Ardea Resources Limited

CSIRO/Ardea research at Goongarrie BTZ – insights for nickel sulphide and gold targets

- Completion of the gold in nickel laterite study by CSIRO for Ardea Resources Limited has identified aspects of the geology that will greatly assist future gold exploration and suggests the potential for nickel sulphide mineralisation at depth.
- A second study will commence in July to fully assess the potential for nickel sulphides beneath the nickel laterite deposits.
- Several nickel sulphide and gold targets to be tested using the new knowledge defined by the study.

Ardea Resources Limited (**Ardea** or the **Company**) is pleased to report that the collaborative study with Australia's national science agency, CSIRO, has been successfully completed. The study is supported by the Department of Industry, Science, Energy and Resources' Entrepreneurs' Programme. It is entitled "Gold behaviour in nickel-cobalt laterite at Goongarrie" focused on Bardoc Tectonic Zone (**BTZ**) gold mineralisation associated with nickel-cobalt laterite mineralisation at the Pamela Jean, Patricia Anne, and Elsie North nickel-cobalt-scandium deposits.

Ardea's Managing Director, Andrew Penkethman, noted:

"The in-depth work undertaken by Dr Walid Salama and his team at CSIRO has shed not only new light on our exploration efforts for gold, but in undertaking this study, has increased our understanding of the nickel laterite deposits as well. For Ardea, the work is already providing significant competitive advantages that will take our project studies and exploration efforts in new directions for nickel sulphide exploration, gold exploration, and metallurgical refinement of the process flow sheet."

Without disclosing full technical details and thereby preserving our competitive advantages, some of the findings include:

- Constraints on the degree of migration of gold within the laterite profile.
- Association of gold mineralisation with several geochemical pathfinders that effectively enable us to 'see' through the laterite and follow otherwise undetectable mineralised structures into the fresh rock.
- First identification of volumetrically significant associated minerals throughout the nickel laterite deposits, to be further investigated during current bench-scale metallurgy for the Definitive Feasibility Study (**DFS**).
- First identification of nickel and cobalt sulphide minerals at Goongarrie, trapped within resistate minerals within the nickel laterite deposits.
- Supportive of structural control over the deep V-shaped parts of the laterite deposits, and confirming potential gold and nickel sulphide targets associated with the BTZ structures.

Techniques including scanning electron microscopy (**SEM**) mineral mapping (using TESCAN), hyperspectral analysis, and laser ablation ICP-MS were used to view, identify and analyse never-before identified aspects of the Goongarrie nickel laterite deposits.

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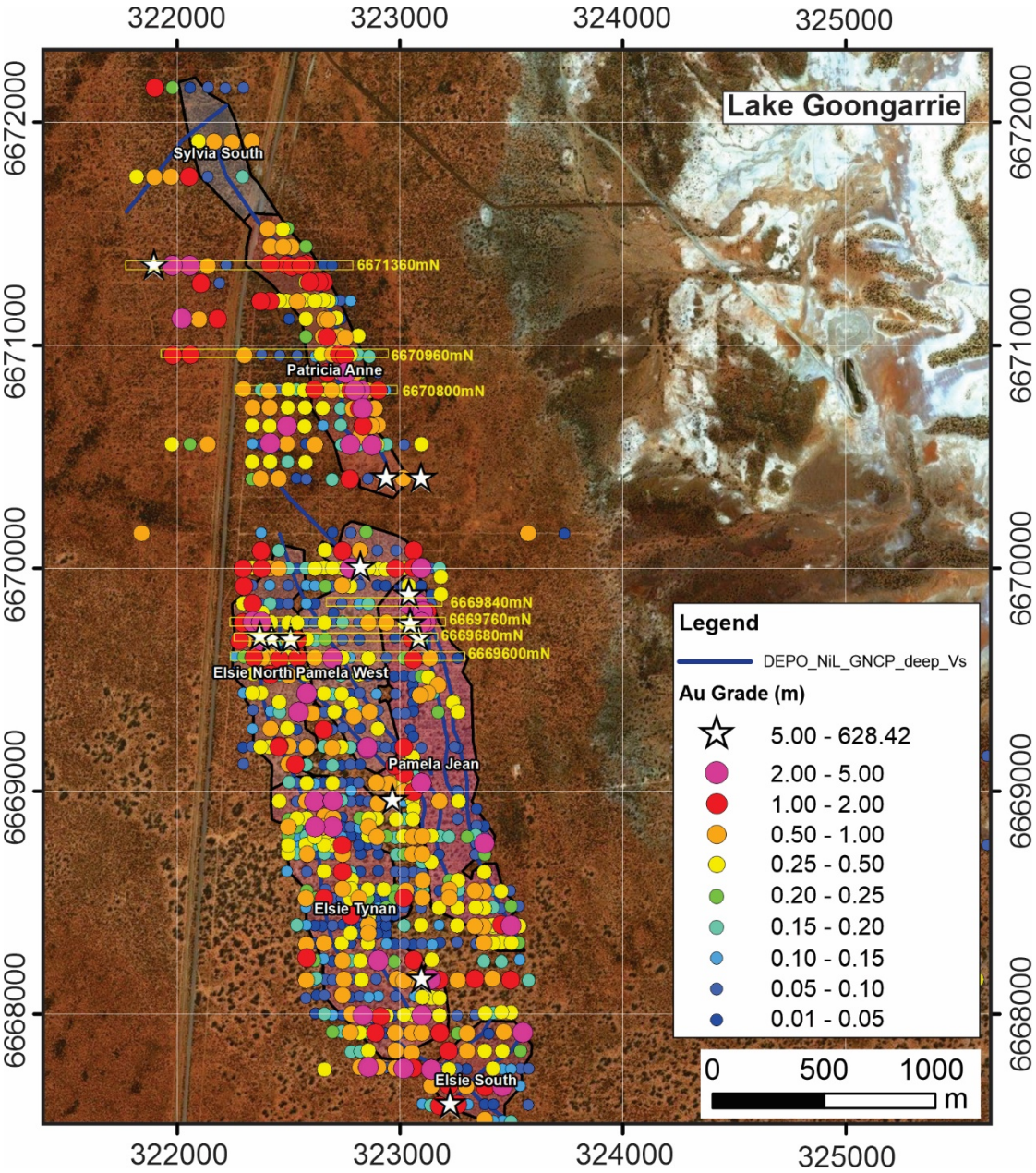

Figure 1 *The location of drill holes in Pamela Jean, Elsie North and Patricia Anne prospect, Goongarrie area. The maximum gold grade (usually over a minimum 2m drill width) is plotted. Projection MGA 94 Zone 51.*

Several gold targets have been identified that will be drilled in the course of DFS drill programs in the coming months (Figure 1 and 2). At Pamela Jean, the deep V-shape of the deposit (Figure 2) appears to be the result of intense penetrative weathering down a pre-existing BTZ structure or stratigraphic unit. The presence of visible gold mineralisation in and around this structure has highlighted this as a target, but the presence of other styles of anomalism also suggests the possibility of nickel sulphide mineralisation down-dip of the V into fresh rock.

The uniformly high gold background identified in Ardea's Goongarrie resource drilling (Figure 1) since it acquired the project in 2017 has implications for future mine grade control and the Kalgoorlie Nickel Project (**KNP**) processing flow-sheet.

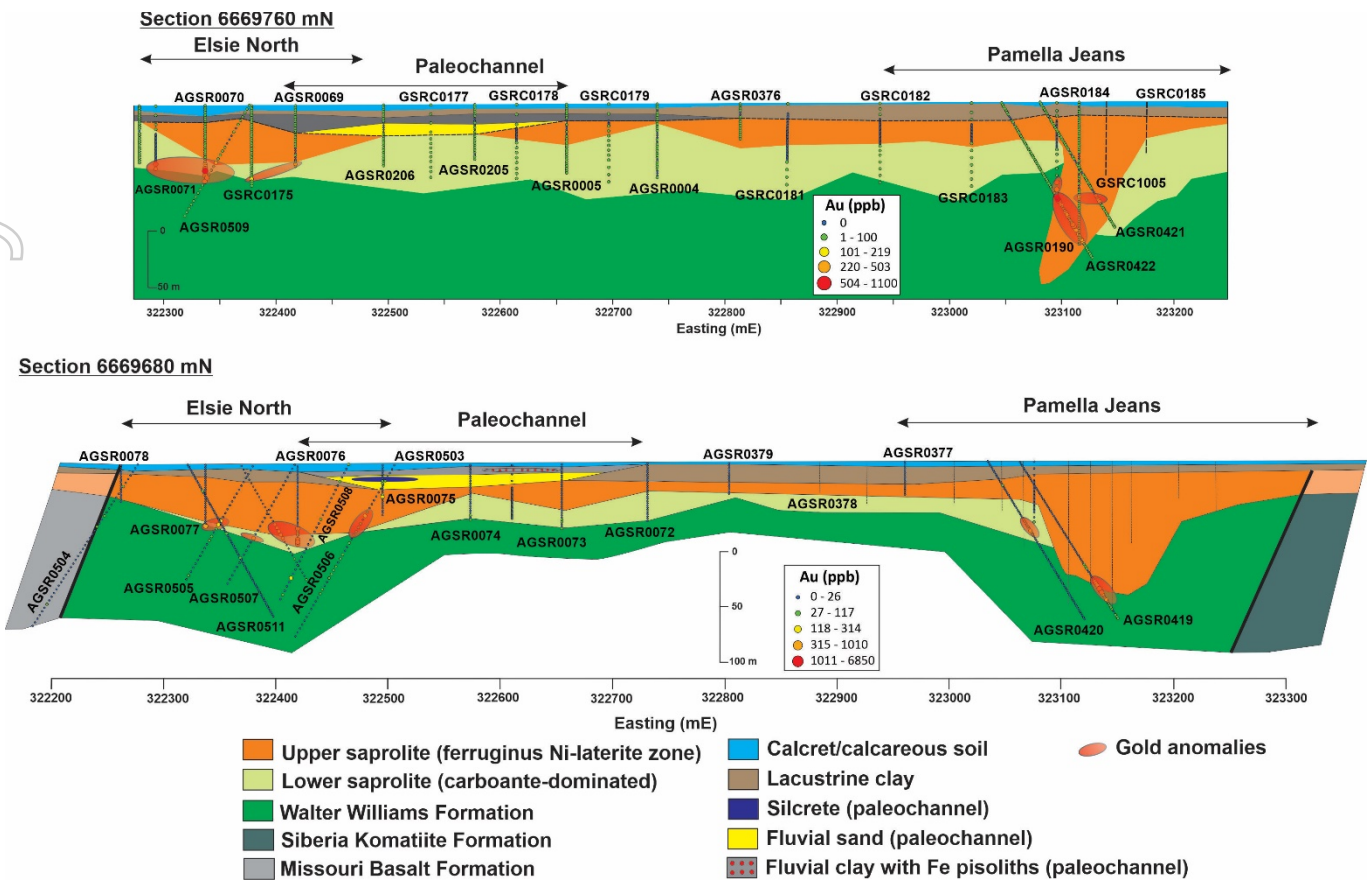

Figure 2 *Two stratigraphic cross-sections are constructed along sections 6669760mN and 6669680mN at Pamela Jean-Elsie North, Goongarrie. Projection MGA 94 Zone 51. These highlight the extensive development of the GNCP laterite profile and thickening associated with preferential weathering on BTZ structures. Gold anomalies tend to occur towards the base of the Upper Saprolite. Insufficient historic drilling to depth within Walter Williams Formation bedrock to test for bedrock gold mineralisation.*

The CSIRO research also begins to unlock the controls of Rare Earth Elements (**REE**s) and other Critical Minerals within the BTZ, as identified by Ardea in drilling within the KNP.

The findings of the CSIRO gold study along with the professionalism and capabilities of CSIRO have encouraged Ardea to follow up with another collaborative study. An assessment of the nickel sulphide prospectivity of the host ultramafic sequences that underlie the Goongarrie nickel cobalt laterite deposits, the Walter Williams Formation and the Siberia Komatiite, will commence in July 2021.

The study will seek to define the fertility of the host sequences for nickel sulphide, and then define vectors to potential mineralisation. The presence of the microscopic sulphide inclusions including nickel sulphide along with a series of other features identified for the first time at Goongarrie during this initial study suggest that there is a possibility of primary nickel sulphide mineralisation at depth beneath the laterite deposits.

Should such mineralisation be encountered, even in trace amounts, it would partly explain the far superior nickel grade and Critical Minerals association of the Goongarrie Line when compared to peer Australian nickel laterites.

This new CSIRO study is expected to be a part of a region-wide multi-client study that aims to define and prescribe a new standard of nickel sulphide exploration technique to assess sequences and drive future discoveries.

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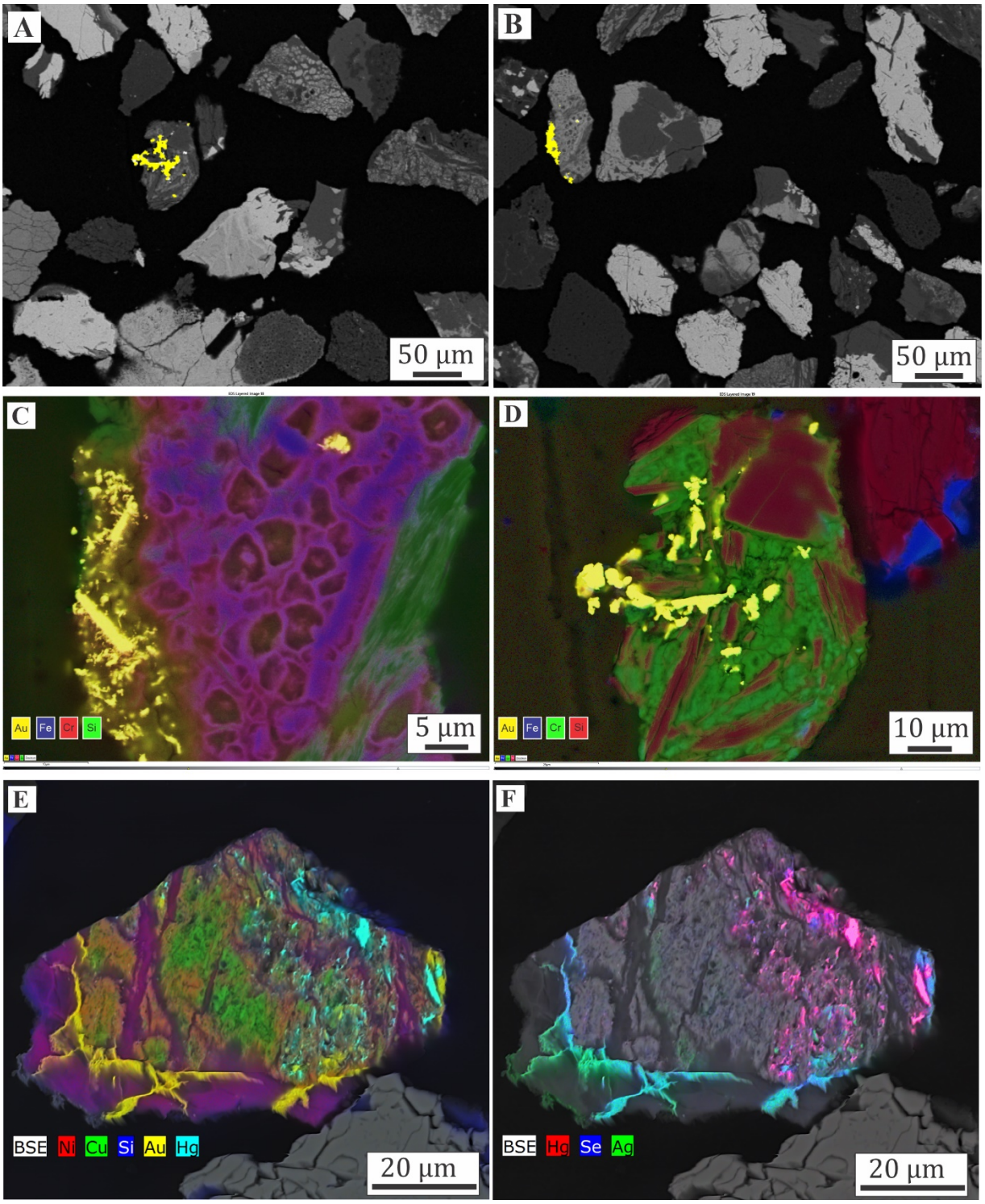

Figure 3 *(A, B) SEM images showing distribution of Au (elemental gold, yellow colour) in Heavy Mineral concentrates of sample 07-39218 (AGSR0422, 98-100m).*

(C, D) Element maps showing the distribution of gold (yellow) in Cr-bearing Fe oxides (green in C and blue and red in D). Magnesium silicates and quartz (red in C and green in D).

(E, F) Millerite (nickel sulphide) with cross-cutting veins filled by Ni silicates and Au, Ag and Hg selenides. Nickel and copper shows inhomogeneous distribution in millerite.

Authorised for lodgement by the Board of Ardea Resources Limited.

For further information regarding Ardea, please visit www.ardearesources.com.au or contact:

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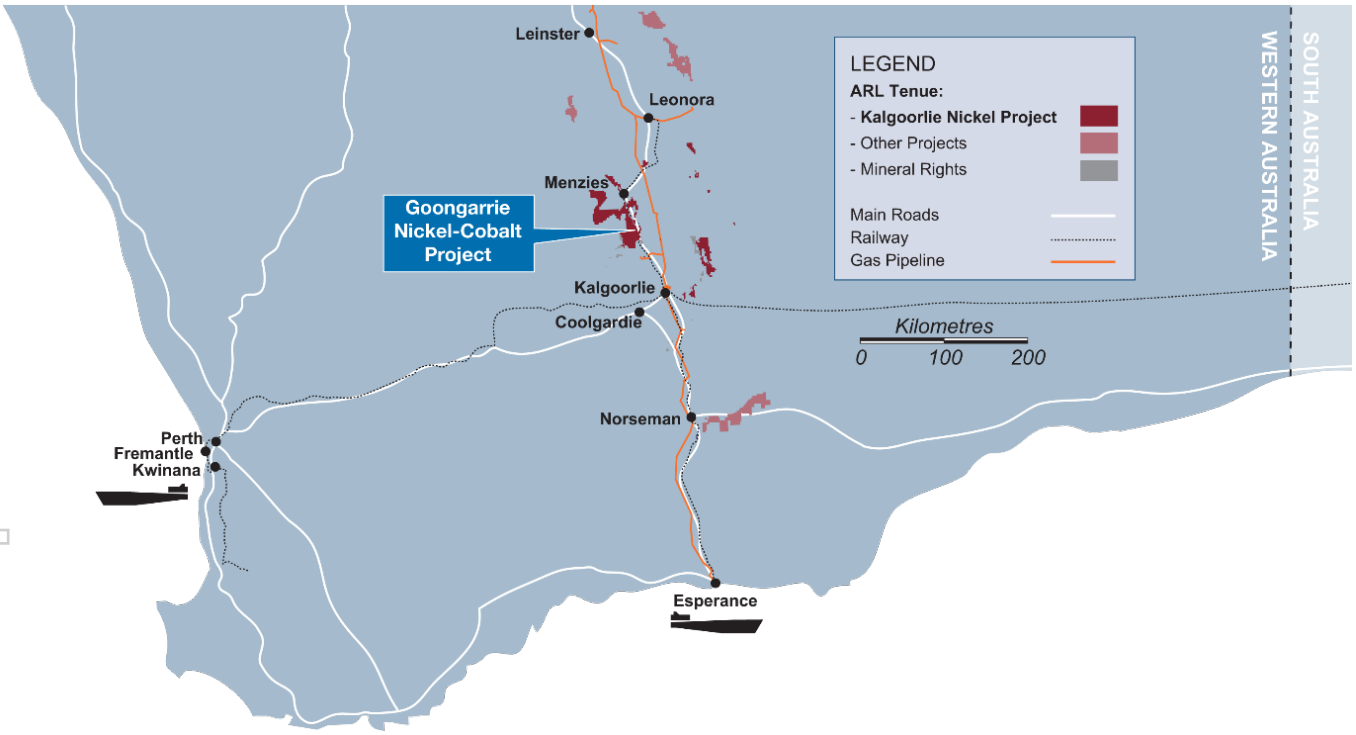
About Ardea Resources

Ardea Resources (ASX:ARL) is an ASX-listed resources company, with a large portfolio of 100% controlled West Australian-based projects, focussed on:

- Development of the Kalgoorlie Nickel Project (KNP) and its sub-set the Goongarrie Nickel Cobalt Project (GNCP), a globally significant series of nickel-cobalt and Critical Mineral deposits which host the largest nickel-cobalt resource in the developed world; and
- Advanced-stage exploration at compelling nickel sulphide and gold targets within the KNP Eastern Goldfields world-class nickel-gold province.



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CAUTIONARY NOTE REGARDING FORWARD-LOOKING INFORMATION

This news release contains forward-looking statements and forward-looking information within the meaning of applicable Australian securities laws, which are based on expectations, estimates and projections as of the date of this news release.

This forward-looking information includes, or may be based upon, without limitation, estimates, forecasts and statements as to management's expectations with respect to, among other things, the timing and amount of funding required to execute the Company's exploration, development and business plans, capital and exploration expenditures, the effect on the Company of any changes to existing legislation or policy, government regulation of mining operations, the length of time required to obtain permits, certifications and approvals, the success of exploration, development and mining activities, the geology of the Company's properties, environmental risks, the availability of labour, the focus of the Company in the future, demand and market outlook for precious metals and the prices thereof, progress in development of mineral properties, the Company's ability to raise funding privately or on a public market in the future, the Company's future growth, results of operations, performance, and business prospects and opportunities. Wherever possible, words such as "anticipate", "believe", "expect", "intend", "may" and similar expressions have been used to identify such forward-looking information. Forward-looking information is based on the opinions and estimates of management at the date the information is given, and on information available to management at such time.

Forward-looking information involves significant risks, uncertainties, assumptions and other factors that could cause actual results, performance or achievements to differ materially from the results discussed or implied in the forward-looking information. These factors, including, but not limited to, the ability to create and spin-out a gold focussed Company, fluctuations in currency markets, fluctuations in commodity prices, the ability of the Company to access sufficient capital on favourable terms or at all, changes in national and local government legislation, taxation, controls, regulations, political or economic developments in Australia or other countries in which the Company does business or may carry on business in the future, operational or technical difficulties in connection with exploration or development activities, employee relations, the speculative nature of mineral exploration and development, obtaining necessary licenses and permits, diminishing quantities and grades of mineral reserves, contests over title to properties, especially title to undeveloped properties, the inherent risks involved in the exploration and development of mineral properties, the uncertainties involved in interpreting drill results and other geological data, environmental hazards, industrial accidents, unusual or unexpected formations, pressures, cave-ins and flooding, limitations of insurance coverage and the possibility of project cost overruns or unanticipated costs and expenses, and should be considered carefully. Many of these uncertainties and contingencies can affect the Company's actual results and could cause actual results to differ materially from those expressed or implied in any forward-looking statements made by, or on behalf of, the Company. Prospective investors should not place undue reliance on any forward-looking information.

Although the forward-looking information contained in this news release is based upon what management believes, or believed at the time, to be reasonable assumptions, the Company cannot assure prospective purchasers that actual results will be consistent with such forward-looking information, as there may be other factors that cause results not to be as anticipated, estimated or intended, and neither the Company nor any other person assumes responsibility for the accuracy and completeness of any such forward-looking information. The Company does not undertake, and assumes no obligation, to update or revise any such forward-looking statements or forward-looking information contained herein to reflect new events or circumstances, except as may be required by law.

No stock exchange, regulation services provider, securities commission or other regulatory authority has approved or disapproved the information contained in this news release.

Competent Person Statement

The information in this report that relates to Exploration Targets, Exploration Results, Mineral Resources or Ore Reserves is based on information compiled or reviewed by Dr Matthew Painter, a Competent Person who is a Member of the Australian Institute of Geoscientists. Dr Painter is a full-time employee of Ardea Resources Limited and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Dr Painter consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

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Appendix 1 – Collar location data, Pamela Jean

Collar location data for AGSR0422, relative to the SEM images shown in Figure 3.

Target area	Drill hole	Type	Depth (m)	Tenement	Grid	Easting (mE)	Northing (mN)	RL (mASL)	Dip (°)	Azimuth (°)
Pamela Jean	AGSR0422	RC	160	M29/272	MGA94_51	323045	6669748	376.5	-60	090

Appendix 2 – Assay results from Pamela Jean

All assays >0.1g/t Au and their adjacent 2 samples from drill hole, AGSR0422.

Abbreviations used: Au – gold, Ag – silver, As – arsenic, Sb – antimony, W – tungsten, S – sulphur, m – metre, g/t – grams per tonne, ppm – parts per million, b.d. – below detection.

Hole	From (m)	To (m)	Sample number	CSIRO sample	Ni (%)	Co (%)	Sc (ppm)	Au (g/t)	Ag (g/t)	As (ppm)	Sb (ppm)	S (%)
AGSR0422	92	94	AR020050		0.143	0.005	b.d.	0.00	b.d.	b.d.	1	0.065
	94	96	AR020051		0.200	0.009	b.d.	0.01	0.1	b.d.	1	0.074
	96	98	AR020052	07-39217	0.343	0.029	b.d.	0.70	0.1	10	2.3	0.072
	98	100	AR020053	07-39218	0.465	0.047	10	**1.10**	0.2	20	4	0.085
	100	102	AR020054	07-39219	0.377	0.037	b.d.	0.50	0.4	10	2.1	0.068
	102	104	AR020055		0.496	0.042	20	0.13	0.2	20	4.5	0.131
	104	106	AR020056		0.504	0.036	10	0.13	b.d.	20	4.2	0.185

Appendix 3 – Calculated gold intercept, Pamela Jean

Parameters used to define gold intercepts at Pamela Jean

Parameter	Gold	
Minimum cut-off	0.5g/t	2.0g/t
Minimum intercept thickness	2m	2m
Maximum internal waste thickness	2m	2m

Gold intercepts are defined using a nominal 0.5g/t Au cut-off on a minimum intercept of 2m and a maximum internal waste of 2m. Secondary intercepts (i.e. the "*including*" intercepts) are defined using a nominal 2.0g/t cut-off and the same intercept and internal waste characteristics. Where appropriate, consideration is also given to geological controls, such as vein and alteration zone distributions, in the definition of intercepts.

	Drillhole	Interval	Gold intercept (0.5 g/t cutoff)
Pamela Jean	AGSR0422	96-102	6m at 0.77g/t Au from 96m

Appendix 4 – JORC Code, 2012 Edition, Table 1 report

Samples used in the CSIRO study were collected from Ardea's archives of historic samples stored on site in Kalgoorlie. All samples used in the study have all been reported previously throughout the history of the exploration of the Goongarrie Nickel Cobalt Project (GNCP). Selected drillholes were re-sampled for mineralogical analysis using various techniques including SEM in-house at CSIRO. The following tables describe the analytical techniques used to define assay results through the Goongarrie South part of the GNCP which were used as a basis of sample selection for the CSIRO study, as well as the CSIRO analytical techniques that were mineralogical and petrographic in their findings.

Section 1 Sampling Techniques and Data

(Criteria in this section applies 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.* • *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases, more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.*	• All holes were sampled on a 2 metre down hole interval basis, with exceptions being made for end of hole final-lengths. All sampling lengths were recorded in ARL's standard sampling record spreadsheets. Sample condition, sample recovery and sample size were recorded for all drill-core samples collected by ARL. • Industry standard practice was used in the processing of samples for assay, with 2m intervals of RC chips collected in green plastic bags. • Assay of samples utilised standard laboratory techniques with standard ICP-AES undertaken on 40 gram samples for Au, Pt and Pd, and lithium borate fused-bead XRF analysis used for the remaining multi-element suite. Other elements are determined by separate XRF and LA-ICP-MS analyses. Further details of lab processing techniques are found in Quality of assay data and laboratory tests below. • Most RC drilling was completed by Heron Resources between 1999 and 2006, Vale Inco in 2007 and 2008 and Ardea Resources in 2017 and 2018. Limited diamond drilling as also completed by Ardea Resources in 2017 and 2018.
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 performed with a face sampling hammer (bit diameter between 4½ and 5 ¼ inches) and samples were collected by either a cone (majority) or riffle splitter using 2 metre composites. Sample condition, sample recovery and sample size were recorded for all drill samples collected by ARL. • All diamond drilling used triple tube core barrels to collect predominantly PQ3, HQ3 and NQ3 size core. • Sonic drill samples were collected as whole core samples either 3.75 or 5.1 inches diameter of up to 1 metre lengths in sealed clear plastic wrap. Sonic core of longer lengths was cut to shorter lengths as it was retrieved from the drill string to facilitate handling of the heavy samples.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• RC chip sample recovery was recorded by visual estimation of the reject sample, expressed as a percentage recovery. The overall average RC sample recovery at Goongarrie is estimated to be 75% which is considered acceptable for nickel laterite deposits.. • RC Chip sample condition was recorded using a three code system, D=Dry, M=Moist, W=Wet. A proportion of samples were moist or wet, with the majority of these being associated with soft kaolin-goethite clays, where water injection has been used to improve drill recovery. Plots of sample recovery versus grade also indicate a tendency for higher recoveries for samples with higher Ni grades particularly for wet samples from the Heron RC drilling. While this does not demonstrate any clear evidence of grade bias resulting from RC drilling and sampling processes, it does highlight a need for routine verification of the RC drill samples and assay data with core drilling (diamond or sonic). • Measures taken to ensure maximum RC sample recoveries included maintaining a clean cyclone and drilling equipment, using water injection at times of reduced air circulation, as well as regular communication with the drillers and slowing drill advance rates when variable to poor ground conditions are encountered. • For diamond drilling, drill runs were reduced to as little as 0.5 metre in poor ground conditions to maximise core recovery. Core recovery was excellent mostly averaging

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Criteria	JORC Code explanation	Commentary
		over 90% for each deposit except Big Four where the average core recovery from the Ardea diamond drilling was 85%. • Recovery from Sonic drilling was excellent with very good recoveries experienced in soft goethite clays where water injection was required in RC to facilitate acceptable recoveries.
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant intersections logged.*	• RC logging was undertaken on 1 metre intervals. Visual geological logging was completed for all drilling both at the time of drilling (using standard Ardea logging codes), and later over relevant met-sample intervals with a metallurgical-logging perspective. Geochemistry from Ardea aircore drilling data was used together with logging data to validate logged geological horizons. Aircore results cannot be used in a resource estimation. • Logging was performed at the time of drilling, and planned drill hole target lengths adjusted by the geologist during drilling. The geologist also oversaw all sampling and drilling practices. ARL employees supervised all drilling. A small selection of representative chips were collected for every 1 metre interval and stored in chip-trays for future reference. • For DD holes, both visual geological and geotechnical logging were performed on all drill core. Core was also selectively sampled for both geological and metallurgical test work. • The geological legend used by Ardea and all other companies that have historically worked on the project is based on that established by Heron Resources. The Heron legend is a qualitative legend designed to capture the key physical and metallurgical features of the nickel laterite mineralisation. Logging captured the colour, regolith unit and mineralisation style, often accompanied by the logging of protolith, estimated percentage of free silica, texture, grain size and alteration. Most of the logging correlates well with material type predictions from algorithms developed based on XRD mineralogy analyses and corresponding multi-element assay data. • Drilling conducted by Vale Inco and Ardea has been logged in similar detail to Heron's procedures, but using slightly modified geological logging legends. There are direct translations between the Vale Inco, Ardea and Heron logging legends.
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* • *Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• For RC drilling, 2 metre composite samples were recovered using a 15:1 rig mounted cone splitter or trailer mounted riffle splitter during drilling into a calico sample bag. Sample target weight was between 2 and 3kg. In the case of wet clay samples, grab samples taken from sample return pile, initially into a calico sample bag. Wet samples were stored separately from other samples in plastic bags and riffle split once dry. • One metre half core samples from the Heron and Ardea diamond drilling were cut using a diamond saw when hard or spatula when soft, and submitted for assay analysis along with blanks and standards for QAQC monitoring. Core from the Vale Inco diamond holes was sampled over variable intervals (1-1.5m) with half core samples cut with a diamond saw and submitted for head assay along with blanks and standards, and the other half for beneficiation test work. • Most of the exploration samples from the GNCP have been submitted for sample preparation and chemical analysis to either Kalgoorlie Assay Labs (KAL) in Kalgoorlie (by Heron in 1999 through 2002) and Ultratrace come Bureau Veritas (BV) in Perth by Heron, Vale Inco and Ardea from 2004 to present. • Industry standard sample preparation procedures have been used by both labs: • Log samples received (both labs), weigh samples as received (BV), dry samples at 105° C (both labs), weigh dried samples (BV), jaw crush samples when required eg core samples to -3mm; (both labs), riffle split RC chips / crushed core samples to produce -3kg subsample for pulverisation (both labs). • QAQC was employed. A standard, blank or duplicate sample was inserted into the sample stream every 10 samples on a rotating basis. Standards were quantified industry standards. Every 30th sample a duplicate sample was taken using the same sample sub sample technique as the original sub sample. Sample sizes are appropriate for the nature of mineralisation. • Petrographic and mineralogical observations formed a core part of the CSIRO study. They were conducted on 25 mm polished-thin sections of 35 samples of heavy mineral concentrates and 7 samples from the lateritic profile, cover and the bedrock using a Zeiss AxioImager polarising microscope and Zeiss Ultra-Plus field emission gun (FEG) scanning electron microscope (SEM) at CSIRO, Perth. The Zeiss SEM is coupled with a Brucker X-Flash EDX detector for elemental analyses. An accelerating voltage of 20 kV with a beam current of 3 nA was used. • Powder X-ray diffraction (XRD) data were collected for 32 samples from the drill hole AGSR0422 using a Brucker D4 Endeavor AXS instrument operating with Co radiation at CSIRO, Perth. The X-ray diffractogram patterns were collected for the range of 2 θ from 5 to 90°, with an increment of 0.02° and scan speed of 0.1. The obtained X-ray data were interpreted and semi-quantified using Eva diffraction software. • Heavy mineral analyses were performed on mineral concentrates extracted from thirty-four samples with Au values ≥0.5 ppm collected from 17 drill holes (Table 3) and sent to Western Geolabs (28 Wells St, Bellevue WA 6056). The total sample weight of each samples was approximately 500 grams. The total sample is dried at 110c for 5-8 hrs

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Criteria	JORC Code explanation	Commentary
		and then wetted and attritioned before desliming (removing the <63 µm size fraction). The size of the heavy minerals targeted is between <63 µm and 1 mm. Samples were dried, weighed and stirred into glass separation funnels containing Tetra bromo-ethane with 2.95sg (tested daily by the lab via a hydrometer). The sinks are drained from the funnels into filter paper, washed with acetone and dried then weighed. • Carbon coated polished sections were examined using a Tescan Mira-3 FEGSEM (Field Emission Gun scanning Electron Microscope) fitted with 3 EDAX Element 30 X-ray detectors and one Oxford X-Max 50 X-ray detector. TIMA (Tescan Integrated Mineral Analyser) software was used to determine the major mineralogy of the samples and locate phases of interest, such as gold. The system was operated in high vacuum mode at 25kV and between 7 to 8nA. Data was collected using a dot mapping technique with a 1 or 2 micrometre BSE (backscattered Electron) image pixel size and a X-ray dot spacing of between 9 to 14 micrometres (depending on feature size and time available).

Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.*
	• *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.*
	• *Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.*
		• All Ardea samples were submitted to Kalgoorlie Bureau Veritas (BV) laboratories and transported to BV Perth, where they were pulverised.
		  • The samples were sorted, wet weighed, dried then weighed again. Primary preparation has been by crushing and splitting the sample with a riffle splitter where necessary to obtain a sub-fraction which has then been pulverised in a vibrating pulveriser. All coarse residues have been retained.
		  • The samples have been cast using a 66:34 flux with 4% lithium nitrate added to form a glass bead. Al, As, Ba, Ca, Cl, Co, Cr, Cu, Fe, Ga, K, Mg, Mn, Na, Ni, P, Pb, S, Sc, Si, Sr, Ti, V, Zn, Zr have been determined by X-Ray Fluorescence (XRF) Spectrometry on oven dry (105˚C) sample unless otherwise stated.
		  • A fused bead for Laser Ablation MS was created to define Ag_LA, Be_LA, Bi_LA, Cd_LA, Ce_LA, Co_LA, Cs_LA, Dy_LA, Er_LA, Eu_LA, Gd_LA, Ge_LA, Hf_LA, Ho_LA, In_LA, La_LA, Lu_LA, Mo_LA, Nb_LA, Nd_LA, Ni_LA, Pr_LA, Rb_LA, Re_LA, Sb_LA, Sc_LA, Se_LA, Sm_LA, Sn_LA, Ta_LA, Tb_LA, Te_LA, Th_LA, Tl_LA, Tm_LA, U_LA, V_LA, W_LA, Y_LA, Yb_LA, which have been determined by Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LAICP-MS).
		  • The samples have been analysed by Firing a 40 g (approx) portion of the sample. Lower sample weights may be employed for samples with very high sulphide and metal contents. This is the classical fire assay process and will give total separation of Gold, Platinum and Palladium in the sample. Au1, Pd, Pt have been determined by Inductively Coupled Plasma (ICP) Optical Emission Spectrometry.
		  • Loss on Ignition results have been determined using a robotic TGA system. Furnaces in the system were set to 110 and 1000 degrees Celsius. LOI1000 have been determined by Robotic TGA.
		  • Dry weight and wet weight have been determined gravimetrically.
		• BV routinely inserts analytical blanks, standards and duplicates into the client sample batches for laboratory QAQC performance monitoring.
		• Ardea also inserted QAQC samples into the sample stream at a 1 in 10 frequency, alternating between blanks (industrial sands) and standard reference materials. Additionally, a review was conducted for geochemical consistency between historically expected data, recent data, and geochemical values that would be expected in a nickel laterite profile.
		• All of the QAQC data has been statistically assessed. There were rare but explainable inconsistencies in the returning results from standards submitted, and it has been determined that levels of accuracy and precision relating to the samples are acceptable.
		• All CSIRO

Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• BV routinely inserts analytical blanks, standards and duplicates into the client sample batches for laboratory QAQC performance monitoring. • Ardea also inserted QAQC samples into the sample stream at a 1 in 20 frequency, alternating between duplicates splits, blanks (industrial sands) and standard reference materials. • All of the QAQC data has been statistically assessed. Ardea has undertaken its own further in-house review of QAQC results of the BV routine standards, 100% of which returned within acceptable QAQC limits. This fact combined with the fact that the data is demonstrably consistent has meant that the results are considered to be acceptable and suitable for reporting.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.* • *Quality and adequacy of topographic control.*	• All drill holes are to be surveyed using an RTK DGPS system with either a 3 or 7 digit accuracy. The coordinates are stored in the exploration database referenced to the MGA Zone 51 Datum GDA94. • Gyroscopic downhole surveys were undertaken with hole orientation measurements gathered every 10m during descent and then on ascent of the tool. • Topography is very flat. The topographic surface has been constructed from hole collar surveys. These are consistent with regional DTMs and are considered adequate for exploration purposes. • A DGPS pickup up of drill collar locations is considered sufficiently accurate for reporting of resources, but is not suitable for mine planning and reserves.

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Criteria	JORC Code explanation	Commentary

Data spacing and distribution	• *Data spacing for reporting of Exploration Results.*
	• *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.*
	• *Whether sample compositing has been applied.*
		• All samples collected for the CSIRO study were from representative sections that transect the Patricia Anne, Pamela Jean and Elsie North nickel laterite deposits. Each of these also show concomitant gold anomalism. The east-west sections selected were as follows:
		  • Patricia Anne – 6671360mN, 6670960mN, and 6670800mN
		  • Pamela Jean and Elsie North – 6669840mN, 6669760mN, 6669680mN, and 6669600mN.
		  Sections were selected on the basis of representivity, gold anomalism, Ni-Co mineralisation, ample archived sample for analysis, and coverage.
		• The drill line spacing was variable, being around 80m at Pamela Jean and Elsie North, and at 160m and 400m at Patricia Anne. Section lines were up to nearly 1.1km long, with collar locations at a maximum 80m spacing, to 40m in some areas, to less where drilling required differently oriented collars.
		• Studies of the spatial continuity of nickel and cobalt grades at the Goongarrie deposits have determined that the drill spacing within the GNCP is sufficient to define Measured, Indicated and Inferred resources in the project area. Resources were published on 15 February 2021.
		• Samples were composited over 2m for the entire drill program apart from the upper transported lake clays, which were not sampled. This is justified by the results of the previous aircore program where transported overburden was shown to be barren of mineralisation.

Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.*	• Most of the drill holes are vertical and give true width of the regolith layers and mineralisation. • On a local scale there is some variability due to sub-vertical to vertical structures which may not be picked up with the vertical drilling employed. This local variability is not considered to be significant for the overall project but may well have local effects on mining and scheduling later in the project life, particularly mineralisation along more deeply weathered narrow structures that may enable localised deeper pit developments along such structures. • However, Ardea's angled RC drilling at GS was useful to confirm the widths and location of laterite mineralisation along deeply weathered structure along the eastern side of the deposit and appropriately considered in future mining studies. It also provides some limitations to the possible orientations of some mineralised structures, which commonly dip steeply westward.
Sample security	• *The measures taken to ensure sample security.*	• All samples were collected and accounted for by ARL employees/consultants during drilling. All samples were bagged into calico plastic bags and closed with cable ties. Samples were transported to Kalgoorlie from logging site by ARL employees/ consultants and submitted directly to BV Kalgoorlie. • The appropriate manifest of sample numbers and a sample submission form containing laboratory instructions were submitted to the laboratory. Any discrepancies between sample submissions and samples received were routinely followed up and accounted for.

Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• Heron periodically conducted internal reviews of sampling techniques relating to resultant exploration datasets, and larger scale reviews capturing the data from multiple drilling programmes within the KNP.
		• Ardea has periodically conducted internal reviews of sampling techniques relating to resultant exploration datasets, and larger scale reviews capturing the data from multiple drilling programs.
		• Internal reviews of the exploration data included the following:
		  • Unsurveyed drill hole collars (less than 1% of collars).
		  • Drill Holes with overlapping intervals (0%).
		  • Drill Holes with no logging data (less than 2% of holes).
		  • Sample logging intervals beyond end of hole depths (0%).
		  • Samples with no assay data (from 0 to <5% for any given project, usually related to issues with sample recovery from difficult ground conditions, mechanical issues with drill rig, damage to sample in transport or sample preparation).
		  • Assay grade ranges.
		  • Collar coordinate ranges
		  • Valid hole orientation data.
		• All the exploration and corresponding QAQC data were reviewed and assessed again by Vale Inco in 2008, Heron in 2009 and Ardea in 2019 and 2020. Vale Inco, Heron and Ardea all concluded that the quality of the data was suitable for use in resource estimation studies.

Section 2 - Reporting of Exploration Results

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

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Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• All Mineral Resources reported in this report occur within tenement holdings 100% owned by Ardea Resources. Specifically, the tenements from which historic samples were collected for the CSIRO study are M29/423 and M29/272. The tenements are in good standing. • Heritage surveys over the area did not identify any areas of interest over or near the program area.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• Nickel laterite mineralisation at Goongarrie Hill, Goongarrie South, Scotia Dam and the northern half of Big Four was initially discovered by Heron Resources Limited with RC drilling in 1999 and 2000, while Anaconda Nickel was the first to drill test (RC) the southern half of Big Four in 2000. • Heron's typical drilling strategy was to complete initial RC drilling of weathered ultramafic rocks of the Walter Williams Formation on an 80mE x 800mN grid, followed by infill drilling resulting in 80mE x 400mN drillhole spacing. Subsequent infill drilling was undertaken on an 80mE by 80mN grid in regions where well-developed nickel laterite mineralisation was intersected by earlier drilling. • In 2001 Heron undertook closer spaced infill drilling of deep high grade laterite mineralisation along the eastern side of GS (Pamela Jean zone) initially on a 40mE by 40mN grid, then further infilling to a 20mE x 40mN hole spacing. • A joint venture between Heron and Inco-come-Vale Inco from 2005 to 2009 saw Vale Inco complete significant diamond and sonic drilling as twins to earlier Heron RC holes at the GNCP deposits. This previously enabled verification of the geology and assay data from the Heron RC drilling and collection of samples/material for bulk density measurements and metallurgical testwork. • Vale Inco also undertook infill RC drilling in the northern half of Goongarrie South for input to updated resource estimates completed by Vale Inco in 2009 and revised estimates by Heron in 2010. • Ardea drilled several RC holes at and around the Elsie North gold target in 2018 and 2019 which penetrated below the lateritic mineralisation and into fresh rock. These were the first holes of the area to substantially sample the underlying fresh rock so were used to inform the CSIRO study. • All the exploration datasets collected by previous explorers have been assessed by Ardea technical staff and most of the data found to be suitable for use in resource estimation.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• The KNP nickel laterite mineralisation, including cobalt rich areas is developed from the weathering and near surface enrichment of Archaean-aged olivine-cumulate ultramafic units within the Walter Williams Formation. The mineralisation is usually within 60 metres of surface and can be further sub divided on mineralogical and metallurgical characteristics into upper iron-rich material and lower magnesium-rich material based on the ratios of iron to magnesium. The deposits are analogous to many weathered ultramafic-hosted nickel-cobalt deposits both within Australia and world-wide. • The continuity of mineralisation is strongly controlled by bed rock alteration and paleo water flow within the ultramafic host rocks. Areas of deep fracturing and water movement within the bedrock typically have higher grade and more extensive mineralisation in the overlying regolith. In the proximity of geological contacts between the ultramafic hosts and surrounding mafic and felsic lithologies there is often a distinctive increase in grade and widths of mineralisation, often coinciding with meso-cumulate facies and increased structural deformation proximal to more competent thinner ortho-cumulate facies and mafic rocks immediately to the east and west of the WWF. Where the host regolith overlies olivine adcumulate lithologies there is an increase in siliceous material with lower nickel and cobalt grades and a loss of the high magnesium mineralisation horizon. Furthermore, in areas where the host ultramafic is altered to talc, or talc-carbonate lithologies there is often little to no development of nickel mineralisation in the regolith. These areas typically occur along shears, and sheared contacts within the bedrock. • Frequent northwest trending and lesser northeast trending fault structures are evident cross cutting the WWF along the entire strike length of the GNCP deposits based on a combination of aeromagnetic and the drilling data. Differential movement along these structures, particularly those with relatively minor apparent offsets in the contacts between the host WWF and adjacent lithological units appears to have provided a structural network interacting with stratigraphic based ultramafic lithology variations for ground water movement giving rise to the extensive nickel laterite mineralisation present within the GNCP. • Transported colluvial, alluvial and lacustrine sediments overlie much of the *in situ* laterite mineralisation at the GNCP, with all the sediment types present at Goongarrie South ranging from less than 5m to over 40m thick. • Beneath the laterite deposits, gold mineralisation appears to be orogenic shear or vein hosted gold mineralisation. Veining and alteration styles intersected during drilling are consistent with this style of mineralisation. Throughout the ultramafic

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		package, shears and faults are commonplace. • In places, penetrative weathering appears to have propagated along some of these types of structures, resulting in laterite mineralisation and gold mineralisation coincident within deep v-shaped bodies. Their geometries and controls are still being defined.
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* • *easting and northing of the drill hole collar* • *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* • *dip and azimuth of the hole* • *down hole length and interception depth* • *hole length.*	• Data from thousands of drillholes with significant intersections have been used to generate the updated resource estimates for the GNCP deposits. A selected subset of these was used to provide samples for the CSIRO study along the northing lines previously described. Most of the drilling is vertical and represents the true thickness of the sub-horizontal nickel laterite mineralisation, but some angled holes of various orientations were used to test gold targets at Elsie North. • All the exploration drilling activities undertaken in the GNCP and representative results for 'Material' drillholes have previously been reported to the public by Heron and Ardea.
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• No numerical exploration results reported. • No intercepts quoted. • No metal equivalent calculations have been used in this assessment.
Relationship between mineralisation widths and intercept lengths	• *These relationships are particularly important in the reporting of Exploration Results.* • *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	• No numerical exploration results were reported. • The nickel laterite mineralisation of the GNCP has a strong global sub-horizontal orientation. The great majority of the drill holes focused on the nickel-cobalt laterite mineralisation at the GNCP are therefore vertical and represent the true thickness of the mineralisation. The only exceptions to this are several angled drill holes at Pamela Jean and Elsie North that test the precise location and width of mineralisation resulting from deep weathering within deep V zones along steep westerly dipping structures along which could not adequately be determined based on the earlier vertical RC holes. • Primary structures and gold mineralised zones are generally steep dipping and so are intercepted more obliquely. Presently, the lack of oriented diamond drill core into fresh rock means that true orientations cannot be ascertained.
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 maps are shown in the body of the document. Nickel laterite deposits are flat and are show as such in cross sections. There is insufficient certainty around the true orientation of several gold lodes to provide a meaningful cross section. • A map of the sampled section was presented in the body of the document and is presented again below. The sampled sections are highlighted in yellow outlines.

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		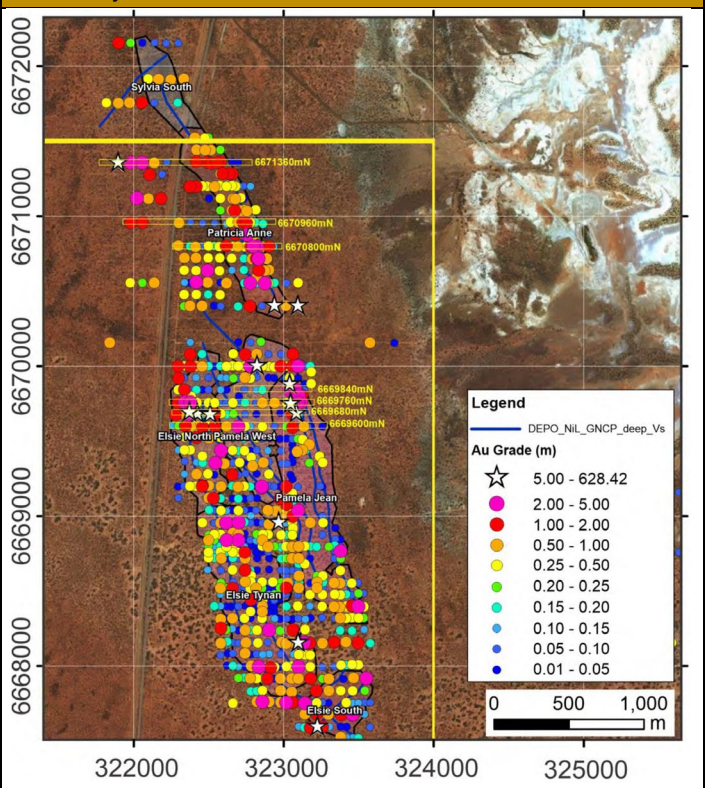
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• This announcement provides a brief overview of the findings of the CSIRO study of gold behaviour in nickel laterite, and exploration results were not reported.
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.*	• This announcement provides a brief overview of the findings of the CSIRO study of gold behaviour in nickel laterite, and exploration results were not reported.
Further work	• *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• Further drilling is required to identify the extent and nature of primary mineralisation in fresh rock. Both RC and diamond drill programs are flagged to increase the understanding of controls and orientation of mineralised structures. Initially, 2 diamond drill holes would be likely. Closely-spaced, pattern RC drilling to a nominal 150m depth is being considered to fully define the uppermost distributions of gold in both saprolite and fresh rock.