Milestone D 7.1 – Attachment E:

- **Page 1 - Energy availability v's consumption (solar and grid) and water applied (ML/ha)**
- **Page 2 - Pump to solar capacity operating threshold**

Weather site data	July to December 2018 (for 2019 harvest)	January 2019 to June 2019 (for 2019 harvest)	July to December 2019 (for 2020 harvest)	January 2020 to May 2020 (for 2020 harvest)
Available bright sunshine hours	2239	2134	2283	1563
Pump operational threshold (W/m^2)	400	400	400	400
Available bright sunshine hours equal to threshold	1100	896	1105	653

Pumping data	July to December 2018 (for 2019 harvest)	January 2019 to June 2019 (for 2019 harvest)	July to December 2019 (for 2020 harvest)	January 2020 to May 2020 (for 2020 harvest)
Total time pumping (hours)	595	841	751	486
Daytime Solar pumping hrs (estimate)	416	589	578	328
Night time Grid demand pumping hrs (estimate)	179	252	173	158
Percent of available solar hours utilised	37%	66%	68%	67%

Calculated energy mix	July to December 2018 (for 2019 harvest)	January 2019 to June 2019 (for 2019 harvest)	July to December 2019 (for 2020 harvest)	January 2020 to May 2020 (for 2020 harvest)
Average hourly pump demand (kWh)	27.31	28.66	30.11	29.88
Solar input (kWh)	11977	16689	17356	7363*
Grid input (kWh)	4302	7486	5259	7155*
Total pump energy use (grid+solar) kWh	16279	24144	22615	14520

System utilisation	July to December 2018 (for 2019 harvest)	January 2019 to June 2019 (for 2019 harvest)	July to December 2019 (for 2020 harvest)	January 2020 to May 2020 (for 2020 harvest)
Annual nominal water allocation (ML/ha)*	3.6	3.6	3.6	3.6
Annual farm area (ha)	55	55	55	55
Annual total water allocation (ML)	198	198	198	198
Irrigation volume applied per period (ML)	56.28	79.48	65	48
Percent of allocation applied per period	28.4%	40.1%	32.8%	24.2%

*The variance in the ratio of solar to grid energy utilised in the current reporting period is explained by reduced capacity within the solar system. Storm conditions affected to solar system during the intense wet period from late January to March 2020 and when irrigation was due to restart in late March it was discovered that two strings of the system (approximately 20 kW) had damage to the earth protection diodes. The system has operated in this reduced operational mode for the 393 hours of pumping as new parts are on

back order. This matter will be resolved prior to the completion of the project. The reduced capacity (82 kW) provided an opportunity to test the solar system design capacity relative to the pumping energy demand (28-30 kW). It has been shown the effectiveness of the system when operated over a period of 393 hrs has utilised 2454 kWh of additional grid supply which is 6 kWh per hour of pumping operation. This represents an increase from the previous 9 kWh per pumped hour to 15 kWh per pumped hour (+ 66% to grid demand).

Pump / solar operational threshold July 2019 to May 2020