

Mustang Resources Limited  
(ASX: MUS)

May 2017

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**Note:** This report is based on information provided by the company as at May 2017

Investment Profile	
Share Price as at 23 May 2017	\$0.046
12 month price target per share	\$0.169
Issued Capital:	
Ordinary Shares	526.0m
Options	154.6m
Performance Rights	14.0m
Fully Diluted	694.5m
Market Capitalisation	\$24.19m
12 month L/H	\$0.02/\$0.105

Board and Management	
Mr Ian Daymond: Non-Executive Chairman	
Mr Christiaan Jordaan: Managing Director	
Mr Cobus van Wyk: Non-Executive Director	
Mr Peter Spiers: Non-Executive Director	
Mr Rob Marusco: CFO/Company Secretary	
Mr Paul Allan: Senior Geologist, Montepuez Ruby Project	

Major Shareholders	
Lanstead Capital	7.77%
Andium Pty Ltd	6.26%
Regius Resources ((Jordaan, Van Wyk)	5.65%
Board and Management	5.75%
Top 20	35.53%

## Share Price Performance



Senior Analyst – Mark Gordon

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## MOZAMBIQUE RUBIES AND GRAPHITE

Mustang Resources ("Mustang" or "the Company"), an ASX listed ruby and graphite explorer and developer, is concentrating activities on its Montepuez Ruby Project ("Montepuez" or "the Project") located 150km west of the city of Pemba in northern Mozambique. The Project is located adjacent to, and over similar geology to LSE-listed Gemfields' plc (LSE: GEM, "Gemfields") Montepuez Ruby Project (the world's largest ruby deposit), from which Gemfields has received US\$225 million to date from sales of rubies recovered from bulk sampling operations. Sampling by Mustang to date has recovered stones that are potentially of similar quality to those of Gemfields', and it expects first sales in October 2017. The Company has also been receiving excellent results from drilling at its nearby Caula Graphite Project ("Caula"), with this located along strike from Syrah Resources' (ASX: SYR, "Syrah") Balama development project.

## KEY POINTS

**New high quality field:** The Montepuez Ruby Field is a new discovery, having been found in 2009, and is underexplored with significant potential for expansion – a notable feature of the field is the high quality of some of the stones (equivalent to the renowned Burmese "Pigeon-Blood" rubies), but it also has the capacity to produce rubies over a range of qualities so it will be able to supply a range of markets.

**Stable ruby supply:** The Montepuez Ruby Field looks as though it will become a consistent, stable source of rubies (something that the ruby market has been lacking and that has hindered development of reliable markets), and thus will enable participants to develop a stable and solid market strategy for product, possibly akin to the setup of the original De Beers diamond markets, with the diamond market now being valued at around US\$70 billion annually, in contrast with rubies, with a current estimated market size of US\$2 billion.

**Encouraging results from Montepuez:** Early stage work by Mustang to date has resulted in the recovery of ~73,000 carats of reportedly high quality rubies from bulk sampling and prospecting, thought to be of similar quality to Gemfields high quality stones that have received average prices of ~US\$500/ct at auction – the geology of Mustang's holding is also the same as that for Gemfields, with, in the case of secondary mineralisation gravel beds being delineated, and with significant areas of artisanal workings.

**Upgraded Plant:** Recent upgrades to the treatment plant should lead to increased recoveries and significantly higher throughput.

**Revenue expected soon:** The Company expects first revenue from rubies in October 2017, from a planned auction of 200,000ct – as mentioned above Gemfields has received US\$225 million for sales of rubies from auctions over the past three years.

**Strong ruby market:** Increasing demand for rubies over recent years has caused the price index to rise by ~60%, with this possibly partly due to the marketing efforts of Gemfields – should a viable resource be delineated Mustang will be in a prime position to take advantage of the market, which has also seen increasing price with increasing supply.

**Experienced and committed personnel:** Company personnel have extensive experience in Africa, particularly in Mozambique, in which directors have operated for ~13 years. In addition Paul Allan, the Senior Geologist previously worked with Gemfields at Montepuez. Insiders hold some 5.75% of Mustang, thus aligning their interests with those of other shareholders.

**Steady news flow:** Ongoing activities should provide steady news flow through 2017.

**Valuation:** We have completed a valuation for Mustang, with this resulting in a base case 12 month price target of \$89 million, or \$0.169/share. 80% of this is based on a risk DCF valuation for a hypothetical operation, including bulk sampling, at Montepuez, with our target predicated on milestones being met, including successful results from the planned ruby auction later this year and positive bulk sampling results leading to a meaningful initial Mineral Resource Estimation ("MRE") at Montepuez.

## SWOT ANALYSIS

### Strengths

- ◆ **Underexplored world class field:** Montepuez hosts the world's largest ruby resource, and having only been discovered in 2009, is underexplored – the first modern exploration has only been done since 2011, with this being highly successful.
- ◆ **Prospective geology:** Mustang's tenements are hosted over geology similar to that at Gemfields' project, with the number of artisanal mines and results of work to date highlighting this prospectivity.
- ◆ **Quality products:** Stones recovered to date are of reportedly high quality, possibly similar to Gemfields' gem quality products which have returned an average price of ~\$US500/ct for rough gem/high quality rubies.
- ◆ **Short term cash flow:** With the ongoing recovery of rubies we will expect short term cash flow to help fund the bulk sampling and exploration activities, and, going by the example of Gemfields could add significant cash to the treasury – the installation of the upgraded treatment plant should help in growth in production.
- ◆ **Graphite:** Drilling at Balama has returned thick intersections of high grade graphite at Caula, with every indication that it has the potential to host a large, high grade resource.
- ◆ **Experienced people with skin in the game:** Company personnel have significant experience in the resources game as well as significant shareholdings – this includes African and gemstone experience.

### Weaknesses

- ◆ **Graphite projects:** There are a large number of graphite projects all vying for a limited pool of capital, and thus projects will need to be able to differentiate themselves from others to get funded. This is not so critical for Mustang with activities focussed on Montepuez; and also Caula, by virtue of grade and preliminary metallurgical testwork is looking like a quality project.
- ◆ **Ruby sale strategy change:** The recently announced change in strategy from planned sales of rough and cut stones to selling all in the rough at auctions (as for Gemfields) severely impacted on the share price and also investor trust in Mustang – the Company will now need to deliver to gain back value and investor trust. This change was made however so as not to compete with customers and to ensure quicker cash flow and less complexity in marketing and sales.

### Opportunities

- ◆ **Exploration success:** This is the key opportunity for Mustang, with this expected to lead to initial JORC-compliant resources later in 2017 for both the ruby and graphite projects.
- ◆ **Ruby marketing:** Recent developments in ruby markets, and the reportedly growing interest in coloured gemstones gives Mustang an ideal opportunity to market products, and should exploration activities be successful, will strengthen its marketing potential by being able to guarantee a consistent and stable supply.

### Threats

- ◆ **Lack of exploration success:** This is self-explanatory, and a threat to any explorer.
- ◆ **Ruby prices and markets:** These will depend on both the markets and gem quality and will only be determined at the first auction, expected in October 2017 - prices are always a threat to resource projects and although rubies have increased in value over recent years this could quickly change due to economic slowdowns in any of the target markets – sales of luxury goods are closely tied with economic conditions - another question to be raised is will the markets be able to absorb production from Mustang in addition to that from Gemfields without driving down prices?
- ◆ **Costs:** Again a factor to consider when assessing a resources company, however this should not be too much of a threat at Montepuez (should a reasonable value deposit be defined) given the expected relatively low cost mining and processing.
- ◆ **Security and illegal miners:** These threats are commonly found in developing countries where generally poor locals are dependent upon illegal mining for income – this has to be carefully managed and the Company is well aware of the potential issues and employs artisans for prospecting, thus making the artisans' operations legal.

## OVERVIEW

### STRATEGY AND PROJECT OVERVIEW

- ◆ Mustang's activities are focussed on the Montepuez Ruby Project and Balama/Caula Graphite Project, both located in Cabo Delgado Province in northern Mozambique (Figure 1).
- ◆ At Montepuez Mustang's strategy is to generate revenue through the current bulk sampling programme, with the results of sampling used in conjunction with auger drilling to estimate an initial JORC-compliant MRE by late 2017.
- ◆ The Company will only be targeting high quality rubies, with these initially expected to come from two sources – test pits dug by the Company; and artisanal miners, with the Company using the latter as prospecting teams and paying them for stones collected.
- ◆ The use of artisanal miners in the Company's operations should cut down on the security risk that these previously illegal operators pose – bringing them into the Company's fold makes their operations legal, and also ensures that the Government receives royalties from the rubies that they recover – previously these went into the black market.
- ◆ On the marketing side the strategy will be to sell rough stones – the Company is currently working through marketing options and is looking at sales, following the development of its own proprietary rough grading system, through tender auctions similar to those held by Gemfields.
- ◆ At Balama, the Company is working towards a JORC-compliant MRE in H2, CY2017.

**Figure 1: Project location map**



Source: Mustang



## FINANCIAL POSITION

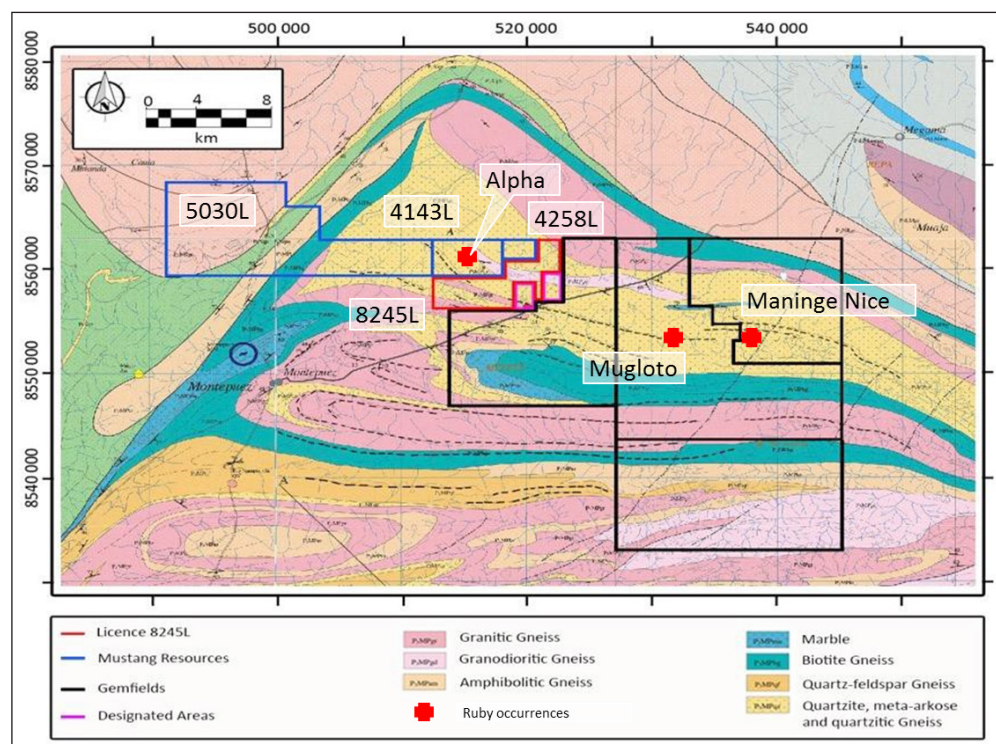
- ◆ As of March 31, 2016 the Company had \$3.143 million in cash and no debt.
- ◆ During the March 2017 Quarter \$7.169 million has been added to the Company's coffers through Tranche 2 of a \$2.8 million placement (at \$0.021) in the December 2016 Quarter, and Tranche 1 of a \$5.88 million placement (at \$0.077) in the March 2017 Quarter.
- ◆ Tranche 2 of the 2017 placement, totalling ~\$600,000, which was approved at a General Meeting of shareholders held on May 22, 2017.
- ◆ Total funds raised since January 1, 2016 have been \$13.802 million.
- ◆ Over the last two full quarters the Company spent a total of \$6.350 million including \$1.504 million on administration and wages.

## MONTEPUEZ RUBY PROJECT - MUS 52.5% TO 65%

### Location and Tenure

- ◆ Montepuez comprises four exploration tenements for 193km<sup>2</sup> as shown in Figure 2 – these are located some 150km west of the coastal town of Pemba.
- ◆ The corporate and ownership structure of these tenements is shown in Figure 3.
- ◆ The tenements are immediately to the west of Gemfields Montepuez Project, and cover similar geology to that hosting the world's largest identified ruby deposit.

Figure 2: Montepuez geology map showing major ruby occurrences and tenements

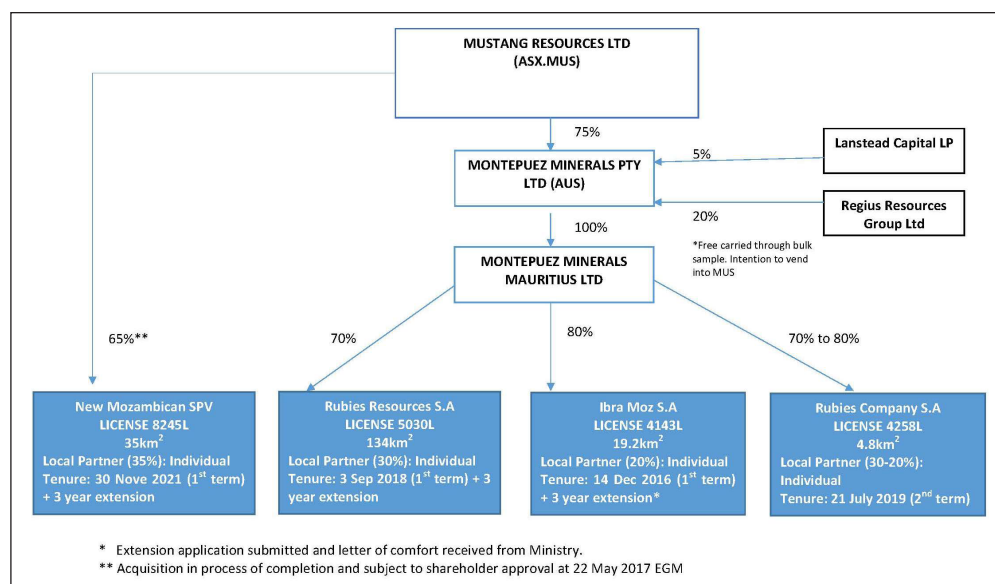


Source: Adapted from Mustang

- ◆ The tenements were acquired under two separate agreements – all except for 8245L were acquired under an initial agreement as announced to the market on October 22, 2015, with a General Meeting in March 2016 approving the acquisition.
- ◆ The acquisition of Licence 8245L, announced to the market on February 28, 2017, which was approved at a General Meeting held on May 22, 2017.
- ◆ The acquisition of the first tenement package is by way of Mustang acquiring 80% of the equity in Montepuez Mining Pty Ltd ("MM"), a company which has Regius Resources Pty Ltd ("Regius") as a major shareholder – Regius is controlled by Mustang director Mr Mr Van Wyk, with Mr Jordaan also having an interest.
- ◆ The corporate structure for the three initially acquired licences is shown in Figure 3.
- ◆ At the time of acquisition MM held 80% of 4143L (on which activities are currently focussed) and 70% of both 5030L and 4258L - MM has a call option to acquire an additional 10% in 4258L for US\$1 million upon successful conclusion of a bulk sampling programme.

- ◆ Subsequent to the transaction Lanstead Capital ("Lanstead") took a 5% stake in MM, thus reducing Mustang's ownership to 75% - this was part of a share subscription agreement between Mustang and Lanstead, with Lanstead now being the largest shareholder in Mustang
- ◆ The terms of the acquisition of the first tenement package were amended, as announced on December 11, 2015, and as detailed below:
  - 17,187,500 fully paid ordinary shares to be issued for the acquisition of 80% of MM – these replaced fully paid ordinary shares and performance rights having a value of US\$9 million as under the original term sheet.
  - 2,921,389 fully paid ordinary shares in lieu of the cash component of US\$2.75 million in the original term sheet.
  - Cash of US\$150,000 to cover historic costs.
- ◆ The acquisition of licence 5030L is contingent upon payments to the local partner of US\$750,000, 6 months after bulk sampling startup and US\$750,000 12 months after bulk sampling startup – these are also contingent on the licence being transferred to the Mozambican SPV, with this currently in process.
- ◆ Bulk sampling is yet to commence on 5030L.
- ◆ The acquisition of 65% of 8245L involves an initial payment of 30 million Mustang shares (escrowed for 2 years) and a cash payment of US\$100,000 to the vendor, Regius Resources, with local group SLR Mining Lda ("SLR") retaining 35%.
- ◆ The licence will be transferred to a special purpose vehicle ("SPV"), owned 65% by Mustang and 35% by SLR.
- ◆ Other conditions of the acquisition include:
  - SLR will have a right to sell its remaining 35% holding in the tenement at any time after definition of a minable resource – the price will be determined by an independent expert.
  - Mustang will be required to pay SLR US\$1.5 million upon completion of a 150,000t bulk sampling programme which leads to a decision to progress to full scale mining.
  - Should Mustang decide not to proceed it will sell its holding in SPV to SLR for MZM10 (~\$0.02).

Figure 3: Corporate structure – Montepuez



Source: Mustang

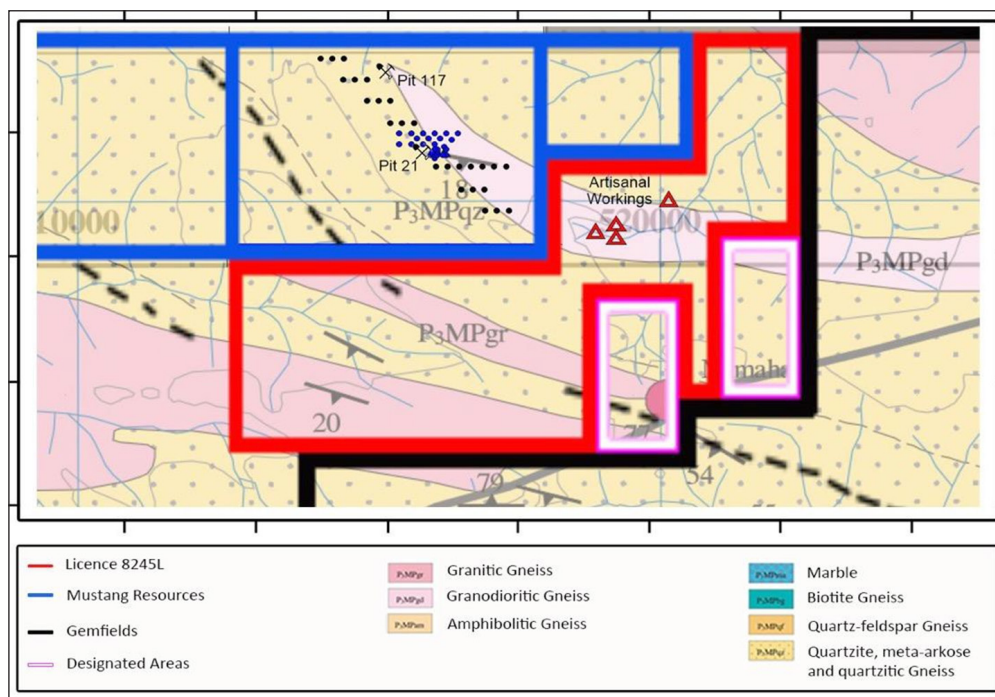
## Geology and Mineralisation

- ◆ Montepuez is located within the Mesoproterozoic to Neoproterozoic Montepuez Complex, a highly deformed and metamorphosed constituent of the Mozambique Belt, a mobile belt that forms the NE margin to the Mozambique Craton.
- ◆ The Mozambique Belt is part of the East African Orogenic Zone.



- ◆ Rocks within the project include granitic to amphibolitic orthogneiss, and paragneiss including quartzite, meta-arkose, marble lenses, quartz feldspar gneiss and biotite gneiss, with the metamorphics being intruded by granitic bodies.
- ◆ The units are highly deformed and structurally complex, and are interpreted as forming a complex series of refolded doubling plunging tight to isoclinal folds, cut by a number of largely northeast trending shears.
- ◆ The underlying geology at Gemfields' Maninge Nice deposit can be broadly divided into four main units – amphibolite, granitic gneiss, carbonate and minor other units, including quartzite, pegmatite and vein quartz.
- ◆ The bedrock units are overlain by, at Maninge Nice, up to 18m of cover, including weathered bedrock, transported gravels and a well-developed lateritic soil profile.
- ◆ Two types of deposit have been recognised to date – primary and secondary.
- ◆ The primary mineralisation, as exhibited by Maninge Nice, is associated with amphibolites and is coincident with north-south trending feldspar and carbonate veins and alteration, interpreted as being related to dextral shearing.
- ◆ It is probable that alteration (possibly associated with granitic intrusions and pegmatitic activity, and with shears and lithological contacts acting as fluid pathways and hence sites of alteration) has led to the conversion of preexisting corundum in the amphibolites to the red ruby through the introduction of chrome sourced from the amphibolites; colour variations in ruby are also due to changes in other impurities, including iron and titanium.
- ◆ As can be seen in Figure 2, both of Gemfields Maninge Nice and Mugloto deposits are spatially related to an east-west to NW-SE trending structure that extends past Mustang's Alpha prospect – this also trends through the artisanal areas of Namahaca and Nacaca which are located in the region - Figure 4 shows the structure and contacts in Mustang's tenements.

**Figure 4: Map showing Mustang's Alpha prospect and location of artisanal workings**

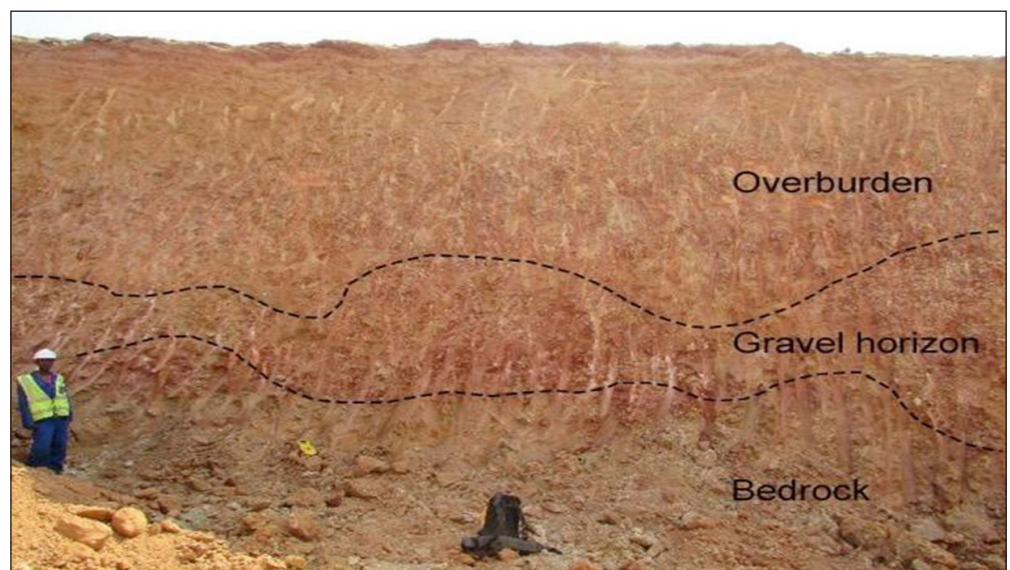


Source: Mustang

- ◆ So called secondary mineralisation at Gemfields' Maninge Nice deposit is probably the in-situ weathered primary mineralisation - the stones at Maninge Nice are reportedly largely of "commercial" and not gem quality.
- ◆ Secondary mineralisation at Mugloto, although of significantly lower grade, is of much higher quality, with the rubies being of a darker colour, less included and fractured (a large proportion of the Maninge Nice stones are pink sapphires) – this indicates a different primary source for the rubies, and with our understanding being that these stones make up the bulk of Gemfields' high quality auction parcels.
- ◆ The mineralisation at Mugloto is hosted within a gravel bed, with pitting and auger sampling (as reported in the 2015 CPR) indicating thicknesses of between 0 and 1.5m, with an average thickness of 0.32m.

- ◆ Grades from the trial/ bulk sampling pits at Mugloto ranged between 0.11ct/t and 5.64ct/t, with an average of 2.57ct/t – of this around 50% of the recovered stones were in the higher value ruby and high ruby classes.
- ◆ The gravels are interpreted as being alluvial in origin, possibly being reworked by braided streams after a flood event – the interpreted gravels cover a significant proportion of Gemfields' three northern licences – these are paleochannels, with rubies largely found in "trap" sites associated with coarser gravels, cobbles and boulders.
- ◆ Like Mugloto, Alpha is a secondary deposit, with rubies hosted in a gravel bed with thicknesses of up to 3m, and averaging ~0.5m – the prospect is located along the contact of an intrusive with the metasediments.
- ◆ It is interpreted however that the rubies, although alluvial or possibly eluvial in origin are relatively close to the source – edges, although slightly abraded and pitted indicating transport, are not rounded as one would expect in stones that have been transported for a significant distance.
- ◆ Mustang has stated that the rubies collected as part of the current bulk sampling programme within tenement 4143L are of comparable quality to those at Mugloto – this has been supported by comments by Mr. Vincent Pardieu of the Gemological Institute of America ("GIA") made on a site visit to the Montepuez area and as quoted, with his permission, by the Company:
  - Mustang rubies "are of high quality with some gemstones showing variety of colour, size and clarity".
  - Work done to date by Mustang is "very encouraging and indicative of a secondary ruby deposit similar to some other deposits GIA has studied in the Montepuez area".

**Figure 5: Geology, Alpha pit.**



Source: Mustang

- ◆ Similar quality rubies are being collected by artisanal miners on the newly acquired tenement 8245L (Figure 4).

### Work by Mustang

- ◆ Fieldwork commenced in April/May 2016, with the establishment of the field camp and commencement of installation of the nominal 75tph processing plant – major parts of the plant were relocated from the Company's Save River diamond operation, which was placed on care and maintenance.
- ◆ Initial pitting and concentration using a "bushman jig" commenced in July 2016, with a release on July 27, 2016 announcing the discovery of 10 rubies in this initial small scale work.
- ◆ The first bulk sampling pit was opened up at the "Pit 21" area (Figure 4) in September 2016, with 460.23ct of rubies recovered from 2,683t of commissioning feed as reported in October – at this time the plan was to ramp up the plant to 350m<sup>3</sup> (525t) per day operating on a single shift.

- ◆ Initial issues with the processing included lack of water and sticky and hard clays hampering recoveries, and limiting the plant to 115m<sup>3</sup> per day.
- ◆ Water drilling discovered appreciable water near the Alpha deposit (with the plant subsequently moved to this site and recommissioning completed in January 2017).
- ◆ Most recent developments have included the upgrade of the front end to increase throughput and improve recoveries – commissioning of the plant, which includes a 250tph scrubber (with water jets to break up the clays) and replacement of the conveyors feeding the rotary pans with slurry pipes has recently been completed, with the plant shown in Figure 6.
- ◆ The plant includes a 250tph feed capacity scrubber, that based on one seven hour shift can deliver 1,750tpd to the concentrating pans (with the Company planning on 1,500tpd) - these in turn will deliver ~ a 1% to 2% mass pull concentrate to two sorthouses/gloveboxes.
- ◆ There is the potential to ramp up production in the future by operating on two or three shifts per day, without the need to incur any additional capital.
- ◆ Plans are to operate for 21 days/month, which is based on six day weeks and maintenance days.
- ◆ The Company also has an ongoing auger drilling programme to test for the presence and extent of the prospective gravels throughout the Company's licences – this is being conducted in parallel with test pitting where gravels are intersected.

**Figure 6: New plant front end under construction**



Source: Mustang

### **Ruby Inventory and Marketing**

- ◆ With the exception of discovering rubies, marketing is the most important facet of the operation.
- ◆ As of March 9, 2017 the Company had mined and processed 22,815m<sup>3</sup> (34,222t) of ruby bearing gravels and had recovered 3,952ct of high quality ruby, with a grade of 0.11ct/tonne.
- ◆ In addition, as of this date 33,339ct had been collected by the Company's prospecting teams which are largely made up of artisanal miners working within Mustang's licences who are paid on a per carat basis.
- ◆ As of April 28, 2017, the Company's inventory had grown to ~73,500 carats; however no details are provided regarding production from the bulk sampling operating and rubies collected by the prospecting activities – it would be expected, given upgrades being carried out on the plant, that the bulk of the increase in the ruby inventory had been collected from the prospecting teams.
- ◆ The company originally sent two parcels of rubies for appraisal, grading and to establish marketing strategies and connections:
  - An initial parcel of 6,221ct was sent to the US in early 2017 – this included five "special" stones of >5ct including two 24ct rubies – these have now been cut by renowned gemstone cutter and polisher Meg Barry, and are to be sent to Thailand for inclusion in the rough inventory being prepared for sale in October 2017.



- A second parcel of 25,000ct was sent to Thailand in March 2017, with this including four “special” stones and a third parcel of 40,000ct is planned for export in May 2017 - a sample of the rubies from the first parcel is shown in Figure 7.
- ◆ Having a large inventory is essential for an accurate grading process and a successful auction.
- ◆ The Company was expecting cash from the sales of the special stones by the end of June, and was looking to an initial larger volume sale of 50,000ct later in H2, CY17 – this was part of an initial strategy of selling cut as well as rough stones to capture the value add, and would also assess direct sales versus auctions – plans were initially to cut stones larger than 1ct, which most likely would be sold to wholesalers.
- ◆ However, after discussions with potential rough stone customers this strategy has been changed to one of selling all rubies in rough parcels at auctions similar to Gemfields – advantages of this method include the potential for competitive tension at the auctions, leading to higher prices, as well as receiving cash immediately upon sale, as opposed to payment terms of 6-12 months for cut stones.
- ◆ This will also prevent the Company, in not selling cut stones, from competing with its own rough stone customers.
- ◆ The revised strategy has led to the decision for a planned auction of ~200,000ct in October 2017, some 12 months after commencing sampling at Montepuez.
- ◆ One of the key markets is the US, which in 2014 imported coloured stones valued at around US\$1.2 billion – this had grown from US\$354 million in 2009, an over 25% CAGR rise, with coloured stones now capturing some 4.5% of the total gemstone market and growing.
- ◆ Another factor in the US market is the requirement for ethically sourced stones with traceability – Mustang will be able to provide this.

**Figure 7: Rubies included in first package**



Source: Mustang

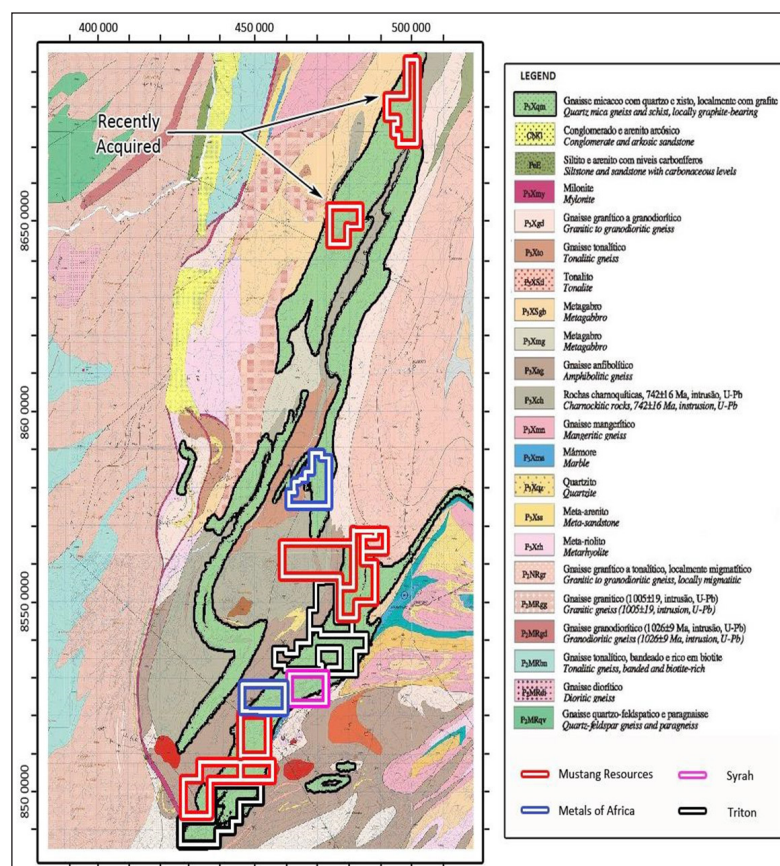
### Exploration Potential

- ◆ Work to date has identified a number of areas of ruby mineralisation in the tenements, with the operations of Gemfields highlighting the prospectivity of the Project.
- ◆ This is highlighted by the artisanal workings on the newly acquired 8245L licence.
- ◆ Work is at an early stage, with significant areas of the prospective stratigraphy and structure yet to be tested, and also areas of artisanal mining need to be assessed.

### BALAMA GRAPHITE PROJECT – MUS 60% TO 95%

- ◆ The Balama Graphite Project includes seven exploration licences for 661.4km<sup>2</sup>, with tenement 5873L located some 25km to the west of Montepuez, and tenement 6678L (Caula) located 40km north of Syrah's Balama Project (Figures 8 and 9, Table 1).

Figure 8: Balama Graphite Project



Source: Mustang

Table 1: Balama tenements

Licence No.	Area (km <sup>2</sup> )	Commodity	Issue Date	Valid Until	Interest/Right to Earn Interest
4661L	147.5	Graphite	11/09/2013	11/09/2018	60%
4662L	94.8	Graphite	1/10/2012	1/10/2017	60%
5873L	137.8	Graphite	17/11/2014	17/11/2019	60% to 75%*
6636L	45.7	Graphite	16/07/2014	16/07/2019	75%
6678L	31.9	Graphite	18/03/2014	18/03/2019	80%
6363L	75.79	Graphite	18/11/2015	18/11/2020	90%
7560L	127.92	Graphite	21/06/2016	21/06/2021	95%

Source: Mustang

- ◆ Equity in six of the licences (not including 6363L and 7560L) was acquired through the 100% purchase of Balama Resources Pty Ltd in late 2014 – Balama is a company associated with Mr Jordaan and Mr van Wyk.
- ◆ Initially the consideration included an initial issue of 10 million shares and a total of 42 million performance rights – the cash consideration included:
  - ~US\$300,000 on completion of the original agreement
  - US\$1,500,000 on proving up a JORC compliant MRE of at least 100Mt at a grade of equal to or greater than 5% total graphitic carbon (“TGC”).
- ◆ In early 2016 the terms of the acquisition were amended in a strategy of cleaning up the Company structure – this included:
  - Replacement of the 42 million performance rights with 14 million Class E Performance Rights, which will vest on proving up a JORC compliant MRE of at least 50Mt at a grade of equal to or greater than 5% TGC on or before December 31, 2019.
- ◆ Tenements 6363L and 7560L were acquired from Regius in late September 2015 – these are the northernmost tenements as shown in Figure 8.
- ◆ Terms of this second acquisition, again amended by the cancellation of performance rights, includes:

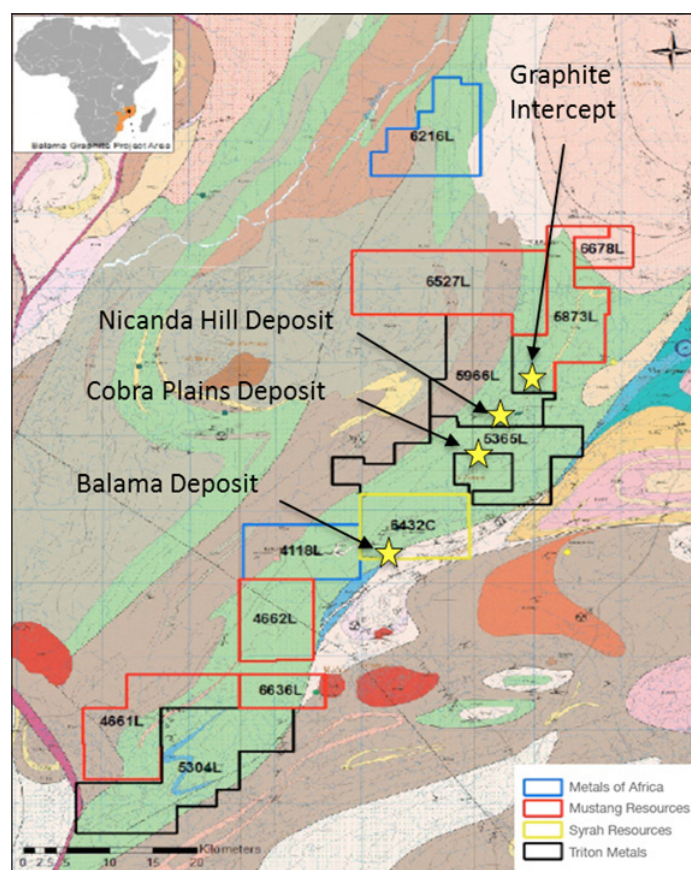


- A share based payment of A\$150,000 payable in fully paid shares based on a 10 day VWAP prior to the date of settlement.
- A payment of A\$50,000 in cash.

## Geology and Mineralisation

- ◆ Like Montepuez, Balama is hosted in rocks of the Mesoproterozoic to Neoproterozoic Mozambique Belt, one of a number of mobile belts of similar age on the African continent.
- ◆ The tenements are underlain by units of the Neoproterozoic Lurio Group, part of the Xixano Complex.
- ◆ Lithologies include mafic to intermediate orthogneiss, with some paragneiss, arkose, quartzite, tremolite-rich marble and graphitic gneiss.
- ◆ Graphitic gneisses are interpreted as being metamorphosed carbonaceous pelitic (mudstone/siltstone) to psammitic (sandstone) sediments.
- ◆ The metamorphic grade is typically amphibolite, with rocks being strongly deformed.
- ◆ The region is host to a number of significant graphite deposits, including those held by Syrah, Battery Minerals (ASX: BAT, "Battery", formerly Metals of Africa) and Triton Resources (ASX: TON, "Triton") as shown in Figure 9.

Figure 9: Balama, showing neighbouring deposits



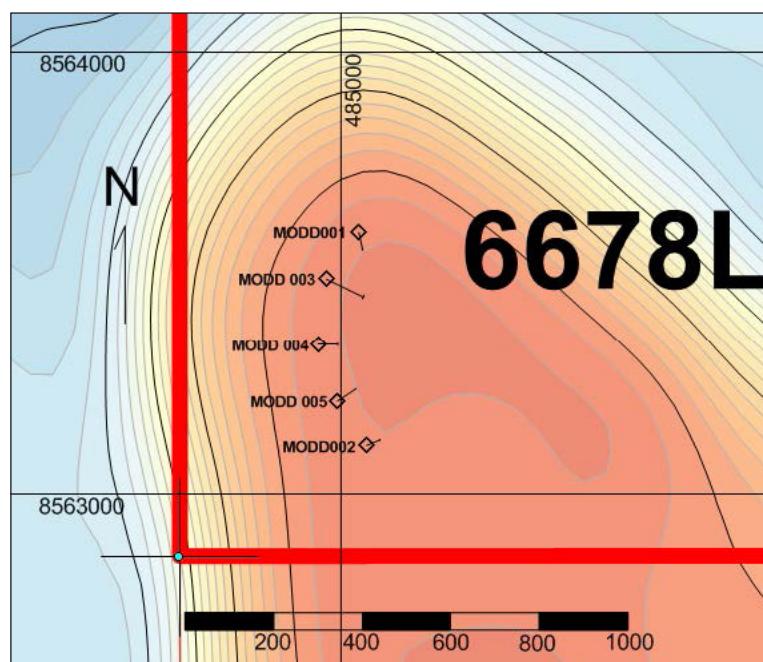
Source: Mustang

## Work by Mustang

- ◆ Initial work by Mustang in late 2014 included reconnaissance mapping and sampling, and scout drilling – the drilling included two reverse circulation ("RC") holes for 110m – these were drilled on tenements 5873L and 6527L ("Balama North"), along strike from Triton's Nicanda Hill deposit.
- ◆ This early work returned up to 13.5% TGC in rock chip sampling and 17% TGC in the drilling.
- ◆ In September/October 2016 the Company completed a 2,400 line kilometre "SkyTEM" survey over the six original tenements, with this defining a number of anomalies that required follow up.
- ◆ SkyTEM is an airborne transient electro-magnetic ("TEM") geophysical survey technique that is very successful at highlighting graphitic-bearing strata due to the conductive nature of graphite.

- ◆ In late 2015 the Company completed an eight hole, 620m RC drilling programme, including seven holes at Balama North, and one, MORC008, in 4662L, along strike from Syrah's Balama Project, in the "Balama South" group of tenements.
- ◆ This drilling intersected broad zones of graphite mineralisation, with some exceptionally high grades.
- ◆ For example, graphitic units totalling 52m were intercepted from 4m to 93m in hole MORC004, with this including one very high grade interval of 25m @ 24% TGC.
- ◆ Flake size distribution analyses were carried out on samples from the 2014 scout drilling programme, with this indicating very high percentages of large and greater flake size, with for example 59.56% super jumbo flake from 42m to 43m in hole RC002; no other quality work has been completed to date.
- ◆ Results from this drilling were used to calculate exploration targets for two of the holes in the Balama North area:
  - MORC004, 6678L – 18.66Mt @ 13.6% TGC to 29.84Mt @ 9.7% TGC
  - MORC006, 5873L – 23.56Mt @ 6.7% TGC to 50.33Mt @ 5.1% TGC.
- ◆ The midpoint of the combined targets is 61Mt @ 8.2% TGC, for 5Mt of contained TGC.
- ◆ In late 2016 Mustang completed an eight hole (including one abandoned hole) 582.4m diamond drilling programme – this included five holes testing the mineralisation intersected by MORC004 on 6678L and one hole each in 6636L and 4662L.
- ◆ The results of the drilling were very positive, with all holes, (with the exception of MODD008), intersecting broad zones of high grade graphite mineralisation.
- ◆ Key intercepts were from the five holes drilled into the target originally tested by MORC004 in the south-west corner of 6678L, along strike from Triton's Nicanda deposit (Figures 9, 10 and 11).
- ◆ This target, renamed the Caula Project is interpreted as a north plunging, tightly folded anticline as defined by the SkyTEM survey.

**Figure 10: Caula Project drill plan**

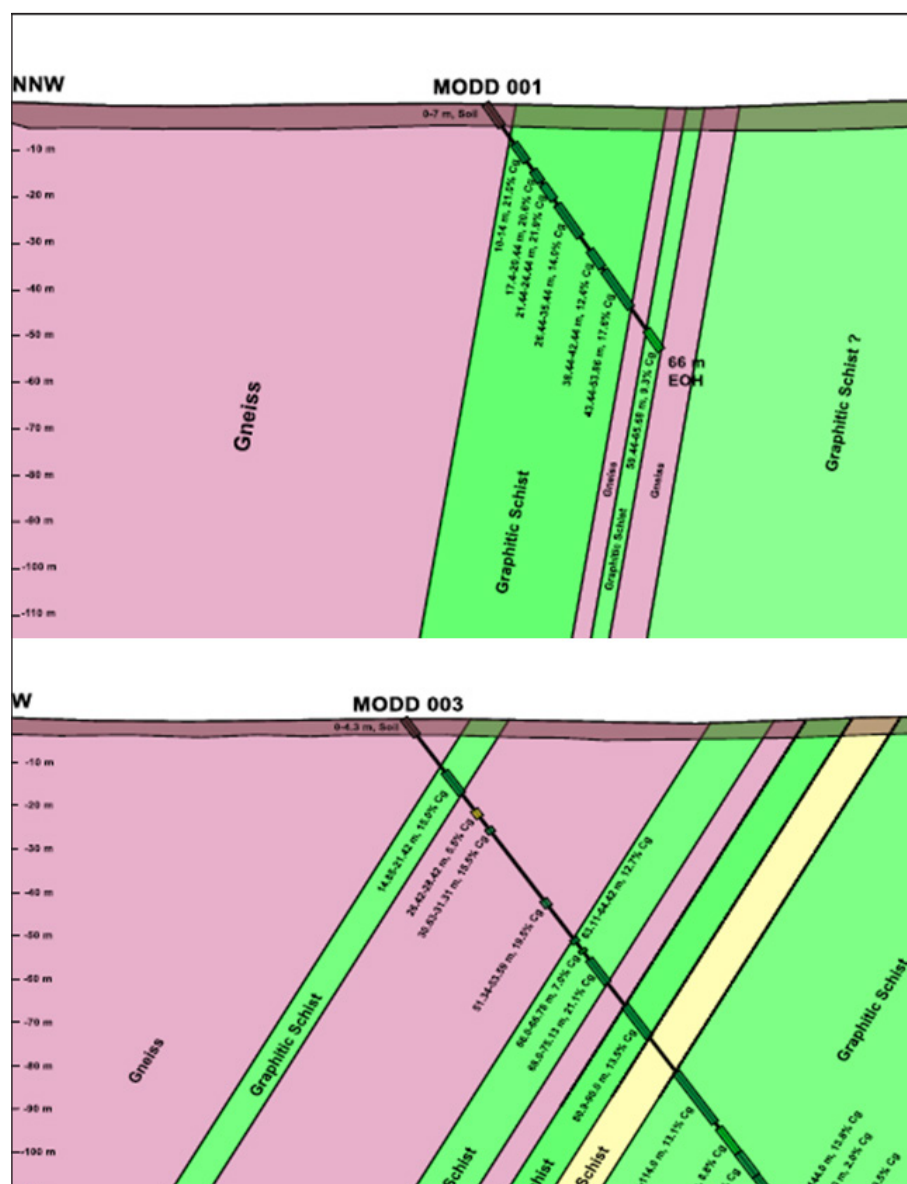


Source: Mustang

- ◆ Intercepts from this drilling include (these are the average grades of mineralised zones within the broader intervals – the intervals quoted include some non-mineralised material as shown in Figure 11):
  - 55.68M @ 15.9% TGC from 10m in hole MODD001.
  - 44.1m @ 12.90% TGC from 19.04m in hole MODD002.
  - 143.57m @ 15.2% TGC from 14.85m in hole MODD003 – this includes 1m @ 26.3% TGC from 153m.
  - 80.4m @ 12.1% TGC from 17m in hole MODD004 – this hole was drilled above MORC004

- 87.09m @ 11.03% TGC from 13.35m in hole MODD005.

Figure 11: Caula drill sections MODD001 and MODD003



Source: Mustang

## VALUATION

### Introduction

- We have completed a one year price target/valuation for Mustang based on Montepuez, Balama and cash as shown in Table 2.

Table 2: MUS indicative valuation/price target

MUS indicative valuation /price target				
Asset	Unrisked	Risk Factor	Valuation	Valuation/Share
Montepuez Ruby	\$349 m	20%	\$70 m	\$0.133
Balama Graphite	\$16 m	100%	\$16 m	\$0.030
Cash (31 March, 2017)	\$3.1 m	100%	\$3 m	\$0.006
Total	\$369 m		\$89 m	\$0.169

Source: IIR analysis

- The valuation for Montepuez is based on a hypothetical production scenario, risked accordingly; that for Balama is based on a peer comparison – these are detailed below.

## Montepuez Ruby

- ◆ Our valuation for Montepuez is based on the NPV of a hypothetical 10 year production scenario, and has been risked to reflect the early stage of the Project - this is predicated on successful ruby sales and estimation of an initial MRE in 2017 that will be sufficient in size and grade to service our hypothetical production scenario.
- ◆ This is to be considered indicative only – no resources have been defined and with no ruby sales to date there is no price or quality data for the rubies that may be produced from Montepuez – these figures have been estimated from those at Gemfields' Mugloto project, and we have also included a sensitivity analysis using grades and prices (Table 6).
- ◆ Actual figures will largely depend upon the results from the planned October auction, and ongoing bulk sampling and exploration activities leading to the initial MRE.
- ◆ These types of projects are different from “normal” resource projects, in that there is the potential to generate significant cash prior to a resource being estimated.
- ◆ Our scenario is premised on a resource grade of 1ct/t, and total recovered rubies of ~4.5 million carats over 10 years – we note Gemfields' Mugloto deposit has 72 million carats of rubies in reserves at a grade of 3.2ct/t.
- ◆ Our view is that figures as presented in Table 3 are reasonable, and have been derived from various sources.

**Table 3: Montepuez production and financial inputs**

Montepuez production and financial inputs			
Financial Parameters	Value	Production Parameters	Value
Discount Rate	8.00%	Plant Capacity	1,500 tpd
AUD/US ER	0.75	Tonnes/Year	378,000 tpa
Income Tax	32.00%	Strip Ratio	8 :1
Royalties	6.00%	Recovered Grade	1.00 ct/t
Withholding Tax	8.00%	Percentage High Quality	70%
Mining and Processing	US\$27/t	Percentage Low Quality	30%
Sales Commissions	1.00%	Rubies from Prospectors pa	75,600 ctpa
Shipping and Insurance	2.00%	Development Period	2 years
Sustaining Capex	US\$500kpa	Total Mine Life inc. Development	10 years
Overheads	US\$2,000kpa	Total Treated	3,780,000 t
High Quality Gem Sales	US\$400/ct	Total Rubies Recovered	4,536,030 ct
Low Quality Gem Sales	US\$50/ct	Price to prospectors	US\$15/ct
Prospectors Gem Sales	US\$200/ct		

Source: IIR analysis

- ◆ Forecast production and unit cost figures are presented in Table 4 - this is premised on all gem ruby production being sold.

**Table 4: Montepuez annual production figures**

Montepuez annual production figures			
Annual Production	Production	Price Unit Cost	Revenue Costs
Tonnes Treated per Year	378,000 tpa		
Carats Recovered - Plant	378,000 ct		
High Quality Rubies @ 70%	264,600 ct	US\$400/ct	US\$106 million
Low Quality Rubies @ 30%	113,400 ct	US\$50/ct	US\$6 million
Gems Recovered - Prospectors	75,600 ct	US\$200/ct	US\$15 million
Total Rubies Recovered	453,600 ct	US\$279/ct	US\$127 million
Costs excluding Royalties		-US\$38/ct	-US\$17 million
Sustaining Capex		-US\$1.1/ct	-US\$0.5 million
Operating Margin		US\$240/ct	US\$109 million
Royalties		-US\$17/ct	-US\$7.6 million
EBITDA		US\$224/ct	US\$101 million

Source: IIR analysis

- ◆ Table 5 provides a summary of Project cash flows and those attributable to Mustang – this assumes a 60% ownership of the project, and recoupment of development/exploration expenditure over the initial two years of the Project – we have also assumed an 8% withholding tax payable on repatriation of funds to a Mauritian holding company – this rate is as advised by the Company.

**Table 5: Summary of cash flows**

Summary of cashflows	
Financial Results	Unrisked
Project Valuation	
Undiscounted Post-Tax FCF (US\$)	US\$643 million
Undiscounted Post-Tax FCF (A\$)	US\$858 million
Project Post-Tax NPV (US\$)	US\$467 million
Project Post-Tax NPV (A\$)	A\$622 million
Attributable to MUS	
Gross Cash Flows to MUS (A\$)	A\$523 million
Withholding Tax	-A\$42 million
Net Cash Flows to MUS	A\$482 million
Mid-Year NPV of Cash Flows	A\$349 million

Source: IIR analysis

- ◆ As part of our analysis we have completed a sensitivity analysis – Table 6 shows sensitivity to grade and the price for premium rubies, two parameters that are as yet unknown, however should be determined from the upcoming auction, ongoing bulk sampling and the initial MRE.

**Table 6: Risked Montepuez sensitivity analysis – grade vs premium ruby price**

Table 6: Risked Montepuez sensitivity analysis – grade vs premium ruby price								
A\$35 m	0.25 ct/t	0.50 ct/t	0.75 ct/t	1.00 ct/t	1.25 ct/t	1.50 ct/t	1.75 ct/t	2.00 ct/t
US\$200/ct	A\$8 m	A\$18 m	A\$27 m	A\$36 m	A\$46 m	A\$55 m	A\$64 m	A\$73 m
US\$300/ct	A\$13 m	A\$26 m	A\$40 m	A\$53 m	A\$67 m	A\$80 m	A\$94 m	A\$107 m
US\$400/ct	A\$17 m	A\$34 m	A\$52 m	A\$70 m	A\$88 m	A\$105 m	A\$123 m	A\$141 m
US\$500/ct	A\$21 m	A\$43 m	A\$65 m	A\$87 m	A\$109 m	A\$130 m	A\$152 m	A\$174 m
US\$600/ct	A\$25 m	A\$51 m	A\$77 m	A\$103 m	A\$130 m	A\$156 m	A\$182 m	A\$208 m

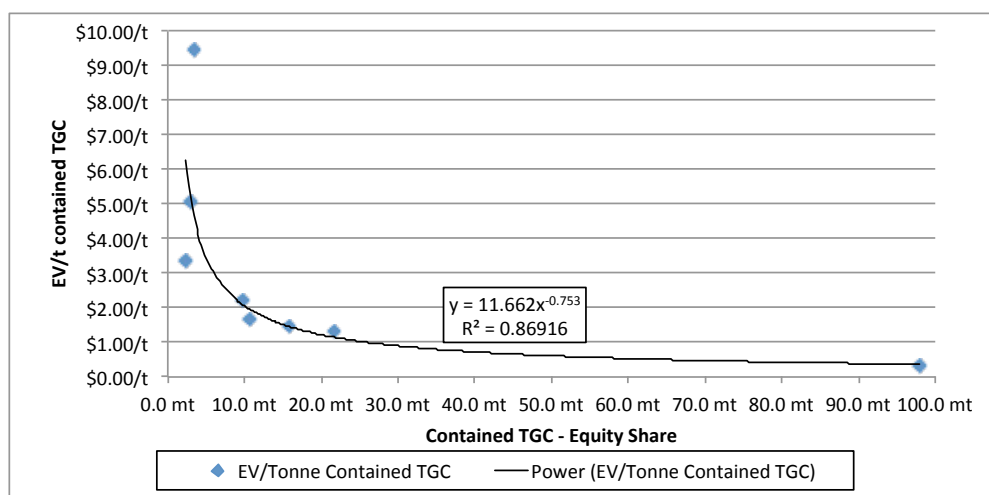
Source: IIR analysis

## Balama Graphite

- ◆ Our valuation for Balama is peer based on the equity tonnage of contained TGC – here we have used the midpoint of the published exploration targets (61Mt @ 8.2% TGC, for 5Mt contained TGC), with the Company's share being 71.3%, or 3.6Mt as shown in Table 9 – ownership share is based on the current ownership of the two tenements that the targets are located on – 80% in the case of 6678L and 60% in the case of 5873L - weighted by contained TGC in each tenement.
- ◆ We have compared the EV/t contained TGC for our peer group, to arrive at a figure for Mustang.
- ◆ One issue with commodities like graphite is that, unlike most metals, the size of a resource has a large impact on this metric – generally the larger the resource the lower the unit EV/t value – this is similar for bulk commodities.
- ◆ This is largely due to resources over a certain size being largely redundant – given the relatively small size of the potential markets in the case of graphite large resource will not be exploited, and hence parts effectively have no economic value.
- ◆ We have plotted EV/t contained TGC against the equity share of contained TGC for explorers and potential developers as presented in Figure 12 – data is shown in Table 9.
- ◆ We have omitted obvious outliers – these include Triton, with an anomalously high EV/t contained TGC and Syrah, which is more advanced and in construction.



Figure 12: EV/t vs Contained TGC – Mustang graphite peer group



Source: IIR analysis

- ◆ What can be seen here is that there is a power curve with a very good fit – the  $R^2$  figure of 0.89 attests to this.
- ◆ Applying the equation to Mustang's share of the exploration target gives an EV/t of \$4.45, and a total valuation of \$16 million – we have not risked this given the generally consistent and predictable behaviour of stratigraphically controlled graphite mineralisation, with generally good expected conversion from exploration targets to resources.

## PEER GROUP ANALYSIS - RUBIES

- ◆ Gemfields is the only other listed ruby miner globally – Gemfields is listed on the LSE, and has a current market capitalisation of ~£230 million.
- ◆ In addition to its Montepuez operations, Gemfields also mines emeralds and beryl at its Kagem operation in Zambia.
- ◆ Other interests include 100% ownership of luxury goods company Faberge, and other gem projects in Colombia, Ethiopia, Mozambique and Sri Lanka.
- ◆ Gemfields holds 75% of Montepuez through the subsidiary Montepuez Ruby Mining Company ("MRM"), which is owned 25% by a local company, Mwiriti Ltd., with the partnership being formed in 2011.
- ◆ As mentioned earlier work to date has resulted in bulk sampling operations at two main deposits, Mugloto and Maninge Nice, with resources also being defined as shown in Table 7 below.

Table 7: MRM 2015 Mineral Resource Estimate

MRM 2015 Mineral Resource Estimate						
Area	Mineralisation Type	Classification	Density (g/cm3)	Tonnage (kt)	Grade (ct/t)	000 ct
Maninge Nice	Primary	Indicated	2.15	2,124	115.4	245,000
	Primary	Inferred	2.15	378	115.4	44,000
	Secondary	Indicated	1.53	305	349.8	107,000
	Secondary	Inferred	-			
	Stockpiles - Primary	Indicated	N/A	91	115.4	10,600
	Stockpile - Secondary	Indicated	N/A	60	58.9	3,500
Mugloto	Secondary	Indicated	1.95	4,693	15.3	72,000
	Secondary	Inferred	-			
	Stockpile - Secondary	Indicated	N/A	200	2.6	500
Total	Primary	Indicated + Inferred	2.15	2,502	115.4	289,000
	Secondary	Indicated + Inferred	1.91	4,998	35.7	178,000
	Stockpiles	Indicated	N/A	351	41.6	14,600

Source: Mustang

- ◆ As of December 31, 2016 bulk sampling had involved the mining of 1.76Mt of material, and the treatment of 984,000t.

- ◆ This has resulted in the recovery of 32.7 million carats of ruby and corundum, with 425,000ct estimated as being high quality stones.
- ◆ Gemfields has hosted seven auctions of rubies, with the first being in June 2014 and the latest in December 2016 – this has resulted in revenue of US\$225 million, with 8.6 million carats being sold at an average price of US\$26.23/ct (Table 8).
- ◆ It is thought that the majority of the high value stones are those that have been mined at Mugloto, and the value may give a guide as to the potential value of Mustang's stones.
- ◆ Average site costs are in the order of US\$2.5/carats recovered, including both primary and secondary mineralisation.

**Table 8: Gemfields ruby auction results**

Gemfields ruby auction results				
Quality	Total	High Quality	Mixed	Commercial Quality
Carats offered	9,281,980	249,835	5,002,145	4,030,000
Carats Sold	8,595,435	201,029	4,434,406	3,960,000
No. of lots offered	413	136	213	64
No. of lots sold	351	108	186	57
Percentage of lots sold by weight	93%	80%	89%	98%
Total sales realised at auction	US\$225.50 m	US\$101.40 m	US\$108.20 m	US\$15.90 m
Average per carat sales value	US\$26.23/ct	US\$504.40/ct	US\$24.40/ct	US\$4.02/ct

Source: Gemfields

## PEER GROUP ANALYSIS – GRAPHITE

- ◆ Mustang is one of a number of ASX-listed companies with East African graphite projects as shown in Table 9.
- ◆ Here we have ranked the companies in decreasing order of EV/tonne contained TGC – this however should be considered an indicative comparison only, and does not take into account the value of any other projects that the companies may hold.
- ◆ This is particularly pertinent with Mustang, as the figure does not take into account any value for Montepuez.
- ◆ Of these most have completed development studies or are in the development stage – Mustang's Balama and Caula Projects are the least advanced of those peers which are listed in Table 9.
- ◆ Even including the lower grade exploration target on tenement 5873L, the midpoint grade of Mustang's combined exploration target is in the ball park with others, and given the recent high grade results we may expect a resource with a grade near the upper end – note that a number of the companies below have published reserves with significantly higher grades than the published resources, e.g. Syrah (16.2% TGC) and Walkabout (16.2% TGC).

**Table 9: East African graphite companies**

East African graphite companies								
Company	EV1 (A\$ million)	Project	Status	Global Resource Tonnage	Resource Grade	Owner -ship	Contained TGC Co Share	EV/Tonne Contained TGC
Magnis	\$300	Nachu, Tanzania	Financing	174 mt	5.4%	100.0%	9.3 mt	\$32.10/t
Kibaran	\$32	Epanko, Tanzania	Financing	40 mt	8.4%	100.0%	3.3 mt	\$9.45/t
Mustang	\$19	Balama, Mozambique	Drilling	61 mt <sup>2</sup>	8.2%	71.3%	3.6 mt	\$5.42/t
Graphex	\$15	Chilalo, Tanzania	DFS	54 mt	5.6%	100.0%	3.0 mt	\$5.07/t
Syrah	\$436	Balama, Mozambique	Construction	1,191 mt	10.5%	100.0%	125 mt	\$3.48/t
Walkabout	\$8	Lindi Jumbo, Tanzania	DFS	30 mt	11.0%	70.0%	2.3 mt	\$3.38/t
Battery Minerals	\$22	Montepuez, Mozambique	DFS	122 mt	8.1%	100.0%	10 mt	\$2.21/t

East African graphite companies								
Company	EV1 (A\$ million)	Project	Status	Global Resource Tonnage	Resource Grade	Owner -ship	Contained TGC Co Share	EV/Tonne Contained TGC
Sovereign Metals	\$18	Duwi, Malingunde Malawi	Scoping	151 mt	7.1%	100.0%	10.7 mt	\$1.68/t
Black Rock	\$23	Mahenge, Tanzania	Scoping	203 mt	7.8%	100.0%	16 mt	\$1.45/t
Volt	\$28	Namangale, Tanzania	PFS	441 mt	4.9%	100.0%	21.8 mt	\$1.30/t
Triton	\$32	Ancuabe, Balama Mozambique	Scoping	1,587 mt	10.3%	60.2%	98 mt	\$0.33/t

1: EV = undiluted market capitalization less cash plus debt – no value is ascribed to other projects

2: The Mustang resource figures are midpoint of the published exploration target

Source: IRESS, company reports

## CAPITAL STRUCTURE

- ◆ Mustang currently has 526.0 million shares, 98.0 million listed options, 56.6 million unlisted options and 14 million performance rights on issue.
- ◆ Currently 33.4 million listed options are in the money ("MUSOA"), with the potential to bring in \$2.096 million should they be exercised.
- ◆ The top shareholder is Lanstead Capital, with a 7.60% holding.
- ◆ The Lanstead holdings have been through two share subscription agreements – through these Lanstead subscribes for a fixed number of shares, with funds received by Mustang determined by the share price at the time of payment – this is not a fixed value agreement whereby the number of shares would increase with a falling price.
- ◆ Total insiders interests are 5.75%, largely through directors' holdings in Regius Resources
- ◆ The top 20 hold 35.53%
- ◆ The Company has 2,346 shareholders.

## RISKS

- ◆ **Exploration and sampling:** Although the Company is producing rubies and expects to receive good revenue from the first sale in October 2017, Montepuez is still an exploration project with the risks that exploration entails. This is somewhat mitigated by the geology and results of work to date – sampling from Alpha has returned 0.11ct/t to date, which although low, is close to grades that Gemfields recovered at their first pit at Mugloto.
- ◆ **Ruby quality and value:** The Company is currently having rubies assessed for sales and marketing purposes and is developing a proprietary rough grading system, and until such time that is completed there will be no firm indication of value; however comments by various parties have indicated that the rubies are broadly similar to those from Gemfields' Mugloto product.
- ◆ **Ruby markets:** Will the ruby market be able to absorb the planned production from Montepuez (including both from Gemfields and Mustang) - this, and the potential affects on price are yet to be tested. However it has only two formal miners and is missing consistent supply, particularly of higher quality stones.
- ◆ **Processing:** There have been some issues with processing caused by hard and sticky clays – the Company expects that recent changes to the plant, including the installation of a wet front end will resolve these issues and allow the plant to operate at design capacity.
- ◆ **Illegal miners and security:** Some reports have come out about alleged security issues at Gemfields' operations, with Gemfields employing both Government and private security personnel to control illegal miners. Mustang, with their strategy of using locals as prospecting teams and paying them for stones appears to be taking a pro-active approach to managing this challenge.
- ◆ **Sovereign risk:** There is always sovereign risk in operating in Africa, however recent years have seen increasing interest in Mozambique as an exploration destination, with coal, graphite and particularly natural gas playing a major role - the natural gas has led to major

investment and M & A activity in the northern offshore basins. The country also introduced a new Mining Law in 2014. However, Africa being Africa there is always the change of unforeseen law changes.

- ◆ **Costs** – Managing costs will be important depending upon the grade and quality of the rubies extracted – the current and proposed operations are however relatively low cost, with free dig mining and industry standard simple processing.

## BOARD AND MANAGEMENT

- ◆ **Mr Ian Daymond – Non-Executive Chairman:** Mr Daymond practised as a solicitor for more than 41 years as an external or in-house mining and resources lawyer and continues to provide consulting services in the mining and resources sector. He was General Counsel and Company Secretary of Delta Gold Ltd for over 11 years which saw the company grow from a small gold explorer into one of the largest gold producers in Australia with significant platinum and gold mining interests in southern Africa. Mr Daymond has significant independent director experience, having served as a non-executive director of International Base Metals Ltd with substantial copper interests in Namibia and is the former chairman of Eldorado Mining Corporation Ltd (ASX: EDM), ActivEx Ltd (ASX: AIV) and Copper Range Ltd (ASX:CRJ) and a former non-executive director of Hill End Gold Ltd. Mr Daymond was the national chairman of the Australia-Southern Africa Business Council for 3 years and has substantial business, legal and corporate government precious, base metals and diamond projects, not only in Australia but also southern Africa over the past 25 years. He is currently the Honorary Consul in NSW for the Republic of Botswana and was an individual member of the Australia-Africa Mining Industry Group (now called the Australia-Africa Minerals & Energy Group (AAMEG) of which the Company has now become a corporate member) which promotes corporate social responsibility principles amongst Australian mining companies with activities in Africa.
- ◆ **Mr Christiaan Jordaan – Managing Director:** Mr. Jordaan is the former Chief Executive Officer and Co-Founder of Regius Resources Group Ltd ("Regius"), the Mozambican-focused mining and exploration company that has been operating in Mozambique since 2004. Christiaan has extensive experience in managing mining and energy projects in Mozambique, an intimate knowledge of the Mustang projects from their inception, as well as the local operational environment. He is a Member of the Australian Institute of Company Directors, holds a Commercial Law Degree, and prior to co-founding Regius, he was a director of a financial services group in South Africa where he was responsible for risk management. He is based in Mustang's Sydney head office.
- ◆ **Mr Cobus Van Wyk – Non-Executive Director:** Mr van Wyk is the Chief Executive Officer and co-founder of the Regius group of companies, obtained his Bachelor of Marketing at the Tshwane University of Technology and his MBA at the University of Wales. Mr van Wyk started his career in the financial industry and capital markets in the Bankcorp Group in South Africa. He commenced work on the Johannesburg Stock Exchange ("JSE") in 1994 and is a qualified portfolio manager and Stockbroker. Mr van Wyk was accepted as a member of the JSE in January 1996, became a member of Safex in 1996 in the derivatives market. Since 1999 Mr van Wyk has been involved in corporate finance as part of his duties as a member of the JSE. Mr van Wyk has more than 23 years' experience in the financial services industry which he is applying to the mining sector. Mr van Wyk has more than 10 years' experience in mining and exploration ventures in Mozambique (tantalite & coal) as well as South Africa (platinum group metals).
- ◆ **Mr Peter Spiers - Non-Executive Director:** Mr Spiers has more than 30 years of international experience in the resources industry spanning exploration, mine development, operations and commercial roles. He spent 20 years with Western Mining Corporation ("WMC"), during which time he worked as a senior geologist, project manager and lastly Group Manager – Business Development prior to WMC being acquired by BHP Billiton for A\$9.2billion. Subsequent to his employment with WMC, Mr Spiers was Managing Director of Orbis Gold, an ASX-listed West African gold company which was acquired for A\$170 million in 2015 by SEMAFO Inc. at a 98% bid premium. Mr Spiers is a graduate geologist from the University of Melbourne and a Member of the Australasian Institute of Mining and Metallurgy.
- ◆ **Mr Rob Marusco – CFO/Company Secretary:** Mr. Marusco is a Certified Practising Accountant in Australia, and has nearly 30 years of experience specialising in financial reporting, taxation law, corporate law and financial strategy. Furthermore, Mr. Marusco has experience in corporate management including company secretarial, governance and

compliance dealing with the ASX, ASIC and other authorities for both ASX listed and private corporations. Accounting, financial and taxation services in the CFO role will be provided through Mr. Murasco's consulting company MVP Accountants & Advisors Pty Ltd.

- ◆ **Mr Paul Allan – Senior Geologist, Montepuez Ruby Project:** Paul Allan (BSc Hons., Dip. Bus. M.) has over 25 years' experience in multi commodity geology (predominantly precious stones exploration and evaluation). His initial experience began with Anglo American Research Laboratory (De Beers) in Kimberlite mineral chemistry & petrography and culminated in his role as Project Geologist for Gemfields PLC (GEM:LN) where he was instrumental in the initial development of their Montepuez Ruby Project in Mozambique. During his career in the gemstone industry Paul has also been involved in several diamond related ventures throughout Southern Africa which includes a role as the Regional Exploration Manager for SouthernEra (a Canadian Junior Diamond and platinum company) as well as Senior Project Geologist for Firestone Diamonds (FDI:LN). for several projects throughout Southern Africa, including the BK16 project in Botswana where SouthernEra conducted a large diameter drilling & sampling program as well as the geological exploration conducted on Firestone's projects in Botswana and their flagship Liqhobong Diamond Mine in Lesotho.

## BACKGROUND – RUBIES

### Introduction

- ◆ Rubies, a variety of the aluminium oxide corundum, are the second most valuable of the gemstones behind diamond, and the most valuable of the coloured stones.
- ◆ The red colour in rubies is caused by the presence of small amounts of chromium; colour variations can also be caused by small amounts of iron.
- ◆ Like all gemstones rubies come in a variety of qualities and grades, with these determined by factors such as size, colour, clarity, inclusions and fracturing.
- ◆ High quality stones of >5ct are extremely rare, and demand premium prices – prices for the US wholesale cut ruby market are shown in Table 10 below.

**Table 10: Gemguide Ruby Pricing Guide for Good to Extra Fine Rubies. Oct 2016 – US\$/ct**

Gemguide Ruby Pricing Guide for Good to Extra Fine Rubies. Oct 2016 – US\$/ct						
Size-carats	Lower Good	Upper Good	Lower Fine	Upper Fine	Lower Extra Fine	Upper Extra Fine
0.020 - 0.099	65- 90	95- 125	140- 280	315- 345	345- 440	440- 750
0.100 - 0.249	95- 155	165- 225	280- 345	375-440	440- 565	565- 815
0.250 - 0.499	150- 200	205- 260	300- 720	840- 1080	1080- 1800	1800- 3000
0.500 - 0.999	445- 660	900- 1140	1360- 1680	1800- 2400	2400- 3720	3720- 4500
1.000 - 1.999	595- 780	1170- 1620	1980- 2400	2640-3600	3600- 4800	6600- 8100
2.000 - 2.999	900- 1170	1740- 2280	3000- 4800	5400- 7200	7200- 10200	10750- 13200
3.000 - 3.999	1455- 2000	3190- 4375	5625- 6625	6750- 8200	10500- 13700	16850- 21000
4.000 - 4.999	1950- 2600	4065- 5525	7200- 9000	10500- 12900	14250- 19200	22600- 26200
5.000 - 7.999	2295- 4160	5785- 7410	9800- 12500	13500- 17900	19900- 25700	27625- 35900

Source: Mustang

- ◆ Historically rubies have been mainly sourced from small operators in Myanmar, Tanzania and Madagascar amongst others, with supply being fractured and unreliable – the discovery of Montepuez would seem to have now changed that, with consistency now coming into supply.
- ◆ The ruby market is estimated at some US\$2 billion per year, with key markets including the US, Europe, Thailand, China and India – increase in demand from these markets has given rise to recent increases in prices for rubies.



- ◆ As mentioned earlier, increasing supply has also led to increasing prices – this may be largely due to major wholesalers now stocking up with higher certainty in supply.
- ◆ The size of the ruby market is approximately the size of that the diamond market was in the 1950's, with the global diamond market now being in the order of US\$70 billion.
- ◆ In June 2015 the 25.59ct “Sunrise” ruby ring was sold for US\$30 million at Sotheby's Geneva auction – this was the highest price ever paid for a coloured gemstone, and indicates the potential for increasing market size - there were a number of other multi-million dollar sales of rubies in the period 2011 to 2016.
- ◆ Only around 6% of the ~US\$250 billion luxury goods market is for jewellery – reportedly Asian luxury goods retailers are shifting their offering more towards jewellery than watches, indicating good potential market growth in the sector.

## BACKGROUND – GRAPHITE

### What is Graphite and What is it Used For?

- ◆ Graphite (chemical symbol 'C') was named by Abraham Gottlob Werner in 1789 from ancient Greek “to write/draw.” The key properties of graphite include; an excellent conductor of heat and electricity, the highest natural strength and stiffness of any material, maintaining its strength and stability to temperatures in excess of 3,600°C and high resistance to chemical attack. It is also one of the lightest of all reinforcing agents and has high natural lubricating properties.
- ◆ If you took a very close look at a graphite pencil lead you will see layer upon layer of carbon atoms, multiple two dimensional planes that are loosely bonded to their neighbours. The reason graphite works so well as a writing material, and industrial lubricant, is because the layers of atoms slip easily over one another. The layered structure facilitates easy cleavage along the planes. Each of these single layers of atoms is known as graphene. Separating the individual layers of graphite sets the electrons free and allows carbon to behave differently.
- ◆ Natural graphite is generally found in three forms, amorphous, flake and vein. In all cases graphite generally forms platy, hexagonal crystals, giving graphite its flaky appearance.

### Amorphous Graphite

- ◆ Amorphous graphite is the lowest quality material, and occurs generally as microcrystalline (<75µm crystal size) masses. It is commonly formed by the metamorphism of coal or carbon rich rocks, and is the most abundant form of graphite – amorphous graphite commonly occurs as seams, with grades commonly in the range of 30-90% Cg, and purities in the order of 60-90% C.

### Flake Graphite

- ◆ Flake is the most abundant crystalline form of graphite, and is generally associated with metamorphosed graphitic and carbonaceous sediments.
- ◆ Generally, grades are in the range of 1-12% Cg, however higher grades are also found in a number of cases - graphite quality is commonly determined by flake size and concentrate TGC grades, with the coarser flake (>150 micron) products are generally more sought after due to their commonly higher TGC grades.

### Vein Graphite

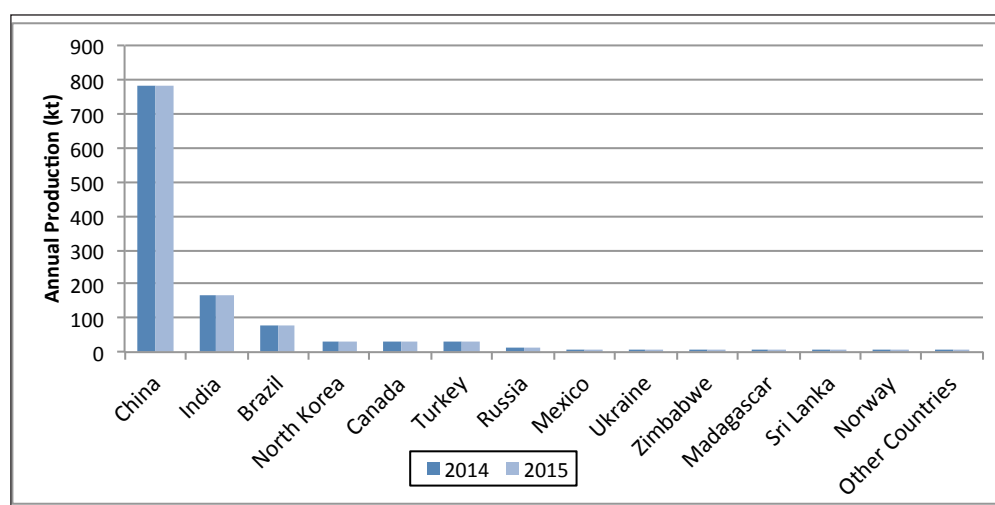
- ◆ This style of mineralisation is uncommon, and poorly understood. The best known (and only mined) examples are in Sri Lanka, which are high grade veins (+90% Cg) producing high purity (+98% carbon) concentrates. Flake size can be variable in this style, as can grade and purity, but are generally very coarse.

### Graphite Demand and Production

- ◆ Traditional demand for graphite is largely tied to the steel industry where it is used as a refractory, including as liners for ladles and crucibles, and as a component in bricks which line furnaces. The second major use in the steel industry is as an additive in steel, where it is used to increase the carbon content.
- ◆ In the automotive industry it is largely used in brake linings, gaskets (for which expanded graphite is an important component) and clutch materials.

- ◆ Graphite also has a numerous other uses, including in lubricants, fire retardants, and reinforcements in plastics, however, it is the use in batteries (including automotive) that is forecast to outstrip industrial uses by many times in the near future.
- ◆ Other potential uses currently being researched include the use of graphite and graphene in 3D printing, and a number of other potential uses for graphene particularly in electronics.
- ◆ The current market is dominated by refractories, which comprise ~40% of the total market, with metallurgical applications next at ~25%. Batteries currently comprise ~8% of the market.
- ◆ According to the USGS worldwide production of natural graphite (as opposed to synthetic graphite, but which has a similar sized market) was 1.17Mt in 2014, which is a similar scale to the nickel market (~1.3Mtpa).
- ◆ Of this production, flake accounted for 60% and amorphous 40% and some production from vein. China is the dominant world producer (yet is still a net importer); accounting for ~70% of total world output, however, the graphite is primarily amorphous and low grade flake. Concerns about the long term reliability of high quality graphite supply out of China are driving consumers to look for other sources.

**Figure 13: World mine production 2014 (actual) and 2015 (estimated)**



Source: USGS

- ◆ Industrial demand for graphite has been steadily growing at around 5% p.a. and significant further growth in the industry is expected from the incremental demand created by numerous green initiatives including lithium-ion batteries, fuel cells, solar energy, semi-conductors, and nuclear energy. Many of these applications have the potential to consume more graphite than all the current uses combined. Importantly, only flake graphite that can be upgraded to 99.95% purity is suitable for making lithium-ion batteries.

### Lithium-ion Batteries

- ◆ Many commentators see the lithium-ion battery market, with the growing demand for electric vehicles and home/commercial energy storage as the key graphite demand driver going forward. In a lithium-ion battery, various elements including lithium and cobalt are in the cathode and flake graphite the anode, however, 10 – 30 times more graphite is required in these batteries than lithium. Approximately 60% of the battery market is supplied by natural flake and 40% by the more expensive and less conductive synthetic graphite.
- ◆ Electric vehicles on average each require in the order of 40kg of spherical graphite ('SPG') for their batteries, with the production of 40kg of SPG requiring 100kg of high grade, high purity (>99.95%) flake graphite due to losses in the production process. The key requirements for spherical graphite are at least a 94% TGC, and ideally a size of minus 150µm to optimise the costs of milling and upgrading. Traditionally larger flake has been used due to higher concentrate grades, with the extra cost of milling the larger flake being offset by the significantly cheaper thermal or chemical upgrade costs.
- ◆ Some commentators have estimated that up to 6 million electric vehicles could be manufactured in 2020. This equates to a ~10% market penetration, and assuming 60% of demand is met by flake would require an estimated extra 360,000tpa of flake graphite, or approximately 60% additional to current supply of ~600,000tpa.

- ◆ China previously announced that it has mandated that 30% of Government vehicle purchases to be electric, fuel cell or hybrid by 2016, with the ratio to be raised in following years, with provincial governments being required to follow suit. Other measures reportedly being taken by China include waiving a 10% purchase tax for new-energy vehicles.
- ◆ Tesla, the US electric vehicle manufacturer has recently commenced battery production at its “Gigafactory” facility in Sparks, Nevada, in what will ultimately be the world’s largest single battery manufacturing facility. Tesla estimates demand for 126,000tpa of flake graphite (50,000t of SPG) on a best case basis, and 83,000tpa on a conservative basis to supply the plant.
- ◆ Tesla is also developing its domestic battery production, with Powerwall products being recently introduced into Australia.
- ◆ The lithium-ion battery industry is currently growing at a rate of 30 – 40% annually and it is estimated that Lithium-ion batteries are also crucial to the consumer electronics industry for applications as varied as power tools, cell telephones, laptops, tablets and media players.

### **Expanded Graphite and Graphite Foil**

- ◆ Expandable graphite is used in a number of applications, including the manufacture of graphite foil, graphite tape and other sealant materials.
- ◆ Graphite is made to expand through intercalation – this is where reagents, including an oxidiser, strong acid and ancillary reagent are introduced to the graphite and then heated – this causes the expansion through the intercalation of the reagents between the individual graphene layers.
- ◆ Graphite foil is used in a number of applications where high heat resistance is required – this includes in gaskets, heat sinks for laptop computers and as bipolar plates in fuel cells.
- ◆ As a sealant, expandable graphite can be used as firestops surrounding a fire door or in sheet metal collars surrounding ductwork – during a fire the graphite will expand and char to prevent the spread of the fire.

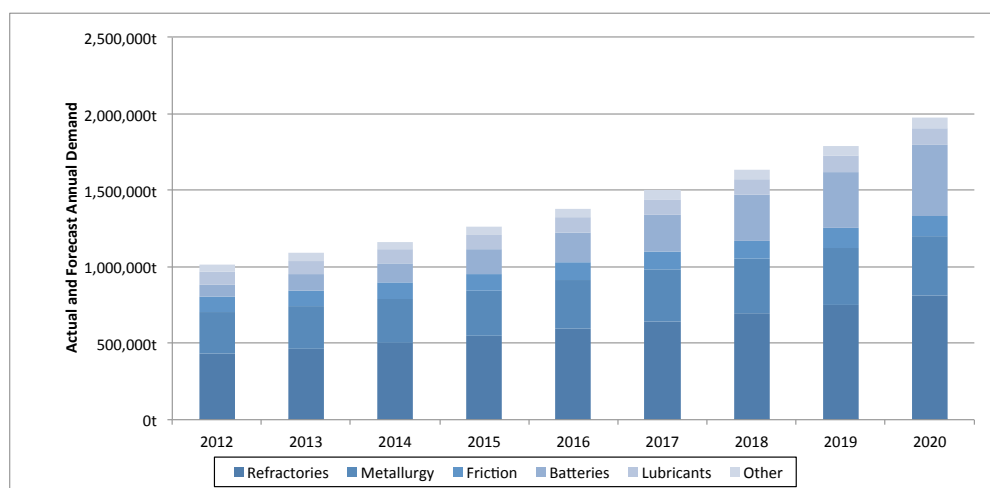
### **Graphene**

- ◆ Another potential demand driver is graphene, although our view is that significant commercial utilisation is some way off. Graphene is a single atom thick layer of graphite, and is the strongest material in nature, at approximately 200 times the strength of structural steel.
- ◆ Graphene was first formed in the laboratory over 10 years ago, and is now a hot topic of research in the scientific community and R & D laboratories. The material has a number of potential applications including, amongst others:
  - Used in electronic applications, transmitting electrons faster than silica
  - Included in composite materials that are potentially ten times tougher than Kevlar
  - Used as an anti-corrosion coating which would be the world’s thinnest
  - Allows plastics to conduct electricity

### **Outlook for Graphite**

- ◆ During 2010 the European Commission included flake graphite amongst 14 materials it considered high in both economic importance and supply risk while the British Geological Survey listed flake graphite as one of the materials to most likely be in short supply globally. The US government has also declared flake graphite a critical material.
- ◆ Concerns come from the dominance of the industry by China; however, there is also the view that China is rationalising its domestic industry to lower costs of production and in response to environmental concerns. Over the long term this may end up decreasing Chinese supply.
- ◆ The following graph shows Industrial Minerals’ forecast short term trends in natural graphite end usage. This shows general 6% CAGR growth in all except batteries, with batteries being the largest growth area at 24% CAGR from 2012 to 2016. Extrapolating these figures through to 2020 results in battery demand of ~460,000t, and non-battery demand of ~1,500,000t, for a total demand approaching 2,000,000t.
- ◆ Other forecasts indicate a much more aggressive growth due to the battery market, as shown below – the extrapolated Industrial Minerals forecast falls between the two cases presented below.

Figure 14: Forecast graphite demand by use



Source: Various

### Graphite Quality and Associated Pricing

- ◆ Product pricing is dependent upon a number of parameters, including flake size and purity. In general, the larger the flake size and higher the purity the higher the price – this is largely due to the lower cost of treating the concentrate to achieve desired specifications for end uses, and the common increase in grade with flake size.
- ◆ The most common quality parameters that prices are quoted on are large flake (>177µm) and high purity (94-97% carbon). Specifications higher than either of these will command premium prices.
- ◆ There is a wide range of price forecasts for the different graphite products - Industrial Minerals has forecast large flake (>177µm) prices of around US\$1,800/t and medium flake (150-177µm) prices of around US\$1,200/tonne from 2017.
- ◆ This variability in forecasting can be seen when the above is compared with forecast prices from Stormcrow Capital Ltd., an independent Toronto based research firm, as shown below. We note that the jumbo flake pricing is based on very high purity material that is a potential substitute for the high cost synthetic graphite.
- ◆ One of the key points to be noted are the expected price falls in the lower quality material – this will be largely due to, should a number of the planned large operations come on stream, a glut of this material.
- ◆ Therefore, size and quality will more and more be a discriminant on whether a project will go ahead.

Table 11: Graphite specifications and indicative pricing

Graphite specifications and indicative pricing						
Graphite Product	Carbon Content (%)	Mesh Size	Graphite Size	2015 (US\$/tonne)	Spot Prices 11/16 (US\$/t)	Forecast 2020 Price (US\$/t)
Super Jumbo	99-99.9%	+35	>500µm	>\$2,000		>\$6,175
Jumbo Flake	99-99.9%	+35	300-500µm	~\$2,000	\$1,250	\$6,175
Large Flake	94-97%	+80	180 - 300µm	~\$1,300	\$850	\$1,165
Medium Flake	94-97%	+100	150 - 180µm	~\$1,150		\$517
Small Flake	90-97%	+200	74-150 µm	~\$750	\$675	\$493
Fine Flake	80-85%	-200	<74µm	\$450		\$395
Synthetic	99.95%					\$7,000 - \$20,000

Source: Various, Inc. Stormcrow Capital

- ◆ It needs to be noted that graphite is not transparently traded – prices are set between customers and suppliers, and prices received for similar products in the future will vary between the different producer/customer agreements.

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