The screen oversize (+60 mesh) product reports to a product bin (40 tonnes) while the screen undersize (-60 mesh) to a smaller bin (5 tonnes). A tubular drag conveyor transfers material from the product bin to the bulk bag filling machine. A pneumatic conveyor will transfer the reject minus 60 mesh material to the Industrial/Electrode Line for further processing.

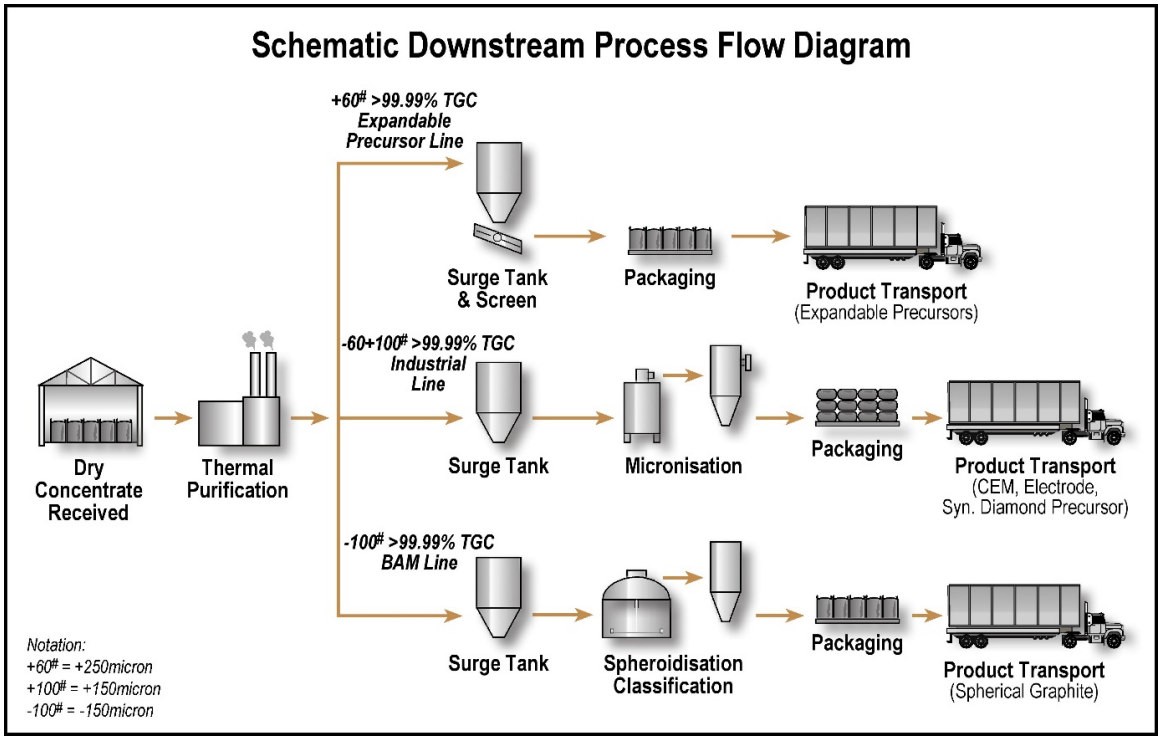
Industrial/Electrode Line - is fed by purified +100 mesh flake. The process consists of a series of fluidised air jet milling systems which mill/micronise and classify the purified graphite flake in a shallow, cylindrical chamber. High pressure air is injected into this chamber through the specially designed nozzles placed at regular intervals on the peripheral wall. During operation, the feed material is introduced into the vortex via a screw feeder, strong velocity gradients near the jet cause the suspended particles of graphite material to collide with each other and reduce particle size autogenously. The jet fluid exits through an outlet at the centre of the chamber and draws the micronised particles with it. An internal classifier

returns oversized particles back to the grinding chamber and allows near sized particles to pass through to the bag house product collection system.

Battery Material Line - is fed by purified -100 mesh flake and produces two Battery Anode Material (**BAM**) products and a fine by-product.

The target product-sized distribution is achieved with the operation of a train of Air Classifying Mills (**ACM**). Each train comprises a 5-tonne battery feed bin equipped with a screw feeder for accurate feed rate control, a series of paired classifying mills for micronisation and spheroidisation/classification. These ACM mills incorporate internal classification where oversize material is returned to the mill for further micronisation and near-size material is discharged to the further spheroidisation process. In the final stage, the spheroidised product is collected in a baghouse collection system while the fine by-products (- < 10 microns) is diverted through a cyclone classifying system as overflow to a centralised ultra-fine collection facility.

Figure 7: The GPPP Process Route



5 INFRASTRUCTURE

Infrastructure for the project comprises all facilities external to, and in support of, the processing plant. The key infrastructure associated with both potential site locations includes:

- **Power Supply**
  - Geraldton - Phase 1 power will be supplied from the grid by connection to an existing transmission line. In Phases 2 and 3, the site will be powered by a build-own-operate (BOO) solar farm with top up from the grid as required.
  - Chelan County - power for all phases will be supplied via an existing grid connection at a nearby substation.

- **Water Supply**
    - Raw and fire water will be stored on site in a combined usage 1000kL commercial water tank with duty and standby raw water pumps and a fire water pump set including a diesel standby pump. Potable water will be stored in a 30kL HDPE tank with electric duty or diesel standby pumps.
    - Geraldton - scheme water will supply raw, fire and potable water requirements for all three phases.
    - Chelan County - river water will be supply raw and fire water for the project. Scheme water will supply potable water.
- **Waste Disposal**
    - Waste will be collected on site in sewage pits and pumped to local sewage infrastructure.
- **Buildings and Offices**
    - Phase 1 - a transportable style administration office, ablutions block and crib room will be hired and temporarily installed. A basic workshop and stores will be installed comprising three 40-foot containers with dome shelters spanning between them. There will be no on-site laboratory for Phase 1 with all samples sent off site for testing.
    - Phase 2 - complexed transportable style buildings will be purchased and permanently installed including a larger administration office, ablutions and crib room, training and induction room and an on-site laboratory. A steel framed, fully enclosed workshop and stores will also be installed along with a transportable style maintenance office.
    - Phase 3 - the administration office will be extended, and two additional ablutions blocks will be provided to accommodate the increased thermal purification plant footprint.
- **Communications**
    - It is assumed that the project will establish a connection with existing local communications infrastructure.
- **Mobile Equipment**
    - Phase 1 - all mobile equipment will be hired.
    - Phase 2 and 3 - mobile equipment will be purchased.

6 IMPLEMENTATION AND OPERATING PLAN

The implementation and operating plan for the GPPP is based on staged development and production to:

- Achieve customised product qualification to finalise the marketing agreements;
- Have downstream capacity come online as product markets develop; and
- Manage capital expenditure via internal cash flow for the final development phase.

Three development phases are proposed at the Scoping Study level to meet what the company envisages will be a strong demand growth profile and which matches Hexagon's entire 49% equitable share of production from the MJV, in the hope that this will become a major feedstock source. The staged development plan is set out in Table 1.

Table 1: Staged Development Plan

Phase	Approximate Annual Throughput (t/a)
Phase 1 – Qualification	1,000
Phase 2	20,000
Phase 3	49,000

Phase 1 is required for qualification of the process and the customised products with an annualised rate of approximately 1,000 tonnes. This will ensure enough graphite product is available for marketing and qualification purposes and subsequently to demonstrate to potential customers that Hexagon is able to consistently produce the product to meet their specifications. Qualification processes and periods vary for different end users with battery applications typically having longer stage-gate qualification requirements.

The first commercial scale development, Phase 2, will be designed to process approximately 20,000 tonnes of feedstock concentrates annually to produce various products split across the three production lines.

The final Phase 3 development is at a scale which would rank Hexagon amongst the larger graphite manufacturers in the USA and China. Notionally it also provides capacity for Hexagon to process all of its own attributable concentrate production from the MJV of 49,000 tonnes per annum should that ultimately be developed. Given the modular nature of the process equipment there are no major advantages through economies of scale. On this basis, the Phase 2 throughput rate was selected by Hexagon as the initial commercial scale to generate a "meaningful" quantity of product for its customers and revenues for its shareholders. On the basis that Phase 2 is operating soundly, the procurement, marketing and the operational aspects being largely de-risked, it is planned to commence the Phase 3 expansion.

The GPPP production profile is expected to ramp up to c.20,000 tonnes per year in Year 5 and based on a Phase 3 investment decision in Year 6, achieve a 3-year ramp-up to 46,000 tonnes per year of product by Year 10 as presented in Figure 6. As summarised in Table 2, the Expanded Precursor will only be screened and packaged, the Electrode Line products will be milled/ micronised and classified to highly exacting particle size distribution, specific surface area and purity specifications, and the Battery Line will comprise spheroidisation (shaping for anode material), and classification units. The overall yield of feedstock to product is assumed to be 95%. This is because of the high purity achieved in the thermal purification process, the reject material from one production line may potentially produce a product suitable for another line; for example, fine material from the Battery Line might divert to the Electrode Line for high end lubricant products or it can be sold directly outright as mould release agent or recarburiser product. This is regarded as an optimisation step to ensure that the various size fractions deport to the highest value product streams.

Figure 6: GPPP Planned Ramp of Total Product Output

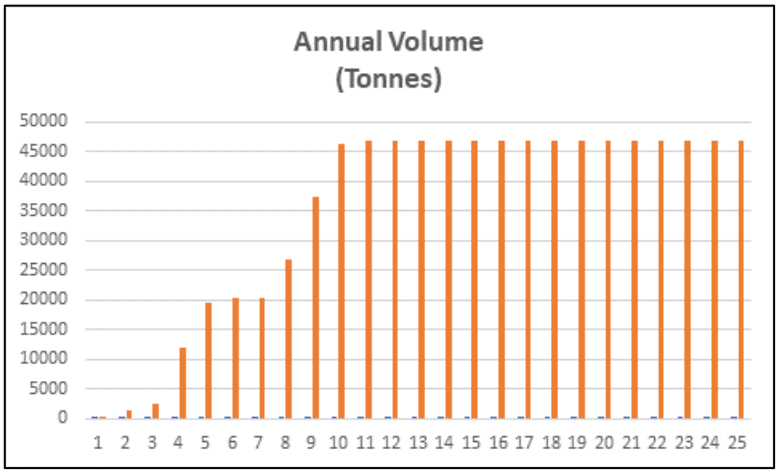


Table 2: Production Line Throughput.

Production Line	Annualised Production based on 95% Purification Yield (t/yr.)		
	Phase 1	Phase 2	Phase 3
Expanded Line Screening / Packaging	446	7,130	16,421
Electrode Line Micronisation / Classification / Packaging	573	9,186	21,112
Battery Line Micronisation / Spheroidisation / Classification / Packaging	255	4,074	9,383

7 CAPITAL AND OPERATING COST ESTIMATE

7.1 Capital Costs

Capital cost estimates for this Scoping Study are based upon an EPC approach for the processing facility and infrastructure. As such, pricing is inclusive of a contractor's margin. Capital estimates by phase and location are set out in Tables 3 and 4.

This cost is based on the preliminary processing route developed for optimisation by Hexagon and includes all labour, EPC services, equipment, materials, first fills, consumables and spare parts required to design, procure, construct and commission the Project.

The Project capital cost estimate has been costed to an accuracy of ±30% and has been based on the following:

Table 3: Geraldton Site – Capital Cost Estimate

Area	Phase 1 (A$ million)	Phase 2 (A$ million)	Phase 3 (A$ million)
Flake Receival and Storage	0.5	1.3	1.2
Thermal Purification	4.1	51.3	65.2
Expandable Line	0.1	1.3	0.7
Electrode Line	0.9	1.3	3.0
Battery Line	1.3	1.9	1.0
Product Packing and Storage	0.9	5.0	1.7
Plant Power Reticulation and Services	8.5	14.3	15.1
Plant Administration Buildings & Offices	0.2	7.8	7.5
Project Management and Engineering	2.7	14.1	16.7
Site Construction and Management	4.0	19.7	27.4
Grand Total	**23.1**	**117.9**	**139.5**

Table 4: Chelan County – Capital Cost Estimate

Area	Phase 1 (A$ million)	Phase 2 (A$ million)	Phase 3 (A$ million)
Flake Receival and Storage	0.8	2.8	1.3
Thermal Purification	5.0	61.3	78.5
Expandable Line	0.1	2.4	1.7
Electrode Line	1.2	1.3	3.4
Battery Line	1.8	2.8	1.0
Product Packing and Storage	1.4	6.9	3.2
Plant Power Reticulation and Services	9.2	15.2	16.3
Plant Administration Buildings & Offices	0.2	8.8	8.6
Project Management and Engineering	2.8	14.1	16.7
Site Construction and Management	4.4	19.3	22.2
Grand Total	**26.9**	**134.9**	**152.7**

7.2 Operating Costs

Project Operating costs have been developed from first principles and are based on prices for the 1st quarter of 2019 (1Q19). The costs estimates are considered to have an accuracy of ±30 %.

Processing operating costs for the two locations were determined for each phase of operation based on 24 hours per day and 365 days per year operation. Administration operating costs have been determined to reflect the Project location, scale of operation and accepted requirements in either location.

The operating costs are summarised by phase and location in Tables 5 and 6.

Table 5: Geraldton Site – Operating Cost Estimate

Plant Area	Phase 1		Phase 2		Phase 3	
	Cost (A$ million/ yr.)	Unit Cost (A$/t product)	Cost (A$ million/ yr.)	Unit Cost (A$/t product)	Cost (A$ million/ yr.)	Unit Cost (A$/t product)
Purification	2.7	2,144	23.2	1,137	50.8	1,082
Expandable Line	0.5	400	1.5	76	2.5	54
Electrode Line	0.9	729	2.4	120	4.6	98
Battery Line	1.3	1,021	2.8	136	4.4	95
Logistics - Conc. Feed	0.3	274	5.6	274	12.8	274
Logistics - Product	0.3	221	4.5	222	10.4	222
Laboratory	0.1	88	0.3	13	0.4	9
General and Admin.	1.1	898	2.5	122	3.4	72
Total	**7.4**	**5,775**	**42.8**	**2,099**	**89.4**	**1,906**

Table 6: Chelan County Site – Operating Cost Estimate

Plant Area	Phase 1		Phase 2		Phase 3	
	Cost (A$/yr.)	Unit Cost (A$/t)	Cost (A$/yr.)	Unit Cost (A$/t)	Cost (A$/yr.)	Unit Cost (A$/t)
Purification	2.1	1,637	18.1	890	39.4	840
Expandable Line	0.4	338	1.3	65	2.2	46
Electrode Line	0.7	530	2.0	100	3.6	78
Battery Line	0.9	674	2.2	110	3.5	75
Logistics - Conc. Feed	0.6	473	9.6	473	22.2	473
Logistics - Product	0.1	41	0.8	41	1.9	41
Laboratory	0.1	88	0.3	15	0.5	11
General and Admin.	1.2	913	2.5	124	3.4	73
Total	2.1	**4,693**	**37.0**	**1,817**	**76.7**	**1,636**

8 PRODUCT SUITES

Hexagon's thermally purified flake graphite (+60, +100 and -100 mesh ASTM sizes) will feed into the following three downstream processing facilities of GPPP.

- ***Expandable Precursor Production*** – the thermally purified flake +60 mesh flakes, >99.99% wt%C grade. This refined product will be packed in a dedicated packaging facility into single-use bulk bags. The product is mainly marketed as the raw material for the production of expandable graphite to be used foils and similar or delaminated CEM.

  Standard specification of this product will be as below:

  * Total Graphitic Content 99.90 – 99.99%

  * Ash content < 0.01-0.10%

  * Particle size distribution: -60 mesh at less than 20% by weight

  * Moisture content < 0.2%

- ***Industrial/Electrode Line*** - The feedstock to this production facility is the thermally purified +100 mesh ASTM flake graphite. The products will consist of the production of three major size ranges of milled/micronised refined graphite powder via air jet milling system.

  1) D50 size of 25-45 microns micronised graphite

     This is the coarsest fraction of the production line whose products will be marketed into precursors for making standard industrial and premium technical grade synthetic diamond and other premium quality food grade lubricant and air-craft or luxurious automobile brake pads/linings, etc.

  2) D50 size 10-25 microns micronised graphite

     This is the medium size fraction and is for broad-based application in various types of standard batteries including lead acid, lithium ion and standard/premium grade AA, AAA and 9V alkaline batteries, as well as EAF Electrode CEM.

3) 50 3-10 microns micronised graphite

   This is the finest fraction of the production and is generally targeted for super CEM and premium quality can-coating for batteries. It is also used in applications such as premium lubricant and mould release agent for foundry casting and forming.

- ***Battery Material Line*** - The feedstock to this Battery Line is -100 mesh purified flake material. This consists of a series of chain ACM impact mills and spheroidisation/classification mills. Two uncoated spherical graphite (**USG**) products suitable for BAM and an ultra-fine < 10-micron graphite by-product are generated as follows:
  - USG product 1 with d50 23+/- 1.5 microns;
  - USG product 2 with d50 16+/- 1.5 microns; and
  - P100 minus 10-micron graphite fines by-product.

  The minus-10 micron graphite fine, at a purity of 99.90% wt%C grade can be directly sold at high pricing for mould release agent, premium grade re-carburiser and CEM, amongst other applications.

9 PRODUCT MARKETING AND PRICING

Hexagon is planning to produce a wide range of specialty graphite materials to cater for the recent upsurge in demand for energy storage applications, particularly electric vehicles, but also increasing demand from a range of high tech and industrial applications, such as specialty CEM and battery can-coating, etc. In some cases, the strategy includes the displacement of synthetic graphite for applications such as CEM. Hexagon's downstream products marketing strategy introduces the highest quality premium grade graphite products into three major streams of market segmentation as follows:

- Expandable precursor and foils.
- CEM for electrodes and batteries, technical grade synthetic diamond precursor, lubricant and brake lining/pads.
- BAM for Li Ion Battery, premium lubricant, mould release and re-carburiser.

Current planned targets are spread across the global markets with the principal focus in North America and Europe for high-end and niche-market customised graphite products such as milled/micronised ultrafine (< 2 microns d50 size) and high purity (> 99.99% wt%C) product for battery can coating and pigments which is often sold at US$18-20/kg (e.g. IMERYS KS4).

The second target geography for Hexagon products will be in Asia (Japan, South Korea and Thailand/Indonesia/Malaysia and Taiwan) for standard and premium grade products – mainly, battery related BAM and CEM, as well as , mould release agent and lubricant for foundry applications. Hexagon products destined for the Asian market can command a premium price due to its high purity (i.e. > 99.99% wt%C) than those currently marketed around this region. For example, USG has a standard specification grade of 99.95% wt%C and is currently sold in Asia for US$3,000/tonne which compares to Hexagon's USG which has a specification of > 99.99% wt%C and Hexagon predicts will sell at US$3,600/tonne. The low impurity and high graphite content is anticipated to enhance the performance in charge/discharge rate and improving the battery cycle life.

Hexagon went through a detailed market investigation process for each of its planned products across its Asian contacts and utilising independent experts for the North American and European market assessments. This included a comparison of specifications and prices for certain synthetic graphite-based materials with the comparable or enhanced products developed by Hexagon.

The product sale prices assumed in this Scoping Study will utilise those "modelled" in Table 7 and can be broadly characterised as representing a "basket price" for product sold of approximately US$6,110.

Table 7: Downstream Products and Pricing

Product	ID	Product Price US$/t			Conviction Rating
		Low	High	Modelled	
Expandable					
Std. +80#X	E1_Z3	4,500	7,500	5,000	4
	E1_Z4	3,000	3,500	3,500	5
Prem +80#X	E2_Z6	6,000	11,000	7,500	3
	E2_Z9	3,500	4,000	4,000	4
Industrial					
Std. Diamond Precursor	I1_P4	4,200	5,000	5,000	4
	I1_P6	4,200	4,200	4,200	5
Prem. Diamond Precursor	I2_P1	8,000	10,000	10,000	3
Std. CEM	I3_E3	6,000	9,000	6,500	4
	I3_E6	3,000	4,000	3,500	3
UHP-E CEM	I4_E8	4,000	14,000	5,000	5
Prem. CEM	I4_E9	9,000	19,000	9,000	3
Coating Precursor	I4_E12	15,000	22,000	18,215	4
BAM					
USG - 23	B1_L3	3,200	3,800	3,600	4
USG - 16	B1_L6	3,200	3,800	3,600	4
SG-SSP	B3_L12	15,000	18,034	15,329	4
G-SSF	B3_L13	3,000	7,000	3,250	4

Generally the modelled prices are conservative compared to the price ranges generated from Hexagon's market studies reflecting several marketing challenges, namely:

- Hexagon needs to achieve market penetration into a well-established, conservative market;
- Also in several cases, it is introducing new products into that market which have the same specifications as established products but through a different treatment route (e.g. thermal purification) which can create a marketing inertia; and
- In some cases the Hexagon products are unknown due to their very high specifications and customers may need some convincing of the merits of these enhanced products.

These factors are reflected in the pricing selected for modelling and into the Conviction Rating (where 5 is the strongest) which also reflects some of these uncertainties, including in some cases the need for more detailed market investigations qualification and acceptance notwithstanding that a modelled price has been proposed.

10 FINANCIAL ANALYSIS

10.1 Financial Outcomes

The Scoping Study estimates an NPV range of A$880 to A$1.240 million on an unleveraged, pre-tax basis using a 10% discount rate, an IRR range of 40%-61% with a payback in 3.7 years from financial investment decisions on commercial production and a project life of 25 years.

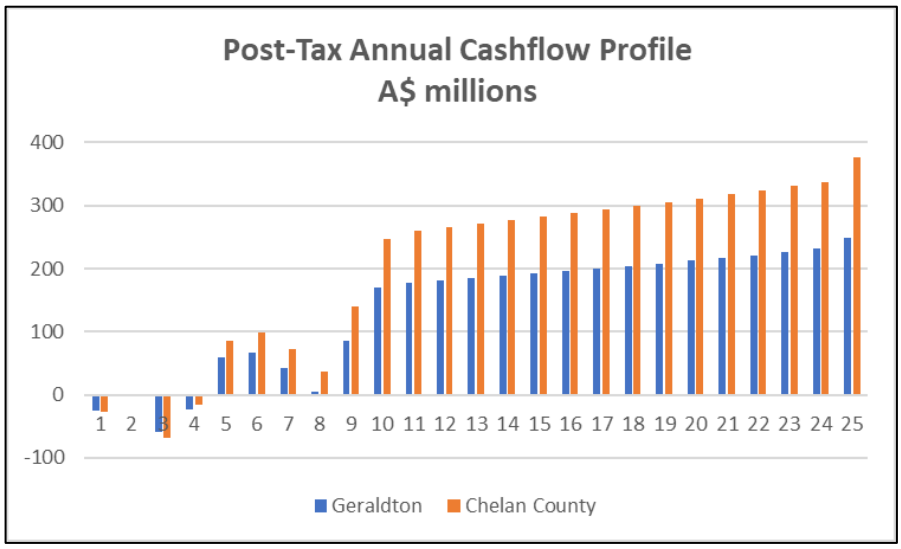
This indicates a financially viable project with strong financial returns. With a short payback period, the project has relatively low exposure to the key risk factors of long-term product prices which mitigates some of the financial risk associated with the project's capital funding requirements.

The financial performance of the project is summarised in Table 8 and Figure 8.

Table 8: Summary of Financial Modelling Outcomes

	Financial Highlights	
	Geraldton (Australia)	Chelan County (USA)
Pre-tax NPV (10% discount)	A$0.88 to A$1.20 Billion	A$0.92 to A$1.24 Billion
Post-tax NPV (10% discount)	A$594 to A$804 Million	A$708 to A$958 Million
Pre-tax Internal Rate of Return	40% to 61%	40% to 58%
Post-tax Internal Rate Return	32% to 48%	35% to 49%
Operating Margin (EBITDA)	51%	54%
Payback period from FID (post-tax)	4 years	4 years
Payback period from full commercial production (post-tax)	2 years	2 years
Operating Cost Product (life of project)	A$2,618 / Tonne	A$2,248 / Tonne
Feedstock Price	A$2,089 / Tonne	
Weighted Ave Basket Price of Products	A$8,487 / Tonne	
Start-Up Capital Phase 1	A$23 Million	A$27 Million
Start-Up Capital Phase 2	A$118 Million	A$135 Million
Start-Up Capital Phase 3 (fully funded from operations)	A$139 Million	A$153 Million

Figure 8: Post-Tax Cashflow Comparing the Two Locations



10.2 Financial Sensitivities

Product price, Australian-US exchange rate, Feedstock Price, Operating Expenditure and Capital Expenditure were selected as the critical factors to assess at this Scoping Study level of evaluation.

A standard sensitivity analysis for each of the preferred locations, Geraldton and Chelan highlights that Product Price and then FX movements have the greatest impact on NPV as presented in Figures 9 and 10 below. The leverage on NPV outcomes by % change to Product price is not surprisingly similar for both GPPP locations as the changes to price report straight to the surplus cash flow position in either a positive or negative manner. Relevant to the risk assessments - flex of exchange rates, namely AUD:USD, impacts the Geraldton site significantly more than the USA location. In the USA, operating costs and most revenues are in USD; hence relatively little sensitivity. In Australia, a significant portion of the capital costs and some operating consumable costs are in USD, which reduces NPV estimates when the USD rises relative to the AUD. However, in this circumstance, sales revenues are enhanced in AUD terms, because sales are transacted in USD.

Changes in Operating Cost, Feedstock Price and Capital Costs ranked well below in terms of impact on NPV.

At this +/- 30% scoping level study this level of sensitivity is regarded as adequate as having highlighted the importance of understanding the product markets and pricing as well as additional risks associated with currency.

Figure 9: Geraldton Sensitivity Analysis

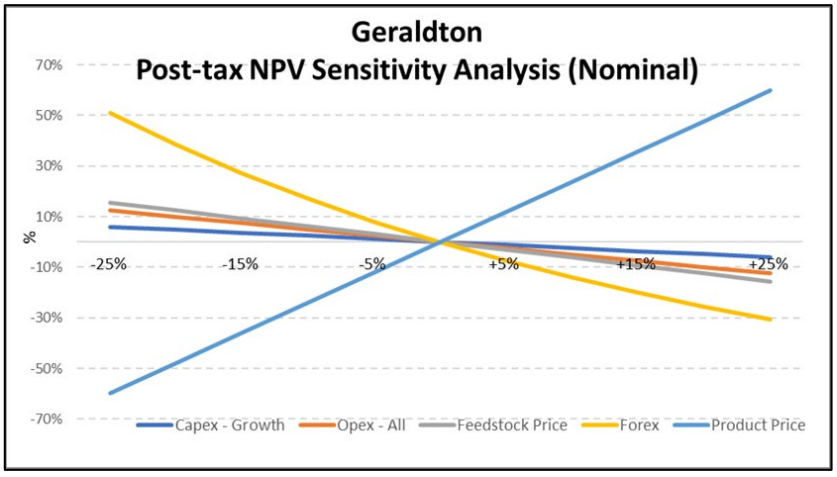
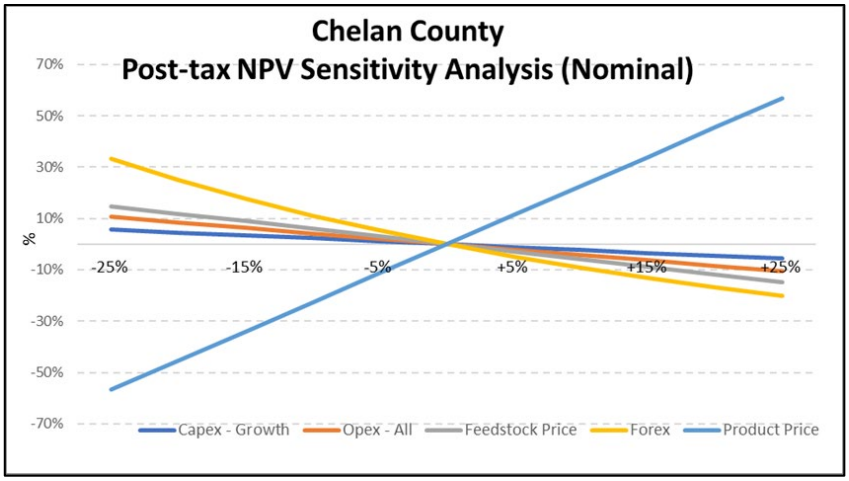


Figure 10: Chelan County Sensitivity Analysis



11 RISKS AND OPPORTUNITIES

This section is intended to be a general discussion highlighting what Hexagon considers to be the current prime risk issues, not an exhaustive risk assessment. Broadly there are significant commercial and technical issues or risks that the Company needs to address in future studies and development plans, which are outlined below.

11.1 Financing

The Phase 1 financing tranche is probably the most difficult to secure but also the most critical. There is risk, particularly in the current poor market conditions that Hexagon simply cannot raise the required funding for this Phase.

The initial tranche to build the Qualification Plant is approximately A$25–A$28 million which is likely to be the most challenging financing tranche. Hexagon will explore ways to fund the GPPP at the "project" level potentially seeking strategic technical or offtake partners able to contribute funding as well as enhance the GPPP business plan by contributing technical or market knowledge. The MJV with MinRes is an example of this transaction style, though Hexagon has not yet considered what kind of GPPP equity could be divested nor what investment contribution might be required.

In terms of funding for the Phase 2, commercial scale operation – this would be underpinned by "locked-in" sales agreements resulting from the successful operation of the Qualification Plant. Again, this could potentially be funded by a strategic partner, if one was not already secured fore Phase 1. A mixture of Hexagon equity and conceivably some layered debt structures, such as debentures or conventional secured debt funding, along with a minor portion of offtake/working capital finance is a realistic assumption. The technical risks are considerably reduced to a standard Greenfields development given the Qualification Plant operations.

In terms of funding Phase 3, the current assumption is that it is fully funded from internal cashflows.

11.1.1 Sales Agreements

Sales agreements require enough samples for the end user to trial, as an acceptance phase ahead of entering a formal qualification process. Hexagon has attracted the attention of end-user groups based on the technical reports it has lodged on ASX and presented at various industry conferences. This needs to be followed up with samples and more testwork to take the GPPP plans to a feasibility level. Both objectives require samples; initially significant volumes of graphite concentrate and ultimately finished product samples.

At McIntosh this is problematical because the top of the main deposit is 20 metres beneath the surface so all samples to date were generated from drill core. An additional 12 tonnes of drill core samples became available late last year and flotation testwork is in progress; but significantly more drilling and samples are required.

To mitigate this, Hexagon can source samples and ultimately feedstocks from other advanced projects or producers. It has also recently acquired an interest in several early stage graphite prospects in the USA, these were selected specifically on their flake attributes but also because the mineralisation is exposed and easily accessible for bulk sampling.

11.1.2 Feedstock

Hexagon has completed this Scoping Study on the basis that it is factoring in an arms-length commercial price to procure its feedstock which is the same as its assumed basket price for the sale of McIntosh concentrates (refer Figure 1 for price comparison). This leaves considerable latitude in

the pricing assumption for Hexagon to investigate a range of alternative feedstock sources with specific attributes suited to the product line specifications, should the need arise. Also, the process circuit components have a reasonable degree of flexibility in terms of accommodating varying types of feedstock.

The majority of Hexagon's testwork to date has been undertaken on samples of McIntosh concentrate. This has highlighted a mix of diverse technical attributes making it suitable for a range of end-use applications. However, the Company considers that given the wide availability of many different flake types it will be able to procure the specific flake attributes it requires for each of its planned products. There is enough margin in the assumed premium feedstock costs to cover any variations in operating or freight costs. McIntosh is a possible source, but to have multiple sources would de-risk source issues for customers and mitigate the risk that the McIntosh project is still undergoing feasibility level assessment and there is no certainty that a similar suite of concentrates will ultimately be produced, or indeed, that the project will be delivered by MinRes.

11.1.3 Other Technical Risks

- Utilisation of a new-generation of EFB Furnaces for purification of natural flake graphite. Hexagon plans to address this by utilising a 30kg/hr pilot furnace to develop its Feasibility level parameters. This would be followed up by the Qualification scale plant (100kg /hr) and ultimately with a commercial scale (1,000kg/hr) reactor. These successive scaleup factors of 3 times and then 10 times are considered reasonable and conservative.
- Translation of test work on McIntosh flake to other flake sources. The McIntosh work provides a strong base case for the preferred flake type the Company is targeting, and as stated above, it is assuming a premium feedstock price to ensure it obtains its desired specifications for each product line. The equipment assumed in the Scoping Study is robust and by varying parameters such as temperature and residence time in the furnaces, and various residence and air-pressure settings in the mills. Hexagon is confident it can achieve the same specifications.
- At this level of study, it is simply not feasible to undertake the exercise of characterising concentrate from approximately 30 to 40 different producers for qualification work. This would be undertaken in the Feasibility study.
- Product contamination post purification from process (mills, classifiers, cyclones, etc.) and handling (bins, conveyors, feeders, pipes, etc.). This needs to be quantified by further testwork and piloting, but key issues will be addressed by careful consideration of the construction materials, design of clean facilities and appropriate airflows and pressures.
- The process has a high power requirement and grid infrastructure requirement for both locations in Geraldton Western Australia and Chelan County in USA. This needs to be investigated in further detail.
- The furnace is a critical long lead item with a manufacturing period of six months with a maximum concurrent manufacturing capacity of four furnaces. This put the furnace delivery on the critical path for all phases.
- Neutralised solution is currently returned to the raw water system and this may present scaling issue and eventually blocking up the returning pipe works. This will need further investigation for a properly designed waste water treatment /process solution.
- No dust suppression and collection system has been included in the plant sheds to create a negative pressure for dust control. This study assumes natural ventilation via louvres and ridge vents is adequate. Further investigation required to determine the environmental and processing requirement for dust control.

Key risk identified for Geraldton location:

- Power prices are not defined for the long-term and the location also relies on building a solar farm for Phase 2 and 3.
- Exporting US furnace technology (EFB Furnace) to Australia present possible USA technology taxes and associated higher cost of transporting parts and labour to support this furnace technology from USA.
- Exchange rate risks include operating risk as revenue in USD and costs in AUD, cost risk as USA based technology provider of furnaces, parts and services.

Key risks identified for location Chelan County:

- Logistical challenges having a source in Australia and downstream facilities in USA.
- Unknowns regarding working in an unknown operating and regulatory environment.
- Exchange risk for the capital build with funding likely sourced from Australia.
- Spheriodised material being exported to China may attract Government duties given their embargo with China.

11.1.4 Other Commercial Risks

- Power prices are not defined for the long-term and the Geraldton location relies on building a solar farm for phase 2 and 3;
- Freight comprises a large proportion of the operating costs, particularly for the USA Site. These are subject to fuel prices amongst other factors, and could rise on an oil price increase.
- Exporting USA furnace technologies, (if those are utilised), to Australia present possible USA technology taxes as well as the associated higher cost of transporting parts and labour to support this furnace technology from the USA.
- Exchange rate risks include: operating risk as revenue in USD and costs in AUD, cost risk as USA based technology provider of furnaces, parts and services.
- Closing a technology Licencing deal with NAmLab for the EFB furnace technology.

These commercial risks will largely be addressed with additional investigative work, ongoing negotiations to close suitable long-term supply contracts and further development of the Company's hedging strategy linked to its actual planned currency exposures.

11.2 Opportunities

The key opportunities identified are as below:

- The use of new, updated EFB furnace technology over the traditional static furnace.
- Long-term concentrate procurement arrangements for materials which offer enhanced properties to each of Hexagon's planned product lines.
- Ongoing research and development utilising the Qualification Plant.
- Toll refining and increasing procurement of third-party concentrates to expand and diversify.

Key opportunities identified for Geraldton:

- Transportation cost from McIntosh to the GPPP could be significantly reduced with back loading options and long-term contracts, possibly as much as 30-40%.

- Additional renewable energy initiatives to manage power prices.
- Profits from the business can be offered as fully franked dividends to Australian based shareholders which would serve to equalise the NPV outcomes where Chelan is a clear front-runner on an After-tax basis.

Key opportunities identified for Chelan County:

- Power prices are considerably lower and provide certainty of an established low Hydro power market.
- Exploiting the “Made in America” branding to assist in accessing USA markets.
- Possible eligibility for various USA Federal grants to assist development of certain listed minerals such as graphite.
- Utilising feedstock from Charge Minerals’ Ceylon Graphite Project – subject to successful exploration and feasibility studies.

APPENDIX 2

ASSUMPTIONS - GPPP SCOPING STUDY & FINANCIAL MODELLING

INPUT	DESCRIPTION
Study Level	Scoping Study at a plus/minus 30% accuracy level for estimates.
Production Target	The Scoping Study is based on a standalone downstream processing facility procuring feedstock from third-party suppliers on arms-length commercial terms within a well-established international graphite concentrate market. A Production Target as defined in the JORC Code is provided however the feedstock for this Graphite Purification and Processing Plant (**GPPP**) is not necessarily directly linked to any one Mineral Resource owned by the Company. This is planned to be an industrial facility, similar to a copper or zinc smelter business, not reliant on any one feedstock source, but selective in the sources they can utilise. A variety of graphite concentrates are produced and available for long-term sales contracts in China, Brazil, Mozambique, Madagascar and India (top 5 flake concentrate producers). It is a standard procedure to characterise samples from each location to determine which are better suited for Hexagon's various product needs. An additional source is the McIntosh Project, which is the subject of a joint venture agreement between Hexagon and Mineral Resources Limited (**MinRes**), the McIntosh Joint Venture (**MJV**). The testwork on the McIntosh samples along with some comparative work with other materials provides a strong base case for the preferred flake type the Company is targeting. It is not feasible at this level of study for Hexagon to undertake concentrate characterisation studies on approximately 40 different potential feedstocks to create a shortlist for qualification work. *For support:* the Mineral Resources at the MJV which, subject to a positive Feasibility Study and Investment Decision by MinRes, might be processed at the GPPP, were last updated and reported on 5 April 2019, "Revised McIntosh Mineral Resource – Amended". Previously, Hexagon had completed a Prefeasibility Study on the McIntosh Project based on a

	very similar Mineral Resources estimate (c.12% difference) which was reported 31 May 2017 "Prefeasibility Study confirms viability of McIntosh Project. These are studies of the upstream activities, i.e. mining and primary processing into graphite concentrates. This GPPP Scoping Study is unrelated to these other than certain target flake parameters are based on McIntosh samples and Hexagon is hopeful that in time, McIntosh material will comprise part of the planned feedstock for the GPPP. The GPPP assumed 25 year operating term of the GPPP is predicated on an expectation that concentrates from McIntosh will be available; however there is insufficient data to make any conclusions on the capacity of the Mineral Resources at McIntosh to supply the operation over that time. The equipment being employed, and suite of products planned have the flexibility to accommodate varying types of feedstocks, which supports Hexagon's decision to use a full-commercial cost for its feedstocks which enables external sources to be utilised. Given that there will ongoing access to qualification scale facilities this is considered to be a reasonable assumption at this level of study.
Feedstock Specifications	Some fundamental flake specifications that Hexagon would be using for first pass screening of potential flake concentrates for its planned product suite include: • Graphite grade - min of 95% TGC other impurities 5% max • Moisture content < 0.5% H_2O • Feed flake sizes +60, +100 and -100 mesh ASTM. • Thin-moderate thickness flake crystalline graphite. Other specifications are confidential.
Metallurgical Factors	Three processing lines are planned at the GPPP. The processing parameters for each are based on testwork, largely completed over the past 18 months at NAmLab, Hexagon's technology partner based in the USA. This testwork has covered: • Complete characterisation profiles for all sample material and sun-samples submitted by Hexagon. • Concentrate purification focussed on utilisation of Electrothermal Fluidised Bed (EFB) up to 20kg pilot scale samples and bench-scale purification tests utilising an updated version of traditional static furnace technology. • Milling and Micronising assessing impact hammer milling, air jet micronisation and a proprietary super fine grinding technology for the production various size grades, including ultra-fine graphite powders for a range of industrial powder metallurgical end uses.

	• Milling and shaping to produce spherical graphite and determine yields, size distribution (d10, d50 and d90) and other physiochemical characteristics. • Electrochemical testwork including cycling work in coin cells for both anode and conductivity enhancement materials (**CEM**) manufactured from Hexagon samples. Initial spheroidisation testwork was also carried out in China by a local equipment manufacturer. • Expandability testwork. • Assessment of suitability for production of synthetic diamond. • Manufacturing prototype EAF electrodes with blends of refined Hexagon flake graphite mixed into the blend. • Assessment of an appropriate mechanical grinding and classification technique in the production of industrial premium grade foundry lubricant and mould release agent The above testwork was reported to ASX in the following reports: • Positive Preliminary Battery Test Results; 16 August 2017; • Positive Battery Testwork and Marketing Strategy; 6 September 2017; • McIntosh Large & Jumbo Graphite Flake Endowment; 6 November 2017; • Expandable Large Flake Graphite at McIntosh; 23 November 2017; • Testwork Program Highlights Premium Opportunities;29 November 2017; • McIntosh Graphite Easily Achieves 5N's Purity, 18 January 2018; • Unique High Quality Crystallinity of McIntosh Graphite, 6 March 2018; • New Results Demonstrate 99% Yields in Spheroidisation Tests, 21 June 2018; • Highly Encouraging Cell Cycling Results for McIntosh Graphite, 17 July 2018; • Building a Vertically Integrated Graphite Business, 28 August 2018; • 5-Nines Graphite Purity in Pilot Scale Sample, 17 December 2018; • Excellent Technical Outcomes Underpin Downstream Business, 29 April 2019.
Process Technology	The process technology assumptions are: *Purification:* The base case is the use of Static Furnaces because they are commercially available and widely used. The particular type tested by Hexagon has various proprietary modifications which Hexagon cannot

	disclose but the result is to reduce the residence time to approximately 8-hours from c. 3 weeks. The EFB is Hexagon's preferred technology, and assessments were undertaken for this technology also. The EFB under evaluation is viewed as offering the greatest versatility to process different feedstocks and to achieve further operating improvements which will reduce downtime and maintenance costs. *The Expandable Line:* The process units comprise screening into plus and minus 60 Mesh flake size followed by a packaging unit to fill one tonne bulk bags. *The Industrial/Electrode Line* The process units comprise a series of three fluidised air jet mills (Phase 2 expansion of GPPP each with internal classification system), set up in series. Each series has annualised production capacity of approximately 3000 tonnes of product. In Phase 3, four additional air jet milling system are further added to achieve a total annualised production of approximately 21,000 tonnes of micronised products. *Battery Line:* The process units comprise a train of Air Classifying Mills (ACM) which mill and micronise and incorporates internal classification where oversized material is returned to the grinding chamber and near size material is fed to the downstream units i.e. combined spheroidisation and classification units. The spheroidisation ACM consists of a series of smaller ACM machines incorporating internal classifiers. Each train comprises one paired set of large ACM units for milling and eight paired sets of smaller ACM mills, with an annualised total feed rate of 7,500 tonnes per year. At an assumed yield to USG of 50% to 55% annual production of USG is approximately 3,750 to 4,125. The spherical product is collected as the classified discharge at the final ACM units and is collected at the final product bin. While the classified overflow is either directed to other process streams or can be sold outright directly as recarburiser or mould release agent (minus 10 micron size).
Transport	Transportation cost of feedstock concentrates to the respective GPPP sites has been included – so essentially assuming an "FOB" price with Hexagon responsible for freight to the GPPP. As a sound, base case starting point, the McIntosh JV site was selected as a proxy for the likely 10-12 suppliers as it incorporates aspects of long-distance trucking, sea-freight and short hauls from Port; all at Australian or USA rates. These would be key elements with international sources such as Africa, Brazil, India, etc. though not all at the higher Australian or American rates. Therefore at this scoping level, the Company considers it has adequately factored in logistic costs for feedstocks.

	Outbound transportation of product is also assumed to be on an FOB basis with transport to port included if customer is not in-country. However, for the Geraldton location – transportation to the USA and Europe (based on West Coast USA costing) was included for customers in this location. This recognises that product prices in these locations have domestic competition for some product overlap and Hexagon is at a disadvantage transporting from Australia.
Infrastructure and Services	*Power* For the Geraldton site, Phase 1 power will be supplied from the grid by connecting to existing transmission lines. In Phases 2 and 3, the site will be powered by a build-own-operate (BOO) solar farm with top up from the grid as required to achieve a blended power cost. For the Chelan County USA site, power for all three phases will be supplied via an existing grid connection at a nearby sub-station from hydro power. *Water supply* For the Geraldton site, scheme water will supply raw, fire and potable water requirements for all three phases. For the Chelan County site, existing, permitted intakes for river water from the Columbia River, will supply raw and fire water for the project. Scheme water will supply potable water. *Communication* For both locations and all phases, it is assumed that the project will establish a connection with existing local communication infrastructure comprising mobile and internet communications.
Exchange Rates	The relevant crates are AUD, USD and CNY. The following rates are used in all cost estimates and financial modelling: • 1.00 AUD = 0.72 USD; • 1.00 AUD = 4.90 CNY. • No allowance has been made in the estimate for exchange rate fluctuations.
Capital Cost Estimates	The estimate is qualified by the following assumptions: • The estimate is based on an EPC contract execution strategy; • No allowance has been included for any Import Taxes or Customs Duty for imported equipment and materials; • The estimate is based upon GR Engineering Services Limited (**GRES**) design criteria, process flow diagrams, preliminary layout drawings and the mechanical equipment list developed in collaboration with Hexagon. *Also note:*

	• All construction labour to be sourced locally; • Contingency on equipment, materials and labour has been set at 10% except for the furnace supply which is set at 2.5% based on existing commercial quotes. The contingency allowance is not intended to cover scope other than that defined in the study scope of work; • Market prices are effective 1Q19; • No allowance has been made for any training of operations personnel.
Operating Cost Estimates	• The plant operating cost estimates are based on intermittent operation for phase 1 -the plant will be operated on consignment production basis to produce sufficient product tonnages over a planned period of operating time for customers' commercial qualification purpose. • Phase 2 and 3 will be operated on a continuous 24/7 basis with an estimated plant availability of 85% to allow for schedule maintenance shut-down and furnace heat-up time requirement, etc.
Implementation Schedule	Phase 1 – commence construction. Phase 2 – construction commences after qualifying plant fully operational for 12 months, phased scale up with 25% Phase 2 production capacity coming online in six monthly increments with first production instalment 10 months after construction commencement. Phase 3 - construction commences after Phase 2 plant fully operational for 24 months, phased scale up with 20% Phase 3 additional production capacity coming online in six monthly increments with first production instalment 10 months after construction commencement.
Product Prising and marketing Strategy	Current product suite of 12 materials as listed in Table 2 of the main report. All price assumptions are listed. Data on suppliers, customers, market depths and locations is confidential.
Funding	The GPPP financial model is unleveraged. It effectively assumes that all funds are via equity; i.e. the model does not assume any debt or financing charges.

Financial Modelling Parameters	The key financial assumptions are:
	• All analysis and costs are presented in Australian Dollars (**AUD**).
	• Amounts are modelled in both AUD and USD depending on location and currency of sale or purchase.
	  ○ Sales Price and Concentrate feedstock are modelled in USD.
	  ○ Furnace and other specialised technology from both USA and China are modelled in USD.
	  ○ Other plant and equipment are modelled relevant to location.

	○ Construction and operating costs are modelled relevant to location. • Exchange rates assumed: *as above.* • The financial model is built using real annual inputs in 2019 dollars. Product prices, operating costs and capital costs are escalated within the cashflows to nominal values by using a general 2% inflation rate. Cashflows are discounted using a nominal discount rate of 10%. • Taxation rates vary between the different locations and are based on professional advice from BDO and judgements by Hexagon. ○ Corporate tax of 30% is applied to operations in Geraldton. ○ Corporate tax of 21% is applied to operations in Chelan County. ○ B&O tax of 0.484% of revenues applied to operations in Chelan County. ○ Depreciation for USA location assumed to be the same as Australia. ○ R&D grants not considered. ○ No withholding tax is applicable to USA operations. ○ No Company carried forward tax losses are assumed and project tax losses are carried forward and applied in future periods. • Working capital assumptions are: ○ Feedstock (concentrate) inventory is assumed to be 3 days; ○ Finished goods inventory is assumed to be 28 days; ○ Creditors Debtors are 30 days; ○ Capital Costs are assumed payable as incurred; and ○ Corporate taxes are 90 days.