

Alpha **HPA**

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ASX: **A4N**  
ASX Announcement  
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(8 pages by email)

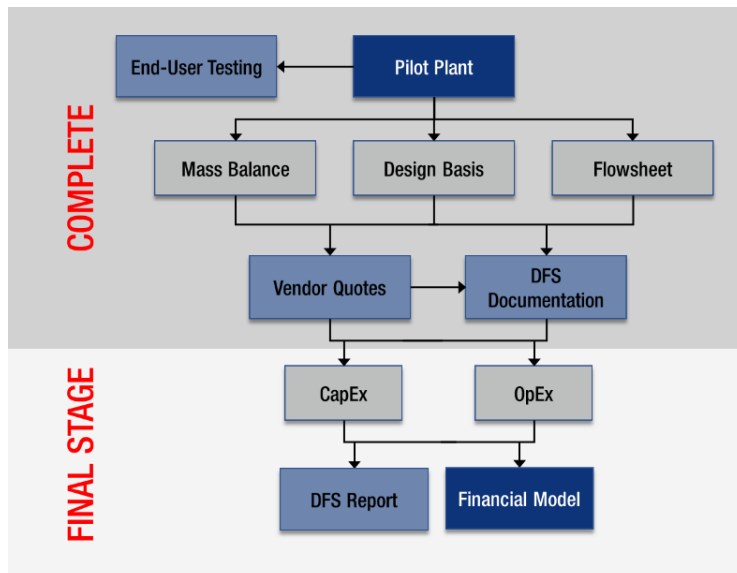
## COMPANY ACTIVITIES UPDATE

- **HPA First DFS & chemical counterparty discussions in final stages**
- **Pilot Plant Campaign 3B complete with further purity improvements**
- **FY19 R&D Rebate of \$684K received**
- **Successful production of additional battery material (Boehmite) using the HPA First process**

The Board of Alpha HPA Limited ('Alpha HPA' or 'the Company') is pleased to provide an update on its HPA First Project, representing the evaluation and intended commercialisation of the production of ~10,000tpa of high purity alumina (HPA) using the Company's proprietary licenced solvent extraction and HPA refining technology.

### HPA First DFS

Alpha HPA has completed all the key engineering and design stages of the HPA Definitive Feasibility Study (DFS) and is now in the final stage of detailed capital cost (CapEx) and operating costs (OpEx) estimation, as per the graphic below.



Final CapEx and OpEx estimates remain subject to final value engineering and finalisation of the chemical counterparty selection. The DFS is expected to be drafted by early in the 1st quarter CY 2020.

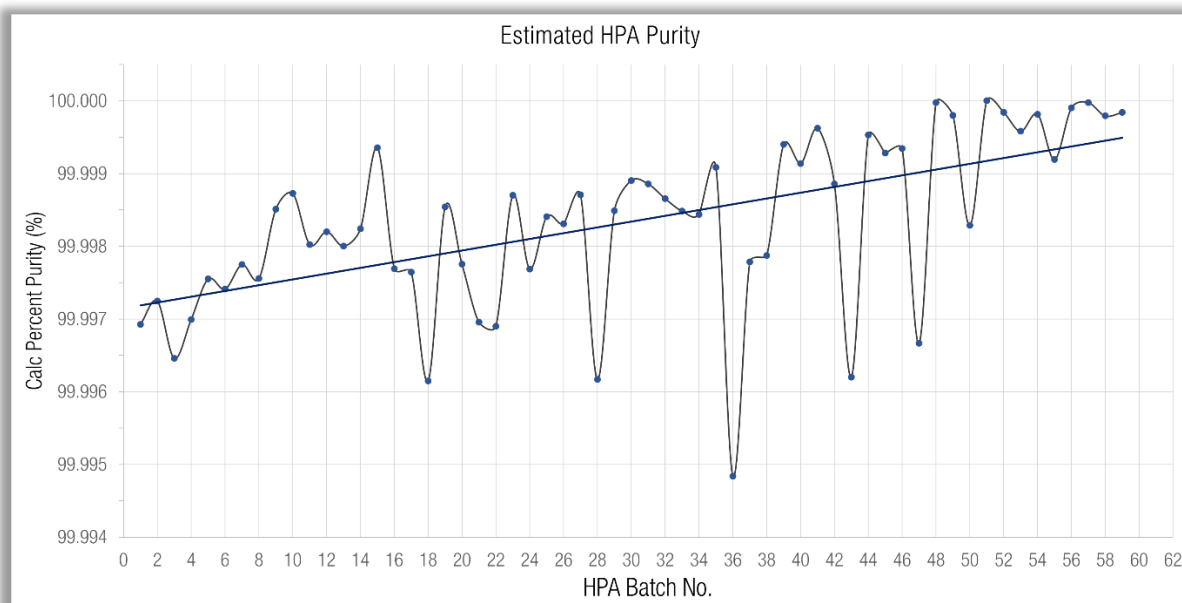
### Chemical Counterparty

Chemical counterparty discussions are directed at reaching agreement on terms for the supply of key process reagents and the offtake of the process by-product and will dictate the project location. As this agreement will influence the project interface engineering, labour and project support costs, the Company is seeking to complete negotiations with a chemical counterparty immediately prior to finalising the DFS. The Company's DFS and chemical counterparty negotiations are well advanced and the Company anticipates the completion of the DFS shortly after the selection of a chemical counterparty.

### Pilot Campaign 3B Complete

Pilot Campaign 3B is now complete. Campaign 3B has converted the Aluminium Salt from campaign 3A into HPA-precursor. This pre-cursor will now be progressively converted into HPA for end-users and HPA Research programs.

The entire 2019 Pilot Plant production (Campaigns 1, 2 and 3), comprised over 600 hours of operating time and included the production of 62 individual batches of HPA pre-cursor. Assays of all 62 batches of HPA pre-cursor, which are predictive of final HPA purity before calcination and milling, show the implied HPA purity progressively improving over the Pilot Plant life, and now reaching 5N (99.999%) purity (see below).



### Successful Boehmite Production

In consultation with a significant Japanese lithium-ion battery separator manufacturer, Alpha HPA has now successfully manufactured crystalline, high-purity boehmite (aluminium-oxide-hydroxide) using the HPA First process. Boehmite represents the only material, other than HPA, used in significant volumes in the manufacture of ceramic coated separators (CCS) for the lithium-ion battery market. Alpha HPA is now completing larger scale batch production of high-purity boehmite to provide sufficient sample for assessment by the Japanese separator manufacturer.

Boehmite represents a potential additional revenue product for the HPA First Project.

### FY19 R&D Rebate of \$684K received

The Company has now received \$684K in respect of its FY19 R&D rebate, related to the HPA first Project. The Company expects to close CY19 with a cash position of approximately \$4.8M.

Managing Director, Rimantas Kairaitis, commented; "The 2019 calendar year has been incredibly productive for Alpha HPA, with the Pilot Plant operation confirming the validity and stability of our proprietary licenced solvent extraction and HPA refining technology. Over 3 separate campaigns we have demonstrated continual improvements in impurity management and rejection across larger volumes of product which gives us great confidence in the commercial scalability of the HPA First process as we move towards the imminent delivery of our chemical counterparty agreements and DFS delivery. We look forward to 2020 with great optimism for not only arriving at a positive Final Investment Decision for the HPA First Project but also for delivering material value for our shareholders"

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### **About the HPA First Project**

The Company's HPA First Project represents the evaluation and intended commercialisation of the production of ~10,000tpa of high purity alumina (HPA) using the Company's proprietary licenced solvent extraction and HPA refining technology. The technology provides for the extraction and purification of aluminium from an industrial feedstock to produce 4N (>99.99% purity) alumina for the intended use within the lithium ion battery and LED lighting industry. Following a successful testwork program and Pre-Feasibility Study (PFS), updated in March 2019, Alpha HPA has now completed its pilot plant program at its dedicated laboratory facility in Brisbane, with the definitive Feasibility Study (DFS) due for delivery early in the March quarter 2020.

## **Competent Persons Statement (Process Development Testwork)**

Information in this announcement that relates to metallurgical results is based on information compiled by or under the supervision of Dr Stuart Leary, an Independent Consultant trading as Delta Consulting Group. Dr Leary is a Member of The Australasian Institute of Mining and Metallurgy (AusIMM). Dr Leary has sufficient experience to the activity which he is undertaking to qualify as a Competent Persons under the 2012 Edition of the 'Australasian Code for reporting of Exploration Results, Mineral Resources and Ore Reserves'. Dr Leary consents to the inclusion of the technical data in the form and context in which it appears.

For further information on testwork results and processes see ASX announcements dated 10 December 2019, 21 November 2019, 10 October 2019, 23 September 2019, 28 August 2019, 5 August 2019, 25 July 2019, 2 July 2019, 3 June 2019, 17 April 2019, 7 March 2019, 4 December 2018, 20 November 2018, 6 September 2018, 31 August 2018, 9 July 2018, 30 April 2018, 26 April 2018, 21 March 2018, 6 March 2018, 21 February 2018, 8 December 2017, 30 November 2017, 29 November 2017, 24 November 2017 and 13 November 2017.

## **Cautionary Statement**

The Pre-Feasibility Study (PFS) referred to in this announcement has been undertaken to assess the technical and financial viability of the HPA First Project. Further evaluation work including a Definitive Feasibility Study (DFS) is required before the Company will be in a position to provide any assurance of an economic development case. The PFS is based on the material assumptions about the availability of funding and the pricing received for HPA. While the Company considers all of the material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated by this PFS will be achieved. To achieve the range of outcomes indicated in the PFS, Pre-Production Capital in the order of \$198 million plus working capital will likely be required. Investors should note that there is no certainty that the Company will be able to raise the amount of funding when needed. It is also possible that such funding may only be available on terms that may be dilutive to or otherwise affect the value of the Company's existing shares. It is also possible that the Company could pursue other "value realisation" strategies such as a sale, partial sale or joint venture of the project. If it does, this could materially reduce the Company's proportionate ownership of the project. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the PFS.

## **Forward Looking Statements**

This PFS contains certain forward-looking statements with respect to the financial condition, results of operations, business of the Company and certain plans and objectives of the management of the Company. These forward-looking statements involve known and unknown risks, uncertainties and other factors which are subject to change without notice and may involve significant elements of subjective judgement and assumptions as to future events which may or may not occur. Forward-looking statements are provided as a general guide only and there can be no assurance that actual outcomes will not differ materially from these statements. Neither the Company nor any other person give any representation, warranty, assurance or guarantee that the occurrence of the events expressed or implied in any forward-looking statement will actually occur. In particular, those forward-looking statements are subject to significant uncertainties and contingencies, many of which are outside the control of the Company. A number of important factors could cause actual results or performance to differ materially from the forward looking statements. Investors should consider the forward looking statements contained in this PFS in light of those disclosures.

pjn10222

## 1. JORC CODE, 2012 EDITION – TABLE 1

### 1.1 Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

| Criteria              | JORC Code explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Commentary                                                                                                                                    |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Sampling techniques   | <ul style="list-style-type: none"> <li>Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.</li> <li>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</li> <li>Aspects of the determination of mineralisation that are Material to the Public Report.</li> <li>In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.</li> </ul> | <ul style="list-style-type: none"> <li>Samples of high purity alumina were taken as ~20g splits of homogenised, crystalline powder</li> </ul> |
| Drilling techniques   | <ul style="list-style-type: none"> <li>Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Not Applicable. The samples were generated from a feedstock of industrial chemicals.</li> </ul>        |
| Drill sample recovery | <ul style="list-style-type: none"> <li>Method of recording and assessing core and chip sample recoveries and results assessed.</li> <li>Measures taken to maximise sample recovery and ensure representative nature of the samples.</li> <li>Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Not Applicable</li> </ul>                                                                              |
| Logging               | <ul style="list-style-type: none"> <li>Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.</li> <li>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.</li> <li>The total length and percentage of the relevant intersections logged.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Not Applicable</li> </ul>                                                                              |

| Criteria                                                | JORC Code explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Commentary                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sub-sampling techniques and Sample Preparation          | <ul style="list-style-type: none"> <li>• If core, whether cut or sawn and whether quarter, half or all core taken.</li> <li>• If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.</li> <li>• For all sample types, the nature, quality and appropriateness of the sample preparation technique.</li> <li>• Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.</li> <li>• Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.</li> <li>• Whether sample sizes are appropriate to the grain size of the material being sampled.</li> </ul> | <ul style="list-style-type: none"> <li>• Samples were presented as a homogenised, crystalline aluminium salt generated from a crystallisation and centrifuge process</li> </ul>                                                                                                                                           |
| Quality of assay data and laboratory tests              | <ul style="list-style-type: none"> <li>• The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.</li> <li>• For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.</li> <li>• Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.</li> </ul>                                                                                   | <ul style="list-style-type: none"> <li>• The purity analysis of the high-purity alumina (HPA) pre-cursor was determined by dissolution of ~7g of pre-cursor in 16% HCl and analysis by ALS Brisbane using ICP-MS. HPA pre-cursor assays are converted to indicative HPA assays using the process mass balance.</li> </ul> |
| Verification of sampling and assaying                   | <ul style="list-style-type: none"> <li>• The verification of significant intersections by either independent or alternative company personnel.</li> <li>• The use of twinned holes.</li> <li>• Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</li> <li>• Discuss any adjustment to assay data.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>• Not Applicable</li> </ul>                                                                                                                                                                                                                                                        |
| Location of data points                                 | <ul style="list-style-type: none"> <li>• Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.</li> <li>• Specification of the grid system used.</li> <li>• Quality and adequacy of topographic control.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>• Not Applicable</li> </ul>                                                                                                                                                                                                                                                        |
| Data spacing and distribution                           | <ul style="list-style-type: none"> <li>• Data spacing for reporting of Exploration Results.</li> <li>• Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.</li> <li>• Whether sample compositing has been applied.</li> </ul>                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>• Not Applicable</li> </ul>                                                                                                                                                                                                                                                        |
| Orientation of data in relation to geological structure | <ul style="list-style-type: none"> <li>• Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.</li> <li>• If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.</li> </ul>                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>• Not Applicable</li> </ul>                                                                                                                                                                                                                                                        |
| Sample security                                         | <ul style="list-style-type: none"> <li>• The measures taken to ensure sample security.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>• Duplicates of all samples submitted were retained at the Company's Brisbane laboratories to insure against any sample</li> </ul>                                                                                                                                                 |

| Criteria          | JORC Code explanation                                                                                                   | Commentary                                                       |
|-------------------|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
|                   |                                                                                                                         | loss                                                             |
| Audits or reviews | <ul style="list-style-type: none"> <li>The results of any audits or reviews of sampling techniques and data.</li> </ul> | <ul style="list-style-type: none"> <li>Not applicable</li> </ul> |

## 1.2 Section 2 Reporting of Exploration Results

(Criteria listed in the preceding section also apply to this section.)

| Criteria                                | JORC Code explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Commentary                                                       |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Mineral tenement and land tenure status | <ul style="list-style-type: none"> <li>Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.</li> <li>The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.</li> </ul>                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Not Applicable</li> </ul> |
| Exploration done by other parties       | <ul style="list-style-type: none"> <li>Acknowledgment and appraisal of exploration by other parties.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Not Applicable</li> </ul> |
| Geology                                 | <ul style="list-style-type: none"> <li>Deposit type, geological setting and style of mineralisation.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Not Applicable</li> </ul> |
| Drill hole Information                  | <ul style="list-style-type: none"> <li>A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: <ul style="list-style-type: none"> <li>easting and northing of the drill hole collar</li> <li>elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar</li> <li>dip and azimuth of the hole</li> <li>down hole length and interception depth</li> <li>hole length.</li> </ul> </li> <li>If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.</li> </ul> | <ul style="list-style-type: none"> <li>Not Applicable</li> </ul> |
| Data aggregation methods                | <ul style="list-style-type: none"> <li>In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.</li> <li>Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.</li> <li>The assumptions used for any reporting of metal equivalent values should be clearly stated.</li> </ul>                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Not Applicable</li> </ul> |



| Criteria                                                                | JORC Code explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Commentary                                                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Relationship between mineralisation widths and intercept lengths</i> | <ul style="list-style-type: none"> <li>• <i>These relationships are particularly important in the reporting of Exploration Results.</i></li> <li>• <i>If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.</i></li> <li>• <i>If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').</i></li> </ul> | <ul style="list-style-type: none"> <li>• Not Applicable</li> </ul>                                                                                                                                                                                                                               |
| <i>Diagrams</i>                                                         | <ul style="list-style-type: none"> <li>• <i>Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.</i></li> </ul>                                                                                                                                               | <ul style="list-style-type: none"> <li>• Not Applicable</li> </ul>                                                                                                                                                                                                                               |
| <i>Balanced reporting</i>                                               | <ul style="list-style-type: none"> <li>• <i>Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.</i></li> </ul>                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>• Not Applicable</li> </ul>                                                                                                                                                                                                                               |
| <i>Other substantive exploration data</i>                               | <ul style="list-style-type: none"> <li>• <i>Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.</i></li> </ul>                           | <ul style="list-style-type: none"> <li>• Not Applicable</li> </ul>                                                                                                                                                                                                                               |
| <i>Further work</i>                                                     | <ul style="list-style-type: none"> <li>• <i>The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).</i></li> <li>• <i>Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.</i></li> </ul>                                                        | <ul style="list-style-type: none"> <li>• From July-December 2019 the Company completed pilot plant operations validating the process flow sheet on a semi-continuous, end-to-end basis</li> <li>• Minor additional testwork is planned during CY2020 to refine the process flow sheet</li> </ul> |