MINERAL RESOURCE UPDATES COMPLETED FOR FIVE GOLD DEPOSITS ON THE CENTRAL TANAMI PROJECT JOINT VENTURE YIELDS 1.5M OUNCES

- **Updated Mineral Resource estimates for the Groundrush, Ripcord, Jims, Hurricane and Crusade gold deposits returns 13.0Mt at 3.7 g/t gold for 1.5Mozs.**
- **The updated Mineral Resource estimates have collectively increased in grade by 19% and decreased in tonnes by 31% and ounces by 5%.**
- **The primary deposit Groundrush has increased in grade by 31% from 3.3 g/t gold to 4.3 g/t gold totalling 1.1 Mozs.**
- **Models tightly constrained to Whittle and Stope Optimisations based on a A$2,700 per ounce gold price, benchmark costs and processing recoveries.**
- **18 CTPJV deposits still remain to be updated and reported in accordance with the 2012 JORC Code.**

Perth, Australia, 24 November 2022: Tanami Gold NL (ASX:TAM) ("Tanami Gold" or the "Company") is pleased to advise that the Central Tanami Project Joint Venture ("CTPJV") have completed updates of the Mineral Resource estimates for the Groundrush Gold Deposit ("Groundrush"), Ripcord Gold Deposit ("Ripcord"), Jims Gold Deposit ("Jims"), Hurricane-Repulse Gold Deposit ("Hurricane-Repulse") and the Crusade Gold Deposit ("Crusade"). These updates are part of an ongoing transition of the Mineral Resource estimates for the Central Tanami Project to the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the "2012 JORC Code"), in readiness for inclusion in a scoping level mining study that is scheduled to be completed in the coming months.

The updated Mineral Resource estimates for Groundrush, Ripcord, Jims, Hurricane-Repulse and Crusade returned a total of 13.0Mt at 3.7 g/t gold for 1.5Mozs as of 1 November 2022, representing a 19% increase in grade and a 31% decrease in tonnes, and 5% decrease in ounces when compared to historical estimates.

"It is extremely pleasing to see the grade increase overall as we update the project Mineral Resources to best practice, establishing a robust mining inventory and reflecting the upside potential of this previously mined project," Tanami Gold Chairman Arthur Dew said.

Mr. Dew further stated, "Our flagship deposit Groundrush previously generated 611kozs at over 4.0 g/t gold, the updated Mineral Resource puts Groundrush's grade at 4.3 g/t gold and the deposit remains open at depth, which bodes well for the future."

The updated estimates were compiled by independent mining consultants MoJoe Mining Pty Ltd ("MJM") in Western Australia and have been undertaken using improved geological models that better reflect the mineralised systems. The reported Mineral Resources have been tightly constrained by Whittle and Stope Optimisations with deposit specific cut-off grades based on a A$2,700 per ounce gold price, haulage to the existing mill site, benchmark operating costs and free milling processing recoveries. The updated estimates do not include results from drilling completed during the 2022 field season.

Mineral Resource updates for 18 other CTPJV deposits remain to be undertaken and reported in accordance with the 2012 JORC Code.

The CTPJV is a 50/50 Joint Venture between Tanami Gold and ASX listed Northern Star Resources Limited ("Northern Star"), which was established to advance exploration on the 2,211km^2 tenement area in the Tanami Region held by the CTPJV. The tenement area encompasses highly prospective, underexplored geological sequences, in an area that is known to be well endowed with gold mineralisation. The objective of the CTPJV is to develop and mine the Groundrush gold deposit, and any other gold deposits delineated within the CTPJV tenements at the earliest time, commensurate with good mining practice and utilising project infrastructure already in place on the previously operated project area.

Table 1 - Mineral Resource estimates for the Groundrush Gold Deposit, Ripcord Gold Deposit, Jims Gold Deposit, Hurricane-Repulse Gold Deposit and the Crusade Gold Deposit from the Central Tanami Project in the Northern Territory as of 1 November 2022

	COG (g/t Au)	Measured			Indicated			Inferred			Total		
		Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)
Groundrush Gold Deposit													
OP	0.7	-	-	-	2,600	3.8	320	170	5.6	30	2,800	3.9	350
UG	SO @ 1.7	-	-	-	1,400	3.9	170	3,600	4.8	550	4,900	4.6	720
Total		-	-	-	**4,000**	**3.8**	**490**	**3,700**	**4.8**	**580**	**7,700**	**4.3**	**1,100**
Ripcord Gold Deposit													
OP	0.6	-	-	-	640	2.1	43	110	2.2	8	750	2.1	51
Total		-	-	-	**640**	**2.1**	**43**	**110**	**2.2**	**8**	**750**	**2.1**	**51**
Jims Gold Deposit													
OP	0.7	120	1.9	7	500	2.1	34	120	1.7	6	740	2.0	48
UG	SO @ 1.9	1	3.1	0	150	2.7	13	590	3.2	60	730	2.7	73
Total		**120**	**1.9**	**7**	**650**	**2.3**	**47**	**700**	**2.9**	**66**	**1,500**	**2.3**	**120**
Hurricane-Repulse Gold Deposit													
OP Ox/Trans	0.63				510	2.6	42	165	2.1	11	670	2.5	53
OP Fresh	0.97				20	4.4	3	0	2.4	4	20	4.4	3
UG	SO @ 2.8				70	3.7	8	700	5.0	110	770	4.9	120
Total					**590**	**2.8**	**53**	**860**	**4.5**	**120**	**1,500**	**3.8**	**180**
Crusade Gold Deposit													
OP	0.77				1,200	2.2	86	38	1.7	2	1,200	2.2	88
UG	SO @ 3.0				49	3.7	6				49	3.7	6
Total					**1,200**	**2.3**	**92**	**38**	**1.7**	**2**	**1,300**	**2.3**	**94**
Total		**120**	**1.9**	**7**	**7,100**	**3.2**	**720**	**5,400**	**4.5**	**780**	**13,000**	**3.7**	**1,500**

Notes:

Mineral Resource estimates are not precise calculations, being dependent on the interpretation of limited information on the location, shape and continuity of the occurrence and on the available sampling results. The quantities contained in the above table have been rounded to two significant figures to reflect the relative uncertainty of the estimate. Rounding may cause values in the table to appear to have computational errors.

Mineral Resources are reported on a dry in-situ basis.

Mineral Resources are reported above 0.63 g/t to 0.77 g/t gold cut-off grades within an optimised pit shell and within stope optimisation wireframe optimised at 1.7 g/t to 3.0 g/t gold cut-off grades based on a A$2,700 per ounce gold price.

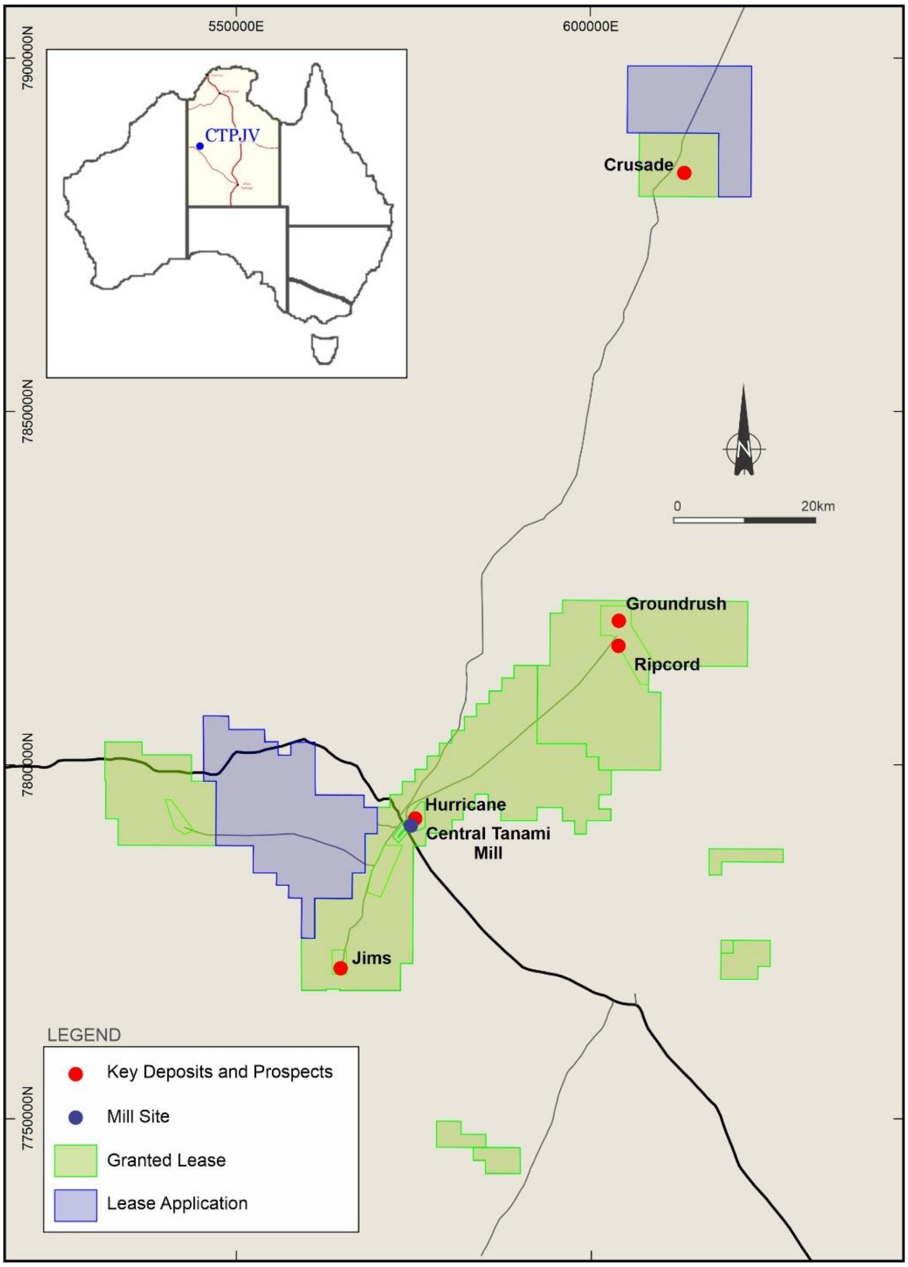

Figure 1 – CTPJV Project Holding.

Groundrush Gold Deposit

Groundrush is located approximately 45km northeast of the Central Tanami Mill site in the Northern Territory. It is fully encompassed by granted Mining Lease ML22934 that covers an area of 39.5 km^2. ML22934 was granted on 14 September 2001 for a period of 25 years. The Groundrush deposit was previously subject to open pit mining between 2001 and 2005, when Normandy/Newmont produced 611,000 ounces of gold at a reconciled mill grade of 4.0 g/t gold.

The updated Groundrush estimate returned:

- within the optimised pit shell, using A$2,700 per gold ounce, at a reporting cut-off grade of 0.7 g/t gold a Mineral Resource of 2,800 kt grading 3.9 g/t gold for 350 kozs; and

- below the optimised pit shell using A$2,700 per gold ounce and within the A$2,700 underground stope optimisation a Mineral Resource of 4,900 kt grading 4.6 g/t gold for 720 kozs.

for a combined total of 7,700 kt grading 4.3 g/t gold for 1,100 kozs. This represents a 31% increase in grade and a 28% decrease in tonnes and 5% decrease in ounces, with the resource model better reflecting the mineralised system through the removal of sub-grade material.

Table 2 - Mineral Resource estimate for the Groundrush Gold Deposit.

	COG (g/t Au)	Measured			Indicated			Inferred			Total		
		Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)
Groundrush Gold Deposit													
OP	0.7	-	-	-	2,600	3.8	320	170	5.6	30	2,800	3.9	350
UG	SO @ 1.7	-	-	-	1,400	3.9	170	3,600	4.8	550	4,900	4.6	720
Total		-	-	-	**4,000**	**3.8**	**490**	**3,700**	**4.8**	**580**	**7,700**	**4.3**	**1,100**

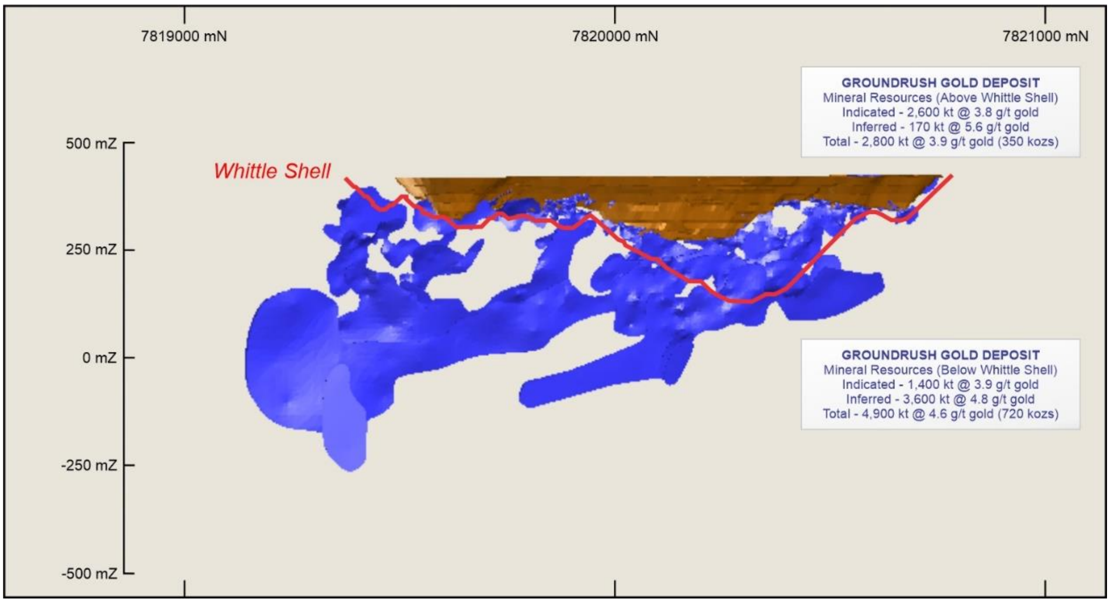

Figure 2 – Groundrush Gold Deposit

- ***Geology and Mineralisation Interpretation***

Groundrush represents a reverse fault orogenic system, with mineralisation typically hosted in stacked vein sets with a variety of orientations, as well as sub-vertical quartz-filled shear zones, within a fractionated dolerite sill. Minor mineralisation also extends into the adjacent turbiditic sediments. Along with the various orientations of veining there also exists a variety of types, including shear, extensional and also a shear-extension hybrid style of veining.

The steep dipping lodes generally strike around 340° but varied between 323° to 355° and dip about 60° to 70° west but range between 32° to 80° west. They exhibit a true thickness from 1-2 to 35 metres and plunge to the south at approximately 10° to 15°. Mineralisation has been defined over a collective strike length of 1,900 metres with the various individual lodes extending from 50 to 970 metres in length and down dip from 50 to 250 metres.

The flat lying lodes are only well established in the mined-out areas where they were defined by close spaced grade control drilling. These lodes crosscut the steep lodes and are difficult to interpret from the exploration drilling data. They are largely confined to areas of dolerite and strike between 325° to 340°, dip from 25° to 50° and plunge southwest between 15° to 24°. The strike length of these lodes varies from 50 metres to a maximum of 600 metres, with a true thickness in fresh material of 1-2 metres. The down dip extent varies from 15 to 100 metres. Volumetrically they represent about 20% of the total resource with most of that volume intersecting steep lodes.

A two-stage approach to interpreting and modelling the gold mineralisation was completed. Interpretations of the geology were honoured, but the veins were characterised as either steep dipping or flat dipping lodes, with greater certainty in the steep dipping stacked lenses than the flat dipping lodes.

- ***Drill Information and Sampling***

The various mineralised lodes at Groundrush were sampled using surface diamond drill holes ("DDH"), reverse circulation ("RC") drill holes, reverse circulation grade control ("RC_GC") drill holes, aircore ("AC"), vacuum ("VC") and rotary air blast ("RAB") drill holes. Drilling has been completed by Normandy, Newmont, Tanami Gold and Northern Star since 1998.

Table 3 – Summary of Groundrush Drilling.

Hole Type	In Database		In OP Resource Model		In UG Resource Model	
	Hole Number	**Metres Drilled**	**Hole Number**	**Intersection Metres**	**Hole Number**	**Intersection Metres**
AC	16	882.00				
DDH	258	73,553.72	225	3,345.91	218	2,058.23
RC_GC	41,183	321,743.00	14,784	68,744.79	15,897	43,634.88
RAB	611	32,125.00				
RC	397	39,961.00	280	5,044.00	269	3,585.00
RC_DDH	79	30,259.75	76	709.00	75	393.40
TR	8	11.00				
VC	897	8,283.00				
Total	**43,449**	**506,818.47**	**15,365**	**77,843.70**	**16,459**	**49,671.51**

- ***Normandy***

RC drilling was sampled on 1m intervals through mineralised zones and 2m intervals within pre-collars. Entire samples were collected using a cyclone then split using a riffle splitter down to approximately 2kg. Diamond holes were half-cut lengthways and sampled on 0.5m intervals, with the right half retained in the core trays for future reference. All core samples were crushed to 25 mm on site with a barren quartz wash between each sample.

- ***Newmont***

RC drillholes were logged and sampled over 1m intervals and riffle split to obtain 2-5 kg samples. Wet intervals were grab sampled. Diamond core was half core sampled where mineralisation was deemed likely on a 1.0 m interval, which was adjusted where necessary to conform to lithological boundaries.

- ***Tanami Gold***

RC samples were taken at 1m intervals and split using a cone splitter. Two minor fractions were collected for sampling, with the bulk remaining fraction either stored in plastic green bags or dumped on the ground, dependent on the nature of drilling. A permanent record of each RC hole is kept by storing a small fraction of each 1m interval in chip trays, which were then logged by Tanami geologists. Recovery is recorded within the database and averages 98% for all drillholes.

Diamond drilling is completed as either HQ/HQ3 or NQ2 core. All holes are meter marked and oriented using either a Reflex ACT or EZY MARK. Core recovery, RQD and fracture frequency are all measured on metre intervals. Core is sampled and analysed for gold on intervals of between 0.2m and 1.2m. All samples are half cored and are cut using an Almonte Diamond Pty Ltd automated belt driven core saw.

- ***Northern Star***

Stage 1 RC drilling – all bulk material collected on a 1m basis directly from cyclone in pre-labelled green plastic mining bags. Primary analysis determined using 4m speared composite samples at geologist's discretion. Composite samples with a grade above 0.5 g/t gold had single metre bulk samples riffle split (using a 3-tier riffle splitter).

Stage 2 RC drilling – single metre (1m) samples from a trailer mounted static cone splitter. Approximately 12.5% of each meter sample was collected in a pre-labelled calico bag with the depth while the remaining 87.5% was collected in a green mining bag and retained. As in stage 1 drilling 4m composite speared samples were taken for primary analysis, followed up by using before mentioned 1m samples.

All RC chips were logged using wet sieving technique retaining a sample in a plastic chip tray.

For diamond drilling, selective samples were taken at the rig geologists' discretion focusing on areas with veins, sulphides and alteration. The core was cut in half using an Almonte Core saw with the orientation line and geologists marking retained on the left-hand side of the core

- ***Sample Preparation and Analysis***

- ***Normandy***

Normandy completed sample preparation in Alice Springs before analysis by Analabs in Adelaide utilising several assay techniques for gold including P603 (Acid Digest, Carbon Rod Finish), P625 (Acid Digest, AAS Finish), P630 (30g Fire Assay, AAS Finish), P650 (50g Fire Assay, AAS Finish). Normandy procedures dictated that aqua regia was to be utilised for all samples unless visible gold was observed during logging. If the gold assay returned was greater than 2 ppm the sample was resubmitted for a fire assay; if it was greater than 7-8 ppm, then it was re-submitted for a screen fire assay. If visible gold was observed during logging, screen fire assay was the preferred technique.

- ***Newmont***

All Newmont samples were sent to ALS in Alice Springs for 50g fire assay (method Au-AA26). Sample preparation included jaw crushing all of the interval then pulverisation by a LM5. Barren quartz flushes were inserted between each sample to minimise sample cross contamination.

No record has been located outlining where the Newmont RC grade control samples were assayed, but it is assumed that it would have been in an onsite laboratory.

- ***Tanami Gold***

Samples collected by Tanami Gold in 2011 were sent to SGS in Perth where gold grades were determined by 50 g Fire Assay with AAS finish (Ore grade analysis FAA505). In 2012 samples were sent to Intertek Genalysis (Genalysis) with preparation completed in Alice Springs and analysis done in Townsville. Samples are dried at approximately 120°C, crushed and rotary split (where required), and fine pulverised. Analysis for gold is completed using a 50-gram lead collection fire assay with aqua regia digestion of the prill and flame AAS determination of the gold to 0.005 ppm (FA50/AA).

- ***Northern Star***

Samples collected by Northern Star were sent to ALS in Malaga, Perth and ALS in Adelaide. Gold (Au) was determined by conventional fire assay with a 50g charge and AAS finish. Multi-elements done by ICP. This was common to both DDH and RC samples.

- ***QAQC***

Historical QAQC data from the Normandy and Newmont drilling has not been located, but reports reference that QAQC was carried out. It is likely that the drilling was of good quality as the area was mined by open pit methods. Since that time extensive exploration has been out by Tanami Gold and Northern Star and they have confirmed the existence of significant mineralisation below the Groundrush open pit.

Programs of QAQC have been carried out by Tanami Gold and Northern Star. Certified reference standards were inserted at regular intervals and results have, in the main, accurately reflected the original assays and expected values. A recognised laboratory has been used for analysis of samples. Overall, the QAQC data does not indicate any bias and supports the assay data used in the Mineral Resource.

- ***Estimation Methodology and Classification***

The open pit and underground wireframes were constructed in Leapfrog software after importing all the geology files and used a low grade assay cut-off of 0.5 g/t gold and 1.2 g/t gold for the open pit and underground, respectively. Some lower grade intercepts were included for the sake of continuity.

The cut-off levels used were based upon preliminary economic studies that suggested that these values were just below the break-even grade for an operating mine. No natural breaks in the gold populations could be established. The gold envelopes were modelled into a total of 54 individual domains or lodes for the open pit resource and 53 for the underground resource.

The wireframes of the mineralised zones were used to code the database to allow identification of the resource intersections. Surpac software was then used to extract down hole composites within the different resource domains. All holes were composited to 1m as most of the sampling was at 1m intervals. The open pit model was composited using a 1 metre fixed length method ±10% while the underground model used a 1 metre best fit method ±50% to account for the narrower samples taken in drill core. The composites were checked for spatial correlation within the objects, the location of the rejected composites, and zero composite values.

Analysis of statistics and histogram plots for all lodes suggested that high grade cuts were required for some lodes. For the open pit resource, a high grade cut of between 10 g/t gold and 50 g/t gold was applied to some of the lodes for gold. This resulted in a total of 911 composites being cut or 1.27% of the data.

For the underground resource a high grade cut of between 20 g/t gold and 50 g/t gold was applied to some of the lodes. The dilution skins were top cut between 4 g/t and 30 g/t gold. This resulted in a total of 723 composites being cut or 1.37% of the data.

Mineralisation continuity was examined via variography. A two-structured nested spherical model was found to model the experimental variograms reasonably well. The down-hole variogram provides the best estimate of the true nugget value, which varied from 0.19 to 0.73 for the open pit resource and 0.03 to 0.66 for the underground resource.

Two block models were created using Surpac software to encompass the full extent of the deposit. The open pit block model used a primary block size of 10m NS by 5m EW by 5m RL with sub-blocking to 2.5m by 1.25m by 1.25m while the underground block model used sub-blocking of 2.5m by 0.625m by 0.625m. The parent block size was selected based on approximately half the average drill spacing of RC drilling in the well drilled areas, while dimensions in other directions were selected to provide sufficient resolution to the block model in the across-strike and down-dip direction.

Ordinary Kriging ("OK") grade interpolation was used to estimate gold values in the block models with the search ellipse oriented to the variogram axes. For all zones in the block model, the wireframe interpretations were used as hard boundaries in the interpolation. That is, only grades inside each lode were used to interpolate the blocks inside the lode.

An orientated ellipsoid search was used to select data for interpolation. The ellipsoid was oriented to the average strike and dip of the mineralised zones. Where significant negative weights were encountered, and the model was outside of 10% versus the naïve and declustered means some domains were re-estimated using an octant search.

A first pass of radius 20-80m with a minimum number of samples of 3-6 samples and a second pass of radius 40-160m with a minimum number of 3-6 samples were used for Groundrush. A third pass of search radius 80-320m was used with 3-4 samples to ensure all blocks within the mineralised lodes were estimated. The maximum number of samples ranged from 4-28 depending on the number of samples in the domain. Blocks that did not fill after 3 passes were given a fourth pass using nearest neighbour estimation.

Bulk density was applied through oxidation state and rock type. Values for Groundrush were derived from drilling completed by the CTPJV in 2015 and 2016.

Table 4 – Groundrush Bulk Density

	Rock Type					
Oxidation State	**Sediments**	**Groundrush Dolerite**	**Groundrush Quartz Dolerite**	**Western Dolerite**	**Tombstone Dolerite**	**Back Fill/ Waste Dump**
Oxide	2.53	2.55	2.40	2.55	2.55	2.20
Transitional	2.62	2.90	2.76	2.90	2.90	
Fresh	2.74	2.94	2.86	2.99	2.94	

The Mineral Resource was classified in accordance with the 2012 JORC Code as Indicated and Inferred Mineral Resource based on data quality, sample spacing, and lode continuity. The Indicated Mineral Resource was defined within areas of RC drilling of 25m by 25m, and where the continuity and predictability of the lode positions was good, and the estimation reconciled with the input data. The Inferred Mineral Resource was assigned to areas where support for the continuity of mineralisation was limited by wider spaced drilling or insufficient drilling in smaller lodes. The minimum requirement for an inferred resource is 3 drill holes spaced apart so that strike and dip can be determined.

Both the open pit and underground Mineral Resources stated have been derived from Whittle optimisations for the open pit resource and Deswick stope optimisations for the underground resource based on a A$2,700 per ounce gold price, benchmark costs and processing recoveries.

- ***Mining, Metallurgy and Other Modifying Factors***

- **Metallurgy**

Composite samples were collected for Extraction Test Work that included a total of 18 individual samples from within the Groundrush model. The samples were derived from quarter NQ2 diamond core. The metallurgical data shows good gold recoveries that range from 86.7% to 99.3% with an average of 94.3%.

Ripcord Gold Deposit

Ripcord is located on Mining Lease ML22934, approximately 3 kilometres south of the Groundrush deposit and about 40 km northeast of the Central Tanami Mill site. It is fully encompassed by granted Mining Lease ML22934 that covers an area of 39.5 km^2. ML22934 was granted on 14 September 2001 for a period of 25 years.

The updated Ripcord estimate returned:

- within the optimised pit shell, using A$2,700 per gold ounce, at a reporting cut-off grade of 0.6 g/t gold a Mineral Resource of 750 kt grading 2.1 g/t gold for 51 kozs.

This represents a 32% decrease in tonnes, 16% decrease in grade and 43% decrease in ounces.

Table 5 - Mineral Resource estimate for the Ripcord Gold Deposit.

	COG (g/t Au)	Measured			Indicated			Inferred			Total		
		Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)
Ripcord Gold Deposit													
OP	0.6	-	-	-	640	2.1	43	110	2.2	8	750	2.1	51
Total		-	-	-	**640**	**2.1**	**43**	**110**	**2.2**	**8**	**750**	**2.1**	**51**

- ***Geology and Mineralisation Interpretation***

The geology and deposit style at Ripcord appears to have similarities to the nearby Groundrush deposit, although it is yet to be fully determined if the host dolerite body is the same as that which hosts gold mineralisation at Groundrush. The host dolerite unit at Ripcord shows similar fractionation textures as observed at Groundrush, with fractionated quartz dolerite bounded on both sides by transitional quartz dolerite zones.

Gold mineralisation is primarily hosted within the larger main dolerite body, with minor mineralisation extending in to the turbiditic sediments on the footwall contact. The main mineralised lodes consist of 1 - 6m wide zones of quartz veining that trend north to northwest and dip at 80° to the southwest.

The strike of the mineralised zone is about 1200 metres and the known down dip extent from drill data is about 150 metres. The width of the zone of primary mineralisation is in the order of 40 metres.

There are 3 styles of mineralisation:

- supergene or flat lying lodes;
- dolerite hosted; and
- turbiditic sediment hosted.

The supergene or flat lying mineralisation dip shallowly to the west and are separated into north and southerly plunging bodies. They consist of narrow zones of quartz veining (1-3m) but with similar vein and alteration assemblages as the main steep lode system. Many of the mineralised veins also consist of carbonate and chlorite plus blebby pyrite and minor arsenopyrite. Alteration minerals related to mineralisation include silica, hematite and sericite. The supergene or flat lying zones have strikes of up to 150 metres and dip extents of up 100 metres and true thickness of 1-3 metres.

The dolerite and turbiditic sediment hosted mineralisation display similar strikes between 320° to 330° and dip about 60° west. There is a difference in the overall dimensions of the mineralised quartz lenses. The thickness of the mineralisation varies between 1 to 6 metres for both types however the dolerite hosted mineralisation is up to 150 metres in strike and 120 metres down dip while the sediment hosted mineralisation is up to 100 metres and 25 metres down dip.

Pyrite is the dominant sulphide present with accessory pyrrhotite, arsenopyrite, chalcopyrite and sphalerite. Dolerite and sediments both contain fine disseminated pyrite within the rock mass or on joint surfaces, generally in trace amounts. Proximal to, and within the mineralised zones there is up to 5% pyrite in blebby, stringer and disseminated forms. Arsenopyrite can form local accumulations of up to 2%.

- ***Drill Information and Sampling***

The various mineralised lodes at Ripcord were sampled using DDH, RC , AC, VC and RAB drill holes.

Twenty-five RC drill holes for 207 intersection metres in the resource were drilled by Normandy during the period from 2001 to 2002. This represents 19.8% of the total intersection metres but has been backed up drilling completed by Tanami Gold who drilled the remaining 84 holes.

Table 6 – Summary of Ripcord Drilling.

Hole Type	In Database		In Resource Model	
	Hole Number	Metres Drilled	Hole Number	Intersection Metres
AC	41	2,042.00		
DDH	6	1,087.60	5	72.79
RAB	256	12,806.00		
RC	167	23,001.00	104	971.00
VC	83	776.40		
Total	**553**	**39,713.00**	**109**	**1,043.79**

RC drill samples were collected at 1m intervals. Samples were collected at the rig, representing cutting's coarse fraction. For Tanami Gold drillholes, all samples are taken as 1 metre intervals directly from the cone splitter, with the bulk sample collected in green bags and left on site.

For Normandy RC holes analytical samples were collected at 1 metre intervals using a rig mounted splitter with the bulk sample being bagged in green plastic bags.

- ***Sample Preparation and Analysis***

Normandy assays were sent to ALS–Chemex in Perth for Aqua Regia (PM203). Any samples that came back with an Aqua Regia result greater than 2ppm were automatically sent for A & B split Fire Assay (PM209), and those that assayed over 7ppm were sent for Screen Fire Assay.

Tanami Gold sent samples from RPRC0001 to RPRC0037 to SGS lab in Perth for analysis by 50g Fire assay with atomic absorption finish (FAA505). Samples from RPRC0038 to RPRC0111 were submitted to Genalysis lab in Alice Springs for analysis by 50g Fire Assay with atomic absorption finish (FA50/AA).

- ***QAQC***

Detailed QAQC analysis for all drilling completed prior to 2013 has been reported by Tanami Gold. Standards, Blanks and Duplicates were inserted in the Normandy drilling sample stream. However, the frequency of these insertions is highly variable and expected values for the standards are not available, limiting the value of this data. QC samples were inserted routinely for all Tanami Gold drillholes. Standard samples were inserted every 25 metres, blank samples every 20 samples and duplicate samples were collected every 12m.

Programs of QAQC have been carried out by Tanami Gold. Certified reference standards were inserted at regular intervals and results have, in the main, accurately reflected the original assays and expected values. Coarse crush duplicates show repeatable although variable results. A recognised laboratory has been used for analysis of samples.

Overall, the QAQC data does not indicate any bias and supports the assay data used in the Mineral Resource.

- ***Estimation Methodology and Classification***

Mineralisation interpretations were prepared by Tanami Gold and Northern Star. They were provided to MJM in Vulcan format files and converted to Surpac format by MJM. The supplied wireframes were snapped to drill holes supplied by Northern Star. Minor modifications were made to the wireframes to ensure that they represented the mineralisation. A low grade cut off of 0.5 g/t gold appears to be the driver, but some lower values have been incorporated in the wireframes to enhance the continuity.

The gold envelopes were modelled into a total of 58 individual domains or lodes. The mineralisation was classified into 3 categories, supergene or flat lying, dolerite and sediment hosted.

The wireframes of the mineralised zones were used to code the database to allow identification of the resource intersections. Surpac software was then used to extract down hole composites within the different resource domains. All holes were composited to 1m.

Analysis of statistics and histogram plots for all lodes suggested that high grade cuts were required for some lodes. A high grade cut of between 15 g/t gold and 20 g/t gold was applied to some of the lodes for gold. This resulted in a total of 12 composites being cut or 1.1% of the data.

Mineralisation continuity was examined via variography. The one metre composite data was transformed into a normal distribution using a normal scores transformation to help identify the main directions of mineralisation continuity from skewed data. A two-structured nested spherical model was found to model the experimental variograms reasonably well. The down-hole variogram provides the best estimate of the true nugget value, which was 0.32, 0.64 and 0.58 for Domains 27, 59, and 104 respectively.

A block model was created using Surpac software to encompass the full extent of the deposit. The block model used a primary block size of 10m NS by 5m EW by 5m RL with sub-blocking to 2.5m by 1.25m by 1.25m. The parent block size was selected based on approximately half the average drill spacing of RC drilling in the well drilled areas,

OK grade interpolation was used to estimate gold values in the block models with the search ellipse oriented to the variogram axes. For all zones in the block model, the wireframe interpretations were used as hard boundaries in the interpolation.

An orientated ‘ellipsoid’ search was used to select data for interpolation. The ellipsoid was oriented to the average strike and dip of the mineralised zones.

A first pass of radius 40m with a minimum number of samples of 2-8 samples and a second pass of radius 80m with a minimum number of 2-6 samples were used for Ripcord. A third pass of search radius 160m was used with 2-6 samples to ensure all blocks within the mineralised lodes were estimated. The maximum number of samples ranged from 3-26 depending on the number of samples in the domain. Blocks that did not fill after 3 passes were left without grade as a reflection of the paucity of samples in the lode.

Bulk density was applied through oxidation state and rock type and were derived from the Groundrush deposit.

Table 7 – Ripcord Bulk Density

	Rock Type	
Oxidation State	**Dolerite**	**Turbiditic Sediment**
Oxide	2.4	2.32
Transitional	2.7	2.58
Fresh	2.85	2.70

The Mineral Resource was classified as Indicated and Inferred Mineral Resource based on data quality, sample spacing, and lode continuity. The Indicated Mineral Resource was defined within areas of RC drilling of 20m by 25m, and where the continuity and predictability of the lode positions was good. The Inferred Mineral Resource was assigned to areas where support for the continuity of mineralisation was limited by wider spaced drilling or insufficient drilling in smaller lodes. The minimum requirement for an inferred resource is 3 drill holes spaced apart so that strike and dip can be determined. Over 700 metres of strike to the northwest did not meet this criterion as the area has been drilled on 100 metre sections.

For reporting purposes only material that resides within an AU$2700 pit shell is included in the reported resource.

- ***Mining, Metallurgy and Other Modifying Factors***

- **Metallurgy**

Tanami Gold submitted composite RC samples for metallurgical testing in 2013. These samples were ground to 150 microns and tested for recovery of gold. Recovery data was collated by oxidation state (weathering) and the average level was assigned to the Ripcord block model.

Recovery in oxide samples ranged from 95.8% to 98.9% at an average of 97.2%, recovery in transitional samples returned a single value of 90.1% and in fresh samples recovery ranged from 82.5% to 94.3% at an average of 89.9%.

Jims Gold Deposits

Jims is located on Mineral Lease (Southern) MLS168, approximately 23 kilometres southwest of the Central Tanami Mill site. The known deposits are fully encompassed by MLS168 that covers an area of
711.90 hectares.

Mining at Jims was previously carried out between 1998 and 2001, with open pits established over the Main and Central deposits. Between 30 January 1998 to 25 June 2001 an estimated 1.66 million @ 2.34 g/t gold for 125,000 ounces was mined. The Central deposit produced 3,069 tonnes grading 2.67 g/t gold during the period 10 June 1998 to 1 April 1999 for 263 ounces. The latter pit was abandoned because tonnes and ounces were not reconciling with the resource model.

The updated Jims estimate returned:

- within the optimised pit shell, using A$2,700 per gold ounce, at a reporting cut-off grade of 0.7 g/t gold a Mineral Resource of 740 kt grading 2.0 g/t gold for 48 kozs; and

- below the optimised pit shell using A$2,700 per gold ounce and within the A$2,700 underground stope optimisation a Mineral Resource of 730 kt grading 2.7 g/t gold for 73 kozs.

for a combined total of 1,500 kt grading 2.3 g/t gold for 120 kozs. This represents a 30% decrease in tonnes, 30% increase in grade and 0% change in ounces.

Table 8 - Mineral Resource estimate for the Jims Gold Deposit.

	COG (g/t Au)	Measured			Indicated			Inferred			Total		
		Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)
Jims Gold Deposit													
OP	0.7	120	1.9	7	500	2.1	34	120	1.7	6	740	2.0	48
UG	SO @ 1.9	1	3.1	0	150	2.7	13	590	3.2	60	730	2.7	73
Total		**120**	**1.9**	**7**	**650**	**2.3**	**47**	**700**	**2.9**	**66**	**1,500**	**2.3**	**120**

- ***Geology and Mineralisation Interpretation***

The Jims deposit is a Palaeoproterozoic, basalt and sediment-hosted vein-mineralised deposit that is part of the Granites-Tanami Inlier. Gold mineralisation is controlled by a brittle fracture system associated with regional-scale structures that crosscut a regional-scale southeast, shallowly plunging anticline. Mineralisation occurs within a series of vein and breccia lodes developed near basalt-sediment contacts.

The mineralised trend at Jims Main strikes north-south, dipping moderately to steeply west in the upper extent but changes to a steep to east dipping below the 320m RL. The main ore zone has a true thickness of 15 to 25 metres but has areas up to 60 metres thick. The strike length of the Jims Main mineralisation is of the order of 300 metres and mineralisation has been interpreted down to 250 metres below the surface. The mineralisation at Jims Central appears to be the northern strike extension of the Jims Main mineralisation. The mineralisation has a strike of about 200 metres and is 2 to several metres thick and has been interpreted to a depth of 150 metres below the surface.

Jims West is adjacent to the current waste dump and occurs close to the north-northwest striking regional fault. Mineralisation is striking about north-south and dips approximately 45 degrees west. The strike length of Jims West is of the order of 150 metres with true thickness between 1 – 7 metres and individual lenses have been interpreted up to 120 metres down dip. The Jims West area has previously not been mined.

- ***Drill Information and Sampling***

The various mineralised lodes at the Jims prospect were sampled using DDH, RC, AC, ditch witch (“DW”), VC, water bore (“WB”) and RAB drill holes. Drilling was completed by various owners since 1993, the majority conducted between 1993 and 2001.

Table 9 – Summary of Ripcord Drilling.

Hole Type	In Database		In Resource Model	
	Hole Number	Metres Drilled	Hole Number	Intersection Metres
AC	57	4,581.00		
DDH	57	8,832.31	57	8,832.31
DW	1,944	95,327.00		
RAB	1,048	47,675.00		
RC	3,212	77,993.10	320	33,775.50
VC	58	63.00		
WB	35	4,582.00		
Total	**6,411**	**239,053.00**	**377**	**42,607.81**

RC drill samples were collected at 1m intervals. Samples were collected at the rig, representing cutting's coarse fraction. Samples are taken at 1 metre intervals directly from the cone splitter, with the bulk sample collected in green bags and left on site.

For RC holes drilled in the 1990s to 2001 samples were taken at 1 metre intervals from the cyclone and manually fed through a riffle splitter. Historically, where wet samples were encountered the entire sample was collected into a 40-litre plastic bucket before being tipped into discrete piles whereupon scoop samples through the spoil pile were taken. The use of booster air systems since mid-1998 overcame this problem.

All diamond drill holes drilled from 1990s to 2011 were photographed and half core assayed in 1 metre intervals with the remainder retained for future reference. Core is stored in racks or on pallets at the on-site core yard located at the old exploration camp, approximately 5km to the south of the Tanami mill site.

- ***Sample Preparation and Analysis***

During mining operations drill samples were analysed offsite at ALS Alice Springs, however with the availability of the onsite laboratory, the database does include some onsite analysis. There was no fixed procedure for selecting on or offsite analysis; rather the choice was governed by onsite laboratory availability. Analysis (both on and off site) was by AAS with selective FA checks. It should be noted that all onsite analysis was performed with a 20ml aliquot whereas ALS use a 50ml aliquot for all AAS readings. CTPJV drill samples were analysed by ALS Perth by Fire Assay.

- ***QAQC***

Programs of QAQC have been routinely carried out. Certified reference standards were inserted at regular intervals and results have, in the main, accurately reflected the original assays and expected values. Coarse crush duplicates show repeatable although variable results. A recognised laboratory has been used for analysis of samples.

QAQC programs from drilling data from the 1990s to 2001 was carried out but that data has not been located. Significant mining was carried during that time period. Drilling by CTPJV appears to confirm the results, but no definite conclusion can be made about the quality of the earlier period of data collection. It is assumed to be representative.

Overall, the QAQC data does not indicate any bias and supports the assay data used in the Mineral Resource.

- ***Estimation Methodology and Classification***

Mineralisation interpretations were prepared by Tanami Gold and Northern Star. They were provided to MJM in Vulcan format files and converted to Surpac format by MJM.

The supplied wireframes were snapped to drill holes supplied by Northern Star. Minor modifications were made to the wireframes to ensure that they represented the mineralisation. A low grade cut off appears to be in the order of 0.5 g/t gold, but some lower values have been incorporated in the wireframes to enhance the continuity. The gold envelopes were modelled into a total of 80 individual domains or lodes and mineralisation was classified into Jims Main, Jims Central and Jims West.

The wireframes of the mineralised zones were used to code the database to allow identification of the resource intersections. Surpac software was then used to extract down hole composites within the different resource domains. All holes were composited to 1m as most of the sampling was at 1m intervals.

Analysis of statistics and histogram plots for all lodes suggested that high grade cuts were required for 29 lodes. A high grade cut of 6-12g/t gold was applied to some of the lodes for gold. This resulted in a total of 136 composites from 29 lodes being cut or 2.6% of the data

Mineralisation continuity was examined via variography. The one metre composite data was transformed into a normal distribution using a normal scores transformation to help identify the main directions of mineralisation continuity from skewed data. A two-structured nested spherical model was found to model the experimental variograms reasonably well.

A block model was created using Surpac software to encompass the full extent of the deposit. The block model used a primary block size of 10m NS by 5m EW by 5m RL with sub-blocking to 2.5m by 1.25m by 1.25m. The parent block size was selected based on approximately half the average drill spacing of RC drilling in the well drilled areas, while dimensions in other directions were selected to provide sufficient resolution to the block model in the across-strike and down-dip direction.

OK grade interpolation was used to estimate gold values in the block models with the search ellipse oriented to the variogram axes. For all zones in the block model, the wireframe interpretations were used as hard boundaries in the interpolation. That is, only grades inside each lode were used to interpolate the blocks inside the lode.

An orientated 'ellipsoid' search was used to select data for interpolation. The ellipsoid was oriented to the average strike and dip of the mineralised zones. Where high number of negative kriging weights were encountered those domains were rerun with an "octant" search.

A first pass of radius 20-40m with a minimum number of samples of 2-6 samples and a second pass of radius 40-80m with a minimum number of 2-6 samples were used for Jims. A third pass of search radius 80-160m was used with a minimum number of 2-4 samples to ensure all blocks within the mineralised lodes were estimated. The maximum number of samples ranged from 4-28 depending on the number of samples in the domain. Blocks that did not fill were given a fourth pass.

Bulk density was applied through oxidation state and rock type.

Table 10 – Jims Bulk Density

	Material Type	
Oxidation State	**Basalt**	**Waste Dump**
Oxide	2.6	2.5
Transitional	2.7	
Fresh	2.8	

The Mineral Resource was classified as Measured, Indicated and Inferred Mineral Resource based on data quality, sample spacing, and lode continuity. The Measured Mineral Resource is located below Jims Main Open Pit and has already been grade controlled drilled in part. The Indicated Mineral Resource was defined within areas of RC and diamond drilling of 25m by 25m (with some infill), where the continuity and predictability of the lode positions was good, and the estimation had reasonable slopes of regression. The Inferred Mineral Resource was assigned to areas where support for the continuity of mineralisation was limited by wider spaced drilling or insufficient drilling in smaller lodes. The minimum requirement for an inferred resource is 3 drill holes spaced apart so that strike and dip can be determined.

Both the open pit and underground Mineral Resources stated have been derived from Whittle optimisations for the open pit resource and Deswick stope optimisations for the underground resource based on a A$2,700 per ounce gold price, benchmark costs and processing recoveries.

- ***Mining, Metallurgy and Other Modifying Factors***

- **Metallurgy**

Metallurgical testing was carried out in 1993 to test the metallurgical properties of Jims.

The sighter test work campaign was carried out on a 12 metre intersection in JRC043 that had an average grade of 2.94 g/t gold. 25% of the of the gold was recovery by gravity concentration but it was noted that it was locked up in heavy particles. It was noted that leach kinetics were good and gold recovery was of the order of 96% with much of the extraction in the first 8 hours.

Further leach tests indicated that Jims weathered low and high grade had slow leaching times and after 40 hours recovery was 76% and 78%. The other 3 samples, (Jims Mottled Zone, Jims Transitional and Jims Primary) after 40 hours were 93 to 95%.

A conservative 85% processing recovery was applied to the Whittle shell constraining the Mineral Resource estimate.

Hurricane-Repulse Gold Deposit

Hurricane-Repulse is located adjacent to the Central Tanami Mill site, with the deposits fully encompassed by MLS153, MLS125 to MLS129. Mining has previously occurred at Hurricane-Repulse during the mid to late 1980s.

The updated Hurricane-Repulse estimate returned:

- within the optimised pit shell, using A$2,700 per gold ounce, at a reporting cut-off grade of 0.63 g/t gold for oxide and transitional material a Mineral Resource of 670kt grading 2.5 g/t gold for 53kozs;
-
- within the optimised pit shell, using A$2,700 per gold ounce, at a reporting grade of 0.97 g/t gold for fresh material a Mineral Resource of 20 kt grading 4.4 g/t gold for 3kozs; and
- below the optimised pit shell using A$2,700 per gold ounce and within the A$2,700 underground stope optimisation a Mineral Resource of 770 kt grading 4.9 g/t gold for 120 kozs.

for a combined total of 1,500 kt grading 3.8 g/t gold for 180 kozs. This represents a 11% increase in tonnes, 22% increase in grade and 32% increase in ounces.

Table 11 - Mineral Resource estimate for the Hurricane-Repulse Gold Deposit.

	COG (g/t Au)	Measured			Indicated			Inferred			Total		
		Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)
Hurricane-Repulse Gold Deposit													
OP Ox/Trans	0.63				510	2.6	42	165	2.1	11	670	2.5	53
OP Fresh	0.97				20	4.4	3	0	2.4	4	20	4.4	3
UG	SO @ 2.8				70	3.7	8	700	5.0	110	770	4.9	120
Total					**590**	**2.8**	**53**	**860**	**4.5**	**120**	**1,500**	**3.8**	**180**

- ***Geology and Mineralisation Interpretation***

The Hurricane-Repulse deposit is hosted by mafic volcanic flows (pillowed, vesicular and massive basalt flows) some volcanic flow breccias, sequences of lithic sandstones, siltstones and mudstones, occasional coarse sediments consisting of very proximal volcanic fragments, and more minor to rare siliceous/cherty horizons, and rare graphitic mudstones.

Vein stages have been identified from crosscutting relationships in several areas of the mine leases, with gold mineralisation associated with either:

1) grey quartz ± sericite ± pyrite ± chlorite ± sphalerite ± arsenopyrite ± gold; or
2) ankerite-quartz ± chalcopyrite ± chlorite ± gold ± sericite ± pyrite ± calcite.

Gold occurs in grains up to 15 µm within pyrite in first vein style and in chalcopyrite in the second vein style.

The overall strike length of the known gold mineralisation on the Hurricane-Repulse trend is of the order of 1,750 metres and has a variable down dip extent of about 180 metres. True thickness of gold mineralisation varies from less than a metre to 10 metres.

The host to the mineralisation in the Hurricane pit is interbedded sandstone and siltstone. In this area the strike of the mineralisation is about 030° and the strike length of individual lenses varies between 80 to 120 metres. The down dip extent of lenses varies from 10 to 80 metres and the true thickness from 0.6 to several metres. The shapes of the mineralisation are irregular and are interpreted to reflect the rheology contrasts between the siltstone and sandstone. The dips of the mineralisation varied from 30° to 75° southeast.

In the northern part of the Hurricane pit the mineralisation changes strike to about 010° as the mineralisation approaches the boundary between the sediments and basalt. The strike length of the mineralisation increases to 180 metres and there are a several cross-cutting structures that vary in strike from 040° to 075° close to the basalt / sediment contact. This pattern continues into the basalt.

Mineralisation on the Airstrip trend strikes at about 045° and dips between 45° to 50° southeast. The overall strike length is about 900 metres, but individual lenses vary from about 100 to 350 metres while the true thickness varies from less than a metre to several metres. The down dip extent has been interpreted to be up to 170 metres in length.

- *Drill Information and Sampling*

The various mineralised lodes at the Hurricane-Repulse prospect have been sampled using DDH, RAB, RC, blast holes ("BH") and WB drill holes. Drilling was completed by various owners since the 1980's.

Table 12 – Summary of Hurricane-Repulse Drilling.

Hole Type	In Database		In Resource Model	
	Hole Number	Metres Drilled	Hole Number	Intersection Metres
DDH	75	13,940.19	56	745.77
RAB	1,352	48,429.00		
RC	1,076	81,490.47	642	6,500.00
TR	6	945.00		
BH	242,607	705,655.00		
WB	5	404.00		
Total	**244,121**	**850,863.66**	**698**	**7,245.77**

For the drill holes drilled by Zapopan NL during the early 1990s, samples were collected at 1 metre intervals via a rig mounted cyclone and collected into plastic bags. All holes were originally sampled on a 3-metre composite using a PVC spear to obtain a 2kg sample. Most assaying was conducted at the onsite laboratory with a minor amount of assaying by outside laboratories during busy mine periods or for laboratory checking purposes. RC samples were assayed for gold only by fire assay with a 0.01 ppm detection limit. Once results were received for the 3 metre composites, mineralised zones for each RC hole were re-sampled at 1 metre intervals using a riffle splitter. 2kg samples were assayed for gold at the onsite laboratory.

Further Zapopan NL geologically logged all RC drill holes on a 1 metre basis, noting lithology, colour, weathering, alteration, quartz veining, iron oxides and sulphides.

For drill holes completed by Otter Gold Mines, RC drill samples were collected at 1m intervals. Samples were collected at the rig, representing cutting's coarse fraction. For CTP drillholes, all samples are taken at 1 metre intervals directly from the cone splitter, with the bulk sample collected in green bags and left on site.

For RC holes drilled in the mid-1990s to 2001 samples were taken at 1 metre intervals from the cyclone and manually fed through a riffle splitter. Historically, where wet samples were encountered the entire sample was collected into a 40-litre plastic bucket before being tipped into discrete piles whereupon scoop samples through the spoil pile were taken.

All diamond drill holes drilled from 1990s to 2011 were photographed and half core assayed in 1 metre intervals with the remainder retained for future reference. Core is stored in racks or on pallets at the TMJV core yard located at the old exploration camp, approximately 5km to the south of the Tanami mill.

For RC drill holes drilled by Tanami Gold between 2010 to 2011 samples were collected on a one metre basis through a 75:25% riffle splitter and placed into pre-numbered sample bags. The sample dryness varied from wet to dry. There were no wet samples used in the estimation. Tanami Gold personnel went to great pains to ensure that the cyclone was cleaned on a regular basis and that the splitter was also periodically cleaned. All the samples were submitted to SGS Laboratories in Perth and assayed using a 50g fire assay charge for gold with an atomic spectrometer finish. This method had a 0.01ppm detection limit. Sample weights were generally around 3kg in size.

Diamond holes produced NQ2 sized diamond drill core. The diamond core was half core sampled down the length of the core. Samples from HRDD0001 to HRDD0004 were submitted to Genalysis Laboratories, Holes HRDD0005 to HRDD0013 were submitted to SGS Laboratories in Perth. Both set of samples were assayed using a 50g fire assay charge for gold with an atomic spectrometer finish with a 0.01ppm detection limit.

Northern Star Stage-1 RC drilling saw all bulk material collected on a 1m basis directly from cyclone in pre labelled green plastic mining bags. Primary analysis determined using 4m speared composite samples at geologist discretion. Composite samples with a grade above 0.5g/t had single metre bulk samples riffle split (using a 3-tier riffle splitter).

Northern Star Stage-2 RC drilling saw single metre (1m) samples collected from a trailer mounted static cone splitter. Approximately 12.5% of each meter sample was collected in a pre-labelled calico bag with the depth while the remaining 87.5% was collected in a green mining bag and retained. As in stage 1 drilling 4m composite speared samples were taken for primary analysis, followed up by using before mentioned 1m samples.

All RC chips were logged using wet sieving technique retaining a sample in a plastic chip tray.

For Northern Star diamond drilling, selective samples were taken at the rig at the geologist's discretion focusing on areas with veins, sulphides, and alteration. The core was cut in half using an Almonte Core saw with the orientation line and geologists marking retained on the left-hand side of the core

- ***Sample Preparation and Analysis***

During the period from the late 1980s to about March 1994 most of the samples collected by Zapopan NL were assayed for gold by fire assay with a 0.01 ppm detection limited at the onsite laboratory.

During mining operations (mid 1990s to 2001) under the Tanami Gold Joint Venture drill samples were analysed offsite at ALS Alice Springs however with the availability of the onsite laboratory, the database does include some onsite analysis. There was no fixed procedure for selecting on- or offsite analysis; rather the choice was governed by onsite laboratory availability. Analysis (both on and offsite) was by AAS with selective FA checks. It should be noted that all onsite analysis was performed with a 20ml aliquot whereas ALS use a 50ml aliquot for all AAS readings.

Tanami Gold sent RC samples to SGS Laboratories in Perth for the 2010 to 2011 drilling. They were assayed using a 50g fire assay charge for gold with an atomic spectrometer finish. The method detection was 0.01 ppm Au. Sample weights were generally around 3kg. Samples from diamond holes HRDD0001 to HRDD0004 were submitted to Genalysis Laboratories, Holes HRDD0005 to HRDD0013 were submitted to SGS Laboratories in Perth. Both set of samples were assayed using a 50g fire assay charge for gold with an atomic spectrometer finish with a 0.01ppm detection limit.

Samples collected by Northern Star were sent to ALS in Malaga, Perth. Gold (Au) concentration was determined by ICP-AAS (Atomic Adsorption Spectrometry), after conventional Lead Button Fusion and HCl/HNO3 digestion of a 50g charge sample, with at least 170g of litharge-based flux at the ALS Malaga facility. This was common to both Diamond Core and RC Chip sample collection.

- ***QAQC***

No conclusions can be derived about the data quality collected prior to Tanami Gold taking control of the Hurricane-Repulse project. The only comment that can be made is that the gold assays from drilling appear to be repeatable. The area was originally mined by Zapopan NL from the mid to late 1980s to March 1994. Most assays were completed in an onsite laboratory. Records may still exist at the Tanami Gold Mine so a literature search in the archive sheds is warranted as it is likely that the laboratory would have run some form of QAQC.

QAQC programs from drilling data from the mid-1990s to 2001 was carried out but that data has not been located. Significant mining was also carried during that time period. Drilling by CTP appears to confirm the results, but no definite conclusion can be made about the quality of the earlier period of data collection. It is assumed to be representative.

Programs of QAQC have been carried out by Tanami Gold and CTP. Certified reference standards were inserted at regular intervals and results have, in the main, accurately reflected the original assays and expected values. Coarse crush duplicates show repeatable although variable results. This may be due to the heterogeneity of the mineralisation. A recognised laboratory has been used for analysis of samples.

Overall, the QAQC data does not indicate any bias and supports the assay data used in the Mineral Resource.

- ***Estimation Methodology and Classification***

Mineralisation interpretations were prepared by RPM Global in Leapfrog software. Other files were provided to MJM in Vulcan format files and converted to Surpac format by MJM.

The supplied wireframes were snapped to drill holes supplied by RPM Global in Leapfrog. A low grade cut off of 0.5 g/t gold was used but some lower values have been incorporated in the wireframes to enhance the continuity. The wireframes were based upon previous interpretations, structural measurements of veins and grade control drilling.

The wireframes of the mineralised zones were used to code the database to allow identification of the resource intersections. Surpac software was then used to extract down hole composites within the different resource domains. 6,432 out of a total of 6,762 samples were 1 metre lengths. All holes were composited to 1m as most of the sampling was at 1m intervals

Analysis of statistics and histogram plots for all lodes suggested that high grade cuts were required for 42 out of 84 lodes. A high grade cut of 5-15 g/t gold was applied to some of the lodes for gold. This resulted in a total of 526 composites from 42 lodes being cut or 7.5% of the data. The high-grade cuts were applied to the composite data prior to grade estimation.

Bulk densities were applied to the model by rock type and oxidation state. These values were derived from data collected by Tanami Gold in 2011 from diamond drill holes HRDD0005 to HRDD0013

Table 13 – Hurricane-Repulse Bulk Density

	Material Type			
Oxidation State	**Basalt**	**Sediments**	**Waste Dump**	**Backfill**
Oxide	2.29	2.51	2.2	2.2
Transitional	2.60	2.65		
Fresh	2.84	2.87		

Mineralisation continuity was examined via variography. The one metre composite data was transformed into a normal distribution using a normal scores transformation to help identify the main directions of mineralisation continuity from skewed data. A two-structured nested spherical model was found to model the experimental variograms reasonably well. The down-hole variogram provides the best estimate of the true nugget value,

A block model was created using Surpac software to encompass the full extent of the deposit. The block model used a primary block size of 10m NS by 5m EW by 5m RL with sub-blocking to 2.5m by 1.25m by 1.25m. The parent block size was selected based on approximately half the average drill spacing of RC drilling in the well drilled areas, while dimensions in other directions were selected to provide sufficient resolution to the block model in the across-strike and down-dip direction.

OK grade interpolation was used to estimate gold values in the block models with the search ellipse oriented to the variogram axes. For all zones in the block model, the wireframe interpretations were used as hard boundaries in the interpolation. That is, only grades inside each lode were used to interpolate the blocks inside the lode.

An orientated ellipsoid search was used to select data for interpolation. The ellipsoid was oriented to the average strike and dip of the mineralised zones.

A first pass of radius 25-60m with a minimum number of samples of 3-6 samples and a second pass of radius 50-120m with a minimum number of 3-6 samples were used for Hurricane Repulse. A third pass of search radius 100-240m was used with a minimum number of 3-6 samples to ensure all blocks within the mineralised lodes were estimated. The maximum number of samples ranged from 4-38 depending on the number of samples in the domain. Blocks that did not fill were given a fourth pass using nearest neighbour estimation.

The Mineral Resource was classified as Indicated and Inferred Mineral Resource based on data quality, sample spacing, and lode continuity. The Indicated Mineral Resource was defined within areas of RC and diamond drilling of 25m by 12 to 25m, where the continuity and predictability of the lode positions was good, and the estimation had reasonable slopes of regression. The Inferred Mineral Resource was assigned to areas where support for the continuity of mineralisation was limited by wider spaced drilling or insufficient drilling in smaller lodes. The minimum requirement for an inferred resource is 3 drill holes spaced apart so that strike and dip can be determined.

For reporting purposes only material that resides within an AU$2700 pit shell and underground optimisation are listed in the reported resource.

- ***Mining, Metallurgy and Other Modifying Factors***

- **Metallurgy**

Available data suggests that metallurgical gold recovery in oxide and transitional material is in the vicinity of 85 to 87%. Fresh rock gold recovery appears to be far more complex. The Repulse area may have gold recoveries of up to 87% in fresh rock, but this is based upon one sample and may not be representative of the entire Repulse pit.

A conservative 55% processing recovery was applied to the Whittle and Stope optimisations constraining the Mineral Resource estimate.

Crusade Gold Deposit

Crusade is located on EL28282, a granted 35 Block (101.07 km^2) Exploration Licence that fully encompasses the deposit that is sited approximately 100km northeast of the Central Tanami Mill site.

The updated Crusade estimate returned:

- within the optimised pit shell using A$2,700 per gold ounce, at a reporting cut-off grade of 0.77 g/t gold a Mineral Resource of 1,200 kt grading 2.2 g/t gold for 88 kozs; and

- below the optimised pit shell using A$2,700 per gold ounce and within the A$2,700 underground stope optimisation a Mineral Resource of 49 kt grading 3.7 g/t gold for 6 kozs.

for a combined total of 1,300 kt grading 2.3 g/t gold for 94kozs. This represents a 9% decrease in tonnes, 13% decrease in grade and 21% decrease in ounces.

Table 14 - Mineral Resource estimate for the Crusade Gold Deposit.

	COG (g/t Au)	Measured			Indicated			Inferred			Total		
		Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)	Tonnes (kt)	Gold (g/t)	Ounces (kozs)
Crusade Gold Deposit													
OP	0.77				1,200	2.2	86	38	1.7	2	1,200	2.2	88
UG	SO @ 3.0				49	3.7	6				49	3.7	6
Total					**1,200**	**2.3**	**92**	**38**	**1.7**	**2**	**1,300**	**2.3**	**94**

- ***Geology and Mineralisation Interpretation***

Crusade lies on the northerly striking and westerly dipping contact between biotite dacite and mafic volcanics. The contact dips between 60° to 70° west and strikes at about 020°.

The biotite dacite has been described as being porphyritic but also includes some lithic crystal tuffs, whilst the mafic volcanics are described as mainly pyroxene porphyritic units that are probably interpreted as flows. The dacite can be interpreted from airborne magnetic data and occurs as a magnetic low with an apparent thickness of 250 to 500 metres. The mafic volcanic unit can be seen clearly in the airborne magnetic data as a high that is striking at 020° and has an apparent thickness of about 100 metres.

Primary mineralisation is associated with hydrothermal veining and vein brecciation that are dominated by quartz enclosing lesser amounts of pyrite, illite/sericite and tourmaline. Accessory ore minerals associated with higher gold values include chalcopyrite, galena and sphalerite.

The overall strike of the economically significant mineralisation is about 680 metres and is made up of 9 lodes with 2 high grade subdomains. The mineralisation is striking at 020° and dips vary between 40° to 60° west. Individual lenses of mineralisation vary in strike length from 25 metres to 650 metres. Down dip lengths vary from 25 to 200 metres while true thickness can be from 2 to 25 metres.

- ***Drill Information and Sampling***

The various mineralised lodes at the Crusade prospect were sampled using DDH, RC and RAB drill holes. Drilling has been completed at Crusade by various owners since 1994 through to 2019.

Table 15 – Summary of Crusade Drilling.

Hole Type	In Database		In Resource Model	
	Hole Number	Metres Drilled	Hole Number	Intersection Metres
DDH	20	3,466.70	19	429.14
RAB	294	7,352.00		
RC	98	10,121.00	38	497.61
Total	**412**	**20,940.00**	**57**	**926.75**

RC drill samples were collected at 1m intervals. Samples were collected at the rig, representing cutting's coarse fraction. For CTP drillholes, all samples are taken at 1 metre intervals directly from the cone splitter, with the bulk sample collected in green bags and left on site.

For RC holes drilled in the 1990s samples were taken at 1 metre intervals from the cyclone and manually fed through a riffle splitter

Historically where wet samples were encountered the entire sample was collected into a 40-litre plastic bucket before being tipped into discrete piles, whereupon scoop samples through the pile were taken.

- ***Sample Preparation and Analysis***

A Tanami Gold historic report states that samples collected during the 1990's were submitted to the onsite laboratory. Analysis was by AAS with selective FA checks. The onsite procedure incorporates the inclusion of a check sample, quartz wash and a standard sample per batch of 30 samples. All onsite analysis was performed with a 20ml aliquot.

Samples collected by Northern Star were sent to ALS in Malaga, Perth. Gold (Au) concentration was determined by ICP-AAS (Atomic Adsorption Spectrometry), after conventional Lead Button Fusion and HCl/HNO3 digestion of a 50g charge sample, with at least 170g of litharge-based flux at the ALS Malaga facility. This was common to both diamond core and RC sample collection.

- ***QAQC***

Programs of QAQC have been carried out by CTP Joint venture. Certified reference standards were inserted at regular intervals and results have, in the main, accurately reflected the original assays and expected values. Field duplicates show some degree of variability but are considered acceptable. A recognised laboratory has been used for analysis of samples.

Overall, the QAQC data does not indicate any bias and supports the assay data used in the Mineral Resource.

- ***Estimation Methodology and Classification***

Mineralisation interpretations were prepared by Tanami Gold and Northern Star. They were provided to MJM in Vulcan format files and converted to Surpac format by MJM. Gold envelopes were modelled into a total of 9 individual domains or lodes and 2 subdomains. Subdomains or sub-lodes 21 – 22 are high grade lodes of lodes 1 – 2. The mineralisation was classified into 2 categories, mafic volcanic or biotite dacite hosted.

The wireframes of the mineralised zones were used to code the database to allow identification of the resource intersections. Surpac software was then used to extract down hole composites within the different resource domains. All holes were composited to 1m as most of the sampling was at 1m intervals.

Analysis of statistics and histogram plots for all lodes suggested that high grade cuts were required for 2 lodes. A high grade cut of 12g/t gold was applied to some of the lodes for gold. This resulted in a total of 5 composites being cut or 0.5% of the data. The high grade cuts were applied to the composite data prior to grade estimation.

Mineralisation continuity was examined via variography. The one metre composite data was transformed into a normal distribution using a normal scores transformation to help identify the main directions of mineralisation continuity from skewed data. A two-structured nested spherical model was found to model the experimental variograms reasonably well.

A block model was created using Surpac software to encompass the full extent of the deposit. he block model used a primary block size of 10m NS by 5m EW by 5m RL with sub-blocking to 2.5m by 1.25m by 1.25m. The parent block size was selected based on approximately half the average drill spacing of RC drilling in the well drilled areas, while dimensions in other directions were selected to provide sufficient resolution to the block model in the across-strike and down-dip direction.

OK grade interpolation was used to estimate gold values in the block models with the search ellipse oriented to the variogram axes. For all zones in the block model, the wireframe interpretations were used as hard boundaries in the interpolation. That is, only grades inside each lode were used to interpolate the blocks inside the lode.

An orientated ‘ellipsoid’ search was used to select data for interpolation. The ellipsoid was oriented to the average strike and dip of the mineralised zones.

A first pass of radius 40-60m with a minimum number of samples of 4-6 samples and a second pass of radius 80-120m with a minimum number of 4-6 samples were used for Crusade. A third pass of search radius 160-240m was used with 3-6 samples to ensure all blocks within the mineralised lodes were estimated. The maximum number of samples ranged from 8-24 depending on the number of samples in the domain. Blocks that did not fill were given a fourth pass.

Bulk density was applied through oxidation state and rock type. These values were derived from average values for dacite and basalt and adjusted for oxidation.

Table 16 – Crusade Bulk Density

	Rock Type	
Oxidation State	**Basalt**	**Biotite Dacite**
Oxide	2.29	2.51
Transitional	2.60	2.65
Fresh	2.84	2.87

The Mineral Resource was classified as Indicated and Inferred Mineral Resource based on data quality, sample spacing, and lode continuity. The Indicated Mineral Resource was defined within areas of RC and diamond drilling of 40m by 40m (with some 25 by 25 metre infill and twinning), where the continuity and predictability of the lode positions was good, and the estimation had reasonable slopes of regression. The Inferred Mineral Resource was assigned to areas where support for the continuity of mineralisation was limited by wider spaced drilling or insufficient drilling in smaller lodes. The minimum requirement for an inferred resource is 3 drill holes spaced apart so that strike and dip can be determined.

For reporting purposes only material that resides within an AU$2700 pit shell and underground optimisation are listed in the reported resource.

- ***Mining, Metallurgy and Other Modifying Factors***

- **Metallurgy**

Metallurgical testing was carried out in 1996 by Oretest Pty Ltd (“Oretest”) to test whether the Crusade prospect was amenable to heap leach extraction of gold. Oretest concluded that the saprolite and weathered bedrock was amenable to heap leach however the fresh rock was not.

Further test work in 1996 was carried out by Normet Pty Ltd (“Normet”) on CDH007 from 53 to 83 metres in a zone that was considered to represent saprolite and weathered bedrock. Normet concluded that a recovery of 80% at a solution rate of 2.5m^3/t could be expected from a heap leach extraction method. Although this testing is not directly applicable to recoveries in a CIL plant it is a reasonable assumption that the gold is cyanide extractable recoveries of around 90% could be expected in oxide and transitional material.

Further testing was carried out in 2020 by the Northern Star exploration department on ore grade material from drill holes SJRC0005-6 using a 500g Leachwell assay and fire assay of the residual material. Arsenic and sulphur values were compared with the recovery data along with the oxidation state of the sample. There appears to be a correlation between As, S and Au recovery.

A conservative 94% for the oxide and transitional material and 40% for the fresh rock for the processing recovery was applied to the Whittle shell and Stope Optimisation constraining the Mineral Resource estimate.

Information on Tanami's projects can be found on the Company's website at https://www.tanami.com.au.

This release has been authorised by the Board of Directors of Tanami Gold NL.

Arthur G Dew
Chairman
Tanami Gold NL

Competent Persons Statements

The information in this release that relates to the Mineral Resource estimate of the Groundrush Gold Deposit, Ripcord Gold Deposit, Jims Gold Deposits, Hurricane-Repulse Gold Deposits and the Crusade Gold Deposit is based on information compiled by Mr. Graeme Thompson, who is a Member of the Australasian Institute of Mining and Metallurgy, and is an employee of MoJoe Mining Pty Ltd. Mr Graeme Thompson has sufficient experience, which is relevant to the style of mineralisation and type of deposit under consideration and to the activity, which he has undertaken to qualify as a Competent Person, as defined in the 2012 Edition of the Australasian Code for the Reporting of Mineral Resources and Ore Reserves.

Mr Graeme Thompson has provided written consent approving the inclusion of the Mineral Exploration Results in the report in the form and context in which they appear.

The information in this report that relates to Exploration Results prior to the involvement of Northern Star fairly represents information and supporting documentation that was compiled by Mr. Neale Edwards BSc (Hons), a Fellow of the Australian Institute of Geoscientists, who is a Director of the Company and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as Competent Persons as defined in the 2012 Edition of the Australasian Code of Reporting for Exploration Results, Mineral Resources and Ore Reserves. Mr. Neale Edwards has provided written consent approving the inclusion of the Exploration Results in the report in the form and context in which they appear.

Mr Neale Edwards has provided written consent approving the inclusion of the Exploration Results in the report in the form and context in which they appear.

The information in this Report that relates to exploration carried out by NST, its results, data quality and geological interpretations for the Company's Operations is based on information compiled by Dr Jamie Rogers, a Competent Person who is a Member of the Australasian Institute of Geoscientists and a full-time employee of Northern Star Resources Limited. Dr Rogers has sufficient experience that is relevant to the styles of mineralisation and type of deposits under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves.

Dr Rogers consents to the inclusion in this Report of the matters based on this information in the form and context in which it appears.

Appendix 1 - JORC Table 1
Groundrush Gold Deposit

Section 1 - Sampling Techniques and Data

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

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (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.*	Sampling was completed using reverse circulation (RC) and diamond (DDH) core drilling. Some drill holes were pre-collared using RC drilling methods and completed with DDH tails, while some were drilled diamond core or reverse circulation from the surface.
	• *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.*	Diamond drilling used a combination of HQ and NQ2-sized core. HQ core was drilled until competent ground was intersected, then NQ2 core was drilled. Drill core was oriented, aligned, and half-cut using metre intervals and geologically determined intervals (max 1.2 metres and min 0.3 metres), with geologically determined intervals taking precedence. RC metres intervals are defined by paint markings on the rig. The larger split or sample reject is left at the sample pad to indicate metres drilled.
	• *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.*	1m RC samples were collected from a cone splitter on the rig, in a calico bag. The sample/bulk ratio was 12.5/87.5. Sample weights ranged between 1kg and 4kg, although sample weight/size are ideally uniform, at least within a drillhole. Sampling of DDH drillholes was completed using a diamond core saw. Half core was sampled on intervals between 0.3-1.2m in length honouring lithological boundaries. Sample weights are typically between 0.5kg and 3kg, mostly dependent on length, however sometimes dependent on lithology.
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 was completed using a 5.25" face sampling hammer drill bit. Diamond core was completed using a combination of HQ and NQ2 size drill bits and oriented where possible using the bottom dead centre technique. Deviation surveys were completed on all drillholes using Reflex ACT, EZY MARK, Boart Longyear TruCore, or Axis Champ Ori equipment. Single Shot Surveys were completed at 30m intervals during drilling, and a continuous in/out survey was completed at the end of the hole.
Drill sample recovery	• *Method of recording and assessing core and chip sample*	Approximate RC recoveries are sometimes recorded as percentage ranges based on a visual and/or

Criteria	JORC Code explanation	Commentary
	recoveries and results assessed.	weight estimate of the sample. RC recovery in the completed campaigns were considered consistent. DDH core was reconstructed into continuous runs with depths checked against core blocks. Core recoveries were recorded as a percentage and calculated from measured core versus drilled intervals by geologists.
	• *Measures taken to maximise sample recovery and ensure representative nature of the samples.*	Experienced RC drilling contractors were engaged to complete the drilling campaigns. Drilling contractors are supervised and routinely monitored by the geologists. The diamond drill contractors adjusted their drilling rate and method if recovery issues arose. All recovery was recorded by the drillers on core blocks. This was checked and compared to the core measurements by the geological team. Any issues were communicated back to the drilling contractor, and necessary adjustments were made.
	• *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.*	No relationship was noted between RC sample recovery and grade. The consistency of the mineralised intervals suggests sampling bias due to material loss or gain is not an issue. No relationship was noted between core recovery and grade. The consistency of the mineralised intervals suggests that sampling bias due to material loss or gain is not an issue.
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.*	All RC holes were logged by geologists at the drill rig to a high level of detail to support resource estimation, mining studies and metallurgical studies. RC logging is undertaken on a metre by metre basis at the time of drilling. Geologists log DDH core to industry standards. All relevant features such as lithology, structure, texture, grain size, alteration, oxidation state, vein style and veining percentage per interval, and mineralisation were recorded in the geological logs.
	• *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.*	RC samples are logged for lithology, alteration, mineralisation. Logging is a mix of qualitative and quantitative observations. Visual estimates are made of sulphide, quartz, and alteration as percentages. RC samples are not photographed. All DDH logging was quantitative where possible and qualitative elsewhere. All diamond drill core was photographed.
	• *The total length and percentage of the relevant intersections logged.*	The entire length of each RC and diamond core hole was logged.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.*	Diamond drill core was cut in half using a diamond core saw. Half core was sampled on intervals between 0.3-1.2m in length honouring lithological boundaries. The right-hand side of the core was bagged as the primary sample for analyses. The remaining half of the core was archived and stored for reference.
	• *If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.*	Depending on the drilling campaign, RC samples were sampled using a cyclone rotary splitter mounted on the RC drill rig, from an approximate 12.5% split off the bulk reject, or samples were collected using a cyclone then split using a riffle splitter down to approximately 2kg.

Criteria	JORC Code explanation	Commentary
		Primary analysis on some RC drilling was determined using 4m speared composite samples at the geologist's discretion. Composite samples with a grade above 0.5 g/t gold had single metre bulk samples riffle split (using a 3-tier riffle splitter) and reanalysed. All RC chips were logged using wet sieving technique retaining a sample in a plastic chip tray.
	• *For all sample types, the nature, quality and appropriateness of the sample preparation technique.*	Sample preparation was completed at various labs depending on the drilling campaign and are deemed appropriate. Normandy completed sample preparation in Alice Springs All Newmont samples were sent to ALS in Alice Springs for 50g fire assay (method Au-AA26). Sample preparation included jaw crushing all the interval then pulverisation by an LM5. Barren quartz flushes were inserted between each sample to minimise sample cross-contamination. In 2012 samples were sent to Intertek Genalysis (Genalysis) with preparation completed in Alice Springs and analysis done in Townsville. Samples are dried at approximately 120°C, crushed and rotary split (where required), and fine pulverised. Northern Star drilling samples were prepared at ALS Perth, commencing with sorting, checking, and drying at less than 110°C to prevent sulphide breakdown. Samples were jaw crushed to a nominal -6mm particle size. If the sample is greater than 3kg, a Boyd crusher with a rotary splitter is used to reduce the sample size to less than 3kg at a nominal <3mm particle size. The entire crushed sample (if less than 3kg) or sub-sample is then pulverized to 90% passing 75µm, using a Labtechnics LM5 bowl pulveriser. 300g Pulp subsamples are then taken with an aluminium scoop and stored in labelled pulp packets.
	• *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.*	Grind checks are performed at both the crushing stage (3mm) and pulverising stage (75µm), requiring 90% of the material to pass through the relevant size.
	• *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.*	The sample preparation is considered appropriate and to industry standard. Field duplicates for RC drilling are routinely analysed at a rate of 1 in 20 samples. No Field duplicates were submitted for diamond core sampling.
	• *Whether sample sizes are appropriate to the grain size of the material being sampled.*	Sample sizes are considered appropriate to represent the style of mineralisation, the thickness and consistency of the intersections, the sampling methodology and assay value 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.*	Gold concentration was determined by several methods from several campaigns, including: Samples from Normandy were sent to Analabs in Adelaide utilising several assay techniques for gold including P603 (Acid Digest, Carbon Rod Finish), P625 (Acid Digest, AAS Finish), P630 (30g Fire Assay, AAS Finish), P650 (50g Fire Assay, AAS Finish). Normandy procedures dictated that aqua regia was to be utilised for all samples unless visible gold was observed during logging. If the gold assay returned was greater than 2 ppm, the sample was resubmitted for a fire assay; if it was greater than 7-8 ppm, then it was re-submitted for a screen fire assay. If visible gold was observed during logging, screen fire assay was the preferred technique.

Criteria	JORC Code explanation	Commentary
		Samples by Tanami Gold in 2011 were sent to SGS in Perth where gold grades were determined by 50 g Fire Assay with AAS finish (Ore grade analysis FAA505).50 g Fire Assay with AAS finish (Ore grade analysis FAA505) fire assay using the lead collection method with a 50g sample charge weight. MP-AES instrument finish was used to measure gold levels. The methodology used measures total gold. In 2012 samples were sent to Intertek Genalysis (Genalysis) with preparation completed in Alice Springs and analysis done in Townsville. Analysis for gold was completed using a 50-gram lead collection fire assay with aqua regia digestion of the prill and flame AAS determination of the gold to 0.005 ppm (FA50/AA). Gold concentration was determined for Northern Star samples sent to ALS in Perth by fire assay using the lead collection method with a 50g sample charge weight. MP-AES instrument finish was used to measure gold levels. The methodology used measures total gold.
	• *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..*	No geophysical tools were used to determine any element concentrations.
	• *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	Historical QAQC data from the Normandy and Newmont drilling has not been located but reports reference that QAQC was completed. It is likely that the drilling was of good quality as the area was mined by open pit methods. QAQC programs were completed by Tanami Gold and Northern Star as lined out below. QAQC protocols include the use of commercially prepared certified reference materials ("CRM") that are inserted at a rate of 1 in 20 samples. The CRM is not identifiable to the laboratory and is assessed on import to the database and reported monthly, quarterly, and annually. Values outside of 3 standard deviations were re-assayed with a new CRM. Failed standards are followed-up by re-assaying a second 50g pulp sub-sample of all samples in the batch above 0.1 ppm gold by the same method at the primary laboratory. Laboratory QAQC protocols include repeat analysis of pulp samples at a rate of 1 in 20 samples. Screen tests (percentage of pulverised sample passing the 75µm mesh) are undertaken at a rate of 1 in 40 samples. The laboratory reports its QAQC data regularly. The laboratory's standards are routinely loaded into the database. The accuracy component (CRMs) and the precision component (duplicates and repeats) of the QAQC protocols are thought to provide an acceptable level of accuracy and precision. Blanks were routinely inserted into the sample sequence at a rate of 1 per 25 samples and again specifically after potential or existing high-grade mineralisation to test for contamination. Failures of blanks above 0.2g/t were followed up, and re-assayed. New pulps were prepared if failures continued.
Verification of sampling	• *The verification of significant intersections by either*	All significant intersections were verified by Geologists on-site during the drill-hole validation process

Criteria	JORC Code explanation	Commentary
and assaying	*independent or alternative company personnel.*	and later signed off by a Competent person, as defined by JORC.
	• *The use of twinned holes.*	No twinned holes were drilled for this data set.
	• *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.*	Primary data is either entered directly or imported into a SQL acQuire database using semi-automated or automated data entry; hard copies of core assays and surveys are stored at site. Assay files are received in .csv format and loaded directly into the SQL acQuire database by geologists or database administrators. Hardcopy and electronic copies of the data is stored for future reference. Visual checks occur as a result of regular use of the data.
	• *Discuss any adjustment to assay data.*	The first (primary) gold assay is almost always utilised for any resource estimation, except where evidence from re-analysis or check analysis dictates. A systematic procedure utilising several re-assays and/or check assays are employed to determine if/when the first (primary) gold assay is changed for the final assay.
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.*	Planned drillholes were sited either with a handheld global positioning system (GPS) or a differential global positioning system (DGPS), and the initial drillhole pickup is usually with a handheld GPS, as well, with accuracy between ± 0.3 to 1m. After program completion, differential GPS (DGPS) is used for the final collar pickup with an accuracy of ± 5mm. During drilling, single-shot surveys were taken every 30m to ensure the hole remains close to the design. Down-hole surveys were performed using Reflex ACT, EZY MARK, Boart Longyear TruCore, or Axis Champ Ori equipment., recording the down-hole dip and magnetic azimuth. These results were then uploaded into the database.
	• *Specification of the grid system used.*	Collar coordinates were recorded in MGA94 Zone 52.
	• *Quality and adequacy of topographic control.*	Topographic control was established through detailed aerial and ground survey control from airborne survey acquisition, or a DGPS elevation with an accuracy of ± 10mm is used.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.*	Drillhole spacing at Groundrush varies, although minimum 25m spacing was targeted during the design and drilling phases.
	• *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.*	The data spacing and distribution from the reported campaigns is sufficient to establish geological and/or grade continuity. Further drilling will be required to ensure that it is appropriate for resource estimation and classifications to be applied.
	• *Whether sample compositing has been applied.*	No sample compositing was applied. Sample compositing was only undertaken as part of the Mineral Resource estimation process.
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.*	Drillholes were drilled at an angle that is approximately perpendicular to the orientation of the mineralised trends.
	• *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*	No sampling bias is considered to have been introduced by the drilling orientation.

Criteria	JORC Code explanation	Commentary
	assessed and reported if material.	
Sample security	• *The measures taken to ensure sample security.*	The chain of custody of samples was managed by geologists and geotechnicians. Geologists or geotechnicians transport core and RC samples to the admin/mine site; the drill core is logged, cut, and sampled at on-site core shed. Samples were bagged in tied numbered calico bags, grouped in larger tied polyweave plastic bags, and placed in large bulka bags with sample submission sheets. The bulka bags were sent by road freight to the laboratory. Field personnel involvement ceased at this stage. The results of analyses were returned via email or uploaded to an FTP site. Sample pulp splits are stored for a time at the laboratory. Retained pulp packets are returned to the Central Tanami Mine for storage.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	Geologists have undertaken internal reviews of applied sampling techniques and data. The completed reviews raised no issues.

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 Groundrush Gold Deposit is located in the Tanami Region in the Northern Territory on Mining Licence (Groundrush) ML22934, approximately 45km northeast of the Central Tanami Mill site. ML22934 covers an area of 39.5 km2 and forms part of the Central Tanami Project, a 50/50 Joint Venture between Tanami Gold NL and Northern Star Limited. The 2,211km2 tenement area in the Tanami Region held by the CTPJV is registered jointly in Northern Star (Tanami) Pty Ltd and Tanami (NT) Pty Ltd. The CTPJV comprises ten Exploration Licences, eight of which are granted, and two applications, nineteen Mineral Leases, and one Mining Licence. Mineral Leases have a 25-year life and are renewable for 25 years. The Central Tanami project area lies on Aboriginal land within the Central Desert Aboriginal Land Trust and the Mt Frederick Aboriginal Land Trust, both administered by the Central Land Council.
	• *The security of the tenure held at the time of reporting along with any known impediments to obtaining a license to operate in the area.*	ML22934 is granted and in good standing.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	The Groundrush area has been explored since the mid 1980's. Numerous companies, including Zapopan NL, Otter Gold NL, Normandy Mining Ltd, Newmont (Asia Pacific), and Tanami Gold NL have been active in the area. Drilling reported with this release is contiguous with the Groundrush open-cut mine. Previous drilling at this project adds gold grade and geological context to the subsequent Northern Star Resources

Criteria	JORC Code explanation	Commentary
		interpretation of the area as tested by the drill holes covered by this report. Recent exploration in the area has been completed by the Joint Venture partners, Tanami Gold NL and Northern Star Limited.
Geology	• *Deposit type, geological setting and style of mineralisation.*	Rocks of the Killi Killi Formation host the Groundrush deposit exposed in a narrow N- to NNW-trending corridor flanked by lobes of the younger Frankenia Dome granite. Groundrush thus lies within rocks of a similar age to the host rocks of The Granites and Dead Bullock Soak gold deposits 100km to the south, but older than the Mount Charles Formation, which hosts the Tanami gold deposits 50km southwest. Less than 1 km to the north of Groundrush, the Killi Killi beds are truncated by a fault-bounded outlier of younger sediment of the Mount Charles Formation. At Groundrush, a package of relatively undeformed, steeply west-dipping, sedimentary rocks is intruded by two tabular dolerite units broadly conformable with bedding. The main dolerite body exposed in the open pit consists of a coarser-grained leucocratic quartz dolerite. Gold mineralisation is mainly hosted in quartz-sulphide veins and stockwork zones within steeply dipping shear zones in the quartz dolerite unit and flat dipping quartz-sulphide brittle fracture veins.
Drill hole information	• *A summary of all information material to the under-standing 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*	This release pertains to the reporting of Mineral Resources. Exploration results have previously been regularly reported to the ASX by the Joint Venture parties.
	• *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.*	This release pertains to the reporting of Mineral Resources. Exploration results have previously been regularly reported to the ASX by the Joint Venture parties.
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.*	This release pertains to the reporting of Mineral Resources. Exploration results have previously been regularly reported to the ASX by the Joint Venture parties. In the reporting of exploration results, results are reported as weighted averages using a nominal 0.5 g/t gold cut-off and up to 2 metres of internal dilution. No high-grade cuts were applied.

Criteria	JORC Code explanation	Commentary
	• *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.*	This release pertains to the reporting of Mineral Resources. Exploration results have previously been regularly reported to the ASX by the Joint Venture parties. Any high-grade zones above 15g/t gold within a reported intercept are also reported as included intervals.
	• *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	No metal equivalent values were used to report previous exploration results.
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.*	The reported drillholes have been drilled approximately perpendicular to the orientation of the targeted mineralised trends.
	• *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.*	The exact orientation of the Groundrush mineralised system is generally well understood. The geometry of the mineralisation to drillhole intercepts generally at a high angle, often nearing perpendicular. There is enough historic exploration and production data at Groundrush to infer geological continuity in mineralisation 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').*	When exploration results were previously disclosed, only downhole lengths were reported. True widths are not known.
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.*	Appropriate diagrams accompany this release.
Balanced Reporting	• *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.*	Planned drillholes are sited with a handheld global positioning system (GPS), and the initial drillhole pickup is usually with a handheld GPS, as well; with accuracy between ± 0.3 to 1m. After program completion, differential GPS (DGPS) is used for the final collar pickup with an accuracy of ± 5mm.
	• *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.*	Both high and low grades have been reported accurately, clearly identified with the drill-hole attributes and 'From' and 'To' depths. All intercepts for all holes have been reported regardless of grade.
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.*	Exploration results have previously been regularly reported to the ASX by the Joint Venture parties.
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large- scale*	Drilling is planned for CY23 to infill and expand the current resource envelope.

Criteria	JORC Code explanation	Commentary
	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.*	Appropriate diagrams accompany this release.

Section 3 - Estimation and Reporting of Mineral Resources

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.*	The drill hole database is managed by Northern Star Resources in Acquire. MJM completed systematic data validation steps after receiving the database. Checks completed by MJM included verifying that: 1. Down-hole survey depths did not exceed the hole depth as reported in the collar table. 2. Visual inspection of drill hole collars and traces in Surpac. 3. Assay values did not extend beyond the hole depth quoted in the collar table. 4. Assay and survey information was checked for duplicate records. There are some minor overlap errors in the RC and diamond drill holes where 4 metre samples overlapped later 1 metre samples but the occurrence was not significant
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.*	Mr Joe McDiarmid, Director of MoJoe Mining has made a number of site visits. The competent person has visited site on a number of occasions.
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.*	The confidence in the geological interpretation is moderate as there is no exposures and it is based upon RC and diamond drill holes. Mineralisation was based upon sectional interpretations that were assumed to be continuous between sections. At this stage of the project no alternative geological interpretations have been considered. The Groundrush deposit is hosted within the Killi Killi Formation of the Tanami Group (1838+/-6Ma) (Huston, 2006 in Hillyard, 2013), a turbiditic siltstone and sandstone (arkose and greywacke) unit up to 4 Km thick that has been intruded by a fractionated dolerite sill. This unit conformably overlies the Dead Bullock Formation, composed of graphitic units with minor chert and iron rich horizons. Dolerite sills up to 200+m thick intrude the Tanami Group.

Criteria	JORC Code explanation	Commentary
		Bland & Annison (2016) state that the Groundrush deposit sits in an almost arcuate belt of sediments belonging to the Killi Killi formation, it lies between two major granitoid intrusions: The Coomarie Dome to the Northwest and the Frankenia Dome to the Southeast. Sediments dip steeply to the Southwest and exhibit three dolerite intrusions of which there is one containing the bulk of Groundrush gold mineralisation. Other intrusions at Groundrush include dolerite, tonalite porphyry, andesite and quartz monzodiorite. Overall, the deposit can be referred to as a reverse fault orogenic system; mineralisation is typically hosted in stacked vein sets with a variety of orientations as well as sub-vertical quartz-filled shear zones. Along with the various orientations of veining there also exists a variety of types: shear, extensional and also a shear-extension hybrid style of veining. Cross cutting faults are known to exist in the prospect area. These could have an effect of the geometry and continuity of the gold mineralisation.
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.*	Gold mineralisation is primarily hosted within a fractionated dolerite sill, with minor mineralisation extending into turbiditic sediments. Previous mining of the open pit concentrated on ore zones that incorporated many of the vein sets within an economic zone. Fogden (2012) completed a geological analysis and modelled vein sets and lodes identified in close spaced grade control drilling and regional data sets. Three main orientations were identified; steep west dipping shear hosted veins, moderate east dipping veins and moderate west dipping veins. Further, relative metal proportions were estimated to be approximately 70% in the steep shear hosted lodes, 20% in the east dipping lodes and the remaining 10% in the west dipping lodes. The known strike length of the gold mineralisation is about 1.9 km. The down dip extent is about 450 metres with a number of lodes dipping variably. Individual lenses down dip extent varies from 20 to 250 metres. True thickness varies from a few metres to over 20 metres. Overall, the 32 steep and 22 flatter dipping lodes were modelled for the open pit wireframe with one less flatter dipping lode for the underground wireframe. The steep lodes make up 80% of the resource and confidence in these lodes is high. The flatter dipping lodes intersect the steep lodes in many areas. The steep lodes are generally striking around 340o but varied from 323º degrees to 355o and have a total strike length of 1900 metres. They dip about -60º to -70º west but range from -32º to -80º west. These lodes are mostly plunging to the south at about 10º. The strike length of the lodes varies from 50 to 970 metres, and they extend down dip from 50 to a maximum of 250 metres. The true thickness of the lodes varies from 1-2 to 35 metres thick. The geometry of these lodes is as stacked lenses within the Groundrush dolerite. These lenses are still open down plunge. The flat lying lodes are only well established in the mined-out areas where they were defined by closed spaced grade control drilling. These lodes crosscut the steep lodes and are difficult to interpret from the exploration drilling data. They are largely confined to areas of dolerite and strike between 325º to 340º, dip from 25º to 50º and plunge southwest between 15º to 24º. These lodes are best developed in mined

Criteria	JORC Code explanation	Commentary
		out areas of the open where supergene effects have played a role in their enrichment. The strike length of these lodes varies from 50 to a maximum of 600 metres with a true thickness in fresh material of 1-2 metres. The down dip extent varies from 15 to 100 metres. Volumetrically they represent about 20% of the total resource with most of that volume intersecting steep lodes.
Estimation and modelling techniques	• *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 (eg 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.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	Ordinary Kriging (OK) interpolation with an oriented 'ellipsoid' search was used for the estimate. Surpac software was used for the estimations. Three dimensional mineralised wireframes (interpreted by CTPJV and checked by MJM) were used to domain the gold data. Sample data was composited to 1m down hole lengths using the 'fixed length' method. Intervals with no assays were excluded from the estimates. The influence of extreme grade values was addressed by reducing high outlier values by applying top-cuts to the data. These cut values were determined through statistical analysis (histograms, log probability plots, CV's, and summary multi-variate and bi-variate statistics) using Supervisor software. MJM has not made assumptions regarding recovery of by-products from the mining and processing of ore at the Groundrush deposit. All modelling was completed in Surpac Geovia software. No estimation of deleterious elements was carried out. Only gold was interpolated into the block model. The block model used a primary block size of 10m NS by 5m EW by 5m RL with sub-blocking to 2.5m by 1.25m by 1.25m for the open pit model and 10m NS by 5m EW by 5m RL with sub-blocking to 2.5m by 0.625m by 0.625m for the underground model. The parent block size was selected based on approximately half the average drill spacing of RC drilling in the well drilled areas, while dimensions in other directions were selected to provide sufficient resolution to the block model in the across-strike and down-dip direction. QKNA was completed in Supervisor software to justify the block size, number of samples, search ellipses and discretization An orientated 'ellipsoid' search was used to select data for interpolation. The ellipsoid was oriented to the average strike and dip of the mineralised zones. Where significant negative weights were encountered, and the model was outside of 10% versus the naïve and declustered means some domains were re-estimated using an octant search. A first pass of radius 20-80m with a minimum number of samples of 3-6 samples and a second pass of radius 40-160m with a minimum number of 3-6 samples were used for Groundrush. A third pass of search radius 80-320m was used with 3-4 samples to ensure all blocks within the mineralised lodes

Criteria	JORC Code explanation	Commentary
		were estimated. The maximum number of samples ranged from 3-28 depending on the number of samples in the domain. Blocks that did not fill after 3 passes were given a fourth pass using nearest neighbour estimation Selective mining units were not modelled. The block size used in the resource model was based on drill sample spacing and lode orientation. To validate the model, a qualitative assessment was completed by slicing sections through the block model in positions coincident with drilling. A quantitative assessment of the estimate was completed by comparing the average gold grades of the composite file input against the gold block model output for all the resource objects. A trend analysis was completed by comparing the interpolated blocks to the sample composite data within the main lodes. This analysis was completed for eastings and elevations across the deposit. Validation plots showed good correlation between the composite grades and the block model grades.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	Tonnages and grades were estimated on a dry in situ basis.
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	The Mineral Resource estimate has been constrained by the wireframed mineralised envelopes, is undiluted by external waste and reported above a 0.7g/t gold cut-off grade and a AU$2700 optimisation pit shell for open pit. The underground resource is reported by a AU$2700 stope optimisation that includes dilution. These figures were based upon financial studies by MoJoe Mining Pty Ltd.
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 is assumed the Groundrush deposit will be mined by open pit and underground methods when a new mining operation can be established. The following mining factors and costs were used for the Whittle optimisation of the open pit resource: - OP Mining Recovery 98% - OP Mining Dilution 10% - Oxide Processing Recovery 95% - Trans Processing Recovery 95% - Oxide and backfill slope 45° - Trans and Fresh slope 39° - Backfill or Waste Dump Mining Cost $2.75/t - Mining Cost $4.40/t - Incremental Ore Mining Cost $4.95/t - Open Pit Grade Control Cost $0.88/t - Mill Opex Cost (2.0 Mtpa) $34.01/t - ROM to mill transport distance 44km

Criteria	JORC Code explanation	Commentary
		- ROM to Mill cost $4.84/t - Admin (G&A) cost $4.95/t - Au Royalty 5% - Au Price AU$2700/tr oz - Deswick software was used for the underground resource stope optimisation. - Stope Optimiser Assumptions - HW planned dilution skin 0.5 m - FW planned dilution skin 0.25 m - Minimum Mining width 3 metres not including dilution skins - Stope optimisation length 20 m along strike - Sub level interval 25 m - Optimise grade - Stope optimisation -20 degrees - Sub Stope Shapes enabled - Smoothing fast - UG mining unplanned recovery 5% - UG mining unplanned dilution 5% - Processing Recovery 95% - UG Stoping cost $70 per tonne ore - UG Opex Fixed Cost $5 per tonne ore - Mill Opex Cost (2Mtpa) $30.92 per tonne - ROM to mill transport $4.40 per tonne - Admin $4.50 per tonne - NT Factor $11.48 per tonne - Au Royalty 5% - Au Price AU$2700 troy ounce
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*	Twelve composite samples were collected for the TGNL Definitive Feasibility Study (DFS) Extraction Test Work that included a total of 18 individual samples from within the model mineralised lodes of the Groundrush deposit. A total of 5 extra samples (including 6 individual samples from within the model mineralised lodes) that were originally used in the Pre-Feasibility Study (PFS) have also been included in the data (Smith, 2013). The samples were derived from ¼ NQ2 diamond core and sent to ALS Laboratories. Tailings Sample test work were collected and tested at the same time. The metallurgical data shows excellent gold recoveries that range from 86.7% to 99.3% with an average of 94.3%

Criteria	JORC Code explanation	Commentary
	assumptions made.	
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 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.*	No assumptions have been made regarding environmental factors.
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 for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	Bulk density measurements were routinely taken by Tanami in 2011-2012 using the wet and dry emulsion method. Measurements were taken at regular 10 m intervals downhole and are chosen to be representative of the surrounding geology. This data was analysed by Tanami and summarised by mineralisation, lithology and elevation. Bulk density measurements were taken from multiple sections (mineralized and waste) throughout pre-determined new resource definition drilling holes (normally holes ending in 0 and 5). A total of 845 bulk density measurements were taken from 20 drill holes. These results were the validated against previous bulk densities in the 2012 Optiro/Tanami resource model. Measurements were taken using the immersion method and related back to dominant rock code. No oxide and transitional zone were measured in the program. The following values were assigned to the block models for bulk density.

Rock Type	Oxidation State	Density
SED	OX	2.53
SED	TRANS	2.62
SED	FRESH	2.74
GOD	OX	2.55
GOD	TRANS	2.9
GOD	FRESH	2.94

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td></td><td></td><td><table>
<tr><td>GQD</td><td>OX</td><td>2.4</td></tr>
<tr><td>GQD</td><td>TRANS</td><td>2.76</td></tr>
<tr><td>GQD</td><td>FRESH</td><td>2.86</td></tr>
<tr><td>WOD</td><td>OX</td><td>2.55</td></tr>
<tr><td>WOD</td><td>TRANS</td><td>2.9</td></tr>
<tr><td>WOD</td><td>FRESH</td><td>2.99</td></tr>
<tr><td>TOD</td><td>OX</td><td>2.55</td></tr>
<tr><td>TOD</td><td>TRANS</td><td>2.9</td></tr>
<tr><td>TOD</td><td>FRESH</td><td>2.94</td></tr>
</table></td></tr>
<tr><td>Classification</td><td>The basis for the classification of the Mineral Resources into varying confidence categories.
Whether appropriate account has been taken of all relevant factors (ie 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.</td><td>The Mineral Resource estimate is reported here in compliance with the 2012 Edition of the ‘Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves’ by the Joint Ore Reserves Committee (JORC). The Mineral Resource was classified as Indicated and Inferred Mineral Resource based on data quality, sample spacing, and lode continuity. The Indicated Mineral Resource was defined within areas of RC drilling of 25m by 25m, and where the continuity and predictability of the lode positions was good and the quality of the estimation was also good. The Inferred Mineral Resource was assigned to areas where support for the continuity of mineralisation was limited by wider spaced drilling or insufficient drilling in smaller lodes. The minimum requirement for an inferred resource is 3 drill holes spaced apart so that strike and dip can be determined.

Validation of the block model shows good correlation of the input data to the estimated grades.

The result reflects the competent person’s view that the classification is Indicated and Inferred.</td></tr>
<tr><td>Audits or reviews</td><td>The results of any audits or reviews of Mineral Resource estimates.</td><td>Internal reviews have been conducted by Northern Star Resources resource geologists.</td></tr>
<tr><td>Discussion of relative accuracy/ confidence</td><td>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 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</td><td>The Groundrush Mineral Resource Estimate has been reported with a moderate degree of confidence.

The Indicated Mineral Resource is based upon 25 by 25 metre RC drilling of acceptable quality. It is assumed that the mineralisation in this area is continuous between drill sections.

The Groundrush deposit has been previously mined by Normandy / Newmont between 2001 and 2005 by open pit. Groundrush has a recorded historical production of 611,000 ounces (4.2Mt @ 4.5 g/t) via open pit mining. The current model at a low grade cut off of 1 g/t Au produces 4.06 million tonnes @ 4.4 g/t Au for about 574k ounces. The current model slightly under calls the amount of gold produced. This is due to some of the minor lodes not being modelled. The result is within acceptable limits of what was mined.</td></tr>
</table>

Criteria	JORC Code explanation	Commentary
	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.*	The Mineral Resource statement relates to global estimates of tonnes and grade.

Appendix 2 - JORC Table 1
Ripcord Gold Deposit

Section 1 - Sampling Techniques and Data

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

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (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.*	Sampling was completed using reverse circulation (RC) and diamond (DD) core drilling. Sampling of RC chips was completed on RC drillholes, and half core sampling on diamond drillholes was completed.
	• *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.*	RC metres intervals are defined by paint markings on the rig. The larger split or sample reject is left at the sample pad to indicate metres drilled. Diamond drilling used a combination of HQ and NQ2-sized core. HQ core was drilled until competent ground was intersected, then NQ2 core was drilled. Drill core was oriented, aligned, and half-cut using metre intervals and geologically determined intervals (max 1.2 metres and min 0.3 metres), with geologically determined intervals taking precedence.

Criteria	JORC Code explanation	Commentary
	• *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.*	1m RC samples were collected from a cone splitter on the rig, in a calico bag. The sample/bulk ratio was 12.5/87.5. Sample weights ranged between 1kg and 4kg, although sample weight/size are ideally uniform, at least within a drillhole. Sampling of DD drillholes was completed using a diamond core saw. Half core was sampled on intervals between 0.3-1.2m in length honouring lithological boundaries. Sample weights are typically between 0.5kg and 3kg, mostly dependent on length, however sometimes dependent on lithology.
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 was completed using a 5.25" face sampling hammer drill bit. Diamond core was completed using a combination of HQ and NQ2 size drill bits and oriented where possible using the bottom dead centre technique. Deviation surveys were completed on all drillholes using Boart Longyear TruCore, or Axis Champ Ori equipment, or simiilar. Single Shot Surveys were completed at 30m intervals during drilling, and a continuous in/out survey was completed at the end of the hole.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.*	Approximate RC recoveries are sometimes recorded as percentage ranges based on a visual and/or weight estimate of the sample. RC recovery in the completed campaigns were considered consistent. DD core was reconstructed into continuous runs with depths checked against core blocks. Core recoveries were recorded as a percentage and calculated from measured core versus drilled intervals by geologists.
	• *Measures taken to maximise sample recovery and ensure representative nature of the samples.*	Experienced RC drilling contractors were engaged to complete the drilling campaigns. Drilling contractors are supervised and routinely monitored by geologists. The diamond drill contractors adjusted their drilling rate and method if recovery issues arose. All recovery was recorded by the drillers on core blocks. This was checked and compared to the core measurements by the geological team. Any issues were communicated back to the drilling contractor, and necessary adjustments were made.
	• *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.*	No relationship was noted between RC sample recovery and grade. The consistency of the mineralised intervals suggests sampling bias due to material loss or gain is not an issue. No relationship was noted between core recovery and grade. The consistency of the mineralised intervals suggests that sampling bias due to material loss or gain is not an issue.
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.*	All RC holes were logged by geologists at the drill rig to a high level of detail to support resource estimation, mining studies and metallurgical studies. RC logging is undertaken on a metre by metre basis at the time of drilling.

Criteria	JORC Code explanation	Commentary
		Geologists log DD core to industry standards. All relevant features such as lithology, structure, texture, grain size, alteration, oxidation state, vein style and veining percentage per interval, and mineralisation were recorded in the geological logs.
	• *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.*	RC samples are logged for lithology, alteration, mineralisation. Logging is a mix of qualitative and quantitative observations. Visual estimates are made of sulphide, quartz, and alteration as percentages. RC samples are not photographed. All DD logging was quantitative where possible and qualitative elsewhere. All diamond drill core was photographed.
	• *The total length and percentage of the relevant intersections logged.*	The entire length of each RC and diamond core hole was logged.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.*	Diamond drill core was cut in half using a diamond core saw. Half core was sampled on intervals between 0.3-1.2m in length honouring lithological boundaries. The right-hand side of the core was bagged as the primary sample for analyses. The remaining half of the core was archived and stored for reference.
	• *If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.*	RC drillholes were sampled either using a cyclone rotary splitter mounted on the RC drill rig, from an approximate 12.5% split off the bulk reject, or samples were collected using a cyclone then split using a riffle splitter down to approximately 2kg. All RC chips were logged using wet sieving technique retaining a sample in a plastic chip tray.
	• *For all sample types, the nature, quality and appropriateness of the sample preparation technique.*	Sample preparation for early drill programs (Normandy and Tanami Gold) were completed to a high standard. For Northern Star RC samples are dried at 100°C to constant mass, all samples below approximately 3kg are pulverised in LM5's to nominally 85% passing a 75µm screen. Samples generated above 4kg are crushed to <6mm and cone split to nominal mass before pulverisation. For RC samples, no formal heterogeneity study has been carried out or monographed. An informal analysis suggests that the sampling protocol currently in use is appropriate to the mineralisation encountered and should provide representative results.
	• *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.*	Grind checks are performed at both the crushing stage (3mm) and pulverising stage (75µm), requiring 90% of the material to pass through the relevant size.
	• *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.*	The sample preparation is considered appropriate. Field duplicates for RC drilling are routinely analysed at a rate of 1 in 20 samples. No Field duplicates were submitted for DD core sampling.
	• *Whether sample sizes are appropriate to the grain size of the material being sampled.*	Sample sizes are considered appropriate to represent the style of mineralisation, the thickness and consistency of the intersections, the sampling methodology, and assay value ranges for gold.

Criteria	JORC Code explanation	Commentary
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.*	Normandy assays were sent to ALS–Chemex in Perth for Aqua Regia (PM203). Any samples that came back with an Aqua Regia result greater than 2ppm were automatically sent for A & B split Fire Assay (PM209), and those that assayed over 7ppm were sent for Screen Fire Assay. Tanami Gold sent samples from RPRC0001 to RPRC0037 to SGS lab in Perth for analysis by 50g Fire assay with Atomic absorption finish (FAA505). Samples from RPRC0038 to RPRC0111 were submitted to Genalysis lab in Alice Springs for analysis by 50g Fire Assay with Atomic Absorption finish (FA50/AA). For Northern Star drilling programs, gold concentration was determined by fire assay using the lead collection method with a 50g sample charge weight. MP-AES instrument finish was used to measure gold levels. The methodology used measures total gold.
	• *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..*	No geophysical tools were used to determine any element concentrations.
	• *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	Standards, Blanks and Duplicates were inserted in the Normandy drilling sample stream. However, the frequency of these insertions is highly variable and expected values for the standards are not available, limiting the value of this data. QC samples were inserted routinely for all Tanami Gold drillholes. Standard samples were inserted every 25 metres, blank samples every 20 samples and duplicate samples were collected every 12m. Tanami Gold QAQC includes: Certified reference standards were inserted at regular intervals and results have, in the main, accurately reflected the original assays and expected values. Coarse crush duplicates show repeatable although variable results. A recognised laboratory has been used for analysis of samples. The Northern Star QAQC protocols used include the following for all drill samples: • Field QAQC protocols used for all drill samples include commercially prepared certified reference materials (CRM) inserted at an incidence of 1 in 20 samples. The CRM used is not identifiable to the laboratory with QAQC data is assessed on import to the database and reported monthly, quarterly and yearly. • NSR RC Resource definition drilling routinely inserts field blanks and monitor their performance. • Laboratory QAQC protocols used for all drill samples include repeat analysis of pulp samples occurs at an incidence of 1 in 20 samples and screen tests (percentage of pulverised sample passing a 75µm mesh) are undertaken on 1 in 40 samples. • The laboratories' own standards are loaded into the database and the laboratory reports its

Criteria	JORC Code explanation	Commentary
		own QAQC data monthly. • Failed standards are generally followed up by re-assaying a second 30g pulp sample of all samples in the fire above 0.1ppm by the same method at the primary laboratory. The accuracy component (CRMs and third-party checks) and the precision component (duplicates and repeats) of the QAQC protocols are thought to demonstrate acceptable levels of accuracy and precision.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.*	All significant intersections were verified by Geologists on-site during the drill-hole validation process and later signed off by a Competent person, as defined by JORC.
	• *The use of twinned holes.*	No twinned holes were drilled for this data set.
	• *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.*	Primary data is either entered directly or imported into a SQL acQuire database using semi-automated or automated data entry; hard copies of core assays and surveys are stored at site. Assay files are received in .csv format and loaded directly into the SQL acQuire database by geologists or database administrators. Hardcopy and electronic copies of the data is stored for future reference. Visual checks occur as a result of regular use of the data.
	• *Discuss any adjustment to assay data.*	The first (primary) gold assay is almost always utilised for any resource estimation, except where evidence from re-analysis or check analysis dictates. A systematic procedure utilising several re-assays and/or check assays are employed to determine if/when the first (primary) gold assay is changed for the final assay.
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.*	Planned drillholes were sited either with a handheld global positioning system (GPS) or a differential global positioning system (DGPS), and the initial drillhole pickup is usually with a handheld GPS, as well, with accuracy between ± 0.3 to 1m. After program completion, differential GPS (DGPS) is used for the final collar pickup with an accuracy of ± 5mm. During drilling, single-shot surveys were taken every 30m to ensure the hole remains close to the design. Down-hole surveys were performed using Boart Longyear TruCore, Axis Champ Ori, or similar equipment., recording the down-hole dip and magnetic azimuth. These results were then uploaded into the database.
	• *Specification of the grid system used.*	Collar coordinates were recorded in MGA94 Zone 52.
	• *Quality and adequacy of topographic control.*	Topographic control was established through detailed aerial and ground survey control from airborne survey acquisition, or a DGPS elevation with an accuracy of ± 10mm is used.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.*	Drill-hole spacing across the area varies; the indicated mineral resource was defined within areas of RC drilling of 20m by 25m, and where the continuity and predictability of the lode positions was good. Drill spacing of 40 x 40m was targeted during the design and drilling phases for recent drilling campaigns.
	• *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.*	The data spacing and distribution is sufficient to establish geological and/or grade continuity appropriate for the Mineral Resource and classifications to be applied.

Criteria	JORC Code explanation	Commentary
	• *Whether sample compositing has been applied.*	No sample compositing was applied. Sample compositing was only undertaken as part of the Mineral Resource estimation process.
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.*	Drillholes were drilled at an angle that is approximately perpendicular to the orientation of the mineralised trends.
	• *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.*	No sampling bias is considered to have been introduced by the drilling orientation.
Sample security	• *The measures taken to ensure sample security.*	Geologists and geotechnicians managed the chain of custody of samples. Geologists or geotechnicians transport core and RC samples to the admin/mine site; the drill core is logged, cut, and sampled at the on-site core shed. Samples were bagged in tied numbered calico bags, grouped in larger tied polyweave plastic bags, and placed in large bulka bags with sample submission sheets. The bulka bags were sent by road freight to the laboratory. Field personnel involvement ceased at this stage. The results of analyses were returned via email or uploaded to an FTP site. Sample pulp splits are stored for a time at the laboratory. Retained pulp packets are returned to the Central Tanami Mine for storage.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	Geologists have undertaken internal reviews of applied sampling techniques and data. The completed reviews raised no issues.

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 Ripcord prospect is located in the Tanami Region in the Northern Territory in the Northern Territory on Mining Licence (Groundrush) ML22934, approximately 45km northeast of the Central Tanami Mill site. ML22934 covers an area of 3,950ha and forms part of the Central Tanami Project, a 50/50 Joint Venture between Tanami Gold NL and Northern Star Limited. The 2,211km2 tenement area in the Tanami Region held by the CTPJV are registered jointly in Northern Star (Tanami) Pty Ltd and Tanami (NT) Pty Ltd. The CTPJV comprises ten Exploration Licences, eight of which are granted, and two applications, nineteen Mineral Leases and one Mining Licence. Mineral Leases have a 25-year life and are renewable for 25 years. The Central Tanami project area lies on Aboriginal land within the Central Desert Aboriginal Land Trust

Criteria	JORC Code explanation	Commentary
		and the Mt Frederick Aboriginal Land Trust, both administered by the Central Land Council.
	• *The security of the tenure held at the time of reporting along with any known impediments to obtaining a license to operate in the area.*	ML22934 is granted and in good standing.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	The Groundrush area, which includes the Ripcord Prospect, has been explored since the mid-1980's. Numerous companies, including Zapopan NL, Otter Gold NL, Normandy Mining Ltd, Newmont (Asia Pacific), and Tanami Gold NL have been active in the area. Recent exploration in the area has been completed by the Joint Venture partners, Tanami Gold NL and Northern Star Limited.
Geology	• *Deposit type, geological setting and style of mineralisation.*	The Ripcord deposit is a Palaeoproterozoic, dolerite, and sediment-hosted vein-mineralized deposit that is part of the Granites-Tanami Inlier. Gold mineralisation is controlled by a brittle fracture system associated with larger regional-scale structures that crosscut a regional scale southeast, shallowly plunging anticline. Mineralisation is predominantly hosted in dolerite and sediment, in either quartz vein or shear hosted, respectively.
Drill hole information	• *A summary of all information material to the under-standing 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*	See attached Appendix for a table of results.
	• *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	Not applicable to this report.
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.*	This release pertains to the reporting of Mineral Resources. Exploration results have previously been regularly reported to the ASX by the Joint Venture parties. In the reporting of exploration results, results are reported as weighted averages using a nominal 0.5 g/t gold cut-off and up to 2 metres of internal dilution. No high-grade cuts were applied.
	• *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results,*	This release pertains to the reporting of Mineral Resources. Exploration results have previously been regularly reported to the ASX by the Joint Venture parties.

Criteria	JORC Code explanation	Commentary
	the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.	Any high-grade zones above 15g/t gold within a reported intercept are also reported as included intervals.
	• *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	No metal equivalent values were used to report previous exploration results.
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.*	The reported drillholes have been drilled approximately perpendicular to the orientation of the targeted mineralised trends.
	• *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.*	Mineralisation structures are vertical to sub-vertical.
	• *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').*	Only downhole lengths have been reported. True widths are not known.
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.*	Appropriate plans and sections have been included.
Balanced Reporting	• *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.*	Planned drillholes are sited with a handheld global positioning system (GPS), and the initial drillhole pickup is usually with a handheld GPS, as well; with accuracy between ± 0.3 to 1m. After program completion, differential GPS (DGPS) is used for the final collar pickup with an accuracy of ± 5mm.
	• *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.*	Both high and low grades have been reported accurately, clearly identified with the drill-hole attributes and 'From' and 'To' depths. All intercepts for all holes have been reported regardless of grade.
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.*	Exploration results have previously been regularly reported to the ASX by the Joint Venture parties.
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).*	Drilling is planned for CY23 to infill and expand the current resource envelope.

Criteria	JORC Code explanation	Commentary
	• *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	Appropriate Diagrams accompany this release.

Section 3 - Estimation and Reporting of Mineral Resources

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.*	The drill hole database is managed by Northern Star Resources in Acquire. MJM completed systematic data validation steps after receiving the database. Checks completed by MJM included verifying that: ▪ Down-hole survey depths did not exceed the hole depth as reported in the collar table. ▪ Visual inspection of drill hole collars and traces in Surpac. ▪ Assay values did not extend beyond the hole depth quoted in the collar table. ▪ Assay and survey information was checked for duplicate records. There are some minor overlap errors in the RC and diamond drill holes where 4 metre samples overlapped later 1 metre samples but the occurrence was not significant
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 Graeme Thompson, Principal resource Geologist, and Mr Joe McDiarmid, Director of MoJoe Mining have made a number of site visits.
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.*	The confidence in the geological interpretation is moderate as there is no exposures and it is based upon RC and diamond drill holes. Mineralisation was based upon sectional interpretations that were assumed to be continuous between sections. At this stage of the project no alternative geological interpretations have been considered. The Ripcord deposit is hosted within the Killi Killi Formation of the Tanami Group (1838+/-6Ma), a turbiditic siltstone and sandstone (arkose and greywacke) unit up to 4 Km thick. This unit conformably overlies the Dead Bullock Formation, composed of graphitic units with minor chert and iron rich horizons. Dolerite sills up to 200+m thick intrude the Tanami Group. Gold mineralisation is associated with the contact of the dolerite and the turbiditic sediments. The dolerite is striking at about 340º and dipping 70º west. Mineralisation is primarily hosted within the larger main dolerite body, and minor mineralisation extending in to turbiditic sediments. The main mineralised lodes consist of 1 - 6m wide zones of quartz veining that trend north to northwest (290° to 340°), dip at 80° to the southwest.

Criteria	JORC Code explanation	Commentary
		The strike of the mineralised zone is about 1200 metres and the known down dip extent from drill data is about 150 metres. The width of the zone of primary mineralisation is of the order of 40 metres. There are 3 styles of mineralisation: • Supergene or flat lying lodes • Dolerite hosted • Turbiditic sediment hosted The supergene or flat lying mineralisation dip shallowly to the west and are separated into north and southerly plunging bodies. They consist of narrow zones of quartz veining (1-3m). The supergene or flat lying zones have strikes of up to 150 metres and dip extents of up 100 metres and true thickness of 1-3 metres. The dolerite and turbiditic sediment hosted mineralisation display similar strikes between 320° to 330° and dip about 60° west. There is a difference in the overall dimensions of the mineralised quartz lenses. The thickness of the mineralisation varies between 1 to 6 metres for both types however the dolerite hosted mineralisation is up to 150 metres in strike and 120 metres down dip while the sediment hosted mineralisation is up to 100 metres and 25 metres down dip. Cross cutting faults are known to exist in the prospect area. These could have an effect of the geometry and continuity of the gold mineralisation.
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.*	The strike of the mineralised zone is about 1200 metres and the known down dip extent from drill data is about 150 metres. The width of the zone of primary mineralisation is of the order of 40 metres. There are multiple gold bearing quartz lenses of various dimensions within the zone. The mineralisation starts at a depth of 20 metres below the surface.
Estimation and modelling techniques	• *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.*	Ordinary Kriging (OK) interpolation with an oriented 'ellipsoid' search was used for the estimate. Surpac software was used for the estimations. Three dimensional mineralised wireframes (interpreted by CTPJV and checked by MJM) were used to domain the gold data. Sample data was composited to 1m down hole lengths using the 'fixed length' method. Intervals with no assays were excluded from the estimates. The influence of extreme grade values was addressed by reducing high outlier values by applying top-cuts to the data. These cut values were determined through statistical analysis (histograms, log probability plots, CV's, and summary multi-variate and bi-variate statistics) using Supervisor software. MJM has not made assumptions regarding recovery of by-products from the mining and processing of ore at the Ripcord deposit. All modelling was completed in Surpac Geovia software. No estimation of deleterious elements was carried out. Only gold was interpolated into the block model. The block model used a primary block size of 10m NS by 5m EW by 5m RL with sub-blocking to 2.5m by 1.25m by 1.25m. The parent block size was selected based on approximately half the average drill

Criteria	JORC Code explanation	Commentary
	• *Estimation of deleterious elements or other non-grade variables of economic significance (eg 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.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	spacing of RC drilling in the well drilled areas, while dimensions in other directions were selected to provide sufficient resolution to the block model in the across-strike and down-dip direction. QKNA was completed in Supervisor software to justify the block size, number of samples, search ellipses and discretization An orientated 'ellipsoid' search was used to select data and was based on the observed lode geometry. The search ellipsoid was orientated to the average strike, plunge, and dip of the main lodes. Three expanding passes were used in the estimation (40, 80 and 160 metres). A first pass of radius 40m with a minimum number of samples of 2-8 samples and a second pass of radius 80m with a minimum number of 2-6 samples were used for Ripcord. A third pass of search radius 160m was used with 2-6 samples to ensure all blocks within the mineralised lodes were estimated. The maximum number of samples ranged from 3-26 depending on the number of samples in the domain. Blocks that did not fill after 3 passes were left without grade as a reflection of the paucity of samples in the lode. Selective mining units were not modelled. The block size used in the resource model was based on drill sample spacing and lode orientation. To validate the model, a qualitative assessment was completed by slicing sections through the block model in positions coincident with drilling. A quantitative assessment of the estimate was completed by comparing the average gold grades of the composite file input against the gold block model output for all the resource objects. A trend analysis was completed by comparing the interpolated blocks to the sample composite data within the main lodes. This analysis was completed for eastings and elevations across the deposit. Validation plots showed good correlation between the composite grades and the block model grades.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	Tonnages and grades were estimated on a dry in situ basis.
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	The Mineral Resource estimate has been constrained by the wireframed mineralised envelopes, is undiluted by external waste and reported above a 0.7g/t gold cut-off grade for underground material.
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 is assumed the Ripcord deposit will be mined by open pit methods when a new mining operation can be established. The Whittle Optimisation Assumptions used were: - OP Mining Recovery 98% - Op Mining Dilution 10% - Processing Recovery 95% - Mining Cost $4.40 per tonne ore - Incremental Ore Mining Cost $0 - Open Pit Grade Control $0.88 per tonne - Mill Opex cost (2.0Mtpa) $34.02 per tonne ore

Criteria	JORC Code explanation	Commentary
		- ROM to mill transport distance 44 km - ROM to mill transport $4.84 per tonne - Admin (G & A) $4.95 per tonne ore - Au Royalty 5% - Au Price AU$2700
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.*	Tanami Gold NL submitted 9 composite RC samples for metallurgical testing in 2013. These samples were ground to 150 microns and tested for recovery of gold. This data was collated by oxidation state (weathering), summarised and the average was assigned to the Ripcord block model. - Oxide mineralisation 97.2% recovery - Transitional mineralisation 90.1% recovery - Fresh mineralisation 89.9% recovery
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 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.*	No assumptions have been made regarding environmental factors.
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 for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	No bulk density measurements were available for the Ripcord Deposit. The bulk density measurements were taken from the Groundrush deposit 3 km to the northwest.

	Rock Type	
Oxidation State	Dolerite	Turbiditic sediment
Oxide	2.4	2.32
Transitional	2.7	2.58
Fresh	2.85	2.7

Criteria	JORC Code explanation	Commentary
		At this stage of the project, it is assumed that these values will be close to the real values
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (ie 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.*	The Mineral Resource estimate is reported here in compliance with the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' by the Joint Ore Reserves Committee (JORC). The Mineral Resource was classified as Indicated and Inferred Mineral Resource based on data quality, sample spacing, and lode continuity. The Indicated Mineral Resource was defined within areas of RC drilling of 20m by 25m, and where the continuity and predictability of the lode positions was good. The Inferred Mineral Resource was assigned to areas where support for the continuity of mineralisation was limited by wider spaced drilling or insufficient drilling in smaller lodes. The minimum requirement for an inferred resource is 3 drill holes spaced apart so that strike and dip can be determined. Validation of the block model shows good correlation of the input data to the estimated grades. The result reflects the competent person's view that the classification is Indicated and Inferred.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	No audits or reviews of this estimate have been conducted.
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 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.*	The Ripcord Mineral Resource Estimate has been reported with a moderate degree of confidence. The Indicated Mineral Resource is based upon 25 by 20 metre RC drilling of acceptable quality. It is assumed that the mineralisation in this area is continuous between drill sections. The project is in area of no previous mining however the Groundrush deposit is located 3 km to the northwest. The Mineral Resource statement relates to global estimates of tonnes and grade.

Appendix 3 - JORC Table 1
Jims Gold Deposits

Section 1 - Sampling Techniques and Data

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

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (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.*	Sampling was completed using reverse circulation (RC) and diamond (DD) core drilling. Sampling of RC chips was completed on RC drillholes, and half core sampling on diamond drillholes was completed.
	• *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.*	RC metres intervals are defined by paint markings on the rig. The larger split or sample reject is left at the sample pad to indicate metres drilled. Diamond drilling used a combination of HQ and NQ2-sized core. HQ core was drilled until competent ground was intersected, then NQ2 core was drilled. Drill core was oriented, aligned, and half-cut using metre intervals and geologically determined intervals (max 1.2 metres and min 0.3 metres), with geologically determined intervals taking precedence.
	• *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.*	1m RC samples were collected from a cone splitter on the rig, in a calico bag. The sample/bulk ratio was 12.5/87.5. Sample weights ranged between 1kg and 4kg, although sample weight/size are ideally uniform, at least within a drillhole. For RC holes drilled in the 1990s samples were taken at 1 metre intervals from the cyclone and manually fed through a riffle splitter Sampling of DD drillholes was completed using a diamond core saw. Half core was sampled on intervals between 0.3-1.2m in length honouring lithological boundaries. Sample weights are typically between 0.5kg and 3kg, mostly dependent on length, however sometimes dependent on lithology.
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 was completed using a 5.25" face sampling hammer drill bit. Diamond core was completed using a combination of HQ and NQ2 size drill bits and oriented where possible using the bottom dead centre technique. Deviation surveys were completed on all drillholes using Boart Longyear TruCore, or Axis Champ Ori equipment, or similar. Single Shot Surveys were completed at 30m intervals during drilling, and a continuous in/out survey was completed at the end of the hole.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.*	Approximate RC recoveries are sometimes recorded as percentage ranges based on a visual and/or weight estimate of the sample. RC recovery in the completed campaigns were considered consistent.

Criteria	JORC Code explanation	Commentary
		DD core was reconstructed into continuous runs with depths checked against core blocks. Core recoveries were recorded as a percentage and calculated from measured core versus drilled intervals by geologists.
	• *Measures taken to maximise sample recovery and ensure representative nature of the samples.*	Experienced RC drilling contractors were engaged to complete the drilling campaigns. Drilling contractors are supervised and routinely monitored by geologists. The diamond drill contractors adjusted their drilling rate and method if recovery issues arose. All recovery was recorded by the drillers on core blocks. This was checked and compared to the core measurements by the geological team. Any issues were communicated back to the drilling contractor, and necessary adjustments were made.
	• *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.*	No relationship was noted between RC sample recovery and grade. The consistency of the mineralised intervals suggests sampling bias due to material loss or gain is not an issue. No relationship was noted between core recovery and grade. The consistency of the mineralised intervals suggests that sampling bias due to material loss or gain is not an issue.
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.*	All RC holes were logged by geologists at the drill rig to a high level of detail to support resource estimation, mining studies and metallurgical studies. RC logging is undertaken on a metre by metre basis at the time of drilling. Geologists log DD core to industry standards. All relevant features such as lithology, structure, texture, grain size, alteration, oxidation state, vein style and veining percentage per interval, and mineralisation were recorded in the geological logs.
	• *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.*	RC samples are logged for lithology, alteration, mineralisation. Logging is a mix of qualitative and quantitative observations. Visual estimates are made of sulphide, quartz, and alteration as percentages. RC samples are not photographed. All DD logging was quantitative where possible and qualitative elsewhere. All diamond drill core was photographed.
	• *The total length and percentage of the relevant intersections logged.*	The entire length of each RC and diamond core hole was logged.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.*	Diamond drill core was cut in half using a diamond core saw. Half core was sampled on intervals between 0.3-1.2m in length honouring lithological boundaries. The right-hand side of the core was bagged as the primary sample for analyses. The remaining half of the core was archived and stored for reference.
	• *If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.*	RC drillholes were sampled either using a cyclone rotary splitter mounted on the RC drill rig, from an approximate 12.5% split off the bulk reject, or samples were collected using a cyclone then split using a riffle splitter down to approximately 2kg. The Central Tanami Gold Joint Venture (Otter and Acacia) during the early 1990s, collected samples at 1 metre intervals via a rig-mounted cyclone and collected into plastic bags. All holes were originally

Criteria	JORC Code explanation	Commentary
		sampled on a 3-metre composite using a PVC spear to obtain a 2kg sample. The CTP collected samples at 1m intervals at the rig, representing the cutting's coarse fraction. For CTP drillholes, all samples were taken at 1-metre intervals directly from the cone splitter, with the bulk sample collected in green bags and left on site. RC holes drilled in the mid-1990s to 2001 samples were taken at 1 metre intervals from the cyclone and manually fed through a riffle splitter. RC drill holes drilled by Tanami Gold between 2010 to 2011 samples were collected on a one metre basis through a 75:25% riffle splitter and placed into pre-numbered sample bags. Northern Star Stage-1 RC drilling saw all bulk material collected on a 1m basis directly from cyclone in pre labelled green plastic mining bags. Northern Star Stage-2 RC drilling saw single metre (1m) samples collected from a trailer mounted static cone splitter. Approximately 12.5% of each meter sample was collected in a pre-labelled calico bag with the depth while the remaining 87.5% was collected in a green mining bag and retained. All RC chips were logged using wet sieving technique retaining a sample in a plastic chip tray.
	• *For all sample types, the nature, quality and appropriateness of the sample preparation technique.*	During mining operations drill samples were prepped either at onsite or at ALS in Alice Springs to industry standards. Northern Sar sample preparation was conducted at ALS Perth, commencing with sorting, checking and drying at less than 110°C to prevent sulphide breakdown. Samples were jaw crushed to a nominal -6mm particle size. If the sample is greater than 3kg a Boyd crusher with a rotary splitter is used to reduce the sample size to less than 3kg at a nominal <3mm particle size. The entire crushed sample (if less than 3kg) or sub-sample is then pulverized to 90% passing 75µm, using a Labtechnics LM5 bowl pulveriser. 300g Pulp subsamples are then taken with an aluminium scoop and stored in labelled pulp packets.
	• *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.*	Grind checks are performed at both the crushing stage (3mm) and pulverising stage (75µm), requiring 90% of the material to pass through the relevant size.
	• *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.*	The sample preparation is considered appropriate and to industry standard. Field duplicates for RC drilling are routinely analysed at a rate of 1 in 20 samples. No Field duplicates were submitted for diamond core sampling.
	• *Whether sample sizes are appropriate to the grain size of the material being sampled.*	Sample sizes are considered appropriate to represent the style of mineralisation, the thickness and consistency of the intersections, the sampling methodology, and assay value 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.*	Samples collected during mining operations were submitted to the onsite laboratory or ALS in Alice Springs. Analysis (both on and off-site) was by AAS with selective FA checks. It should be noted that all onsite analysis was performed with a 20ml aliquot, whereas ALS used a 50ml aliquot for all AAS readings.

Criteria	JORC Code explanation	Commentary
		Samples collected by Northern Star were sent to ALS in Malaga, Perth. Gold (Au) concentration was determined by ICP-AAS (Atomic Adsorption Spectrometry), after conventional Lead Button Fusion and HCl/HNO3 digestion of a 50g charge sample, with at least 170g of litharge-based flux at the ALS Malaga facility. This was common to both Diamond Core and RC Chip sample collection.
	• *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..*	No geophysical tools were used to determine any element concentrations.
	• *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	The Northern Star QAQC protocols used include the following for all drill samples: • Field QAQC protocols used for all drill samples include commercially prepared certified reference materials (CRM) inserted at an incidence of 1 in 20 samples. The CRM used is not identifiable to the laboratory with QAQC data is assessed on import to the database and reported monthly, quarterly and yearly. • NSR RC Resource definition drilling routinely inserts field blanks and monitor their performance. • Laboratory QAQC protocols used for all drill samples include repeat analysis of pulp samples occurs at an incidence of 1 in 20 samples, and screen tests (percentage of pulverised sample passing a 75µm mesh) are undertaken on 1 in 40 samples. • The laboratories' own standards are loaded into the database, and the laboratory reports its own QAQC data monthly. • Blanks were routinely inserted into the sample sequence at a rate of 1 per 25 samples and again specifically after potential or existing high-grade mineralisation to test for contamination. Failures of blanks above 0.2g/t were followed up, and re-assayed. New pulps were prepared if failures continued. • Failed standards are generally followed up by re-assaying a second 30g pulp sample of all samples in the fire above 0.1ppm by the same method at the primary laboratory. The accuracy component (CRMs and third-party checks) and the precision component (duplicates and repeats) of the QAQC protocols are thought to demonstrate acceptable levels of accuracy and precision.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.*	All significant intersections were verified by Geologists on-site during the drill-hole validation process and later signed off by a Competent person, as defined by JORC.
	• *The use of twinned holes.*	No twinned holes were drilled for this data set.

Criteria	JORC Code explanation	Commentary
	• *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.*	Primary data is either entered directly or imported into a SQL acQuire database using semi-automated or automated data entry; hard copies of core assays and surveys are stored at site. Assay files are received in .csv format and loaded directly into the SQL acQuire database by geologists or database administrators. Hardcopy and electronic copies of the data is stored for future reference. Visual checks occur as a result of regular use of the data.
	• *Discuss any adjustment to assay data.*	The first (primary) gold assay is almost always utilised for any resource estimation, except where evidence from re-analysis or check analysis dictates. A systematic procedure utilising several re-assays and/or check assays are employed to determine if/when the first (primary) gold assay is changed for the final assay.
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.*	Planned drillholes were sited either with a handheld global positioning system (GPS) or a differential global positioning system (DGPS), and the initial drillhole pickup is usually with a handheld GPS, as well, with accuracy between ± 0.3 to 1m. After program completion, differential GPS (DGPS) is used for the final collar pickup with an accuracy of ± 5mm. During drilling, single-shot surveys were taken every 30m to ensure the hole remains close to the design. Down-hole surveys were performed using Boart Longyear TruCore, Axis Champ Ori, or similar equipment., recording the down-hole dip and magnetic azimuth. These results were then uploaded into the database.
	• *Specification of the grid system used.*	Collar coordinates were recorded in MGA94 Zone 52.
	• *Quality and adequacy of topographic control.*	Topographic control was established through detailed aerial and ground survey control from airborne survey acquisition, or a DGPS elevation with an accuracy of ± 10mm is used.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.*	The Indicated Mineral Resource was defined within areas of RC and diamond drilling of 25m by 25m (with some infill), where the continuity and predictability of the lode positions were good, and the estimation had reasonable slopes of regression. The Inferred Mineral Resource was assigned to areas where support for the continuity of mineralisation was limited by wider-spaced drilling or insufficient drilling in smaller lodes.
	• *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.*	The data spacing and distribution is sufficient to establish geological and/or grade continuity appropriate for the Mineral Resource and classifications to be applied.
	• *Whether sample compositing has been applied.*	No sample compositing was applied. Sample compositing was only undertaken as part of the Mineral Resource estimation process.
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.*	Drillholes were drilled at an angle that is approximately perpendicular to the orientation of the mineralised trends
	• *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*	No sampling bias is considered to have been introduced by the drilling orientation.

Criteria	JORC Code explanation	Commentary
	assessed and reported if material.	
Sample security	• *The measures taken to ensure sample security.*	The chain of custody of samples was managed by geologists and geotechnicians. Geologists or geotechnicians transport core and RC samples to the admin/mine site; the drill core is logged, cut, and sampled at the on-site core shed. Samples were bagged in tied numbered calico bags, grouped in larger tied polyweave plastic bags, and placed in large bulka bags with sample submission sheets. The bulka bags were sent by road freight to the laboratory. Field personnel involvement ceased at this stage. The results of analyses were returned via email or uploaded to an FTP site. Sample pulp splits are stored for a time at the laboratory. Retained pulp packets are returned to the Central Tanami Mine for storage.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	Geologists have undertaken internal reviews of applied sampling techniques and data. The completed reviews raised no issues.

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.*	Jims Gold Deposit is located in the Tanami Region in the Northern Territory on Mineral Lease (Southern) MLS168, approximately 23km southwest of the Central Tanami Mill site. MLS168 covers an area of 711.9ha and forms part of the Central Tanami Project, a 50/50 Joint Venture between Tanami Gold NL and Northern Star Limited. The 2,211km2 tenement area in the Tanami Region held by the CTPJV are registered jointly in Northern Star (Tanami) Pty Ltd and Tanami (NT) Pty Ltd. The CTPJV comprises ten Exploration Licences, eight of which are granted, and two applications, nineteen Mineral Lease (Southern) and one Mining Licence. Mineral Leases have a 25-year life and are renewable for 25 years. The Central Tanami project area lies on Aboriginal land within the Central Desert Aboriginal Land Trust and the Mt Frederick Aboriginal Land Trust, both administered by the Central Land Council.
	• *The security of the tenure held at the time of reporting along with any known impediments to obtaining a license to operate in the area.*	MLS168 is granted and in good standing.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	The Jims area has been explored since the early 1990's. Several previous companies, Newmont (Asia Pacific), and Tanami Gold NL have been active in the area. Drilling reported with this release is contiguous with the Jims open-cut mine. Previous drilling at this project adds gold grade and geological context to the subsequent Northern Star Resources interpretation of the area as tested by

Criteria	JORC Code explanation	Commentary
		the drill holes covered by this report. Recent exploration in the area has been completed by the Joint Venture partners, Tanami Gold NL and Northern Star Limited.
Geology	• *Deposit type, geological setting and style of mineralisation.*	The Jims deposit is a Palaeoproterozoic, basalt and sediment-hosted vein-mineralised deposit that is part of the Granites-Tanami Inlier. Gold mineralisation is controlled by a brittle fracture system associated with regional-scale structures that crosscut a regional-scale southeast, shallowly plunging anticline. Mineralisation occurs within a series of vein and breccia lodes developed near basalt-sediment contacts.
Drill hole information	• *A summary of all information material to the under-standing 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*	See attached Appendix for a table of results.
	• *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 holes are excluded from this report.
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.*	This release pertains to the reporting of Mineral Resources. Exploration results have previously been regularly reported to the ASX by the Joint Venture parties. In the reporting of exploration results, results are reported as weighted averages using a nominal 0.5 g/t gold cut-off and up to 2 metres of internal dilution. No high-grade cuts were applied.
	• *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.*	This release pertains to the reporting of Mineral Resources. Exploration results have previously been regularly reported to the ASX by the Joint Venture parties. Any high-grade zones above 15g/t gold within a reported intercept are also reported as included intervals.
	• *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	No metal equivalent values were used to report previous exploration results.

Criteria	JORC Code explanation	Commentary
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.*	The reported drill holes have been drilled approximately perpendicular to the orientation of the targeted mineralised trends
	• *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.*	Mineralisation are sub-vertical to vertical.
	• *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').*	Only downhole lengths have been reported. True widths are not known.
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.*	Appropriate plans and sections have been included.
Balanced Reporting	• *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.*	Planned drillholes are sited with a handheld global positioning system (GPS), and the initial drillhole pickup is usually with a handheld GPS, as well; with accuracy between ± 0.3 to 1m. After program completion, differential GPS (DGPS) is used for the final collar pickup with an accuracy of ± 5mm.
	• *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.*	Both high and low grades have been reported accurately, clearly identified with the drill-hole attributes and 'From' and 'To' depths. All intercepts for all holes have been reported regardless of grade.
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.*	Exploration results have previously been regularly reported to the ASX by the Joint Venture parties.
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).*	Upon receipt of all results, a review of the drilling completed is required before further work is planned.
	• *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	Appropriate diagrams accompany this release.

Section 3 - Estimation and Reporting of Mineral Resources

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.*	The drill hole database is managed by Northern Star Resources in Acquire. MJM completed systematic data validation steps after receiving the database. Checks completed by MJM included verifying that: • Down-hole survey depths did not exceed the hole depth as reported in the collar table. • Visual inspection of drill hole collars and traces in Surpac. • Assay values did not extend beyond the hole depth quoted in the collar table. • Assay and survey information was checked for duplicate records. There are some minor overlap errors in the RC and diamond drill holes where 4 metre samples overlapped later 1 metre samples but the occurrence was not significant
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 has not visited site however Joe McDiarmid, Principal of MoJoe Mining has made a number of visits to the Tanami JV area.
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.*	The confidence in the geological interpretation is moderate to good as there are exposures and it is based upon RC and diamond drill holes. Mineralisation was based upon sectional interpretations that were assumed to be continuous between sections. At this stage of the project no alternative geological interpretations have been considered. The Jims deposits are located mostly on the north-eastern side of an interpreted north-northwest trending regional fault. The mineralisation is hosted by pillow and undifferentiated basalt intercalated with minor sediments. Prior to mining documentation by Makar (2001) suggests that the area had an intact regolith profile with a lateritic cap. The mineralised trend at Jims main pit has been described by Makar (2001) as striking North-South with flexures and dipping moderate to steep west in the upper extent but changes to steep to east dipping below the 320m RL.
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.*	The main ore zone has a true thickness of 15 to 25 metres but has areas up to 60 metres thick. The strike length of the Jims Main mineralisation is of the order of 300 metres and is hosted by basalt. The mineralisation has been interpreted down to 250 metres below the surface or 300 metres down dip. Further Makar (2001) states that secondary ore zones identified by mining indicate moderate to flat east dipping, limited strike length lenses that are generally lower grade +1.5g/t Au, but can contain narrow discrete high grade +5g/t Au pods. These were found in the southern areas of the open pit and decreased in the number of zones with depth. The gold mineralisation has a sharp boundary with sheared zones. Alteration associated with mineralisation consists of sericite, carbonate, chlorite, silicification and pyrite. The mineralisation at Jims Central appears to be the northern strike extension of the Jims Main mineralisation. The mineralisation has a strike of about 200 metres and is 2 to several metres thick and has been interpreted to a depth of 150 metres below the surface. The open pit was abandoned in

Criteria	JORC Code explanation	Commentary
		depleted zone due to not achieving the predicted tonnes or grade that the model predicted. Makar (2001) states that prior to stopping the pit costeans were dug across the mineralised zones and the walls were mapped and sampled. The results indicated that high grade gold was associated with thin flat lying quartz veins stacked at intervals of +1 metre with subgrade between the veins. These appear to have been ladder veins in between shear zones. Jims Central mineralisation was re-interpreted with this knowledge to determine whether any further mineralisation can be economically extracted. Jims West is adjacent to the current waste dump and occurs close to the north-northwest striking regional fault. Mineralisation is striking about North-South and dips approximately 45 degrees West. The strike length of Jims West is of the order of 150 metres with true thickness between 1 – 7 metres and individual lenses have been interpreted up to 120 metres down dip. The area has not previously been mined.
Estimation and modelling techniques	• *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 (eg 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*	Ordinary Kriging (OK) interpolation with an oriented 'ellipsoid' search was used for the estimate. Surpac software was used for the estimations. Three dimensional mineralised wireframes (interpreted by CTPJV and checked by MJM) were used to domain the gold data. Sample data was composited to 1m down hole lengths using the 'fixed length' method. Intervals with no assays were excluded from the estimates. The influence of extreme grade values was addressed by reducing high outlier values by applying top-cuts to the data. These cut values were determined through statistical analysis (histograms, log probability plots, CV's, and summary multi-variate and bi-variate statistics) using Supervisor software. MJM has not made assumptions regarding recovery of by-products from the mining and processing of ore at the Jims deposit. All modelling was completed in Surpac Geovia software. No estimation of deleterious elements was carried out. Only gold was interpolated into the block model. The block model used a primary block size of 10m NS by 5m EW by 5m RL with sub-blocking to 2.5m by 1.25m by 1.25m. The parent block size was selected based on approximately half the average drill spacing of RC drilling in the well drilled areas, while dimensions in other directions were selected to provide sufficient resolution to the block model in the across-strike and down-dip direction. QKNA was completed in Supervisor software to justify the block size, number of samples, search ellipses and discretization An orientated 'ellipsoid' search was used to select data and was based on the observed lode geometry. The search ellipsoid was orientated to the average strike, plunge, and dip of the main lodes. Three expanding passes were used in the estimation (20-40, 40-80 and 80-160 metres). A first pass of radius 20-40m with a minimum number of samples of 2-6 samples and a second pass of radius 40-80m with a minimum number of 4-6 samples were used for Jims. A third pass of search radius 80-160m was used with a minimum of 2-6 samples to ensure all blocks within the mineralised lodes were estimated. The maximum number of samples ranged from 4-28 depending on the number of samples in the domain. Blocks that did not fill after 3 passes were given a 4th pass. Selective mining units were not modelled. The block size used in the resource model was based on drill

Criteria	JORC Code explanation	Commentary
	to control the resource estimates. • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	sample spacing and lode orientation. To validate the model, a qualitative assessment was completed by slicing sections through the block model in positions coincident with drilling. A quantitative assessment of the estimate was completed by comparing the average gold grades of the composite file input against the gold block model output for all the resource objects. A trend analysis was completed by comparing the interpolated blocks to the sample composite data within the main lodes. This analysis was completed for eastings and elevations across the deposit. Validation plots showed good correlation between the composite grades and the block model grades.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	Tonnages and grades were estimated on a dry in situ basis.
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	The Mineral Resource estimate has been constrained by the wireframed mineralised envelopes, is undiluted by external waste and reported above a 0.67g/t gold cut-off grade for open pit material within a $AU2700 pit shell.
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 is assumed the Jims deposit will be mined by open pit and underground methods when a new mining operation can be established. This model is only suitable for open pit purposes although it can be used for a preliminary assessment of underground potential. Whittle Assumptions: - Open Pit Mining Recovery 98% - Open Pit dilution 10% - Processing Recovery 85% - Mining Cost $4.40 per tonne rock - Oxide and Backfill slope 45 degrees - Trans and fresh Slope 39 degrees - Backfill cost 2.75 per tonne backfill - Incremental Ore Mining Cost $0 - Open Pit grade Control Cost $0.88 per tonne ore - Mill Opex cost (2.0Mtpa) $34.01 per tonne - ROM to mill transport distance (Current Mill location) 28 km - ROM to mill transport $2.83 per tonne - Admin (G&A) $4.95 per tonne - Au Royalty 5% - Au Price AU$2700 per troy ounce
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part*	Metallurgical testing was carried out in 1993 by Laurie Smith & Associates and AMDEL. Sighter test work was carried from a 12 metre intersection in JRC043 that had an average grade of 2.94

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td></td><td>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.</td><td>g/t Au. 25% of the of the gold was recovery by gravity concentration but it was noted that it was locked up in heavy particles. Further they noted that Leach kinetics were also good and gold recovery was of the order of 96% with much of the extraction in the first 8 hours.

Leach tests indicated that Jims weathered low and high grade had slow leaching times and after 40 hours recovery was 76% and 78%. The other 3 samples, (Jims Mottled Zone, Jims transitional and Jims Primary) after 40 hours were 93 to 95%.

The following recoveries were assigned to the block model.

<table><tr><th>Material Type</th><th>Recovery%</th></tr><tr><td>Oxide</td><td>83</td></tr><tr><td>Transitional</td><td>94.6</td></tr><tr><td>Fresh</td><td>92.9</td></tr></table></td></tr>
<tr><td>Environmental factors or assumptions</td><td>Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.</td><td>No assumptions have been made regarding environmental factors.</td></tr>
<tr><td>Bulk density</td><td>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 for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.
Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.</td><td>No bulk density data from the Jims prospects could be located. Given that there were three open pits in the area it is assumed that bulk density data would have been taken. Density values were taken from the previous estimate.

<table><tr><th></th><th colspan="2">Material Type</th></tr><tr><th>Oxidation State</th><th>Basalt</th><th>Waste Dump</th></tr><tr><td>Oxide</td><td>2.6</td><td rowspan="3">2.5</td></tr><tr><td>Transitional</td><td>2.7</td></tr><tr><td>Fresh</td><td>2.8</td></tr></table></td></tr>
</table>

Criteria	JORC Code explanation	Commentary
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (ie 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.*	The Mineral Resource estimate is reported here in compliance with the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' by the Joint Ore Reserves Committee (JORC). The Mineral Resource was classified as Measured, Indicated and Inferred Mineral Resource based on data quality, sample spacing, and lode continuity. The Measured Mineral Resource is located below Jims Main Open Pit and has already been grade controlled drilled in part. The Indicated Mineral Resource was defined within areas of RC and diamond drilling of 25m by 25m (with some infill), where the continuity and predictability of the lode positions was good and the estimation had reasonable slopes of regression. The Inferred Mineral Resource was assigned to areas where support for the continuity of mineralisation was limited by wider spaced drilling or insufficient drilling in smaller lodes. The minimum requirement for an inferred resource is 3 drill holes spaced apart so that strike and dip can be determined. Validation of the block model shows good correlation of the input data to the estimated grades. The result reflects the competent person's view that the classification is Indicated and Inferred.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	No audits or reviews of this estimate have been conducted.
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 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.*	The Jims Mineral Resource Estimate has been reported with a moderate degree of confidence. The Measured Mineral Resource is located below Jims Main Open Pit and has already been grade controlled drilled in part. The Indicated Mineral Resource was defined within areas of RC and diamond drilling of 25m by 25m (with some infill), where the continuity and predictability of the lode positions was good and the estimation had reasonable slopes of regression. Jims Main was successfully mined from the 30th January 1998 to 25th June 2001 and produced 1,383,585 @ 2.62 g/t Au for 116,386 ounces. A block model report for this area from ctp_jims_apr2022.mdl results in a resource that was mined of 1.66 million tonnes @ 2.33 g/t Au for 125,195 ounces. Once mining factors are applied this figure is within acceptable limits of the mined reserve. Jims Central produced 3,069 tonnes @ 2.67 g/t Au for the period from 10th June 1998 to 1st April 1999 for 263 ounces. The pit was abandoned because tonnes and ounces were not reconciling with the model. A block model report with a low grade cut off from 1.0 g/t Au from ctp_jims_apr2022.mdl produces 2,993 tonnes @ 2.04 g/t Au for 157 ounces. This zone is just below the depletion zone and variable results can be expected. The Mineral Resource statement relates to global estimates of tonnes and grade.

Appendix 4 - JORC Table 1
Hurricane-Repulse Gold Deposit

Section 1 - Sampling Techniques and Data

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

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (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.*	Sampling was completed using reverse circulation (RC) and diamond (DD) core drilling. Sampling of RC chips was completed on RC drillholes, and half core sampling on diamond drillholes was completed.
	• *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.*	RC metres intervals are defined by paint markings on the rig. The larger split or sample reject is left at the sample pad to indicate metres drilled. Diamond drilling used a combination of HQ and NQ2-sized core. HQ core was drilled until competent ground was intersected, then NQ2 core was drilled. Drill core was oriented, aligned, and half-cut using metre intervals and geologically determined intervals (max 1.2 metres and min 0.3 metres), with geologically determined intervals taking precedence.
	• *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.*	1m RC samples were collected from a cone splitter on the rig, in a calico bag. The sample/bulk ratio was 12.5/87.5. Sample weights ranged between 1kg and 4kg, although sample weight/size are ideally uniform, at least within a drillhole. For RC holes drilled in the 1990s samples were taken at 1 metre intervals from the cyclone and manually fed through a riffle splitter Sampling of DD drillholes was completed using a diamond core saw. Half core was sampled on intervals between 0.3-1.2m in length honouring lithological boundaries. Sample weights are typically between 0.5kg and 3kg, mostly dependent on length, however sometimes dependent on lithology.
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 was completed using a 5.25" face sampling hammer drill bit. Diamond core was completed using a combination of HQ and NQ2 size drill bits and oriented where possible using the bottom dead centre technique. Deviation surveys were completed on all drillholes using Boart Longyear TruCore, or Axis Champ Ori equipment, or simiilar. Single Shot Surveys were completed at 30m intervals during drilling, and a continuous in/out survey was completed at the end of the hole.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.*	Approximate RC recoveries are sometimes recorded as percentage ranges based on a visual and/or weight estimate of the sample. RC recovery in the completed campaign was considered consistent. Diamond drill core recoveries are recorded as a percentage calculated from measured core versus

Criteria	JORC Code explanation	Commentary
		drilled intervals length.
	• *Measures taken to maximise sample recovery and ensure representative nature of the samples.*	Experienced RC drilling contractors were engaged to complete the drilling campaigns. Drilling contractors are supervised and routinely monitored by geologists. The diamond drill contractors adjusted their drilling rate and method if recovery issues arose. All recovery was recorded by the drillers on core blocks. This was checked and compared to the core measurements by the geological team. Any issues were communicated back to the drilling contractor, and necessary adjustments were made.
	• *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.*	No relationship was noted between RC sample recovery and grade. The consistency of the mineralised intervals suggests sampling bias due to material loss or gain is not an issue. No relationship was noted between core recovery and grade. The consistency of the mineralised intervals suggests that sampling bias due to material loss or gain is not an issue.
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.*	All RC holes were logged by geologists at the drill rig to a high level of detail to support resource estimation, mining studies and metallurgical studies. RC logging is undertaken on a metre by metre basis at the time of drilling. Geologists log DD core to industry standards. All relevant features such as lithology, structure, texture, grain size, alteration, oxidation state, vein style and veining percentage per interval, and mineralisation were recorded in the geological logs.
	• *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.*	RC samples were logged for lithology, alteration, mineralisation. Logging was a mix of qualitative and quantitative observations. Visual estimates were made of sulphide, quartz, and alteration as percentages. RC samples were not photographed. All DDH logging was quantitative where possible and qualitative elsewhere. All diamond drill core was photographed.
	• *The total length and percentage of the relevant intersections logged.*	The entire length of each RC and diamond core hole was logged.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.*	Diamond drill core was cut in half using a diamond core saw. Half core was sampled on intervals between 0.3-1.2m in length honouring lithological boundaries. The right-hand side of the core was bagged as the primary sample for analyses. The remaining half of the core was archived and stored for reference.
	• *If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.*	Depending on the drilling campaign, 1m RC samples were collected using a cyclone rotary splitter mounted on the RC drill rig, from an approximate 12.5% split off the bulk reject, or samples were collected using a cyclone and then split using a riffle splitter down to approximately 2kg. Samples collected from RC drill holes drilled by Tanami Gold between 2010 to 2011 were selected on a one metre basis through a 75:25% riffle splitter Primary analysis on some RC drilling was determined using 4m or 3m speared composite samples at

Criteria	JORC Code explanation	Commentary
		the geologist's discretion. Composite samples with a grade above 0.5 g/t gold had single metre bulk samples riffle split (using a 3-tier riffle splitter) and reanalysed. All RC chips were logged using wet sieving technique retaining a sample in a plastic chip tray.
	• *For all sample types, the nature, quality and appropriateness of the sample preparation technique.*	Sample preparation was completed at various labs depending on the drilling campaign and are deemed appropriate. Zapopan NL completed all sample preparation pre-1994 at the on site laboratory. During mining operations, Tanami Gold Joint Venture sent samples to ALS in Alice Springs for sample preparation, alternatively, samples were prepared at the onsite laboratory. Tanami Gold sent RC samples to SGS in Perth from 2010 to 2011 for sample preparation. For Northern Star, sample preparation for DD drilling was conducted at ALS Perth, commencing with sorting, checking, and drying at less than 110°C to prevent sulphide breakdown. Samples were jaw crushed to a nominal -6mm particle size. If the sample is greater than 3kg, a Boyd crusher with a rotary splitter is used to reduce the sample size to less than 3kg at a nominal <3mm particle size. The entire crushed sample (if less than 3kg) or sub-sample is then pulverized to 90% passing 75µm, using a Labtechnics LM5 bowl pulveriser. 300g Pulp subsamples are then taken with an aluminium scoop and stored in labelled pulp packets. For Northern Star, RC samples are dried at 100°C to constant mass, all samples below approximately 3kg are pulverised in LM5's to nominally 85% passing a 75µm screen. Samples generated above 4kg are crushed to <6mm and cone split to nominal mass before pulverisation. No formal heterogeneity study has been completed or monographed. An informal analysis suggests that the sampling protocol currently in use is appropriate to the mineralisation encountered and should provide representative results.
	• *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.*	Grind checks are performed at both the crushing stage (3mm) and pulverising stage (75µm), requiring 90% of the material to pass through the relevant size.
	• *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.*	The sample preparation is considered appropriate and to industry standard. Field duplicates for RC drilling are routinely analysed at a rate of 1 in 20 samples. No Field duplicates were submitted for diamond core sampling.
	• *Whether sample sizes are appropriate to the grain size of the material being sampled.*	Sample sizes are considered appropriate to represent the style of mineralisation, the thickness and consistency of the intersections, the sampling methodology and assay value 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.*	Gold concentration was determined in various ways depending on the drilling program. From the late 1980s to about March 1994, most of the samples collected by Zapopan NL were assayed for gold by fire assay with a 0.01 ppm detection limit at the onsite laboratory. During mining operations (the mid-1990s to 2001) under the Tanami Gold Joint Venture, analysis (both on and offsite) was done by AAS with selective FA checks. All onsite analysis was performed with a

Criteria	JORC Code explanation	Commentary
		20ml aliquot, whereas ALS used a 50ml aliquot for all AAS readings. Tanami Gold sent RC samples to SGS Laboratories in Perth for the 2010 to 2011 drilling. They were assayed using a 50g fire assay charge for gold with an atomic spectrometer finish and a 0.01 ppm detection limit. Samples collected by Northern Star were sent to ALS in Malaga, Perth. Gold (Au) concentration was determined by ICP-AAS (Atomic Adsorption Spectrometry), after conventional Lead Button Fusion and HCl/HNO3 digestion of a 50g charge sample, with at least 170g of litharge-based flux at the ALS Malaga facility. This was common to both Diamond Core and RC Chip sample collection.
	• *For geophysical tools, spectrometers, handheld XRF instruments, etc., the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc..*	Not applicable.
	• *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	QAQC programs from drilling data from the mid-1980s to 2001 were carried out, but that data has yet to be located. Significant mining was also carried out during that period. Drilling by CTP appears to confirm the results, but no definite conclusion can be made about the quality of the earlier data collection period. It is assumed to be representative. QAQC programs completed by Tanami Gold included insertion of certified reference material at regular intervals and results have, in the main, accurately reflected the original assays and expected values. Coarse crush duplicates show repeatable although variable results. This may be due to the heterogeneity of the mineralisation. A recognised laboratory has been used for analysis of samples. Northern Star QAQC protocols used include the following for all drill samples: • Field QAQC protocols used for all drill samples include commercially prepared certified reference materials (CRM) inserted at an incidence of 1 in 20 samples. The CRM used is not identifiable to the laboratory with QAQC data is assessed on import to the database and reported monthly, quarterly and yearly. • NSR RC Resource definition drilling routinely inserts field blanks and monitor their performance. • Laboratory QAQC protocols used for all drill samples include repeat analysis of pulp samples occurs at an incidence of 1 in 20 samples and screen tests (percentage of pulverised sample passing a 75µm mesh) are undertaken on 1 in 40 samples. • The laboratories' own standards are loaded into the database and the laboratory reports its own QAQC data monthly. • Blanks were routinely inserted into the sample sequence at a rate of 1 per 25 samples and

Criteria	JORC Code explanation	Commentary
		again specifically after potential or existing high-grade mineralisation to test for contamination. Failures of blanks above 0.2g/t were followed up, and re-assayed. New pulps were prepared if failures continued. • Failed standards are generally followed up by re-assaying a second 30g pulp sample of all samples in the fire above 0.1ppm by the same method at the primary laboratory. Both the accuracy component (CRM's and third-party checks) and the precision component (duplicates and repeats) of the QAQC protocols are thought to demonstrate acceptable levels of accuracy and precision.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.*	All significant intersections were verified by a Northern Star Senior Geologist on-site during the drill-hole validation process and later signed off by a Competent person, as defined by JORC.
	• *The use of twinned holes.*	No twinned holes were drilled for this data set.
	• *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.*	Primary data is either entered directly or imported into a SQL acQuire database using semi-automated or automated data entry; hard copies of core assays and surveys are stored at site. Assay files are received in .csv format and loaded directly into the SQL acQuire database by geologists or database administrators. Hardcopy and electronic copies of the data is stored for future reference. Visual checks occur as a result of regular use of the data.
	• *Discuss any adjustment to assay data.*	The first (primary) gold assay is almost always utilised for any resource estimation, except where evidence from re-analysis or check analysis dictates. A systematic procedure utilising several re-assays and/or check assays are employed to determine if/when the first (primary) gold assay is changed for the final assay.
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.*	Planned drillholes were sited either with a handheld global positioning system (GPS) or a differential global positioning system (DGPS), and the initial drillhole pickup is usually with a handheld GPS, as well, with accuracy between ± 0.3 to 1m. After program completion, differential GPS (DGPS) is used for the final collar pickup with an accuracy of ± 5mm. During drilling, single-shot surveys were taken every 30m to ensure the hole remains close to the design. Down-hole surveys were performed using Boart Longyear TruCore, Axis Champ Ori, or similar equipment., recording the down-hole dip and magnetic azimuth. These results were then uploaded into the database.
	• *Specification of the grid system used.*	Collar coordinates were recorded in MGA94 Zone 52.
	• *Quality and adequacy of topographic control.*	Topographic control was established through detailed aerial and ground survey control from airborne survey acquisition, or a DGPS elevation with an accuracy of ± 10mm is used.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.*	The Indicated Mineral Resource was defined within areas of RC and diamond drilling of 25m by 12 to 25m.
	• *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*	The data spacing and distribution from the reported campaigns is sufficient to establish geological and/or grade continuity. Further drilling will be required to ensure that it is appropriate for resource estimation and classifications to be applied.

Criteria	JORC Code explanation	Commentary
	estimation procedure(s) and classifications applied.	
	• *Whether sample compositing has been applied.*	No sample compositing was applied. Sample compositing was only undertaken as part of the Mineral Resource estimation process.
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.*	Drillholes were drilled at an angle approximately perpendicular to the orientation of the mineralised trends.
	• *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.*	No sampling bias is considered to have been introduced by the drilling orientation.
Sample security	• *The measures taken to ensure sample security.*	Geologists and geotechnicians managed the chain of custody of samples. Geologists or geotechnicians transport core and RC samples to the admin/mine site; the drill core is logged, cut, and sampled at the on-site core shed. Samples were bagged in tied numbered calico bags, grouped in larger tied polyweave plastic bags, and placed in large bulka bags with sample submission sheets. The bulka bags were sent by road freight to the laboratory. Field personnel involvement ceased at this stage. The results of analyses were returned via email or uploaded to an FTP site. Sample pulp splits are stored for a time at the laboratory. Retained pulp packets are returned to the Central Tanami Mine for storage.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	Geologists have undertaken internal reviews of applied sampling techniques and data. The completed reviews raised no issues.

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 Hurricane/Repulse deposit is located in the Tanami Region in the Northern Territory in the Northern Territory fully encompassed by mineral leases MLS153 and MLS125 to MLS129., approximately 600km northwest of Alice Springs, NT. Hurricane/Repulse forms part of the Central Tanami Project, a 50/50 Joint Venture between Tanami Gold NL and Northern Star Limited. The 2,211km2 tenement area in the Tanami Region held by the CTPJV are registered jointly in Northern Star (Tanami) Pty Ltd and Tanami (NT) Pty Ltd. The CTPJV comprises ten Exploration Licences, eight of which are granted, and two applications, nineteen Mineral Leases, and one Mining Licence. Mineral Leases have a 25-year life and are renewable for 25 years. The Central Tanami project area lies on Aboriginal land within the Central Desert Aboriginal Land Trust

Criteria	JORC Code explanation	Commentary
		and the Mt Frederick Aboriginal Land Trust, both administered by the Central Land Council.
	• *The security of the tenure held at the time of reporting along with any known impediments to obtaining a license to operate in the area.*	MLS153 and MLS125 to MLS129 are granted and in good standing.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	The Hurricane/Repulse area has been explored since the mid-1980's. Several companies, including Zapopan NL, Otter Gold NL, Normandy Mining Ltd, Newmont (Asia Pacific), and Tanami Gold NL have been active in the area. Drilling reported with this release is contiguous with the Hurricane/Repulse open-cut mine. Previous drilling at this project adds gold grade and geological context to the subsequent Northern Star Resources interpretation of the area as tested by the drill holes covered by this report. Recent exploration in the area has been completed by the Joint Venture partners, Tanami Gold NL and Northern Star Limited.
Geology	• *Deposit type, geological setting and style of mineralisation.*	The Hurricane-Repulse deposit is hosted by mafic volcanic flows (pillowed, vesicular and massive basalt flows), some volcanic flow breccias, sequences of lithic sandstones, siltstones and mudstones, occasional coarse sediments consisting of very proximal volcanic fragments, and more minor to rare siliceous/cherty horizons, and rare graphitic mudstones. Vein stages have been identified from crosscutting relationships in several areas of the mine leases, with gold mineralisation associated with both: • grey quartz ± sericite ± pyrite ± chlorite ± sphalerite ± arsenopyrite ± gold; or • ankerite-quartz ± chalcopyrite ± chlorite ± gold ± sericite ± pyrite ± calcite. Gold occurs in grains up to 15 µm within pyrite in the first vein style and chalcopyrite in the second vein style. The overall strike length of the known gold mineralisation on the Hurricane-Repulse trend is 1,750 metres and has a variable down dip extent of about 180 metres. The true thickness of gold mineralisation varies from less than a metre to 10 metres. The host to the mineralisation in the Hurricane pit is interbedded sandstone and siltstone. In this area, the strike of the mineralisation is about 030°, and the strike length of individual lenses varies between 80 to 120 metres. The down-dip extent of lenses varies from 10 to 80 metres and the true thickness from 0.6 to several metres. The shapes of the mineralisation are irregular and are interpreted to reflect the rheology contrasts between the siltstone and sandstone. The dips of the mineralisation varied from 30° to 75° southeast. In the northern part of the Hurricane pit, the mineralisation changes strike to about 010° as the mineralisation approaches the boundary between the sediments and basalt. The strike length of the mineralisation increases to 180 metres and there are several cross-cutting structures that vary in strike from 040° to 075° close to the basalt/sediment contact. This pattern continues into the basalt.
Drill hole information	• *A summary of all information material to the under-standing of the exploration results including a tabulation of*	See attached Appendix for a table of results.

Criteria	JORC Code explanation	Commentary
	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 holes are excluded from this report.
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.*	This release pertains to the reporting of Mineral Resources. Exploration results have previously been regularly reported to the ASX by the Joint Venture parties. In the reporting of exploration results, results are reported as weighted averages using a nominal 0.5 g/t gold cut-off and up to 2 metres of internal dilution. No high-grade cuts were applied.
	• *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.*	This release pertains to the reporting of Mineral Resources. Exploration results have previously been regularly reported to the ASX by the Joint Venture parties. Any high-grade zones above 15g/t gold within a reported intercept are also reported as included intervals.
	• *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	No metal equivalent values were used to report previous exploration results.
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.*	The reported drill holes have been drilled approximately perpendicular to the orientation of the targeted mineralised trends.
	• *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.*	The exact orientation of the Hurricane/Repulse mineralised system is generally well understood. The geometry of the mineralisation to drill hole intercepts generally at a high angle, often nearing perpendicular. There is enough historic exploration and production data at Hurricane/Repulse to infer geological continuity in mineralisation 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').*	Only downhole lengths have been reported. True widths are not known.
Diagrams	• *Appropriate maps and sections (with scales) and*	Appropriate plans and sections have been included.

Criteria	JORC Code explanation	Commentary
	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.	
Balanced Reporting	• *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.*	Planned drillholes are sited with a handheld global positioning system (GPS), and the initial drillhole pickup is usually with a handheld GPS, as well; with accuracy between ± 0.3 to 1m. After program completion, differential GPS (DGPS) is used for the final collar pickup with an accuracy of ± 5mm.
	• *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.*	Both high and low grades have been reported accurately, clearly identified with the drill-hole attributes and 'From' and 'To' depths. All intercepts for all holes have been reported regardless of grade.
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.*	Exploration results have previously been regularly reported to the ASX by the Joint Venture parties.
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).*	A review of the drilling completed is required before further work is planned.
	• *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	Appropriate Diagrams accompany this release.

Section 3 - Estimation and Reporting of Mineral Resources

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.*	The drill hole database is managed by Northern Star Resources in Acquire. MJM completed systematic data validation steps after receiving the database. Checks completed by MJM included verifying that: • Down-hole survey depths did not exceed the hole depth as reported in the collar table. • Visual inspection of drill hole collars and traces in Surpac. • Assay values did not extend beyond the hole depth quoted in the collar table. • Assay and survey information was checked for duplicate records. There are some minor overlap errors in the RC and diamond drill holes where 4 metre samples

Criteria	JORC Code explanation	Commentary
		overlapped later 1 metre samples but the occurrence was not significant
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.*	A number of site visits have been conducted by Mr Joe McDiarmid, Director of MoJoe Mining Pty Ltd and Mr Graeme Thompson, Principal Resource Geologist of MoJoe Mining Pty Ltd.
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.*	The confidence in the geological interpretation is moderate to good as there are exposures and it is based upon RC and diamond drill holes and geological mapping. Mineralisation was based upon sectional interpretations that were assumed to be continuous between sections. At this stage of the project no alternative geological interpretations have been considered. The Hurricane Repulse deposits are hosted by mafic volcanic flows (pillowed, vesicular and massive basalt flows) some volcanic flow breccias, sequences of lithic sandstones, siltstones and mudstones, occasional coarse sediments consisting of very proximal volcanic fragments, and more minor to rare siliceous/cherty horizons, and rare graphitic mudstones
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.*	The overall strike length of the known gold mineralisation on the Hurricane Repulse trend is of the order of 1750 metres and has a variable down dip extent of about 180 metres. True thickness of gold mineralisation varies from less than a metre to 10 metres. Mineralisation on the Airstrip trend strikes at about 045° and dips between 45° to 50° southeast. The overall strike length is about 900 metres, but individual lenses vary from about 100 to 350 metres while the true thickness varies from less than a metre to several metres. The down dip extent has been interpreted to be up to 170 metres.
Estimation and modelling techniques	• *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*	Ordinary Kriging (OK) interpolation with an oriented 'ellipsoid' search was used for the estimate. Surpac software was used for the estimations. Three dimensional mineralised wireframes (interpreted by RPM Global in Leapfrog software and checked by MJM) were used to domain the gold data. Sample data was composited to 1m down hole lengths using the 'fixed length' method. Intervals with no assays were excluded from the estimates. The influence of extreme grade values was addressed by reducing high outlier values by applying top-cuts to the data. These cut values were determined through statistical analysis (histograms, log probability plots, CV's) using Supervisor software. MJM has not made assumptions regarding recovery of by-products from the mining and processing of ore at the Hurricane Repulse deposit. All modelling was completed in Surpac Geovia software. No estimation of deleterious elements was carried out. Only gold was interpolated into the block model. The block model used a primary block size of 10m NS by 5m EW by 5m RL with sub-blocking to 2.5m by 1.25m by 1.25m. The parent block size was selected based on approximately half the average drill spacing of RC drilling in the well drilled areas, while dimensions in other directions were selected to

Criteria	JORC Code explanation	Commentary
	variables of economic significance (eg 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.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	provide sufficient resolution to the block model in the across-strike and down-dip direction. QKNA was completed in Supervisor software to justify the block size, number of samples, search ellipses and discretization An orientated 'ellipsoid' search was used to select data and was based on the observed lode geometry. The search ellipsoid was orientated to the average strike, plunge, and dip of the main lodes. Three expanding passes were used in the estimation (25-60, 50-120 and 100-240 metres). A first pass of radius 25-60m with a minimum number of samples of 3-6 samples and a second pass of radius 50-120m with a minimum number of 3-6 samples were used for Hurricane Repulse. A third pass of search radius 100-240m was used with a minimum of 3-6 samples to ensure all blocks within the mineralised lodes were estimated. The maximum number of samples ranged from 4-38 depending on the number of samples in the domain. Blocks that did not fill after 3 passes were given a 4th pass using nearest neighbour estimation Selective mining units were not modelled. The block size used in the resource model was based on drill sample spacing and lode orientation. To validate the model, a qualitative assessment was completed by slicing sections through the block model in positions coincident with drilling. A quantitative assessment of the estimate was completed by comparing the average gold grades of the composite file input against the gold block model output for all the resource objects. A trend analysis was completed by comparing the interpolated blocks to the sample composite data within the main lodes. This analysis was completed for eastings and elevations across the deposit. Validation plots showed good correlation between the composite grades and the block model grades.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	Tonnages and grades were estimated on a dry in situ basis.
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	The Mineral Resource estimate has been constrained by the wireframed mineralised envelopes, is undiluted by external waste and reported above a 0.67g/t gold cut-off grade in oxide and transitional and 0.97 g/t gold in fresh for open pit material within a $AU2700 pit shell.
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 is assumed the Hurricane Repulse deposit will be mined by open pit and underground methods when a new mining operation can be established. This model is only suitable for open pit purposes although it can be used for a preliminary assessment of underground potential. The following mining factors and costs were used for the Whittle optimisation of the open pit resource: - OP Mining Recovery 98% - OP Mining Dilution 10% - Oxide Processing Recovery % - Trans Processing Recovery % - Oxide and backfill slope 45° - Trans and Fresh slope 39°

Criteria	JORC Code explanation	Commentary
		- Backfill or Waste Dump Mining Cost $2.75/t - Mining Cost $4.40/t - Incremental Ore Mining Cost $4.95/t - Open Pit Grade Control Cost $0.88/t - Mill Opex Cost (2.0 Mtpa) $34.01/t - ROM to mill transport distance 2km - ROM to Mill cost $4.84/t - Admin (G&A) cost $4.95/t - Au Royalty 5% - Au Price AU$2700/tr oz - Deswick software was used for the underground resource stope optimisation. - Stope Optimiser Assumptions - UG Mining Unplanned Recovery 5% - UG Mining Unplanned Dilution 5% - Processing Recovery 55% - HW planned dilution skin 0.5 m - FW planned dilution skin 0.25 m - Minimum Mining width 3 metres not including dilution skins - Stope optimisation length 20 m along strike - Sub level interval 20 m - Optimise metal - UG Stoping cost $70 per tonne ore - UG Backfill Cost $10 per tonne ore - UG Opex Fixed Cost $5 per tonne ore - Mill Opex Cost (2Mtpa) $30.92 per tonne - ROM to mill transport $4.00 per tonne - Admin $4.50 per tonne - NT Factor $12.06 per tonne - Capex $0 - Au Royalty 5% - Au Price AU$2700 troy ounce
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*	The Hurricane Repulse pits were mined from the late 1980s to March 1994. Several satellite pits were also included in the production figures but no break down of the source feed to the mill has been found. These pits may have included Dinky, Airstrip, Temby, Dingo, Central, Bastille, Reward, Southern, Bumper and Bouncer. For the period from October 1990 to November 1991 1.36 million tonnes @ 2.34 g/t Au were fed into a CIL plant for an overall recovery of 87%. For the period from

Criteria	JORC Code explanation	Commentary
	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.	October 1992 to March 1994 1.87 million tonnes were fed into the CIL plant for an overall recovery of 85.2%. A metallurgical study was completed in 2016 following the diamond drilling of HRDD0004 to HRDD0011 to determine fold recovery in fresh rock. Anon (2016) states four holes were chosen to be included Hurricane metallurgical studies; HRDD0004, HRDD0007, HRD0010, HRDD0011. The samples selected were gold mineralisation found in fresh basalt. The results indicate that for the Hurricane area that only a 51-56% gold recovery can be achieved in fresh rock using a 75 µm grind size. This grind size is finer than would be achieved in a CIL plant. The available data suggests that metallurgical gold recovery in oxide and transitional material is in the vicinity of 85 to 87%. Fresh rock gold recovery appears to be far more complex. The Repulse area may have gold recoveries of up to 87% in fresh rock but this is based upon one sample and may not be representative of the entire Repulse pit.
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 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.*	No assumptions have been made regarding environmental factors.
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 for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	Bulk density data was located from Tanami Gold NL drilling data HRDD0005 to HRDD0013. All sample densities were calculated using the water displacement/air water method [Density = Weight of sample in air / (weight of sample in air – weight of sample in water)]. Results were highly variable. Hillyard (2011) does not mention whether the samples were oven dried before being weighed so there is some uncertainty as to whether the values represent a wet or dry bulk density. There is also no mention of whether void space was considered Bulk densities were applied to the model by rock type and oxidation state. The top of fresh rock and base of complete oxidation surfaces were re-interpreted to consider the latest drilling from 2016.

Oxidation State	Material Type	
	Basalt	Sediments
Oxide	2.29	2.51
Transitional	2.6	2.65

Criteria	JORC Code explanation	Commentary
		Fresh | 2.84 | 2.87 Densities of 2.2 were applied to backfill and waste dumps.
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (ie 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.*	The Mineral Resource estimate is reported here in compliance with the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' by the Joint Ore Reserves Committee (JORC). The Mineral Resource was classified as Measured, Indicated and Inferred Mineral Resource based on data quality, sample spacing, and lode continuity. The Indicated Mineral Resource was defined within areas of RC and diamond drilling of 25m by 25m (with some infill), where the continuity and predictability of the lode positions was good and the estimation had reasonable slopes of regression. The Inferred Mineral Resource was assigned to areas where support for the continuity of mineralisation was limited by wider spaced drilling or insufficient drilling in smaller lodes. The minimum requirement for an inferred resource is 3 drill holes spaced apart so that strike and dip can be determined. Validation of the block model shows good correlation of the input data to the estimated grades. The result reflects the competent person's view that the classification is Indicated and Inferred.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	No audits or reviews of this estimate have been conducted.
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 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.*	The Hurricane Repulse Mineral Resource Estimate has been reported with a moderate degree of confidence. The Indicated Mineral Resource was defined within areas of RC and diamond drilling of 25m by 25m (with some infill), where the continuity and predictability of the lode positions was good and the estimation had reasonable slopes of regression. Production The Mineral Resource statement relates to global estimates of tonnes and grade. Production figures were recovered for 2 periods of mining. For the period from October 1990 to November 1991 the Hurricane Repulse area produced 1.44 million tonnes @ 2.26 g/t Au of high grade and 0.25 million tonnes @ 0.6 g/t Au of low grade. For the period from November 1992 to January 1994 the production was 1.49 million tonnes @ 2.37 g/t Au. The current resource of 0.69 million tonnes @ 2.53 g/t Au has the same tenure of grade as previous production.

Appendix 5 - JORC Table 1
Crusade Gold Deposit

Section 1 - Sampling Techniques and Data

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

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (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.*	Sampling was completed using reverse circulation (RC) and diamond (DD) core drilling. Sampling of RC chips was completed on RC drillholes, and half core sampling on diamond drillholes was completed.
	• *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.*	RC metres intervals are defined by paint markings on the rig. The larger split or sample reject is left at the sample pad to indicate metres drilled. Diamond drilling used a combination of HQ and NQ2-sized core. HQ core was drilled until competent ground was intersected, then NQ2 core was drilled. Drill core was oriented, aligned, and half-cut using metre intervals and geologically determined intervals (max 1.2 metres and min 0.3 metres), with geologically determined intervals taking precedence.
	• *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.*	1m RC samples were collected from a cone splitter on the rig, in a calico bag. The sample/bulk ratio was 12.5/87.5. Sample weights ranged between 1kg and 4kg, although sample weight/size are ideally uniform, at least within a drillhole. For RC holes drilled in the 1990s samples were taken at 1 metre intervals from the cyclone and manually fed through a riffle splitter Sampling of DD drillholes was completed using a diamond core saw. Half core was sampled on intervals between 0.3-1.2m in length honouring lithological boundaries. Sample weights are typically between 0.5kg and 3kg, mostly dependent on length, however sometimes dependent on lithology.
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 was completed using a 5.25" face sampling hammer drill bit. Diamond core was completed using a combination of HQ and NQ2 size drill bits and oriented where possible using the bottom dead centre technique. Deviation surveys were completed on all drillholes using Boart Longyear TruCore, or Axis Champ Ori equipment, or similar. Single Shot Surveys were completed at 30m intervals during drilling, and a continuous in/out survey was completed at the end of the hole.
Drill sample recovery	• *Method of recording and assessing core and chip sample*	Approximate RC recoveries are sometimes recorded as percentage ranges based on a visual and/or

Criteria	JORC Code explanation	Commentary
	recoveries and results assessed.	weight estimate of the sample. RC recovery in the completed campaigns were considered consistent. DD core was reconstructed into continuous runs with depths checked against core blocks. Core recoveries were recorded as a percentage and calculated from measured core versus drilled intervals by geologists.
	• *Measures taken to maximise sample recovery and ensure representative nature of the samples.*	Experienced RC drilling contractors were engaged to complete the drilling campaigns. Drilling contractors are supervised and routinely monitored by geologists. The diamond drill contractors adjusted their drilling rate and method if recovery issues arose. All recovery was recorded by the drillers on core blocks. This was checked and compared to the core measurements by the geological team. Any issues were communicated back to the drilling contractor, and necessary adjustments were made.
	• *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.*	No relationship was noted between RC sample recovery and grade. The consistency of the mineralised intervals suggests sampling bias due to material loss or gain is not an issue. No relationship was noted between core recovery and grade. The consistency of the mineralised intervals suggests that sampling bias due to material loss or gain is not an issue.
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.*	All RC holes were logged by geologists at the drill rig to a high level of detail to support resource estimation, mining studies and metallurgical studies. RC logging is undertaken on a metre by metre basis at the time of drilling. Geologists log DD core to industry standards. All relevant features such as lithology, structure, texture, grain size, alteration, oxidation state, vein style and veining percentage per interval, and mineralisation were recorded in the geological logs.
	• *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.*	RC samples were logged for lithology, alteration, mineralisation. Logging was a mix of qualitative and quantitative observations. Visual estimates were made of sulphide, quartz, and alteration as percentages. RC samples were not photographed. All DD logging was quantitative where possible and qualitative elsewhere. All diamond drill core was photographed.
	• *The total length and percentage of the relevant intersections logged.*	The entire length of each RC and diamond core hole was logged.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.*	Diamond drill core was cut in half using a diamond core saw. Half core was sampled on intervals between 0.3-1.2m in length honouring lithological boundaries. The right-hand side of the core was bagged as the primary sample for analyses. The remaining half of the core was archived and stored for reference.
	• *If non-core, whether riffled, tube sampled, rotary split,*	RC drillholes were sampled either using a cyclone rotary splitter mounted on the RC drill rig, from an approximate 12.5% split off the bulk reject, or samples were collected using a cyclone then split using a

Criteria	JORC Code explanation	Commentary
	etc. and whether sampled wet or dry.	riffle splitter down to approximately 2kg. All RC chips were logged using wet sieving technique retaining a sample in a plastic chip tray.
	• *For all sample types, the nature, quality and appropriateness of the sample preparation technique.*	Sample preparation was completed at various labs depending on the drilling campaign and are deemed appropriate Northern Star drilling samples were prepared at ALS Perth, commencing with sorting, checking, and drying at less than 110°C to prevent sulphide breakdown. Samples were jaw crushed to a nominal -6mm particle size. If the sample is greater than 3kg, a Boyd crusher with a rotary splitter is used to reduce the sample size to less than 3kg at a nominal <3mm particle size. The entire crushed sample (if less than 3kg) or sub-sample is then pulverized to 90% passing 75µm, using a Labtechnics LM5 bowl pulveriser. 300g Pulp subsamples are then taken with an aluminium scoop and stored in labelled pulp packets. An informal analysis suggests that the sampling protocol currently in use is appropriate to the mineralisation encountered and should provide representative results.
	• *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.*	Grind checks are performed at both the crushing stage (3mm) and pulverising stage (75µm), requiring 90% of the material to pass through the relevant size.
	• *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.*	The sample preparation is considered appropriate. Field duplicates for RC drilling are routinely analysed at a rate of 1 in 20 samples. No Field duplicates were submitted for diamond core sampling.
	• *Whether sample sizes are appropriate to the grain size of the material being sampled.*	Sample sizes are considered appropriate to represent the style of mineralisation, the thickness and consistency of the intersections, the sampling methodology and assay value 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.*	Samples collected during the 1990s were analysed by AAS with selective FA checks with a 20ml aliquot. It is unknown where the samples were analysed. Samples collected by Northern Star were sent to ALS in Malaga, Perth. Gold (Au) concentration was determined by ICP-AAS (Atomic Adsorption Spectrometry), after conventional Lead Button Fusion and HCl/HNO3 digestion of a 50g charge sample, with at least 170g of litharge-based flux at the ALS Malaga facility. This was common to both Diamond Core and RC Chip sample collection.
	• *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..*	No geophysical tools were used to determine any element concentrations.
	• *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	The laboratory procedure during the 90s is unknown. The Northern Star QAQC protocols used include the following for all drill samples: • Field QAQC protocols used for all drill samples include commercially prepared certified

Criteria	JORC Code explanation	Commentary
		reference materials (CRM) inserted at an incidence of 1 in 20 samples. The CRM used is not identifiable to the laboratory with QAQC data is assessed on import to the database and reported monthly, quarterly and yearly. • NSR RC Resource definition drilling routinely inserts field blanks and monitor their performance. • Laboratory QAQC protocols used for all drill samples include repeat analysis of pulp samples occurs at an incidence of 1 in 20 samples and screen tests (percentage of pulverised sample passing a 75µm mesh) are undertaken on 1 in 40 samples. • The laboratories' own standards are loaded into the database and the laboratory reports its own QAQC data monthly. • Blanks were routinely inserted into the sample sequence at a rate of 1 per 25 samples and again specifically after potential or existing high-grade mineralisation to test for contamination. Failures of blanks above 0.2g/t were followed up, and re-assayed. New pulps were prepared if failures continued. • Failed standards are generally followed up by re-assaying a second 30g pulp sample of all samples in the fire above 0.1ppm by the same method at the primary laboratory. The accuracy component (CRM's and third-party checks) and the precision component (duplicates and repeats) of the QAQC protocols are thought to demonstrate acceptable levels of accuracy and precision.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.*	All significant intersections were verified by Geologists on-site during the drill-hole validation process and later signed off by a Competent person, as defined by JORC.
	• *The use of twinned holes.*	Two twin holes were completed in the 2019 Northern Star drilling campaign, SJRC0005 twinned CDH007 and SJRC0006 twinned CDH008.
	• *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.*	Primary data is either entered directly or imported into a SQL acQuire database using semi-automated or automated data entry; hard copies of core assays and surveys are stored at site. Assay files are received in .csv format and loaded directly into the SQL acQuire database by geologists or database administrators. Hardcopy and electronic copies of the data is stored for future reference. Visual checks occur as a result of regular use of the data.
	• *Discuss any adjustment to assay data.*	The first (primary) gold assay is almost always utilised for any resource estimation, except where evidence from re-analysis or check analysis dictates. A systematic procedure utilising several re-assays and/or check assays are employed to determine if/when the first (primary) gold assay is changed for the final assay.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings*	Planned drillholes were sited either with a handheld global positioning system (GPS) or a differential global positioning system (DGPS), and the initial drillhole pickup is usually with a handheld GPS, as

Criteria	JORC Code explanation	Commentary
	and other locations used in Mineral Resource estimation.	well, with accuracy between ± 0.3 to 1m. After program completion, differential GPS (DGPS) is used for the final collar pickup with an accuracy of ± 5mm. During drilling, single-shot surveys were taken every 30m to ensure the hole remains close to the design. Down-hole surveys were performed using Boart Longyear TruCore, Axis Champ Ori, or similar equipment., recording the down-hole dip and magnetic azimuth. These results were then uploaded into the database.
	• *Specification of the grid system used.*	Collar coordinates were recorded in MGA94 Zone 52.
	• *Quality and adequacy of topographic control.*	Topographic control was established through detailed aerial and ground survey control from airborne survey acquisition, or a DGPS elevation with an accuracy of ± 10mm is used.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.*	Drillhole spacing across the area varies; The Indicated Mineral Resource was defined within areas of RC and diamond drilling of 40m by 40m (with some 25 by 25 metre infill and twinning), where the continuity and predictability of the lode positions was good and the estimation had reasonable slopes of regression.
	• *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.*	The data spacing and distribution is sufficient to establish geological and/or grade continuity appropriate for the Mineral Resource and classifications to be applied.
	• *Whether sample compositing has been applied.*	No sample compositing was applied. Sample compositing was only undertaken as part of the Mineral Resource estimation process.
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.*	Drillholes were drilled at an angle that is approximately perpendicular to the orientation of the mineralised trends
	• *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.*	No sampling bias is considered to have been introduced by the drilling orientation.
Sample security	• *The measures taken to ensure sample security.*	The chain of custody of samples was managed by geologists and geotechnicians. Geologists or geotechnicians transport core and RC samples to the admin/mine site; the drill core is logged, cut, and sampled at the on-site core shed. Samples were bagged in tied numbered calico bags, grouped in larger tied polyweave plastic bags, and placed in large bulka bags with sample submission sheets. The bulka bags were sent by road freight to the laboratory. Field personnel involvement ceased at this stage. The results of analyses were returned via email or uploaded to an FTP site. Sample pulp splits are stored for a time at the laboratory. Retained pulp packets are returned to the Central Tanami Mine for storage.

Criteria	JORC Code explanation	Commentary
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	Geologists have undertaken internal reviews of applied sampling techniques and data. The completed reviews raised no issues.

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 Crusade deposit is located in the Tanami Region in the Northern Territory in the Northern Territory on Exploration Licence (Supplejack) EL28282, approximately 100km northeast of the Central Tanami Mill site. EL28282 covers an area of 101.07km2 and forms part of the Central Tanami Project, a 50/50 Joint Venture between Tanami Gold NL and Northern Star Limited. The 2,211km2 tenement area in the Tanami Region held by the CTPJV are registered jointly in Northern Star (Tanami) Pty Ltd and Tanami (NT) Pty Ltd. The CTPJV comprises ten Exploration Licences, eight of which are granted, and two applications, nineteen Mineral Leases, and one Mining Licence. Mineral Leases have a 25-year life and are renewable for 25 years. The Central Tanami project area lies on Aboriginal land within the Central Desert Aboriginal Land Trust and the Mt Frederick Aboriginal Land Trust, both administered by the Central Land Council.
	• *The security of the tenure held at the time of reporting along with any known impediments to obtaining a license to operate in the area.*	EL28282 is granted and in good standing.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	The Crusade area has been explored since the mid 1990's. Several companies, including Newmont (Asia Pacific) and Tanami Gold NL have been active in the area. Recent exploration in the area has been completed by the Joint Venture partners, Tanami Gold NL and Northern Star Limited.
Geology	• *Deposit type, geological setting and style of mineralisation.*	The Crusade deposit is a Palaeoproterozoic, mafic-hosted vein-mineralized deposit that is part of the Granites-Tanami Inlier. Mineralisation occurs within quartz veins which are parallel to the basalt/dacite contact. Primary mineralisation is associated with hydrothermal veins and vein brecciation dominated by quartz enclosing lesser amounts of pyrite, illite/sericite, and tourmaline.
Drill hole information	• *A summary of all information material to the under-standing 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*	See attached Appendix for a table of results.

Criteria	JORC Code explanation	Commentary
	• *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.*	Not applicable to this report.
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.*	This release pertains to the reporting of Mineral Resources. Exploration results have previously been regularly reported to the ASX by the Joint Venture parties. In the reporting of exploration results, results are reported as weighted averages using a nominal 0.5 g/t gold cut-off and up to 2 metres of internal dilution. No high-grade cuts were applied.
	• *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.*	This release pertains to the reporting of Mineral Resources. Exploration results have previously been regularly reported to the ASX by the Joint Venture parties. Any high-grade zones above 15g/t gold within a reported intercept are also reported as included intervals.
	• *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	No metal equivalent values were used to report previous exploration results.
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.*	The reported drill holes have been drilled approximately perpendicular to the orientation of the targeted mineralized.
	• *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.*	Mineralisation structures are vertical to sub-vertical.
	• *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').*	Only downhole lengths have been reported. True widths are not known.
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.*	Appropriate plans and sections have been included.
Balanced Reporting	• *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.*	Planned drillholes are sited with a handheld global positioning system (GPS), and the initial drillhole pickup is usually with a handheld GPS, as well; with accuracy between ± 0.3 to 1m. After program completion, differential GPS (DGPS) is used for the final collar pickup with an accuracy of ± 5mm.

Criteria	JORC Code explanation	Commentary
	• *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.*	Both high and low grades have been reported accurately, clearly identified with the drill-hole attributes and 'From' and 'To' depths. All intercepts for all holes have been reported regardless of grade.
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.*	Exploration results have previously been regularly reported to the ASX by the Joint Venture parties.
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).*	A review of the drilling completed is required before further work is planned.
	• *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	Appropriate Diagrams accompany this release.

Section 3 - Estimation and Reporting of Mineral Resources

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.*	The drill hole database is managed by Northern Star Resources in Acquire. MJM completed systematic data validation steps after receiving the database. Checks completed by MJM included verifying that: ▪ Down-hole survey depths did not exceed the hole depth as reported in the collar table. ▪ Visual inspection of drill hole collars and traces in Surpac. ▪ Assay values did not extend beyond the hole depth quoted in the collar table. ▪ Assay and survey information was checked for duplicate records. There are some minor overlap errors in the RC and diamond drill holes where 4 metre samples overlapped later 1 metre samples but the occurrence was not significant
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 competent person has not visited site however Joe McDiarmid, Principal of MoJoe Mining has made a number of visits to the Tanami JV area

Criteria	JORC Code explanation	Commentary
	the case.	
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.*	The confidence in the geological interpretation is moderate to good as there are exposures and it is based upon RC and diamond drill holes. Mineralisation was based upon sectional interpretations that were assumed to be continuous between sections. At this stage of the project no alternative geological interpretations have been considered. The Crusade deposit lies at the contact between the Nany Goat Volcanics and the Killi Killi Formation along a regional fault structure. Specifically, the deposit lies on the northerly striking and westerly dipping contact between biotite dacite and mafic volcanics. The contact dips between 60 to 70 degrees west and strikes at about 020 degrees. The biotite dacite has been described by Moore (1996) as being porphyritic but also includes some lithic crystal tuffs. Further, Moore describes the mafic volcanics as mainly pyroxene porphyritic units that are probably interpreted as flows. The dacite can be interpreted from TMI shown in **Error! Reference source not found.** and occurs as a magnetic low has an apparent thickness of 250 to 500 metres. The mafic volcanic unit can be seen clearly in the TMI as a high that is striking at 020 degrees and has an apparent thickness of about 100 metres. Moore (1996) describes the primary mineralisation being associated with hydrothermal veining and vein brecciation that are dominated by quartz enclosing lesser amounts of pyrite, illite/sericite and tourmaline. Accessory ore minerals associated with higher gold values include chalcopyrite, galena and sphalerite. The mineralisation appears to be thickest highest grade at the intersection of the regional fault and the dacite / basalt contact .
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.*	The overall strike of economically significant mineralisation is about 680 metres and is made up of 9 lodes. The mineralisation is striking at 020 degrees and dips vary between 40 to 60 degrees west. Individual lenses of mineralisation vary in strike length from 25 metres to 650 metres. Down dip lengths vary from 25 to 200 metres while true thickness can be from 2 to 25 metres. The best thickness of mineralisation occurs where a fault interpreted from the TMI data intersects the dacite/mafic volcanic contact. The mineralisation starts at the surface.
Estimation and modelling techniques	• *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*	Ordinary Kriging (OK) interpolation with an oriented 'ellipsoid' search was used for the estimate. Surpac software was used for the estimations. Three dimensional mineralised wireframes (interpreted by CTPJV and checked by MJM) were used to domain the gold data. Sample data was composited to 1m down hole lengths using the 'fixed length' method. Intervals with no assays were excluded from the estimates. The influence of extreme grade values was addressed by reducing high outlier values by applying top-cuts to the data. These cut values were determined through statistical analysis (histograms, log probability plots, CV's, and summary multi-variate and bi-variate statistics) using Supervisor software. MJM has not made assumptions regarding recovery of by-products from the mining and processing of ore at the Crusade deposit.

Criteria	JORC Code explanation	Commentary
	data. • *The assumptions made regarding recovery of by-products.* • *Estimation of deleterious elements or other non-grade variables of economic significance (eg 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.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	All modelling was completed in Surpac Geovia software. No estimation of deleterious elements was carried out. Only gold was interpolated into the block model. The block model used a primary block size of 10m NS by 5m EW by 5m RL with sub-blocking to 2.5m by 1.25m by 1.25m. The parent block size was selected based on approximately half the average drill spacing of RC drilling in the well drilled areas, while dimensions in other directions were selected to provide sufficient resolution to the block model in the across-strike and down-dip direction. QKNA was completed in Supervisor software to justify the block size, number of samples, search ellipses and discretization An orientated 'ellipsoid' search was used to select data and was based on the observed lode geometry. The search ellipsoid was orientated to the average strike, plunge, and dip of the main lodes. Three expanding passes were used in the estimation (40-60, 80-120 and 160-240 metres). A first pass of radius 40m with a minimum number of samples of 4-6 samples and a second pass of radius 80-120m with a minimum number of 4-6 samples were used for Crusade. A third pass of search radius 160-240m was used with 3-6 samples to ensure all blocks within the mineralised lodes were estimated. The maximum number of samples ranged from 8-24 depending on the number of samples in the domain. Blocks that did not fill after 3 passes were given a 4th pass. Selective mining units were not modelled. The block size used in the resource model was based on drill sample spacing and lode orientation. To validate the model, a qualitative assessment was completed by slicing sections through the block model in positions coincident with drilling. A quantitative assessment of the estimate was completed by comparing the average gold grades of the composite file input against the gold block model output for all the resource objects. A trend analysis was completed by comparing the interpolated blocks to the sample composite data within the main lodes. This analysis was completed for eastings and elevations across the deposit. Validation plots showed good correlation between the composite grades and the block model grades.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	Tonnages and grades were estimated on a dry in situ basis.
Cut-off parameters	• *The basis of the adopted cut-off grade(s) or quality parameters applied.*	The Mineral Resource estimate has been constrained by the wireframed mineralised envelopes, is undiluted by external waste and reported above a 0.7g/t gold cut-off grade for open pit material within a $AU2700 pit shell.
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*	It is assumed the Crusade deposit will be mined by open pit methods when a new mining operation can be established.

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td></td><td>with an explanation of the basis of the mining assumptions made.</td><td></td></tr>
<tr><td>Metallurgical factors or assumptions</td><td>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.</td><td>Metallurgical testing was carried out in 1996 by Oretest Pty Ltd (Oretest) to test whether the Crusade prospect was amenable to heap leach extraction of gold. Oretest concluded that the saprolite and weathered bedrock was amenable to heap leach however the fresh rock was not. Further test work in 1996 was carried out by Normet on CDH007 from 53 to 83 metres in a zone that was considered to represent saprolite and weathered bedrock.
Percolations tests were also carried out on -12 mm crushed ore showed that with the addition of 0.5% cement good percolation rates were achieved. A composite column test of –50mm ore was carried out, consisting of pre-screened plus 12.5mm ore being combined with agglomerated –12.5mm ore.
Normet concluded that a recovery of 80% at a solution rate of 2.5m3/t could be expected from a heap leach extraction method. Although this testing is not directly applicable to recoveries in a CIL plant it is a reasonable assumption that the gold is cyanide extractable recoveries of around 90% could be expected.</td></tr>
<tr><td>Environmental factors or assumptions</td><td>Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.</td><td>No assumptions have been made regarding environmental factors.</td></tr>
<tr><td>Bulk density</td><td>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 for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.
Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.</td><td>There is no bulk density data from the Crusade prospect. Density values were taken from average densities for dacitic rocks and basalts and adjusted for oxidation. These values may not be correct. It is recommended that diamond holes are drill to gather representative bulk density measurements.
<table>
<tr><th></th><th colspan="2">Rock Type</th></tr>
<tr><th>Oxidation State</th><th>Basalt</th><th>Biotite Dacite</th></tr>
<tr><td>Oxide</td><td>2.5</td><td>2.4</td></tr>
<tr><td>Transitional</td><td>2.6</td><td>2.5</td></tr>
<tr><td>Fresh</td><td>2.77</td><td>2.65</td></tr>
</table></td></tr>
</table>

Criteria	JORC Code explanation	Commentary
		At this stage of the project, it is assumed that these values will be close to the real values.
Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (ie 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.*	The Mineral Resource estimate is reported here in compliance with the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' by the Joint Ore Reserves Committee (JORC). The Mineral Resource was classified as Indicated and Inferred Mineral Resource based on data quality, sample spacing, and lode continuity. The Indicated Mineral Resource was defined within areas of RC drilling of 40m by 40m (with some infill), where the continuity and predictability of the lode positions was good and the estimation had reasonable slopes of regression. The Inferred Mineral Resource was assigned to areas where support for the continuity of mineralisation was limited by wider spaced drilling or insufficient drilling in smaller lodes. The minimum requirement for an inferred resource is 3 drill holes spaced apart so that strike and dip can be determined. Validation of the block model shows good correlation of the input data to the estimated grades. The result reflects the competent person's view that the classification is Indicated and Inferred.
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	No audits or reviews of this estimate have been conducted.
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 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.*	The Crusade Mineral Resource Estimate has been reported with a moderate degree of confidence. The Indicated Mineral Resource is based upon 40 by 40 metre (with some infill) RC and diamond drilling of acceptable quality. It is assumed that the mineralisation in this area is continuous between drill sections. The project is in area of no previous mining The Mineral Resource statement relates to global estimates of tonnes and grade.