

**PACKAGE OF SUPPLY, CONSTRAINTS AND EFFICIENCY MEASURES  
 AGREED BY THE MURRAY–DARLING BASIN MINISTERIAL COUNCIL ON 22 APRIL 2016**

| Project title  | Proponent state(s) | Project description (include location) <sup>1</sup>   |
|--|--------------------|---|
| <b>SUPPLY MEASURES</b>   |                    |   |
| Chowilla Floodplain TLM Project*<br><br><i>Environmental works</i> | South Australia    | <p>The Living Murray (TLM) project. The Chowilla Floodplain works is part of a program of works at icon sites along the River Murray to ensure that environmental water recovered as part of The Living Murray program is used efficiently and ecological elements are maintained.</p> <p>The Chowilla Floodplain project involves a major environmental regulator on the Chowilla Creek and a range of complementary works. The environmental regulator will allow flows to be managed to enable flooding across the floodplain under relatively low river flow conditions. The Chowilla Floodplain works is proposed as a 'supply measure' project.</p> |
| Flows for the Future<br><br><i>Environmental works</i>             | South Australia    | <p>The project proposes activities that at times of low flows, will result in additional flows to riverine environments in the Eastern Mount Lofty Ranges (EMLR), including end of system flows to the Coorong, Lower Lakes and Murray Mouth (CLLMM) in South Australia.</p> <p>The project will restore the environmental important parts of the natural flow pattern within the EMLR that are currently significantly affected by water capture, by shifting the timing of consumptive water capture to higher flow events.</p>   |
| Riverine Recovery Project<br><br><i>Environmental works</i>        | South Australia    | <p>This project aims to return a number of wetlands to a more natural wetting/drying regime which results in evaporative savings that can be used by the environment elsewhere. These savings are assigned to the Commonwealth as a South Australian Class 9 water access entitlement. This entitlement can be used for environmental purposes either within or upstream of the South Australian/Victorian border.</p>  |

| Project title   | Proponent state(s) | Project description (include location) <sup>1</sup>   |
|---|--------------------|---|
| South East Flows Restoration Project*<br><br><i>Environmental works</i>   | South Australia    | <p>The Project will use a combination of newly constructed drains and widened existing drains within the Upper South East drainage system to divert additional water that currently flows to the sea from the Blackford Drain in the Upper South East into the Coorong South Lagoon.</p> <p>The diverted water will provide significant environmental outcomes for en route wetlands of the Upper South East through the provision of additional water of suitable quality, as well as salinity improvements in the Coorong South Lagoon.</p>   |
| South Australian Riverland Floodplain Integrated Infrastructure Program (SARFIIP)<br><br><i>Environmental works</i> | South Australia    | <p>SARFIIP aims to create an integrated and resilient floodplain along the South Australian River Murray, between the border and Lock 1, through a package of works and measures that enable floodplain inundation and freshening of groundwater lenses with particular focus on the Pike and Katarapko floodplains.</p> <p>Environmental works on the Pike and Katarapko Floodplains will optimize the frequency, duration and extent of inundation events to protect and restore these floodplain ecosystems and contribute to Basin Plan environmental outcomes.</p> <p>Salinity management measures will complement the floodplain inundation works to manage ecological risk, enhance ecological condition by maximizing the area of soil salinity that is within the tolerances of target vegetation and to manage any long term and real time in-stream salinity risk.</p>   |
| Belsar-Yungera Floodplain Management Project<br><br><i>Environmental works</i>                                      | Victoria           | <p>This proposed supply measure will maintain and improve flora and fauna habitat values and provide periodic breeding opportunities for wetland species, such as fish, frogs and waterbirds. Managed flows will be able to be delivered to 2,370 hectares of highly valued floodplain, representing one third of the total area. The works can be operated flexibly to meet the water requirements of different vegetation communities, mimicking a broad range of River Murray flows up to 170,000 ML/ day.</p> <p>Through the construction of three large regulators, a series of smaller supporting regulators, track raising (levees) and a pipeline (to allow use of temporary pumps), this project will connect extensive areas of floodplain through tiered watering events. These works will make use of natural flow paths to increase the extent, frequency and duration of inundation from either Basin Plan flows or pumping during low flow events.</p> |

| Project title  | Proponent state(s) | Project description (include location) <sup>1</sup>   |
|--|--------------------|---|
| Burra Creek Floodplain Management Proposal<br><br><i>Environmental works</i>                               | Victoria           | <p>The proposed works will enable inundation of an area of 407 hectares. This represents 33% of the total forest area and almost all of the flood dependent communities found within the forest, and provides a greater extent of watering than is possible under Basin Plan flows.</p> <p>The works involve the construction of three large regulators, raising tracks to form levees, and the removal of barriers to flow on the floodplain.</p>  |
| Gunbower Forest TLM Project*<br><br><i>Environmental works</i>   | Victoria           | <p>A suite of engineering works have been built through the Living Murray program to deliver environmental water to the Gunbower Forest Icon Site, watering up to 4800 ha. These works and associated operating regime have been designed to achieve the ecological objectives that have been set for the forest. The works include two main components:</p> <ul style="list-style-type: none"> <li>• Lower Landscape Works — target the forest wetlands and use relatively small volumes of water. Works included refurbishing existing regulators within the forest, constructing new regulators and decommissioning of a single regulator. These regulators deliver water from either Gunbower Creek or the River Murray (when flows exceed 14,000 ML/d).</li> <li>• Hipwell Road Channel — targets large areas of river red gums and can create the conditions required for large colonial waterbird breeding events. Works include construction of a channel to deliver water from Gunbower Creek to the forest, a new weir in Gunbower Creek and associated works.</li> </ul> |
| Gunbower National Park Floodplain Management Project*<br><br><i>Environmental works</i>                    | Victoria           | <p>The project has been developed to enable the delivery of environmental water to the wetlands and forest of the Gunbower National Park. It will mimic a natural flood event of up to 50,000 ML/day across 500 hectares. This includes almost half of the permanent and temporary wetlands in the project area and 20% (250 hectares) of the River Red Gum with flood dependent understorey.</p> <p>The package of works including a new irrigation weir, regulator and channel enhancements will enable the provision of water to approximately 500 hectares of Gunbower National Park, currently unable to be watered by any other infrastructure.</p>   |
| Guttrum and Benwell State Forests Floodplain Environmental Works Project<br><br><i>Environmental works</i> | Victoria           | <p>The project will reinstate a more natural flooding regime for the Guttrum and Benwell Forests, addressing, in particular, the reduced frequency and duration of floods. The proposed works will water 1,200 ha via the irrigation channel system, including semi-permanent wetlands and 82% of the river red gum forest with flood dependent understorey.</p> <p>The works will include two separate channels to deliver environmental water into Guttrum Forest, one channel in Benwell Forest and containment works (regulators and levees) in both forests to contain water on the floodplain. The works have been designed to meet the environmental watering requirements of the ecological values by mimicking a 26,000 ML/d flood event in the River Murray for Guttrum Forest and a 24,000 ML/d flood event for Benwell Forest.</p>  |

| Project title  | Proponent state(s) | Project description (include location) <sup>1</sup>  |
|--|--------------------|--|
| <p>Hattah Lakes North Floodplain Management Project</p> <p><i>Environmental works</i></p>                            | Victoria           | <p>This project will complement the Living Murray works at the Hattah Lakes Icon Site by enhancing flooding across higher floodplain terraces. The project will also increase the flexibility for environmental water management across the lakes. The proposed works will water an additional 1,130 hectares of floodplain through the construction of two new regulators, a causeway across an existing track and 1.7 kilometres of levees along track alignments.</p>   |
| <p>Hattah Lakes Environmental Flows TLM Project*</p> <p><i>Environmental works</i></p>                               | Victoria           | <p>The project aims to deliver a watering regime that will achieve the ecological objectives for the Hattah Lakes Living Murray Icon Site. The on-ground works have been designed to increase the frequency, duration and extent of flooding across the lakes and surrounding floodplain. The package of works enables watering of 6000 ha and includes:</p> <ul style="list-style-type: none"> <li>• A new pumping station at Messenger's Crossing</li> <li>• Sill lowering in Chalka Creek South</li> <li>• Four new regulators (Messenger's, Oatey's, Cantala, Kramen) and associated works</li> <li>• Refurbishment of an existing regulator (Little Hattah)</li> <li>• Three new stop banks or levees.</li> </ul>   |
| <p>Lindsay Island (Stage 1) Upper Lindsay watercourse Enhancement TLM Project*</p> <p><i>Environmental works</i></p> | Victoria           | <p>Lindsay Island is part of the Lindsay-Wallpolla Icon Site. The Stage 1 works were funded by the Living Murray program and aimed to maintain existing high quality habitat for native fish, increase the extent of flowing habitat on Lindsay Island by about 28 km, improve fish passage between the Lindsay Island anabranches and the River Murray and improve the condition of riparian vegetation. These works will contribute to achieving the ecological objectives that have been set for the site, focusing on in-stream habitat. The works include three new regulators:</p> <ul style="list-style-type: none"> <li>• Upper Lindsay River regulators (north and south inlets)</li> <li>• Mullaroo Creek regulator and fishway.</li> </ul>  |
| <p>Lindsay Island (Stage 2) Floodplain Management Project*</p> <p><i>Environmental works</i></p>                     | Victoria           | <p>The Lindsay Island Floodplain Project will inundate 5,152 hectares of the floodplain and connect many parts of the floodplain through tiered watering events, including areas of unique fast-flowing aquatic habitat, through to sections of black box, lignum and onto the higher alluvial terraces. The proposed works will be operated in tandem with the recently completed Living Murray works at this site (Lindsay State 1) and Lock 7 to mimic flows of 40,000 ML/day to 120,000 ML/day.</p> <p>The proposed works include two components:</p> <ul style="list-style-type: none"> <li>• Primary: Berrabee Regulator and fishway, five containment regulators and 2.6 km of levees along track alignments.</li> <li>• Secondary: 13 regulators and associated works, and 4.9 km of levees along track alignments.</li> </ul> |

| Project title  | Proponent state(s)        | Project description (include location) <sup>1</sup>  |
|--|---------------------------|--|
| <p>Mulcra Island Environmental Flows TLM Project*</p> <p><i>Environmental works</i></p>  | Victoria                  | <p>Mulcra Island is part of the Lindsay-Wallpolla Islands Icon Site. The works have been funded through the Living Murray program and will assist in achieving the ecological objectives that have been set for the icon site by increasing the frequency, duration and extent of wetland and floodplain inundation, improving fish access to the creek and introducing flows to the upper Potterwalkagee Creek. The works enable watering of 820 ha included the construction of seven environmental regulators and associated works, including sill lowering, stream rehabilitation and upgrading access tracks.</p>   |
| <p>Nyah Floodplain Management Project</p> <p><i>Environmental works</i></p>              | Victoria                  | <p>The proposed works will water almost 500 hectares of floodplain within Nyah Forest, replicating River Murray flows of up to 25,000 ML/day. The works will influence over 53% of the total forest area and almost all of the flood dependent communities. The works consist of four regulators, three on the downstream end of Parnee Malloo Creek and one on the upstream end. Additional works to contain water within the forest include 1,648 metres of low level track raising, forming a levee at the downstream end of the forest.</p>  |
| <p>Vinifera Floodplain Management Project</p> <p><i>Environmental works</i></p>          | Victoria                  | <p>The Vinifera Floodplain project will water up to 350 hectares of floodplain within Vinifera Forest. This represents 55% of the total forest area (638) and almost all of the flood dependent communities. The proposed works involve construction of four regulators and 1,087 metres of low level track raising to enable control of both flood and pumped flows into and out of Vinifera Creek. Water will be delivered to the site through a combination of natural inflows or temporary pumping when river flows are insufficient.</p>  |
| <p>Wallpolla Island Floodplain Management Project*</p> <p><i>Environmental works</i></p> | Victoria                  | <p>Wallpolla Island is part of the Living Murray's Lindsay-Wallpolla Islands Icon Site. The proposed works will complement existing Living Murray works at this icon site. This project will increase the frequency and duration of floodplain inundation across 2650 ha, providing significant benefit to nationally important species, threatened vegetation communities, ecological values, carbon cycling and downstream water quality. This will benefit both Wallpolla Island and the broader Lower Murray region.</p> <p>The proposed works include four major regulators, 22 smaller containment regulators and 4.5 km of levees (raised tracks). The works have been designed to complement weir pool manipulation activities (Locks 8 and 9) and connect areas of flowing aquatic habitat with sections of black box, lignum and higher alluvial terraces. This will enable watering at a landscape scale, mimicking flows of 30,000 ML/day to 120,000 ML/day.</p> |
| <p>Barmah-Millewa Forest Environmental Water Allocation*</p> <p><i>Rule change</i></p>   | Victoria /New South Wales | <p>Rule change to vary the rules associated with the water set aside by Victoria and NSW in an environmental account (BMFEWA) to water the Barmah-Millewa Forest proposed to allow the use of other environmental entitlements to target the environmental requirements specified in the Basin Plan.</p> <p>This measure proposes to trigger Barmah-Millewa Forest Environmental Watering Account if a four month flood has not occurred, and no longer make automatic releases in December.</p>   |

| Project title  | Proponent state(s)         | Project description (include location) <sup>1</sup>  |
|--|----------------------------|--|
| Flexible Rates of Fall in River Levels Downstream of Hume Dam*<br><br><i>Rule change</i>                         | Victoria / New South Wales | Rule change to allow Hume releases to be reduced more quickly when flows have not been elevated for an extended period beforehand, with the water saved released at a different point in time or in a different flow pattern that would provide additional environmental benefits. The additional flexibility improves Hume Dam operational efficiency.  |
| Hume Dam airspace management and pre-release rules*<br><br><i>Rule change</i>                                    | Victoria / New South Wales | Rule change to allow future environmental water releases in airspace management. When environmental water releases are anticipated, the revised rules reduce both airspace and pre-release target volumes.   |
| Improved Regulation of the River Murray<br><br><i>Rule change</i>  | Victoria / New South Wales | It is proposed that the recent observed improvement in operational loss efficiency be locked in, and recognised by putting in place revised arrangements for estimating the operational loss requirements needed to run the River Murray system.   |
| Computer Aided River Management (CARM) Murrumbidgee<br><br><i>Rule change</i>                                    | New South Wales            | The CARM project aims to use better information in the form of metering, inundation models and more accurate loss estimates to allow operators to more accurately make releases to meet downstream orders. The saved operational loss may then be calculated and set aside to achieve environmental outcomes.<br><br>A callable entitlement as a result of the envisaged saving will allow delivery of previous losses (which were also contributing to environmental outcomes) in a more managed way. |
| Improved Flow Management Works at the Murrumbidgee River - Yanco Creek Offtake<br><br><i>Environmental works</i> | New South Wales            | This proposal aims to return the Yanco Creek system closer to a pre-development wetting/drying regime, while improving infrastructure that supplies irrigation and stock and domestic water. Upgrades to Yanco Weir on the Murrumbidgee would result in more control over flows through the proposed Yanco Creek regulator. This may provide the Commonwealth Environmental Water Holder/Office of Environment and Heritage with more flexibility in managing flows within the Murrumbidgee system.    |
| Modernising Supply Systems for Effluent Creeks – Murrumbidgee River<br><br><i>Environmental works</i>            | New South Wales            | This proposal involves returning parts of three creek systems closer to a pre-development wetting/drying regime, while improving infrastructure that supplies irrigation and stock and domestic water. This project may provide the Commonwealth Environmental Water Holder/Office of Environment and Heritage with more flexibility in managing flows within the Murrumbidgee system.   |

| Project title   | Proponent state(s) | Project description (include location) <sup>1</sup>   |
|---|--------------------|---|
| <p>Nimmie Caira Infrastructure Modifications Proposal</p> <p><i>Environmental works</i></p>   | New South Wales    | <p>Reconfigure water delivery infrastructure to more effectively deliver environmental flows to the Nimmie-Caira floodplain and other parts of the Lowbidgee. This project, along with the Murray and Murrumbidgee Valley National Parks SDL Adjustment Supply measure has the potential to supply significant additional environmental benefit to the area.</p>  |
| <p>SDL offsets in the Lower Murray NSW*</p> <p><i>Environmental works and Rule change</i></p>   | New South Wales    | <p>The project aims to improve environmental water delivery and achieve better environmental and operational outcomes than achieved under the SDL benchmark model. This is to be done through the manipulation of weir pools, construction of a replacement pump station for Lake Cullulleraine (in Victoria), and works in the Carrs, Capitts and Bunberoo Creek systems to provide evaporative and seepage water savings.</p> <p>Weir pools can create unnatural inundation of connected wetlands when the river is held artificially high. Lowering the weir pool can be used to return wetlands to a more natural wetting/drying regime, while raising it can allow water to reach areas that would be difficult to water under most conditions. The strategy of raising and lowering the weirs should provide an environmental benefit compared to an artificially constant weir pool level.</p> |
| <p>2011 Snowy Water Licence Schedule 4 Amendments to River Murray Increased Flows Call Out Provisions</p> <p><i>Rule change</i></p>     | New South Wales    | <p>Amendments to Snowy Hydro licence in 2011 allow the water recovered by the Murray River Increased Flows to be held and called out. Previously the release of the water was at the discretion of Snowy Hydro and was generally at times suited to Snowy Hydro's commercial outcomes. The proposal intends to provide a means to control the timing of RMIF water releases from the Snowy Scheme, allowing more flexibility to achieve environmental outcomes targeted in the River Murray below Lake Hume.</p>  |
| <p>Structural and operational changes at Menindee Lakes*</p> <p><i>Environmental works and Rule change</i></p>                          | New South Wales    | <p>Changes to improve the efficiency of the Menindee Lakes as water storages have been discussed over the past decade. A supply measure proposal for the Menindee Lakes is currently under development by NSW.</p>  |
| <p>TLM environmental works and measures - Koondrook-Perricoota Forest Flood Enhancement proposal*</p> <p><i>Environmental works</i></p> | New South Wales    | <p>Koondrook-Perricoota Forest is a highly significant floodplain ecosystem on the River Murray in NSW. The Koondrook-Perricoota Forest is a large mosaic of river red gum, black box and grey box communities, interspersed by wetland ecosystems in New South Wales. Covering 32,000ha the state forest (Crown land) is managed by Forests NSW and is listed on the Register of the National Estate. The structures have been built and partially commissioned by NSW Water and MDBA River Murray Operation.</p>  |
| <p>Murray and Murrumbidgee Valley National Parks SDL Adjustment Supply Measure</p> <p><i>Environmental works</i></p>                    | New South Wales    | <p>The proposal is for a suite of works across the national park estate in the Murray and Murrumbidgee valleys. It aims to deliver more targeted environmental watering than achieved under benchmark conditions of development and benefit public land areas exceeding 70,000 ha. Benefits identified include improved native fish outcomes and a reduction in the frequency and level of flooding on private land holdings and blackwater events.</p>   |

| Project title   | Proponent state(s)           | Project description (include location) <sup>1</sup>   |
|---|------------------------------|---|
| <b>CONSTRAINTS MEASURES</b>   |                              |   |
| Goulburn key focus area<br><i>Also nominated as a supply measure</i>                      | Victoria                     | Investigation of opportunities to address physical and policy constraints to the delivery of higher flows (up to 25,000 ML/day at Shepparton). Investigations will include the potential effects of higher flows on third parties and mitigation options to address unacceptable impacts (including easements and/or infrastructure) to allow the delivery of these flows (to support improved river and wetland health outcomes).  |
| Hume to Yarrawonga key focus area<br><i>Also nominated as a supply measure</i>            | Victoria/<br>New South Wales | Investigation of opportunities to address physical and policy constraints to the delivery of higher regulated flows (up to 40,000ML/day from Hume Dam). Investigations will include the potential effects of higher flows on third parties and mitigation options to address unacceptable impacts (including easements and/or infrastructure) to allow the delivery of these flows (to support improved river and wetland health outcomes).   |
| Lower Darling key focus area<br><i>Also nominated as a supply measure</i>                 | New South Wales              | Investigation of opportunities to address physical and policy constraints to the delivery of higher regulated flows (up to 14,000 ML/day at Weir 32). Investigations will include the potential effects of higher flows on third parties and mitigation options to address unacceptable impacts (including easements and/or infrastructure) to allow the delivery of these flows (to support improved river and wetland health outcomes).   |
| Murrumbidgee key focus area<br><i>Also nominated as a supply measure</i>                  | New South Wales              | Investigation of opportunities to address physical and policy constraints to the delivery of higher regulated flows (up to 40,000 ML/day at Wagga Wagga). Investigations will include the potential effects of higher flows on third parties and mitigation options to address unacceptable impacts (including easements and/or infrastructure) to allow the delivery of these flows (to support improved river and wetland health outcomes).   |
| South Australian Murray key focus area<br><i>Also nominated as a supply measure</i>       | South Australia              | Investigation of opportunities to address physical and policy constraints to the delivery of higher regulated flows up to 80,000ML/day at the South Australian border. Higher flows are important for maintaining longitudinal connectivity from the border to the Coorong, Lower Lakes and Murray Mouth and promoting lateral connectivity to deliver water to the wetlands, floodplains, creeks and anabranches connected to the main river channel.  |
| Yarrawonga to Wakool junction key focus area<br><i>Also nominated as a supply measure</i> | New South Wales              | Investigation of opportunities to address physical and policy constraints to the delivery of higher flows (to 30,000 ML/d downstream of Yarrawonga Weir, allowing a mitigation buffer of to 50,000 ML/d). Investigations will include the potential effects of higher flows on third parties and mitigation options to address unacceptable impacts (including easements and/or infrastructure) to allow the delivery of these flows (to support improved river and wetland health outcomes).<br><br>This project will be nominated as a supply measure at a flow rate of 30,000 ML/d at Yarrawonga Weir. |

| Project title         | Proponent state(s) | Project description (include location) <sup>1</sup>   |
|-----------------------|--------------------|---|
| Gwydir key focus area | New South Wales    | Exploring options to allow greater ability to deliver environmental water to wetlands on the Gingham watercourse, lower Gwydir River and Mallowa watercourse. |

Notes:

1. Parties will continue to submit updated information about projects, which may affect these descriptions.
- \* Projects with an asterix are included in current MDBA modelling of supply measures. The MDBA has so far modelled 15 of the 37 nominated supply measures, which have an estimated SDL offset of 370 gigalitres. This estimate is anticipated to increase in line with the stocktake report. The MDBA will provide updated figures to the Ministerial Council as the modelling progresses and a final number will be known when the MDBA has modelled the complete package. The Council has agreed to keep the community informed of progress.

**Efficiency measures**

|  |   |
|--|---|
| <p><b>Title of project</b></p>                 | <p>On Farm Irrigation Efficiency and Other Water Use Efficiencies</p>   |
| <p><b>Project description and benefits</b></p> | <p>The set of works listed below to be undertaken on farm and/or off farm with the participation of consumptive water users decreases or will decrease the quantity of water required for one or more consumptive uses in a set of surface water SDL resource units, compared with the quantity required under the benchmark conditions of development, with the water savings transferred to the Commonwealth and forming part of the Commonwealth environmental water holdings:</p> <ul style="list-style-type: none"> <li>• Installing, upgrading and/or reconfiguring water delivery and irrigation infrastructure or technology.</li> <li>• Upgrading, closure, restructuring, reconfiguring and/or installing water delivery systems.</li> <li>• Improving irrigation water delivery management systems and associated telemetry and controls.</li> <li>• Upgrading and/or installing of delivery system operation technologies.</li> <li>• Changing the management of dams, weirs, locks and other river infrastructure.</li> <li>• Modifying, reconfiguring and/or replacing water delivery channels and/or fencing.</li> <li>• Constructing channels and/or upgrading to regulatory channel structures.</li> <li>• Decommissioning water delivery channels.</li> <li>• Installing, upgrading and/or reconfiguring surface and/or sub-surface piping.</li> <li>• Installing, upgrading, improving and/or reconfiguring :             <ul style="list-style-type: none"> <li>○ pump systems</li> <li>○ pump stations and associated power and control arrangements</li> <li>○ fertigation systems</li> <li>○ pumping equipment</li> <li>○ pump houses.</li> </ul> </li> <li>• Improving connection to a water re-use system; reconfiguring filtration; reducing seepage, leakage or other system, transmission or storage losses.</li> <li>• Removing redundant structures and/or streamlining irrigation delivery infrastructure and/or technology.</li> <li>• Rationalising individual irrigators and/or other water users within a water supply scheme.</li> <li>• Modifying and/or improving irrigated area layout or design.</li> <li>• Constructing or upgrading drainage and reuse/recirculation systems and practices.</li> <li>• Improving water use efficiency through laser or GPS levelling.</li> <li>• Renewing surface irrigation through paddock land-forming works.</li> <li>• Installing, upgrading, improving and/or reconfiguring surface and/or sub-surface irrigation systems:             <ul style="list-style-type: none"> <li>○ pressurised irrigation systems</li> <li>○ overhead irrigation systems</li> <li>○ drip, trickle, sprinkler or micro-sprinkler systems</li> <li>○ multi line irrigation systems</li> <li>○ micro and mini irrigation systems</li> <li>○ spray irrigation technologies.</li> </ul> </li> <li>• Improving flood irrigation.</li> <li>• Installing, upgrading and/or reconfiguring irrigation automation, sensing, control and monitoring systems and scheduling tools.</li> </ul> |

|  |  |
|--|--|
| <b>Title of project</b>                | On Farm Irrigation Efficiency and Other Water Use Efficiencies   |
|  | <ul style="list-style-type: none"> <li>• Installing, upgrading and/or reconfiguring water metering systems.</li> <li>• Installing river level and channel gauges.</li> <li>• Installing remote monitoring.</li> <li>• Installing, upgrading, improving and/or reconfiguring irrigation systems as a temperature mitigation strategy to minimise the need to overwater on high temperature days or reduce frost incidence or impact.</li> <li>• Installing weather proof netting and/or wind breaks.</li> <li>• Installing, upgrading and/or reconfiguring moisture monitoring equipment; moisture sensors and irrigation timers; moisture probes, relays and computer and communication equipment to monitor soil moisture levels.</li> <li>• Improving soil moisture holding capacity through mulching, manuring, cultivation and/or addressing soil acidity and alkalinity.</li> <li>• Upgrading, improving, and/or reconfiguring surface or sub-surface storages to reduce losses or installing or upgrading equipment to reduce losses.</li> <li>• Installing, upgrading, improving and/or reconfiguring surface or sub-surface storages.</li> <li>• Water harvesting.</li> <li>• Transferring to covered, intensive production systems.</li> <li>• Reconfiguring or diversifying crops or changing cropping times to reduce water requirement.</li> <li>• Changing to non-irrigation production systems.</li> <li>• Changing land or environmental management.</li> <li>• Modernising water supply control systems and its telemetry.</li> <li>• Changing water supply - replacing MDB water supply with groundwater, recycled water or water supply from a desalinisation plant.</li> <li>• Recovering and/or reusing wastewater.</li> <li>• Recycling water through hydroponics.</li> <li>• Recharging aquifers and/or underground storage of water.</li> </ul> |
| <b>Estimated costs</b>                 | <ul style="list-style-type: none"> <li>• Greater than \$1.2 billion</li> </ul>   |
| <b>SDL resource unit code and area</b> | <ul style="list-style-type: none"> <li>• All units in the Murray–Darling Basin Plan</li> </ul>   |
| <b>Status</b>                          | <ul style="list-style-type: none"> <li>• Commonwealth is finalising details of an on-farm efficiency measures programme following public consultation in 2015.</li> <li>• Commonwealth is also developing an off-farm efficiency measure programme intended to complement on-farm efficiency measures and gap-bridging water recovery programmes.</li> </ul>   |

|   |   |
|---|---|
| <b>Title of project</b>                 | Urban or Industrial and Mining areas water efficiency   |
| <b>Project description and benefits</b> | <p>The set of works listed below to be undertaken in urban or industrial areas with the participation of consumptive water users decreases or will decrease the quantity of water required for one or more consumptive uses in a set of surface water SDL resource units, compared with the quantity required under the benchmark conditions of development, with the water savings transferred to the Commonwealth and forming part of the Commonwealth environmental water holdings:</p> <ul style="list-style-type: none"> <li>• Constructing, replacing, upgrading, improving, or refurbishing bulk water infrastructure.</li> <li>• Improving management of bulk water supplies.</li> <li>• Upgrading, improving and/or refurbishing bulk water transport and/or distribution infrastructure.</li> <li>• Replacing surface water with fit-for-purpose water delivered from alternative supplies.</li> <li>• Improving economic regulation, competition and/or governance arrangements that lead to an increase in efficiency, availability, effectiveness and/or sustainability of the urban water sector.</li> <li>• Constructing, replacing, upgrading, installing, improving, or refurbishing filtration and/or water treatment infrastructure.</li> <li>• Constructing, replacing, installing, upgrading, refurbishing and/or improving the operation of urban water delivery infrastructure.</li> <li>• Improving systems for monitoring and predicting leaks.</li> <li>• Constructing, replacing, installing, upgrading, refurbishing and/or improving the operation of stock and domestic delivery infrastructure.</li> <li>• Constructing, replacing, upgrading, installing, improving or refurbishing water recycling and/or water reuse infrastructure.</li> <li>• Constructing, replacing, installing, upgrading, improving or refurbishing stormwater and waste-water capture and quality improvement infrastructure.</li> <li>• Constructing, replacing, installing, upgrading, improving or refurbishing stormwater and waste-water reuse infrastructure and/or devices.</li> <li>• Constructing, replacing, upgrading, installing, improving or refurbishing water sensitive urban design infrastructure and/or landscaping.</li> <li>• Improving management, use and/or integration of urban water sources.</li> <li>• Constructing, replacing, installing, upgrading, improving and/or refurbishing water efficient devices and/or technology.</li> <li>• Installing alternative household and/or community water supplies.</li> <li>• Metering and/or pressure management.</li> <li>• Reducing demand through demand management.</li> <li>• Undertaking water audits and/or offering rebates.</li> <li>• Consolidating and/or returning water entitlements where existing available water is no longer required for urban or other use.</li> </ul> <p>Programmes will be designed requiring adherence to all relevant approvals and regulations.</p> |
| <b>Estimated costs</b>                  | <ul style="list-style-type: none"> <li>• Less than \$400 million</li> </ul>   |
| <b>SDL resource unit code and area</b>  | <ul style="list-style-type: none"> <li>• All units in the Murray–Darling Basin Plan</li> </ul>  |
| <b>Status</b>                           | <ul style="list-style-type: none"> <li>• Urban or industrial and mining areas water efficiency programmes providing for improved water use efficiency will be designed over the next year in consultation with states and stakeholders.</li> </ul>  |