

8 February 2018

## Agrimin Limited (AMN)

**BUY**

**Share Price: A\$0.80**

### Agrimin's competitive advantage

**Target Price:**

**A\$1.26**

Australia is well endowed with sulphate of potash (SOP) brine deposits. Whilst these projects display a wide range of strengths and weaknesses, it is our view that Agrimin's Lake Mackay project is the most technically robust and faces least technical risk. Agrimin's large resource and extensive lake surface area allows the deposit to be solely exploited using low cost trenches and unlined evaporation ponds. Projects reliant on bores rather than trenches, and lined ponds, rather than unlined ponds face higher capital and operating costs which Agrimin is able to avoid. Agrimin is BUY rated with a TP of A\$1.26/sh.

#### Largest Lake Surface Area

- Lake Mackay has the largest lake surface (350kha) of any ASX, SOP developer. This allows a larger trench network, unlined ponds, higher SOP production & lower costs.

#### Trenches vs Bores

- Trenching is a low cost method to extract brines from shallow deposits. Compared to bores, trenching is less than half the capex and nearly a tenth of the opex for an equivalent volume of brine. Agrimin and Reward have the only projects that will solely use trenching.

#### Lined vs Unlined Evaporation Ponds

- Studies by Salt Lake Potash estimate the costs of lined ponds at A\$10.5/m<sup>2</sup> and unlined ponds at A\$1.6/m<sup>2</sup>. Unlined ponds are used by all of the major existing SOP producers including SDIC Xinjiang Luo Bupo and Compass Minerals.
- Kalium Lakes is the only developer proposing to construct lined ponds which is likely to increase the capital intensity of the project relative to unlined projects.

#### Transport to Port

- SOP brine deposits require large, closed and arid basins to form. Consequently, they form in the interior of continents (think Tibetan Plateau, Western Andes or Australian Interior) and therefore they are long distances from port infrastructure.
- ASX listed developers are located between 862km and 2,000km from port infrastructure (Kalium Lakes and Agrimin respectively).
- Using simplistic transport costs for unsealed roads @ A\$0.15/t/km, sealed roads @ A\$0.11/t/km and rail @ A\$0.04/t/km; Salt Lake Potash has the lowest transport costs and Reward Minerals has the highest.

**Price Target (1xP/NPV) of A\$1.26/sh**

#### Company Data

Shares – ordinary (M)	156
Market capitalisation (\$M)	125
12 month low/high (\$)	0.43 / 1.02
Average monthly turnover (\$M)	0.9
Index	Materials

#### Financial Summary (fully diluted/normalised)

Year end June	2020F	2021F	2022F	2023F	2024F
Revenue (\$M)	0	109	145	254	291
Costs (\$M)	1	100	134	139	141
EBITDA (\$M)	-1	8	11	114	149
NPAT (\$M)	-3	-19	-21	43	71
EPS (¢ps)	-2.2	-12.2	-13.6	12.3	20.3
PER (x)	na	na	na	7	4
Cashflow (\$M)	-3	-4	-3	73	103
CFPS (¢ps)	-2	-3	-2	21	29
PCFPS (x)	na	na	na	4	3
Enterprise Value (\$M)	236	293	305	240	146
EV / EBITDA (x)	-281	37	28	2	1
Dividends (¢ps)	0	0	0	0	0
Yield (%)	0	0	0	0	0

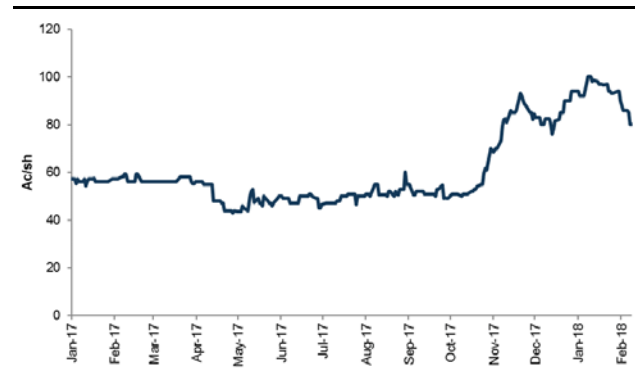
#### Director

#### Position

#### Executive

Brad Sampson	Chairman	Non-Executive
Mark Savich	CEO	Executive
Alec Pismiris	Company Secretary	Non-Executive

#### AMN – performance over one year



#### Disclosure and Disclaimer

This report must be read with the disclosure and disclaimer on the final page of this document.

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# Analysis

## Agrimim Limited (AMN)

8-Feb-18  
Year End June

Share Price	(\$)	A\$0.80
Iss. Shares	(M)	156.1
Dilution	(M)	195.0
Fully Diluted	(M)	351.1
Mkt Cap.	(\$M)	A\$125M

PROFIT & LOSS		2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F
Revenue	ASM	0	0	0	109	146	254	291	291
Operating Costs	ASM	0	0	0	100	134	139	141	141
Exploration	ASM	0	0	0	0	0	0	0	0
Other	ASM	5	1	1	1	1	1	1	1
<b>EBITDA</b>	<b>ASM</b>	<b>(5)</b>	<b>(1)</b>	<b>(1)</b>	<b>8</b>	<b>11</b>	<b>114</b>	<b>149</b>	<b>149</b>
D&A	ASM	0	0	0	15	18	29	31	29
<b>EBIT</b>	<b>ASM</b>	<b>(5)</b>	<b>(1)</b>	<b>(1)</b>	<b>(7)</b>	<b>(7)</b>	<b>85</b>	<b>117</b>	<b>120</b>
Net Interest	ASM	(0)	(2)	4	20	23	23	16	6
<b>Pre-Tax Profit</b>	<b>ASM</b>	<b>(5)</b>	<b>1</b>	<b>(5)</b>	<b>(27)</b>	<b>(30)</b>	<b>62</b>	<b>102</b>	<b>114</b>
Tax	ASM	(1)	0	(1)	(8)	(9)	19	31	34
<b>Net Profit</b>	<b>ASM</b>	<b>(3)</b>	<b>0</b>	<b>(3)</b>	<b>(19)</b>	<b>(21)</b>	<b>43</b>	<b>71</b>	<b>80</b>
Abnormal	ASM	0	0	0	0	0	0	0	0
<b>Reported Profit</b>	<b>ASM</b>	<b>(3)</b>	<b>0</b>	<b>(3)</b>	<b>(19)</b>	<b>(21)</b>	<b>43</b>	<b>71</b>	<b>80</b>
Dividends Paid	ASM	0	0	0	0	0	0	0	0
Adjustments	ASM	0	0	0	0	0	0	0	0

Resource		2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F
<b>Lake Mackay</b>									
Volume (Mm3)	M m3			44,088					
SOP Grade (K2SO4)	kg/m3			8.25					
Specific Yield (%)	%			6%					
Contained SOP (kt)	Mt			23,278					

CASHFLOW		2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F
Net Op Cash Flow	ASM	(5)	(1)	(1)	8	11	114	149	149
Net Interest	ASM	0	2	(4)	(20)	(23)	(23)	(16)	(6)
Tax Paid	ASM	1	(0)	1	8	9	(19)	(31)	(34)
<b>Op Cash Flow</b>	<b>ASM</b>	<b>(3)</b>	<b>0</b>	<b>(3)</b>	<b>(4)</b>	<b>(3)</b>	<b>73</b>	<b>103</b>	<b>109</b>

REVENUE		2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F
Lake Mackay	ASM	0	0	0	109	146	254	291	291
<b>Total</b>	<b>ASM</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>109</b>	<b>146</b>	<b>254</b>	<b>291</b>	<b>291</b>

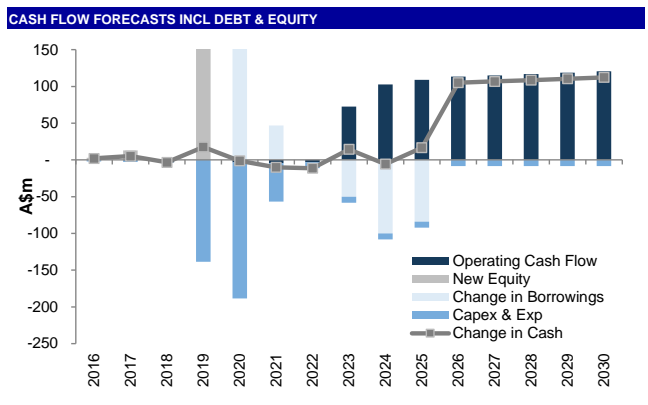
OPERATING COSTS		2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F
Site Processing	ASM	0	0	0	35	47	47	47	47
G&A	ASM	0	0	0	7	9	9	9	9
Transport	ASM	0	0	0	53	71	71	71	71
C1 Cash Cost	ASM	0	0	0	95	127	127	127	127
Royalties	ASM	0	0	0	5	7	13	15	15
Corporate	ASM	0	0	0	2	2	2	2	2
<b>Total</b>	<b>ASM</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>108</b>	<b>144</b>	<b>150</b>	<b>151</b>	<b>151</b>

CAPEX		2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F
Project	ASM	0.0	138.8	185.0	46.3	0.0	0.0	0.0	0.0
SIBC	ASM	0.0	0.0	0.0	6.2	8.3	8.3	8.3	8.3
<b>Total</b>	<b>ASM</b>	<b>0.0</b>	<b>138.8</b>	<b>185.0</b>	<b>52.5</b>	<b>8.3</b>	<b>8.3</b>	<b>8.3</b>	<b>8.3</b>

BALANCE SHEET		2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F
Cash	ASM	5	23	22	12	0	15	9	26
Other Current	ASM	5	5	5	5	5	5	5	5
<b>Cur Assets</b>	<b>ASM</b>	<b>10</b>	<b>28</b>	<b>27</b>	<b>17</b>	<b>6</b>	<b>20</b>	<b>14</b>	<b>31</b>
Fixed Assets	ASM	0	139	324	376	385	393	401	409
Exploration	ASM	5	5	5	5	5	5	5	5
Other	ASM	0	0	0	0	0	0	0	0
<b>Non Cur Assets</b>	<b>ASM</b>	<b>5</b>	<b>144</b>	<b>329</b>	<b>382</b>	<b>390</b>	<b>398</b>	<b>406</b>	<b>415</b>
<b>Total Assets</b>	<b>ASM</b>	<b>16</b>	<b>172</b>	<b>356</b>	<b>398</b>	<b>395</b>	<b>418</b>	<b>421</b>	<b>446</b>
Borrowings	ASM	0	0	0	0	0	0	0	0
Payables	ASM	1	1	1	1	1	1	1	1
Other	ASM	0	0	0	0	0	0	0	0
<b>Cur Liab</b>	<b>ASM</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
Borrowings	ASM	0	0	187	234	234	184	84	0
Provisions	ASM	0	0	0	0	0	0	0	0
Other	ASM	0	0	0	0	0	0	0	0
<b>Non Cur Liab</b>	<b>ASM</b>	<b>0</b>	<b>0</b>	<b>187</b>	<b>234</b>	<b>234</b>	<b>184</b>	<b>84</b>	<b>0</b>
<b>Total Liabilities</b>	<b>ASM</b>	<b>1</b>	<b>1</b>	<b>188</b>	<b>235</b>	<b>235</b>	<b>185</b>	<b>85</b>	<b>1</b>
<b>Total Equity</b>	<b>ASM</b>	<b>15</b>	<b>171</b>	<b>168</b>	<b>164</b>	<b>161</b>	<b>233</b>	<b>336</b>	<b>445</b>

ASSUMPTIONS		2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F
Exchange Rate	AS/US\$	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Interest Paid	%	5%	5%	5%	5%	5%	5%	5%	5%
Interest Rec	%	2%	2%	2%	2%	2%	2%	2%	2%
Diesel Price	AS/L	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Gas Price	\$/GJ	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
SOP Price	US\$/t	550	550	550	550	550	550	550	550
SOP Price	AS/t	786	786	786	786	786	786	786	786

RATIO ANALYSIS		2018F	2019F	2020F	2021F	2022F	2023F	2024F	2025F
EPS	¢	(2.1)	0.2	(2.2)	(12.2)	(13.6)	12.3	20.3	22.7
PER	x	na	323.9	na	na	na	6.5	3.9	3.5
EPS Growth	%	266	(112)	(976)	463	12	(191)	65	12
CFPS	¢	(2.1)	0.2	(2.2)	(2.7)	(1.9)	20.7	29.3	31.0
PCFR	x	na	323.9	na	na	na	3.9	2.7	2.6
DPS	¢	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yield	%	0%	0%	0%	0%	0%	0%	0%	0%
Payout Ratio	%	0%	0%	0%	0%	0%	0%	0%	0%
Gearing ND/E	%	-34%	-13%	99%	136%	145%	73%	22%	-6%
Interest Cover	x	22.3	0.7	na	na	na	3.7	7.6	21.2
EBITDA Margin	%	na	na	na	7.4	7.6	45.0	51.2	51.2
EBIT Margin	%	na	na	na	(6.1)	(5.0)	33.4	40.4	41.2
Return On Assets	%	(31.6)	(0.7)	(0.2)	(1.7)	(1.8)	20.3	27.9	26.8
Eff Tax rate	%	30%	30%	30%	30%	30%	30%	30%	30%



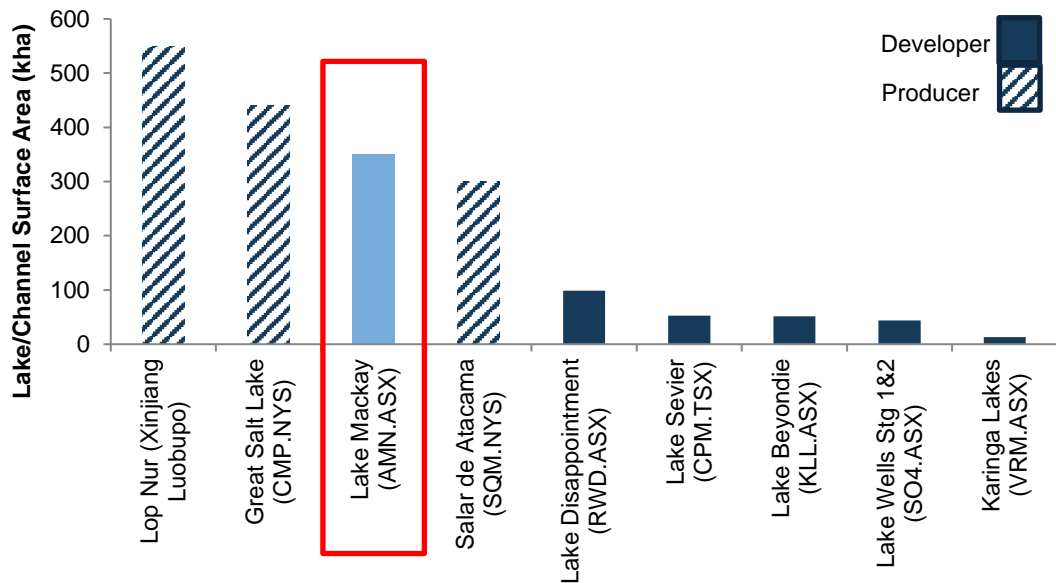
NPV (+1Yr)		ASM	AS/sh.
Lake Mackay		334	\$ 0.95
Corporate costs		-6	\$ (0.02)
Net Cash (Debt)		114	\$ 0.33
<b>Total</b>		<b>443</b>	<b>\$ 1.26</b>

Source: Petra Capital

## Lake Surface Area

Lake Mackay's surface area of 350kha is comparable to some of the world's largest SOP brine projects such as the Great Salt Lake (440kha) and is larger than the Salar de Atacama (300kha) (Figure 1). A large surface area is not only indicative of a large resource, but if combined with a near surface water table, allows trenching over bores to extract the mineral rich brines and enables the construction of on-lake, unlined ponds. In the longer term, a larger lake surface area increases the production capacity of a salt lake.

**Figure 1: Lake Surface Area**



Source: Company Reports, Petra Capital

## Trenches vs Bores

Agrimin and Reward Minerals are the only two ASX listed projects that are able to extract brine solely from the low opex trenching method whereas other projects are reliant on bores (Figure 2).

**Figure 2: Extraction Method**

Extraction Method	KLL	AMN	RWD	SO4	APC
Trenches	✓	✓	✓	✓	X
Bores	✓	X	X	✓	✓

Source: Company Reports, Petra Capital

Lake Mackay is ideally suited to trenching with 42% of the deposit within 6m of the surface, with the balance within 6-25m of the surface. A deeper resource would require pumping from a series of wells. Trenching is the preferred method of brine extraction and is undertaken and planned at numerous SOP projects around the world including the world’s largest operation; SDIC Xinjiang Luobupo Potash at Lop Nur, China. Trenching is of low capital intensity and low technical risk. We compare the opex and capex costs for trenches and wells below (Figure 3).

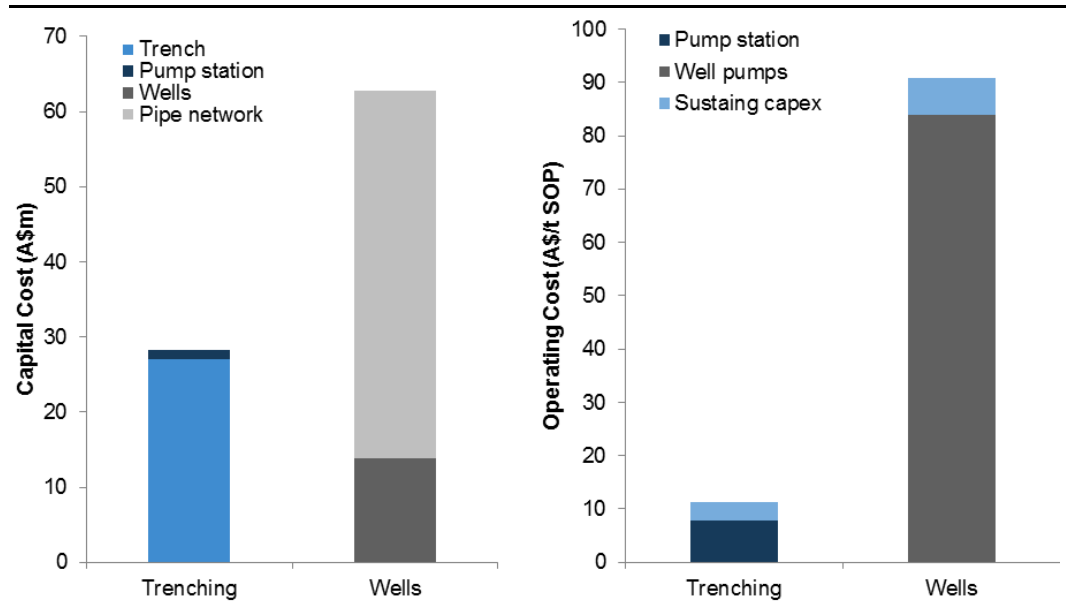
**Capital cost between trenching and wells**

For the purposes of illustrating the capital intensity difference between trenching and wells, we compare the capital intensity of two hypothetical operations, each extracting 66.5GLpa (Figure 4 and Figure 5). This analysis shows that well-based operations are more than 4.2 times more capital intensive than trenching. Not only do they require a large network of extraction wells but each 10kW submersible pump needs to be connected to an extensive network of pipes which accounts for the majority of the capital cost.

**Operating cost between trenching and wells**

Using the same hypothetical project characteristics, the operational costs for brine extraction is 7.7 times more expensive for well based operations than for trench based operations (Figure 6 and Figure 7). A trench based network only requires a single 1,000kW pumping station, versus a network of 110, 10kW pumps with a combined 11,000kW draw.

**Figure 3: Opex and capex comparison between trenches and wells**



Source: Company Reports, Petra Capital

**Figure 4: Capex – trenching brine extraction method**

Trenching Capital Cost	A\$m	Per Unit
250km, 6m deep trench	A\$27m	A\$0.1/km
Pump station	A\$1.3m	A\$1.3m
<b>Total</b>	<b>A\$28m</b>	<b>A\$76/t SOP capacity</b>

Source: Petra Capital, Company Reports

**Figure 5: Capex – well brine extraction method**

Wells Capital Cost	A\$m	Per Unit
110 wells, 100m deep	A\$14m	A\$0.13m/well
250km pipeline network	A\$49m	A\$0.20m/km
<b>Total</b>	<b>A\$63m</b>	<b>A\$170/t SOP capacity</b>

Source: Petra Capital, Company Reports

**Figure 6: Opex – trenching brine extraction method**

Operating Cost	A\$m	Per Unit
Pump station 1,000kW	A\$2.9mpa	A\$7.8/t SOP
Sustaining Capex	A\$1.3mpa	A\$3.5/t SOP
<b>Total</b>	<b>A\$4.4mpa</b>	<b>A\$11.9/t SOP</b>

Source: Petra Capital, Company Reports

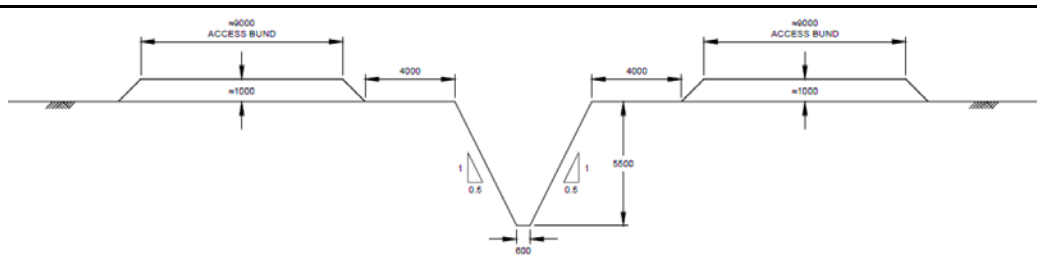
**Figure 7: Opex – well brine extraction method**

Operating Cost	A\$m	Per Unit
11,000kW	A\$31.4mpa	A\$84.0/t SOP
Sustaining Capex	A\$2.5mpa	A\$6.8/t SOP
<b>Total</b>	<b>A\$33.9mpa</b>	<b>A\$91.6/t SOP</b>

Source: Petra Capital, Company Reports

A schematic of the Lake Mackay trench design is displayed in Figure 8 and proposed construction method demonstrated in Figure 9. Agrimin propose a 250km network of trenches to extract 66.5GL of brine per year. Each trench will be 5.5m deep and have a 2.25m width at surface narrowing to 0.6m at the base. The slope angle helps provide stability to the walls and the surrounding bunds provide access tracks for service vehicles and prevent fresh water inflows during rain events. Similarly, with other trench based salt lake operations, the trenches will be regularly inspected to monitor and maintain the network.

**Figure 8: Trench schematic**



Source: Company Reports

**Figure 9: Trench construction**



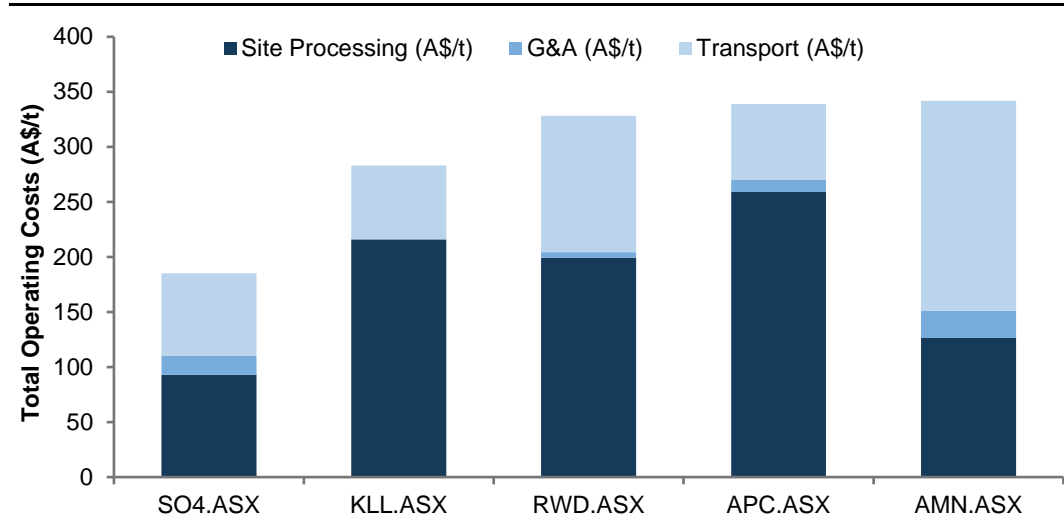
Source: Company Reports

## Operating and Capital Costs

Agrimin has very competitive site processing costs due to its shallow brine resource being amenable to trench extraction (Figure 10) but the scoping study's transport costs of A\$190/t give the operation the highest overall total operating costs. It is our view that these haulage costs are conservative, and are likely to be revised lower through improved haulage studies.

Agrimin has the median capital intensity of its peer group (Figure 11) but has the highest capital costs. We believe Agrimin's capital cost estimates to be conservative in comparison to its peers as it is able to construct unlined ponds and does not require a bore field for brine extraction.

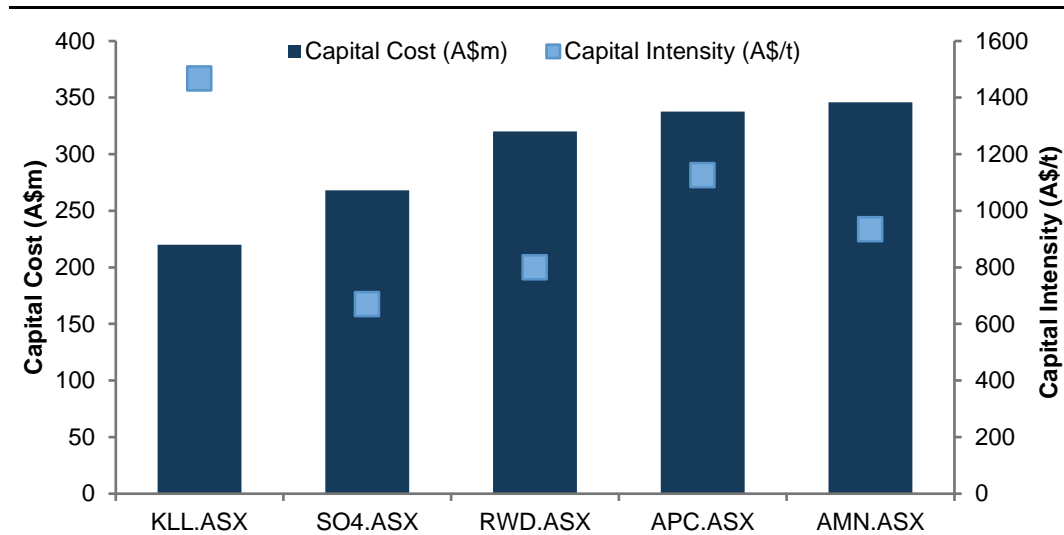
**Figure 10: Total Operating Costs (A\$/t)**



Source: Company Reports, Petra Capital

AMN SS @370ktpa, APC SS @300ktpa, KLL PFS @150ktpa, RWD SS @400ktpa, SO4 SS @400ktpa

**Figure 11: Capital Costs (A\$m)**



Source: Company Reports, Petra Capital

AMN SS @370ktpa, APC SS @300ktpa, KLL PFS @150ktpa, RWD SS @400ktpa, SO4 SS @400ktpa

## Lined vs Unlined Ponds

Extracted SOP rich brine is placed into a series of evaporation ponds, which are utilised as a low cost method to concentrate the brine from ~0.5% K to ~8.0% K. ASX listed developers are proposing a variety of construction methods for their pond systems;

- **On/Off Lake** – Projects such as Lake Mackay and Lake Disappointment (RWD.ASX) have large, flat, impermeable lake surface areas which are ideally suited to the construction of unlined ponds on the lake surface. Other projects, such as Lake Beyondie (KLL.ASX) have much smaller lake surface areas which requires the ponds to be located off the lake. Off-lake construction requires significant earthworks to flatten large areas of land; these are also likely to require lined ponds.
- **Lined/Unlined** – Projects that construct on lake ponds do not require their ponds to be lined. Some seepage can be experienced through the lake but it is generally immaterial for three key reasons; 1) high clay content in near-surface sediments means the lake surface is generally impermeable and; 2) precipitating salts decrease the permeability of the lake surface area and; 3) the lake's water table interacts with the ponds reducing seepage. Lining ponds significantly adds to material and labour costs during construction.

Established SOP brine producers including SDIC Xinjiang Luo Bupo, Qinghai Bindi and Compass Minerals all use on-lake, unlined ponds. It is also possible to construct unlined ponds and seal the perimeter by installing a bentonite dyke, Compass Minerals has recently undertaken this work at Great Salt Lakes costing US\$40m in capital.

We prefer Agrimin for the favourable lake sediments and surface area which allows an unlined pond network. Salt Lake Potash recently undertook field trials testing on-lake, unlined ponds which is also possible at its Goldfields Salt Lakes Project. Salt Lake Potash was able to conclude that unlined ponds cost ~A\$1.6/m<sup>2</sup> but lined ponds cost ~7x more at A\$10.5/m<sup>2</sup>. Based on these costs, we estimate the capital required for the ponds of ASX listed developers in Figure 12.

**Figure 12: Pond type and cost estimates**

	Existing Producers			ASX Developers				
	SDIC	Qinghai Bindi	CMP.NYS	KLL	AMN	RWD	SO4	APC
<b>Unlined Ponds</b>	✓	✓	✓	X	✓	✓	✓	✓
<b>Lake Surface Area (ha)</b>	550,000	440,000		51,500	350,000	99,000	44,000	
<b>Pond Surface Area (ha)</b>			18,200	762	3,400	3,000	2,990	1,040
<b>Apprx Cost (A\$m)</b>				80.4	5.7	5.1	5.0	1.8

Source: Company Reports, Petra Capital

**Route to Market**

It is hard to classify any ASX listed SOP developer as being near port infrastructure. Kalium Lakes’ Beyondie project is the closest at 700-862km whilst Agrimin’s Lake Mackay is the furthest at 2,057km (Figure 13). Transport is a material operating cost for all ASX listed developers, but at no site is it significant enough to make the project uneconomic. On average, transport costs make up over 50% of overall opex of the ASX-listed peer group.

- Agrimin – 2,057km Darwin via Alice Spring including; 510km unsealed road, 137km sealed road and 1,410km of rail.
- Reward Minerals – 1,368km Geraldton via Newman including; 355km unsealed road and 1,013km of sealed road.
- Australian Potash – 1,149km Fremantle Port via Leonora including; 85km unsealed road, 215km of sealed road and 849km of rail.
- Salt Lake Potash – 968km Esperance via Leonora including 220km unsealed road, 100km sealed road and 648km of rail.
- Kalium Lakes – 862km Geraldton Port via Kumerina including; 78km unsealed road, 784km sealed road (700km to Port Hedland).

**Figure 13: Location of ASX Listed SOP Producers**



Source: Company Reports



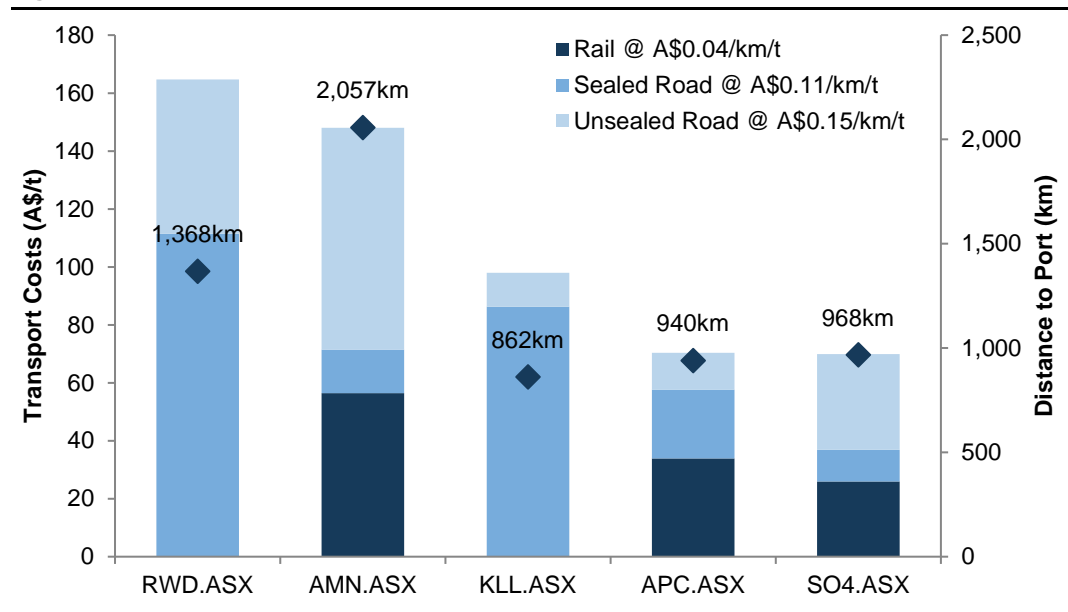
We take a simplistic approach and use industry benchmark transport costs to estimate total costs on a A\$/t basis which are shown in Figure 14;

- Unsealed Road @ A\$0.15/km/t
- Sealed Road @ A\$0.11/km/t
- Rail @ A\$0.04/km/t

Agrimin has the longest distance to port but does not have the highest transport costs due to a significant portion of the transport route being undertaken by rail. Salt Lake Potash has the second shortest transport distance and lowest transport costs on these metrics.

In Figure 15 we compare our estimates to recent company studies. Our estimates for Agrimin show the greatest upside in the peer group.

**Figure 14: Distance and Transport Cost to Port**



Source: Company Reports, Petra Capital

**Figure 15: Petra Estimates vs Company Studies**

	RWD.ASX	AMN.ASX	KLL.ASX	APC.ASX	SO4.ASX
Company Study Est (A\$/t)	124	191	67	69	75
Petra Est (A\$/t)	165	148	98	70	70
Difference	33%	-23%	46%	2%	-7%

Source: Company Reports, Petra Capital

AMN SS@370ktpa, APC SS@300ktpa, KLL PFS@150ktpa, RWD SS@400ktpa, SO4 SS@400ktpa

### Conclusion

Overall we see Agrimin’s large lake surface area as being a key distinguishing feature when comparing to ASX-listed SOP developers. It is our view that this characteristic significantly reduces the technical risk of constructing and operating the project. A large and shallow trench network that a large lake surface area allows for can significantly reduce the geological and operating risk versus a large bore and pump network. Similarly, the simplicity of unlined ponds reduces construction risk versus lined ponds.

As the ASX listed developer’s progress through their respected studies, we expect Agrimin’s conservative approach to their scoping study metrics to become apparent. It is our view that there are further gains to be made as the level of study detail improves. We believe Agrimin will pay particular attention to refining transport costs.

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