

# Savannah poised for restart

East Coast Roadshow 13 – 16 November 2017

## **Disclaimer**



#### No New Information or Data

This presentation contains references to exploration results, and Mineral Resource and Ore Reserve estimates, all of which have been cross referenced to previous market announcements made by the Company. The Company confirms that it is not aware of any new information or data that materially affects the information included in the relevant market announcements and, in the case of estimates of Mineral Resources and Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcements continue to apply and have not materially changed.

#### Forward Looking Statements

This presentation may contain certain "forward-looking statements" which may not have been based solely on historical facts, but rather may be based on the Company's current expectations about future events and results. Where the Company expresses or implies an expectation or belief as to future events or results, such expectation or belief is expressed in good faith and believed to have a reasonable basis. However, forward looking statements are subject to risks, uncertainties, assumptions and other factors, which could cause actual results to differ materially from future results expressed, projected or implied by such forward-looking statements. Such risks include, but are not limited to metals price volatility, currency fluctuations, increased production costs and variances in ore grade or recovery rates from those assumed in mining plans, as well as political and operational risks in the Countries and States in which we operate or sell product to, and governmental regulation and judicial outcomes. For a more detailed discussion of such risks and other factors, see the Company's Annual Reports, as well as the Company's other filings. The Company does not undertake any obligation to release publicly any revisions to any "forward-looking statement" to reflect events or circumstances after the date of this announcement, or to reflect the occurrence of unanticipated events, except as may be required under applicable securities laws.

## Contents



Corporate Directory

Company Overview

Savannah

**Other Assets** 

**Comparative Metrics** 

Vision



# Corporate Directory



Capital	Structure	and I	Enterp	rise '	Value

	•
ASX Ticker	ASX:PAN
Shares on issue	430.1M
Share Price	\$0.47 (10 November 2017)
Market Cap	~\$200M
Cash	~\$7.5M (30 September 2017)
Listed Investments	~\$13M
Bank debt	Nil
Enterprise Value	~\$180M

### Significant Shareholder (at 30 September 2017)

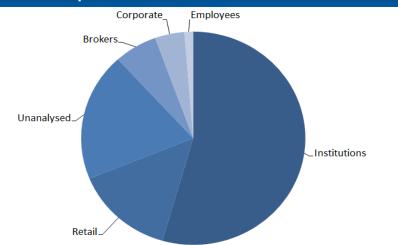
Zeta Resources Limited	27.0%
------------------------	-------

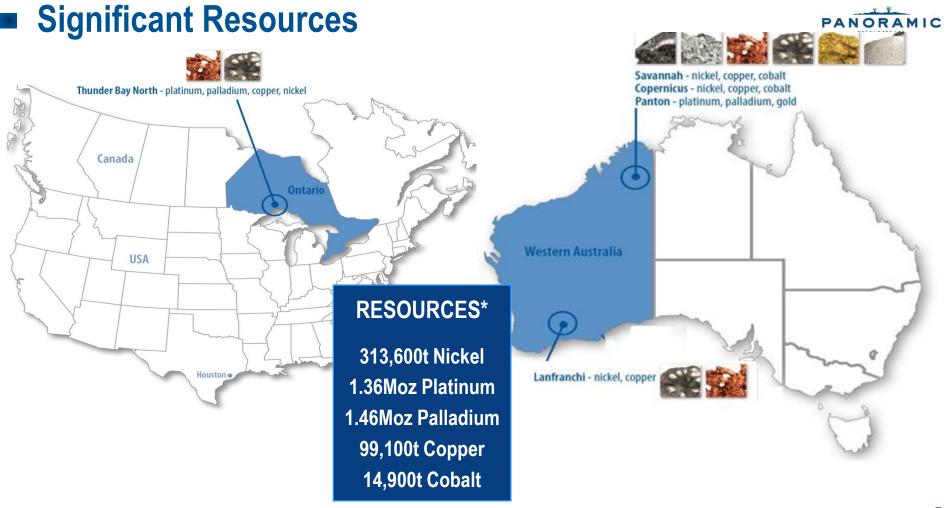
Volume	
30-day average daily volume	1,721,000
90-day average daily volume	1,177,000

#### **Board**

Brian Phillips	Non Executive Chairman
Peter Harold	Managing Director
John Rowe	Non Executive Director
Peter Sullivan	Non-Executive Director
Trevor Eton	CFO/Company Secretary

#### **Shareholder spread +50% institutional**





Refer to Appendices "Resources and Reserves"

## **Continuous Exploration Success**



342,700 tonnes Nickel 125,000 tonnes Copper 18,700 tonnes Cobalt

#### **Kimberley**

**Savannah North:** 175,100t Ni, 74,400t Cu, 12,700t Co

**Savannah Lower Zone: 50,120t** Ni, 28,200t Cu, 2,400t Co

**Savannah Sub 900 Fault: 14,900t** Ni, 6,900t Cu, 900t Co

**Copernicus:** 10,600t Ni, 6,900t Cu, 400t Co

#### Lanfranchi

**Deacon:** 71,800t Ni, 6,300t Cu, 1,900t Co

Jury-Metcalfe 6,400t Ni, 1,300t Cu, 100t Co

■ **Lower Schmitz 6,700t** Ni, 500t Cu, 100t Co

#### 630,000 ounces Gold

#### **Gum Creek (now owned by Horizon Gold Limited)**

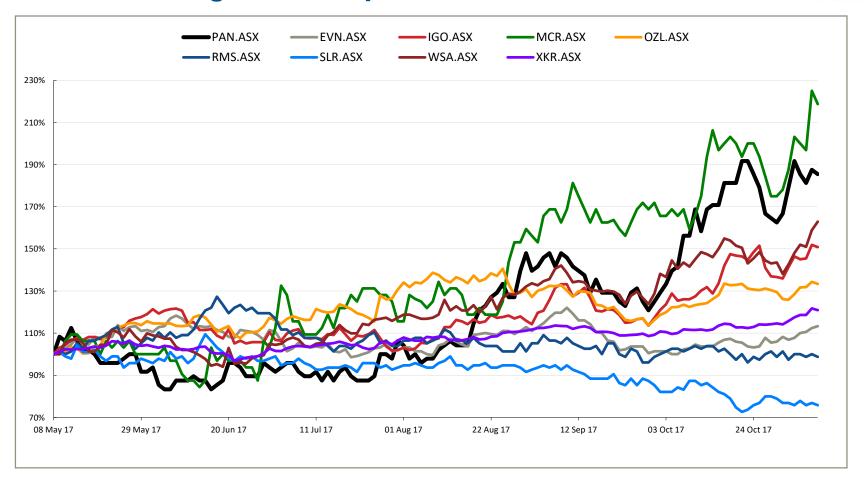
Combined Howards, Heron South, Swan, Swift and Wilsons



John Hicks, General Manager Exploration

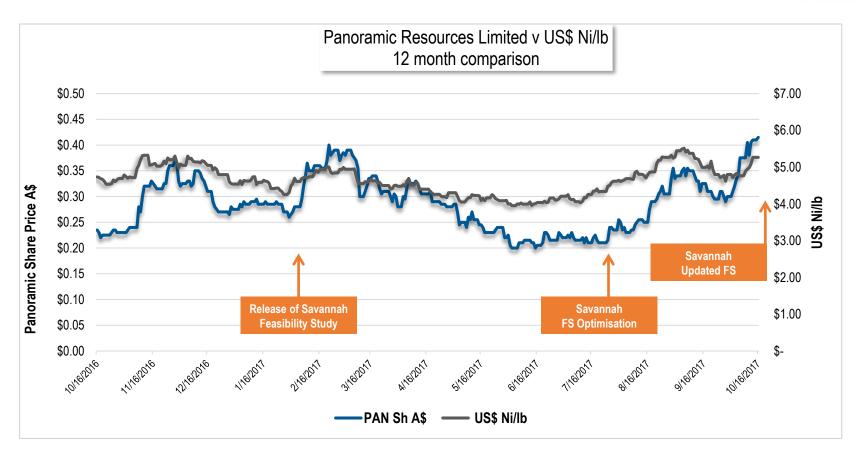
# Performance against our peers in last six months





## Highly leveraged to nickel price







# Nickel, Copper, Cobalt – production ready assets















# Savannah - Summary

## PANORAMIC

#### **Mining and Processing**

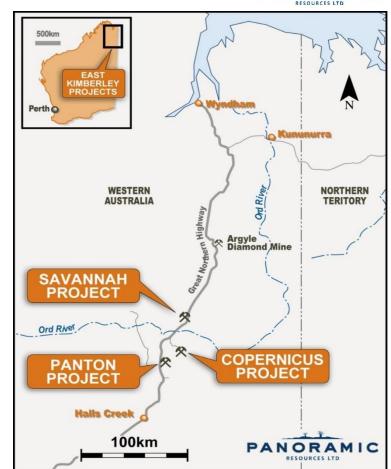
- Fully developed underground mine
- 1Mtpa processing plant (SAG mill and conventional flotation)
- Full mining fleet, 200 person village & associated infrastructure
- Mined continuously for 12 years (2004-2016)
- 8.5Mt ore milled for 95kt Ni, 53kt Cu, 5kt Co in concentrate
- Care and maintenance since May 2016
- Updated Feasibility Study for re-start delivered October 2017
- Offtake with Sino/Jinchuan to March 2020

#### Resources

■ Total Resources of 218,300t Ni, 99,100t Cu, 14,900t Co

#### **Exploration upside**

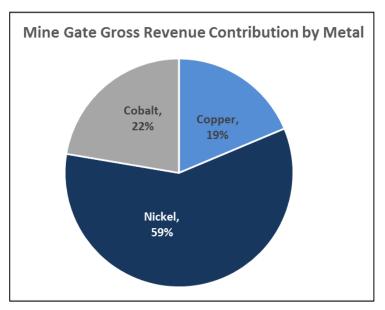
- Only half of interpreted extent of Savannah North Upper Zone tested by drilling
- Other mafic/ultramafic intrusives with little or no drilling



# **Savannah Updated Feasibility Study**



- Payable Operating Cash Costs US\$2.40/lb payable Ni
- Sustaining Cash Costs US\$3.50/lb payable Ni
- Pre-production and ramp-up capital A\$36M
- Mine life 8.3 years
- Average annual production forecast\*
  - 10,800t Ni
  - 6,100t Cu
  - **800t Co**
- Short lead time to production
- NPV \$380M (at US\$6.75/lb Ni and A\$=US\$0.75)
- IRR 200%



\*Refer Company ASX release 27 October 2017 titled "Updated Savannah Feasibility Study. Enhances fundamentals for a decision to restart"

Cautionary Statement

Approximately 1.1% of nickel in the Production Target is from material classified as Inferred Resource. There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised.

# **Key Resource and Production Statistics**



Operating Metric	Details
Mineral	<b>13.2Mt</b> @ 1.65%Ni, 0.75% Cu, 0.11% Co containing
Resources	<b>218,300t</b> Ni <b>99,100t</b> Cu <b>14,900t</b> Co
Mine Production	<b>7.65Mt</b> @ 1.42% Ni, 0.68% Cu, 0.10% Co containing <b>108,700t</b> Ni <b>51,700t</b> Cu <b>7,300t</b> Co
Mine Life	8.3 years
LOM production (metal in concentrate)	<b>90,200t</b> Ni <b>50,700t</b> Cu <b>6,700t</b> Co
Annual production	<b>10,800t</b> Ni <b>6,100t</b> Cu <b>800t</b> Co

- Long mine life ~8.3 years

   (excluding future Resource to Reserve conversion and exploration upside potential)
- Significant nickel production
  - averaging 10,800t nickel in concentrate over LOM
- Significant by-product credits
  - 41% of gross mine-gate revenue from copper and cobalt

The Mineral Resources and Ore Reserves underpinning the above production target have been prepared by a competent person or persons in accordance with the requirements of the JORC Code – refer to PAN's ASX announcements of 24 August 2016, 30 September 2016 and 2 February 2017.

# Mining

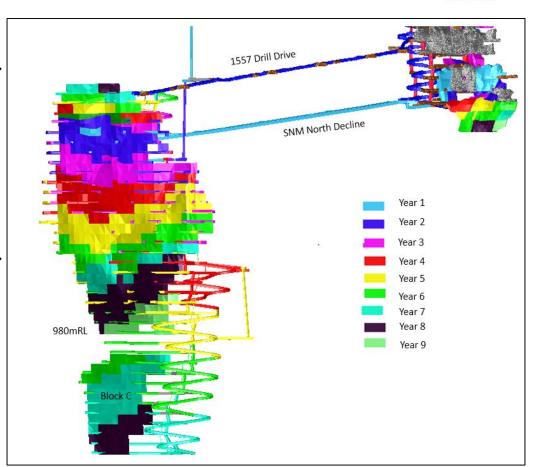


#### Savannah

- Forecast mine production of 1.68Mt @ 1.18% Ni for 19,800t Ni contained
- Use Savannah to top-up production from Savannah North
- Resources below 900F not included in mine plan (0.90Mt @ 1.65% Ni for 14,900t Ni)

#### Savannah North

- Forecast mine production of 5.97Mt @ 1.49% Ni for 88,900t Ni contained
- Commence development when restart Savannah
- First ore 9 months after commencing access development and full production after 15 months



## **Processing**

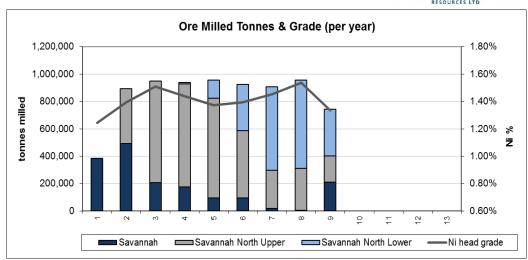
## PANORAMIC

#### Milling

- Average 120 tonnes per hour (~940,000 tonnes per year) at full production
- Estimated four months to refurbish plant
- Three months ramp up to steady-state production and 12 months to full production
- Life-of-mine head grade averages 1.42% Ni
- Lower grades in first year of production, associated with the remnant Ore Reserves at Savannah

# Assumed Average Recoveries over LOM

- 83% Ni
- 98% Cu
- 92% Co





## **Metal Production**



#### Product

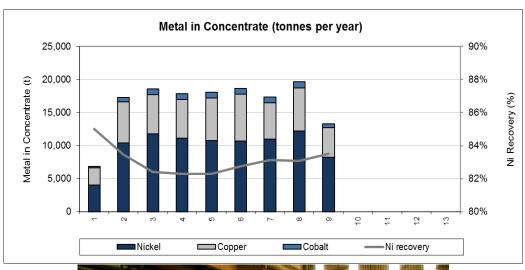
- Bulk Ni-Cu-Co concentrate, target grade of 8% Ni
- Low impurities and attractive Fe:MgO and Ni:Fe ratios
- Ideal blending feed for Ni smelters

#### Annual metal in concentrate

- 10,800t Ni
- 6,100t Cu
- 800t Co

#### ■ LOM metal in concentrate

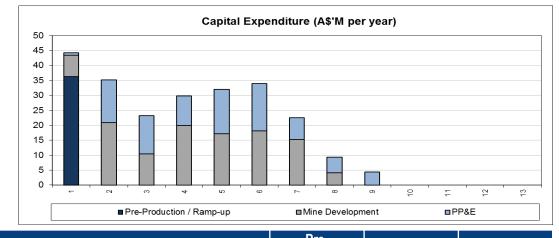
- 90,200t Ni
- 50,700t Cu
- 6,700t Co





# **Capital Costs**

- Total capex over LOM: ~\$240M
- Pre-production and ramp-up: \$36M
  - Plant refurb
  - Savannah Nth access
  - Savannah Nth ventilation
- LOM sustaining capex: \$27M pa
  - Mine dev't average \$17M pa
  - PP&E capex average \$11M pa



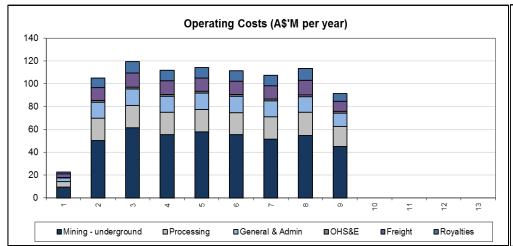
a	Description	Pre- production and ramp-up	Sustaining	Life of Mine
	Mine development	8	103	111
	Mining mobile equipment	4	32	36
	Capitalised pre-production and ramp-up opex	28	-	28
	Other pre-production and sustaining capital	6	23	29
	Savannah North primary ventilation	4	13	17
	Plant refurbishment	10	-	10
	Tailings facilities construction	2	8	9
	Solar power plant	-	7	7
	TSF 1 capping	-	7	7
	Concentrate haulage fleet	-	5	5
	Initial store inventories	2	-	2
	Capitalised Revenue	(28)	-	(28)
	TOTAL	36	198	235

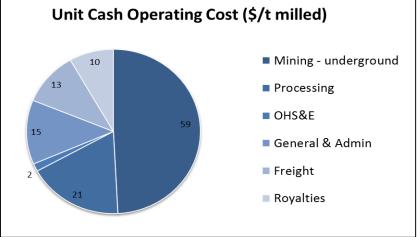
# **Operating Costs**



- Site operating unit costs: ~\$100/t
- Major cost impacts:
  - Labour costs (higher salaries) 25% of total opex
  - Power & fuel (increased ventilation and cooling requirements) – 15% of total opex

Description	LOM cost per tonne milled (\$/t)	LOM total (\$'M)	
Mining (incl. Geology)	59	440	
Processing	21	160	
Other site costs	17	130	
Total	97	730	

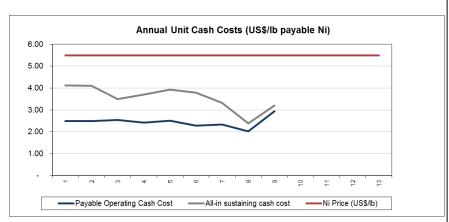


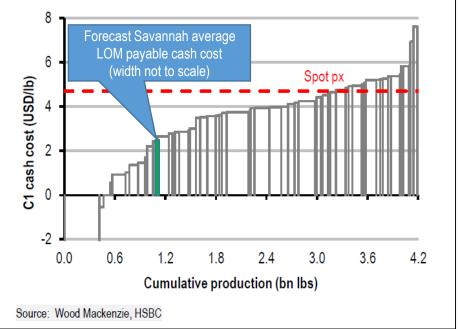


# **Payable Cash Costs**



- Payable operating cash cost US\$2.40/lb average over LOM (bottom of 2<sup>nd</sup> quartile)
- Sustaining cash cost US\$3.50/lb average over LOM (US\$4.20/lb in Years 1 and 2)
- Sustaining cash cost margin 36% average over LOM





# | Financial Assumptions



Commodity and FX assumptions used in the Base Case model are reflective of current prices:

Commodity	Base Case	Long Term*		
Nickel	US\$5.50/lb	US\$6.75/lb		
Copper	US\$3.10/lb	US\$2.72/lb		
Cobalt	US\$28.00/lb	US\$26.00/lb		
US\$:A\$	0.78	0.76		

- Revenue assumptions based on recent indicative sales terms received from potential offtake partners
- Discount rate 8%
- Modelling is pre-tax
- Tax losses of \$69M at 30 June 2017 PAN had accumulated tax losses of approximately \$69M (not included in modelling)

<sup>\*</sup>Long Term Prices - The Long Term (LT) Real (2017\$) US\$ nickel and copper prices and the US\$:A\$ FX rate are consensus forecasts sourced from UBS Global I/O Miner Price Review, dated 5 October 2017. The LT Real (2017\$) US\$ cobalt price is sourced from Macquarie Bank Limited Research Report titled "Price Forecast Changes", dated 9 October 2017.

## **Financial Results**



#### Viable at spot, highly leveraged to commodity price

Financial Metric	Units	Base Case	Long Term	
Revenue	A\$M	1,470	1,720	
Initial Capital	A\$M	36	32	
LOM Capital (incl. initial capital)	A\$M	240	230	
Operating costs plus royalties	A\$M	900	920	
Pre-tax cashflow	A\$M	330	570	
Pre-tax NPV (8% discount rate)	A\$M	210	380	
IRR	%	100	200	
C1 cash cost	A\$/lb Ni	1.90	2.10	
(Ni in concentrate basis)	US\$/lb	1.50	1.60	
Operating cash costs	A\$/lb Ni	3.10	3.40	
(payable Ni basis)	US\$/lb	2.40	2.60	
Sustaining cash costs	A\$/lb Ni	4.50	4.80	
(payable Ni basis)	US\$/lb	3.50	3.60	

#### **Key changes from Feb 2017 FS**

- Improved marketing terms
- Improved Cu and Co recoveries
- Lower Ni price for Base Case
- Ni processing recovery average 83%
- Initial capex (plant refurb cost estimates updated)
- Opex (salaries and power consumption updated)

## Leveraged to commodity prices and currency



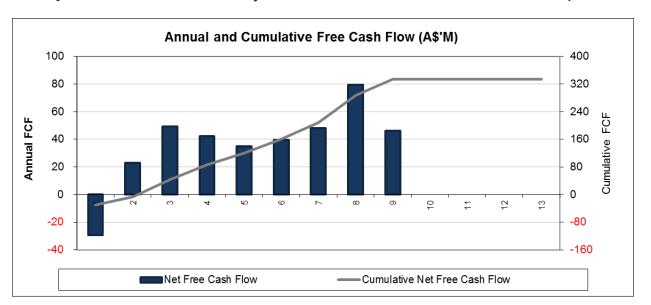
- Strongly leveraged to nickel price and US\$:A\$
  - US\$1.00/lb increase in nickel price adds ~A\$160M to pre-tax NPV
  - US\$0.05 cent decrease in the US\$:A\$ exchange rate adds ~A\$50M to pre-tax NPV

Pre-tax NPV <sub>8</sub> (\$'M)		Nickel Price US\$/lb)					
		5.00	6.00	7.00	8.00	9.00	10.00
	0.65	270	453	635	790	946	1,102
US\$:A\$ FX Rate	0.70	207	377	546	690	835	979
	0.75	153	312	469	604	739	874
	0.80	105	254	401	528	654	781
	0.85	63	203	342	461	580	699

# **Cashflow Forecast (Base Case) - LOM**



- **LOM Revenue** \$1,470M (\$180M per year)
- LOM pre-tax cashflow \$330M
- Pre-production and ramp-up capex \$36M
- Payback period less than 2 years after recommencement of production



## **Opportunities to add further value**



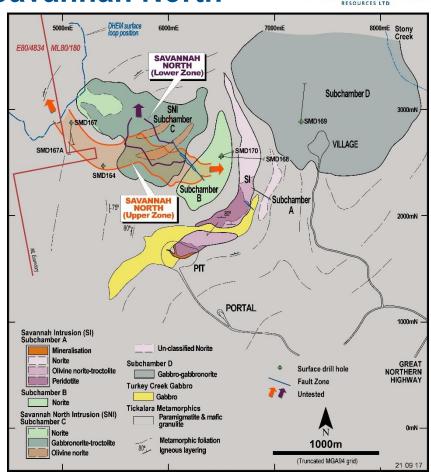
- Battery loaders reduce heat generation & diesel particulate emissions, lower vent & cooling requirements
- Alternative truck technology smaller, lighter units, faster travel times, lower capital and operating costs
- Ore sorting Reject waste prior to milling, improving head grade and increasing milling capacity
- Split Concentrate Produce separate Cu and Ni-Co concentrates, improving payability terms
- Sulphate Production Convert Ni-Co concentrate to higher-value Ni and Co sulphates, for use in EV/battery industry

# These opportunities will continue to be assessed for potential adoption by the Company in the future

# **Upside – potential 2km strike at Savannah North**

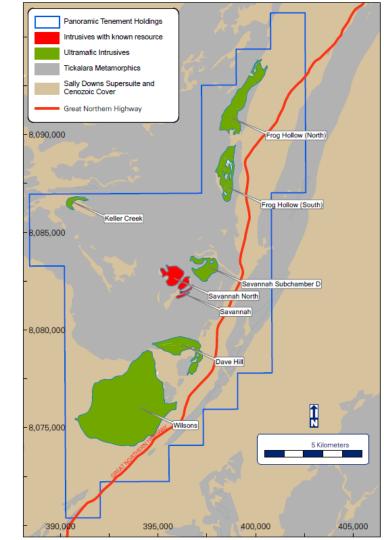
PANORAMIC

- Resource open Savannah North Resource drilling programs have not closed off the mineralisation
- Potential strike length of the Upper Zone is ~2km based on the large, highly conductive on-hole EM responses identified in surface drill holes:
  - SMD164, Section 5400mE
  - SMD167 & SMD167A, Section 5100mE
- Only half of the potential Upper Zone mineralisation has been tested by resource drilling
- The Lower Zone Resource remains open down dip to the northwest



# **Upside – Other Intrusives**

- A number of other mafic/ultramafic intrusive bodies occur at the Savannah Project (Wilsons, Dave Hill, Subchamber D and Frog Hollow)
- CSIRO age dating indicate these are part of the same magmatic event as the Savannah / Savannah North mineralised bodies
- Dave Hill & Wilsons bodies are known to contain magmatic sulphides
- Past drilling has been minimal, and has not tested the most prospective basal parts of these intrusives:
  - Dave Hill one 700m deep and five shallow core holes
  - Wilsons one core and seven shallow RC holes
  - Subchamber D one core hole
  - Frog Hollow never been drilled



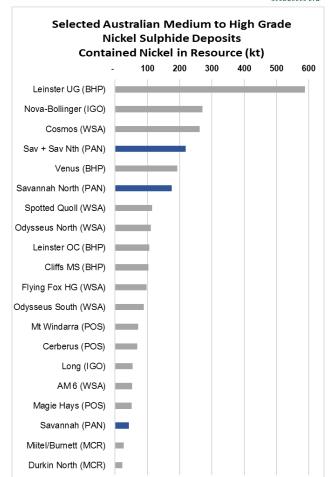
## Summary



- Savannah is a significant Australian base metal project containing\*
  - 218,300t contained nickel
  - 99,100t contained copper
  - 14,900t contained cobalt

#### ✓ Updated Feasibility Study confirms

- Financially robust project at current commodity prices and US\$:A\$ FX
- +8 year mine life
- Globally competitive cash costs of US\$2.40/lb payable Ni
- Low re-start capex
- Short timeframe to production leveraging off existing Savannah infrastructure
- Significant leverage to nickel, copper and cobalt prices
- Excellent potential for further exploration success and mine life extension



<sup>\*</sup>Refer to Appendices





# **Lanfranchi - Summary**



#### **Mining**

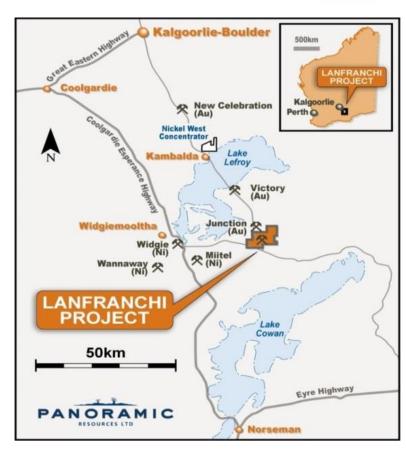
- Fully developed underground mine
- Large mining fleet, village & associated infrastructure
- Mined continuously by PAN for 10 years (2005-2015)
- 3.85Mt ore mined containing 94kt Ni (PAN)
- Care and Maintenance from November 2015
- Quick re-start to mine Jury-Metcalfe, Deacon
- Offtake with BHP Nickel West to February 2019

#### Resources

- Resources plus past production: 280kt contained Ni
- Total Resources of 95,500t contained Ni
- Lower Schmitz high-grade Resource of 6,700t contained Ni at 5.1% Ni

#### **Exploration upside**

Multiple exploration targets identified



# **Lanfranchi – Exploration Potential**



#### Schmitz Channel – Lower Zone

- 700m below surface
- 9,000t Ni per 100m vertical\*
- Historic production of ~58,000t Ni

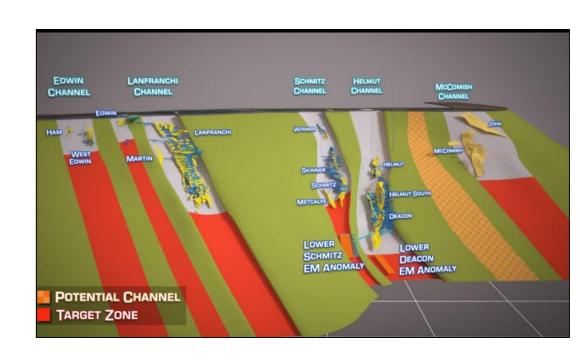
#### Lanfranchi Channel

- 500m below surface
- 6,000t Ni per 100m vertical\*
- Historic production of ~39,000t Ni

#### **Helmut/Deacon Channel**

- 900m below surface
- 20,000t Ni per 100m vertical\*
- Historic production of ~92,000t Ni

#### **New Channels?**



\*Historical Ni tonnes per vertical metre





# Horizon Gold (ASX:HRN) - Gum Creek Gold Project



IPO of Horizon, spun out from Panoramic

Shares on issue 76.5M

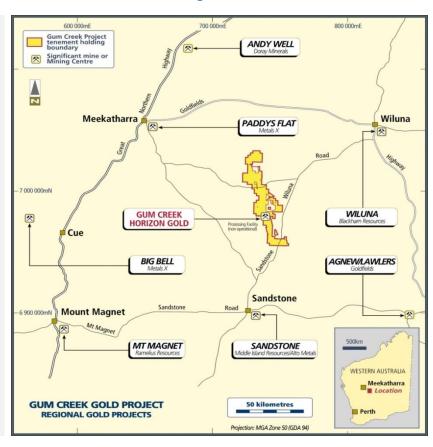
Market capitalisation ~\$19M (at \$0.25/sh)

Cash (30 Sept 2017) ~\$10M

Enterprise value ~\$9M

Panoramic interest 51%

- Location 640km NE of Perth, Western Australia
- Large tenement package covering large portion of the Gum Creek Greenstone belt
- Historic production >1Moz gold
- Significant Resources 17.3Mt at an average grade of 2.25g/t Au for 1.25Moz
- Drilling targets twenty prospect areas identified for follow-up RC and aircore drill testing
- Recent results drilling at Psi prospect returned 7m @ 4.94g/t
   Au from 55m in GWRC462\*. Follow-up drilling planned



\*Refer HRN Quarterly Activities Report for the period ended 30 September 2017

## **PGMs**



#### **Panton**

Located 60km from Savannah

#### Resources\*

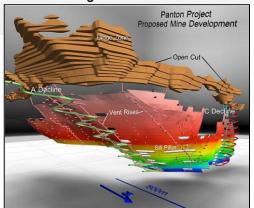
2.1Moz of Pt+Pd

#### Feasibility Study by previous owner

- Open pit plus underground mining
- 600,000tpa throughput rate
- 83,000oz Pt+Pd+Au per year

#### Recent positive test work by Panoramic

- Improved recovery and concentrate grade
- Ore sorting



#### **Thunder Bay North**

Located in Ontario, Canada

#### Resources\*

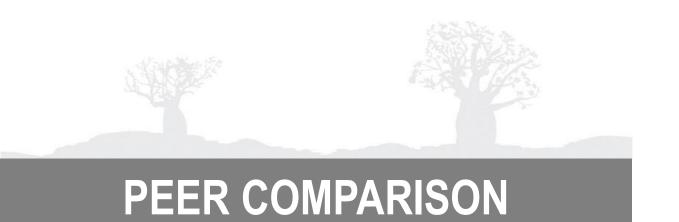
0.7Moz of Pt+Pd

#### Rio Tinto earn in and JV option

- Consolidates PAN's Thunder Bay North Project and Rio's Escape Lake Project
- Earn in Option Rio spending up to C\$20M over 5½ years to earn 70% interest

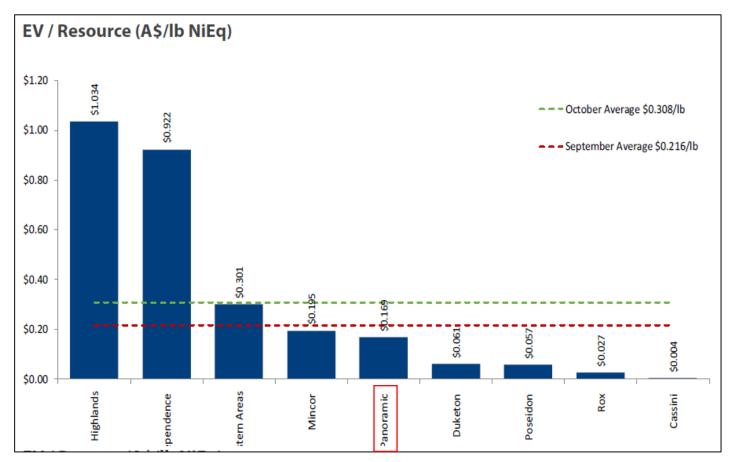






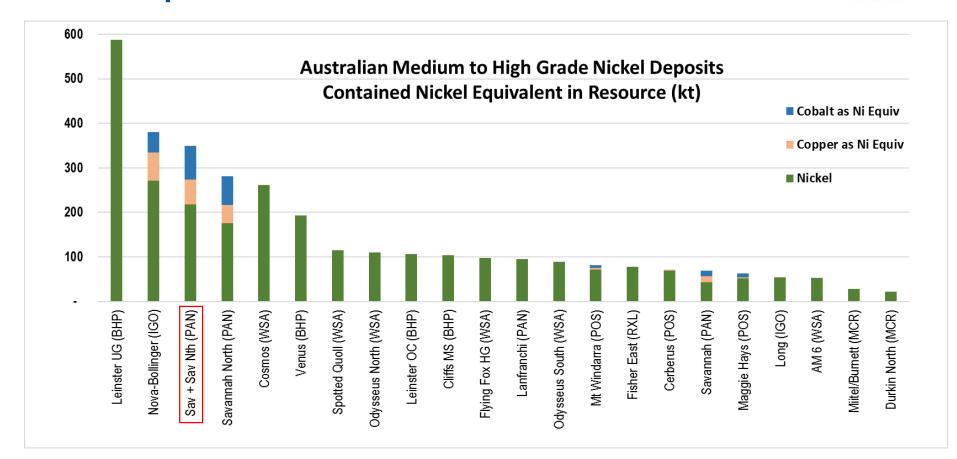
# I Undervalued Against Peers





## **Nickel Equivalent Resources**

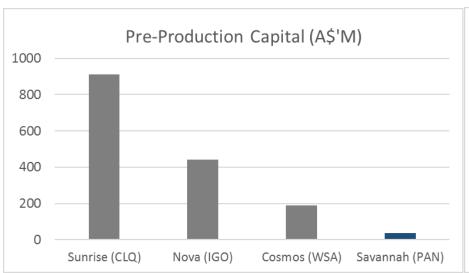


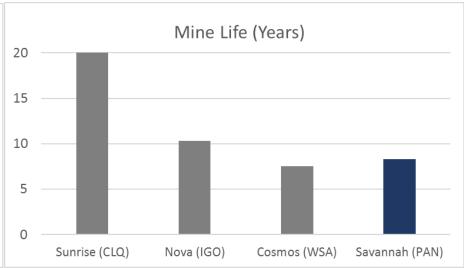


## **Pre-Production Capex and Mine Life**



- Low pre-production capex
- At least 8 year mine life

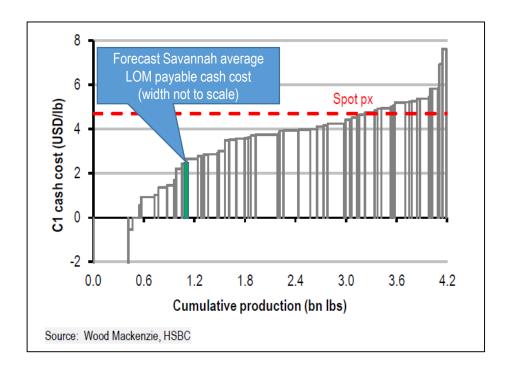




# Payable Cash Costs



Savannah payable operating cash cost - US\$2.40/lb average over LOM (bottom of 2<sup>nd</sup> quartile)



### **Vision**



Restart Production
At Savannah and Lanfranchi



# NICKEL, COPPER, COBALT

### **Build Resources**

**Through Exploration** 



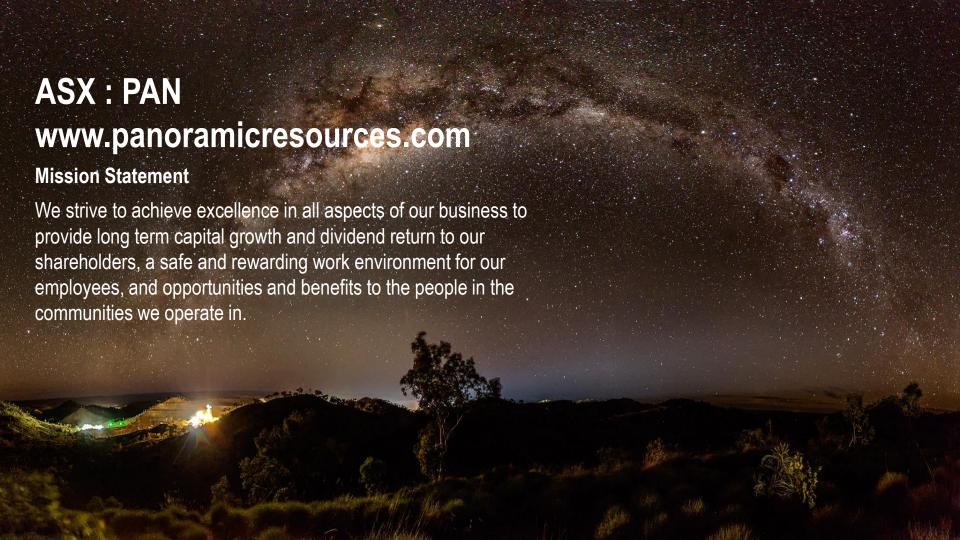
### **GOLD** and PGM's

### **Grow the Business**

Acquire quality advanced assets



### OTHER COMMODITIES







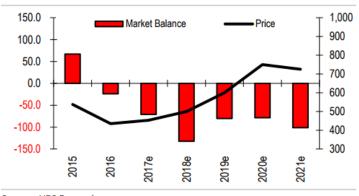
Note: further 2012 Edition JORC compliance tables are referenced in the PAN ASX announcement dated 30 September 2016





### **Nickel**

Figure 76: Price & supply/demand balance (Mt & USc/lb)



Source: UBS Research.

#### **UBS Nickel Price Forecasts**

**2018 - \$5.00/lb** 

**2019 - \$6.00/lb** 

**2020 - \$7.50/lb** 

**2021 - \$7.00/lb** 

Figure 77: Price forecasts & Upside/Downside (US\$/lb)



Source: UBS & Bloomberg.

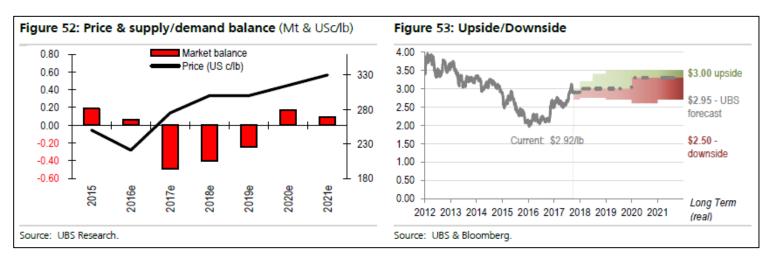
#### Nickel price to surge in 2019-20e from Electric Vehicles:

"We see substantial price upside from the current spot of ~US\$4.60/lb to US\$7.50/lb in 2020e. Here electric vehicle penetration & a cathode chemistry shift to greater nickel use will drive a substantial uplift in demand." (UBS 5/10/17)

Source: UBS - 5 October 2017







#### **UBS Copper Price Forecasts**

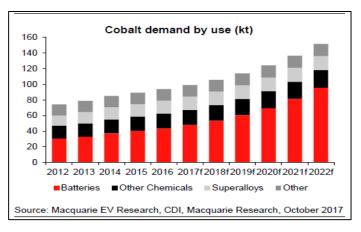
- **2018 \$3.00/lb**
- **2019 \$3.00/lb**
- **2020 \$3.30/lb**
- **2021 \$3.30/lb**

"Beyond the near term, we think EV's & the promise of accelerating demand underpin the case for an incentive price of ~US\$3/lb (real)". (*UBS 5/10/17*)

Source: UBS - 5 October 2017







### **Macquarie Cobalt Price Forecasts**

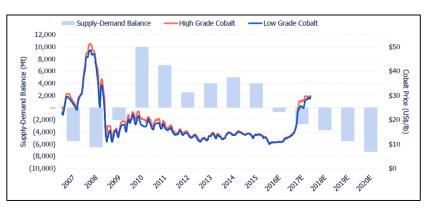
- **2018 \$27.00/lb**
- **2019 \$20.00/lb**
- 2020 \$22.00/lb
- **2021 \$32.00/lb**
- **2022 \$41.00/lb**

#### Sources:

Macquarie Research – Commodities Compendium, 10 October 2017 Cobalt 27 Capital Corp - corporate presentation, 20 September 2017

#### **Cobalt 27 Capital Corp comments**

- Cobalt demand in lithium-ion batteries forecast to grow at 11.7% CAGR to 2022
- Supply currently concentrated in the DRC (65% of 2016 mine output)
  - Relatively politically unstable country
  - Lack of infrastructure
  - ~15% of DRC output from unregulated artisanal mining







# INFERRED RESOURCES IN MINE PLAN

# Material in Updated FS mine plan

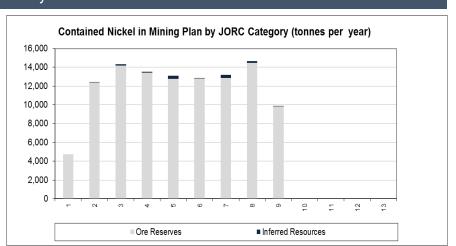


Classification	Tonnage Mt	Grade Ni%	Grade Cu%	Grade Co%	Contained Ni (t)	Contained Cu (t)	Contained Co (t)
Ore Reserves	7.58	1.42	0.68	0.09	107,500	51,200	7,200
Inferred Resource	0.06	1.91	0.69	0.13	1,200	400	100
Total	7.65	1.42	0.68	0.10	108,700	51,700	7,300

#### The Updated FS mine plan has only ~1.1% material classified as Inferred Resource

#### **Cautionary Statement**

There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised.







#### No New Information or Data

The Mineral Resource and Ore Reserve estimates tabled below have been previously reported, and the relevant market announcements cross referenced. The Company confirms that it is not aware of any new information or data that materially affects the information included in the relevant market announcements and, in the case of estimates of Mineral Resources and Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcements continue to apply and have not materially changed.

# Nickel, Copper, Cobalt - Resources



Deserves	Familia	Metal	JORC	Measured		Indicated		Inferred		Total		Metal
Resource	Equity	Metai	Compliance	Tonnes	(%)	Tonnes	(%)	Tonnes	(%)	Tonnes	(%)	Tonne
Savannah Project												
Savannah (above 900)	100%	Nickel	2012	1,275,000	1.51	759,000	1.20	,	-	2,034,000	1.39	28,30
		Copper			0.87		0.90		-		0.88	17,90
		Cobalt			0.07		0.07		-		0.07	1,400
Savannah (below 900)	100%	Nickel	2012	780,000	1.64	125,000	1.72	-	-	905,000	1.65	14,90
		Copper			0.76		0.75		-		0.76	6,900
		Cobalt			0.10		0.09		-		0.10	900
Savannah North (Upper)	100%	Nickel	2012	-	-	4,229,000	1.64	1,759,000	1.25	5,987,000	1.53	91,30
		Copper					0.65		0.49		0.60	36,10
		Cobalt			-		0.12		0.10		0.11	6,800
Savannah North (Lower)	100%	Nickel	2012	-	-	2,697,000	1.96	853,000	2.02	3,549,000	1.97	70,10
		Copper			-		0.98		0.93		0.97	34,40
		Cobalt			-		0.14		0.13		0.14	4,900
Savannah North (Other)	100%	Nickel	2012	-	-	242,000	2.22	493,000	1.67	735,000	1.85	13,60
		Copper			-		0.50		0.53		0.52	3,800
		Cobalt			-		0.14		0.11		0.12	900
Lanfranchi Project												
Cruikshank	100%	Nickel	2004	-	-	2,018,000	1.42	611,000	0.79	2,629,000	1.28	33,60
Deacon	100%	Nickel	2012	89,000	2.99	-	-	134,000	1.70	224,000	2.22	5,000
Gigantus	100%	Nickel	2004	-	-	-	-	652,000	1.63	652,000	1.63	10,60
Helmut South Ext	100%	Nickel	2012	21,000	4.54	29,000	2.87	-	-	50,000	3.59	1,800
John	100%	Nickel	2004	-	-	-	-	291,000	1.42	291,000	1.42	4,100
Lanfranchi	100%	Nickel	2012	40,000	4.12	55,000	4.40	63,000	3.49	158,000	3.97	6,300
Martin	100%	Nickel	2012	-	-	47,000	3.58	7,000	4.16	54,000	3.66	2,000
McComish	100%	Nickel	2004	-	-	-	-	992,000	1.49	992,000	1.49	14,80
Metcalfe	100%	Nickel	2012	-	-	280,000	1.99	111,000	1.35	391,000	1.81	7,10
Schmitz	100%	Nickel	2012	30,000	4.92	23,000	3.93	16,000	2.95	69,000	4.14	2,90
Lower Schmitz	100%	Nickel	2012	-	-	51,000	5.60	79,000	4.80	131,000	5.11	6,70
Winner	100%	Nickel	2004	-	-	14,000	4.40	-	-	14,000	4.40	600
Total (Equity)		Nickel										313,60
		Copper										
		Cobalt										14,90

### Nickel, Copper, Cobalt - Resources



#### **Qualifying Statement and Notes**

#### Notes:

- Figures have been rounded and therefore may not add up exactly to the reported totals
- All resources are inclusive of reserves
- Savannah Project Resource cutoff grade is 0.50% Ni
- Lanfranchi Project Resource cutoff grade is 1.00% Ni

#### Cross references to previous market announcements:

- Savannah (above 900) refer ASX announcement dated 30 September 2016 titled "Mineral Resources and Ore Reserves at 30 June 2016"
- Savannah (below 900) refer ASX announcement dated 30 September 2015 titled "Mineral Resources and Ore Reserves at 30 June 2015"
- Savannah North refer ASX announcement dated 24 August 2016 titled "Major Resource Upgrade for Savannah North"
- Cruickshank refer ASX announcement dated 28 April 2011 titled "Cruickshank Resource Upgraded 26% to 33,560t Ni"
- Deacon, Helmut South Ext, Lanfranchi, Metcalfe refer ASX announcement dated 30 September 2016 titled "Mineral Resources and Ore Reserves at 30 June 2016"
- Gigantus, John, McComish, Winner refer ASX announcement dated 12 October 2011 titled "Business Review 2011"
- Martin refer ASX announcement dated 13 September 2013 titled "Resources and Reserves at 30 June 2013 and Exploration Update"
- Schmitz refer ASX announcement dated 30 September 2015 titled "Mineral Resources and Ore Reserves at 30 June 2015"
- Lower Schmitz refer ASX announcement dated 28 April 2016 titled "Quarterly Report for the period ending 31 March 2016"

# Nickel, Copper, Cobalt - Reserves



December	Fauits	Metal	JORC	Prove	en	Probak	ole	Total		Metal
Reserve	Equity		Compliance	Tonnes	(%)	Tonnes	(%)	Tonnes	(%)	Tonnes
Savannah Project										
Above 900 Fault	100%	Nickel	2012	1,365,000	1.15	194,000	1.24	1,558,000	1.16	18,100
		Copper			0.66		1.28		0.74	11,500
		Cobalt			0.06		0.07		0.06	900
Savannah North	100%	Nickel	2012	-	-	6,650,000	1.42	6,650,000	1.42	94,500
		Copper			-		0.61		0.61	40,900
		Cobalt			-		0.10		0.10	6,700
Lanfranchi Project										
Deacon	100%	Nickel	2012			42,000	2.67	42,000	2.67	1,100
Metcalfe	100%	Nickel	2012			113,000	1.57	113,000	1.57	1,800
Lanfranchi	100%	Nickel	2012			11,000	2.56	11,000	2.56	300
Schmitz	100%	Nickel	2012			15,000	2.96	15,000	2.96	500
Helmut Sth Ext	100%	Nickel	2012			27,000	2.19	27,000	2.19	600
Total (Equity)		Nickel								116,800
		Copper								52,400
		Cobalt								7,600

#### Notes:

- Figures have been rounded and therefore may not add up exactly to the reported totals
- Savannah Project Reserve cutoff grade is 0.80% Ni
- Lanfranchi Project Reserve cutoff grade is 1.00% Ni except for airleg mining which is 2.00% Ni

#### Cross references to previous market announcements:

- refer to ASX announcement dated 30 September 2016 titled "Mineral Resources and Ore Reserves at 30 June 2016"
- refer to ASX announcement dated 2 February 2017 titled "Savannah Feasibility Study. Ten year life with minimal restart capital requirements"

# Platinum Group Metals - Resources



Resource	Equity	JORC Compliance	Tonnage	Grade										Contained Metal	
				Pt (g/t)	Pd (g/t)	Rh (g/t)	Au (g/t)	Ag (g/t)	Cu (%)	Ni (%)	Co %	Pt-Eq (g/t)	Pt (oz ,000)	Pd (oz ,000)	
Thunder Bay North															
Open Pit	100%	2004													
Indicated			8,460,000	1.04	0.98	0.04	0.07	1.50	0.25	0.18	0.014	2.13	283	267	
Inferred			53,000	0.96	0.89	0.04	0.07	1.60	0.22	0.18	0.014	2.00	2	2	
Underground	100%	2004													
Indicated			1,369,000	1.65	1.54	0.08	0.11	2.60	0.43	0.24	0.016	3.67	73	68	
Inferred			472,000	1.32	1.25	0.06	0.09	2.10	0.36	0.19	0.011	2.97	20	19	
Sub-total – Thu	nder Bay	North (Equity)	10,354,000	1.13	1.07								377	355	
								•			•				
Panton															
Top Reef	100%	2012													
Measured			4,400,000	2.46	2.83	-	0.42	-	0.08	0.28	-	-	348	400	
Indicated			4,130,000	2.73	3.21	-	0.38	-	0.09	0.31	-	-	363	426	
Inferred			1,560,000	2.10	2.35	-	0.38	-	0.13	0.36	-	-	105	118	
Middle Reef	100%	2012													
Measured			2,130,000	1.36	1.09	-	0.10	-	0.03	0.18	-	-	93	75	
Indicated			1,500,000	1.56	1.28	-	0.10	-	0.04	0.19	-	-	75	62	
Inferred			600,000	1.22	1.07	-	0.10	-	0.05	0.19	-	-	24	21	
Sub-total – Panton (Equity)			14,320,000	2.19	2.39								1,008	1,102	
Total - PGM (Ed											1,385	1,456			

# **Platinum Group Metals - Resources**



### **Qualifying Statements and Notes**

#### Notes

Thunder Bay North Open Pit Resource: The open pit Mineral Resource is reported at a cut-off grade of 0.59 g/t Pt-Eq within a Lerchs-Grossman resource pit shell optimized on Pt-Eq. The strip ratio (waste:ore) of this pit is 9.5:1. The platinum-equivalency formula is based on assumed metal prices and overall recoveries. The Pt-Eq formula is: Pt-Eq g/t = Pt g/t + Pd g/t x 0.3204 + Au g/t x 0.6379 + Ag g/t x 0.0062 + Cu g/t x 0.00011 + Total Ni g/t x 0.000195 + Total Co g/t x 0.000124 + Rh g/t x 2.1816. The conversion factor shown in the formula for each metal represents the conversion from each metal to platinum on a recovered value basis. The assumed metal prices used in the Pt-Eq formula are: Pt US\$1,595/oz, Pd US\$512/oz, Au US\$1,015/oz, Ag US\$15.74/oz, Cu US\$2.20/lb, Ni US\$7.71/lb, Co US\$7.71/lb and Rh US\$3,479/oz. The assumed combined flotation and PlatsoITM process recoveries used in the Pt-Eq formula are: Pt 76%, Pd 75%, Au 76%, Ag 55%, Cu 86%, Ni 44%, Co 28% and Rh 76%. The assumed refinery payables are: Pt 98%, Pd 98%, Au 97%, Ag 85%, Cu 100%, Ni 100%, Co 100% and Rh 98%.

Thunder Bay North Underground Resource: The underground mineral resource is reported at a cut-off grade of 1.94g/t Pt-Eq. The Pt-Eq formula is: Pt-Eq g/t = Pt g/t + Pd g/t x 0.2721 + Au g/t x 0.3968 + Ag g/t x 0.00084 + Cu g/t x 0.000118 + Sulphide Ni g/t x 0.000433 + Sulphide Co g/t x 0.000428 + Rh g/t x 0.27211. The assumed metal prices used in the Pt-Eq formula are: Pt US\$1,470/oz, Pd US\$400/oz, Rh US\$4,000/oz, Au US\$875/oz, Ag US\$14.30/oz, Cu US\$2.10/lb, Ni US\$7.30/lb and Co US\$13.00/lb. The assumed process recoveries used in the Pt-Eq formula are: Pt 75%, Pd 75%, Rh 75%, Au 50%, Ag 50%, Cu 90%, and Ni and Co in sulphide 90%. The assumed smelter recoveries used in the Pt-Eq formula are Pt 85%, Pd 85%, Au 85%, Ag 85%, Cu 85%, Ni 90% and Co 50%. Ni and Co in sulphide were estimated by linear regression of MgO to total Ni and total Co respectively. The regression formula for Ni in sulphide (NiSx) is: NiSx = Ni - (MgO% x 60.35 - 551.43). The regression formula for Co in sulphide (CoSx) is: CoSx = Co - (MgO% x 4.45 - 9.25).

#### Cross references to previous market announcements:

- Thunder Bay North Open Pit Resources refer Magma Metals Limited (ASX:MMW) announcement dated 7 February 2011 titled "Positive Scoping Study for Thunder Bay North Project"
- Thunder Bay North Underground Resources refer Magma Metals Limited (ASX:MMW) announcement dated 23 February 2012 titled "Magma Metals Increases Mineral Resources at TBN to 790,000 Platinum-Equivalent Ounces"
- Panton refer ASX announcement dated 30 September 2015 titled "Mineral Resources and Ore Reserves at 30 June 2015"