



## SOUTH AUSTRALIA - ADDITIONAL EFFICIENCY MEASURES CRITERIA ASSESSMENT OUTCOME

Project Reference No:	386869
Outcome:	Compliant with the Efficiency Measures assessment
Date recommended to proceed to public comment	6 October 2020
Date recommended to proceed to the Australian Government's detailed assessment stage	19 March 2021

### Overview

The project involves installing permanent netting structures over 22.3ha of citrus plantings located at Lyrup in the SA Riverland irrigation region.

Previous applied studies have demonstrated significant water efficiencies can be achieved with the adoption of permanent netting over horticultural crops. The primary driver of the water savings is driven by the reduction in evapotranspiration levels under netting which is predominantly the result of significantly reduced wind runs under netted crops and this also has flow on benefits to fruit quality and hence profitability. The netting can also assist with crop establishment meaning commercially viable production is achieved earlier.

Studies also show that fruit quality is significantly improved under netting with a much higher percentage of fruit produced in higher grade specifications. These works are projected to increase annual turnover in the netted area by approximately 20% which coupled with the water use reductions delivers a much improved productivity of on-farm water use. The netting also protects the crops from extreme weather events such as hail and intense rainfall which can potentially result in complete crop loss. While these events are not common they can cause financial pressures on impacted enterprises.

The works will also assist to secure existing full time and seasonal employment both directly (on-farm picking) and along the fruit packing and distribution supply chain.

The property is located adjacent to wetland, floodplain and riverine environments of high ecological value and the project works will ensure any irrigation induced impacts on these assets are minimised.

A conservative water saving of 29.9ML is expected to be generated through the project works.

## Part 1 - State Assessment - Efficiency Measures criteria

### Assessment Approach

This State Assessment is reliant on the information provided by the applicant. The comments provide a summary of the information provided by the applicant which is deemed relevant by the assessor to demonstrate that the Efficiency Measures – Agreed Criteria have been met.

### Water Savings Substantiation

The water savings expected to be achieved by the project have been verified by an Independent Approved Irrigation Professional.

Anecdotally the water savings generated by permanent netting have been reported to be in the order of 30%. However, significant applied research has been undertaken in recent years to more closely quantify the benefits of the installation of permanent netting over horticultural crops including citrus.

From a water use efficiency perspective permanent netting has been shown to significantly reduce the rate of evapotranspiration which has a direct relationship to crop irrigation requirements. The key driver of the reduction in evapotranspiration is the effect the permanent netting has on reducing wind speeds inside the netted areas compared to the observations taken outside of the nets. Netting also provides protection against heavy rainfall and hail which can potentially wipe out entire crops at major economic cost.

Table 1 below shows the measured evapotranspiration levels at a citrus orchard located at Pyap (SA) for netted vs. un-netted patches over 3 irrigation seasons. As shown in the table there is a consistent reduction in the measured evapotranspiration rate ranging from a low of 333.7mm to a high of 663.0mm, with an average reduction over the 3 year period of 512.2mm which equates to 5.12ML/ha.

*Table 1: Seasonal Evapotranspiration: Netted vs. Un-Netted*

	<i>Evapotranspiration (mm)</i>			
	<b>2018-19</b>	<b>2017-18</b>	<b>2016-17</b>	<b>3 Year Mean</b>
<b>Netted</b>	1063.8	1044.5	1008.4	1038.9
<b>Un-Netted</b>	1603.6	1378.2	1671.4	1551.1
<b>Difference</b>	539.8	333.7	663.0	512.2
<b>% ETo Reduction</b>	34%	24%	40%	33%

Source: <https://www.awsnetwork.com.au/>

Research undertaken in Western Australia comparing the water use of netted vs. un-netted crops also showed a water saving in excess of 40% for netted crops - <https://www.abc.net.au/news/rural/2015-04-16/netted-orchard-saves-on-water/6396952>

Further on-farm water use analysis undertaken in the Victorian Goulburn Valley region also reported a 30% water saving in netted areas compared with traditional un-netted areas - <https://www.countrynews.com.au/news/2020/06/29/1227993/protecting-fruit-crops-is-netting-rewards>

A crop water use study was also undertaken overseas in Morocco that involved applying 50% (deliberate deficit irrigation) of calculated crop evapotranspiration to netted citrus trees which resulted in no adverse effect on crop performance compared to trees that were irrigated at 100% of the calculated crop requirement. This study reinforces the potential water savings that can be achieved through netting - <http://www.cwejournal.org/vol7no1/shading-nets-usefulness-for-water-saving-on-citrus-orchards-under-different-irrigation-doses/>

When the reported water savings percentages are applied to longer term climatic data and crop co-efficients as developed by the Irrigated Crop Management Service (ICMS) it further confirms that a 3.0-5.0ML/ha water saving is achievable based on annual citrus irrigation requirements in the Riverland. It is acknowledged that 5.0ML/ha saving would be a challenge to achieve in a dynamic operating environment and therefore 4.0ML/ha is considered more realistic. Despite this point if annual citrus irrigation requirements are in the range of 9.0-12.0ML then applying the results of reported studies does deliver water savings of up to 5.0ML/ha.

In addition to the improved water use efficiency permanent netting has also been shown to significantly increase fruit quality which contributes to increased profitability.

The project is expected to return a conservative 29.9 ML to the environment, with the applicant retaining 59.3 ML of water savings.

Water Saving Component	Area ha	Water Saving (ML/ha)	Estimated Water Saving (ML)	Total volume of Eligible Water Rights offered for transfer (ML)
Installation of Permanent Netting	22.3	4	89.2	29.9 (1.3 ML/ha)
<b>Total Water Saving</b>			<b>89.2</b>	

Efficiency Measures Criteria	Project Responses to Efficiency Measures Criteria	Adequate Response Y/N	State Assessment
<b>Evidence of engagement with community, industry and government agencies during project design (Criteria 9, 6a, 6b)</b>	<p>9. Refer to responses 5b and 6b.</p> <p>6a. N/A - Private diverter.</p> <p>6b. Since being engaged as a delivery partner by the Australian Government in December 2018, extensive consultation on the Water Efficiency Program has been undertaken with key stakeholders.</p> <p>Direct engagement with industry and commodity groups, irrigation infrastructure operators, Local Government, Regional Development organisations has occurred on the program.</p> <p>The works proposed through this project are consistent with regional plans and strategies on sustainable land and water management practices and building resilience and adaptability into the irrigated agriculture sector.</p>	Y	<p>The application has demonstrated that the delivery partner has consulted with relevant industry bodies, Irrigation Infrastructure Operators, local governments and regional development organisations on a strategic regional approach to developing projects under the Water Efficiency Program.</p> <p>The proposed project is not located within an irrigation network, so the application is not required to provide evidence that the relevant network operator or water corporation is involved in or aware of the project.</p>
<b>Potential Direct Water Market Impacts (Criteria 7a, 7b, 7c, 7d)</b>	<p>7a. The Water Licence included at Attachment 2 confirms that the proponent owns the water entitlement that has been nominated for transfer.</p> <p>The proposal has also undergone an independent technical assessment that verified that the volume nominated for</p>	Y	<p>The application has demonstrated that:</p> <ul style="list-style-type: none"> <li>The water rights to be transferred as part of the project have been independently verified as a conservative estimate of the water savings that can be generated and that the project will not transfer more water than the project will save.</li> </ul>

	<p>transfer represents a conservative volume and that the proponent will retain a significant share of the overall assessed water saving (Attachment 1).</p> <p>7b. Attachment 2 confirms that the proponent has held the nominated water entitlement for greater than 3 years.</p> <p>7c. This project will generate a significant volume of retained savings for the proponent meaning there will be a net increase in water availability. This outcome is consistent with other proposals that have been submitted based on only a conservative volume of assessed water savings being transferred. As a result the cumulative implementation of projects will not have a direct impact on the future reliability of water.</p> <p>7d. As outlined in 7c. this proposal will generate a significant volume of retained savings and therefore will result in a reduction in existing demand while creating additional supply. Recent reports e.g. ACCC have concluded that supply and demand remains they key driver of water prices in the southern connected Murray-Darling Basin system and therefore consistent with this funding this project will not directly increase the price of water despite the transfer of entitlement.</p>		<ul style="list-style-type: none"> <li>The water entitlements to be transferred have been held for a minimum of 3 years at the time of application.</li> </ul> <p>The project will generate water savings above the volume returned to the environment and will effectively increase the water available for productive uses in the consumptive pool. The increase in available water will have no direct impact on reliability, and will put downward pressure on water market prices.</p>
<b>Contribution to Proponent Businesses and Irrigation District Viability (Criteria 4a, 4b, 4c)</b>	4a. The project will deliver increased productivity in terms of returns per ML to the	Y	<p>The application has demonstrated that:</p> <ul style="list-style-type: none"> <li>The project will contribute to the future viability</li> </ul>

	<p>enterprise which will provide flow on benefits to the local Lyrup community which is heavily reliant on a sustainable and viable irrigation sector.</p> <p>The property is not part of an irrigation trust network however the works will ensure the family owned and operated enterprise can continue to grow and prosper which will have flow on benefits to the local community and Riverland region more generally.</p> <p>4b. The proposed works do not involve direct upgrades to the existing irrigation system however the proponent is a private diverter and is not part of an irrigation infrastructure operator network.</p> <p>4c. The applicant is a private diverter and not part of an irrigation infrastructure operator network. The property is however located near the Pike River floodplain which is a high priority ecological and cultural area. One of the key aims of the Pike River Land and Water Management Plan is to foster sustainable irrigation practices which this proposal is consistent with. The return of water through projects such as this also assist to facilitate benefits to the Pike Floodplain through the delivery of environmental water.</p>		<p>and sustainability of the business by improving the productivity and efficiency of on-farm water use.</p> <ul style="list-style-type: none"> <li>The project is focused on modernising existing inefficient irrigation systems which will underpin irrigation management into the future and will not upgrade water supply infrastructure where the system, or parts of the system, are not going to be used in the future.</li> </ul> <p>The project is not located within an irrigation network, so the application is not required to take account of relevant irrigation business' strategies or plans.</p>
<b>Support for Regional Economies (Criteria 5a, 5b, 5c, 5d, 6c)</b>	<p>5a. As has been described in other responses this project represents a direct investment in the longer-term viability of medium scale family owned and operated business. The</p>	Y	<p>The application has demonstrated that the project will:</p> <ul style="list-style-type: none"> <li>Generate benefits for the broader region and not just the applicant through sourcing of local</li> </ul>

	<p>works will assist with securing existing employment both on-farm and along the supply chain network. Irrigated agriculture and specifically citrus production is the key driver of the Riverland economy and is an important contributor to the broader State economy also.</p> <p>5b. This project is directly contributing to an increase in productivity in terms of return per ML. This will provide the enterprise with longer term resilience and viability and an enhanced capacity to manage periods of varying and /or more volatile water availability.</p> <p>5c. scale to the existing Riverland citrus industry, adding supply to a local pack house and distributor which supplies the Australian market and exports to over 20 countries. This will assist to ensure the citrus industry retains a critical mass which will contribute to industry support programs such as local research, development, extension and adoption activities.</p> <p>5d. The proposed works will assist to secure existing employment, both on-going and seasonal and will also deliver direct economic stimulus during the construction phase. The netting will also protect the business from extreme weather events which should they occur would have significant negative impacts on on-farm and regional jobs in general.</p>		<p>farm input supplies by the participating business and generating regional employment.</p> <ul style="list-style-type: none"> <li>• The project will contribute to the longer term sustainability of the business and the irrigation district more generally.</li> <li>• Increase regional and Basin wide productivity through increasing the volume of water available for consumptive uses on the water market.</li> </ul>
--	---	--	--

	<p>6c. This proposal will generate significant and lasting water savings that will provide benefits beyond the farm gate. The reduction in demand and increase in supply means that there is a net increase in water availability within the southern connected Murray-Darling Basin which provides socio-economic at the broader Basin scale.</p> <p>The water entitlement volume that is nominated for transfer is also very minor at a local, regional and Basin context and therefore is highly unlikely to result in a negative outcomes at any of those scales.</p>		
<b>Social and Environmental Benefits (Criteria 2a, 2b, 2c)</b>	<p>2a. This project represents a further investment in building resilience and sustainability into a family owned business in the SA Riverland region.</p> <p>The works will greatly improve the productivity of on-farm water use while protecting the asset from extreme weather events.</p> <p>Citrus properties are significant employers on a per ML applied basis due to the manual nature of picking. Projects such as this that invest in the longer-term viability of the enterprise therefore assist with securing both direct and in-direct employment into the future which provides flow on benefits to the local, regional and State economies.</p> <p>All works will be completed by a SA based</p>	Y	<p>The application has:</p> <ul style="list-style-type: none"> <li>• demonstrated that the project will: <ul style="list-style-type: none"> <li>○ Support the regional irrigated agriculture industry which is an important sector of the Riverland and SA State economy.</li> <li>○ Improve the profitability and resilience of the business and ensure that the economic contribution can be sustained over time.</li> <li>○ Generate benefits for the broader region and not just the applicant through sourcing of local farm input supplies by the participating business and generating regional employment.</li> <li>○ Increase regional and Basin wide</li> </ul> </li> </ul>



	<p>company meaning the investment will provide economic stimulus to the region and beyond. The investment in the netting infrastructure will also provide an opportunity to further showcase the benefits of netting to other growers which will facilitate further gains being made and assisting irrigated businesses to be more sustainable and resilient into the future.</p> <p>The property is located adjacent to high ecological value floodplain and therefore the improvements in water use efficiency will ensure any irrigation induced impacts are minimised into the future.</p> <p>2b. While all works will occur on-farm as outlined above the property is located adjacent to important floodplain and riverine habitat which assists with attracting tourism and recreational based pursuits linked to these assets.</p> <p>2c. N/A - project is not over \$4 million.</p>		<p>productivity through increasing the volume of water available for consumptive uses on the water market.</p> <ul style="list-style-type: none"> <li>• Not identified any social values including the amenity to local communities of weirs, storages and parks that may be affected by the project.</li> </ul> <p>The project is below the \$4 million threshold for large projects and is not required to address criteria 2c.</p>
<b>Work health and safety laws (Criteria 2d)</b>	<p>2d. The Delivery Partner has well established WHS management procedures in place which have been specifically tailored to the implementation of Australian Government irrigation efficiency programs.</p> <p>The proponent will be required to complete a Risk Assessment specific to the project activities and demonstrate that all required insurance is in place and current prior to the project works commencing and any funds</p>	Y	<p>The application has demonstrated that the applicant and delivery partner have an understanding of all relevant legislation or regulation that will require approval prior to works commencing and that they will comply with all relevant laws including work health and safety laws.</p>

	being paid.		
<b>Business Resilience, including Drought and Climate Change Impacts (Criteria 10a, 13a, 12)</b>	<p>10a. Please refer to response to 5b.</p> <p>13a. As outlined in responses to other criteria this project will generate water savings in addition to the volume that has been nominated for transfer. The retained savings will provide the proponent with enhanced resilience and adaptability during periods of reduced and /or more volatile water availability which are predicted to occur more frequently in the future.</p> <p>The netting will also provide direct insurance against extreme weather events which have the potential to wipe-out entire crops and create long lasting financial impacts.</p> <p>12a. As was outlined in the response to criterion 7a. the project will generate water savings in addition to the volume that is nominated for transfer.</p> <p>The water savings have been based on accepted industry benchmarks and published irrigation requirements and verified as part of the independent technical assessment of the proposal. The project budget has been prepared using quotations provided by reputable service providers. Project costs have been reviewed as part of the independent technical assessment.</p>	Y	<p>The application has demonstrated that the project will:</p> <ul style="list-style-type: none"> <li>• Address under-performing irrigation areas which will allow water to be used as efficiently as possible while maximising output (yield).</li> <li>• Generate additional water savings that will be retained by the applicant to improve the capacity of the proponent to better manage periods of reduced water availability.</li> </ul> <p>Provide the enterprise with an increased ability to endure and adapt to future climate variability and water availability by generating productivity improvements and improving profitability.</p>
<b>Cultural Benefits (Criteria 8a, 8b, 8c)</b>	8a. Lyrup is a small irrigation community located 15km from Berri and 20km from	Y	The application has described the expected cultural benefits of the proposed project, including the

	<p>Renmark. Lyrup was established in the late 1800's with the intent of placing families on the land that would eventually become self-supporting. Given the origins of Lyrup a strong sense of community still exists to this day with a sporting and social club acting as hubs for the local community.</p> <p>With irrigated horticulture being the primary land-use surrounding the Lyrup village projects such as this one are most important as they underpin existing businesses which provides flow on benefits to the local community and the Riverland region more generally.</p> <p>As mentioned in an earlier response the Pike River Floodplain is located near Lyrup and is a high priority ecological and cultural area.</p> <p>8b. Goods and services for the project will be sourced from a SA based company and the proposed works will enhance the resilience and adaptability of the participating business.</p> <p>The water recovered through the project will become part of e-water holders' portfolio and sites such as the adjacent Pike Floodplain will be beneficiaries of this.</p> <p>8c. N/A – project is not over \$3 million.</p>		<p>strategy for increasing the cultural benefit to participants and their communities through local sourcing of goods, services and labour.</p> <p>The total project value is below \$3 million and is not required to identify cultural heritage sites and manage any impacts in accordance with relevant Commonwealth and State laws.</p>
--	---	--	---

**In-Principle Recommendation**

The application has adequately addressed the Efficiency Measures – Agreed Criteria and demonstrated that the project will have neutral or positive socio-economic impacts and not have negative third party impacts on irrigation systems, water markets or regional communities. Accordingly, the South Australian Government provides in-principle approval for the project and recommends that the application proceed to the **public comment stage**.

## Part 2 - State Response – Public Comments

Relevant Public Comments to be responded to	Response to Relevant Public Comments
<p>Any project that decreases the total pool available to food production results in negative outcomes as there will simply be less water available for agriculture.</p> <p>On-farm projects reduce the total amount of water available to agriculture. While this proponent claims they will become more efficient with their water use, agriculture as a whole in the Basin will be worse off as there is simply less for agriculture to use.</p>	<p>The South Australian Government prefers efficiency measures to recover water for the environment, as they provide real and positive outcomes to irrigation businesses, while supporting communities that would otherwise be hard hit by the reduction in regional productivity or the closure of businesses through water leaving the consumptive pool through buybacks.</p> <p>Unlike water buybacks that remove water from the consumptive pool, efficiency measures increase the volume of water available. Properly constructed efficiency measures projects recover water that is effectively “lost” through evaporation, leaky infrastructure and inefficient irrigation systems or overwatering and is unavailable for use until projects are completed.</p> <p>The water savings for all South Australian on-farm projects have been independently verified as a conservative estimated of water savings. Those water savings were not previously available to the consumptive pool.</p> <p>Additionally, proponents of all on farm projects in South Australia under the efficiency measures program have retained a portion (ranging from 12 percent to 89 percent) of the water savings with this increasing supply and putting downward pressure on water market prices.</p> <p>Accordingly, South Australian projects are increasing the water available for consumptive uses across the southern connected Murray-Darling Basin and have not reduced the amount of water available for agricultural use.</p>

<p>On-farm efficiency measures are creating upward pressure on water prices as reported in independent research completed by ABARES and Aither and do not meet principle 7d – Projects must not directly increase the price of water.</p>	<p>Both the ABARE and Aither reports have acknowledged that it is difficult to separate the impact of water recovery from other major trends such as climate change and the significant growth in industries and as such the findings should be treated with caution.</p> <p>The ABARE report draws heavily on a recent study undertaken by ABARES, available at <a href="https://onlinelibrary.wiley.com/doi/full/10.1111/1467-8462.12396?af=R">https://onlinelibrary.wiley.com/doi/full/10.1111/1467-8462.12396?af=R</a> This study found that some on-farm program participants subsequently purchased water to increase their irrigated production. The study did not however directly link this to participation in the program and noted that many other demographic and economic factors are likely to influence business decisions. In fact, it is specifically stated that the study did not attempt to define or separately quantify direct and indirect effects of on-farm efficiency measures projects on water prices.</p> <p>The ABARES study also evaluated many projects that would not meet the criteria agreed by the MDB Ministerial Council and as a result, no conclusions can be drawn between the findings of this study and on-farm efficiency measures projects that have been submitted since these criteria were agreed.</p> <p>The Aither report appears to treat water recovered through on-farm efficiency measures the same as buybacks. This fails to recognise that on-farm efficiency measures are reducing demand by the same amount and in most cases more than the corresponding reduction in supply.</p> <p>Accordingly, it would be incorrect to infer that South Australian on-farm projects are directly attributable to increased water use and higher water market prices when they are consistently reducing water demand and increasing supply.</p> <p>Any expansion of irrigated area and hence water use that occurs post on-farm project is an indirect effect of the program and is likely to be driven by many other complex and interrelated economic and social factors. These indirect impacts are not considered as part of the socio economic assessment.</p>
<p>Independent research over a number of years, most recently from the University of Adelaide, has demonstrated that irrigators who participate in on-farm projects are highly likely to purchase additional water following the implementation of the project and the resulting increase in enterprise profitability.</p>	

<p>The application does not provide details of how it will impact the irrigation network, nor does it provide details of the local and regional plans for the area and how the project aligns with relevant objectives.</p>	<p>These criteria have been addressed in various places in the application and the proponent has demonstrated that their proposed project will:</p> <ul style="list-style-type: none"> <li>• Increase productivity in terms of return per ML for the business and region.</li> <li>• Improve the business's long term resilience and viability which will have flow on benefits to the local, regional and State economies.</li> <li>• Source goods and services for the project from local companies which will add further economic stimulus to the Riverland community.</li> <li>• Increased regional and Basin wide productivity through increasing the volume of water available for consumptive uses on the water market.</li> </ul> <p>The applicant is a private diverter and is not located within an irrigation network, so the application is not required to take account of relevant irrigation business' strategies or plans.</p>
---	---

### **Final Recommendation**

The application has adequately addressed the Efficiency Measures – Agreed Criteria and demonstrated that the project will have neutral or positive socio-economic impacts and not have negative third party impacts on irrigation systems, water markets or regional communities. Accordingly, it is recommended that the application proceed to the Australian Government's detailed assessment stage.

# Water Savings Substantiation – Water Efficiency Program (WEP)

## Technical Assessment

**Project ID:** [REDACTED]

**Crop Type:** Citrus

### Project Summary:

The applicant is seeking to install permanent netting over 22.3ha of citrus located at Lyrup in the SA Riverland region.

Studies have shown that fruit quality is significantly improved under netting with a much higher percentage of fruit produced in higher grade specifications. The works are projected to increase annual turnover in the netted area by approximately 20% which coupled with the water use reductions delivers a much improved productivity of on-farm water use. The netting also protects the crops from extreme weather events such as hail and intense rainfall which can potentially result in complete crop loss. While these events are not common they can cause lasting financial pressures on an impacted enterprise.

The works will also assist to secure existing full time and seasonal employment both directly (on-farm picking) and along the fruit packing and distribution supply chain.

The property is located adjacent to wetland, floodplain and riverine environments of high ecological value and the project works will ensure any irrigation induced impacts on these assets are minimised.

A conservative water saving of 29.9ML, or 1.3ML/ha is nominated for the proposal.

### Water Saving Methodology:

Anecdotally the water savings generated by permanent netting have been reported to be in the order of 30% however significant applied research has been undertaken in recent years to more closely quantify the benefits of the installation of permanent netting over horticultural crops including citrus.

From a water use efficiency perspective permanent netting has been shown to significantly reduce the rate of evapotranspiration which has a direct relationship to crop irrigation requirements. The key driver of the reduction in evapotranspiration is the effect the permanent netting has on reducing wind speeds inside the netted areas compared to the observations taken outside of the nets. Netting also provides protection against heavy rainfall and hail which can potentially wipe out entire crops at major economic cost.

Table 1 below shows the measured evapotranspiration levels at a citrus orchard located at Pyap (SA) for netted vs. un-netted patches over 3 irrigation seasons. As shown in the table there is a consistent reduction in the measured evapotranspiration rate ranging from a low of 333.7mm to a high of 663.0mm, with an average reduction over the 3 year period of 512.2mm which equates to 5.12ML/ha.



*Table 1: Seasonal Evapotranspiration: Netted vs. Un-Netted*

	<b>Evapotranspiration (mm)</b>			
	<b>2018-19</b>	<b>2017-18</b>	<b>2016-17</b>	<b>3 Year Mean</b>
<b>Netted</b>	1063.8	1044.5	1008.4	1038.9
<b>Un-Netted</b>	1603.6	1378.2	1671.4	1551.1
<b>Difference</b>	539.8	333.7	663.0	512.2
<b>% ETo Reduction</b>	34%	24%	40%	33%

Source: <https://www.awsnetwork.com.au/>

Research undertaken in Western Australia comparing the water use of netted vs. un-netted crops also showed a water saving in excess of 40% for netted crops -

<https://www.abc.net.au/news/rural/2015-04-16/netted-orchard-saves-on-water/6396952>

Further on-farm water use analysis undertaken in the Victorian Goulburn Valley region also reported a 30% water saving in netted areas compared with traditional un-netted areas -

<https://www.countrynews.com.au/news/2020/06/29/1227993/protecting-fruit-crops-is-netting-rewards>

A crop water use study was also undertaken overseas in Morocco that involved applying 50% (deliberate deficit irrigation) of calculated crop evapotranspiration to netted citrus trees which resulted in no adverse effect on crop performance compared to trees that were irrigated at 100% of the calculated crop requirement. This study reinforces the potential water savings that can be achieved through netting - <http://www.cwejournal.org/vol7no1/shading-nets-usefulness-for-water-saving-on-citrus-orchards-under-different-irrigation-doses/>

When the reported water savings percentages are applied to longer term climatic data and crop coefficients as developed by the Irrigated Crop Management Service (ICMS) it further confirms that a 3.0-5.0ML/ha water saving is achievable based on annual citrus irrigation requirements in the Riverland. It is acknowledged that 5.0ML/ha saving would be a challenge to achieve in a dynamic operating environment and therefore a range of 3.0-4.0ML/ha is considered more realistic. Despite this point if annual citrus irrigation requirements are in the range of 9.0-12.0ML then applying the results of reported studies does deliver water savings of up to 5.0ML/ha.

In addition to the improved water use efficiency permanent netting has also been shown to significantly increase fruit quality which contributes to increased profitability.

<b>Water Saving Activity</b>	<b>Area (ha)</b>	<b>Water Saving (ML/ha)</b>	<b>Total Water Saving (ML)</b>	<b>Conservative Water Saving (ML)</b>	<b>Conservative Water Saving (ML/ha)</b>
Installation of Permanent Netting	22.3	3.0ML/ha - 4.0ML/ha	89.2	29.9	
<b>Total Water Saving</b>	<b>22.3</b>		<b>89.2</b>	<b>29.9</b>	<b>1.3</b>

**Project Budget:**

Project costs have been based on quotes provided by [REDACTED].

**Irrigation Design:**

A design of the proposed permanent netting has been completed and is included as an attachment to the application.

**Approvals/Environmental:**

The specific irrigation efficiency improvements will contribute to reducing deep drainage beyond the crop root zone and hence improved salinity outcomes for the River Murray, floodplains and wetlands.

## 1 PROJECT DETAILS:

CID Name:		Date:	29/11/2019
CID No:		Client Name:	
Project Name:		Project No:	
Submitted By:		Contractors:	

## 2 PREAMBLE AND PROJECT SCOPE:

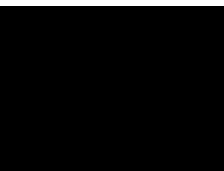
The above project was assessed on the below mentioned scope and is limited to project data supplied, including any documentation and designs as being true and correct in every respect.

I declare, as an Independent Approved Irrigation Professional agreed to under the Deed, that:

- I have carried out the technical and practical feasibility assessment for the Works; and
- I have had no previous involvement in preparing this Project Proposal.

I certify that the Project Works are technically and practically feasible, including that:

- the projected water savings they will generate are reasonable and realistic, including being appropriate to the crops, soils, climates, water delivery system and topography of the Eligible Irrigator's Property;
- the rationale for the water savings assessment is clearly explained;
- the projected water savings can be achieved while maintaining the agricultural production potential of the Property on which the Works would be completed as part of a Project;
- the engineering solutions they entail are achievable and appropriate to the needs of the Eligible Irrigator and the Property;
- the projected costs are reasonable and realistic, and within the expected range for that type of infrastructure and scale of installation; and
- the projected water savings they will generate represent the conservative or minimum feasible volume that could be derived from completing the Works.



Certified Irrigation Designer

