MILLENNIUM
MINERALS LIMITED

ASX Code: MOY

Corporate Details

Ordinary Shares:
795,237,123

Market Capitalisation:
~$180 million

Cash, bullion and available financing facilities at 31 December 2018:
$18.2 million

Debt at 31 December 2018:
$5 million

ASX Code: MOY

Board of Directors

Greg Bittar
Non-Executive Chairman

Tim Kennedy
Non-Executive Director

Peter Lester
Non-Executive Director

Bruno Lorenzon
Non-Executive Director

Management

Peter Cash
Chief Executive Officer

Ray Parry
Chief Financial Officer and Company Secretary

Contact Details

Address:
Unit 7, 140 Abernethy Road
Belmont WA 6104

Telephone:
61 (08) 9216 9011

Facsimile:
+ 61 (08) 9481 0288

Email:
info@mmltd.com.au

Website:
millenniumminerals.com.au

4th February 2019

2018 Ore Reserve and Mineral Resource Statement

Millennium delivers 70% increase in Ore Reserves at Nullagine to 375,300oz

Successful exploration and growth programs deliver outstanding results, with +150,000oz added to Reserve base over CY2018, net of mining depletion of 98,900oz

- **Millennium's aggressive exploration program at the Nullagine Gold Project continues to achieve outstanding results, delivering an updated Ore Reserve as at 31 December 2018 of 375,300oz:**
  - **7.1Mt at 1.6g/t Au for 375,300oz of contained gold**
- **This represents a 70% increase in Ore Reserves since 31 December 2017 (221,600oz), net of mining depletion of 98,902oz**
- **Average Ore Reserve grade remains constant at 1.6g/t**
- **Delivers mine life visibility approaching four years, based on Millennium's targeted annual production rate of ~100kozpa**
- **Updated Ore Reserve includes maiden Ore Reserve estimate for Golden Gate Underground of 220.6kt at 3.8g/t Au for 27,100oz of contained gold, underpinned by recent strong metallurgical test work results on arsenopyrite-dominant sulphide ore (see announcement of 1 February)**
- **Updated Mineral Resource estimate of 22.9Mt at 1.6g/t Au for 1.16Moz, with 0.75Moz, or ~65%, in the higher-confidence Measured and Indicated categories**
- **Increase in Mineral Resource grade from 1.5g/t Au to 1.6g/t Au**
- **Annual production guidance for CY2019 of 90,000-100,000oz at an AISC of $1,300-1,375/oz**
- **Aggressive exploration programs continuing across the Nullagine Project area, with further growth in Ore Reserves and mine life expected as Millennium continues to close-in on its goal of achieving a +5-year mine life**

Millennium Minerals Limited (ASX: MOY) ("**Millennium**" or the "**Company**") is pleased to announce that its ongoing aggressive exploration programs at the Nullagine Gold Project in WA have again successfully extended mine life, with an updated Ore Reserve estimate for the 12 months to 31 December 2018 delivering a 70% increase in Ore Reserves, net of mining depletion, to 375,300 ounces.

The increase in Ore Reserves is a result of recent successful drilling programs, as well as the conversion of several Mineral Resource estimates to Ore Reserves.

The Project's Ore Reserves at 31 December 2018 have increased by 70 per cent to 375,300oz, up from 221,600oz as at 31 December 2017 (net of mining depletion of 98,900oz for CY2018).

The Mineral Resource at 31 December 2018, net of mining depletion, stands at 22.9 million tonnes at 1.6g/t Au for 1.16Moz, with approximately 65 per cent of the total in the higher confidence Measured and Indicated categories.

The updated Ore Reserve delivers mine life visibility approaching four years, based on Millennium's current annualised production rate of approximately 100,000ozpa, which the Company has successfully maintained since September 2018.

The Company's objective is to further increase its Ore Reserve base to deliver a plus-five year mine life, with significant opportunities to deliver near-term Ore Reserve growth through the conversion of additional sulphide Mineral Resources and through further exploration success.

The updated Ore Reserve includes a maiden Ore Reserve estimate for Golden Gate Underground of 220,000 tonnes at 3.8g/t Au for 27,100oz. This Ore Reserve is underpinned by the recent strong metallurgical test work results from arsenopyrite-dominant sulphide ore using Millennium's patented pressurised in-mill oxidation process (PINOX), which delivered gold recoveries averaging approximately 70 per cent (see ASX Announcement dated 1 February 2019).

As a result of this test work, Millennium is proceeding with a two-stage expansion of the Nullagine processing plant, with the Stage 1 upgrade comprising the addition of in-mill oxidation (INOX), and Stage 2 comprising the addition of the PINOX processing capability.

The Stage 1 INOX upgrade will be completed for a total capital cost of approximately $15 million, with commissioning expected in April 2019. The Stage 2 PINOX upgrade is expected to be completed in early 2020 for a total capital cost of $5 million.

Development of the portal for Golden Gate Underground is scheduled to commence in Q3 2019, with first ore to coincide with commissioning of the Stage 2 PINOX upgrade.

Annual production guidance for the 2019 calendar year is 90,000 - 100,000 ounces at an all-in sustaining cost (AISC) of between $1,300 and $1,375 per ounce.

Millennium Chief Executive Peter Cash said the Company's exploration and growth strategies were successfully driving mine life growth at Nullagine.

"We are on a strong upward trajectory at Nullagine, with our ongoing growth initiatives enabling us to achieve our targeted 100kozpa production rate in September last year and with today's Ore Reserve update delivering a mine life approaching four years," he said.

"This has been the result of our highly successful drilling programs, coupled with the very positive outcomes being delivered by our sulphide metallurgical work, which has confirmed strong gold recoveries from our low-cost, two-stage plant upgrade.

"This puts us on-track to develop our second underground mine at Nullagine at the Golden Gate Mining Centre later this year and potentially opens up further significant parts of our Mineral Resource inventory for conversion to Ore Reserves. The ability to cost-effectively process all ore types at Nullagine has also dramatically expanded our exploration scope into under-explored areas which have been virtually untouched in years – an exciting prospect for our exploration team.

"We remain firmly committed to continuing to grow mine life, with a key objective of pushing our mine life visibility beyond five years. We have a multi-pronged exploration program underway, with a number of high-priority exploration targets to be tested in the coming months," he continued.

Mineral Resources

The Mineral Resources Statement as at 31 December 2018 is reported according to the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the 'JORC Code') 2012 edition. The Mineral Resources are reported inclusive of Ore Reserves and exclusive of all mined (depleted) material.

Table 1: December 2018 Mineral Resource Estimate[1] by Resource Category

Mineral Resource Category	Million Tonnes	Grade (g/t Au)	Thousand Ounces
Measured	5.69	1.6	287.6
Indicated	9.19	1.5	461.6
Inferred	7.97	1.6	410
Total	**22.85**	**1.6**	**1,159.1**

Ore Reserves

The total Project Ore Reserve estimate as at 31 December 2018, depleted for mining, is set out in Table 2 below:

Table 2: 2018 Total Ore Reserve Estimate[2] by Reserve Category

Ore Reserve Category	Million Tonnes	Grade (g/t Au)	Thousand Ounces
Proved	1.58	1.5	74.2
Probable	5.55	1.7	301.2
Total	**7.14**	**1.64**	**375.3**

Summary

The Mineral Resource and Ore Reserve estimates have been updated for a number of the Company's gold deposits located within the Project area in the East Pilbara District of Western Australia (***Figure 1***).

Mineral Resource Estimates

Mineral Resources were updated for the following deposits based on further infill drilling

Au81	Little Wonder
Bartons	Golden Eagle
Condor	Roscoes
Golden Gate	

The Mineral Resources for the following deposits were updated for mining depletion:

Golden Eagle	Au81 (incl. Au 81 West)
Bartons Underground	Mustang
Redbeard	

Mining depletion was calculated by intersecting the final end of month surveyed pit digital terrain model (DTM) with the Mineral Resource block model and subtracting/depleting the Mineral Resource above that DTM to the natural pre-mining surface.

The following Mineral Resources remain unchanged:

Agate	Angela
Bow Bells	Shearers / Shearers North/ Mundalla
All Nations	Crossing
Anne De Vidia	Falcon
Biljim	Gambols
Buzzard	Hopetoun/Endeavour
Hut	Little Annie
Majuba	Otways
Round Hill	Junction

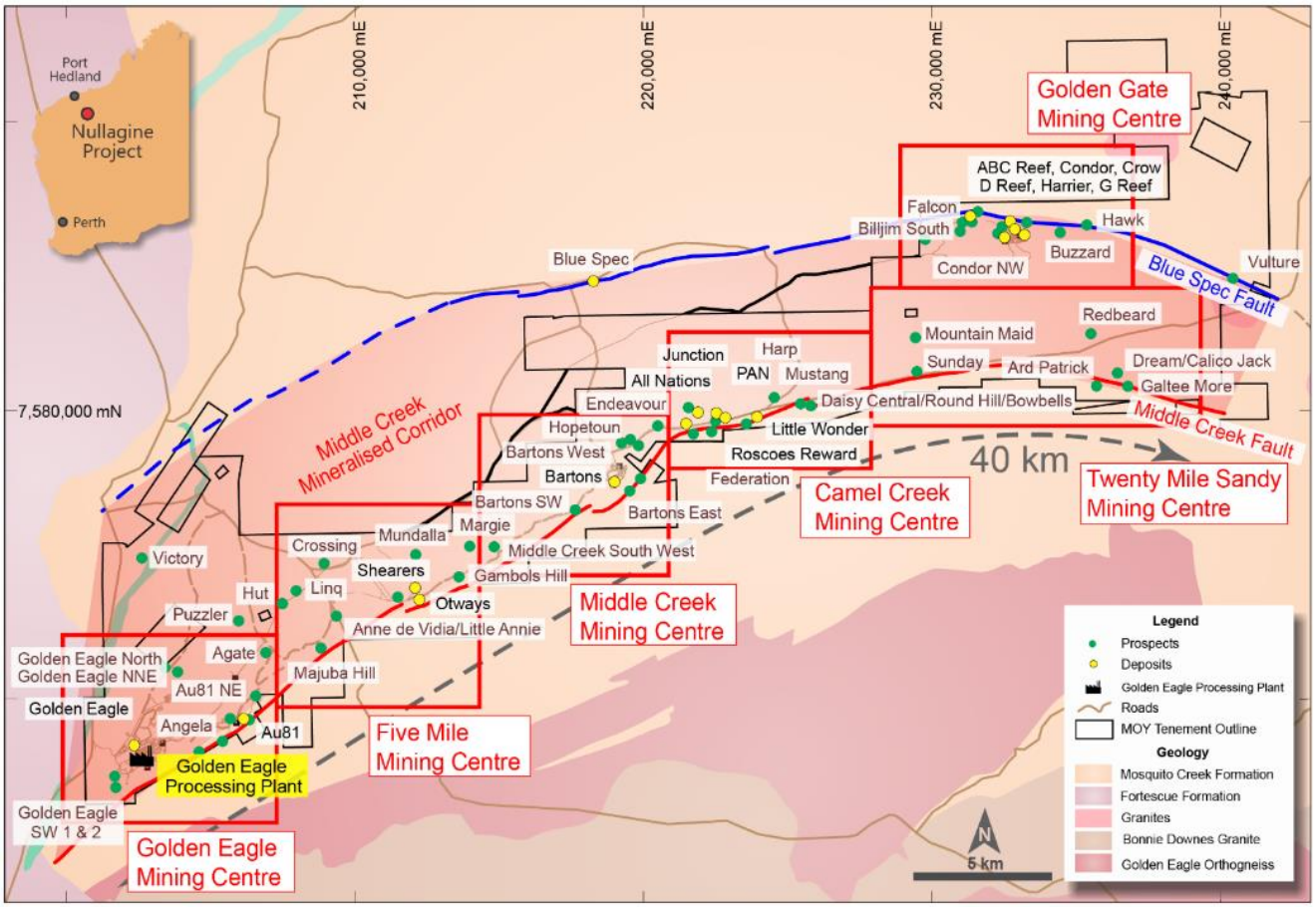

Figure 1: Nullagine Deposit Location Plan over regional geology

A summary of material information required under Australian Securities Exchange (ASX) Listing Rules 5.8 and JORC Code (2012), inclusive of 'Table 1', for all deposits are presented in the Appendices.

Table 3 details the total Mineral Resource estimate for the Project. Details of all Mineral Resource models are documented in the appended JORC "Table 1".

Geology and Geology Interpretation

The Nullagine Project deposits are structurally controlled, sediment-hosted, lode-style gold deposits. They are all situated in the Mosquito Creek Basin that consists predominantly of Archean aged, turbidite sequences of sandstones, siltstones, shales and conglomerates.

The mineralisation was interpreted on cross-sections and modelled in three-dimensions using a 0.5 g/t Au cut-off grade for open pits and a 2.0 g/t Au cut-off grade for mineralisation that is planned to be mined using underground methods.

Drilling and Sampling Techniques

Reverse circulation (RC) and diamond core drilling was used to collect samples at all of the Nullagine deposits. Drill holes used in the resource estimate are located on nominal spacings between 20m by 20m and 10m by 10m, with wider spacings at the deposit peripheries or below the depths of the planned open pits.

All sampling was conducted on site by Millennium Minerals using sampling protocols which include the regular insertion and monitoring of Certified Reference Materials, blanks and duplicate samples. Sample recovery is generally close to 100% and no bias between sample weight and grade has been observed.

All samples used in the resource estimates were analysed by ALS and Bureau Veritas laboratories using a 50g fire assay.

Resource Estimation Method

Ordinary Kriging (OK) was used to estimate gold mineralisation for all deposits. The grade estimates were constrained to the geology domains for each deposit. Kriging neighbourhood analysis was completed to aid in the selection of block sizes, number of samples and search strategies for each domain.

The grade estimates were validated visually, statistically and with swath plots.

Resource Classification

Mineral Resources were classified in accordance with the guidelines of the Australian Code for Reporting Exploration Results, Mineral Resources and Ore Reserves. The classifications were completed by the Competent Person and were based on geological and grade continuity confidence criteria, drill spacing and estimation quality parameters.

A detailed summary of the project geology, drilling and sampling data, geology interpretation and resource estimation and classification methods are included in Appendix 1 of this announcement.

Table 3: Nullagine Gold Project – Mineral Resource Statement[1] (31 December 2018)

LOCATION	Measured			Indicated			Inferred			Total		
	Tonnes (M)	Grade	Ounces	Tonnes (M)	Grade	Ounces	Tonnes (M)	Grade	Ounces	Tonnes (M)	Grade	Ounces
GOLDEN EAGLE MINING CENTRE	**3.41**	**1.4**	**151,200**	**4.06**	**1.3**	**163,600**	**3.83**	**1.4**	**174,900**	**11.31**	**1.3**	**489,600**
Golden Eagle	*3.26*	*1.4*	*144,400*	*1.69*	*1.2*	*65,700*	*2.70*	*1.5*	*127,700*	*7.65*	*1.4*	*337,900*
CAMEL CREEK	**0.74**	**1.4**	**34,100**	**1.91**	**1.5**	**93,000**	**1.15**	**1.5**	**53,500**	**3.80**	**1.5**	**180,500**
FIVE MILE	**0.67**	**1.2**	**24,900**	**2.15**	**1.3**	**89900**	**1.68**	**1.2**	**67000**	**4.50**	**1.3**	**181,700**
GOLDEN GATE	**0.13**	**3.2**	**13100**	**0.50**	**3.9**	**62300**	**0.69**	**3.8**	**83,700**	**1.31**	**3.8**	**159,100**
Golden Gate Underground	*0.07*	*3.4*	*7,400*	*0.35*	*4.2*	*47,200*	*0.36*	*4.7*	*54,900*	*0.78*	*4.4*	*109,400*
MIDDLE CREEK	**0.34**	**4.6**	**51,100**	**0.52**	**3.0**	**50,000**	**0.56**	**1.6**	**28,400**	**1.42**	**2.8**	**129,500**
Bartons Underground	*0.34*	*4.6*	*51,100*	*0.35*	*3.8*	*42,100*	*0.06*	*3.2*	*6,200*	*0.75*	*4.1*	*99,400*
TWENTY MILE SANDY	**0.04**	**2.4**	**2700**	**0.05**	**1.8**	**2800**	**0.06**	**0.14**	**2,500**	**0.14**	**1.8**	**8,100**
Sub-total												
Stockpiles	0.37	0.9	10,500							0.37	0.9	10,500
Total Resources	**5.69**	**1.6**	**287,600**	**9.19**	**1.5**	**461,600**	**7.97**	**1.6**	**410,000**	**22.85**	**1.6**	**1,159,100**

Ore Reserve Estimates

The JORC compliant Ore Reserve estimates as at 31 December 2018 is 7.14 million tonnes at 1.64g/t Au for 375,300 ounces.

Material Assumptions Applied in Ore Reserves Estimates

Ore Reserves are based upon 21 stratigraphically domained and ordinary kriged block Mineral Resource models. The Ore Reserves estimates are defined from those Mineral Resources by completing pit optimisations and subsequent pit designs based on geotechnical parameters and practical mining considerations.

The following material assumptions have been applied to the Ore Reserves:

- Gold price of $1800 per ounce
- Current mining and processing operating costs
- Geotechnical recommendations (as per current practice and advised by external consultants)
- For pits expected to be mined prior to commissioning of the sulphide processing facility (April 2019), the current Metallurgical recoveries. For pits that are expected to be mined after this, an improvement of 50% to the recovery of gold currently sent to tails has been applied. For Bartons Underground, current Metallurgical recoveries have been applied. For Golden Gate Underground, an improvement of 50% to the recovery of gold currently sent to tails has been applied

Ore Reserve Classification

All Proved and Probable Ore Reserves are derived from Measured and Indicated Mineral Resources and surveyed stockpiles. The Mineral Resource estimates reported are inclusive of the Ore Reserves. Inferred Mineral Resource are treated as waste in the pit optimisation and therefore not included in the Ore Reserves estimation process.

Measured resources where mining is currently not occurring have been downgraded to Probable Reserves. Measured resources where mining is currently occurring have been converted to Proven Reserves.

Mining Method

Open Pit

The mining method is conventional drill and blast and load and haul with an excavator and large open pit mining equipment. This is considered to be appropriate for the style of mineralisation being exploited and is applied to many similar type operations in Western Australia.

A 10% gradient and 14 m width (including safety windrow) is used in most in-pit ramp designs. At the base of some pits and in the smaller pits, a 14% gradient and 9m ramp has been utilised. The mining costs have been changed to reflect the change in equipment.

Geotechnical and hydrogeological recommendations have been applied during pit optimisation and incorporated in designs with ongoing reviews. Mining dilution and ore loss factors have been applied during pit optimisations and hence are considered in the Ore Reserves estimates.

Underground

The mining method for is the "Homestead Method" a minor refinement to the modified Avoca method ustilised extensively within Western Australia. This is considered to be appropriate for the style of mineralisation being exploited, the geothechnical conditions encountered and expected and is applied to many similar type operations in Western Australia.

A 14% gradient 5.5m wide, 5.5m high decline is used as the primary access with smaller drive sizes utilised for non-truck access locations. Contractor costs have been applied to the physicals to determine the economics of the project.

Geotechnical recommendations have been applied during mine designs with ongoing reviews. Mining dilution and ore loss factors have been applied during the stope design process for reserve generation and hence are considered in the Ore Reserves estimates.

Ore Processing

The existing 1.5 Mtpa nameplate ore processing facility and infrastructure consists principally of a primary crusher, SAG mill, gravity circuit and carbon-in-leach (CIL) tankage and will be utilised for the processing of the Ore Reserves. Metallurgical recovery factors are based on metallurgical tests and ongoing actual plant recovery reconciliation factors. For the Oxide Pit reserves, Recovery factors range from 70% to 95% and vary depending on particular areas in each pit and deposit. These factors have been assumed in the pit optimisation and Ore Reserves estimates. For the Sulphide Pit reserves, an improvement on these recoveries (some of which are less than 50%) has been applied. All recoveries have been applied on a pit by pit basis and dependant on the planned processing regime. Additionally, the Processing Costs have been increased by $4/t to reflect the minor additional costs of Sulphide Expansion Plant.

Cut-off Grade

An economical block cut-off grade is calculated and applied to individual deposits in the block model in estimating the Ore Reserves. The cut-off grade varies between the deposits due to varying haulage costs from pit to ROM (located at the processing plant).

Due to variable recoveries for the Golden Eagle deposit, the recoveries obtained from various metallurgical testing methods have been built into the resource model and used for optimisation. Each Ore block has a separate recovered grade and economic cut-off grade.

Material Modifying Factors

The inputs for the Ore Reserve estimates are consistent with current actual operating practices and experience. The infrastructure required for the mining and processing of the Ore Reserves is in place and operating. Agreements with all key stakeholders are in place and active.

Mining Proposal approvals and Native Vegetation Clearing Permits have been granted for Golden Eagle, Bartons, Shearers, Otways, Little Wonder, All Nations, Roscoe Reward, Junction, Anne de Vidia, Round Hill, Majuba, Hutt and Gambols Hill.

Ore Reserve Estimation were updated for the following deposits based on further infill drilling, changes in the Gold price and improvements in mining.

Au81	Falcon
Crow	G Reef
Harrier	Golden Gate Underground
Bartons Underground	

The following Ore Reserve Estimates remain unchanged:

Crossing	Angela
Round Hill	Bow Bells
Hut	Agate
Hopetoun-Endeavour	All Nations/Junction
Otways	Shearers
Sheaers North / Mundulla	

Table 4 comprises the Ore Reserves for the Project's Mining Centre. Details of the Ore Reserve estimation are documented in the appended JORC compliant "Table 1"

Table 4: Nullagine Gold Project – Ore Reserve Statement[1] (31 December 2018)

MINING CENTRE	Proved			Probable			Total		
	Tonnes	Grade	Ounces	Tonnes	Grade	Ounces	Tonnes	Grade	Ounces
GOLDEN EAGLE MINING CENTRE	963,000	1.11	34,400	2,985,000	1.44	138,300	3,949,000	1.36	172,800
Golden Eagle Open Pit	952,000	1.11	33,900	2,226,000	1.46	104,700	3,178,000	1.36	138,600
CAMEL CREEK	-	-	-	805,000	1.64	42,400	805,000	1.64	42,400
FIVE MILE	-	-	-	845,000	1.32	35,800	845,000	1.32	35,800
GOLDEN GATE	-	-	-	424,000	3.31	45,100	424,000	3.31	45,100
Golden Gate Underground	-	-	-	221,000	3.81	27,100	221,000	3.81	27,100
MIDDLE CREEK	251,000	3.62	29,200	493,000	2.50	39,600	744,000	2.88	68,800
Bartons Underground	251,000	3.62	29,200	425,000	2.65	36,200	676,000	3.01	65,400
TWENTY MILE SANDY	-	-	-	-	-	-	-	-	-
Sub-total	**1,214,000**	**1.63**	**63,600**	**5,553,000**	**1.69**	**301,200**	**6,767,000**	**1.68**	**364,800**
Stockpiles							-	-	-
ROM	239,000	0.85	6,500				239,000	0.85	6,500
MOPS	131,000	0.95	4,000				131,000	0.95	4,000
GIC	-	-	-				-	-	-
Sub-total	**370,000**	**0.88**	**10,500**	**-**		**-**	**370,000**	**0.88**	**10,500**
Total Ore Reserves	1,584,000	**1.46**	74,200	5,553,000	1.69	301,200	7,137,000	1.64	375,300

[1] *Figures in Table 4 may not sum due to rounding.*

ENDS

For further information:

Millennium Minerals Limited:

Peter Cash
Chief Executive Officer
+61 8 9216 9011

For media inquiries:

Kate Bell / Nicholas Read
Read Corporate
+61 8 9388 1474

Competent Persons Statements – Mineral Resources

The information in this Report which relates to Agate, Angela, All Nations, Anne De Vidia, Au81, Au81 West, Bartons Open Pit and Underground, Billjim South, Bow Bells, Buzzard, Condor, Condor North-West, Crossing, Crow, D Reef, Falcon, Gambols Hill, Golden Eagle, Golden Gate (ABC Reef-Harrier, D Reef, Condor, Crow & G Reef), Hopetoun-Endeavour, Hut, Junction, Little Annie, Little Wonder, Majuba, Mundalla, Mustang, Otways, Redbeard, Roscoes Reward, Round Hill, Shearers and Shearers North Mineral Resource estimates accurately reflects information prepared by Competent Persons (as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves).

The Au81, Anne De Vidia , All Nations, Bartons, Billjim South, Buzzard, Golden Eagle, Gambol Hills, Golden Gate, Little Annie, Little Wonder, Junction, Majuba, Mundalla, Mustang, Redbeard, Roscoes Reward, Shearers, Shearers North Mineral Resource Estimates have been compiled and prepared by Mr Graeme Thompson (MAUSIMM) who is a full time employee of Millennium Minerals Limited and is a Competent Person as defined by the Australasian Code for the reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code) 2012 Edition and who consents to the inclusion in this report of the matters based on the information in the form and context in which it appears.

The Agate, Angela, Bow Bells, Crossing, Hopetoun-Endeavour, Hut, Otways, and Round Hill Mineral Resource estimates have been compiled and prepared by Ms Christine Shore (MAusIMM) who was a full-time employee of Millennium Minerals Limited who is a Competent Person as defined by the Australasian Code for the reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code) 2012 Edition and who consents to the inclusion in this report of the matters based on the information in the form and context in which it appears.

The Falcon Mineral Resource estimate have been compiled and prepared by Mr Andrew Paterson, (MAusIMM) of Dampier Consulting who is a Competent Person as defined by the Australasian Code for the reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code) 2012 Edition and who consents to the inclusion in this report of the matters based on the information in the form and context in which it appears.

Competent Persons Statements – Ore Reserves

The information in this Release which relates to the Ore Reserve estimates accurately reflect information prepared by Competent Persons (as defined by the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves).

The information in this public statement that relates to the Ore Reserves at the Nullagine Gold Project covering the All Nations/Junction, Angela, Anne de Vidia, Au81, Condor (including North West), Crow, Falcon, Gambols, Golden Eagle, G Reef, Harrier, Otways, Roscoes Reward, Little Wonder, Shearers and Shearers Nth/Mundulla Open Pits and the Bartons and Golden Gate Underground Reserves are based on information resulting from technical works carried out by Mr Michael Poepjes, who is a member of the Australasian Institute of Mining and Metallurgy. Mr Michael Poepjes who is a full-time employee of Millennium Minerals Limited and has sufficient experience which is relevant to the style of mineralisation and type of deposits under consideration and to the activity which she is undertaking 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". Michael Poepjes consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

The information in this public statement that relates to the Ore Reserves at the Nullagine Gold Project covering the Crossing, Round Hill, Hut, Angela, Agate, Hopetoun-Endeavour and Bow Bells projects is based on information resulting from technical works carried out by Mr Srinivasa Rao Gadi, who was a full-time employee of Millennium Minerals Limited who is a member of the Australasian Institute of Mining and Metallurgy and Competent Person as defined by the Australasian Code for the reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code) 2012 Edition and who consents to the inclusion in this report of the matters based on the information in the form and context in which it appears.

Qualifying Statement

This release may include forward-looking statements. These forward-looking statements are based on Millennium's expectations and beliefs concerning future events. Forward-looking statements are necessarily subject to risks, uncertainties and other factors, many of which are outside the control of Millennium, which could cause actual results to differ materially from such statements. Millennium makes no undertaking to subsequently update or revise the forward-looking statements made in this release, to reflect the circumstances or events after the date of this release.

Appendix 1 – JORC 2012 Edition – Table 1

JORC 2012 Edition - Table 1

Section 1 Sampling Techniques and Data

Criteria	JORC Code Explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (e.g. 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.* • *Include reference to measures taken to ensure sample representatively and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (e.g. '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 (e.g. submarine nodules) may warrant disclosure of detailed information.*	• *No surface samples were used in the estimation of Mineral Resources or Ore Reserves.* • *Reverse circulation drilling and limited diamond core drilling was used to obtain samples, from which approximately 3 kg was dried, crushed, pulverised and subsampled at the laboratory to produce a 50 g charge for fire assay, as per industry standard methods.* • *Recent Reverse circulation (RC) Sampling was carried out under Millennium protocols and QAQC procedures, as per industry best practice (field & lab duplicates, blanks & certified reference standards). 1 m interval RC samples were sub-sampled to nominal 3 kg by a rig-mounted cone splitter under Millennium's supervision.* • *Both NQ2 and HQ3 sized core was drilled. This was drilled from surface and from an underground position. Core sampling was carried out to geological boundaries with a minimum sample intervals of 0.3m. The core was cut in half with half core submitted for analysis. Quarter core was occasionally submitted for Au analysis and the other half retained for metallurgical test work.* • *Where twinned core holes were drilled for metallurgical test work, the core was sampled in predominantly 1m intervals, except in the case of contacts (minimum interval 0.3m).* • *Underground face samples were collected for each geological unit by rock chipping the face over the selected interval. A duplicate of at least one geological interval is completed for each face.*
Drilling techniques	• *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 oriented and if so, by what method, etc).*	• *RC drilling and Diamond (HQ3 and NQ2) drilling was used; Mineral Resources were estimated using predominantly RC drilling samples.* • *All core from 2015 onwards was oriented, using Reflex Act II or Ace-Coretool electronic orientation device (Bottom of hole orientation).*
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *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.*	• *A record of RC sample recovery percentage and moisture content was recorded by field assistants under supervision of the rig geologist. Check weights were done periodically at the rig. Overall sample weight and quality were good to very good (2.0-3.5 kg).* • *ALS (assay lab since mid-2011) also records sample weights on receipt of samples.*

Criteria	JORC Code Explanation	Commentary
		• *The rig geologists closely monitored the RC rig to ensure that all of the sample was collected in the calico bag prior to removal from the cyclone splitter, and action was taken if sample weights showed marked variation.* • *Core recoveries from diamond drilling were generally >98%.* • *There is no observed correlation between sample recovery and gold grade.*
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.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• *The logging has been validated and is regarded as being comprehensive and of good quality.* • *Geological logging is both qualitative and quantitative in nature. Whilst drilling the lithology, colour, grain size, regolith, alteration, weathering, veining and mineralisation were recorded. Sulphide and vein content were logged as a percentage of the interval. Photography has been taken of the diamond drill core.* • *RC chip trays are retained at site.*
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *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.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *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.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• *For core samples, the core was cut using a core saw with half core submitted for analysis. For metallurgical holes ¼ core samples assayed; ¼ core was retained onsite, and ½ core was used for metallurgical testing.* • *The RC samples were split using a rig mounted, levelled cone splitter. The vast majority of the samples were dry with moist and wet samples recorded on the sampling sheet.* • *The entire underground face sample was crushed and milled in the on site laboratory prior to geochemical analysis.* • *The sample preparation followed industry best practice in sample preparation involving oven drying, crushing (core) and pulverisation of the entire subsample with LM5 milling to a grind size of 85% passing 75 micron.* • *The sample sizes are industry-standard and considered to be appropriate to correctly represent mineralisation at the deposits based on: the style of mineralisation, the thickness and consistency of the intersections, the sampling methodology and assay ranges for gold.*
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.* • *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.*	• *The industry best practice standard assay method of 50g charge Fire Assay for this style of mineralisation was employed.* • *Commercially prepared, predominantly matrix-matched blanks, low, medium & high value certified reference QAQC standard, blanks, assay laboratory and field duplicate samples were inserted at a rate of 1:20 into the sample stream* • *The QAQC results from this protocol were considered to be acceptable.* • *No geophysical tools were used to determine any element concentrations used for these results.*

Criteria	JORC Code Explanation	Commentary
	• *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.*	• *Sample preparation checks for fineness were carried out by the laboratory as part of their internal procedures to ensure the grind size of 85% passing 75 micron was attained. Laboratory QAQC involves the use of internal lab standards using certified reference material, blanks, splits and replicates as part of the in house procedures.* • *Results highlight that sample assay values are accurate, and that contamination has been contained.*
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• *Metallurgical holes were drilled and assayed at most of deposits; these were twinned to RC holes to provide confirmation of the grade within sampled intervals and geological relationships.* • *Senior exploration personnel from Millennium have visually verified the significant intersections using material collected in the RC chip trays.* • *All significant intersection calculations were cross checked by the Exploration Manager.* • *Assay results were not adjusted.*
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.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• *Immediately post hole completion, a handheld GPS coordinate was taken, then subsequently the collars surveyed with a real Time Kinematic (RTK) DGPS device to a ±10mm positional precision. All collars were then validated against planned positions as a cross check. Surveyed collar co-ordinates were uploaded into the Company SQL database.* • *Grid datum is GDA94 51K (East Pilbara).* • *Downhole surveys were completed on all holes at 30m maximum downhole intervals (initial survey at 10m downhole). Surveys were magnetic via electronic multi-shot survey tool (Camprodual, Camteq or Devishot), as lithologies have negligible magnetic susceptibility (greywacke). Re-surveying was carried out to check the quality of measurements. Selective gyroscopic surveys were undertaken on the deeper holes to confirm the trajectory. Where taken the gyroscopic surveys were used in preference to the electronic multi-shot surveys.* • *Aerial Photogrammetry± LIDAR was produced by Fugro Surveys (±0.2m vertical & ±0.1m horizontal). Survey control points were marked out by licensed surveyor for the Fugro Survey. An error was noted in early RC drilling collar RL co-ordinates (ellipsoid not geoid model); these holes were adjusted to the Fugro DTM surface RL and recorded as DTM RL in the SQL database; the original survey RL was retained. The DTM RL was used for Mineral Resource estimation. Otherwise there was good agreement of surveyed collars and Fugro DTM.*

Criteria	JORC Code Explanation	Commentary
Data spacing and distribution	• *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 classifications applied.* • *Whether sample compositing has been applied.*	• *RC drilling is predominantly on 20m by 20m to 10m by 10m spacing in all the deposits both along strike and down dip; this increases to 30-40m spacing at depth (generally below current pit designs) or along deposit margins. Thus far the 20m by 20m spacing has been sufficient to establish geological and grade continuity* • *1m RC assay composites were used. A small number of core composites were retained with a length of less than 1m (minimum 0.3m).*
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.* • *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.*	• *Geological mapping and structural measurements have been taken at the deposits, open pits and underground workings and have confirmed the orientation of mineralisation defined by the drilling. Based upon the above information the drilling was largely perpendicular to the mineralisation with some exceptions. This was due to steep and inaccessible terrain that meant holes needed to be drilled slightly oblique to the mineralisation to intersect the desired target.* • *No significant orientation bias has been identified in the data at this point.*
Sample security	• *The measures taken to ensure sample security.*	• *Samples were given an ID, cross checked by field personnel that the interval assigned was matched, packed and delivered to the laboratory.* • *The onsite laboratory dispatched the samples with a consignment note by courier to the Perth laboratory facilities.* • *Monitoring of sample dispatch is undertaken for samples sent from site and to confirm that samples have arrived in their entirety and intact at their destination.* • *Sample security is managed with dispatch dates noted for each sample on the sample dispatch form that is also stored in the Company's SQL database. This is checked and confirmed at the laboratory on receipt of samples and discrepancies are corrected via telephone link up with laboratory and Supervising Geologists.*
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• *Internal lab audits conducted by Millennium have shown no material issues.* • *Sampling and data protocols have been previously externally audited by CSA Global with no matters identified that were serious or were likely to impair the validity of the Mineral Resource estimate.*

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 security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• *All the deposits and prospects lie within fully granted Mining Leases within the Pilbara Gold Field (46), as detailed below. All the tenements are in good standing with no known impediments.* • *Agate^+ - M46/265 (100% Millennium)* • *All Nations* –M46/98+, M46/199+, M46/225+ & M46/442@ (100% Millennium);* • *Anne de Vidia^+- M46/262 (100% Millennium);* • *Angela^+ - M46/186 (100% Millennium);* • *Au81^ –M46/138# (100% Millennium);* • *Au81 West^ –M46/443+ & M46/138# (100% Millennium);* • *Bartons* –M46/3, M46/164 & M46/441 (100% Millennium);* • *Bow Bells* @ - M46/166 (100% Millennium);* • *Condor* -M46/129 & M46/200 (100% Millennium);* • *Condor North-West* - M46/200 (100% Millennium);* • *Crossing^*+ - M46/266 (100% Millennium);* • *Crow* - M46/129 (100% Millennium);* • *Falcon* - M46/200 (100% Millennium);* • *Gambols Hill*+ - M46/261 (100% Millennium);* • *G Reef* - M46/47 (100% Millennium);* • *Golden Gate ABC & D* – M46/47 & M46/129 (100% Millennium);* • *Golden Eagle^+ - M46/186 & M46/300 (100% Millennium);* • *Harrier* - M46/47(100% Millennium);* • *Hopetoun – Endeavour*@ - M46/57 & M46/442 (100% Millennium);* • *Hut^+ - M46/265 & M46/266 (100% Millennium);* • *Junction*@ - M46/442 (100% Millennium);* • *Little Annie*^+ - M46/265 & M46/266 (100% Millennium)* • *Little Wonder* –M46/146+, M46/198+ & M46/166@ (100% Millennium);* • *Majuba Hill^+ - M46/192 & M46/445 (100% Millennium);* • *Mundalla* - M46/50 & M46/261+ (100% Millennium);* • *Mustang*@ - M46/166 (100% Millennium);* • *Otways*+ - M46/262 (100% Millennium);* • *Redbeard*+ – M46/433 and M46/434(100% Millennium);* • *Roscoes Reward*@ - M46/166 and M46/442(100% Millennium);* • *Round Hill*@ - M46/166 (100% MML)* • *Shearers*+ - M46/261 & M46/262 (100% Millennium);* • *Shearers North* - M46/50 & M46/262+ (100% Millennium).*

Criteria	JORC Code Explanation	Commentary
		^ *These tenements are located within the Palyku title claim (WC99/16).* **These tenements are located within the Njamal title claim (WC99/8).* *+ A $10/oz royalty payable to Tyson Resources Pty Ltd.* *@ Little Wonder (M46/166), Round Hill (M46/166), Junction (M46/442) and Roscoes Reward (M46/166 and M46/442) gross revenue royalty of 6.44% payable to Royalty Stream Investments (WA Gold) Pty Ltd for up to 20koz then it reverts to 1.5% rate for gold mined beyond 20koz ;* *# $2.5% on applicable Gold Sales payable to Wakeford Holding Pty Ltd.*
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• *Exploration by other parties has been reviewed and taken into account when exploring. Previous parties conducted rock chip sampling, RAB & RC drilling and mapping. Millennium has redrilled selected areas of historical drilling by other parties with more recent holes to confirm accuracy and quality. Where there was low confidence in the remaining areas these holes were excluded from Mineral Resource estimates (Au81 deposit).*
Geology	• *Deposit type, geological setting and style of mineralisation.*	• *The Nullagine Project deposits are structurally controlled, sediment hosted, lode Au style of deposit. They are all situated in the Mosquito Creek Basin that consists predominantly of Archean aged, turbidite sequences of sandstones, siltstones, shale and conglomerate units.*

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:*
	  ○ *easting and northing of the drill hole collar*
	  ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar*
	  ○ *dip and azimuth of the hole*
	  ○ *down hole length and interception depth*
	  ○ *hole length.*
	• *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.*
		• *No exploration results have been reported in this release.*
		• *Where this table relates to Mineral Resource, Ore Reserve of other disclosures, this section is not material. Notes relating to the drill hole information relevant to the Mineral Resource estimate are noted in Section 1 - Sampling Techniques and Data. Notes relating to the geology and interpretation are noted in Section 3 - Estimating and Reporting of Mineral Resources.*

Criteria	JORC Code Explanation	Commentary
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.* • *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.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• *No exploration results have been reported in this release.*
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	• *No exploration results have been reported in this release, and thus, this section is not material to this report on Mineral Resources and Ore Reserves.*
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.*	• *No exploration results have been reported in this release.*
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 exploration results have been reported in this release.*
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.*	• *No exploration results have been reported in this release.*

Criteria	JORC Code Explanation	Commentary
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions 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.*	• *No exploration results have been reported in this release, and thus, this section is not material to this report on Mineral Resources and Ore Reserves.*

Section 3 Estimation and Reporting of Mineral Resources

(Criteria listed in section 1, and where relevant in section 2, also apply to this section.)

Criteria	JORC Code Explanation	Commentary
Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.* • *Data validation procedures used.*	• *Data used for estimation is stored within an SQL database and is managed using DataShed Software* • *Logging is performed on LogChief software and synchronised to the database. Logging software and validation procedure has built in rules that cover downhole surveys, samples and geology. These rules and checks include the following;* ○ *Drillhole collar must have a surveyed Real Time Kinematic (RTK) DGPS collar pickup* ○ *Drillhole must have a downhole survey* ○ *Downhole dip must be negative for open pit drill data* ○ *Downhole depth, survey method, date surveyed, survey company and instrument must be recorded* ○ *Drillhole must have downhole samples.* ○ *Downhole sample intervals must be complete to collar max depth.* ○ *Sample_Type, Sample Method, Sample Condition and Sample Category must be recorded properly* ○ *SampleID must have a prefix followed by 7 numbers e.g. GC1429040* ○ *Drillhole should have downhole field duplicates.* ○ *Sample_Type, Sample Method, Sample Condition and Sample Category are recorded properly (refer library tables).* ○ *SampleID must have a prefix followed by 7 numbers e.g. GC1429041* ○ *Downhole field duplicate QC samples at SampleID's xxxxxxx41 and xxxxxxx81.* ○ *Drillhole should have downhole standards.* ○ *Sample_Type, Sample Method, Sample Condition and Sample Category is recorded properly* ○ *SampleID must have a prefix followed by 7 numbers e.g. GC1429000* ○ *Downhole standard QC samples at SampleID's xxxxxxx00, xxxxxxx20 and xxxxxxx60.* ○ *Drillhole must have downhole lithology.* ○ *Downhole lithology intervals must be complete to collar max depth.* • *Every interval must be recorded. If a cavity is encountered then record interval as cavity.* • *The responsible geologist must check the data to ensure it represents the data collected from the drill hole. Software and validation procedures are set up to enable the process.* • *Quality Assurance and Quality Control data is vetted prior to uploading of the assay data* • *Assays are loaded directly from digital laboratory files* • *Only the database administrator and exploration manager have privileges to change the database* • *Holes for mineral resources are checked visually and suspect information are sent to the Database Administrator to correct if necessary*

Criteria	JORC Code Explanation	Commentary
		Bartons Underground: • *Geological metadata is centrally stored in a SQL database managed using DataShed Software. Millennium Minerals Ltd ("MOY") employ a Database Manager responsible for the integrity of data imported and modified within the system.* • *Logging and sampling data is collected on LogChief software and synchronised digitally to the database by the database manager.* • *Collars of completed drill holes were surveyed with a Real Time Kinematic (RTK) DGPS device. All collars were validated against planned positions. Surveyed collar co-ordinates are uploaded into the SQL database using LogChief software. Grid datum used is GDA94 51K (East Pilbara).* • *Downhole surveys were taken using a single shot camera or electronic multi-shot or gyroscopic survey tool. Survey measurements are entered into the LogChief software and digitally synchronised to the SQL database.* • *Assay data is received from the laboratory in digital format. Quality Assurance and Quality Control (QAQC) data is vetted once uploaded to the database.* • *Drill holes, once uploaded, are checked visually within Micromine or Surpac software packages by MOY Geologists.* • *MOY conducts regular database audits on collar, survey, and assay metadata.* • *Andrew Dunn, Exploration Manager and full-time employee of MOY, is the Competent Person responsible for the veracity of drill hole data underpinning the Bartons Underground Mineral Resources.* • *The Mineral Resource incorporates drilling results available up to, and including, 21st January 2019.* *Golden Gate:* • *Geological metadata is centrally stored in a SQL database and is managed using DataShed Software. Millennium Minerals Ltd ("MOY") employ a database manager who is responsible for the integrity of data imported and modified within the system.* • *Logging and sampling data is collected on LogChief software and synchronised digitally to the database by the database manager.* • *Collars of completed drill holes were surveyed with a Real Time Kinematic (RTK) DGPS device. All collars were validated against planned positions. Surveyed collar co-ordinates are uploaded into the SQL database using LogChief software. Grid datum used is GDA94 51K (East Pilbara).* • *Downhole surveys were taken using a single shot camera or electronic multi-shot survey tool. Survey measurements are entered into the LogChief software and digitally synchronised to the SQL database.* • *Assay data is received from the laboratory in digital format. QAQC data is vetted prior to uploading.* • *Drill holes, once uploaded, are checked visually within Surpac software by MOY Geologists.*

Criteria	JORC Code Explanation	Commentary
		• *MOY conducts regular database audits on collar, survey, and assay metadata.* • *Andrew Dunn, Exploration Manager and full-time employee of Millennium Minerals Ltd is the Competent Person responsible for the veracity of drill hole data underpinning the Golden Gate Underground Mineral Resources.* • *The Mineral Resource incorporates drilling results available up to, and including, 17th January 2019.*
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• *For all resources carried out by Millennium Minerals Ltd, the Competent Person has carried out a site visit. This has allowed the competent person to gain insight into the geology and exploration and mining practices carried out at Nullagine Gold Operations.* • *For all resources carried out by Dampier Consulting, the Competent Person has not carried out a site visit due to the amount of historic data from completed open cut mining.*
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	• *Detailed outcrop and structural mapping have been completed for most of the deposits. Outcrop at the Project deposits ranges from excellent (100% outcrop) to very good. Geological interpretations are based on the mapping and structural measurements, sectional interpretations based on RC and core holes geology.* • *Confidence in the geological interpretation of all resources is high due to the geological knowledge obtained due to either the advanced mining of the pit or infill drilling at either a grade control stage (10 x 10m grid) or resource drilling stage (20 x 20m grid). The geological confidence of the underground resources is also high due to data collected in the open pit mining process and detailed logging of diamond and RC holes. The underground drilling density varies from 10 m x 10 m directly underneath the pit to 20 m x 20 m and up to 40 m x 40 m in the lower levels of the mineralisation.* • *The interpretation for open pit material was based on a 0.5 Au ppm cut-off grade. The reasoning behind this cut off is that it is very close to the economic cut off of the open pits. A 2 ppm Au cut off was used for underground resources. This was also based upon economic factors.* • *Alternate interpretations for open pit would consist of using a lower Au cut-off which would expand the width of the mineralisation having the effect of increasing tonnes and lowering grade of the deposit. A 30% error in mining reconciliation from previous resources which used this interpretation suggests that this model is incorrect.* • *The influence of structure on the geological interpretation is well understood, with a structural model being incorporated within the interpretation process. Weathering surfaces were interpreted from drill logging and extended laterally beyond the limits of the Mineral Resource model.*

Criteria	JORC Code Explanation	Commentary

		Bartons Underground:
		• *Lithology and structure were considered the predominant controls on mineralisation. Geological and structural modelling of the mineralisation controls within a regional framework was underway for Bartons at the time of the Mineral Resource Estimate (MRE). MOY relied on database derived geological and assay data, input from MOY geologists familiar with Bartons geology, historical mineralisation wireframes and mining voids to evaluate geological, structural and mineralisation continuity.*
		• *Factors which limited the confidence of geological interpretation included poor consistency of logged lithological data due to the subjective nature of logging the sandstone/siltstone interbedded host lithology, and an absence of a structural model and understanding of preferential structural orientations for high grade mineralisation shoots.*
		• *Factors which aided the confidence of geological interpretation included; strong strike and dip continuity of structural 'corridors' apparent in surface mapping, pit observations; close spaced resource definition drilling (20 m x 20 m), grade control drilling (10 m x 10 m) and historical stoping voids. Note historical stope voids were compiled by MOY geologists from historical documentation and paper records.*
		• *Mineralisation interpretations were informed by reverse circulation (RC) drill holes, diamond drill (inclusive of diamond tails) holes, underground face samples and mapping, pit mapping/observations and historical underground cross-cut mapping.*
		• *Interpretation of mineralisation domain volumes was based on a combination of geological logging (quartz percentage, alteration halo) and a nominal minimum cut-off grade (2 g/t Au). Two mineralised domains (Main Footwall and Main Hangingwall) were defined within the Bartons Main Lode, with two further domains representing East Lode and a minor footwall splay of East Lode. A Halo domain encompassing the extents of the Main Footwall and Hangingwall domain was based on a combination of geological logging and a nominal minimum cut-off grade of 0.5 g/t Au.*
		• *For instances where the intercept was supported by geological indicators of structural intersection (quartz percentage, alteration halo), although mineralisation values fell below the nominal cut-off, the intercept was included within the domain due to the commodity and style of deposit.*
		• *Assumptions with respect to mineralisation continuity (strike and dip) and shoot orientation within the underground Mineral Resource were drawn directly from:*
		  ○ *historical underground mining documentation*
		  ○ *historical stope spatial locations, preferential orientations, and widths*
		  ○ *drive continuity*
		  ○ *underground cross-cut mapping*
		• *These assumptions were then tested with geostatistical analysis, using close spaced drill hole data at depth (10 m x 10 m), prior to being applied within the MRE where drill spacing was nominally 20 m x 20 m, and up to 60 m x 60 m.*

Criteria	JORC Code Explanation	Commentary

		• *Alternate interpretations would consider alternate preferential orientations of the high-grade shoots within the Main Lode Footwall, Main Lode Hangingwall and East Lode.*
		• *Weathering surfaces were interpreted by MOY geologists from drill logging and extended laterally beyond the limits of the Mineral Resource model. The Bartons underground Mineral Resource lies nominally 20 m below the 'top of fresh' interpreted surface and therefore the weathering profile was not taken into consideration during interpretation or subsequent Mineral Resource estimation approaches.*
		
		Golden Gate:
		• *Lithology and structure were considered the predominant controls on mineralisation. Geological and structural modelling of the mineralisation controls within a regional framework was underway for Golden Gate at the time of the MRE however not available to guide and assist the interpretation for this MRE. MOY relied on database derived geological and assay data, input from geologists familiar with Golden Gate geology, historical mineralisation wireframes and mining voids to evaluate geological, structural and mineralisation continuity.*
		• *Factors which limited the confidence of geological interpretation included limited diamond drilling for volume/structural identification and delineation; poor consistency of logged lithological data due to the subjective nature of logging the sandstone/siltstone interbedded host lithology, and an absence of a structural model and understanding of preferential structural orientations for high grade mineralisation shoots.*
		• *Factors which aided the confidence of geological interpretation included; strong strike and dip continuity of structural 'corridors' apparent in surface mapping, pit observations; close spaced resource definition drilling (20 m x 20 m), grade control drilling (10 m x 10 m) obtained during mining and/or infill drilling within the pit extents.*
		• *MOY considers confidence is high in the geological interpretation and continuity of the structures within the MRE.*
		• *Mineralisation interpretations for ABC Reef, D Reef, Harrier Condor, Crow and G Reef were informed by RC drill holes and diamond (DD) drill holes.*
		• *Interpretation of all mineralisation domain volumes was based on a combination of geological logging (quartz percentage) and a nominal minimum cut-off grade of;*
		  ○ *2.0 g/t Au for ABC Reef, D Reef and Harrier,*
		  ○ *2.0 g/t Au for Crow and G Reef.*
		• *For instances where the intercept gold value fell below the nominal cut-off, however was supported by geological indicators, the intercept was included to maintain domain homogeneity and represent the structural continuity evident in surface mapping and pit observations.*
		• *Using the above approach, a total of 22 mineralised domains were delineated, comprising of the following;*
		  ○ *ABC Reef. One main structural lode and three sub-parallel footwall minor lodes,*

Criteria	JORC Code Explanation	Commentary
		○ *D Reef Lode. One main structural lode and one sub-parallel footwall minor lode,* ○ *Harrier. One lode along strike from the ABC Reef mineralisation.* ○ *Crow. One main lode along strike from the ABC Reef and two minor sub-parallel lodes spatially distant from Crow (80 m),* ○ *G-Reef. Five sub-parallel lodes with limited strike and dip continuity.* ○ *Condor and Condor North-West, consists of 23 subparallel lodes* • *Alternate interpretations would consider variable preferential orientations of the high-grade shoots within all mineralisation domains* • *Weathering surfaces were interpreted by MOY from drill hole logging and were extended laterally beyond the limits of the MRE. Description of weathering profile nomenclature, as utilised for the MRE is outlined below:* ○ *Oxide. Complete oxidation of sulphides, defined by database logging codes in 'Regolith' and 'Weathering' database tables.* ○ *Transitional. Partial oxidation of sulphides, defined by transitional logging codes in 'Regolith' and 'Weathering' database tables.* • *Fresh. No oxidation of sulphides, defined by logged unweathered Bedrock or fresh in 'Regolith' and 'Weathering' database tables.*
Dimensions	• *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.*	• *Agate – Several stacked lodes striking over 300 metres trend North-north-east. Lodes dip to the north-west and are modelled 100 metres below the surface.* • *All Nations -The deposit has an overall north-south trend and has been drilled over some 750m of strike length. The northern ~130m of the deposit comprises a southerly plunging open antiformal lode feature that appears to be separated from the main lode to the south by a regional fault. The main lode is a north-south trending, steeply west dipping feature with a plan width of 20 metres, and a strike length in excess of ~600m. A secondary mineralised trend is observed in the centre and the south of the deposit, and is represented by two distinct moderately shallow, south to SSE dipping mineralised structures. These secondary mineralised structures have a plan width up to 8-10m wide and have been drill tested over an ~130m strike extent. Drilling at All Nations has tested mineralisation to a maximum depth of 140m below the surface* • *Angela – Several stacked lodes with an overall North-East trend strike over a distance of 350 metres and dip around 65 degrees to the north. Mineralisation extends to a depth of 100 metres below the surface.* • *Anne de Vidia – Two multiple zones of mineralisation strike east-north-east and dip steeply to the north-north-west and north-north-east and occur over a strike length of approximately 545 metres. The deposit has been tested to a depth of approximately 100 metres* • *Au81 -Mineralisation strikes north-south, dips 70 to 80 degrees to the west and extends for 240m with an average plan thickness of eight metres. There are multiple low grade, north-north-east striking, steeply west dipping lenses that have been defined over 400m with an average thickness of three metres. The mineralisation has been well defined to 40m below the surface and sparsely to 100m.*

Criteria	JORC Code Explanation	Commentary
		• *Au81 West - The deposit consists of a main lode that has a strike length of over 800 metres and dips at about 60 degrees west and strikes at around 015 degrees. The true thickness of the main lode varies in thickness from 2 to 5 metres. The mineralisation is still open to the north and at depth. There are sporadic high grades that may be associated with cross cutting structures. There are multiple lenses of mineralisation in the southern and northern areas.* • *Bartons –the deposit comprises a series of sub-parallel stacked lodes trending north-north-east and dipping steeply to the north-east. The main lode is mineralised over a strike length of 1300m; the mineralisation plan widths are 2 m to 15m respectively. Mineralisation has been defined to 360m below the surface. The deposit remains open at depth.* • *Bow Bells – Initially included within the Round Hill interpretation, this has now been separated. Two different trends of mineralisation containing multiple lodes trend almost east-west and north-west. This covers a strike of 350 metres and continue to a depth of 85 metres below the surface.* • *Crossing –Multiple stacked lodes with a bearing of ~010 dipping 75 degrees to the west are present and appear to be correlated with sub-cropping quartz veins. The deposit has a strike length over 350m and is drilled to a depth of 100 metres.* • *Falcon -The deposit is comprised of four lodes trending north-east and are sub-vertical to very steeply south-east dipping. Mineralisation has a length of 260m and a nominal plan width of three metres. This deposit has been defined to 75 metres below the surface. The resource remains open along strike to the south-west.* • *Gambols Hill – Multiple stacked lodes trend over a distance of 860 metres in a north-east direction steeply dipping to the west. The deposit has been drilled to a depth of approximately 100 metres.* • *Golden Eagle -The main lode trends north-east, dips moderately to the north-west with a strike length of 1,900m and plan thickness 18m. The hanging wall lodes strike east-north-east, dip moderately to shallowly to the north with a plan width of five metres and vary in extent from 40m to 240m. Footwall lodes extend over similar strike lengths to the hanging wall lodes but trend slightly more northerly than the main lode. The mineralisation has been defined to a depth of 230m below the surface.* • *Hopetoun-Endeavour – is a broadly NE-striking, +2.25km mineralised fault/shear corridor. It is a steeply SE-dipping mineralised shear that outcrops in the order of 3-5 metres in thickness.* • *Hut – Nine parallel, north-east trending and moderately dipping lodes over a strike length of 200m, with mineralisation tested to a depth of 100m.* • *Junction -Mineralisation is comprised of several lodes that form continuous mineralisation over a strike length of 180m. The lodes trend east-south-east and dip steeply to the south, it has been drill tested to 80m below the surface. Mineralisation remains open to the west-north-west.* • *Little Wonder -The main mineralised trend is arcuate ranging from east-west in the west, to east-south-east at the east. The mineralisation dips steeply to the south and varies in plan width from four to twelve metres. Mineralisation has been tested to a depth of 100m below the surface.* • *Majuba Hill - Eight parallel, north-east trending and westerly steeply dipping lodes over a strike length of 500m, with mineralisation tested to a depth of 60m.*

Criteria	JORC Code Explanation	Commentary
		• *Mundulla – contains a north south, north-west and north-east trending zone. These individual zones have a strike length of around 300 metres. Mineralisation extends to a depth of around 110 metres.* • *Mustang – A north east trending lode with ancillary lodes. Having a plan width of around 5 metres, the deposit dips to the south. Mineralisation extends to depth of 55 metres.* • *Otways -The main lode at Otways trends east-north-east and dips steeply to the south, over a strike length of 950m. Drilling has defined mineralisation down to a depth of 100m below the surface. The mineralisation has a nominal plan width of 20m and it remains open along strike to the east-north-east.* • *Red Beard - The primary mineralisation is associated with an east-west trending, steeply south dipping, 2-5m sericite and goethite altered shear zone with 1-4m wide mineralised quartz veins within it. The outcropping quartz veins are mineralised and this continues to a current vertical interpreted depth of 80m. The lodes vary from near vertical to a dip of -75° and strike due west-east over a strike extent of 2km. The main continuous lode (Domain 1) strikes over a length of 490m. Minor lodes interpreted from single drill line intersections, show thin stacked, parallel lodes on each section* • *Roscoes Reward -The deposit has a north-west trending, steeply south-west dipping geometry that is discontinuously mineralised over a strike length of 850m and trends to east-striking lodes at either end. Mineralisation has a nominal plan width of eight metres and has been tested to a depth of 95 metres below the surface.* • *Round Hill -there are two main orientations to the lodes. The first is a north-west trending, steeply south-west dipping vein system that is defined over 120m of strike and the second is comprised of three east-west en echelon veins that are continuous for 40m of strike. The mineralisation has been tested to 75m below surface* • *Shearers -The deposit trends north-south, dips steeply to the west and extends over a strike length of 750m with an average plan width of 12m, to a depth of 110m below the surface.* • *Shearers North - Three main lodes of mineralisation have been interpreted at the Shearers North deposit, striking NE at approximately 32° over a strike length of 600m. The lodes dip steeply at 78° to the NNW. Minor lodes have been interpreted parallel to the main lodes with similar dips. The mineral resource extends to a depth of 86 metres.* *Bartons Underground:* • *Bartons Main Lode – comprises two sub-parallel stacked lodes trending north-east and dipping steeply to the south-east.* • *The main lode is mineralised over a strike length of 1,000 m; the mineralisation plan widths are highly variable, typically ranging from 0.1 m to 4.5 m.* • *Bartons East Lode – comprises two domains, a major lode trending east-north-east and dipping steeply to the south-east combined with a minor splay in the footwall of East Lode.*

Criteria	JORC Code Explanation	Commentary
		• *The East Lode is mineralised over a strike length of 300 m; the mineralisation plan widths are highly variable, typically ranging from 0.1 to 3.5 m.* • *Bartons Main Lode Halo – comprises a single enveloping alteration halo surrounding the Bartons Main Lode. The halo is mineralised over a strike length of 1,000 m; with mineralisation plan widths being highly variable, typically ranging from 0.5 m to 12 m.* • *Depth from surface to the current vertical limit of the Mineral Resource is approximately 220 m.* • *Mineralisation within the model which did not satisfy the criteria for Mineral Resource remained unclassified.* *Golden Gate:* • *ABC Reef. Comprised one main, and three minor, narrow sub-parallel footwall mineralised lodes, trending north-west and dipping steeply to the north-east. The main lode is mineralised over a strike length of 300 m and 300 m down dip (from surface) with plan widths being highly variable, typically ranging from 0.3 to 5 m.* • *D Reef. Comprising of main and minor, sub-parallel footwall mineralised lodes, trending south-west and dipping steeply to the north-west. The main lode is mineralised over 250 m along strike and 230 m down dip (from surface) with plan widths being highly variable, typically ranging from 0.3 m to 2.5 m.* • *Harrier. One single mineralised lode, trending north-west and dipping steeply to the north-east. Harrier was located along strike and north-west of the ABC mineralisation and extends over 80 m along strike and 65 m down dip (from surface), with plan widths being highly variable, typically ranging from 0.5 to 4 m.* • *Crow. One main and two narrow minor parallel, mineralised lodes, trending north-west and dipping steeply to the north-east. The two minor lodes are located approximately 80 m to the south-west of the Crow main lode. Continuity of the main lode is 170 m along strike and 80 m down dip (from surface) whilst the minor lodes are continuous over 50 m along strike and 60 m down dip. Plan widths are highly variable, typically ranging from 0.4 m to 2.0 m.* • *Condor and Condor North-West. Twelve narrow sub-parallel en-echelon mineralised lodes, trending north-west and dipping steeply to the north-east. Condor includes six mineralised lodes with mineralisation varying from 30 m to 90 m along strike and 50 m to 100 m down dip. Condor North-West is located along strike and north-west of Condor and comprises six mineralised lodes with continuity varying from 20 m to 80 m along strike and 30 m to 90 m down dip. Plan widths are highly variable, typically ranging from 0.6 m to 3.0 m.* • *G Reef. Three narrow sub-parallel mineralised lodes, trending north-north-west and dipping steeply to the south-east. Due to localised structural complexity continuity was limited to 10 m to 35 m along strike and 30 m to 60 m down dip. Plan widths were highly variable, typically ranging from 0.4 m to 2.0 m.* • *Mineralisation within the model which did not satisfy the criteria for Mineral Resource remained unclassified.*

<table>
<tr><th>Criteria</th><th>JORC Code Explanation</th><th>Commentary</th></tr>
<tr><td>Estimation and modelling techniques</td><td>

The nature and appropriateness of the estimation technique(s) 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.
The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.
The assumptions made regarding recovery of by-products.
Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).
In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.
Any assumptions behind modelling of selective mining units.
Any assumptions about correlation between variables.
Description of how the geological interpretation was used to control the resource estimates.
Discussion of basis for using or not using grade cutting or capping.

</td><td>

Ordinary Kriging (OK) was used to estimate 3D blocks for Agate, Anne de Vidia, Angela, All Nations, Au81 West, Bartons, Bow Bells, Crossing, Condor North-West, Gambols Hill, Golden Eagle, Golden Gate, Hopetoun-Endeavour, Hut, Junction, Little Wonder, Majuba, Mundalla, Mustang, Otways, Roscoes Reward, Round Hill, Shearers and Shearers North using Surpac (64 bit version 6.6.1) and Kriging Neighbourhood Analysis to optimise parameters for the Kriging search strategies within Supervisor (version 8.8) by Millennium Minerals Ltd.

Grade estimation was constrained to within the geological model domain wireframes: Lithological, structural and grade interpretation was used as a guide in building mineralised domains.
All samples are 1m composites.
Block models were created for the Millennium Minerals Estimations using the following block sizes: Agate using 5.0mE x 5.0mE x 2.5mRL parents blocks, Angela using 5.0mE x 5.0mE x 2.5mRL parents blocks, All Nations using 3.0mE x 3.0mN x 2.5mRL parent blocks, Anne de Vidia using 5.0mE x 5.0mN x 2.5mRL parent blocks, Bartons using 5.0mE x 10.0mN x 2.5mRL parent blocks, Bow Bells using 5.0mE x 5.0mE x 2.5mRL parents blocks, Billjim South using 5mE x 5mN x 2.5mRL, Buzzard using 5mE x 5mN x 2.5mRL, , Crossing using 4.0mE x 5.0mN x 2.5mRL parent blocks, Gambols Hill using 2.5.0mE x 2.5.0mN x 2.5mRL parent blocks, Golden Gate using 5mE x 5mN x 5mRL, Hut using 5.0mE x 4.0mN x 2.5mRL parent blocks, Junction using 2.0mE x 2.0mN x 2.5mRL parent blocks, Hopetoun-Endeavour using 5.0mE x 5.0mN x 2.5mRL parents blocks, Little Annie using 5mE x 5mN x 2.5mRL, Little Wonder using 5.0mE x 5.0mN x 2.5mRL parent blocks, Majuba using 5.0mE x 5.0mE x 2.5mRL parents blocks, Mundalla using 5.0mE x 5.0mE x 2.5mRL parents blocks, Mustang using 5.0mE x 5.0mE x 2.5mRL parents blocks, Otways using 3.0mE x 3.0mN x 2.5mRL parent blocks, Roscoes Reward using 5.0mE x 5.0mN x 2.5mRL parent blocks, Round Hill using 4.0mE x 4.0mN x 2.5mRL parent blocks and Shearers using 5.0mE x 5.0mN x 2.5mRL parent blocks . The models were then sub-celled as appropriate to honour wireframe lodes.
For all Millennium Minerals Estimations, the following minimum and maximum samples were used to estimate the sample grades into each block for the first search pass:

<table>
<tr><th>Deposit</th><th>Minimum Samples</th><th>Maximum Samples</th></tr>
<tr><td>Agate</td><td>9</td><td>28</td></tr>
<tr><td>All Nations</td><td>12</td><td>31</td></tr>
<tr><td>Anne de Vidia</td><td>10</td><td>31</td></tr>
<tr><td>Angela</td><td>8</td><td>26</td></tr>
<tr><td>Au81</td><td>6</td><td>12</td></tr>
<tr><td>Au81 West</td><td>6</td><td>12</td></tr>
</table>
</td></tr>
</table>

Criteria	JORC Code Explanation	Commentary

- *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*

Bartons	*6*	*14*
Billjim South	*2*	*10*
Buzzard	*2*	*20*
Bow Bells	*9*	*29*
Crossing	*10*	*30*
Gambols Hill	*10*	*31*
Golden Eagle	*6*	*16*
Hopetoun-Endeavour	*9*	*28*
Hut	*10*	*30*
Junction	*12*	*30*
Little Annie	*4*	*20*
Little Wonder	*6*	*14*
Majuba	*4*	*20*
Mundalla	*4*	*27*
Mustang	*4*	*20*
Otways	*14*	*28*
Redbeard	*4*	*20*
Roscoes Reward	*4*	*14*
Round Hill	*11*	*31*
Shearers	*4*	*20*
Shearers North	*4*	*20*

- *Ordinary Kriging (OK) was used to estimate 3D blocks for Falcon using Surpac and Kriging Neighbourhood Analysis to optimise parameters for the Kriging search strategies within Supervisor by* ***Dampier Consulting****.*
  - *Block models were created using a 5.0mE x 5.0mN x 2.5mRL parent blocks and sub-celled down 1.25mE x 1.25mN x 1.25mRL as appropriate to honour wireframe lodes.*
  - *A minimum of 8 samples and a maximum of 24 samples were used to estimate the sample grades into each block for pass 1 and 2. The minimum number of samples was reduced to 4 zones in the third search pass to ensure all blocks found sufficient samples to be estimated.*

Criteria	JORC Code Explanation	Commentary

- *The resources completed by Millennium Minerals, and Dampier Consulting were interpreted and wireframes were generated based on a 10 × 10m and a 20m x 20m exploration, resource and grade control drilling pattern.*
- *All search ellipses were orientated based on the overall geometry of mineralisation of domains.*
- *There is the availability of check estimates, previous estimates and/or mine production records and all Mineral Resource estimate takes appropriate account of such data.*
- *There is no by-product.*
- *No estimation was made for deleterious elements or other non-grade variables.*
- *Top cuts applied are:*

Deposit	*From*	*To*
Agate		*10*
All Nations	*2*	*8.36*
Anne de Vidia	*1.34*	*7.1*
Angela		*10*
Au81	*3*	*10*
Au81 West	*4*	*10*
Bartons UG	*20*	*30*
Bow Bells		*12*
Condor North-West	*5*	*15*
Crossing		*5.7*
Falcon		*20*
Gambols Hill	*1.2*	*6*
Golden Eagle	*2.5*	*14*
Hopetoun-Endeavour	*1.3*	*2.8*
Hut	*5*	*7*
Junction		*15*
Little Annie	*1.5*	*3.5*
Little Wonder	*1.5*	*8*

Criteria	JORC Code Explanation	Commentary

Majuba	*2*	*10.6*
Mundalla	*2.2*	*3.5*
Mustang	*2.2*	*7.4*
Otways		*9.5*
Redbeard	*1*	*14.25*
Roscoes Reward	*2*	*5.88*
Round Hill		*22*
Shearers	*1.2*	*10*
Shearers North	*2*	*6.6*

- *The assumption behind modelling of selective mining units is 2.5m x 2.5m x 2.5mRL.*
- *Only gold was estimated as a single variable.*
- *Statistical and visual assessment of the block model was undertaken to assess the successful application of the various estimation passes, to ensure that as far as the data allowed, all blocks within domains were estimated and the model estimates were considered acceptable.*
- *Validation of the estimate was completed by visual inspection in 3D. Checks included that; all blocks were populated, block grades matched composite grades and there was no leakage of grade into adjacent areas.*

Bartons Underground:

- *Interpretations of domain continuity were initially undertaken within Geovia SurpacTM software, with mineralisation intercepts correlating to individual reefs*
- *Domain interpretations utilised all available drill hole data, excluding rotary air blast assays.*
- *Rotary Air Blast, water bore drill hole and known compromised data (ARC001-004) were excluded from all compositing processes and subsequently the MRE outcomes.*
- *The mineralisation interpretation was used as a hard boundary for volume delineation.*
- *There were no assumptions made about metallurgical recovery that were applied within the MRE estimation or reporting process.*
- *There were no assumptions made with respect to by-products.*
- *No estimation was made for deleterious elements or other non-grade variables.*
- *Considerations relating to appropriate halo interpolation block size include: drill hole data spacing: conceptual mining method SMU analysis: variogram continuity ranges and search neighbourhood optimisations.*
- *Grade interpolation of capped gold was undertaken in 3D space utilising OK at the parent cell size of the 3D block model (10 mN x 5 mEL x 5 mRL).*

Criteria	JORC Code Explanation	Commentary

		• *The halo mineralisation interpretation was used as a hard boundary for volume delineation.*
		• *The 3D block model required substantial sub-celling to provide adequate volume fill and honour wireframe volumes. Sub-celling to 0.625 mE x 0.625 mY x 0.625 mRL was utilised.*
		• *Only diamond and reverse circulation data was utilised during the estimate. Average sample spacing is variable ranging from 10 m x 10 m within 50 m of topographic surface to a nominal 30 m x 30 m in the upper portions of the underground resource and 100 m x 100 m at depth (approximately greater than 220 m).*
		• *Check estimates for Main HW, FW and East Lode were carried out in 3D using Inverse Distance Squared.*
		• *Complete reconciliation data pertaining to production performance of Bartons, over time, was:*
		  ○ *not available for underground, and*
		  ○ *open pit data could not be relied upon as an appropriate comparison for validation purposes.*
		
		Golden Gate:
		
		• *Interpretations of domain continuity were initially undertaken within Geovia Surpac™ software, with mineralisation intercepts correlating to individual reefs manually selected prior to creation of a vein model.*
		• *Domain interpretations utilised all available drill hole data, excluding rotary air blast assays.*
		• *RC and DD drill holes were composited over 1 metre.*
		• *Rotary Air Blast and waterbore drill hole data was excluded from all compositing processes and subsequently the MRE outcomes.*
		• *Considerations relating to appropriate block size included: drill hole data spacing, conceptual mining method SMU analysis, variogram continuity ranges and search neighbourhood optimisations. Thus, 3D block models for interpolation comprised a dual block size approach;*
		  ○ *ABC Reef, D Reef, Harrier, Crow. and G Reef 5 mN x 5mRL x 5 mE with sub-celling, and*
		  ○ *Condor and Condor NW 5 mN x 5 mRL x 5 mE with sub-celling.*
		• *The mineralisation interpretation was used as a hard boundary for volume delineation.*
		• *There were no assumptions made about recovery.*
		• *There were no assumptions made with respect to by-product.*
		• *No estimation was made for deleterious elements or other non-grade variables.*
		• *The 3D block model required substantial sub-celling to provide adequate volume fill and honour wireframe volumes. Sub-celling to 1.25 mE x 1.25 mY x 01.25mRL was utilised.*
		• *Average sample spacing for ABC Reef, D Reef, Harrier, Crow and G Reef was variable ranging from 10 m x 10 m within 75 m of topographic surface, to a nominal 40 m x 40 m in the upper portions of the resource, and 80 m x 80 m at depth (approximately greater than 150 m). At Condor sample spacing was variable ranging from 10 m x 10 m within 40 m of topographic surface, to a nominal 20 m x 20 m at depth. For Condor North-West sample spacing was a nominal 20 m x 20 m.*

Criteria	JORC Code Explanation	Commentary
		• *Complete reconciliation data pertaining to production performance of individual deposits, over time, was not available nor could not be relied upon as an appropriate comparison for validation purposes.*
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• *The tonnages were estimated on a dry basis*
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	• *For the Millennium and Dampier Consulting estimated deposits, a nominal 0.5g/t Au boundary was applied to the mineralisation based on the current open pit mining observations of narrow, high-grade veins.* • *Estimates were quoted at 0.5 g/t Au as the base case cut-off, based on experience at the Company operating gold deposits.* *Bartons Underground:* • *The Mineral Resource cut-off grade for reporting of underground global gold resources at Bartons was 2.0 g/t gold. This was based upon conceptual economic evaluations, and consideration of comparable size deposits of similar mineralisation style and tenor.* *Golden Gate:* • *Mineralisation interpretation was based on a 0.5g/t Au cut-off grade for shallow mineralisation and a 2g/t Au cut-off grade for deeper mineralisation.*
Mining factors or assumptions	• *Assumptions made regarding possible mining methods, 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 Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.*	• *It was assumed that the deposits will be mined mechanically via open pit methods, using 5 m high benches, with the potential for 2.5 m flitches. No dilution or cost factors have been applied to the estimate.* *Bartons Underground:* • *Bartons is being mined via medium to small scale mechanised underground mining methods.* • *No dilution or cost factors have been applied to the estimate.* • *The MRE extends nominally 345 m below surface.* *Golden Gate:* • *It was assumed that the ABC Reef, D Reef, and Harrier deposits would be suitable for eventual economic extraction via medium to small scale mechanised underground mining methods. These assumptions were based on conceptual economic evaluations and extraction methodologies utilised in comparable size deposits of similar mineralisation style and tenor.*

Criteria	JORC Code Explanation	Commentary
		• *ABC Reef, D Reef, and Harrier MRE's extend nominally 70 m to 300 m below surface and were historically mined via open pit methods to an approximate depth of 70 m.* • *It was assumed that the Condor, Crow, and G Reef deposits would be suitable for eventual economic extraction via conventional open pit mining methods. These assumptions were based upon mining methodologies utilised on comparable size deposits in operation at MOY's Nullagine operation.* • *Condor, Crow and G Reef deposits MRE's extend nominally 60 m to 90 m below surface and were historically mined via open pit methods to an approximate depth of 40 m, 30 m and 35 m respectively.* • *Condor North-West has not been historically mined.* • *No dilution or cost factors have been applied to the estimate.*

Metallurgical factors or assumptions	• *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.*	• *Metallurgical test work has been completed at all the deposits; recoveries are considered acceptable.*
		• *Assumptions are based on treatment at Millenniums' operational CIL gold processing facility.*
		  ○ *A Sulphide Expansion project is currently under construction. This project will recover 50% of the tail of the CIL processing facility.*
		  ○ *This project is consists of fine grinding and rapid oxygenation of the tails. This process was outlined in the "Sulphide metallurgical results" ASX announcement on the 1 February 2019 and is available on Millennium's webpage.*
		• *No recovery factors have been applied to the Mineral Resources or Resource Tabulations.*

Environmental factors or assumptions	• *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*	• *Environmental surveys continue across the Nullagine Gold Project, including flora and fauna surveys and surface water assessments required for ongoing approvals to be submitted across a number of new and existing areas including Redbeard, Shearers North, Bow Bells, Agate, Angela, Hopetoun-Endeavour and Crossing resource targets. These assessments will compliment previous survey works and studies already completed across the project to provide regional assessment for the Nullagine Gold Project. Heritage surveys continue across the project with areas targeted for exploration operations to provide security of tenure for ongoing operations and security for the protection of heritage values in the area.* *Bartons Underground:* • *Environmental approvals have been received for Bartons Underground.*

Criteria	JORC Code Explanation	Commentary
	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.	*Golden Gate:* • *Environmental surveys have been completed within the Golden Gate project and expected infrastructure areas, including flora and fauna surveys required for ongoing approvals. These assessments will compliment previous surveys and studies and will lead into the assessment for both Underground and Open Pit mining at Golden Gate. Heritage surveys have been completed over the Golden Gate resource and likely infrastructure areas.*
Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* • *The bulk density of 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.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	• *Specific gravity measurements were taken from drill core and were grouped into oxidation domains defined in the geological model; mean values were used as a dry bulk density factor on this basis.* • *SG's determined using industry standard method of dried/sealed weight of core sample in water versus the dry weight in air. The Anne de Vidia, Majuba, Hut, Otways, Round Hill and Shearers were calculated using the calliper method.* • *Full HQ (80%) and PQ core (20%) measured at a rate of 2-3/m of core; the current dataset consists of over 3,700 measurements; these are classified by both oxidation state and lithology.* • *Blocks were assigned densities using weathering classification (oxide, transition or fresh).* • *For deposits Crossing specific gravity measurements were calculated by helium purge pycnometer of RC chips by ALS Metallurgy.* • *For deposits Agate, Angela, Biljim South, Buzzard, Condor NW, Hopetoun-Endeavour, Mustang and Mundalla, specific gravity measurements were estimated by using the data from the nearest deposit and taking a conservative approach.* *Bartons Underground:* • *Bulk density (1,517 records from 24 drill holes) was determined using the following methods:* • *Diamond drilling – weight in air / weight in water – measurements every 0.2 m in fresh. Approximately 0.1 m core length per sample.* • *Displacement method (DIS) and half core immersion testing was carried out by SGS.* • *Specific gravity measurements were grouped into oxidation and estimation domains defined in the geological model. Mean values were applied as a dry bulk density factor on this basis.* • *The average bulk density for transition of 2.51 t/m3 is consistent with that used in the previous resource model. The average for background fresh rock is 2.76 t/m3. The average for mineralised domains is slightly higher, however the number of measurements is generally low. Over 1000 density measurements have been added to the database since the previous model was completed in August 2017. The fresh rock density applied previously was 2.66 t/m3 which was based on the pre-2017 data that contained a large proportion of whole core determinations.*

Criteria	JORC Code Explanation	Commentary

		The 2017 data provides better coverage across the orebody and a significant number of the measurements were conducted at the laboratory. This accounts for the increase in the average fresh rock density since the previous model. The average of 2.76 t/m3 was applied to all fresh rock including mineralised domains
		• *Blocks were assigned densities using weathering classification (oxide, transition or fresh).*
		
		Golden Gate:
		• *Bulk density (730 records) was determined using the following methods:*
		• *Diamond Drilling – weight in air / weight in water – measurements every 0.2 m in fresh. Approximately 0.1 m core length per sample.*
		• *SG's for two drillholes (GGMET010 and GGMET011) were obtained using the Caliper method whereby;*
		  ○ *0.15 m long core lengths were selected,*
		  ○ *Ends were cut to produce a cylinder,*
		  ○ *Diameter was measured 3 times to give average diameter and measured length of cylinder to calculate a volume,*
		  ○ *Weighed undried and dried in the onsite oven for 24 hours and weighed again. Dry density = dry weight/ volume.*
		• *Displacement method (DIS) testing was carried out by SGS Australia Pty Ltd.*
		• *Specific gravity measurements were grouped by oxidation and lithology domains defined by the geological model. Mean values were applied as a dry bulk density factor on this basis.*
		• *Mean density values for oxide, transitional and fresh were assigned within the block model using weathering domains as hard boundaries.*

Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *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).* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• *Mineral Resources have been classified on the basis of geological and grade continuity confidence, geological domaining, estimation quality parameters, drill spacing and reflect the Competent Person's view on the deposit.* • *The appropriate account has been taken of all relevant factors i.e. relative confidence in tonnage/grade computations, confidence in the continuity of geology and metal values, quantity, quality, and distribution of the data.* • *For the Millennium based resources, the classification process was based on geological confidence, drill spacing, slope of regression (SoR) value and validation versus the declustered mean.* • *The mineral resource is classified as Inferred where there are at least 3-4 holes on separate sections and geological confidence is reasonable. If there is enough data to generate reliable statistics, slope of regression is also considered. The typical drill spacing for inferred is 40 metre line spacing with 20 metre spaced holes. Validation of the inferred resource against the naive and declustered means is also considered.* • *The mineral resource is classified as Indicated where the geological confidence is good and there are a minimum of several holes supporting the interpretation on a minimum of 2 sections.*

Criteria	JORC Code Explanation	Commentary
		The minimum drill spacing is usually 20 metres by 20 metres. Slope of regression and validation against the naïve and declustered means are also considered. The Slope of Regression is usually greater than 0.5 and the resource mean within 10% of the delustered sample mean. • *The mineral resource was classified as measured where the geological confidence is high and there are more than several holes supporting the interpretation on a minimum of 2 sections. The minimum drill spacing is 10 metres by 10 metres. Slope of Regression is greater than 0.5 and the resource mean is within 10% of the declustered sample mean. Resources that fall outside of this criterion are downgraded in classification.* • *For the resources estimated by Dampier Consulting, resource classification was based upon confidence in the geological interpretation, the geostatistical continuity of the gold grade, and the density of informing drillholes.* • *Blocks in areas with high geological confidence, immediately below the pit surface that was informed by samples within a distance less than two-thirds of the range of the variogram, filled in the first-pass estimation, were classified as Measured* • *Blocks in areas of high geological confidence that were informed by samples within the full range of the variogram, filled in the first pass of estimation, were classified as Indicated* • *Blocks in other areas of the mineralisation wire-frame informed by at least three drillholes were classified as Inferred* • *Blocks in areas where there was only a single drillhole supporting the mineralised wire-frame were left unclassified.*
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• *The estimates completed by Millennium were peer reviewed internally by Millennium Minerals geological department.*
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.*	• *The current Mineral Resource models provide robust global estimates of the in situ Au mineralisation in the deposits.* • *No formal confidence intervals have been derived by geostatistical or other means; however, the use of quantitative measures of estimation quality such as the Kriging efficiency and the slope of regression allow the Competent Person to be assured that appropriate levels of precision have been attained within the relevant resource confidence categories* • *With respect to Mineral Resources estimated at the deposits, the geological interpretation for geology, weathering and mineralisation domains are adequate for the estimation of Measured, Indicated and Inferred Mineral Resources.* • *Mining of many of the deposits and project to date reconciliation with the resource estimate provides a further degree of assurance in the estimates results.*

Criteria	JORC Code Explanation	Commentary
	• *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	

Section 4 Estimation and Reporting of Ore Reserves
(Criteria listed in section 1, and where relevant in sections 2 and 3, also apply to this section.)

Criteria	JORC Code Explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	• *Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.* *Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.*	• *Mining depletion was applied to all applicable estimates. Au81, Golden Eagle and Round Hill Open Pits were updated to 31 December 2018, whilst the other Open Pits were depleted to the end of the previous mining campaign. All mining depletions were done utilising dtm models of the final mined pit.* • *Mining depletion was applied to all applicable estimates. Bartons Underground were updated to 31 December 2018. All mining depletions were done utilising dtm models of the final mined pit.* • *A technical description of the Mineral Resource is presented in the preceding sections to this table.* • *The Mineral Resource are reported as wholly inclusive of the Ore Reserves.* • *The following resources were utilised for the Reserve Calculations*

Criteria	JORC Code Explanation	Commentary

Prospect	Resource Model
Agate	agate_bm_ok_dec2016_jorc
All Nations / Junction	an_ju_bm_ok_feb2018
Angela	angela_bm_ok_dec2016
Anne de Vidia	adv_bm_ok_april2018
Au81	au81_bm_ok_jan2019
Au81 Pit 7	au81_bm_ok_jan2019
Bartons UG	bartons_bm_ok_january2019
Condor (including NW)	condor_bm_ok_jan2019
Crossing	crossing_bm_ok_sept_2016
Crow	gldngate_bm_ok_jan2019
Falcon	falcon_bm_ok_july16
G Reef	gldngate_bm_ok_jan2019
Gambols	gambols_bm_ok_nov2017
Golden Eagle	201811_GoldenEagle_OK
Golden Eagle	ge_bm_ok_november2018
Golden Gate UG	gldngate_bm_ok_jan2019
Harrier	gldngate_bm_ok_jan2019
Hopetoun-Endeavour	end_htoun_bm_ok_dec2016
Hut	hut_bm_ok_july2016
Mustang	201701_Mustang_OK_JORC
Otways	got_bm_ok_0pt7cut_sept2016
Roscoes Reward / Little Wonder	rr_lw_bm_ok_dec2018
Round Hill / Bow Bells	roundhill_bm_ok_oct2016
Shearers	shearers_bm_ok_20180309
Shearers North / Mundulla	mund_shnth_bm_201809

Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits* • *If no site visits have been undertaken indicate why this is the case*	• *The Competent Person for this Ore Reserves Statement is a full time employee of Millennium Minerals Ltd and visits the site on a regular basis.* • *The Competent Person for previous releases was a Full Time Employee at the time of the release full time Millennium Minerals employees.*

<table>
<tr><th>Criteria</th><th>JORC Code Explanation</th><th>Commentary</th></tr>
<tr><td>Study status</td><td>• The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.

• The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.</td><td>• The Nullagine Gold Project is currently in production, and such an operational mine plan exists. Thus, where available, actual operational costs, values and parameters have been utilised for Modifying Factors as part of this updated Ore Reserve, else existing Modifying Factors have been applied.
• Actual operating costs and modifying factors have been applied in the pit optimisation and Ore Reserve estimates. End of month survey pickups as on December 2018 have been used to deplete material already mined from in-situ material.
• No Inferred Mineral Resource is included in any of the updated Ore Reserves estimates. Inferred material may be mined as a consequence of mining the Measured and Indicated Mineral Resource material. This material has been considered as waste during the economic evaluation of the pits.
• The All Nations, Angela, Anne de Vidia, Au81, Condor (including North West), Crow, Falcon, Gambols, Golden Eagle, G Reef, Harrier Otways, Roscoes Reward, Little Wonder and Shearers reserves have been determined utilising Whittle to optimise the best possible pit. Conservative slope angles (40^{O}) have been used to represent the additional waste material required for ramp access. Due to the nature of the testwork continuing for the Sulphide Expansion plant, these reserves are only considered to represent Pre-Feasibility level standard.</td></tr>
<tr><td>Cut-off parameters</td><td>• The basis of the cut-off grade(s) or quality parameters applied.</td><td>• Economic cut-off grades are calculated for all the deposits and shown below
<table>
<tr><th>Prospect</th><th>COG Au (g/t)</th><th>Prospect</th><th>COG Au (g/t)</th></tr>
<tr><td>Agate</td><td>>0.56</td><td>Hut</td><td>>0.56</td></tr>
<tr><td>All Nations / Junction</td><td>>0.68</td><td>Mustang</td><td>>0.80</td></tr>
<tr><td>Angela</td><td>>0.55</td><td>Otways</td><td>>0.59</td></tr>
<tr><td>Anne de Vidia</td><td>>0.5</td><td>Redbeard</td><td></td></tr>
<tr><td>Au81 Pit 7</td><td>>0.6</td><td>Roscoes Reward / Little Wonder</td><td>>0.6</td></tr>
<tr><td>Au81</td><td>>0.6</td><td>Round Hill / Bow Bells</td><td>>0.67</td></tr>
<tr><td>Bartons OP</td><td></td><td>Crow</td><td>>0.66</td></tr>
<tr><td>Condor (including NW)</td><td>>0.66</td><td>G Reef</td><td>>0.66</td></tr>
<tr><td>Crossing</td><td>>0.54</td><td>Harrier</td><td>>0.66</td></tr>
<tr><td>Falcon</td><td></td><td>Shearers</td><td>>0.65</td></tr>
<tr><td>Gambols</td><td>>0.6</td><td>Shearers North / Mundulla</td><td>>0.54</td></tr>
<tr><td>Golden Eagle</td><td>>0.50</td><td>Bartons UG</td><td>>2.0</td></tr>
<tr><td>Golden Eagle</td><td>>0.53</td><td>Golden Gate UG</td><td>>2.0</td></tr>
<tr><td>Hopetoun-Endeavour</td><td>>0.65</td><td></td><td></td></tr>
</table>
• Due to varying ore haulage transit costs (deposit-to-mill) and mineralogies (varying mill recoveries), multiple economic cut-offs exist.</td></tr>
</table>

Criteria	JORC Code Explanation	Commentary
Mining factors or assumptions	• *The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design).* • *The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.* • *The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc), grade control and pre-production drilling.* • *The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).* • *The mining dilution factors used.* • *The mining recovery factors used.* • *Any minimum mining widths used.* • *The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.* • *The infrastructure requirements of the selected mining methods.*	• *The method used to convert Mineral Resources to Ore Reserves is based upon pit optimisation to identify the economic shell within with a design process completed to achieve a practical mine design. Agate, Au 81 Pit 7, Crossing, Golden Eagle Pit 1, 3, 4, 5, & 6 Pits, Hopetoun-Endeavour, Hut, Round Hill, Bow Bells, Shearers Nth/Mundulla Pits have practical mine designs. Due to the level of work still underway for the Sulphide Expansion Plant, only optimisations have been carried out for the remaining Pits.* • *Basic Underground Mine Designs have been carried out for Golden Gate. Full underground Mine Designs were completed for the Bartons Underground.* • *As the Nullagine Gold Project is currently in production, any mining factors applied as part of this updated Ore Reserve are based on actual data sourced from the project.* • *The mining method is conventional drill and blast and load and haul with an excavator and large open pit mining equipment. A combination of a 90 tonne rigid truck fleet and 40 tonne articulated fleet are currently being used at the Nullagine Project to mine the varying Ore Reserves.* • *The geotechnical parameters are based on the recommendations from a geotechnical study by independent consultants with 15m to 20m batter heights, 55^0 - 70^0 batter angles and 5m to 10m wide berms. Geotechnical Consultants have an ongoing involvement with the project and recommendations made reflect operational reviews following site visits over the course of the project.* • *Mining loss factor of 5% is applied in the pit optimisation and Ore Reserve estimation process.* • *A mining dilution factor of 10% is applied in the pit optimisation and Ore Reserve estimation process.* • *No Inferred Mineral Resource are included in the Ore Reserves estimation process* • *A 12m mining width is applied on all benches except good-bye cuts to allow for truck access.* • *A 10% to 14% - gradient and 9m to 14m width (including safety windrow) are used for in-pit ramp.* *Bartons & Golden Gate Underground* • *The Ore Reserve is planned to be mined using a bottom-up mechanised longhole stoping method incorporating continuous cemented rock fill (CRF) for stability. Areas without top access have had in-situ pillars left unmined for support. Diesel powered trucks and loaders will be used for materials handling. Diesel-electric jumbo drill rigs will be used for development and ground support installation, and diesel-electric longhole rigs used for production drilling.* • *The mining method chosen is well-known and widely used in the local mining industry, and production rates and costing can be predicted with a suitable degree of accuracy.*

Criteria	JORC Code Explanation	Commentary
		The method has been chosen based on the spatial characteristics of the orebody, geotechnical analysis, and location of the mine. • *The decline for Bartons Underground is well established. The proposed portal position for the Golden Gate Underground will be from the Crow Cut-back which is yet to be mined.* • *Independent geotechnical consultancy Ground Control Engineering Pty Ltd has contributed appropriate geotechnical analyses to a suitable level of detail. These form the basis of mining method selection, mine design, mining factors, and ground support design for the Ore Reserve estimate.* • *Independent geotechnical consultancy MineGeoTech Pty Ltd has provided advice on placement of portals within the Bartons open pit.* • *Stope economics were determined using the cut-off grade revenue and cost inputs. A minimum stoping width of 2.1 m (i.e. half ore drive width) was applied. A sub-level interval of 17 m, and stope section strike length of 5.0 m, were applied for Bartons levels 260, 245, 225, 210 levels. For remaining levels at Bartons and the levels at Golden Gate, the sublevel interval has been increased to 20m, with the stope section strike length increasing to 10.0m.* • *In addition to this rock dilution, an average 5% dilution at waste grade was applied to model overdig of fill.* • *At Bartons, no additional dilution was applied to ore development, based on expectations of application of appropriate drill and blast practices and perimeter control. At Golden Gate, Split firing is expected therefore an additional 10% dilution was applied. Additionally, a modifying factor of 88% was applied for Mining Recovery.* • *A 90% mining recovery was applied to crown stopes designed to break into the pit floor. A 95% mining recovery factor was applied to all other stoping.* • *Full-height in-situ rib pillars were retained in areas unable to be filled to honour the geotechnical hydraulic radius recommendations.* • *Only the Indicated portion of the Mineral Resource was used to estimate the Ore Reserve. Any Inferred or Unclassified material contained within the Ore Reserve design had grade set to waste for the purposes of optimisation and evaluation. The Ore Reserve is technically and economically viable without the inclusion of Inferred Mineral Resource material.* • *The Ore Reserve mine plan will require installation of infrastructure including electrical power (generation, transmission, and distribution), water and compressed air supply, a dewatering system to surface, changerooms, laydown yards, explosives magazines and ventilation infrastructure. Offices, ablutions and workshops are currently on-site at Bartons. Additional infrastructure will be required for the Golden Gate Underground. This infrastructure will be constructed prior to the commencement of works and has been factored into the economics of the project.*

Criteria	JORC Code Explanation	Commentary
Metallurgical factors or assumptions	• *The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.* • *Whether the metallurgical process is well-tested technology or novel in nature.* • *The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.* • *Any assumptions or allowances made for deleterious elements.* • *The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.* • *For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?*	• *The existing Nullagine Processing facility will be utilised for processing the Ore* • *The Nullagine processing plant is currently in operation and has been since 2012. It is an industry standard 1.5 Mt pa primary crusher, SAG mill, gravity circuit and carbon-in-leach tankage facility.* • *This is conventional, well-tested technology, and is appropriate for the lode style of mineralisation in all the Project deposits, as demonstrated by successful plant operation since commercial production was declared in February 2013.* • *Recovery factors of 70% to 95% (varies between deposits) have been assumed in the estimation of the Ore Reserves for the Oxide Material. The recovery factors are based on comprehensive test work on metallurgical core holes, mini BLEG and Leachwell analyses on RC and Diamond Core samples. A Sulphide Expansion plant is currently under construction and planned for commissioning in Q1 2019. Recovery improvement of 50% of the previous tails is the base case scenario (supported by completed testwork) have been considered for the Sulphide Material mined after April 2019. Further improvements of the tails have been achieved and are being further developed which will improve the recoveries of the Sulphide Reserves. The technology being considered for the expansion is a fine grind, intense cyanidation process which is in use at other Australian Gold Mining Operations.* • *If more information is available within the "Sulphide Metallurgical results" ASX announcement made on the 1 February and can be found on Millennium Minerals Webpage.* • *The Ore Reserves are quoted 'delivered to mill' basis; this excludes metallurgical recovery factors.* *No allowance was made for deleterious elements as none of concern were noted in work to date.*
Environmental	• *The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.*	• *As the Nullagine Gold Project is currently in operation and as such the appropriate Environmental Management Plans (EMP) have been submitted and approved by the Department of Mines. The EMP will be reviewed on a continuous basis.* • *Environment approvals have been obtained for all reserves.* • *Waste Rock Dump designs take into consideration any Potential Acid Forming Material (PAF) and are design to meet the license requirements. Designs take into consideration stability and erosion measures and will be rehabilitated as per the license requirements.* • *Hydrology studies completed for both surface and ground water flows, with no significant considerations for the proposed mining operations.*

<table>
<tr><th>Criteria</th><th>JORC Code Explanation</th><th>Commentary</th></tr>
<tr><td>Infrastructure</td><td>The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.</td><td>The appropriate infrastructure is currently in place as this is an operating mine.
Accommodation facilities, transportation and power infrastructure are all in place onsite. Access to air transport and labour have been obtained.</td></tr>
<tr><td>Costs</td><td>The derivation of, or assumptions made, regarding projected capital costs in the study.
The methodology used to estimate operating costs.
Allowances made for the content of deleterious elements.
The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co- products.
The source of exchange rates used in the study.
Derivation of transportation charges.
The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.
The allowances made for royalties payable, both Government and private.</td><td>Adequate capital costs were considered in this study for development of new open pits and underground.
The Nullagine Gold Project is currently in production. The mining and processing costs applied in the pit optimisation are based on actual operational costs.
All costs are in Australian Dollars so no direct exchange rate has been applied.
The additional cost of hauling the ore material from each mining site to the existing processing plant is included and appropriately adjusted, to provide final tailored processing costs per satellite site.
Allowances were made for government royalties, native titles and refining charges.<table><tr><td>WA State Government Royalty</td><td>2.5%</td></tr><tr><td>Native Title</td><td>1%</td></tr><tr><td>RSI Royalty</td><td>1.5%</td></tr><tr><td>Tyson royalty</td><td>A$10/Oz</td></tr><tr><td>Wakeford royalty</td><td>2.5%</td></tr></table>
Third party royalties and additional cartage costs (to transport ore to the processing plant where required) have been included within the Cut-off Grade determination for each pit.
The following table outlines the applicable Third Party Royalties</td></tr>
</table>

<table>
<tr><th>Criteria</th><th>JORC Code Explanation</th><th>Commentary</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Prospect</th><th>Third Party Royalty</th></tr>
<tr><td>Agate</td><td>Tyson</td></tr>
<tr><td>All Nations / Junction</td><td>Tyson</td></tr>
<tr><td>Angela</td><td>Tyson</td></tr>
<tr><td>Anne de Vidia</td><td>Tyson</td></tr>
<tr><td>Au81</td><td>Wakeford</td></tr>
<tr><td>Bartons UG</td><td>Tyson</td></tr>
<tr><td>Crossing</td><td>Tyson</td></tr>
<tr><td>Gambols</td><td>Tyson</td></tr>
<tr><td>Golden Eagle</td><td>Tyson</td></tr>
<tr><td>Hopetoun-Endeavour</td><td>RSI</td></tr>
<tr><td>Hut</td><td>Tyson</td></tr>
<tr><td>Otways</td><td>Tyson</td></tr>
<tr><td>Roscoes Reward / Little Wonder</td><td>RSI</td></tr>
<tr><td>Round Hill / Bow Bells</td><td>RSI</td></tr>
<tr><td>Shearers</td><td>Tyson</td></tr>
<tr><td>Shearers North / Mundulla</td><td>Tyson</td></tr>
</table>
</td></tr>
<tr><td>Revenue factors</td><td>The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.
The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.</td><td>A gold price of A$1,800/oz has been used in the pit optimisation for Ore Reserve estimates and for reporting cut-off grades. Appropriate allowances were made for government royalties, native titles and refining charges.
A gold price of A$1,800/oz has been used for optimisation and calculation of cut of grade for Bartons and Golden Gate Undergrounds.
The gold price estimate is based on the prevailing gold price and hedges Millennium currently have in place.</td></tr>
<tr><td>Market assessment</td><td>The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.</td><td>Production from the Nullagine Gold project is sold as a mixture of spot and hedges gold sales.
The demand for gold is not expected to change.</td></tr>
</table>

Criteria	JORC Code Explanation	Commentary
	• *A customer and competitor analysis along with the identification of likely market windows for the product.* • *Price and volume forecasts and the basis for these forecasts.* • *For industrial minerals, the customer specification, testing and acceptance requirements prior to a supply contract.*	
Economic	• *The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.* • *NPV ranges and sensitivity to variations in the significant assumptions and inputs.*	• *The Ore Reserves have been evaluated through the standard financial model. All operating and capital costs have been included in the financial model. The process has demonstrated that Ore Reserves have a positive NPV.* • *The Ore Reserve estimate is based on a financial evaluation prepared at a pre-feasibility study level of accuracy. Mining operations, processing, transportation, sustaining capital, and contingencies, have been scheduled and evaluated to generate a full life of mine financial model.* • *Cost inputs have been sourced from contractors or generated from database information relating to the relevant area of discipline.* • *A discount rate of 10% has been applied.* • *The NPV of the project is positive at the assumed commodity price.* • *Sensitivity analysis shows that the project is most sensitive to commodity price/exchange rate movements. The project is still economically viable at unfavourable commodity price adjustments of 10%.*
Social	• *The status of agreements with key stakeholders and matters leading to a social licence to operate.*	• *All key stakeholder agreements, including Native title and Pastoral Lease holder agreements, are in place. The Company has close working relationships with communities surrounding the Project.*
Other	• *To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:* • *Any identified material naturally occurring risks.* • *The status of material legal agreements and marketing arrangements.*	• *The Nullagine Gold Project is currently in operation. Therefore, much of the standard pre-operational estimates and unknowns that can be associated with Pre-Feasibility or Feasibility studies have little or no application to this updated Ore Reserve.* • *There are no known significant naturally occurring risks to the project.* • *Full government statutory approvals have been received.* • *All current deposits are located on granted Mining Leases.*

Criteria	JORC Code Explanation	Commentary
	• *The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.*	
Classification	• *The basis for the classification of the Ore Reserves into varying confidence categories.* • *Whether the result appropriately reflects the Competent Person's view of the deposit.* • *The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).*	• *All Proved and Probable Ore Reserves have been derived from Measured and Indicated Mineral Resources respectively.* • *Measured Mineral Resources were downgraded to Probable Ore Reserves for all pits not currently being mined.* • *The estimated Ore Reserves are, in the opinion of the Competent Person, appropriate for this style of deposit.*
Audits or reviews	• *The results of any audits or reviews of Ore Reserve estimates.*	• *An internal audit of the Ore Reserve estimate has been carried out.*
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such*	• *The Nullagine Gold Project is currently in production and therefore actual operational costs, values and parameters have been utilised. The Mineral Resource and Ore Reserves are considered to be an extension of current operations* • *The accuracy of the estimates will be subject to regular reconciliation and ongoing monitoring.* *Bartons & Golden Gate Underground* • *The design, schedule, and financial model, on which the Ore Reserve is based has been completed to a Pre-Feasibility Study standard, with a corresponding level of confidence.*

Criteria	JORC Code Explanation	Commentary
	an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate. • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.* • *It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	• *All modifying factors have been applied to designed mining shapes on a global scale.* • *Considerations in favour of a high confidence in the Ore Reserve include:* ○ *The mining process is well-known, small scale and utilises proven technology and methods widely used in the industry, with sufficient data to generate adequate costing estimates to pre-feasibility standard.* ○ *The processing plant has previously treated the Bartons ore.* • *Considerations in favour of a lower confidence in the Ore Reserve include:* ○ *There is a degree of uncertainty associated with geological estimates. The Ore Reserve classifications reflect the levels of geological confidence in the estimates.* ○ *There is a degree of uncertainty regarding estimates of impacts of natural phenomena including geotechnical assumptions, hydrological assumptions, and the modifying mining factors, commensurate with the level of study.* • *Testwork and historical production data has shown the ore is metallurgically complex. The Sulphide Expansion Plant is currently being constructed to process the Refactory ores.* • *Further, i.e. quantitative, analysis of risk is not warranted or considered appropriate at the current level of technical and financial study.*