

# Project Memorandum

22 May 2020

Landpro Reference: S15298

Council Reference: RM20.079

**To:** Charles Horrell

**From:** Will Nicolson

**Subject:** Revised Aqualinc water use efficiency calculations

Dear Charles,

It has recently come to our attention that an error has been made with regards to the Aqualinc water use efficiency calculations provided in Section 6.6 and Appendix E of the AEE provided as part of the consent replacements application (RM20.079). While the Aqualinc table presented in Appendix E does present all of the irrigation areas and their individual water needs, we noticed that the daily, monthly and annual totals did not include all of the irrigation areas (see original table below).

Site: Bendigo Station				Sub-region: Central and Lakes District									
Land use	Soil type	Area (ha)	MAR Zone	Smaps PAW	Aqualinc PAW	peak daily demand (mm/day)	peak daily demand (m <sup>3</sup> )	maximum monthly demand (mm/month)	maximum monthly demand (m <sup>3</sup> )	90%ile annual demand (mm/year)	90%ile annual demand (m <sup>3</sup> )	100%ile annual demand (mm/year)	100%ile annual demand (m <sup>3</sup> )
1 Pasture	MOLYNEUX	14.20	450	30	40	5.5	781.0	171	24,282	820	116,440	919	130498.00
2 Pasture	CLYDE	74.30	450	42	40	5.5	4086.5	171	127,053	820	609,260	919	682817.00
3 Pasture	ARDGOUR	11.00	450	40	40	5.5	605.0	171	18,810	820	90,200	919	101090.00
4 Pasture	LOWBURN	0.50	450	36	40	5.5	27.5	171	855	820	4,100	919	4595.00
5 Vineyard	MOLYNEUX	3.40	450	36	40	2.4	82.3	75	2,550	239	8,126	293	9962.00
6 Vineyard	CLYDE	3.70	450	42	40	2.4	89.9	75	2,775	239	8,843	293	10841.00
7 Vineyard	ASSUMED ADRGOUR	75.30	450	40	40	2.4	1822.3	75	56,475	239	179,967	293	220629.00
<b>Total</b>		<b>182.4</b>					<b>5,672</b>		<b>176,325</b>		<b>836,969</b>		<b>939,803</b>

65.65 L/s

Volume	Daily (m <sup>3</sup> )	Monthly (m <sup>3</sup> )	Annual (m <sup>3</sup> )
Required (per Aqualinc calcs)	5,672	176,325	836,969
Current total paper allocation	7,200[1]	219,000[2]	2,628,000
Stock drinking requirements[3]	103	3,118	37,413
Domestic requirements[4]	1	30	365
Pond maintenance			25,854
<b>Volume sought</b>	<b>5,776</b>	<b>179,473</b>	<b>900,601</b>

incorrect volumes sought

As a result, approximately 75 ha of irrigable land was not included in the monthly and annual Aqualinc requirements presented in Table 4 of Section 6.6. This would create a significant water deficiency for the applicant, therefore a revised Table 4 is provided below, while an updated Appendix E is attached. It is requested that you please assess the application against these latest figures, rather than those provided in the original application. Note that while the monthly and annual volumes sought have been updated to reflect the additional irrigable areas, there is no proposed change to the instantaneous rate of take (primary or supplementary) sought.

**Table 4: Aqualinc modelled application requirements for existing and future irrigated areas of Bendigo Station Ltd, compared to total existing paper allocation from Bendigo Creek (Revised 22 May 2020 – amended values have been highlighted)**

Volume	Daily (m <sup>3</sup> )	Monthly (m <sup>3</sup> )	Annual (m <sup>3</sup> )
Current total paper allocation	7,200 <sup>1</sup>	219,000 <sup>2</sup>	2,628,000
Required (per Aqualinc calcs)	7,598	232,800	1,016,936 (90% ile)
Stock drinking requirements <sup>3</sup>	103	3,118	37,413
Domestic requirements <sup>4</sup>	1	30	365
Pond maintenance requirements <sup>5</sup>	-	-	25,854
<b>Volume sought</b>	-	<b>235,948</b>	<b>1,080,568</b>

Note that the monthly and annual volumes mentioned at the end of Section 2.3 of the AEE would also change to reflect these new volumes. All of the reasoning behind these volumes sought remains the same.

Finally, the proposed consent condition relating to the maximum volumes in Section 6.12 of the AEE would also need to be revised, as follows:

*The volume of water taken under this consent shall not exceed:*

- o 235,948 m<sup>3</sup>/month
- o 1,080,568 m<sup>3</sup>/year

If you have any further questions about these revisions, please do not hesitate to reach out.

Kind Regards



Will Nicolson

Scientist/Resource Management Planner

<sup>1</sup> Based on 300,000 L/hour combined limit for Deemed Permits WR1233Cr & WR3908Cr.

<sup>2</sup> No monthly or annual limit is specified on the current permits – these figures have been calculated based on the specified hourly rate.

<sup>3</sup> Based on 11,500 sheep @ 5 L/head/day & 1000 beef cattle @ 45 L/head/day (at peak capacity)

<sup>4</sup> For 1 house, based on 4-person household @ 250 L/person/day

<sup>5</sup> Calculated for 5 months outside the irrigation season (April 15-September 15). Seepage losses with a clay liner would average 4.5 mm/day (0.0045 m/day) while evaporation from the ~23,000 m<sup>2</sup> pond surface area may average ~2 cm/week (0.0029 m/day). Potential water loss = (0.0045+0.0029)\*23,000 = 170 m<sup>3</sup>/day (~2 L/s). Total potential pond loss outside irrigation season = 152 days x 170 m<sup>3</sup>/day = 25,854 m<sup>3</sup>

**Appendix E: Aqualinc calculations (Revised 22 May 2020)**

Site: Bendigo Station						Sub-region: Central and Lakes District								
Land use	Soil type	Area (ha)	MAR Zone	Smaps PAW	Aqualinc PAW	peak daily demand (mm/day)	peak daily demand (m <sup>3</sup> )	maximum monthly demand (mm/month)	maximum monthly demand (m <sup>3</sup> )	90%ile annual demand (mm/year)	90%ile annual demand (m <sup>3</sup> )	100%ile annual demand (mm/year)	100%ile annual demand (m <sup>3</sup> )	
1 Pasture	MOLYNEUX	14.20	450	30	40	5.5	781.0	171	24,282	820	116,440	919	130498.00	
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7 Vineyard	ASSUMED ADRGOUR	75.30	450	40	40	2.4	1822.3	75	56,475	239	179,967	293	220629.00	
<b>Total</b>		<b>182.4</b>					<b>7,494</b>		<b>232,800</b>		<b>1,016,936</b>		<b>1,160,432</b>	

86.74 L/s

Volume	Daily (m <sup>3</sup> )	Monthly (m <sup>3</sup> )	Annual (m <sup>3</sup> )
Required (per Aqualinc calcs)	7,494	232,800	1,016,936
Current total paper allocation	<a href="#">7,200[1]</a>	<a href="#">219,000[2]</a>	2,628,000
<a href="#">Stock drinking requirements[3]</a>	103	3,118	37,413
<a href="#">Domestic requirements[4]</a>	1	30	365
<a href="#">Pond maintenance</a>			25,854
<b>Volume sought</b>	<b>7,598</b>	<b>235,948</b>	<b>1,080,568</b>