



# Kookaburra Gully Graphite Mine Development

Australian Graphite Conference  
27 April 2017



# Kookaburra Gully Highlights



## Mineral Lease granted – PEPR pending

- Located in South Australia's **world-class graphite-rich metallogenic province** of Eyre Peninsula  
35kms north of export gateway of Port Lincoln
- High grade flake graphite – **a global Top 10 graphite deposit**
- **Set to be Australia's premier and only producing graphite mine**
- Targeting up to 40,000 tonnes per annum high purity graphite concentrate (up to 98% TGC) from conventional flotation – easily upgraded to 99.9% TGC
- **Targeting development start-up late 2017 to 2018**
- Existing water, power, road/rail/sea export infrastructure close-by
- Preparation of **Program for Environment Protection & Rehabilitation (PEPR)** is **well advanced** for lodging mid 2017 – final approval process
- Entering a multi-billion dollar “new era” expanding global graphite market



**Near-term “clean-and-green” production  
with low sovereign risk**

# Lincoln Minerals Limited



**Focused Board and Management**  
**Considerable experience in Chinese investment & markets**

**Non-Executive Chairman - Mr Jin Yubo**

**Non-Executive Vice-Chairman - Mr James Tenghui Zhang**

**Non-Executive Director - Mr Eddie Lung Yiu Pang**

**Managing Director - Dr Allan John Parker**



- Unwavering, long-term focus on the multi-commodity mineral wealth of South Australia's richly endowed Eyre Peninsula with a long history of graphite, iron ore & copper mining
- Graphite is the main strategic investment
- Other assets include substantial magnetite & hematite resources and copper targets
- Australian Graphite Pty Ltd is wholly-owned subsidiary of LML

<b>ASX Code</b>	LML
<b>Market Capitalisation</b>	A\$13.8 million
<b>Shares on issue</b>	460.5 million
<b>52 week range</b>	\$0.03 – \$0.08
<b>Cash at 31 March 2017</b>	A\$2.99 million
<b>Debt</b>	NIL



# Project Status & Key Issues



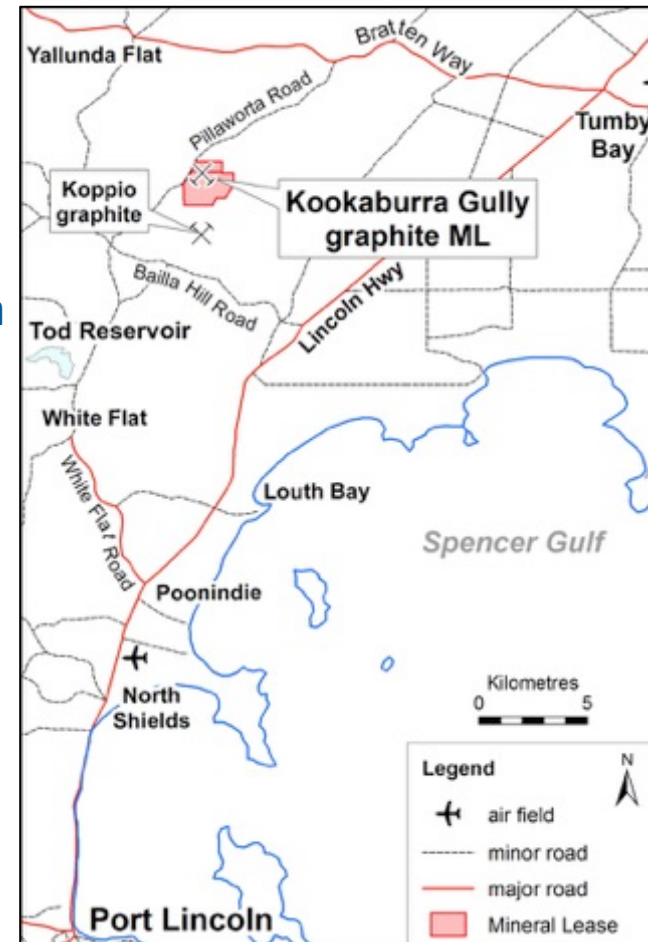
## Kookaburra Gully

- ▶ Mineral Lease ML6460 granted 3 June 2016
- ▶ Design studies (feasibility study level) essentially complete
- ▶ Environmental assessments essentially complete
- ▶ Program for Environment Protection and Rehabilitation (PEPR) – **target lodgement date June 2017**

The outcomes of these studies define the project, enable preparation of the PEPR and other infrastructure related approvals.

## Key Issues requiring further work:

- ▶ Ways to reduce capital & operating costs
- ▶ Better define target graphite market segments & product development – pilot plant tests
- ▶ Consider optimal production rate to match market demand





# Geology & Resource Model



- ▶ Early Proterozoic multiply-deformed granulite to upper amphibolite facies metamorphic graphite schist sequence
- ▶ Upper 30m to 50m oxidised & upgraded by deep Tertiary weathering profile
- ▶ Kookaburra Gully Inferred and Indicated Mineral Resource is **2.2 million tonnes at 15.1% TGC\***
- ▶ Ongoing resource & waste rock modelling by OreWin has provided basis for mine design and preparation of ore & waste rock schedules
- ▶ January-March 2017 – in-fill drilling program completed to better define ore reserves at Kookaburra Gully & mineral potential along strike to southwest

## Next Steps:

- ▶ Refine Resource Model
- ▶ Define Ore Reserves

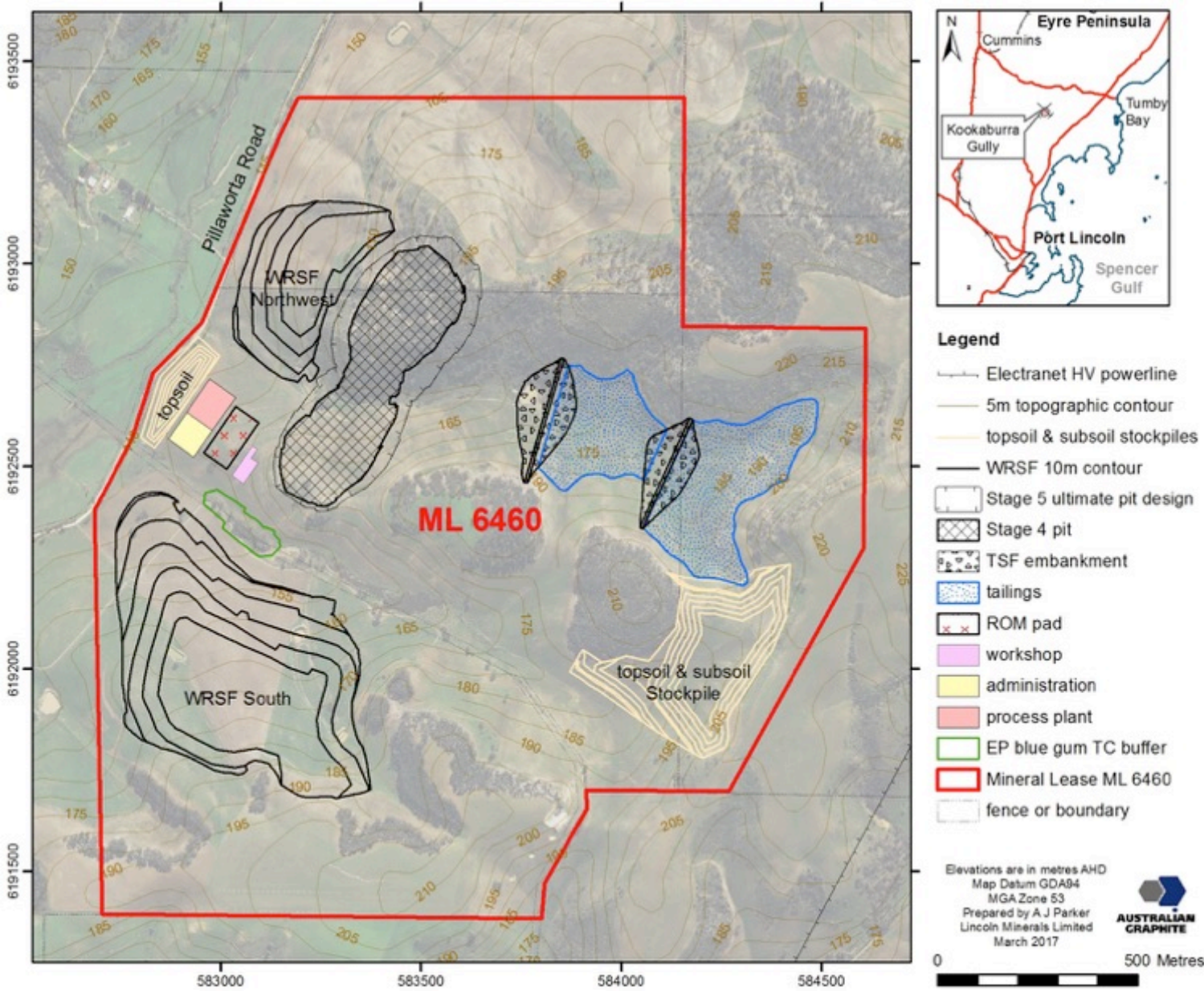
*TGC = Total Graphitic Carbon  
\* at 5% TGC cutoff*

*Under the microscope, Kookaburra Gully schist has an average graphite flake size of 350-500 microns*





# Mine design – pit & waste rock facilities



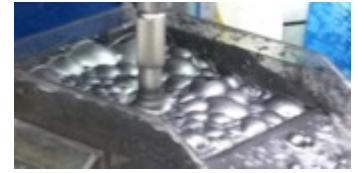
- Optimised pit shell, mine & waste rock facility design prepared by AMC Consultants
- Tailings storage facility design prepared by Golder Associates

## Next step:

- Finalise design as basis for description of operations in PEPR



# Mine design – pit development stages



- Mine optimisation supports an initial 4 stage mine based on current graphite prices
- Mine up to 250,000 tonnes ore per year
- Mine life will depend on progressive mine development & marketing strategy



# Metallurgical test-work & process plant design



- ▶ Inception Group supervised metallurgical test-work & prepared process plant design
- ▶ Comprehensive laboratory-scale test-work program undertaken by IMO Metallurgy – simple crush, grind, flotation, dry, screen & pack process
- ▶ Focus is on high purity, sub-100 micron products for high value specialty markets
- ▶ Lock-cycle tests confirm >90% recovery & concentrate grades >95% TGC
- ▶ Process flow sheet & OPEX prepared by Inception Group
- ▶ Process flow diagrams & CAPEX prepared by ammjohn

## Next steps:

- ▶ Review & undertake larger scale pilot plant tests (30-40 tonne sample)

Size Fraction ( $\mu\text{m}$ )	LMC 11 - Master Comp			LOX 1 - Oxide Comp		
	Mass	TC (%)	LOI (%)	Mass %	TC (%)	LOI (%)
500						
300	0.1%	93.20	96.00	0.4%	97.80	97.11
180	3.5%	93.20	96.00	5.2%	97.80	97.11
150	3.9%	95.80	97.22	4.7%	96.40	97.72
106	11.4%	96.60	97.46	14.8%	97.00	97.31
75	11.4%	96.70	97.41	12.7%	97.10	97.18
-75	69.7%	96.80	96.84	62.2%	93.80	94.52
Calc Head	100.0%	96.60	96.96	100.0%	95.04	95.57



# Transport logistics



- ▶ Tonkin Consulting undertook road route assessment, design & costing
- ▶ Recommended route is via Pillaworta Road & Bratten Way to Tumby Bay

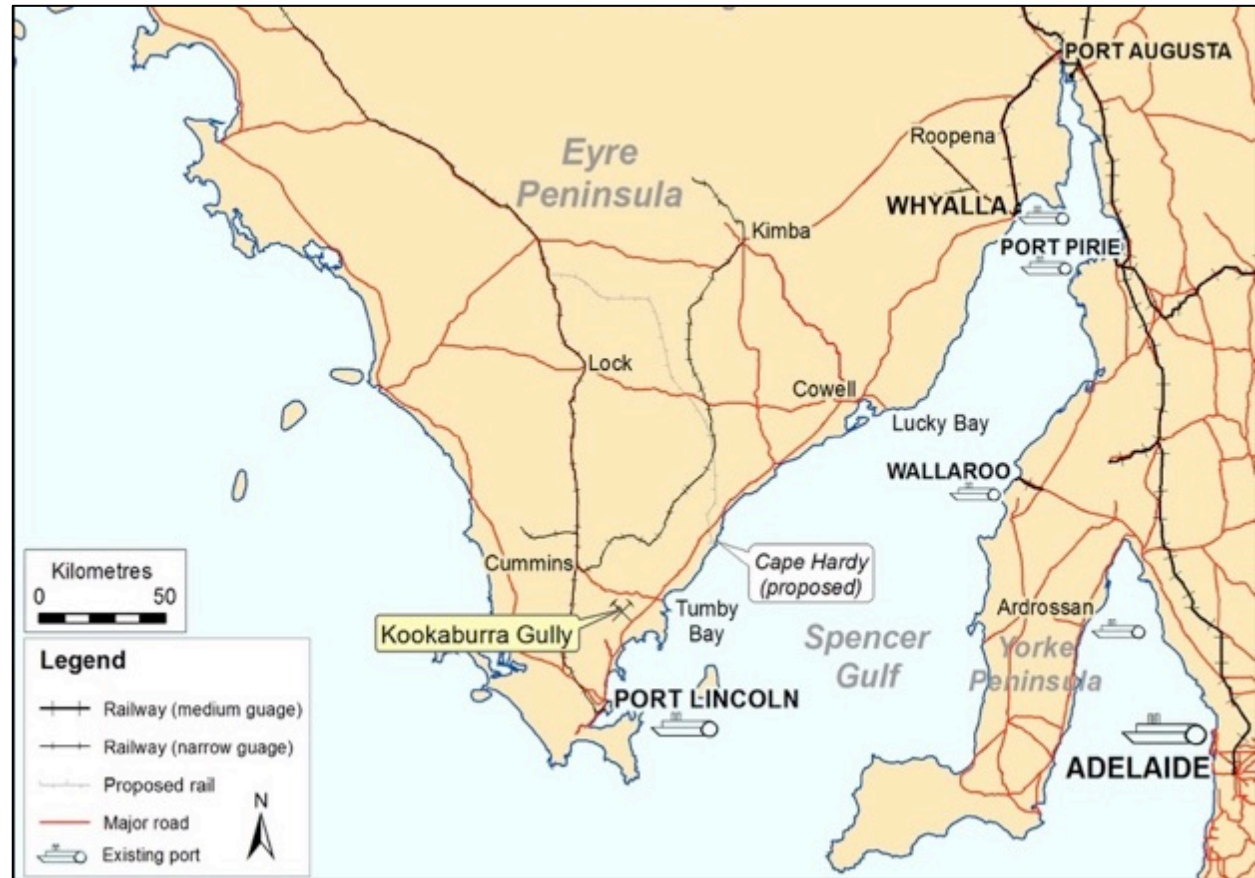
## Further work required to confirm export port & transport logistics

- ▶ Graphite concentrate in containers to Port Adelaide by road or road/rail
- ▶ Freight depot in Tumby Bay
- ▶ Bulk samples to China for pilot plant test-work

## Alternate ports:

Containers or bulka bags

- ▶ Port Lincoln (35 km)
- ▶ Whyalla
- ▶ Port Pirie
- ▶ (? Cape Hardy)



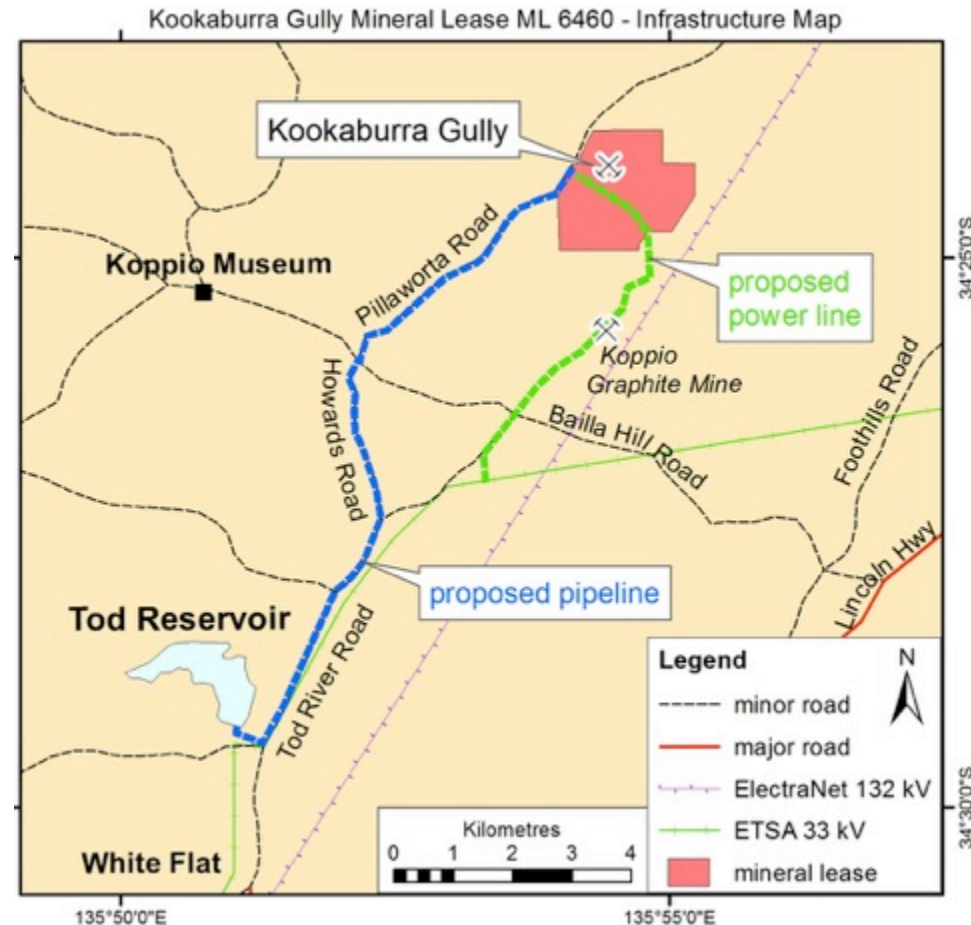
# Water & power supply options



Inside Infrastructure engaged to evaluate options for water supply and GPA  
Engineering engaged to prepare power supply options

## Recommendations:

- ▶ Raw water supply from Tod Reservoir - buried PVC pipeline along roadside
- ▶ Groundwater from on-site bores & pit dewatering for construction & to supplement supply during operations
- ▶ High quality water provided by desalination plant & rainwater harvesting
- ▶ standby potable connection from the SA Water network at Tod Reservoir
- ▶ HV grid connection via tee-off from the nearby 33 kV distribution network followed by a 5-6km overhead power line to the mine supply point



# Groundwater, surface water, fauna & flora



- ▶ CDM Smith engaged to:
  - design & install baseline groundwater & surface water monitoring program
  - undertake groundwater supply options assessment
  - water impact assessment, including groundwater model development and surface & groundwater impact assessment
- ▶ Monitoring bores & gauging stations installed, monitored & pump tests undertaken
- ▶ EBS Ecology & EBS Heritage engaged to do:
  - baseline survey work for the Mineral Lease & PEPR
  - baseline & orchid surveys for transport, power supply & water supply pipeline routes

## Next Steps

- ▶ Complete impact assessment studies for PEPR, site water management & infrastructure system design
- ▶ Update SEB offset calculation



*Pump tests at Kookaburra Gully in March 2017*



# Mine rehabilitation & closure plan



- ▶ Earth Systems & Golder Associates engaged to prepare the closure plan
- ▶ Earth Systems developed an environmental layer for the mine block model with specific attention to potential acid forming rock (PAF) & acid mine drainage (AMD) to form basis of progressive rehabilitation & mine closure plan
- ▶ The closure plan will incorporate care & maintenance and rehabilitation plans with input from all other consultants
- ▶ WRSFs and TSF will be restored to agricultural use and pit will become a lake

## Next Steps

- ▶ Review, finalise and incorporate into the PEPR



*Eyre Peninsula blue gums*

# Long term mine & resource potential



## Historic Koppio Graphite Mine

- ▶ Drilling, sampling, analysis & resource definition completed in 2014
- ▶ 1.85 Mt JORC Inferred Mineral Resource at 9.76% TGC (at 5% TGC cutoff)
- ▶ Next steps – undertake detailed metallurgy & establish process flow sheet

## Kookaburra Gully Extended:

- ▶ Large electromagnetic (EM) anomaly which extends 4-5 kilometres southwest of Kookaburra Gully
- ▶ First stage reconnaissance drilling completed in March 2017
- ▶ Drill sample analysis in progress

## Next steps:

- ▶ Detailed geological logging & interpretation of assay results
- ▶ Define Resource Model
- ▶ Undertake detailed metallurgical analysis
- ▶ Plan further drilling



# 2017 in a nutshell....



**With completion and approval of the PEPR in mid-2017**

**Kookaburra Gully to become....**

**SA's newest mine in one of the hottest global commodities  
and  
the only producing graphite mine in Australia  
in a soaring new era global market**

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## **Competent Person’s Statement**

Information in this presentation that relates to exploration activity, mineral resources and results was compiled by Dr A J Parker who is a Member of the Australasian Institute of Geoscientists. Dr. Parker is Managing Director of and has shares in Lincoln Minerals Limited. He has sufficient experience relevant to the styles of mineralisation and to the activities which are being presented to qualify as a Competent Person as defined by the JORC code, 2012. Dr. Parker consents to the release of the information compiled in this presentation in the form and context in which it appears.

# Kookaburra Gully & Koppio Mineral Resources



*Total combined Mineral Resources for Kookaburra Gully and Koppio*

Mineral Resource Classification	Cutoff Grade (% TGC)	Tonnes (Mt)	Grade (% TGC)	Contained Graphite (tonnes)	Density (g/cc)
<b>Kookaburra Gully</b>					
High-grade Core (Domain 1) - Indicated	5%	1.45	13.74	199,193	2.56
Low-grade Halo (Domain 2) – Indicated	2%	0.62	3.04	18,984	2.54
High-grade Core (Domain 1) – Inferred	5%	0.73	16.17	117,964	2.50
Low-grade Halo (Domain 2) – Inferred	2%	0.40	2.91	11,538	2.54
<b>Koppio</b>					
High-grade Core (Domain 1) – Inferred	5%	1.85	9.76	180,733	2.67
Low-grade Halo (Domain 2) – Inferred	2%	1.21	3.18	38,560	2.80
TOTAL (>2% TGC)		6.26	9.05	566,972	2.63

*Mt = million tonnes    TGC = Total Graphitic Carbon*

## Reference:

Lincoln Minerals 2016 Annual Report. *Lincoln Minerals Limited, ASX Announcement 30 September 2016.*

