**ASX Announcement and Media Release**

Wednesday, 22nd April 2020

# Mt Cecelia Exploration Study Identifies Gold, VMS & Manganese Targets

- **A new expert desktop study has reinterpreted the local geology and structural setting. The study also investigated regional models of mineralisation, resulting in the generation of exploration opportunities.**
- **The new geological interpretation of this under-explored area of the East Pilbara region identifies three distinct targets:**
  - **GOLD TARGET - the identification of a folded and faulted, banded-ironstone, felsic intrusive complex that is highly prospective for orogenic BIF-hosted gold deposits**
  - **POLYMETALIC VMS TARGETS – existence of the Kylena Formation and Jeerinah Formation are highly prospective for VMS deposits**
  - **MANGANESE TARGETS - the district-scale exploration and litho-structural map highlights upside potential for one or more economic deposits**

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**West Wits Mining Limited (ASX: WWI) ("West Wits" or "the Company")** is pleased to provide a summary of recent exploration work on the Mt Cecelia Project which identifies significant opportunities in this highly prospective region.

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**Ian E Neilson MSc R.P. GEO MSEG MAIG, Director of PGN Geoscience commented:** *"The Mt Cecelia project area is situated within a geologically complex and under-explored region. The new geological map and understanding has significant implications for future exploration programs primarily with the identification of a folded and faulted, Banded-Iron Formation ("BIF"), felsic intrusive complex that is highly prospective for orogenic gold. Additionally, potential VMS horizons and Manganese host units are also identified based on other occurrences throughout NW Australia and are highly encouraging at the early stages."*

**Jac van Heerden, Managing Director commented:** *"The work carried out by Ian and the PGN Geoscience team surpassed expectation. The identification of the outstanding orogenic gold target associated with the newly identified banded iron formation ("BIF") complex and VMS targets provide an exciting greenfield exploration opportunity to supplement WWI's marquee Witwatersrand Basin Project in South Africa which has a declared 3.65Moz gold JORC Resource[1]. The prospectivity of the Mt Cecelia project is again highlighted by the newly completed desktop work as well as Rio Tinto's exploration activity at its adjoining tenements, holding the entire eastern boundary of Mt Cecelia which forms part of the Paterson Province. The WWI board is looking forward to taking the next exploration steps in this world-class mining region."*

**West Wits Mining Limited**
ABN 89 124 894 060
Level 3, 62 Lygon Street
Carlton VIC 3053
Australia
P +61 3 8692 9049
F +61 3 8692 9040
www.westwitsmining.com

## New Litho-Structural Interpretation

PGN Geoscience were engaged by the Company to perform a detailed desktop study to assist in developing new exploration models for target generation at WWI's Mt Cecelia project and to provide a context to existing/known mineralisation occurrences.

The study generated an improved geological map and the revised understanding has significant implications for future exploration programs, primarily from the identification of a folded and faulted, banded-ironstone, felsic intrusive complex that is highly prospective for orogenic gold.

The new geological interpretation and resultant map introduces a considerably more complex geology than the currently available public geological map and includes a new interpretation for the Vines Fault (Figure 1).

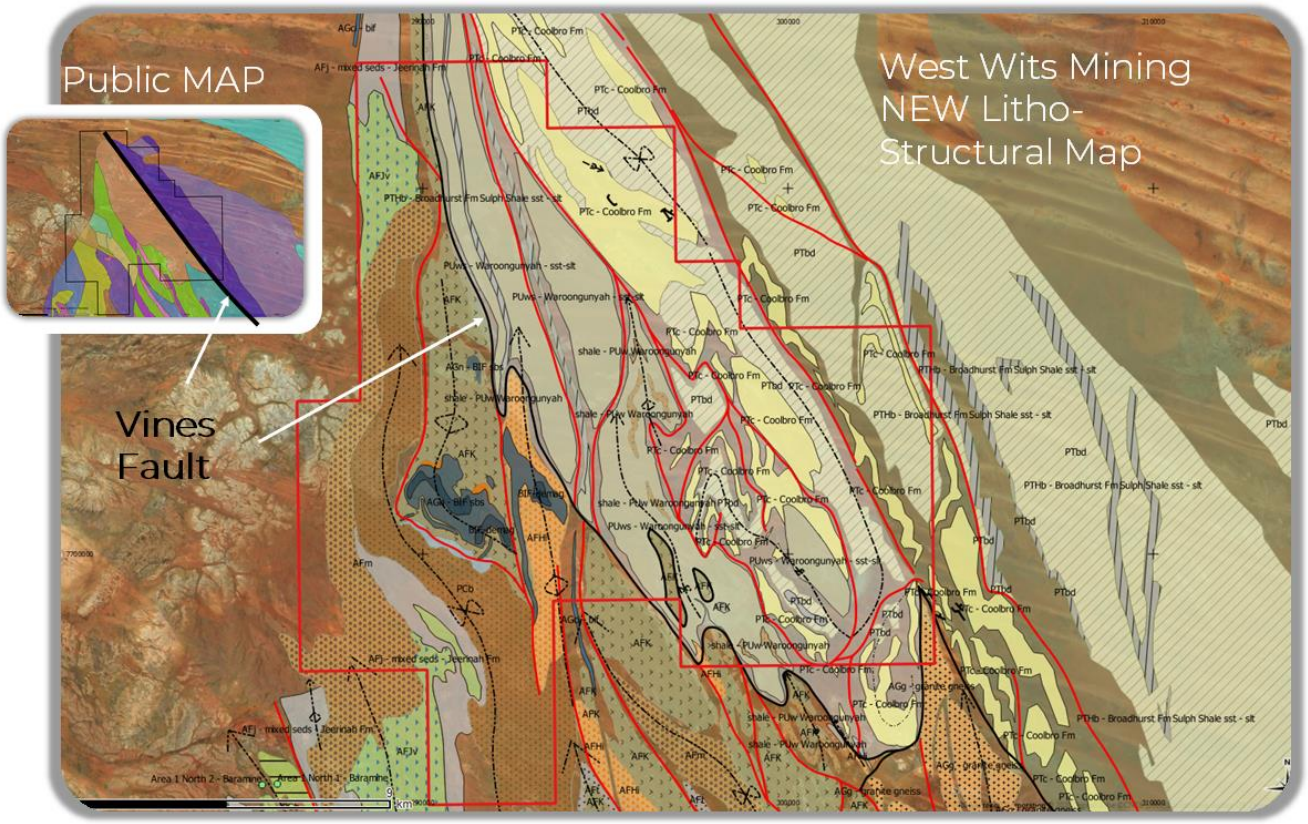


*Figure 1: (top) Newly compiled map for West Wits Mining compared to (inset) currently available map.*

Sectional interpretations were used to assist in the development of a consistent geological framework and the resultant confirmation of geological reasonableness provides a new series of concepts related to exploration.

Suffice to say, the potential of a new orogenic gold play, determination of VMS prospective host units and Manganese potential provides significant upside exploration opportunity to the region. The following immediate significant areas of interest are delineated as Orogenic Gold, VMS and Manganese projects for the E45/5045 project area accordingly.

## Prospectivity

The new lithological and geodynamic interpretation for the region has significant implications for exploration including upside potential for gold, VMS and Manganese deposits previously unrecognised in the area.

### Orogenic Gold

The resultant new geological interpretation has resolved a new architecture and consequently new litho-structural framework for the Mt Cecelia project area within E45/5045, the central west area location is highly prospective for orogenic banded-iron formations ("BIF") hosted gold (Figure 2).

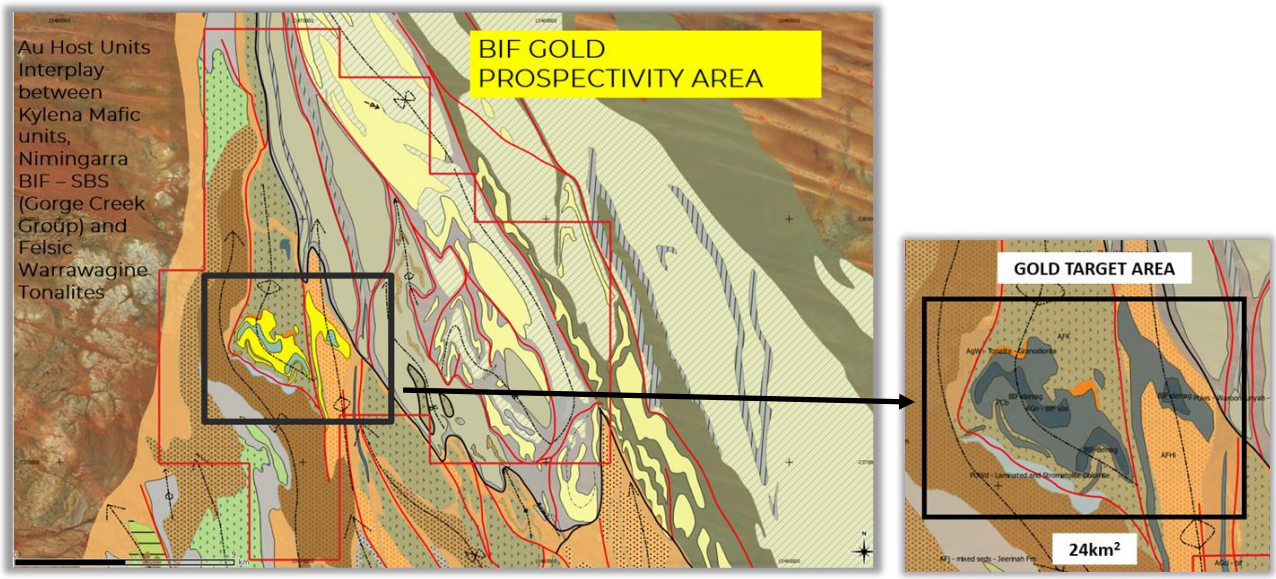


*Figure 2: (left) E45/5045 tenement and geology and (right) target area highlighted.*

The majority of outcrop is identified as the Nimingarra Formation and comprises banded-iron formations, jaspilite, banded, ferruginous chert and black shales is intruded by syeno-granites - felsic intrusions which occur footwall to the intermediate to mafic, amygdaloidal basalts of the Kylena Formation (Figure 3).

The initial interpretation suggests that a folded banded-iron sequence is juxtaposed by a series of steep structures. The airborne magnetics further suggests a series of demagnetised zones internal to the BIF. The hypothesis is that these are prospective for orogenic gold mineralising systems.

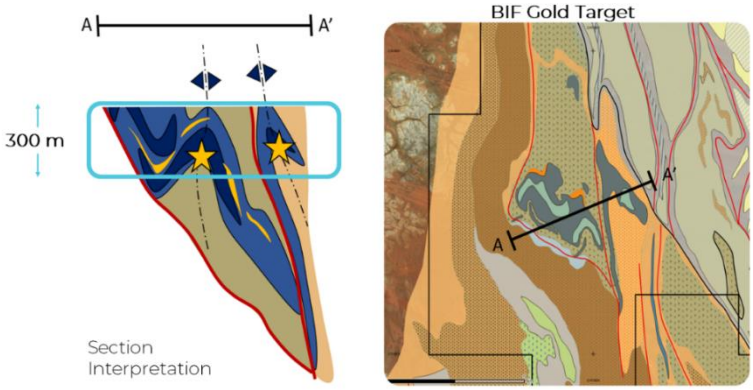


*Figure 3: Geological section interpretation (A-A') comprising foot-wall and hanging-wall Kylena Formation (brown), BIF units of the Nimingarra Formation (blue), felsic intrusives - syeno-granites (orange), demagnetised BIF zones (dark blue) and Koongaling Volcanic member (pale brown) Yellow stars indicate conceptual Au targets.*

The juxtaposition of a folded, faulted BIF sequence that is intruded by alkalic intrusions into a sequence containing reducing shale units, adjacent significant shear zones presents both a structural/rheological, and chemical/redox trap that is highly prospective for orogenic gold.

A deposit analogue proposed is Dacian Gold Ltd's (ASX:DCN) Westralia Mt Morgans deposit in WA. At Mt Morgans, the deposit area straddles the core and western limb of the Mt. Margaret anticline that plunges moderately to the south and has a NNW trending fold axis. Dominant rock types are mafic volcanics, mafic intrusives, minor ultramafics and metasediments, and a narrow, <100 m wide band of a regionally continuous banded iron formation. These units have been intruded by concordant and discordant felsic porphyry dykes and sills (akin to the felsic intrusions within the E45/5045 field area) as well as local thin lamprophyre dykes[2].

## VMS Potential

According to Geological Survey Western Australia reports[3], the Kylena Formation and Jeerinah Formation are prospective for VMS deposits. Both of which occur in significant volumes within the tenement area. These formations represent classic bimodal volcanic sequences and as such, present a significant opportunity and considerable spatial extent for exploration within the WWI tenure (Figure 4).

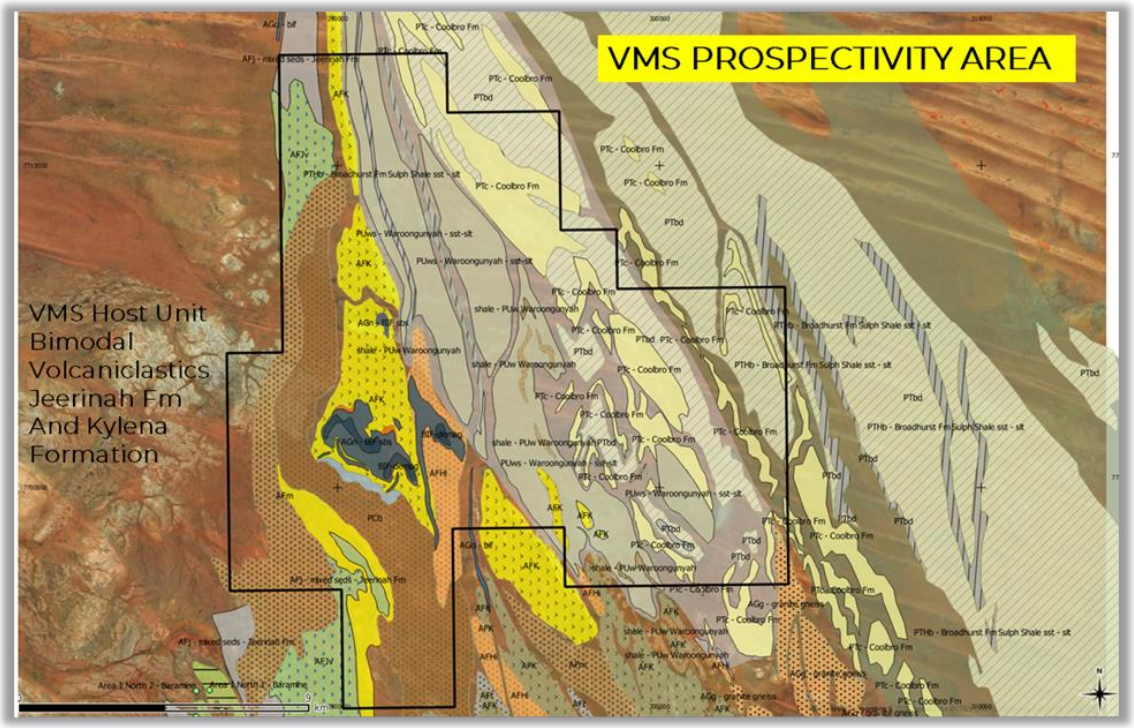


*Figure 4: VMS Prospectivity focuses on the Kylena and Jeerinah bimodal sequences. Initial Geophysical modelling is recommended to identify anomalous zones*

Key structures in VMS systems which formed at the time of basin formation (Vines Fault) have been subsequently folded and refolded resulting in a more complex geometry.

Mineralisation along early graben and feeder structures would likely have created a sericitic alteration halo along these structures, a silica – iron exhalate horizon would have formed the top of the system which is now more likely to be highly deformed (folded). The early sericitic structures would deform very easily, folding and buckling under high-strain conditions whereas more competent units (felsic dominated) would partition the strain around to across them. The sulphides would be focused into low-strain environments including hinge positions, dilational sites etc.

## Manganese Potential

The Mt Cecelia tenement shows considerable exploration potential for a Manganese opportunity amongst the VMS and BIF hosted orogenic gold opportunities (Figure 5). The syngenetic deposits would today reflect the deformation episodes that are recorded in the current geology. That is, when exploring for 'stratiform' deposits in poly-deformed terranes, the application of the architecture needs to be employed to undertake effective exploration practices. i.e. early structures are likely refolded and transposed therefore not upright or remaining in their original locations.

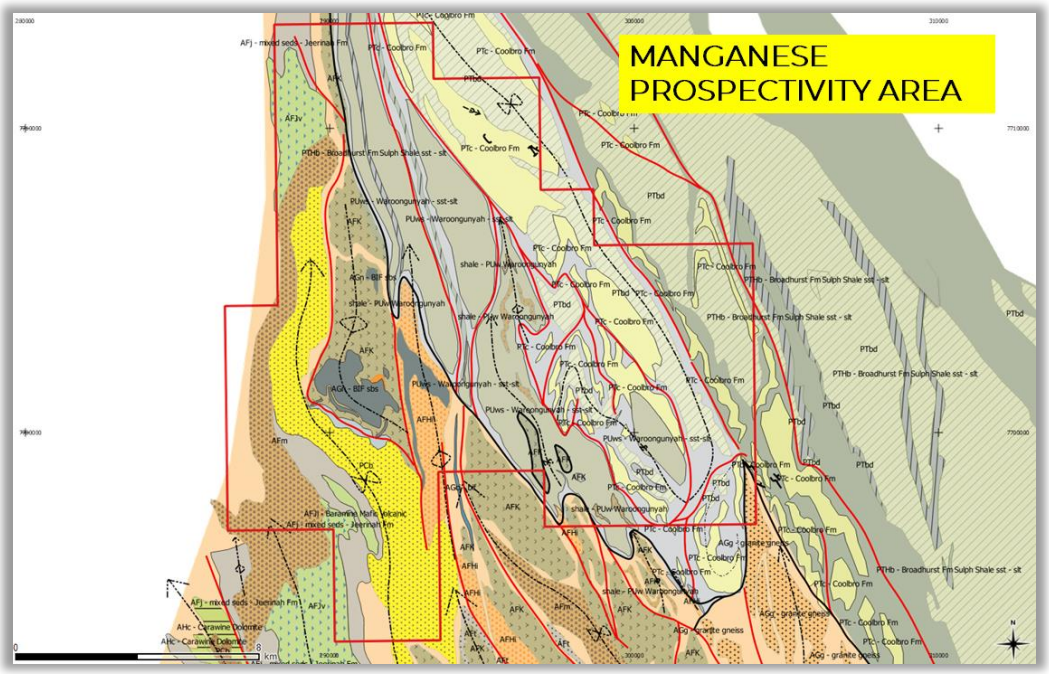


*Figure 5: Prospectivity of the E45/5045 tenement for Manganese highlighting the Pinjian Chert Breccia formation hosted within a synform.*

The Pinjian Chert Breccia formation comprises angular fragments of chert and layered chert in a siliceous matrix; locally rich in iron and manganese oxides giving the rock a black to dark-brown colour and semi metallic lustre. This formation is host to the economic Woodie Woodie Manganese deposit and numerous under-developed showings[4].

Through the extrapolation and resultant understanding from developing a district-scale exploration litho-structural map, Manganese deposits such as those locally related to the Baramine series of deposits ~8km to the south-west are hosted within a form-surface related to the synformally folded sequence of Pinjian Chert Breccia (PCB) units.

Application of the resolution of structural controls to the E45/5045 tenement area suggests that the host horizon sequence is likely folded akin to the Baramine prospects. Thus, the upside potential for one or more economic deposits is highly likely with the expectation of a focus of economic quantities proximal to the hinge axial planar location.

## Mt Cecelia Exploration - Next Steps

PGN's recommendations (detailed below) are being assessed by management.

Commissioning of the proposed follow-up field work is presently influenced by COVID-19 developments which temporarily restricts access to site. It is WWI's intension to advance the following as next exploration steps:

- Field reconnaissance and mapping campaign to verify existing, interpretations, rock classifications as well as define structural controls on main Target areas.
- Complete 3-dimensional geophysical-geological models across the:
  - Nimingarra BIF complex and definition of potential magnetite-destructive zones; and
  - Kylena and Jeerinah Formations for base-metal (VMS) systems

Approved for release by the Company's Managing Director (Jac van Heerden),



Jac van Heerden
Managing Director
West Wits Mining Limited

**Investor Relations:**

Ryan Batros on +61 472 658 777 or Simon Whyte on +61 459 797 101

Otherwise, for further information visit: www.westwitsmining.com

**Competent Person Statement:**

The information on the pages that relate to Exploration Results for the Mt Cecelia Project is based on information compiled or reviewed by Mr Ian E Neilson MSc R.P. GEO MSEG MAIG, a Director of PGN Geoscience Pty Ltd. Mr Neilson is a member of the Australian Institute of Geoscientists and has sufficient experience of relevance to the styles of mineralisation and types of deposits under consideration, and to activities undertaken, to qualify as a Competent Person as defined in the 2012 Edition of the Joint Ore Reserves Committee (JORC) Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr Neilson consents to the inclusion in this report of matters based on information in the form and context in which is appears.

The Australian Securities Exchange has not reviewed and does not accept responsibility for the accuracy or adequacy of this release.

**References:**


1. The original report was "2019 Annual Report to Shareholders" which was issued with consent of competent persons Dr Andrew J. Tunks, it was released to the ASX on 27th September 2019 and can be found on the Company's website (https://westwitsmining.com/). The company is not aware of any new information or data that materially effects the information included in the relevant market announcement. The form & context in which the Competent Persons' findings are presented have not been materially modified.
2. Dacian Gold Ltd (ASX Announcement 21/11/2016) "Mt Morgans Feasibility Study delivers an Initial Ore Reserve of 1.2Moz", https://www.asx.com.au/asxpdf/20161121/pdf/43d1mvn06j1q5m.pdf
3. Bagas, L. (2000). Geology of the Paterson 1: 100 000 sheet. Geological Survey of Western Australia.
   Bagas, L. (2004). Proterozoic evolution and tectonic setting of the northwest Paterson Orogen, Western Australia. Precambrian Research, 128(3-4), 475-496.
4. Jones, S., McNaughton, N. J., & Grguric, B. (2013). Structural controls and timing of fault-hosted manganese at Woodie Woodie, East Pilbara, Western Australia. Ore Geology Reviews, 50, 52-82.

## Appendix 1

## JORC Code, 2012 Edition – Table 1 report – E45/5045 Mount Cecelia project

### Section 1 Sampling Techniques and Data

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

| Criteria | JORC Code explanation | Commentary |
|---|---|---|
| ***Sampling techniques*** | *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.* | Not Applicable |
| | *Include reference to measures taken to ensure sample representation and the appropriate calibration of any measurement tools or systems used.* | Not Applicable |
| | *Aspects of the determination of mineralisation that are Material to the Public Report.*<br>*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.* | Not Applicable |
| ***Drilling techniques*** | *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).* | Not Applicable |
| ***Drill sample recovery*** | *Method of recording and assessing core and chip sample recoveries and results assessed.* | Not Applicable |

| | | |
|---|---|---|
| | *Measures taken to maximise sample recovery and ensure representative nature of the samples.* | Not Applicable |
| | *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.* | Not Applicable |
| ***Logging*** | *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.* | Not Applicable |
| | *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* | Not Applicable |
| | *The total length and percentage of the relevant intersections logged* | Not Applicable |
| ***Sub-sampling techniques and sample preparation*** | *If core, whether cut or sawn and whether quarter, half or all core taken.* | Not applicable |
| | *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* | Not Applicable |
| | *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* | Not Applicable |
| | *Quality control procedures adopted for all sub-sampling stages to maximise representation of samples.* | Not Applicable |
| | *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.* | Not Applicable |
| | *Whether sample sizes are appropriate to the grain size of the material being sampled.* | Not Applicable |
| ***Quality of assay data and laboratory tests*** | *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* | Not Applicable |
| | *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.* | Not Applicable |

| | | |
|---|---|---|
| | *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.* | Not Applicable |
| ***Verification of sampling and assaying*** | *The verification of significant intersections by either independent or alternative company personnel.* | Not Applicable |
| | *The use of twinned holes.* | Not Applicable |
| | *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* | Not Applicable |
| | *Discuss any adjustment to assay data.* | Not Applicable |
| ***Location of data points*** | *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.* | Not Applicable |
| | *Specification of the grid system used.* | Not Applicable |
| | *Quality and adequacy of topographic control.* | Not Applicable |
| ***Data spacing and distribution*** | *Data spacing for reporting of Exploration Results.* | Not Applicable |
| | *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.* | This is not considered material. |
| | *Whether sample compositing has been applied.* | Not Applicable |
| ***Orientation of data in relation to geological structure*** | *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* | Not Applicable |
| | *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.* | This is not considered material. |
| ***Sample security*** | *The measures taken to ensure sample security.* | Not Applicable |

| | | |
|---|---|---|
| ***Audits or reviews*** | *The results of any audits or reviews of sampling techniques and data.* | Not Applicable |

## 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*** | *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.* | The new map interpretation occurred within tenement E45/5045, of which Northern Reserves Pty Limited holds a 100% controlling interest and is managed by West Wits Mining Limited. |
| | *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.* | The tenement is in good standing with the WA DMIRS. |
| ***Exploration done by other parties*** | *Acknowledgment and appraisal of exploration by other parties.* | The new interpretation is supported using 1:100 000 GSWA Map Braeside Sheet 3155, Geology by IR Williams 1991-92 and AF Trendall 1987-91; 1:100 000 GSWA Map Warrawagine Sheet 3056, Geology by IR Williams 1997; 1:100 000 GSWA Map Rudall Sheet SF 51-10, Geology by L Bagas 1991-97; 1:100 000 GSWA Map Nullagine Sheet SF51-05, Geology by IR Williams 2005 and AH Hickman 2007; 1:100 000 GSWA Map Isabella Sheet 3156, Geology by IR Williams 1991-92 and AF Trendall 1988-91; 1:250 000 GSWA Map Yarrie Sheet SF 51-1, Geology by IR Williams 1991-2000 and AF Trendall 1988-91; 1:250 000 GSWA Map Paterson Range Sheet SF 51-6, Geology by AH Hickman, RJ Chin, RR Towner, RWA Crowe 1974.<br>Previous workers in the area include Rumble Resources, Newcrest Mining, Great Sandy, Carawine Resources and Rio Tinto Exploration. |
| ***Geology*** | *Deposit type, geological setting and style of mineralisation.* | The new litho-structural interpretation has resolved within E45/5045, the central west area location prospective for orogenic BIF hosted gold. The majority of outcrop is identified as the Nimingarra Formation and comprises banded-iron formations, jaspilite, banded, ferruginous chert and black shales is intruded by syeno-granites - felsic intrusions which occur footwall to the intermediate to mafic, amygdaloidal basalts of the Kylena Formation. The initial interpretation suggests that a folded banded-iron sequence is juxtaposed by a series of steep structures. The magnetics further suggests a series of demagnetised zones internal to the BIF. The hypothesis is that these are likely host to potential orogenic gold mineralizing systems. The felsic intrusive units of the Warrawagine granitoid |

| Criteria | JORC Code explanation | Commentary |
|---|---|---|
| | | intrusive complex (AgWc) comprise medium to coarse-grained (porphyritic) monzogranites, syeno-granites (alkalic) and granodiorites. These intrusive units have been mapped at the margins of the BIF outcrop and are interpreted to have intruded into the footwall of the BIF sequence. The juxtaposition of a folded, faulted BIF sequence that is intruded by alkalic intrusions into a sequence containing reducing shale units, adjacent significant shear zones presents a both a structural, rheological and chemical/redox trap that is highly prospective for orogenic gold.<br>According to literature cited in the report, the Kylena formation and Jeerinah formation are highly prospective for VMS (includes VHMS) deposits. Both of which occur in significant volumes within the tenement area. The Kylena comprises basalt, andesite, high-Mg basalts, rhyolites, basaltic agglomerates, grey carbonate rocks (dolomite?), stromatolites, sandstone, pillow basalt breccia, limestone and conglomerate. The Jeerinah formation comprises shale, sandstone, siltstone, mudstone, dolomite, local microbanded chert, jaspilite, conglomerate; fine-grained massive rhyolite; mafic tuff with local accretionary lapilli and agglomerate; thin basalt/dolerite and andesitic basalt flows. These formations represent effectively classic bimodal sequences and as such, presents a significant opportunity and considerable spatial extent for exploration across E45/5045.Mineralisation would be expected to be hosted within early graben and feeder structures that have been subsequently deformed and focused into low-strain environments including hinge positions, dilational sites etc.<br>The Mount Cecelia tenement E45/5045 shows considerable upside potential for a Manganese opportunity. The Pinjian Chert Breccia formation comprises angular fragments of chert and layered chert in a siliceous matrix; locally rich in iron and manganese oxides giving the rock a black to dark-brown colour and semi metallic lustre. This formation is host to the economic Woodie Woodie Manganese deposit and numerous under-developed showings. Manganese deposits such as those locally related to the Baramine series of deposits ~8km to the south-west are highlighted hosted within a form-surface related to the synformally folded sequence of Pinjian Chert Breccia (PCB) units. Application of the resolution of structural controls to the E45/5045 tenement area suggests that the host horizon sequence is likely folded akin to the Baramine prospects. Thus, the upside potential for one or more economic deposits is highly likely with the expectation of a focus of economic quantities proximal to the hinge axial planar location. |

| Criteria | JORC Code explanation | Commentary |
|---|---|---|
| ***Drill hole Information*** | *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:*<br>▪ easting and northing of the drill hole collar<br>▪ elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar<br>▪ dip and azimuth of the hole<br>▪ down hole length and interception depth<br>▪ hole length.<br>*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.* | Not Applicable |
| ***Data aggregation methods*** | *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.* | Not Applicable |
| | *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.* | Not Applicable |
| | *The assumptions used for any reporting of metal equivalent values should be clearly stated.* | Not Applicable |
| ***Relationship between mineralisation widths and intercept lengths*** | *These relationships are particularly important in the reporting of Exploration Results.*<br>*If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.*<br>*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').* | Not Applicable |

| Criteria | JORC Code explanation | Commentary |
|---|---|---|
| ***Diagrams*** | *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.* | Refer to Figures 1 to 5 in the body of text. |
| ***Balanced reporting*** | *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.* | No misleading results have been presented in this announcement. |
| ***Other substantive exploration data*** | *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.* | 1:100k and 1:250k Base Outcrop Maps sourced from the GSWA DMIRS portal (https://dasc.dmp.wa.gov.au/dasc/) are referenced in the preceding section Criteria *Exploration done by other parties* accordingly.<br>Open File Aeromagnetic Datasets of Western Australia were accessed and reprocessed for the local scale interpretation of geology. The state-wide dataset is a compilation of all available magnetic anomaly grid compilations at 80, 40 and 20 metres in cell size are generated by merging grids from Federal and State Government datasets, acquired with a line spacing of 500 metres or less and more than 1500 openfile company datasets at various line spacings.<br>The 'Geoscience Australia magnetic grid of Australia V6 2015' has been used as a base reference grid and is also used to complete the background areas where closer spaced data is not available |
| ***Further work*** | *The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).*<br>*Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.* | Further exploration work is currently under consideration, including the geophysical modelling, field mapping and rock chip sampling as described in the report. The details of which will be released in due-course. |