



## ASX Announcement

5 September 2017

### COMPANY DETAILS

ABN: 62 147 346 334

### PRINCIPAL AND

E [info@parkwayminerals.com.au](mailto:info@parkwayminerals.com.au)

P +61 8 9479 5386

F +61 8 9475 0847

### ASX CODE

PWN

### FRANKFURT CODE

A1JH27

### OTC PINK CODE

PWNNY

### CORPORATE

### INFORMATION

5 September 2017

359M Ordinary shares

123M Partly paid shares

17M Listed Options

5M Unlisted options

### BOARD OF DIRECTORS

**Adrian Griffin**

(Non-Executive Chairman)

**Patrick McManus**

(Managing Director)

**Chew Wai Chuen**

(Non-Executive Director)

**Natalia Streltsova**

(Non-Executive Director)

## AMENDED ANNOUNCEMENT ON DINNER HILL PHOSPHATE PROCESS DESIGN

**Note** this announcement is an amendment to the release of 31 August 2017. It contains more detail on the sample selection, a Table 1 on sampling techniques and competent person statements in relation to sample selection and mineral processing

### Highlights

- **Simpler flowsheet offers lower capital and operating costs**
- **Recoveries ranged from 52% to 68% at a range of concentrate grades between 15 and 20% P<sub>2</sub>O<sub>5</sub>, with 1 stage of flotation and without grinding**
- **Process improvements identified that should enhance both recovery and grade**

Parkway Minerals NL (“PWN”, “Parkway” or “the Company”) is pleased to announce the results of independent testwork carried out to enhance the Company’s phosphate fertiliser flowsheet for the Dinner Hill project.

Dinner Hill is the flagship of the Dandaragan Trough (Figure 1). Previous work had outlined a large resource of both phosphate and glauconite both of which can be used for the manufacture of fertiliser products (refer ASX announcement 3 June 2015).

Dinner Hill is located in an area of high quality infrastructure, close to rail and export ports. The development plan is to start mining to produce single superphosphate as stage 1 and use Parkways patented K-Max® process to produce sulphate of potash (SOP), high magnesium SOP, alum and phosphoric acid as stage 2. This reduces risk, capital requirements and shareholder dilution.

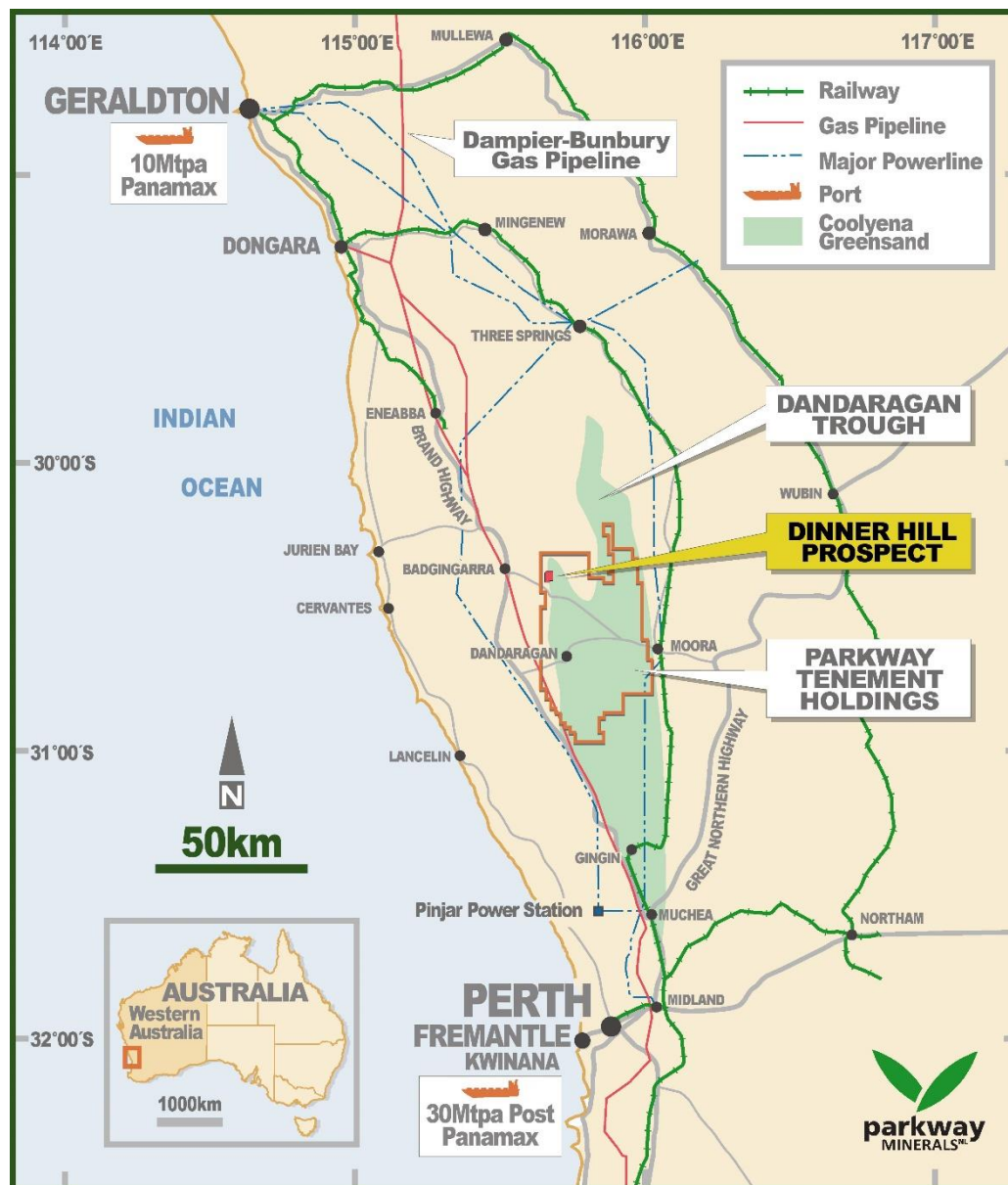


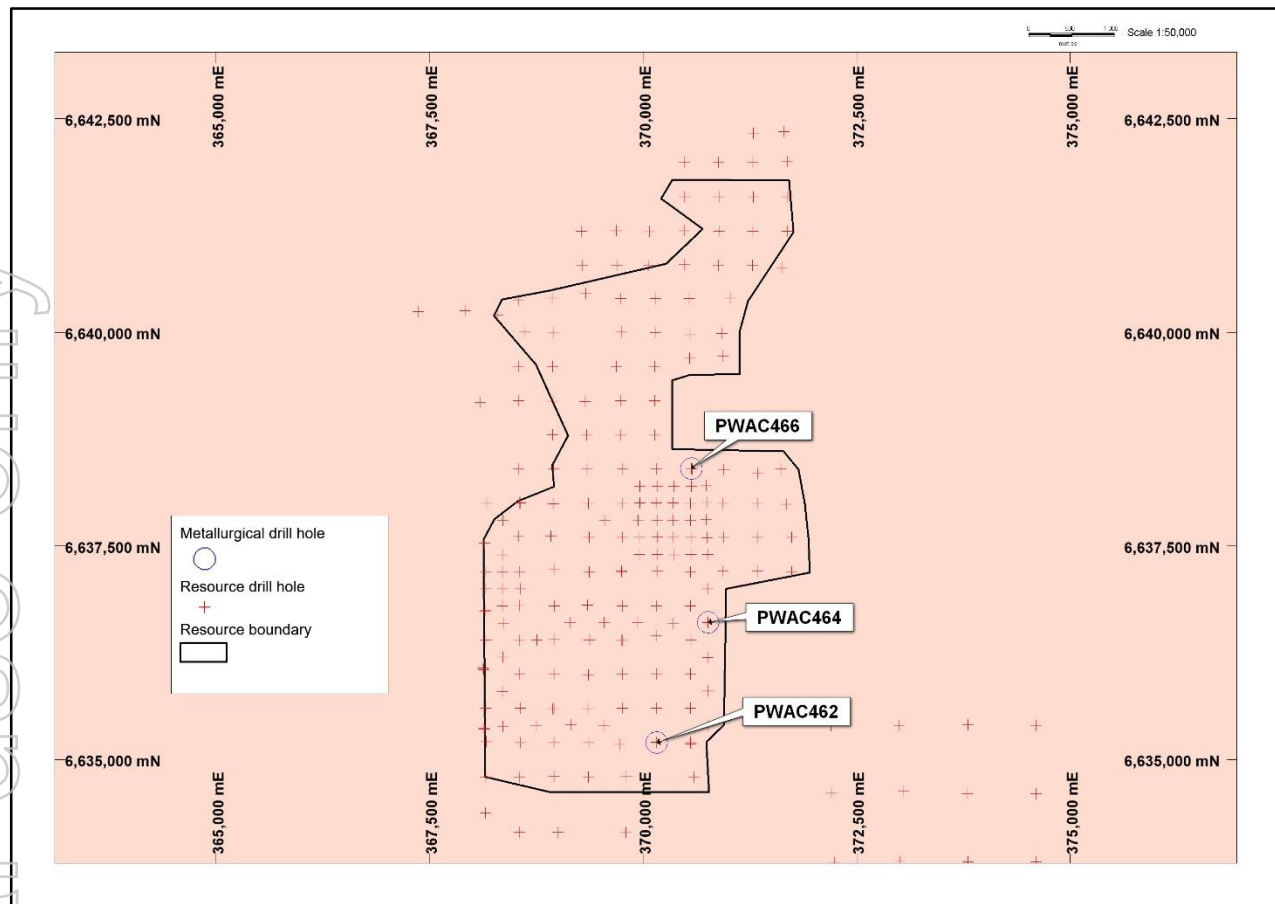
Figure 1: Dinner Hill Location

### Sample Selection

A composite sample of Molecap Greensand weighing 104 kilograms was selected for independent metallurgical testwork. The composite was comprised of 12, 1m drill samples collected from three NQ air core drill holes located within the resource area, see Figure 2. Samples were collected over 1m intervals from the drill rig cyclone directly into polythene sample bags. Individual bags were secured and labelled and transported to storage areas by Company personnel.

The three metallurgical drill holes were drilled as twin holes located within 5m of a drill hole used in the Mineral Resource estimate. The twins, or metallurgical drill holes, were visually logged to confirm the target lithology. The metallurgical drill hole was not assayed by PWN. Assay data from the twinned resource drill hole was used to estimate the geochemistry of the metallurgical drill hole.

It is considered that the samples collected for the testwork are spatially and lithologically representative of the target horizon, the Molecap Greensand.



**Figure 2: Location of metallurgical drill holes**

### Dinner Hill Pre-Feasibility Testwork

As part of the Pre-Feasibility testwork for Dinner Hill the flowsheet developed as part of the Scoping Study was reviewed, and opportunities to improve the process flowsheet were identified.

Testwork was initiated with KEMWorks, based in Central Florida, USA. KEMWorks is a company that is focused on phosphate mining, processing and project development ( website: <http://kemworks.com>). The testwork was aimed at identifying process improvements that could lead to increased Separation Efficiency and/or cost reductions.

Unfortunately the composite provided to KEMWorks was lower grade than the majority of the phosphate mineralisation, which makes direct comparisons with some of the earlier testwork difficult. Typically a lower grade feed leads to a lower recovery and/or lower concentrate grade.

In the scoping study test work, (ASX release 30 September 2015 “Scoping Study Results”) the processing regime, developed by Perth based consultants, Strategic Metallurgy comprised:

- beneficiation,
- grinding and
- flotation (Coarse and fine circuits, 2 sets of Roughers, 3 sets of Cleaners, 3 sets of Scavengers),

which resulted in a product grade of 28%  $P_2O_5$ , with a recovery of 60% from a feed grade of 2.9%  $P_2O_5$ .

Test work at KEMWorks utilizing only beneficiation and a simpler flotation regime (rougher) on only part of the feed, produced a grade of between 15 and 21%  $P_2O_5$  with recoveries between 52 and 68%, from a feed grade

of 1.8% P<sub>2</sub>O<sub>5</sub>. The testwork successfully utilized attrition scrubbing, which is a low energy process, to clean the phosphate mineral surfaces of clays, break loose weak inclusions or attached particles of impurities, and break up aggregates of clay-rich material, whilst minimizing generation of fines, which have proved difficult to separate efficiently in earlier work.

Identified flowsheet improvements (not tested) include:

- Selective size reduction, of coarse fractions, to enhance liberation,
- Further cleaning flotation stages
- Further scavenger flotation stages
- Investigation of reverse flotation, a fairly standard treatment for phosphate flotation

**Parkway Managing Director, Patrick McManus said** “The achievement of this separation performance is a step forward for the Dinner Hill phosphate project. More than 50% of the phosphate was recovered by simple attritioning and screening at Imm, at a grade of 15 to 20% P<sub>2</sub>O<sub>5</sub>. Selective size reduction of this coarse fraction and selective cleaner/scavenger flotation to improve grades should allow an improved overall recovery, whilst meeting our final grade targets of +28% P<sub>2</sub>O<sub>5</sub>. Elimination, or significant reduction in size, of a grinding circuit will have a strong impact on both capital and operating costs”.

#### **Next steps**

Now we have identified areas where we should see a marked improvement in separation, a larger, and more representative sample will be used for further testwork to explore the process improvements identified.

For further information contact:

Parkway Minerals NL:  
Patrick McManus  
Managing Director  
Tel: +61 (08) 9479 5386  
Email: [info@parkwayminerals.com.au](mailto:info@parkwayminerals.com.au)  
Web: [www.parkwayminerals.com.au](http://www.parkwayminerals.com.au)

#### **About Parkway Minerals**

*Parkway Minerals (ASX: PWN) is an exploration company focused on developing large greensand deposits in West Australia's Perth Basin. The Company aims to define a substantial resource base and investigate how best to recover phosphate, potash and other minerals from the Dandaragan Trough. The project is well situated in relation to infrastructure, with close access to rail, power and gas. A successful commercial outcome will allow the Company to become a major contributor to the potash and phosphate markets at a time of heightened regional demand.*

*The Company has a major land holding over one of the world's largest known glauconite deposits, with exploration licenses and applications covering an area of over 1,800km<sup>2</sup>. Previous exploration indicates glauconite sediments are widespread for more than 150km along strike and 30km in width. A pre-feasibility study is in progress for stage 1, production of phosphate fertilisers.*

*The company owns 26% of Davenport Resources, which owns a potash exploration project in the South Harz region of Thuringia, in Central Germany. The region has been a potash producing area for over 100 years.*

#### **Competent Person's Statements:**

*The information in this report that relates to exploration activities is based on information compiled by Lindsay Cahill, who is a member of the Australian Institute of Geoscientists. Mr. Cahill is a consultant to the mining*

*industry, and has sufficient experience relevant to the style of mineralisation and type of deposit under consideration. He is qualified as a Competent Person as defined in the 2012 edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. This report is issued with Mr. Cahill's consent as to the form and context in which the exploration results appears.*

*The metallurgical information in this report relating to work done at KEMWorks is based on information compiled by Dr. Francisco J. Sotillo, CIP, PhD, who is a Member of SME and a Qualified Professional in Metallurgy/Processing of the Mining and Metallurgical Society of America (MMSA) under the National Instrument 43-101 (NI 43-101), Section 1.5. Dr. Sotillo has sufficient experience relevant 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. Sotillo is a consultant to the mining industry and a consultant to KEMWorks. This report is issued with Dr. Sotillo's consent as to the form and context in which the results appear.*

# Attachments

## Appendix 1: JORC Code 2012 Edition – Table 1

## Appendix 2: Sample Drill Hole Location

### APPENDIX 1 - JORC CODE, 2012 EDITION – TABLE 1

#### Section 1 Sampling Techniques and Data

Criteria	JORC Code Explanation	Commentary
<b>Sampling techniques</b>	<ul style="list-style-type: none"> <li>Nature and quality of sampling (eg 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.</li> <li>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</li> <li>Aspects of the determination of mineralisation that are Material to the Public Report.</li> <li>In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3kg was pulverised to produce a 30g 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 (eg submarine nodules) may warrant disclosure of detailed information.</li> </ul>	<ul style="list-style-type: none"> <li>Samples for metallurgical programs were obtained from NQ air core drill holes drilled as a twin hole (within 5m) of a Mineral Resource drill hole.</li> <li>Metallurgical drill holes were visually logged to confirm the lithology of the target samples.</li> <li>Metallurgical drill holes were not assayed and not used in the estimation of Mineral Resources</li> <li>Lithological and assay data from the primary mineral resource NQ air core drill hole was used to inform the target sample selection intervals for the metallurgical drill hole</li> </ul>
<b>Drilling techniques</b>	<ul style="list-style-type: none"> <li>Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg 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)</li> </ul>	<ul style="list-style-type: none"> <li>Vertical NQ Air-core</li> </ul>
<b>Drill sample recovery</b>	<ul style="list-style-type: none"> <li>Method of recording and assessing core and chip sample recoveries and results assessed.</li> <li>Measures taken to maximise sample recovery and ensure representative nature of the samples.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>Clay content of moist greensands ensured acceptable recovery and retention of all size fractions;</li> <li>Holes were conditioned at completion and cyclone opened and cleaned before the next hole was drilled.</li> </ul>
<b>Logging</b>	<ul style="list-style-type: none"> <li>Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral</li> </ul>	<ul style="list-style-type: none"> <li>Lithological and assay data from the primary mineral resource NQ air core drill hole was used to inform the target</li> </ul>



Criteria	JORC Code Explanation	Commentary
	<p>Resource estimation, mining studies and metallurgical studies.</p> <ul style="list-style-type: none"> <li>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.</li> <li>The total length and percentage of the relevant intersections logged.</li> </ul>	sample selection intervals for the metallurgical drill hole
<b>Sub-sampling techniques and sample preparation</b>	<ul style="list-style-type: none"> <li>If core, whether cut or sawn and whether quarter, half or all core taken.</li> <li>If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.</li> <li>For all sample types, the nature, quality and appropriateness of the sample preparation technique.</li> <li>Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.</li> <li>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.</li> <li>Whether sample sizes are appropriate to the grain size of the material being sampled.</li> </ul>	<ul style="list-style-type: none"> <li>The total sample return for each metre of advance was collected direct from the drill rig cyclone into a plastic bag.</li> </ul>
<b>Quality of assay data and laboratory tests</b>	<ul style="list-style-type: none"> <li>The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.</li> <li>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.</li> <li>Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.</li> </ul>	<ul style="list-style-type: none"> <li>Metallurgical holes were not assayed</li> <li>The twinned resource drill hole had sample analysis by Genalysis Laboratory Services Pty Ltd by Phosphate Major Element Suite FB1 method (XRF after lithium borate fusion).</li> </ul>
<b>Verification of sampling and assaying</b>	<ul style="list-style-type: none"> <li>The verification of significant intersections by either independent or alternative company personnel.</li> <li>The use of twinned holes.</li> <li>Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</li> <li>Discuss any adjustment to assay data.</li> </ul>	<ul style="list-style-type: none"> <li>Sampling and visual confirmation of target horizons supervised by company geologist.</li> </ul>
<b>Location of data points</b>	<ul style="list-style-type: none"> <li>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.</li> <li>Specification of the grid system used.</li> <li>Quality and adequacy of topographic control.</li> </ul>	<ul style="list-style-type: none"> <li>Holes located by hand held GPS.</li> <li>Grid MGA_GDA94, Zone 50.</li> <li>Elevation data is based on a topographic contour set produced from SRTM imagery at 5m vertical resolution.</li> </ul>
<b>Data spacing and distribution</b>	<ul style="list-style-type: none"> <li>Data spacing for reporting of Exploration Results.</li> <li>Whether the data spacing and distribution is sufficient to establish the degree of</li> </ul>	<ul style="list-style-type: none"> <li>Not relevant – holes not used for Mineral Resource estimation</li> </ul>

Criteria	JORC Code Explanation	Commentary
	geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied. <ul style="list-style-type: none"> <li>Whether sample compositing has been applied.</li> </ul>	
<b>Orientation of data in relation to geological structure</b>	<ul style="list-style-type: none"> <li>Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>Vertical drilling through virtually horizontal stratigraphy resulted in intersected thicknesses equivalent to true thickness.</li> </ul>
<b>Sample security</b>	<ul style="list-style-type: none"> <li>The measures taken to ensure sample security.</li> </ul>	<ul style="list-style-type: none"> <li>Samples bagged and labelled by Parkway Minerals NL personnel.</li> <li>Samples transported to laboratory by approved commercial contractor.</li> </ul>
<b>Audits or reviews</b>	<ul style="list-style-type: none"> <li>The results of any audits or reviews of sampling techniques and data.</li> </ul>	<ul style="list-style-type: none"> <li>Historical sample techniques, logs, and data reviewed positively by independent consultant geologist.</li> </ul>

## Section 2 Reporting of Exploration Results

Criteria	JORC Code Explanation	Commentary
<b>Mineral tenement and land tenure status</b>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>E70/3987 is held and operated by Parkway Minerals NL</li> <li>The drilling in E70/3987 is located on private freehold land owned and compensation agreements have been signed, with the mineral sub-surface rights subsequently being granted both above and below 30m below surface.</li> </ul>
<b>Exploration done by other parties</b>	<ul style="list-style-type: none"> <li>Acknowledgment and appraisal of exploration by other parties.</li> </ul>	<ul style="list-style-type: none"> <li>Exploration for phosphate in the Dandaragan Trough dates back to the 1940's.</li> </ul>
<b>Geology</b>	<ul style="list-style-type: none"> <li>Deposit type, geological setting and style of mineralisation.</li> </ul>	<ul style="list-style-type: none"> <li>The phosphate is present as fluorapatite nodules and grains concentrated within particular horizons of horizontal greensand and chalk formations;</li> <li>The potash is present as the mineral glauconite, which is a major constituent of the Molecap and Poison Hill Greensands and a minor constituent of the Gingin Chalk.</li> </ul>
<b>Drill hole Information</b>	<ul style="list-style-type: none"> <li>A summary of all information material to the understanding of the exploration results including a tabulation of</li> </ul>	<ul style="list-style-type: none"> <li>See Appendix 2.</li> </ul>



Criteria	JORC Code Explanation	Commentary
	<p>the following information for all Material drill holes:</p> <ul style="list-style-type: none"> <li>○ easting and northing of the drill hole collar</li> <li>○ elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar</li> <li>○ dip and azimuth of the hole</li> <li>○ down hole length and interception depth</li> <li>○ hole length.</li> <li>• If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.</li> </ul>	
<b>Data aggregation methods</b>	<ul style="list-style-type: none"> <li>• In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.</li> <li>• 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.</li> <li>• The assumptions used for any reporting of metal equivalent values should be clearly stated.</li> </ul>	<ul style="list-style-type: none"> <li>• Not relevant – holes not used for Mineral Resource estimation</li> </ul>
<b>Relationship between mineralisation widths and intercept lengths</b>	<ul style="list-style-type: none"> <li>• These relationships are particularly important in the reporting of Exploration Results.</li> <li>• If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.</li> <li>• If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').</li> </ul>	<ul style="list-style-type: none"> <li>• Vertical drilling through virtually horizontal stratigraphy resulted in intersected thicknesses equivalent to true thickness.</li> </ul>
<b>Diagrams</b>	<ul style="list-style-type: none"> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• Diagrams are included in the report.</li> </ul>
<b>Balanced reporting</b>	<ul style="list-style-type: none"> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• Not relevant – holes not used for Mineral Resource estimation</li> </ul>
<b>Other substantive</b>	<ul style="list-style-type: none"> <li>• Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical</li> </ul>	<ul style="list-style-type: none"> <li>• There is no unreported substantive exploration data.</li> </ul>

Criteria	JORC Code Explanation	Commentary
<b>exploration data</b>	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.	
<b>Further work</b>	<ul style="list-style-type: none"> <li>The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).</li> <li>Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.</li> </ul>	<ul style="list-style-type: none"> <li>Additional metallurgical sampling will be undertaken as necessary</li> </ul>

## APPENDIX 2 – DRILL HOLE LOCATION DETAILS

- Grid is GDA 94 Zone 50
- All holes are driller vertical
- Collar coordinates determined by hand held GPS

Hole	East (m)	North (m)	RL (m)	RL (m)
PWAC462	370,155	6,635,202	345	33
PWAC464	370,758	6,636,607	357	42
PWAC466	370,566	6,638,405	365	40