

8 August 2023

ASX Release

**ORANGE MINERALS ACQUIRES LENNON'S FIND PROJECT IN PILBARA WA****HIGHLIGHTS**

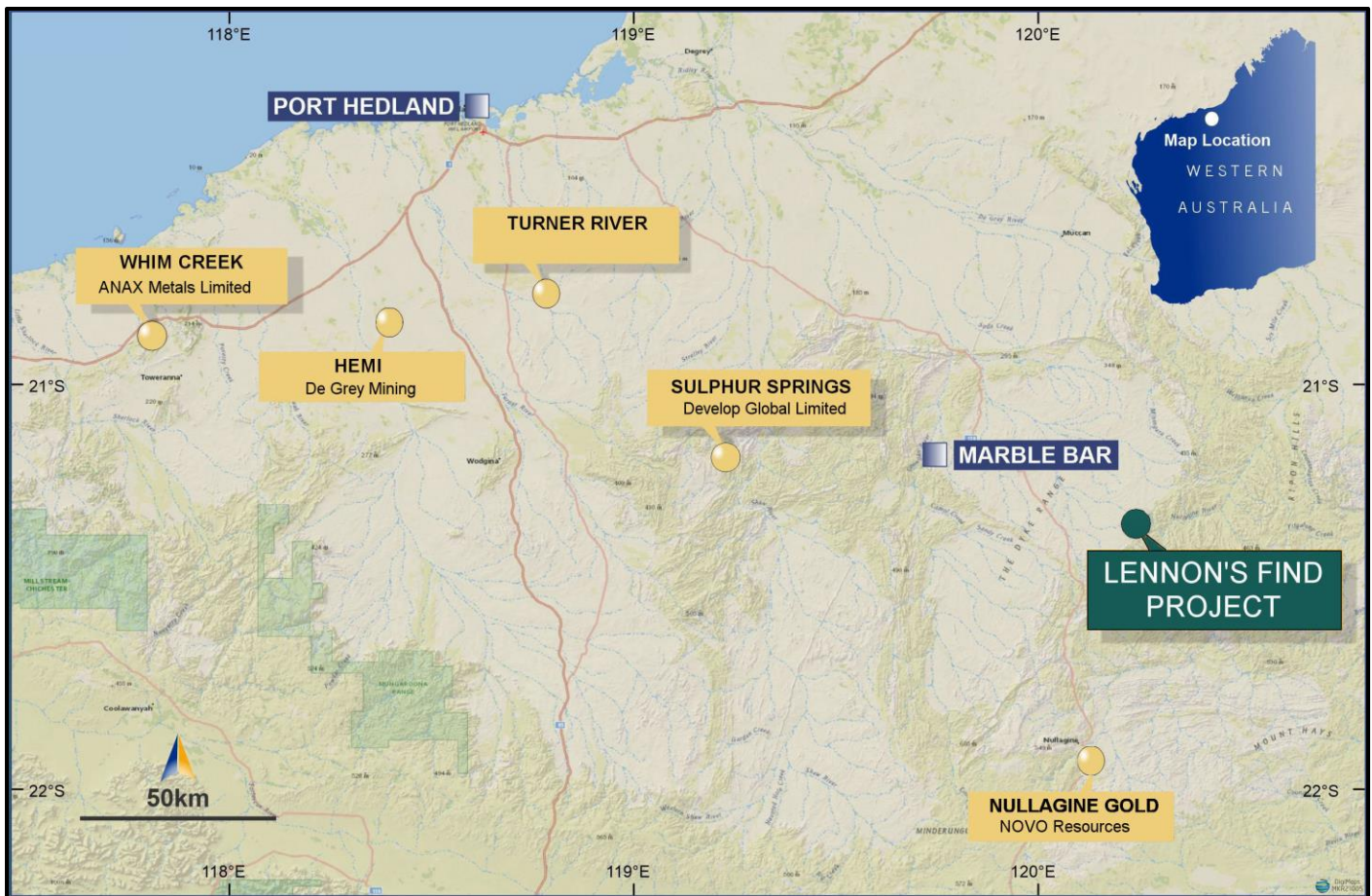
- Binding term sheet to acquire up to a 75% share in the Lennon's Find Polymetallic Project in the Pilbara, WA.
- Lennon's Find includes a Mining Lease with an Inferred Mineral Resource of 1.55 Mt at 5.9% zinc, 0.2% Cu, 1.6% Pb, 0.28 g/t Au, and 84g/t Ag (Optiro 2019).
- Orange can earn 51% of the Lennon's Find Project (M45/368) by spending A\$500,000 by 31 March 2026 (includes an upfront payment of A\$200,000). The Term Sheet stipulates that Orange must spend a minimum of \$200,000 on exploration at Lennon's Find (including 500 metres of drilling) by 31 January 2025.
- Orange may earn up to 75% of the Lennon's Find Project by spending an additional A\$500,000 (A\$1.0 million in total) by 31 March 2028. After 75% has been earned by Orange both Musketeer and Orange would contribute expenditure to the JV, with standard dilution clauses applying.
- Significant untested exploration targets exist below and adjacent to the Resource.
- An historical IP survey has defined a strong untested chargeability anomaly at depth beneath the drill defined Hammerhead zone of mineralisation.
- Exploration targets at Lennon's Find are advanced and drill ready and thus exploration will focus on testing the strong geophysical anomalies and increasing the Resource Base.

Orange Minerals NL (ASX: OMX) ("Orange" or "the Company") is pleased to announce that it has executed a binding Term Sheets for a Farm-in Joint Venture ("JV") Agreements with Musketeer Mining Ltd on the Lennon's Find Project in the Pilbara, WA.

**About Lennon's Find**

The Lennon's Find Project is located 75km south-east of Marble Bar (Figure 1) in the Pilbara region of WA. Three key prospects have been identified from prior exploration and a mineral resource estimate based on documentation prepared by a Competent Person as defined by the JORC 2012 Code has been delineated of 1.55 Mt at 5.9% zinc, 0.2% Cu, 1.6% Pb, 0.28 g/t Au, and 84g/t Ag (Optiro 2019).





**Figure 1 – Location Map of Lennon's Find Project**

## Geology

The Lennon's Find project is located in the Archean Marble Bar greenstone belt. The greenstone sequences are comprised of the Warrawoona Group, which consists of felsic schists and calc-silicates that are thought to be of volcanoclastic or sedimentary origin (Duffer Formation), which is overlain by the Apex Basalt. The Warrawoona Group dips to the southeast, and dips below or is faulted against the rocks of the Fortescue Group.

The Lennon's Find deposits consist of stratiform, lenticular bodies hosted by the Duffer Formation. An upper horizon within quartz-muscovite schist, located 10 m to 20 m stratigraphically below the contact of the Apex Basalt, is intensely mineralised and contains the Bronze Whaler, Hammerhead and Tiger deposits.

At surface, mineralisation consists of thin, discontinuous gossan pods and lenses with secondary copper-lead-zinc carbonates. Mineralisation generally consists of sphalerite, chalcopyrite and galena with associated barite and pyrite. At depth, the upper mineralisation consists of banded massive sulphides, predominantly sphalerite, with chalcopyrite occurring towards the base of the massive-banded mineralisation. Figure 2 shows a plan view of the interpreted local geology.



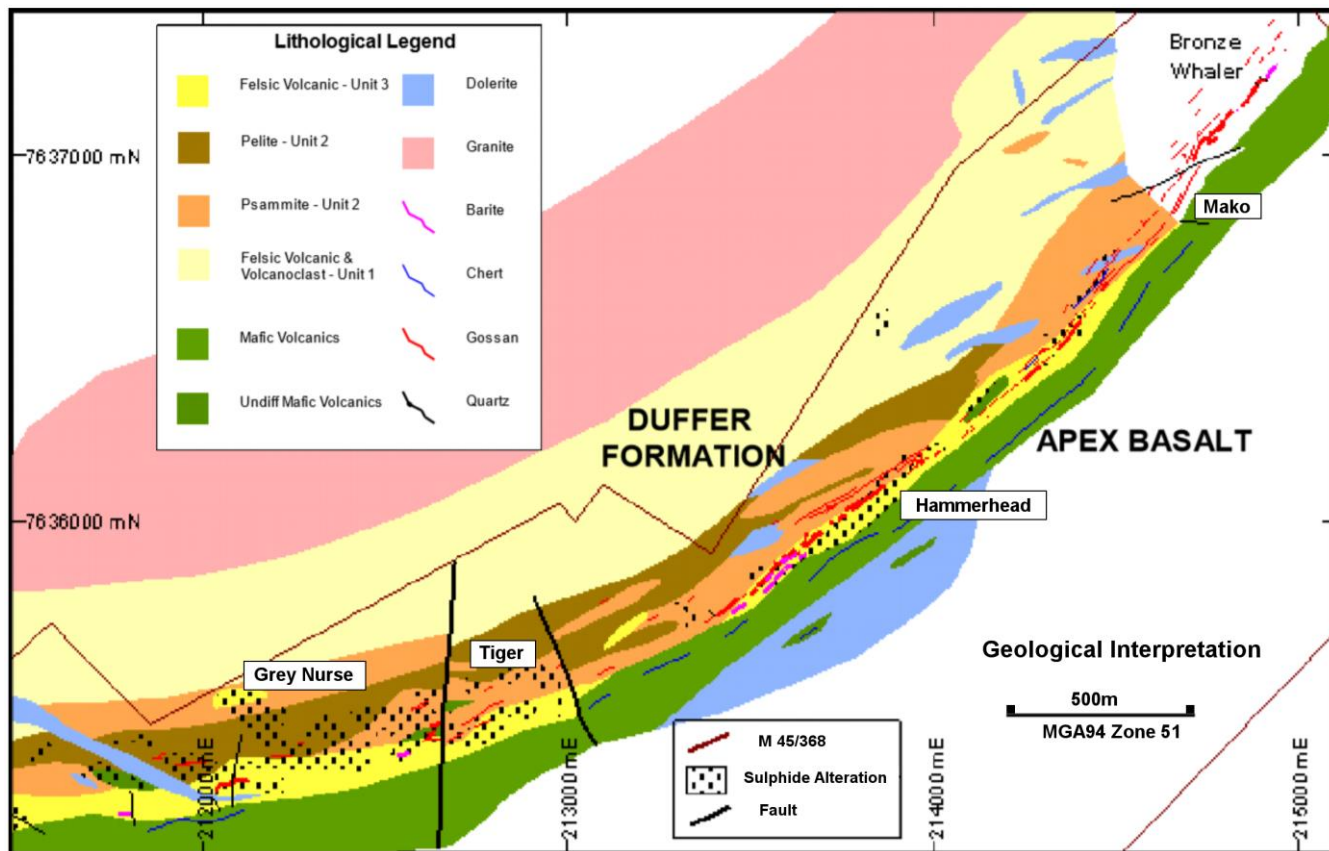
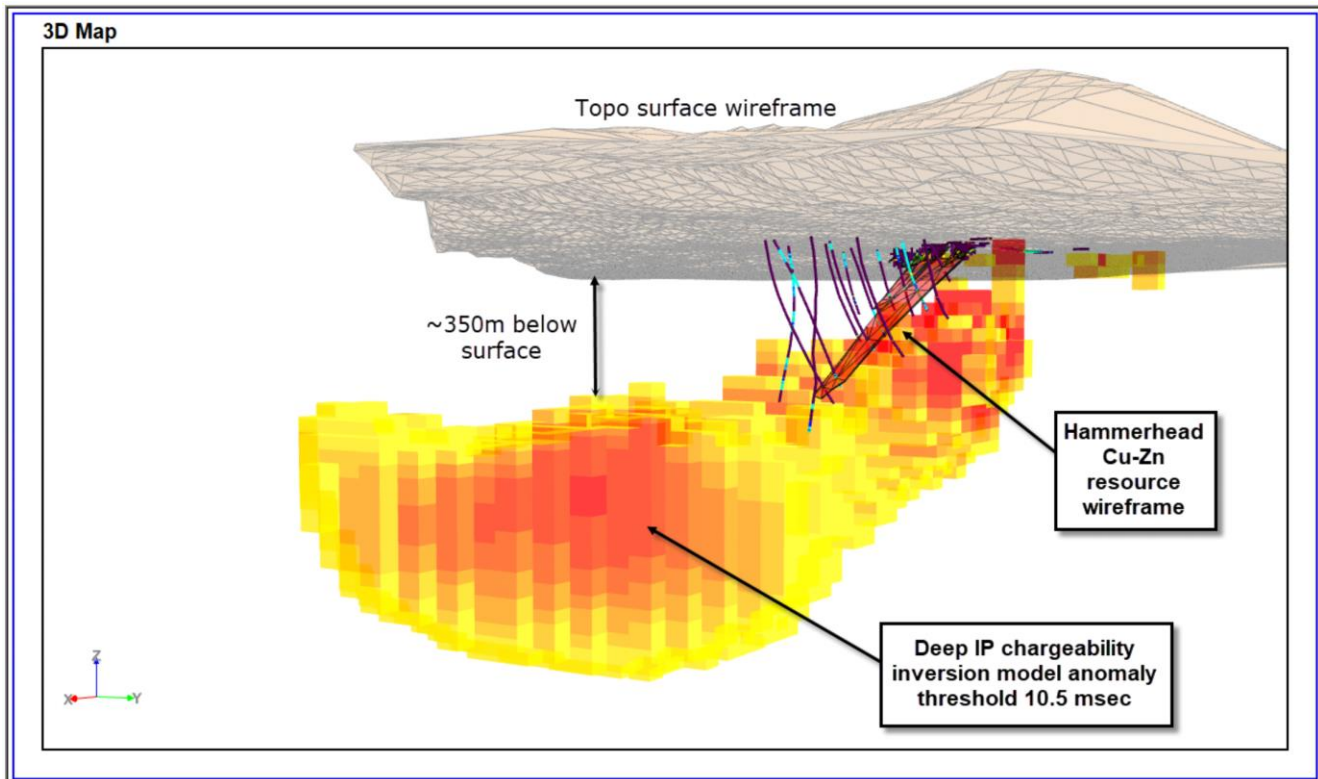


Figure 2 – Geology of Lennon's Find Project (Mincorp 2010)



## Historical IP Survey

An offset pole-dipole induced polarization survey, orientated NW-SE across the Hammerhead resource, was completed in April 2018 by Resource Potentials Pty Ltd. The survey successfully identified a deep IP chargeability anomaly response positioned down dip and to the SE of the resource (Figure 3). Orange Minerals plans to review the geophysical data with the view of delineating drill targets for potential massive sulphides.



**Figure 3 – IP Chargeability – Hammerhead Resource (Resource Potentials 2018)**

## Lennon's Find Resource Estimate (information required under Listing Rule 5.8.1)

Optiro completed a Mineral Resource Estimate of the Lennon's Find project on behalf of Laconia Resources in November 2011, with the estimate reported in accordance with the JORC 2004 reporting guidelines. Volcanic Metals Ltd acquired the Lennon' Find project in 2019 and retained Optiro to update the 2011 estimate in accordance with the JORC 2012 guidelines.

The total inferred Mineral Resource is reported as 1.55Mt @ 5.9% Zn, 0.2% Cu, 1.6% Pb, 0.3g/t Au and 80g/t Ag.

## Geology and Geological Interpretation

The Lennon's Find base metal deposit is a volcanogenic massive sulphide (VMS) deposit, a style of mineralisation that is well researched and understood. At a deposit scale, the Lennon's Find mineralisation is sufficiently tested to provide confidence in the geological interpretation of the mineral deposit, commensurate with the applied Mineral Resource classification. The project consists of 3 lenses mineralised zones: Bronze Whaler, Hammerhead and Tiger.



### *Drilling Techniques*

Historical drilling was conducted by several companies from 1969 to 1995. A total of 161 holes were drilled using a variety of drill techniques including Reverse Circulation (RC), open hole percussion (OP) and diamond drilling. Many of the RC holes were used as pre collars for diamond tails with core sizes of BY, NQ and HQ. The open percussion holes were predominantly 3" diameter.

The geological logging of chip and core samples has been undertaken throughout all the historical drill programs.

RC chips were logged using standard paper logging sheets a geological coding system. Data on rock type, deformation, alteration, quartz content, grainsize, mineralisation and oxidation states were recorded.

### *Sampling and Sub-sampling Techniques*

RC sampling was completed on 1m intervals. A riffle split 2 – 3kg sample was bagged and sent for analysis. The large volume of sample and the RC methodology was industry standard to achieve representivity.

For diamond drilling, sample intervals were based on geological interpretation and a standard 1m was used outside mineralised intervals. Core was cut in half with a diamond saw. Core recovery from the diamond holes was excellent. Half core was bagged and dispatched for assaying and the other half retained as reference.

### *Sample Analysis Method*

For the 2007 drill program, RC cuttings were sampled at 1m intervals using a riffle splitter. Samples were submitted were dried, crushed and pulverized to a nominal 85% passing 75µm. Ten elements (Ag, As, Ba, Bi, Co, Cu, Fe, Pb, Sb and Zn) were analysed using a four-acid digest with ICP-OES finish. Gold was analysed by 50g fire assay with AAS finish.

For the 2011 drill program, RC cuttings were sampled at 1m intervals using a riffle splitter, while diamond drill core was half core sampled. Samples were submitted were dried, crushed and pulverized to a nominal 85% passing 75µm. Six elements (Ag, As, Cu, Fe, Pb and Zn) were analysed using a four-acid digest with ICP finish. Au was analysed by 50g fire assay with AAS.

### *The Criteria Used for Classification, Including Drill and Data Spacing and Distribution*

For the three deposits (Tiger, Hammerhead and Bronze Whaler) holes were drilled on sections approximately 20m apart along strike, with the drillhole spacing along section varying from 10m to 100m. The Lennon's Find 2019 Mineral Resource report has been reported using the JORC 2012 reporting guidelines and is classified entirely as an Inferred Mineral Resource only.

### *Estimation Methodology*

Grade estimation was undertaken using Datamine software. Interpretations of the mineralisation were prepared and used to select samples within the mineralised constraint. The initial samples were composited to 1.0m and a top – cut applied to minimize the impact of extreme outlier grades. Grade estimation used the mineralised lens and oxidation surface to constrain the estimate, and all boundaries were treated as hard boundaries. The maximum distance of extrapolation for the Bronze Whaler lens is 120m, for the Hammerhead lens is 185m, and for the Tiger lens is 100m. Gold, silver, copper, lead and zinc were estimated into parent blocks using ordinary kriging, and a 3-pass search strategy.

### *Cut Off Grades, Including the Basis for the Selected Cut Off Grades*

The Resource has used a zinc head grade cut-off of 0.5% zinc for oxide material and 1.75% for primary material. As zinc is the only variable that is completely informed in the estimate, it was decided to use a zinc cut-off exclusively. The oxide reporting cut-off was derived from preliminary optimisation work undertaken in 2013 that tested a heap leach scenario.



### *Mining and Metallurgical Methods and Parameters, and other Material Modifying Factors Considered to Date*

Preliminary metallurgical work completed on a single sample by ALS AMMTEC Metallurgical in March 2012 confirmed that the oxide mineralisation is amenable to extraction of the base and precious metals using a 2-stage heap leach treatment route.

For the oxide material, sulphuric acid leach removed 75% of the copper and 87% of the zinc. Lead extraction was considered negligible. Subsequent cyanide leach recovered 87% of the gold and 94% of the silver. No metallurgical test work has been undertaken on the primary mineralisation. It has been assumed that the primary material can be treated using conventional milling and flotation techniques.

There has been no mining undertaken at Lennon's Find.

### **Material Terms of the transaction**

1. Binding term sheet signed between the Company and Muskateer to acquire up to a 75% share in the Lennon's Find Polymetallic Project in the Pilbara, WA.
2. Orange can earn 51% of the Lennon's Find Project (M45/368) by spending A\$500,000 by 31 March 2026 (includes an upfront payment of A\$200,000). The Term Sheet stipulates that Orange must spend a minimum of \$200,000 on exploration at Lennon's Find (including 500 metres of drilling) by 31 January 2025.
3. Orange may earn up to 75% of the Lennon's Find Project by spending an additional A\$500,000 (A\$1.0 million in total) by 31 March 2028. After 75% has been earned by Orange both Muskateer and Orange would contribute expenditure to the JV, with standard dilution clauses applying.
4. If the diluted interest of either party falls below 10%, it will convert to a 1% Net Smelter Royalty (NSR)
5. There are no other material terms.

### **Funding**

The Company plans to fund the acquisition and exploration from existing cash reserves.

This ASX announcement has been authorised for release by the Board of Orange Minerals NL.

**-ENDS-**

### **About Orange Minerals NL**

Orange Resources NL is an exploration company listed on the ASX (ASX: OMX) with Australian-based projects in the Lachlan Fold Belt (LFB) of NSW and Eastern Gold Fields of WA, both world-class mineral provinces. The LFB of NSW hosts major mines including Cadia/Ridgeway, North Parkes and Lake Cowal and the tenements in the Eastern Goldfields of WA are close to the Daisy Milano gold mine and Black Cat Resources Majestic Project. The Orange Minerals exploration team plan to rapidly explore its tenement packages with aggressive exploration programmes at its key properties. The company is currently focussing on the Calarie & Wisemans Creek Projects in NSW and the Majestic/Kurnalpi tenements in WA.



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**Competent Persons Statement**

*The information in this report that relates to Exploration Targets, Exploration Results, Mineral Resource Estimates or Ore Reserves fairly represents information and supporting documentation compiled or verified by Phil Shields, a Competent Person who is a Member of the Australian Institute of Geoscientists. Mr Shields is an employee of Orange Minerals NL and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr Shields consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.*

**Forward Statement**

*This release includes forward – looking statements which involve a number of risks and uncertainties. These forward-looking statements are expressed in good faith and believed to have a reasonable basis. These statements reflect current expectations, intentions or strategies regarding the future and are based on current assumptions. Should one or more of the uncertainties materialize, or should underlying assumptions prove incorrect, actual results may vary from the expectations, intentions and strategies described in this announcement. No obligation is assumed to update forward looking statements if these beliefs or opinions should change.*



## APPENDIX A: JORC Table 1

## Section 1: Sampling Techniques and Data

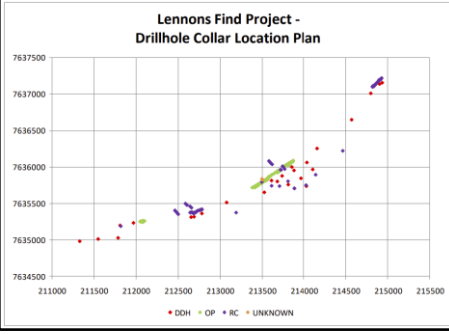
Criteria	JORC Code Explanation	Commentary
<b>Sampling Techniques</b>	<ul style="list-style-type: none"> <li>• <i>Nature and quality of sampling (e.g., cut channels, random chips or specific specialized industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes or handheld XRF instruments, etc.). These examples should not be taken as limiting the broad meaning of sampling.</i></li> <li>• <i>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</i></li> <li>• <i>Aspects of the determination of mineralisation that are material to the public report. In cases where ‘industry standard’ work has been this would be relatively simple (e.g. ‘reverse circulation drilling was used to obtain 1m samples from which 3kg was pulverized to produce a 30g 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 (e.g., submarine nodules) may warrant disclosure of detailed information.</i></li> </ul>	<p>Historical drilling was conducted by several companies from 1969 to 1995. A total of 161 holes were drilled, the majority of which were reverse circulation (RC) with diamond tails or open hole percussion (OP). The resource is based on down hole samples obtained from the above holes.</p> <p>Reverse Circulation chips were collected through a cyclone and bagged in 1m intervals weighing approximately 20 – 30kg. Individual samples were collected from the riffle splitter (2 – 3kg) in calico bags for analysis.</p> <p>Sampling of diamond holes was based on geological interpretation and a standard 1m was used outside areas of mineralisation. Core was cut in half and one half was sent for assaying and the other half stored for reference.</p> <p>Industrial standard practices were conducted to ensure a representative sample was obtained.</p>
<b>Drilling Techniques</b>	<ul style="list-style-type: none"> <li>• <i>Drill type (e.g., core, reverse circulation, open hole hammer, rotary air blast, auger, Bangka, sonic, etc.) and details (e.g., core diameter, triple or standard tube, depth of diamond tails, face sampling bit or other type, whether core is orientated and if so, by what method, etc.).</i></li> </ul>	<p>A variety of drill techniques have been used at Lennon’s Find including Reverse Circulation (RC), open hole percussion (OP) and diamond drilling. Many of the RC holes were used as pre collars for diamond tails with core sizes of BY, NQ and HQ. The open percussion holes were predominantly 3” diameter.</p>





Criteria	JORC Code Explanation	Commentary
<b>Drilling Sampling Recovery</b>	<ul style="list-style-type: none"> <li>Method of recording and accessing core and chip sample recoveries and results accessed. Measures taken to maximise sample recovery and ensure representative nature of the samples. 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>	Core recoveries have not been recorded on a sample-by-sample basis for historic drill programs, however diamond drilling core recoveries were documented as excellent.
<b>Logging</b>	<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. Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography. The total length and percentage of the relevant intersections logged.</li> </ul>	<p>The geological logging of chip and core samples has been undertaken throughout all the historical drill programs.</p> <p>RC chips were logged by Jabiru company and contract geologists using standard paper logging sheets and the Jabiru geological coding system. Data on rock type, deformation, alteration, quartz content, grain size, mineralisation and oxidation states were recorded.</p> <p>The Competent Person considers the quality of the logging for historical drill programs to be appropriate for the style of mineralisation and sufficient for mineral resource estimate.</p>
<b>Sub Sampling techniques and sample preparation</b>	<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. 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 insitu material collected, including for instance results for field duplicate / second half sampling.</li> </ul>	<p>RC sampling was completed on 1m intervals, collected directly into plastic bags from the rig cyclone. A riffle split 2 – 3kg sample was bagged and sent for analysis. The large volume of sample and the RC methodology was industry standard to achieve representivity.</p> <p>For diamond drilling, sample intervals were based on geological interpretation and a standard 1m was used outside mineralised intervals. Core was cut in half with a diamond saw. Core recovery from the diamond holes was excellent. Half core was bagged and dispatched for assaying and the other half retained as reference.</p> <p>The sample sizes are appropriate to the grain size of the material being sampled.</p> <p>There were limited QAQC assay checks in the early drilling, which improved considerably with the Jabiru and Laconia programs.</p>
Criteria	JORC Code Explanation	Commentary



<p><b>Quality of assay data and laboratory tests</b></p>	<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, calibration factors applied and their derivation, etc.</li> </ul>	<p>For the Jabiru Metals 2007 drill program, RC cuttings were sampled at 1m intervals using a riffle splitter. Samples were submitted to Genalysis in Perth, WA, where they were dried, crushed and pulverized to a nominal 85% passing 75um. Ten elements (Ag, As, Ba, Bi, Co, Cu, Fe, Pb, Sb and Zn) were analysed using a four-acid digest with ICP-OES finish. Gold was analysed by 50g fire assay with AAS finish.</p> <p>For the Laconia Resources 2011 drill program, RC cuttings were sampled at 1m intervals using a riffle splitter, while diamond drill core was half core sampled. Samples were submitted to Australian Laboratory Services (ALS) in Perth, WA, where they were dried, crushed and pulverized to a nominal 85% passing 75um. Six elements (Ag, As, Cu, Fe, Pb and Zn) were analysed using a four-acid digest with ICP finish. Au was analysed by 50g fire assay with AAS.</p>															
<p><b>Verification of sampling and assaying</b></p>	<ul style="list-style-type: none"> <li>The verification of significant intersections by either independent or alternative company personnel.</li> <li>Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</li> </ul>	<p>A MS Access format database was used by Optiro for estimation. Collar, survey and assay fields were imported into Datamine and de-surveyed to create a 3D drillhole database. The database was reviewed and as no validation issues were observed the database was deemed adequate to support the resource estimation.</p>															
<p><b>Location of data points</b></p>	<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. Quality and accuracy of topographic control.</li> </ul>	<p>Where recorded, drillhole collars were surveyed by GPS (either handheld or differential). Collar coordinates were originally surveyed in the MGA94 grid system and were then transformed to the Lennon's Find Regional grid coordinates. The November 2011 resource estimate was completed in the regional local grid system. The transformation from MGA94 to local is below.</p> <table border="1" data-bbox="1064 853 1601 933"> <thead> <tr> <th>Reference</th> <th>Local East</th> <th>Local North</th> <th>MGA East</th> <th>MGA North</th> </tr> </thead> <tbody> <tr> <td>Point 1</td> <td>10,188</td> <td>62,413</td> <td>211,808.71</td> <td>7,635,195.88</td> </tr> <tr> <td>Point 2</td> <td>10,410</td> <td>66,103</td> <td>214,940.98</td> <td>7,637,159.19</td> </tr> </tbody> </table>	Reference	Local East	Local North	MGA East	MGA North	Point 1	10,188	62,413	211,808.71	7,635,195.88	Point 2	10,410	66,103	214,940.98	7,637,159.19
Reference	Local East	Local North	MGA East	MGA North													
Point 1	10,188	62,413	211,808.71	7,635,195.88													
Point 2	10,410	66,103	214,940.98	7,637,159.19													
<p><b>Data spacing and distribution.</b></p>	<ul style="list-style-type: none"> <li>Data spacing for reporting of Exploration Results. 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 classification applied.</li> </ul>	<p>For the three deposits (Tiger, Hammerhead and Bronze Whaler) holes were drilled on sections approximately 20m apart along strike, with the drillhole spacing along section varying from 10m to 100m.</p> 															



Criteria	JORC Code Explanation	Commentary
<b>Orientation of data in relation to geological structure</b>	<ul style="list-style-type: none"> <li>• <i>Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.</i></li> <li>• <i>If the relationship between the drilling orientation and the orientation of key mineralised structure is considered to have introduced a sampling bias, this should be assessed and reported if material.</i></li> </ul>	<p>There are three lenses of zinc – lead – copper mineralisation identified at Lennon’s Find:</p> <ul style="list-style-type: none"> <li>• Bronze Whaler outcrops on surface, dips at approximately 52° towards 145° and is 250m along strike x 150m down – dip with an average true thickness of 3m.</li> <li>• Hammerhead outcrops on surface, dips at approximately 41° towards 140° and is 800m along strike, 500m down – dip with an average true width of 3m.</li> <li>• Tiger outcrops on surface, dips at approximately 38° towards 134° and is 220m along strike, 160m down – dip and 3m true thickness.</li> </ul> <p>The Competent Person considers the orientation of drillholes with respect to the attitude of the lithologies and/or structures hosting mineralisation is sufficient to support the reporting of a Mineral Resource estimate.</p> <p>No suspected bias is likely as a result of the pattern of intersecting angles.</p>
<b>Sample security</b>	<ul style="list-style-type: none"> <li>• <i>The measures taken to ensure sample security</i></li> </ul>	All historical sample security procedures have followed standard industrial practice.
<b>Audits or reviews</b>	<ul style="list-style-type: none"> <li>• <i>The results of any audits or reviews of sampling techniques and data.</i></li> </ul>	No audits have been conducted of the historical sampling techniques.



## Section 2: Reporting of Exploration Results

(Criteria listed in the previous section also apply to this section)

Criteria	JORC Code Explanation	Commentary
<b>Mineral tenement and land tenure status</b>	<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> </ul>	<p>The Lennon's Find project is located approximately 70km south of Marble Bar. The project comprises a granted mining lease (M45/368) held 95% by Musketeeer Minerals Ltd and 5% by prospectors Paul Rodney Fletcher and William John Marshall. The mining lease expires on the 18<sup>th</sup> of May 2030.</p>
<b>Exploration done by other parties.</b>	<ul style="list-style-type: none"> <li>Acknowledgment and appraisal of exploration by other parties.</li> </ul>	<ul style="list-style-type: none"> <li>First discovered in 1907 by namesake with small scale mining between 1951 and 1960.</li> <li>In 1964, three mineral claims were pegged by local prospectors over gossanous areas. Seventeen vertical percussion holes drilled.</li> <li>In 1983, Century International Mining Ltd identified a non JORC compliant resource estimation of 1.2Mt @ 0.43% Cu, 7.76% Zn, 1.94% Pb and 100g/t Ag.</li> <li>Jabiru Metals Limited acquired Lennon's Find (M45/368) in 1997, with exploration consisting of geological mapping and regional remote sensing.</li> <li>In 1998, consultant geologists K.H. Morgan and Associates completed an independent geological assessment which highlighted the potential for the area to host stratiform Cu-Pb-Zn mineralisation within the Duffer Formation.</li> <li>In 2002 a fixed loop TEM survey was completed and identified 6 zones of interest.</li> <li>Between 2005 and 2009, the following exploration was conducted; 24 rock chips were collected, returning maximum values of 6.87% Cu, 11.39% Pb, 22.29% Zn and 750g/t Ag. Re modelling of the 2002 Fixed Loop Electromagnetic survey generated additional targets and an inferred resource estimate of 853Kt @ 0.69% Cu, 1.80% Pb, 7.69% Zn and 115g/t Ag was completed for the Hammerhead prospect.</li> <li>During 2007, a 120-sample stream sediment program was carried out.</li> <li>Laconia Resources Ltd purchased the lease in 2010 and drilled 42 drill holes with a best result of 4m @ 2.35% Zn, 1.04% Pb, 0.08% Cu, 117gt/ Ag and 0.23g/t Au. A new inferred mineral resource was reported in 2011 as 1.85Mt @ 5.1% Zn, 1.4% Pb, 0.2% Cu, 82g/t Ag and 0.26g/t Au.</li> <li>Volcanic Metals commissioned Optiro in 2019 to update the 2011 MRE using the JORC 2012 guidelines, resulting in 1.55Mt @ 5.9% Zn, 0.2% Cu, 1.6% Pb, 0.3g/t Au and 80g/t Ag.</li> <li>Musketeeer Mining Ltd commissioned an offset pole – dipole IP survey in 2018. A total of 161 holes drilled between 1969 to 1995. Predominantly RC with diamond tails or open hole percussion.</li> </ul>



Criteria	JORC Code Explanation	Commentary
<b>Geology</b>	<ul style="list-style-type: none"> <li>• <i>Deposit type, geological setting, and style of mineralisation.</i></li> </ul>	<p>The Lennon's Find project is situated in the eastern section of the Archean Pilbara Craton of Western Australia. It covers the southeastern contact between the Mount Edgar Batholith and volcanics of the Archean Warrawoona Group and encompasses the known base metal prospects in this region. The Mount Edgar Batholith is comprised of biotite granodiorites and monzogranites, interpreted to have intruded the surrounding supracrustal rocks. The Warrawoona Group is dominated by felsic schists of the Duffer Formation and the overlying Apex Basalt.</p> <p>The Pilbara area is prospective for Volcanogenic Massive Sulphide (VMS) deposits and are usually concentrated around the margins of the sub volcanic granite intrusions. Mineralisation occurs within and below a persistent chert unit at the top of a pile of tholeiitic to calc alkaline intermediate to felsic rocks.</p>
<b>Drill hole information</b>	<ul style="list-style-type: none"> <li>• <i>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.</i></li> <li>• <i>Easting and northing of the drill hole</i></li> <li>• <i>Elevation or RL of the drill hole collar</i></li> <li>• <i>Dip and azimuth of the hole</i></li> <li>• <i>Down hole length and interception depth</i></li> <li>• <i>Hole length</i></li> </ul>	<p>No exploration results are reported in this announcement.</p>
<b>Data aggregation methods</b>	<ul style="list-style-type: none"> <li>• <i>In reporting Exploration results, weighting averaging techniques, maximum and / or minimum grade truncations and cut off grades are usually material and should be stated. Where aggregate intercepts incorporate short lengths of high-grade results and longer lengths are reported, there should be stated, and some typical examples of such aggregations should be shown in detail.</i></li> </ul>	<p>No exploration results are reported in the announcement.</p>
<b>Relationship between mineralisation and intercept lengths</b>	<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> </ul>	<p>No exploration results are reported in this announcement.</p>



Criteria	JORC Code Explanation	Commentary
<b>Diagrams</b>	<ul style="list-style-type: none"> <li>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 the drill hole collar locations and appropriate sectional views.</li> </ul>	Diagrams can be found in the body of the announcement.
<b>Balanced reporting</b>	<ul style="list-style-type: none"> <li>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.</li> </ul>	No exploration results are reported in the announcement
<b>Other substantive exploration data</b>	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.	An offset pole – dipole induced polarization (PDIP) survey; orientated NW-SE across the Hammerhead Cu-Zn resource zone was completed in 2018 by Resource Potentials. The survey successfully identified a deep (>350m below surface) IP chargeability anomaly response positioned down – dip and to the SE of the resource zone.
<b>Further work</b>	<ul style="list-style-type: none"> <li>The nature and scale of planned further work (e.g., tests for lateral or depth extensions or large – scale step out drilling). Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.</li> </ul>	Orange Minerals will review and reprocess the available IP data to determine whether further geophysical survey work is required to better define and extend the anomaly for drill targeting.



**Section 3: Estimation and Reporting of Mineral Resources**

(Criteria listed in the previous section also apply to this section)

Criteria	JORC Code Explanation	Commentary
<b>Database Integrity</b>	<ul style="list-style-type: none"> <li>Measures taken to ensure that the data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.</li> <li>Data validation procedures used.</li> </ul>	<p>Validation checks of the database were undertaken of the supplied database and no significant issues were identified.</p> <p>The end of hole collar, down hole survey, sampling and logging data all correlated. All assays were within expected ranges for the style of mineralisation.</p>
<b>Site Visits</b>	<ul style="list-style-type: none"> <li>Comment on any site visits undertaken by the Competent Person and the outcome of those visits</li> </ul>	<p>No site visit has been undertaken by the Competent Person as there has been no on ground exploration work undertaken recently.</p>
<b>Geological Interpretation</b>	<ul style="list-style-type: none"> <li>Confidence in the geological interpretation of the mineral deposit</li> <li>Nature of the data used and of any assumptions made.</li> <li>The effect of alternative interpretations</li> <li>The use of geology in guiding and controlling Mineral Resource estimate</li> <li>The factors affecting continuity (grade &amp; geology)</li> </ul>	<p>The Lennon’s Find base metal deposit is a volcanogenic massive sulphide (VMS) deposit, a style of mineralisation that is well researched and understood. At a deposit scale, the Lennon’s Find mineralisation is sufficiently tested to provide confidence in the geological interpretation of the mineral deposit, commensurate with the applied Mineral Resource classification. The project consists of 3 lenses mineralised zones: Bronze Whaler, Hammerhead and Tiger.</p> <p>The geological interpretation is derived from surface mapping, surface geochemistry, geophysical (magnetic and electromagnetic) surveys as well as percussion (open hole and RC) and diamond drilling geological logging and assaying.</p> <p>No alternative interpretations are expected on a global scale as the geological and mineralisation model and style is well understood. Modification to the interpretation reflecting the availability of drilling data is expected as more drilling is completed but are expected to be of a local scale significance only.</p> <p>The zinc – lead – copper style of mineralisation has been identified at Lennon’s Find. Surface gossans and geochemistry correlate well with the available expected downhole lithologies and assay results. The mineralised interpretations were prepared using the presence / absence of copper – lead – zinc bearing massive to disseminated sulphides. A base of oxidation interpretation was prepared using the logged oxidation state of the drilling, and this was used to flag the oxidation state of the mineralisation.</p> <p>The proximity to volcanic source of the sulphides typically controls the sulphide mineralogy. The oxidation has modified the mineralogy resulting in variable re-mobilization of the different metals.</p>



Criteria	JORC Code Explanation	Commentary
<p><b>Dimensions</b></p>	<ul style="list-style-type: none"> <li>The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource</li> </ul>	<p>There are three lenses of zinc – lead – copper mineralisation identified at Lennon’s Find:</p> <ul style="list-style-type: none"> <li>Bronze Whaler outcrops on surface, dips at approximately 52° towards 145° and is 250m along strike x 150m down – dip with an average true thickness of 3m.</li> <li>Hammerhead outcrops on surface, dips at approximately 41° towards 140° and is 800m along strike, 500m down – dip with an average true width of 3m.</li> <li>Tiger outcrops on surface, dips at approximately 38° towards 134° and is 220m along strike, 160m down – dip and 3m true thickness.</li> </ul>
<p><b>Estimation and Modelling Techniques</b></p>	<ul style="list-style-type: none"> <li>The nature and appropriateness of the estimation technique applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.</li> </ul>	<p>Grade estimation was undertaken using Datamine Studio 3 software. Interpretations of the mineralisation were prepared and used to select samples within the mineralised constraint. The initial samples were composited to 1.0m and a top – cut applied to minimize the impact of extreme outlier grades.</p> <p>Grade estimation used the mineralised lens and oxidation surface to constrain the estimate, and all boundaries were treated as hard boundaries. The maximum distance of extrapolation for the Bronze Whaler lens is 120m, for the Hammerhead lens is 185m, and for the Tiger lens is 100m.</p> <p>Gold, silver, copper, lead and zinc were estimated into parent blocks using ordinary kriging, and a 3-pass search strategy.</p> <p>For all lenses, pass 1 used a minimum of 10 and a maximum of 32 samples. Pass 2 and 3 used a minimum of 2 and a maximum of 32 samples.</p> <p>For Bronze Whaler and Tiger lens:</p> <p>Pass 1 used the following search distances:</p> <ul style="list-style-type: none"> <li>Gold 100m x 50m x 5m</li> <li>Silver 140m x 70m x 5m</li> <li>Copper 90m x 45m x 5m</li> <li>Lead 60m x 30m x 5m</li> <li>Zinc 40m x 20m x 5m</li> </ul> <p>Pass 2 used the pass 1 search distance and pass 3 used twice the pass 1 search distances.</p> <p>For the Hammerhead lens:</p> <p>All elements for pass 1 used a minimum of 10 and a maximum of 32 samples, with a search distance of 100m x 50m x 10m.</p> <p>All elements for pass 2 used a minimum of 2 and a maximum of 32 samples, with a search distance of 100m x 50m x 10m.</p> <p>All elements for pass 3 used a minimum of 2 and a maximum of 32 samples, with a search distance of 200m x 100m x 20m.</p>





Criteria	JORC Code Explanation	Commentary
<p><b>Estimation and Modelling Techniques</b></p>	<ul style="list-style-type: none"> <li>• <i>The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.</i></li> <li>• <i>The assumptions made regarding recovery of by-products.</i></li> <li>• <i>Estimation of deleterious elements or other non – grade variables of economic significance (e.g., sulphur for acid mine drainage characterisation)</i></li> <li>• <i>In the case of block model interpretation, the block size in relation to the average sample spacing and the search employed.</i></li> <li>• <i>Any assumptions behind modelling of selective mining unit.</i></li> <li>• <i>Any assumptions about correlation between variables</i></li> </ul>	<p>All cells received a zinc estimate, but approximately 30% of the total mineralised volume did not receive an estimate because of the variable assay suites available. For Bronze Whaler and Tiger lenses 46% and 42% respectively had at least 1 element not estimated, and these blocks were assigned the average estimated value for that element. For the Hammerhead lens 27% of the mineralised volume did not receive an estimate for at least 1 element and had that variable set to “0.00”.</p> <p>There has been no mining undertaken at Lennon’s Find.</p> <p>The Lennon’s Find 2019 Mineral Resource report has been reported using the JORC 2012 reporting guidelines and is classified entirely as an Inferred Mineral Resource only. A zinc cut-off has been used to report the 2019 Mineral Resource as it is the only variable that is informed in the estimate using the following criteria:</p> <ul style="list-style-type: none"> <li>• Oxide material zinc <math>\geq 0.5\%</math> Zn</li> <li>• Primary material <math>\geq 1.75\%</math> Zn</li> </ul> <p>The previous, 2011 Mineral Resource was reported using the JORC 2004 reporting guidelines and used a variable reporting cut-off and had a mixture of Indicated and Inferred Mineral Resource. Compared to the 2019 reported tonnes and grade, the 2011 reported tonnes and grade had 20% more tonnes, with similar base and precious metal grades.</p> <p>In 2010 a resource estimate was prepared for the Hammerhead lens only. At a 0% zinc cut-off the 2010 and 2019 global estimates is shown below:</p> <p><i>2010- 772Kt @ 8.0% Zn, 0.5% Cu, 2.0% Pb, 0.37g/t Au and 96g/t Ag.</i>  <i>2019- 1,856Kt @ 4.9% Zn, 0.17% Cu, 1.3% Pb, 0.24g/t Au and 76g/t Ag.</i></p> <p>The 2010 estimates used different criteria for the interpretation, different estimation techniques. The 2010 estimate had 30% fewer samples which resulted in an increased volume and tonnage with a commensurate reduction in the average grades. The 2010 estimate used bulk density values that were 14 to 17% higher than the later estimate estimates.</p> <p>There are no assumptions regarding the recovery of any by products other than the elements estimated.</p> <p>Deleterious elements (sulphur, arsenic and antimony in particular) have not been estimated. A block size of 20mE x 10mN x 5mRI was used for estimation. This compares to a drillhole nominal spacing of 20m along strike and 10m to 100m across strike on section.</p> <p>There were no assumptions regarding the modelling of selective mining units.</p> <p>There are no correlation assumptions between elements, and all have been estimated independently.</p>



Criteria	JORC Code Explanation	Commentary
<b>Estimation and Modelling Techniques</b>	<ul style="list-style-type: none"> <li>Description of how the geological interpretation was used to control the resource estimates.</li> <li>Discussion of basis for using or not using grade cutting or capping</li> <li>The process of validation, the checking process used, the comparison of model data to drillhole data, and use of reconciliation data if available.</li> </ul>	<p>The oxidation surface was used to constrain the oxide / primary material type which controlled density and was used as a hard boundary for grade estimation. Mineralisation interpretation for each lens was treated as a hard boundary defining the mineralisation.</p> <p>Top cuts were applied to minimize the impact of outlier grades and were derived using a population disintegration technique. Top cuts were applied as follows:</p> <p><u>Bronze Whaler</u> Oxide – Cu @ 1.0%, Pb @ 3.0%, Zn @ 0.5%</p> <p><u>Hammerhead</u> Oxide – Gold 2.5g/t, Silver 400g/t, Cu @ 1.0%, Pb @ 7.0%</p> <p><u>Tiger</u> Oxide – Gold 0.6g/t, Silver 350g/t, Cu @ 0.5%, Pb @ 3.0%, Zn @ 3.5% Primary – Gold 0.1g/t, Silver 90g/t, Cu @ 0.25%, Pb @ 3.0%</p> <p>Validation initially consisted of visual validation of the composite sample grades visually against the block model estimate. The global domain mean of the composite and block model were then compared with acceptable correlation between the two grades. Swathe plots in section and elevation directions for each domain were then prepared and presented an acceptable correlation.</p>
<b>Moisture</b>	<ul style="list-style-type: none"> <li>Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content</li> </ul>	Tonnages are estimated on a dry density basis with no natural moisture
<b>Cut-off Parameters</b>	<ul style="list-style-type: none"> <li>The basis of the adopted cutoff grade or quality parameters applied</li> </ul>	The 2019 Mineral Resource has used a zinc head grade cut-off of 0.5% zinc for oxide material and 1.75% for primary material. As zinc is the only variable that is completely informed in the estimate, it was decided to use a zinc cut-off exclusively. The oxide reporting cut-off was derived from preliminary optimisation work undertaken in 2013 that tested a heap leach scenario. The primary mineralisation cut-off is a zinc cut-off that is believed could support a possible conventional underground mine and treatment.
<b>Mining Factors or Assumptions</b>	<ul style="list-style-type: none"> <li>Assumptions made regarding possible mining method, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating.</li> </ul>	<p>It assumed that the Bronze Whaler, Hammerhead and Tiger lenses are amenable to open pit mining methods.</p> <p>In 2013 an open pit optimisation was run for the project which targeted the oxide mineralisation. The resultant optimisation was positive generating a small oxide shell. No further evaluation work has been undertaken.</p> <p>The deposit has better grades at depth, highlighting the potential for underground exploitation. Future exploration work is required to increase the confidence in this potential.</p>



Criteria	JORC Code Explanation	Commentary
<p><b>Metallurgical Factors or Assumptions</b></p>	<ul style="list-style-type: none"> <li><i>The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.</i></li> </ul>	<p>Preliminary metallurgical work completed on a single sample by ALS AMMTEC Metallurgical in March 2012 confirmed that the oxide mineralisation is amenable to extraction of the base and precious metals using a 2-stage heap leach treatment route.</p> <p>For the oxide material, sulphuric acid leach removed 75% of the copper and 87% of the zinc. Lead extraction was considered negligible. Subsequent cyanide leach recovered 87% of the gold and 94% of the silver.</p> <p>No metallurgical test work has been undertaken on the primary mineralisation. It has been assumed that the primary material can be treated using conventional milling and flotation techniques.</p>
<p><b>Environmental Factors or Assumptions</b></p>	<ul style="list-style-type: none"> <li><i>Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.</i></li> </ul>	<p>No environmental management planning has been undertaken for the potential exploration of the Lennon's Find deposits.</p> <p>As a project requiring significant additional work, it is assumed that mining and process residue will be managed in a manner like other similar operations in Western Australia. Mining waste, low grade stockpiles and leach pads will generate residue that requires management of acid rock drainage (ARD)/acid mine drainage (AMD).</p> <p>Leach pads will generate residue that will require similar acid rock drainage (ARD)/acid mine drainage (AMD) management, as well as management plans for the residue containing cyanide.</p>



Criteria	JORC Code Explanation	Commentary
<b>Bulk Density</b>	<ul style="list-style-type: none"> <li>• <i>Whether assumed or determined. If assumed, the basis for the assumption. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.</i></li> <li>• <i>The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc.), moisture and differences between rock and alteration zones within the deposit.</i></li> <li>• <i>Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.</i></li> </ul>	<p>Bulk density has been assumed. The oxide material was assigned a dry bulk density of 2.2 t/m<sup>3</sup> for the oxide material and 3.0 t/m<sup>3</sup> for the primary material.</p> <p>The assumed bulk density values were based on values derived from deposits of a similar mineralisation style elsewhere in Western Australia.</p> <p>The mineralisation has been modelled as oxide and primary and the assumed dry bulk density values reflect the different material types.</p>
<b>Classification</b>	<ul style="list-style-type: none"> <li>• <i>The basis for the classification of the Mineral Resource into varying confidence categories.</i></li> <li>• <i>Whether appropriate account has been taken of all relevant factors (i.e., relative confidence in tonnage / grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity, and distribution of the data).</i></li> <li>• <i>Whether the result appropriately reflects the Competent Person's view of the deposit.</i></li> </ul>	<p>The entire Mineral Resource has been classified as an Inferred Mineral Resource. This is to reflect the uncertainty associated with the lack of QA/QC for some of the previous assaying and absence of bulk density data from the deposit.</p> <p>The Mineral Resources classification suitably accounts for all relevant factors, especially uncertainty associated with the bulk density, the current available drillhole spacing and the impact on predicted tonnages.</p> <p>The Mineral Resource classification appropriately reflects the Competent Persons view of the associated confidence in the estimated volume, tonnes and grades.</p>
<b>Audit or Reviews</b>	<ul style="list-style-type: none"> <li>• <i>The results of any audits or reviews of Mineral Resource estimates</i></li> </ul>	<p>There have been no independent audits of the Mineral Resource.</p>
<b>Discussion of Relative Accuracy / Confidence</b>	<ul style="list-style-type: none"> <li>• <i>Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource using an approach or procedure deemed appropriate by the Competent Person.</i></li> <li>• <i>These statements of relative accuracy and confidence of the estimate should be compared with production data, where variable.</i></li> </ul>	<p>No bias has been identified in the updated reported Mineral Resource and classification applied is commensurate with the input information, assays and geological understanding. The 2019 estimate is viewed as being a reliable global estimate within the expected error range of an inferred Mineral Resource.</p> <p>The 2019 Mineral Resource is a global estimate, and this is reflected by the Mineral Resource classification applied.</p> <p>There is no available production data to compare against the updated Mineral Estimate.</p>

