Sunraysia Modernisation Project INTERIM FINAL REPORT





Australian Government







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Acronyms

DGC	Design and Construction
DELWP	Department of Environment, Land, Water and
	Planning (Vic)
GL	Gigalitres
JV	Joint Venture
LMW	Lower Murray Water
ML	Megalitres
SCADA	Supervisory control and data acquisition
SMP	Sunraysia Modernisation Project

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INTRODUCTION

On 3 July 2008, the Commonwealth and the Basin States signed an Intergovernmental Agreement on the Murray-Darling Basin Reform. The Reform allowed for Basin States to undertake one or more Priority Projects that would substantially contribute to improved water use efficiency and enhance the sustainability of rural water use in the Murray-Darling Basin. An initial business case was prepared in 2009 by Lower Murray Water (LMW). The Sunraysia Modernisation Project: Merbein, Red Cliffs and Mildura proposed a three staged process involving upgrading of the main delivery infrastructure in Stage 1, replacement and upgrade of sub-systems in Stage 2 and pressurising of the sub-systems in Stage 3.

The Victorian Government, (the former Department of Sustainability and Environment) submitted a revised Business Case in May 2010, to address and clarify issues raised in the review of the initial business case for modernisation.

The concerns raised by the Commonwealth about the previous business cases were addressed in the *Final Business Case (June 2013)*. This business case details a modernisation project that aims to deliver significant changes in the way that irrigation water is delivered within the three pumped irrigation districts to support more diverse and profitable farming systems and businesses.

The Sunraysia Modernisation Project (SMP) includes:

- the pipelining of lengths of open main channels;
- upgrade of pump stations to provide a range of flows with more efficient energy use;
- decommissioning of redundant infrastructure;
- automation of the remaining channels; and
- installation of a modern irrigation and domestic and stock meter fleet.

The SMP is a Basin State Priority Project, and therefore must meet the due diligence criteria including:

- Securing a long-term sustainable future for irrigation communities, in the context of climate change and reduced water availability into the future;
- Delivering substantial and lasting returns of water to the environment to secure real improvements in river health;
- Delivering value for money (in the context of the first two criteria);
- Be in accordance with Council of Australian Governments and National Water Initiative agreements; and
- Consistent with best practice and other national approaches and standards being adopted for planning and implementation of Water for the Future.

On 19 December 2013, the former Victorian Water Minister, the Hon Peter Walsh and Federal Senator Simon Birmingham, former Parliamentary Secretary to the Minister for the Environment, signed a funding agreement for the SMP. The agreement provided approximately \$120 million of funding and a delivery timetable to ensure the realisation of a suite of benefits to irrigators (as well as the greater community) and the environment across the three Sunraysia Irrigation Districts (i.e. Merbein, Red Cliffs and Mildura).

The Commonwealth funding of \$103 million was provided from its Sustainable Rural Water Use and Infrastructure Program, which is a component of the Commonwealth's Water for the Future' initiative. The Victorian State funding of \$17 million was provided from LMW's Capital Works budget.

The project commenced in early 2014 and was fully operational by August 2016.

During the implementation of the project, the SMP delivery team and LMW sought approval to amend the project scope with enhancements made to all three Districts. Addendum No.1 for Merbein and Mildura Districts was approved in August 2014. Addendum No.2 for Red Cliffs District was approved in February 2015.



OBJECTIVES

The SMP objectives were developed to ensure that the project delivered outcomes consistent with the Commonwealth's funding program and was capable of meeting the program assessment criteria. The three main objectives for the Project are outlined below:



To provide 365 day access to irrigation water via the water ordering system for as many customers as possible.



Replacement of key sections of channels with pipelines; modernisation of key pump stations and automation of channels.

Replacement of key sections of channels with pipelines.



Provides the potential for diversification of land use and crop types by enabling extended watering of late summer crops, continuous irrigation or crops and winter specific cropping.

Improve water quality and irrigation application rates for as many customers as possible.

Improved on-farm water efficiency and enhanced production rates; Improved irrigation supply rates over some areas and alleviation of existing supply constraints spurs; Improved public safely and community amenity.

Generate 7.0GL of water savings.

Replacement of key sections of channel, with pipelines; installation of modern, accurate metering systems to all irrigation and domestic and stock customers. Realisation of water savings from previously lost and unaccounted for water.



SCOPE

Initial Scope

The scope of works as outlined in the Business Case (June 2013) are outlined below and had an agreed completion by 30 June 2016.

District	Scope	
Merbein Irrigation District	 Retrofit of the existing Merbein River Pump Station to provide a range of flows with more efficient energy use; Pipelining (5.0 km) of the Channel; Automation of the remaining open channel network, including regulator replacement (two of); Upgrade of 468 Irrigation Meters; 276 meter replacements 192 separate telemetry upgrades 489 Domestic & Stock Meters replaced or upgraded. 	
Red Cliffs Irrigation District	 Retrofit of the existing Red Cliffs River Pump Station to provide a range of flows with more efficient energy use; Partial pipelining (3 km) of the No.1 Channel connecting as many sub-areas as possible – Rising Main to Re-lift Pump Stations B and C; Automation of the remaining 11.6 km of open channel network, including regulator replacement (four of) and integration to the upgraded controls of the pump stations; Upgrade of 654 Irrigation Meters; 354 meter replacements 300 separate telemetry upgrades 724 Domestic & Stock Meters replaced or upgraded. 	
Mildura Irrigation District	 Retrofit of Central and Mid Area River Pump Stations, and Benetook Pump Station to provide a range of flows with more efficient energy use; Automation of the remaining open channel network, including regulator replacement (thirteen off). Additional regulator constructed at the start of Channel L enables better automation control; Upgrade of 1017 Irrigation Meters; 704 meter replacements 313 separate telemetry upgrades 1246 Domestic & Stock Meters replaced or upgraded. 	

Enhanced Scope

Innovative procurement and a competitive construction market enabled the Project the opportunity to be further enhanced from the original scope. First to be enhanced was the Merbein and Mildura Districts in August 2014 and then subsequently the Red Cliffs District in February 2015.

The Enhanced Project Scope had an agreed completion date of 30 August 2016, an extension of 2 months from the original project scope.

District	Scope
	Project enhancement - Modification to the Merbein and Mildura (K and T) Channel Supply Areas to provide a 365-day supply to as many customers as possible.
Merbein Irrigation District	 Additional 2.2 km of channel replaced by pipeline to end of District.
Mildura Irrigation District	 T Pipeline – Installation of a low pressure pipeline of approximately 5400m to replace open channel to Benetook Dam 3 enabling "summer supply"; and KT Pipeline – Installation of a low pressure pipeline of approximately 1900m from Benetook Pump Station to both the new T Pipeline and the existing K Area system enabling "winter supply".
Red Cliffs Irrigation District	Project enhancement - Extension of the Red Cliffs pipeline system to provide irrigation water to customers within the off-take channel feeding the south west portion of the District.
	 Partial pipelining (an addition of 1.5 km) of the No.1 Channel; Pipelining (2.8 km) the entire length of the No. 3 Channel; Construction of a new offtake pump station (D Relift) to replace both A and D Relift Pump Stations; and Channel No. 3 decommissioned together with the 1300m of Channel No. 1.



Governance

A number of parties were involved in the delivery of the SMP, requiring clear roles and accountabilities to ensure efficient implementation of the project. Government oversight was provided by the Treasurer (Vic) and the Minister for Water (Vic). LMW, a state owned entity under the *Water Act, 1989*, was responsible for delivering the SMP and was required to comply with the existing well defined state governance framework for government owned statutory corporations.

The key funding party for the SMP was the Commonwealth. Detailed project milestones and reporting requirements were set out in the SMP Funding Agreements between the Commonwealth and the Victorian State Government (Department of Environment, Land, Water and Planning (DELWP)) as the government's representative with back to back funding agreements between DELWP and LMW.

Key governance groups included:

An **Agency Liaison Group** was established to ensure key stakeholders were kept informed of project developments and progress, and to resolve any high level matters.

A **Community Advisory Group** was used to coordinated community involvement in the project consultation process, representing community views and monitoring project development and implementation ensuring community needs were met.

A **Project Control Group** was established, **headed up by an Independent Chair**, with the overall responsibility for the delivery of the project with primary responsibility to the LMW Board.

The dedicated **Project Delivery Group**, headed up by the Project Director delivered and operationalised the project. The team consisted of a mixture of LMW secondments, experienced contractors and specialised consultants.

Having Independent Control and Delivery Teams, proactively supported by LMW, allowed a flexible approach to project delivery, resulting in a highly-competitive process that utilised the most advanced technology and design methods that were built into the project plans.

Procurement

The contracting methodology separated the project up into five distinct areas to best provide innovation opportunities, appropriate risk transfer to the private sector and value for money for LMW.

Early Works	Pump Station and Metering Works that could not be contracted out into a larger procurement package due to the need to expedite work to meet early milestone dates up to 30 June 2014.
Pipes and Pumps DGC Package	Upgrade of pump stations, low pressure pipeline installation and commissioning and channel decommissioning for three existing channels in the Project area.
Metering D&C Package	Upgrade of 2,139 irrigation meters and installation of 2459 domestic and stock meters in the Project area.
Channel Automation DGC Package	Channel automation in the open channel network, including 19 regulator structures.
CD Pipeline DGC Package	Extension of the Red Cliffs Pipeline system by 3900m including a new offtake pump station and the decommissioning of Channel 3 and existing infrastructure no longer in use.

Sunraysia Modernisation Project

BENEFITS

The SMP was designed to enhance the region and to provide a modernised system capable of meeting the needs of current and future irrigation businesses.

The Project delivered a range of quantifiable benefits to local farming businesses, to LMW in the operation and maintenance of the system, to the environment of the Murray Darling Basin and the local Mildura community.

An innovative project delivery model allowed the SMP benefits to be increased by more than 50 percent than originally proposed maintaining the target delivery date and within the original project budget.

The original business case for the SMP was aimed at delivering 365-day irrigation access in Sunraysia to 885 irrigation outlets, 5801 hectares or 49% of irrigation outlets in Sunraysia. The project delivery model used, allowed significant enhancements to Red Cliffs and Mildura areas.

Project benefits are summarised in the table on the following page:

66 The final enhanced SMP scope delivered 365-day improved irrigation and access to 1,334 irrigation outlets, 8,652 hectares or 66.3% of irrigation outlets – a total increase in service for some 15% of Sunraysia's Irrigation Outlets.

Local employment

As part of their appointment, contractors undertaking the SMP committed to engaging local sub-contractors where possible. In the construction phase, more than 50 Mildura district sub-contractors and firms were engaged in all aspects of service provision for the project such as environmental, planning and community consultancy, traffic management, site cleanup, waste management, excavation, plumbing, welding, engineering, concreting, electrical and cabling work. Companies and individuals also benefitted by providing services like site storage, accommodation, meals and transport.

Investment in the future

The SMP is now providing opportunities for growers to become more efficient with water practices and to diversify their farm businesses. It is also allowing opportunity for new investment in horticulture in the Sunraysia region. To maximise the benefits flowing from the SMP, the Sunraysia Rejuvenation Project has been established in a partnership between Lower Murray Water, the Department of Environment, Land, Water and Planning, Regional Development Victoria, the Mallee CMA, Mildura Development Corporation and Mildura Rural City Council.

66 The SMP created an estimated 180 jobs in the life of the project and in the longer term, many more through improved productivity, diversity and innovation in the horticultural industry.



lssue (pre SMP)	Description of Issue (pre SMP)	SMP Outcome	Project Benefit
Restricted access to winter irrigation	The backbone of the delivery system is through open channels that required winter shut-down between late May and late September for maintenance. Unlimited winter access to irrigation was not available, limiting the establishment of crop types such as winter vegetables that require on-demand irrigation over winter, reducing the potential yield of table grape varieties that require extended irrigation periods into late autumn and early winter and eliminating the efficacy of frost control for citrus and avocados.	The Project enabled year round irrigation access to over 1300 customers and over 8,600ha across the three districts. It is estimated this will result in an increase in the area irrigated by over 1,500 ha over the next 5 years. Customers downstream of the pipelines receive increased access to winter supply due to a reduction in channel maintenance times and therefore system shutdown	 Increased number of customers able to irrigate at peak times Increased number of customers with 365-day access Increased number of customers able to irrigate at peak times Change in crop mix i.e. increased crop diversity
Poor water quality	The open channel system received large amounts of wind-blown debris, blocking on- farm filtration systems and pumps. This previously required the irrigation business significant attention, time and cost.	The water quality issues relating to sediment, weeds, algae and wind-blown contaminants have been eliminated for customers serviced through the pipelines. This directly benefits customers over an area of 8,600ha. Customers downstream of the pipelines now receive improved water quality, resulting in less time and money for farmers in cleaning and servicing filters and pumps in their on-farm irrigation systems.	 Cost savings from improved filtration
Inefficient and out-dated pumps	The fixed speed pumps could previously not match the range of flows required in the system, resulting in high energy costs and flow rates mismatched to farm delivery requirements.	The upgrade of pump stations and replacement of high risk areas of raised channel reduces the incidence of system shut down and potential loss of production and crop failure. It is estimated that this will result in an additional 400 ha of irrigated production over the next 5 years in those areas of the system continued to be supplied through open channels	 Increased area of production / reduction in dried off areas Change in crop mix i.e. increased crop diversity Reduced frequency of system shutdown Increased number of customers able to irrigate at peak times
Inaccurate measurement, monitoring and information	Many irrigation outlets were not fitted with accurate meters and some Domestic and Stock outlets were not metered at all, resulting in meter errors across the Districts. No real-time recording of water use information made it difficult for LMW to monitor and manage water delivery and for landholders to maximise the efficiency of their water use.	Administrative cost saving in regards to billing efficiency and management of water usage data, reduction in meter read errors and efficiency in water trading transactions has been achieved through the installation and upgrade of modernised meters. Real time and accurate water use data allows LMW to more closely monitor and manage water delivery through the system, identify any unmetered usage or meter errors and provide more efficient billing processes	 2139 irrigation meters installed or upgrade including telemetry 2459 domestic and stock meters upgraded

lssue (pre SMP)	Description of Issue (pre SMP)	SMP Outcome	Project Benefit
Land remains vacant and unproductive	For farming businesses to remain competitive and viable, it is desirable to expand their irrigated production or establish new farming businesses in the districts, with a level of service comparable to that available to private diversion schemes and adjacent irrigation districts. Access to year round irrigation supply and water quality were two important areas of service level improvement that would allow farming businesses to establish and grow a more diverse and profitable range of crops and reduce on-farm costs.	Year round access has enable some of the unproductive land to be rejuvenated. As such LMW together with the Mildura Development Corporation has appointed a Rejuvenation Project Officer role to assist Customers wishing to develop unproductive land.	 Increased area of production / reduction in dried off areas Change in crop mix i.e. increased crop diversity Increased number of customers able to irrigate at peak times Increased number of customers with 365-day access Reduced frequency of system shutdown Increased number of customers able to irrigate at peak times
Public safety and OH&S risk	The open channel system ran through urban areas, presenting a significant public risk of drowning and injury. The previous aging pump station infrastructure and open channel infrastructure presented OH&S risks to LMW operations staff.	The risk of drowning and injury to the community was effectively reduced with the replacement of 5.4km of open channel that ran through residential areas of Merbein and Red Cliffs with pipelines.	 Reduced risk of drowning or injury
Catastrophic failure	Catastrophic failure of the irrigation system could result in reduced crop yields, lost income or in the worst case, crop death and failure. Areas of raised channels in Red Cliffs and smaller areas in Mildura presented a risk of breaching, leading to localised flooding potentially having broader effects to the region and system shut down	The upgrade of pump stations and replacement of high risk lengths of channel with pipelines reduce the risk of system failure and breakdown.	 Reduced frequency of system shutdown
Areas of redundant infrastructure	The expansion of urban areas, particularly in the central areas of Mildura, rendered existing areas of old, piped irrigation infrastructure redundant. These areas were leaky and therefore, costly to maintain resulting in inefficient costs being passed onto irrigators.	Decommissioning 17.8km pipeline in the Mildura urban area reduces operation and maintenance costs as well as eliminates leaking pipes. The value of this reduction in cost is \$35,000 per year.	 Reduced operations, maintenance and administrative costs
Important environmental assets stranded	The Cardross Lakes and Woorlong Wetlands adjacent to the irrigation districts were without a year round water supply, reducing their value as habitat and opportunities for optimal timing of environmental watering events.	Enhanced and effective environmental watering opportunities in Cardross Lakes, assists in the management of water quality to protect endangered aquatic species. In the Woorlong Wetlands, the impacts of salinisation are reduced improving the health of wetland communities.	 Improved health of wetland communities.

KEY ACTIVITIES

Activity Timeline

The following table details the progression of activities for the SMP:

SMP Funding Agreement executed	Dec 2013
Project Director appointed	Jan 2014
Project Delivery Team assembled	Feb 2014
Transfer of 3 GL of Water Savings	March 2014
Early metering works commenced by Local Contractors	April 2014
Early metering works completed by Local Contractors	June 2014
Metering and telemetry contract awarded to Comdain Infrastructure	June 2014
Work begins on metering installations and upgrades by Comdain Infrastructure	July 2014
Pumps and Pipelines Contract awarded to GOLD Joint Venture	Aug 2014
Upgrading work completed on Red Cliffs and Mildura Pumping Stations	Sept 2014
LMW announces enhancements to Mildura District (KT Pipeline)	Sept 2014
Request for tender issued for Channel Automation	Oct 2014
Designs complete for Pump and Pipelines (Red Cliffs and Merbein)	Nov 2014
Channel Automation Contract awarded to Comdain Infrastructure	Dec 2014
Start of construction of Pumps and Pipelines (Red Cliffs and Merbein)	Jan 2015

Merbein Channel - Yellow Duck Race	Jan 2015
Start of construction of Merbein Pump Station	Feb 2015
Start of construction of Channel Automation Detailed Design for KT Pipeline Complete	Mar 2015
LMW announces enhancements to Red Cliffs District (CD Pipeline)	May 2015
All materials for Pumps and Pipelines delivered Transfer of 3 GL of water	June 2015
Detail Design for CD Pipeline complete Transfer of 1 GL of water	Oct 2015
Project Innovation Award (Australian Water Associated)	Dec 2015
Project Quality Management System certified to ISO 9001 standards	Dec 2015
Construction of CD pipeline commenced	Jan 2016
New Pump Station for CD Pipeline commenced	Mar 2016
Merbein Pump Station complete	
Merbein Pipeline complete	
Red Cliffs Pipeline complete	June 2016
All metering works complete	
All Channel regulators complete	
KT Pipeline Complete CD Pipeline complete	Aug 2016
Red Cliffs Red Duck Race	Δυσ 2016





Communications and Stakeholder Engagement

Over the past 3 years and during the business case development phase, extensive consultation was carried out with growers, businesses and community. Grower forums, information sessions and presentation occurred via YouTube clips, website content, social media campaigns and direct emails and text message services.

During the project delivery phase, LMW and SMP engaged with customers on a regular basis via face-to-face meetings, newsletters, email and media releases.

Nine information clips were developed for release to customers explaining the projects progress and important information about supply via the new pipeline, channel automation and customer water supply.

Project highlights included Duck Races in channels, the Merbein Historic Pump Monument and SMP information clips.

Merbein and Red Cliffs Little Duck Races

In January 2015 the Merbein Duck Race was held with over 2000 spectators attending to see 1500 ducks race along the soon-tobe decommissioned channel. In August this year the Red Cliffs Little Red Duck Race was held which also had a huge response from the community. Proceeds from both races were given to each town for future community projects and events.

Merbein Historic Pump Monument

The historical pump 3 from the Merbein Pump Station was relocated to the Park Reserve located at the top of pump hill in the entrance to the township of Merbein.

A public space has been established for the community to enjoy and view the 100-year-old pump decommissioned as part of the SMP. A section of the channel has also been retained to show how water was delivered to growers.

SMP Information clips

SMP information clips were created to capture the works on film and the decommissioning process of the channels to ensure future generations can understand the transformation of the irrigation system to modern requirements. The clips have been released via social media on YouTube and Facebook with excellent reach with each clip averaging a reach of over 20,000 people and many positive comments received via the social media platforms.

The clips are available at the following web address http://www. lmw.vic.gov.au/About-us/Sunraysia-Modernisation-Plan.aspx



Safety

Safety was pivotal for all project parties with a dedicated resource engaged for the duration of the project assisting the SMP team in surveillance activities on high risk construction sites. The following safety statistics are provided:

Performance Measure	Totals (All Contractors)
Man hours for all contractors	337,843
Hazards Reported	167
Near Miss Reported	16
Incidents Reported	172
First Aid Injury	21
Medical Treatment Injury	1
Lost Time Injury	0

Federal Safety Commission

All Main Contractors were required to maintain accreditation to the Federal Safety Commission scheme for the duration of works. All main contractors completed a scheduled Federal Safety Commission audit during the project. *No adverse findings reported.*

Compliance Management

Utilising electronic recording of site observations for safety, the SMP Team was able to remotely access drawings, databases, project plans and safety resources. Observations, site photographs and real time recording of activities enabled effective compliance management and assisted in achieving successful project outcomes.

Interaction with External Agencies

Stakeholder relationships enhanced due to interaction with Worksafe and other governmental agencies such as Energy Safe Victoria, VicRail / VicTrack, VicRoads, Aboriginal Affairs, local councils (NSW & Vict), the Department of Environment, Water, Land and Planning and the Environmental Protection Authority.

No notifiable type incidents were recorded for the project.

Environment

All main contractors were required to maintain environmental accreditations for the duration of construction works. Site environmental management was performed in accordance with each Contractor's Environmental Management Plan and included activities to conform to the requirements of environmental approvals including Aboriginal Cultural Heritage Assessments and Historical Cultural Heritage Assessments as well a Native Vegetation Offsets.

No legislative or contract environmental breaches recorded during the project.

The SMP had a co-operative relationship with local and state environmental stakeholders with the sharing and transfer of knowledge throughout the project.



CONCLUSION

The Sunraysia Modernisation Project undertaken by Lower Murray Water has been unprecedented in its successful delivery. The project has been achieved within budget and time, but has resulted in significantly more benefits. The amount of open channel replaced with pipeline was more than doubled from the initial scope, resulting in an additional 15% of the Sunraysia Irrigation District having access to 365-days per year water supply.

SMP has been a success in all forms:

- Governance structure has been utilised for other regional Victoria projects;
- Procurement methods have been commended by industry;
- Employment across Sunraysia increased, with many subcontractors learning valuable knowledge and skills;
- Significant investment is occurring in irrigation properties that were not in production prior to the commencement of SMP;
- Crop diversification has commenced, with many irrigators now having the certainty of water throughout the year to grow new crop types or varieties;
- Communities have relished the opportunity to celebrate their history via Duck Races and monuments, with the backfilled channels creating future community spaces;
- Successful project safety outcomes with zero Lost Time Injuries over the three-year construction period;
- Successful environmental outcomes with the project resulting in significant benefits to ecologically important wetlands;
- Establishment of a highly skilled Project Delivery Team within Lower Murray Water; and
- Successful utilisation of digital media such as YouTube clips and technological advancements such as drones utilised for media purposes and electronic site auditing.

SMP has created an opportunity for the Sunraysia Region to grow, renew and look forward to a bright future.

It is hoped that the success of the Sunraysia Modernisation Project will inspire future projects to challenge scopes, enhance works and have strong community involvement.

Lower Murray Water has been successful in obtaining business case funding from the Commonwealth Government, to not only further the achievements made by the SMP, but to create new achievements through the development of the SMP2 Business Case.

The SMP Project Control Group and Delivery Team look forward to the future success of SMP2 and further benefits to enhance the Sunraysia Region.

Lower Murray Water wishes to sincerely thank the Commonwealth and Victorian Governments for funding, support and belief in the Sunraysia Modernisation Project. Together great things can be achieved.







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