



# Possible structural works considered for Menindee Lakes Scheme Options

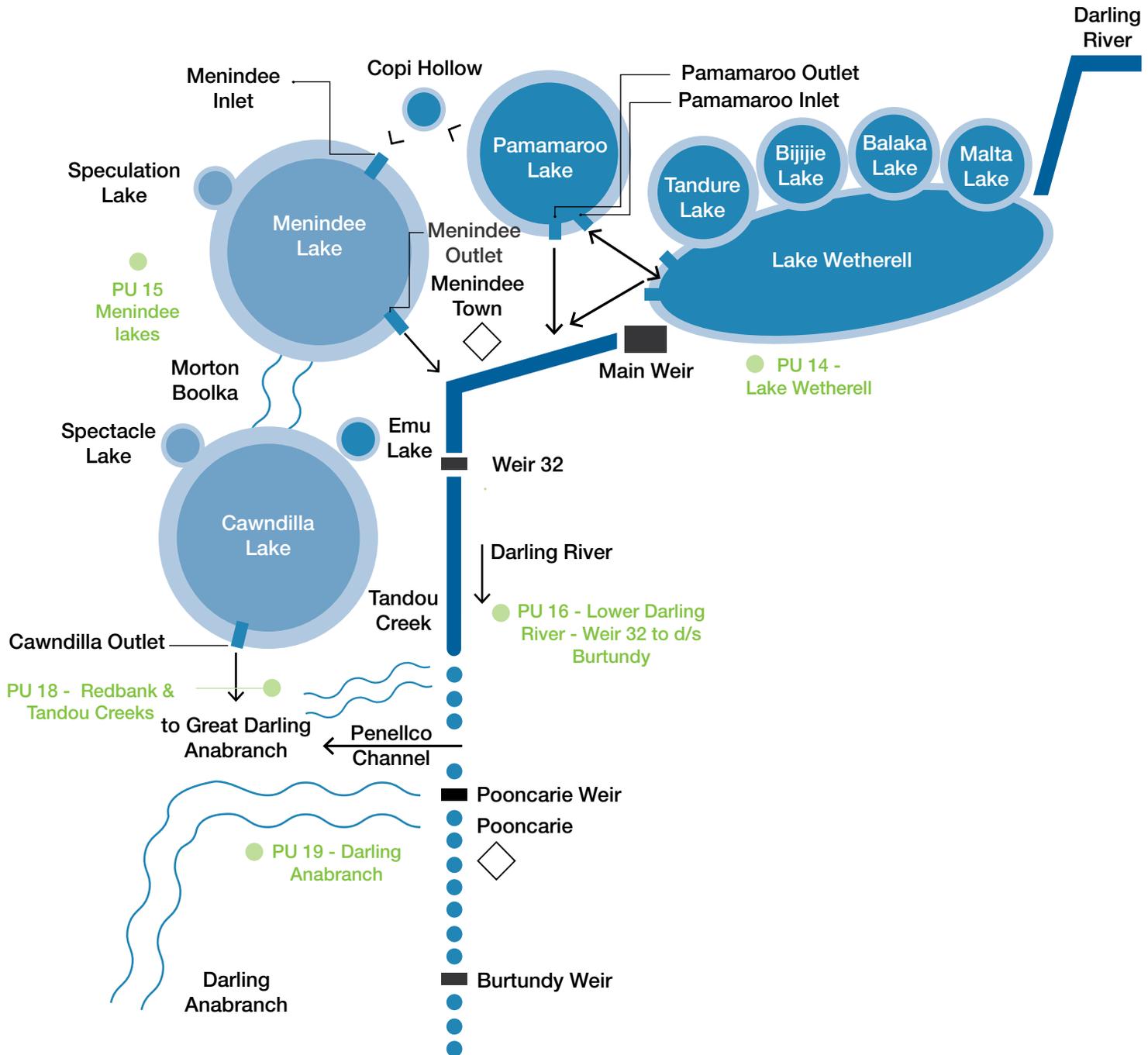
Structural works	New Scheme options											
	A	B	C	D	E	F	G	H	I	J	K	L
Enlarged Menindee outlet up to 14,000ML/day			SDLAM605 works	SDLAM605 works	Modified SDLAM605 works	Alternative combinations		Alternative combinations		Alternative combinations	Alternative combinations	
Menindee drainage channel to bypass Menindee Ck and access residual pool			SDLAM605 works	SDLAM605 works	Modified SDLAM605 works	Alternative combinations		Alternative combinations			Alternative combinations	
Morton-Boolka regulator (full height above FSL)			SDLAM605 works	SDLAM605 works				Alternative combinations				
Morton-Boolka regulator (half height 57.5m)					Modified SDLAM605 works							
Increased capacity Cawndilla drainage channel					Modified SDLAM605 works	Alternative combinations	Alternative combinations	Alternative combinations	Alternative combinations			
Enlarged Cawndilla outlet (2,000ML/day)							Alternative combinations	Alternative combinations	Alternative combinations	Alternative combinations		
Deepen Lakes Malta, Balaka and Bijjije (+ regulators)							Alternative combinations					
Lake Tandure regulator							Alternative combinations	Alternative combinations	Alternative combinations	Alternative combinations		
Lake Bijjije regulator								Alternative combinations	Alternative combinations	Alternative combinations		
Enhance Penellco Channel (larger, reverse grade, 2 regulators)							Alternative combinations	Alternative combinations	Alternative combinations	Alternative combinations		
Pamamaroo drainage channel to bypass internal Ck and access residual pool							Alternative combinations					
Ancillary infrastructure (ecological offset) at Cawndilla Creek (regulator)			SDLAM605 works					Alternative combinations				
Ancillary infrastructure (main channel capacity) at Yartla and Anabranche offtakes			SDLAM605 works	SDLAM605 works	Modified SDLAM605 works			Alternative combinations				
Internal levee around northern and western edge of Pamamaroo and Menindee									Alternative combinations			
Levee around entire internal perimeter of Menindee and Cawndilla										Alternative combinations		
Raise height of Pooncarie Weir											Alternative combinations	
Use 3-mile creek as fast flowing fish habitat												Alternative combinations

**Note that the use of new fishway structures would be an important component in any scheme**

<b>Legend:</b>	No new works	SDLAM605 works	Modified SDLAM605 works	Alternative combinations
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## Scheme A: No new infrastructure, modify operations to improve environmental outcomes (not operate the Lakes as a water storage)

The purpose of this scheme is to test the impact of retaining existing structures and maximise Environmental Water Requirements (EWR) outcomes for all five Planning Units through changes to operating rules.



# Overview of potential scheme options to be considered for further assessment

## Scheme A – No new infrastructure, modify operations to improve environmental outcomes (not operate the Lakes as a water storage)

The purpose of this scheme is to test if it is possible to retain existing structures and maximise Environmental Water Requirements (EWR) outcomes for all five Planning Units through changes to operating rules

### *Structure Options*

- No change from current scheme

### *Operational Options*

- Maintain Order of Lake filling and draw down
- Operate the Lakes to maximise EWR's in the Lakes, Lower Darling and Anabranh
- Modify MDBA 640/480 rule if required to achieve the above
- Use Cawndilla to target Anabranh EWRs
- Water entering the Murray via the Anabranh will need to be accounted for and made available for downstream use

### *EWR benefit/risk relative to SDLM605 scenario*

- Likely improvement in EWR outcomes compared to benchmark and current system

### *Evaporative water savings relative to SDLM605 scenario*

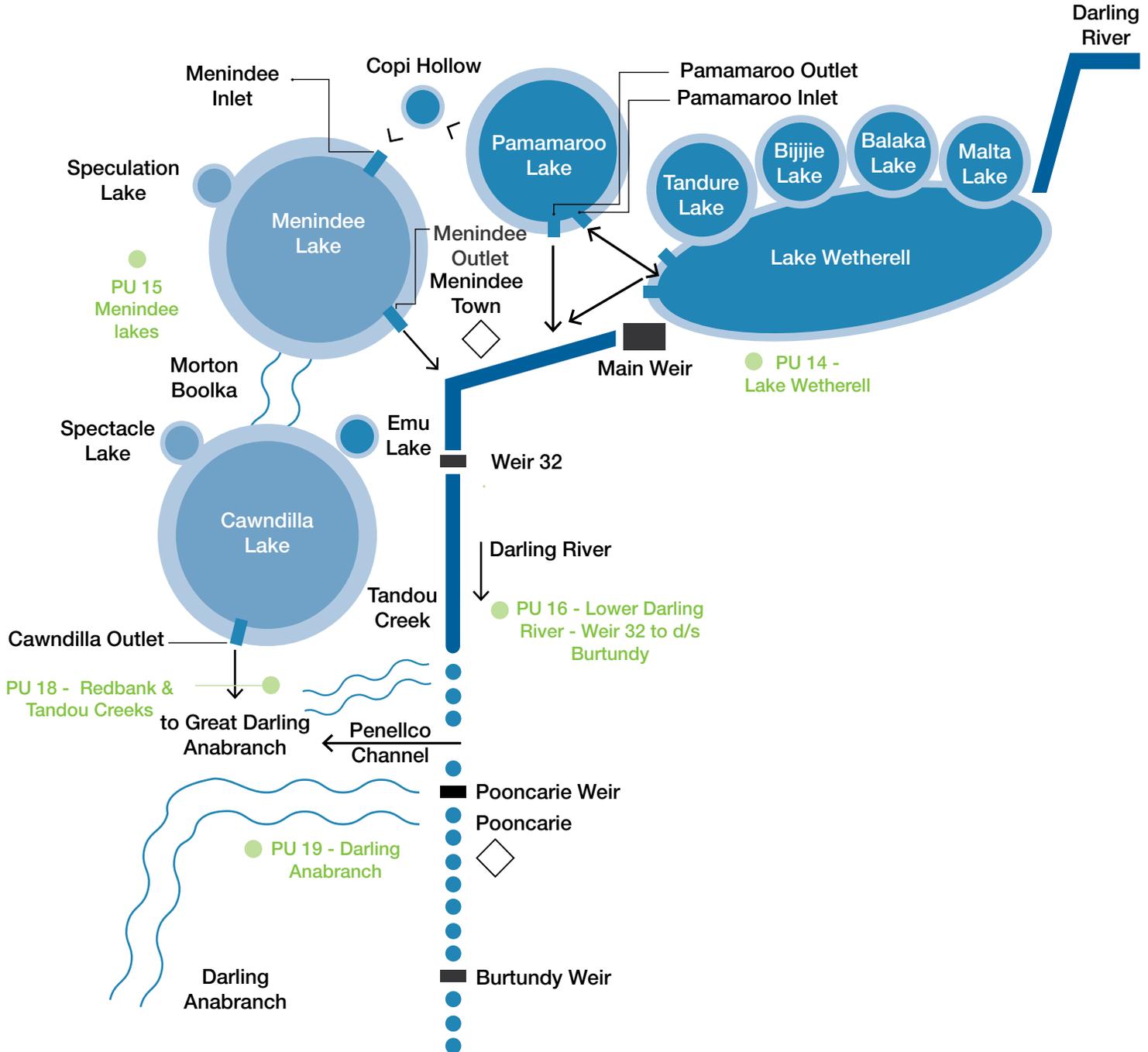
- Substantial reduction in evaporative water savings from SDLAM 605 benchmark due to increase in storage duration and no separation of Menindee and Cawndilla

### *Capital Cost movement relative to SDLM605 scenario*

- Substantial reduction in capital cost requirements
- Potential additional operational cost as no improvement in operational efficiency of the lakes

## Scheme B: No new infrastructure, modify operations to focus on SAG objectives

The purpose of this scheme is to test if it is possible to retain existing structures and increase drought reserve in the upper lakes to 3 summers and maintain a set minimum flow of 150ML/day (and no cease to flow events) in the lower Darling River.



## Scheme B – No new infrastructure, modify operations to focus on SAG objectives as tabled in February 2020

The purpose of this scheme is to test if it is possible to retain existing structures and increase the drought reserve to 3 summers and maintain a minimum flow of 150ML/day (and no cease to flow events) in the lower Darling River

### *Structure Options*

- No change from current scheme

### *Operational Options*

- Maintain order of Lake filling and draw down
- Operate lakes to ensure a three summer drought reserve, preferably in the top lakes in order to maintain base flows in the lower Darling River at a minimum of 150ML/day at Burtundy Weir with no cease-to-flow events
- Modify MDBA 640/480 rule to achieve the above

### *EWR benefit/risk relative to SDLM605 scenario*

- Unlikely to be a change to Menindee and Cawndilla EWR outcomes
- Likely improvement in Lower Darling low flow EWR outcomes however uncertain impact on medium and high flows due to need to retain additional water in the lakes

### *Evaporative water savings relative to SDLM605 scenario*

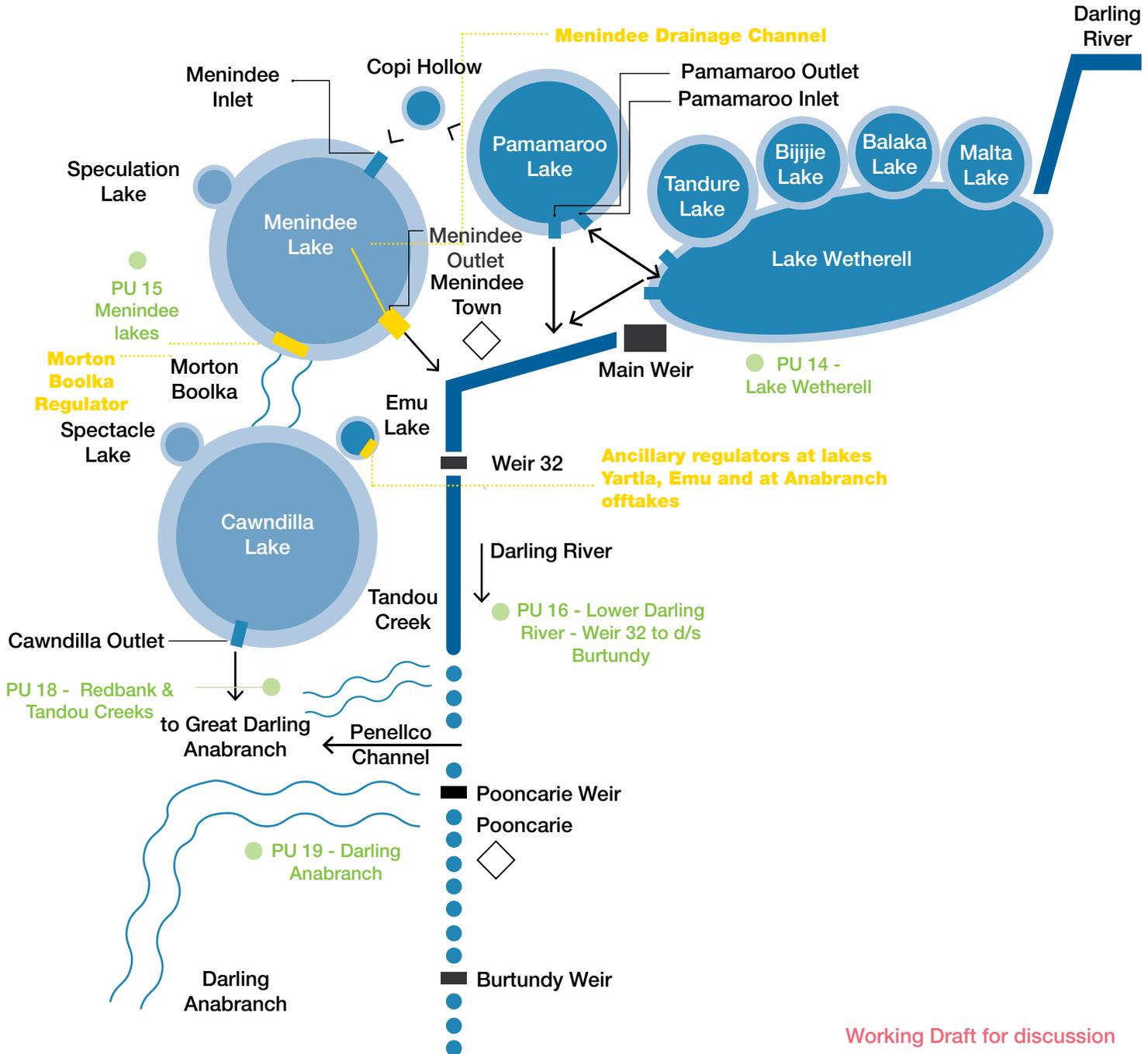
- Substantial reduction in predicted evaporative water savings from SDLAM 605 scenario due to increase in storage duration for drought reserve and no separation of Menindee and Cawndilla

### *Capital Cost movement relative to SDLM605 scenario*

- No substantial change

## Scheme C: SDLAM605 infrastructure with operational modification to focus on SAG objectives

The purpose of this scheme is to test the impact on the project objectives of using the proposed SDLAM605 structures and modify the proposed operating rules to increase the drought reserve to three summers in order to maintain a set minimum flow (no cease to flow events) in the lower Darling River at 150ML/day.



## Scheme C – SDLAM605 infrastructure scheme with operational modification to focus on SAG objectives as tabled in February 2020

The purpose of this scheme is to test the impact on the project objectives of using the proposed SDLAM605 proposed structures and modifying the proposed operating rules to increase the drought reserve to three summers in order to maintain a set minimum flow (no cease to flow events) in the lower Darling River at 150ML/day

### *Structure Options*

- Menindee Outlet up to 14,000 ML/d
  - Ancillary infrastructure (regulators + other works) required to contain flows in main channel particularly at Yartla Lake and at Anabranche offtake
- Menindee drainage channel for access to residual pool
- Morton-Boolka regulator
  - Potential need for ancillary infrastructure at Cawndilla Creek for environmental protection depending on operating rules for filling Cawndilla

### *Operational Options*

- Maintain Order of Lake filling and draw down
- Modify SDLAM605 80:80 rule to create a three summer drought reserve in order to maintain base flows in the lower Darling River at a minimum of 150ML/day at Burtundy Weir with no Cease-to-flow events

### *EWR benefit/risk relative to SDLAM605 scenario*

- Likely improvement in Lower Darling low flow EWR outcomes however uncertain impact on medium and high flows due to need to retain additional water in the lakes

### *Evaporative water savings relative to SDLAM605 scenario*

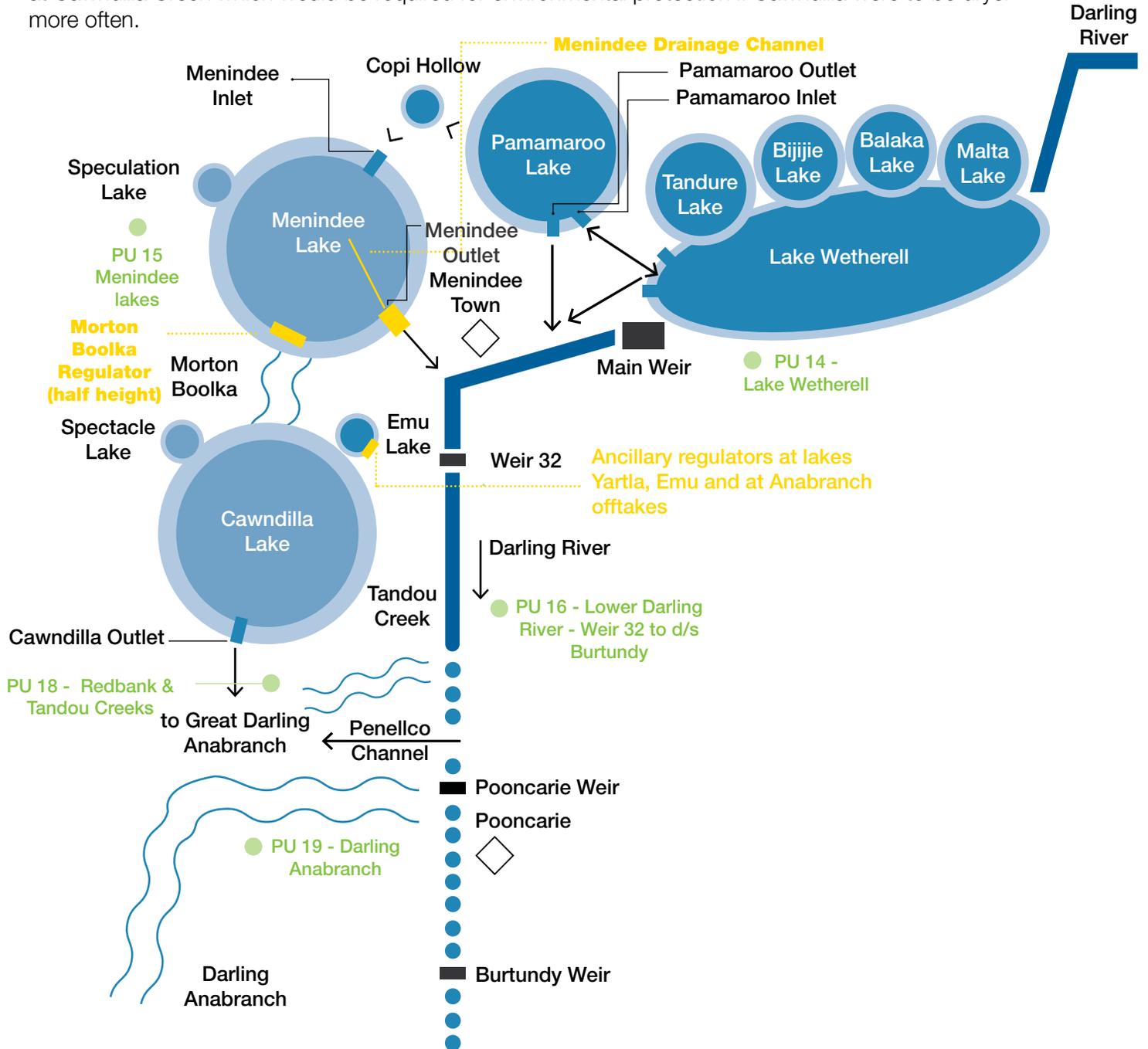
- Likely substantial reduction in predicted evaporative water savings from SDLAM 605 scenario due to increase in storage duration for drought reserve

### *Capital Cost movement relative to SDLAM605 scenario*

- No substantial change

## Scheme D SDLAM605 infrastructure with operational modification to improve Cawndilla low and medium fill and Anabranch EWR outcome

The purpose of this scheme is to test the impact on the project objectives of modifying the proposed operations of the lakes using the SDLAM605 structures to allow better EWR outcomes for Lake Cawndilla as well as downstream and Anabranch EWRs. This may also remove the need for ancillary infrastructure at Cawndilla Creek which would be required for environmental protection if Cawndilla were to be dryer more often.



**Scheme D –SDLAM605 infrastructure scheme with operational modification to improve Cawndilla low and medium fill and Anabranh EWR outcome**

**The purpose of this scheme is to test the impact on the project objectives of modifying the proposed operations of the lakes using the SDLAM605 structures to allow better EWR outcomes for Lake Cawndilla as well as downstream and Anabranh EWRs. This may also remove the need for ancillary infrastructure at Cawndilla Creek which would be required for environmental protection if Cawndilla were to be dryer more often**

*Structure Options*

- Menindee Outlet up to 14,000 ML/d
  - Ancillary infrastructure (regulators + other works) required to contain flows in main channel particularly at Yartla Lake and at Anabranh offtake
- Menindee drainage channel for access to residual pool
- Morton-Boolka regulator

*Operational Options*

- Maintain Order of Lake filling and draw down
- Modify SDLAM605 80:80 rule to improve Cawndilla low and medium fills and downstream EWR
- Use Anabranh for MDBA conveyance of water to Murray (accounting for water entering the Murray via the anabranh)

*EWR benefit/risk relative to SDLM605 scenario*

- Likely improvement in Cawndilla low and medium level EWR attainment when compared to both the SDLAM 605 and benchmark scenario
- Potential for improved downstream and Anabranh EWR attainment. However potential impact on Lower Darling downstream EWR from increased filling of Cawndilla

*Evaporative water savings relative to SDLM605 scenario*

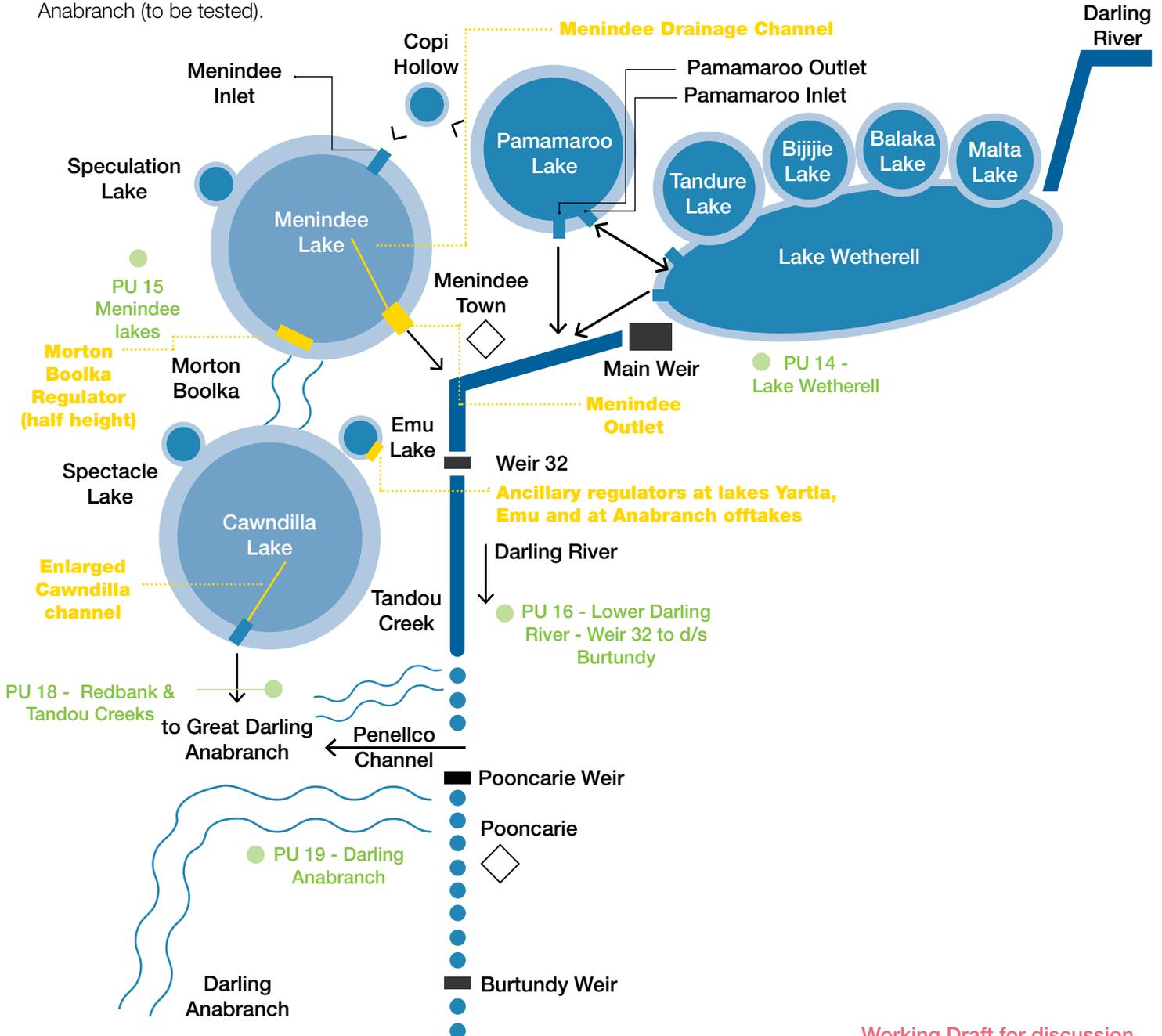
- Increasing flows to L Cawndilla will reduce SDLAM 605 scenario predicted evaporative water savings as surface area and duration will increase

*Capital Cost movement relative to SDLM605 scenario*

- No substantial change

## Scheme E: Modified SDLAM infrastructure scheme with operational modification to improve Cawndilla low and medium fill and Anabranh EWR outcome using a low level Morton-Bookka regulator

The purpose of this scheme is to test the impact on the project objectives of modifying SDLAM605 structures and the proposed operating rules to reduce the footprint of the proposed Morton Bookka regulator. A half-height regulator at Morton Bookka (within Menindee Lake at 57.5m RL 1.5m high) would provide 200GL of storage volume and reduce the level of physical impact at this site confining works to within the lake and below FSL. A low-level regulator at this site may not support the need for an enlarged Menindee outlet particularly if water is able to be transferred to the Murray via the Anabranh (to be tested).



## Scheme E – Modified SDLAM infrastructure scheme with operational modification to improve Cawndilla low and medium fill and Anabranh EWR outcome using a low level Morton-Boolka regulator

The purpose of this scheme is to test the impact on the project objectives of modifying SDLAM605 structures and the proposed operating rules to reduce the footprint of the proposed Morton Boolka regulator. A half-height regulator at Morton Boolka (within Menindee Lake at 57.5m RL 1.5m high) would provide 200GL of storage volume and reduce the level of physical impact at this site confining works to within the lake and below FSL. A low-level regulator at this site may not support the need for an enlarged Menindee outlet particularly if water is able to be transferred to the Murray via the Anabranh (to be tested)

### *Structure Options*

- Enlarged Menindee Outlet (14,000 ML/d)
  - Ancillary infrastructure (regulators + other works) required to contain flows in main channel particularly at Yartla Lake and at Anabranh offtake, if outlet capacity is above 9,000 ML/d
- Menindee drainage channel for access to residual pool
- Low level Morton-Boolka regulator (1.5m high) (note substantially less footprint than full height regulator)
- Enlarged Cawndilla drainage channel

### *Operational Options*

- Maintain order of Lake filling and draw down
- Minimise filling of Menindee and Cawndilla through operational control at new level (RL 57.5m) unless major flood event or EWR requirement
- Modify SDLAM605 80:80 rule to achieve improved Lake and downstream EWR outcome
- Use Cawndilla outlet for Anabranh EWR attainment and for MDBA conveyance of water to Murray (accounting for water entering the Murray via the anabranh)

### *EWR benefit/risk relative to SDLM605 scenario*

- Potential improvement in EWR attainment lake low and medium fill, downstream and anabranh when compared to the SDLAM 605 scenario
- Potential reduction in EWR attainment for lake high fill EWR

### *Evaporative water savings relative to SDLM605 scenario*

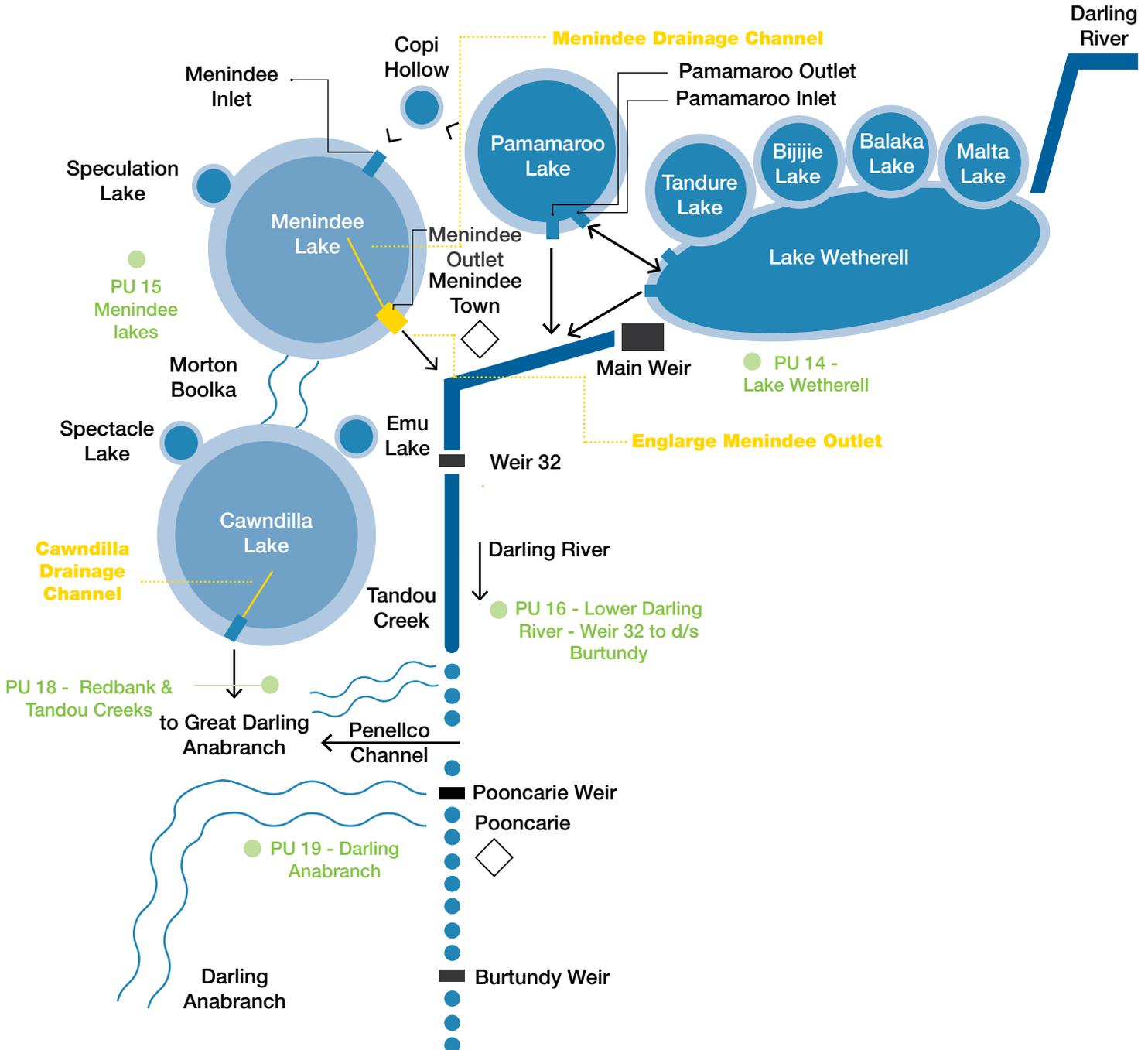
- Uncertain. A decrease in use of Lake Menindee at high water levels may minimise evaporation, however an increased use of Cawndilla will lead to an increase in evaporation

### *Capital Cost movement relative to SDLM605 scenario*

- Likely Increase due to Cawndilla enlargement and channel but dependent on need for enlarged Menindee outlet and ancillary channel works

## Scheme F: Alternate scheme - EES proposal to improve environmental outcomes.

The purpose of this scheme is to test the impact on the project objectives of using new and upgraded infrastructure and modifying the proposed operating rules to focus on environmental outcomes for the lakes, river and the anabranch including improved drought reserve of 2.5-3 years to maintain base flows. This scheme does not include a regulator at Morton-Boolka



## Scheme F – Alternate scheme - EES proposal to improve environmental outcomes

The purpose of this scheme is to test the impact on the project objectives of using new and upgraded infrastructure and modifying the proposed operating rules to focus on environmental outcomes for the lakes, river and the anabranch including improved drought reserve of 2.5-3 years to maintain base flows. This scheme does not include a regulator at Morton-Boolka

### *Structure Options*

- Enlarged Menindee Outlet (14,000 ML/d) (note: regulators on Yartla, Emu and anabranch offtake are not proposed)
- Menindee drainage channel for access to residual pool
- Enlarged Cawndilla channel

### *Operational Options*

- Modify SDLAM605 80:80 rule to achieve three summer drought reserve to (2.5-3 years) to maintain low flow target at weir 32 in accordance with Appendix 3 of the water sharing plan
- Increase low / medium flows in Cawndilla and Menindee at EWR frequency and reduce high level fills
- Use Cawndilla outlet for Anabranch EWR attainment and for MDBA conveyance of water to Murray (accounting for water entering the Murray via the anabranch)

### *EWR benefit/risk relative to SDLM605 scenario*

- Likely substantial improvement in EWR attainment for all Planning Units when compared to SDLAM 605 benchmark

### *Evaporative water savings relative to SDLM605 scenario*

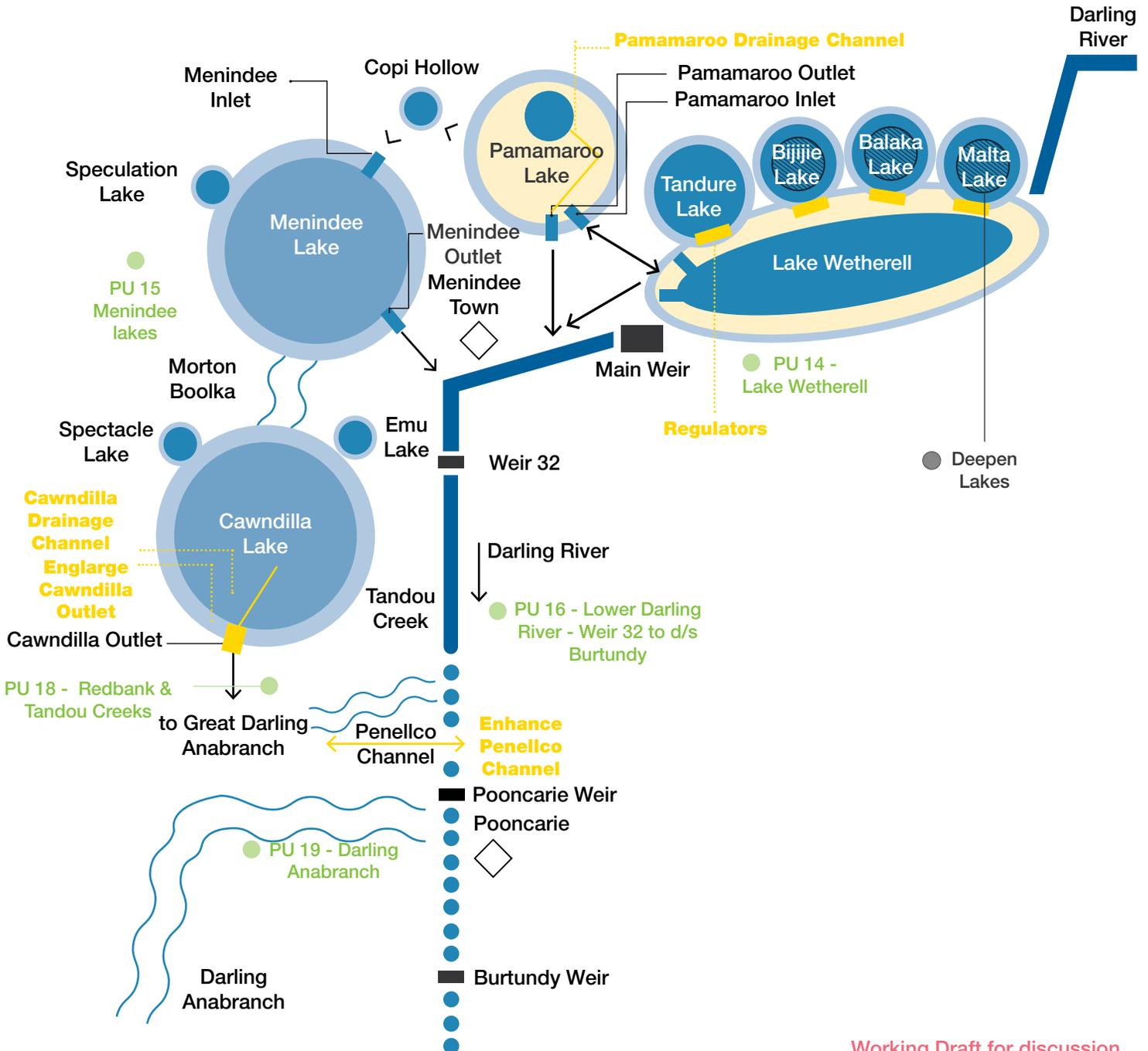
- Likely substantial reduction in predicted evaporative water savings from SDLAM 605 benchmark due to increase in storage duration for drought reserve and no separation of Menindee and Cawndilla

### *Capital Cost movement relative to SDLM605 scenario*

- Potential reduction as scheme swaps Morton Boolka for works at Cawndilla but removes ancillary works in channel
- Will introduce additional operation constraint on MDBA with need to retain water in the upper lakes

## Scheme G: Alternate scheme – Menindee Lakes Water Users Group proposal to increase upstream storage capacity for drought reserve and utilise Penellco to discharge to the Darling River from Lake Cawndilla

The purpose of this scheme is to test the impact on the project objectives of using new and upgraded infrastructure and modifying the proposed operating rules to focus improving storage capacity in the upper lake while allowing water in the lower lakes to be drained through the Cawndilla outlet and Penellco channel back to the Darling River.



## Scheme G – Alternate scheme – Menindee Lakes Water Users Group proposal to increase upstream storage capacity for drought reserve and utilise Penellco to discharge to the Darling River from Lake Cawndilla

The purpose of this scheme is to test the impact on the project objectives of using new and upgraded infrastructure and modifying the proposed operating rules to focus improving storage capacity in the upper lakes while allowing water in the lower lakes to be drained through the Cawndilla outlet and Penellco channel back to the Darling River

### *Structure Options*

- Increase capacity of Lake Cawndilla drainage channel and outlet (2000 ML/d)
- Deepen Lakes Malta, Balaka and Bijijie. Regulators installed to allow filling during flooding and retain water
- Regulators at Lake Tandure to enable Tandure to remain full (create 80 GL storage) as Lake Wetherell recedes off floodplain
- Enhance Penellco Channel to enable flow from Lake Cawndilla to Darling River (larger channel, reverse grade and 2 regulator structures)
- Channel to interconnecting channel to Copi Hollow and Pamamaroo Creek Outlet to maximize amount of water that can be accessed

### *Operational Options (to be refined)*

- Maintain order of Lake filling and draw down - keep both Lake Pamamaroo and Lake Wetherell as full as possible for as long as possible
- Modify MDBA agreement to remove inaccessible water from the drought reserve

### *EWR benefit/risk relative to SDLM605 scenario*

- Potential benefits for Cawndilla and Anabranh EWR's depending on operating rules
- Benefits downstream EWR due to increase in drought reserve
- Likely impacts on Wetherell EWR

### *Evaporative water savings relative to SDLM605 scenario*

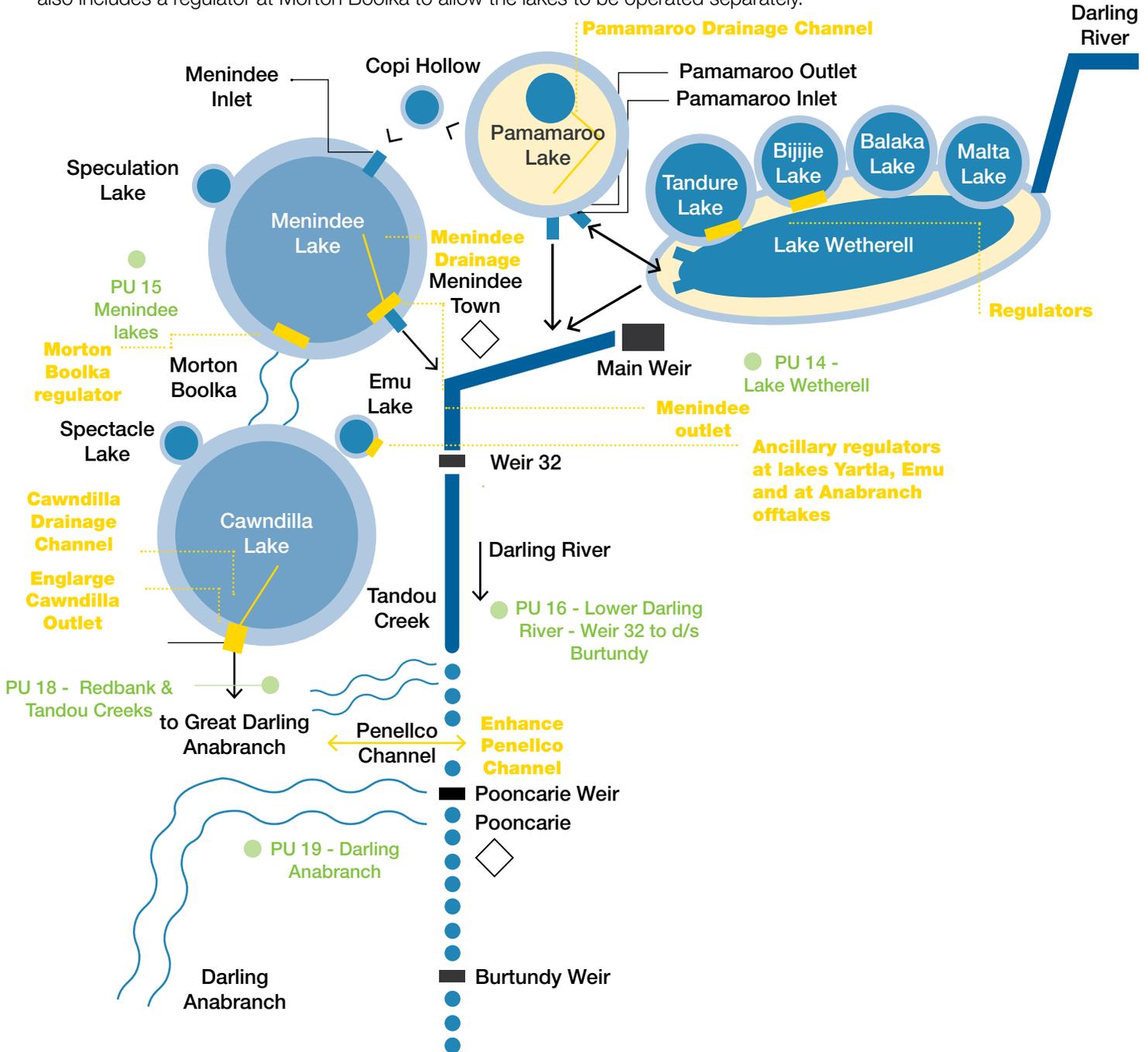
- Likely reduction from SDLAM 605 scenario as Menindee and Cawndilla will still operate as single storage

### *Capital Cost movement relative to SDLM605 scenario*

- Higher cost relative to the SDLAM 605 scenario due to substantial excavation works, Pamamaroo outlet, Cawndilla and Penellco channel

## Scheme H: Alternate scheme to increase upstream storage capacity for drought reserve, separate Menindee and Cawndilla and utilise Penellco to discharge to the Darling River from Lake Cawndilla

The purpose of this scheme is to test the impact on the project objectives of using new and upgraded infrastructure and modifying the proposed operating rules to improve storage capacity in the upper lake while allowing water in the lower lakes to be drained through the Cawndilla outlet and Penellco channel back to the Darling River. This proposal also includes a regulator at Morton Boolka to allow the lakes to be operated separately.



## Scheme H – Alternate scheme to increase upstream storage capacity for drought reserve, separate Menindee and Cawndilla and utilise Penellco to discharge to the Darling River from Lake Cawndilla

The purpose of this scheme is to test the impact on the project objectives of using new and upgraded infrastructure and modifying the proposed operating rules to improve storage capacity in the upper lake while allowing water in the lower lakes to be drained through the Cawndilla outlet and Penellco channel back to the Darling River. This proposal also includes a regulator at Morton Boolka to allow the lakes to be operated separately.

### *Structure Options*

- Menindee Outlet to 14,000 ML/d to facilitate downstream transfers
  - Ancillary infrastructure (regulators + other works) required to contain flows in main channel particularly at Yartla Lake and at Anabranche offtake
- Menindee drainage channel to access residual pool
- Morton-Boolka regulator to separate lakes
  - Potential need for ancillary infrastructure at Cawndilla Creek for environmental protection depending on operating rules for filling Cawndilla
- Lake Cawndilla outlet to 2000 ML/d and improved drainage channel
- Regulators at Tandure and Bijijie to enable water to be retained once Wetherell floodplain is drained
- Enhance Penellco Channel to enable flow from Lake Cawndilla to Darling River (larger channel, reverse grade and 2 regulator structures)

### *Operational Options (to be refined)*

- Keep both Lake Pamamaroo and Lake Wetherell as full as possible for as long as possible
- Modify MDBA agreement to remove inaccessible water from the drought reserve

### *EWR benefit/risk relative to SDLM605 scenario*

- Potential benefits for lower lakes and Anabranche EWR depending on operating rules
- Impacts Wetherell EWR

### *Evaporative water savings relative to SDLM605 scenario*

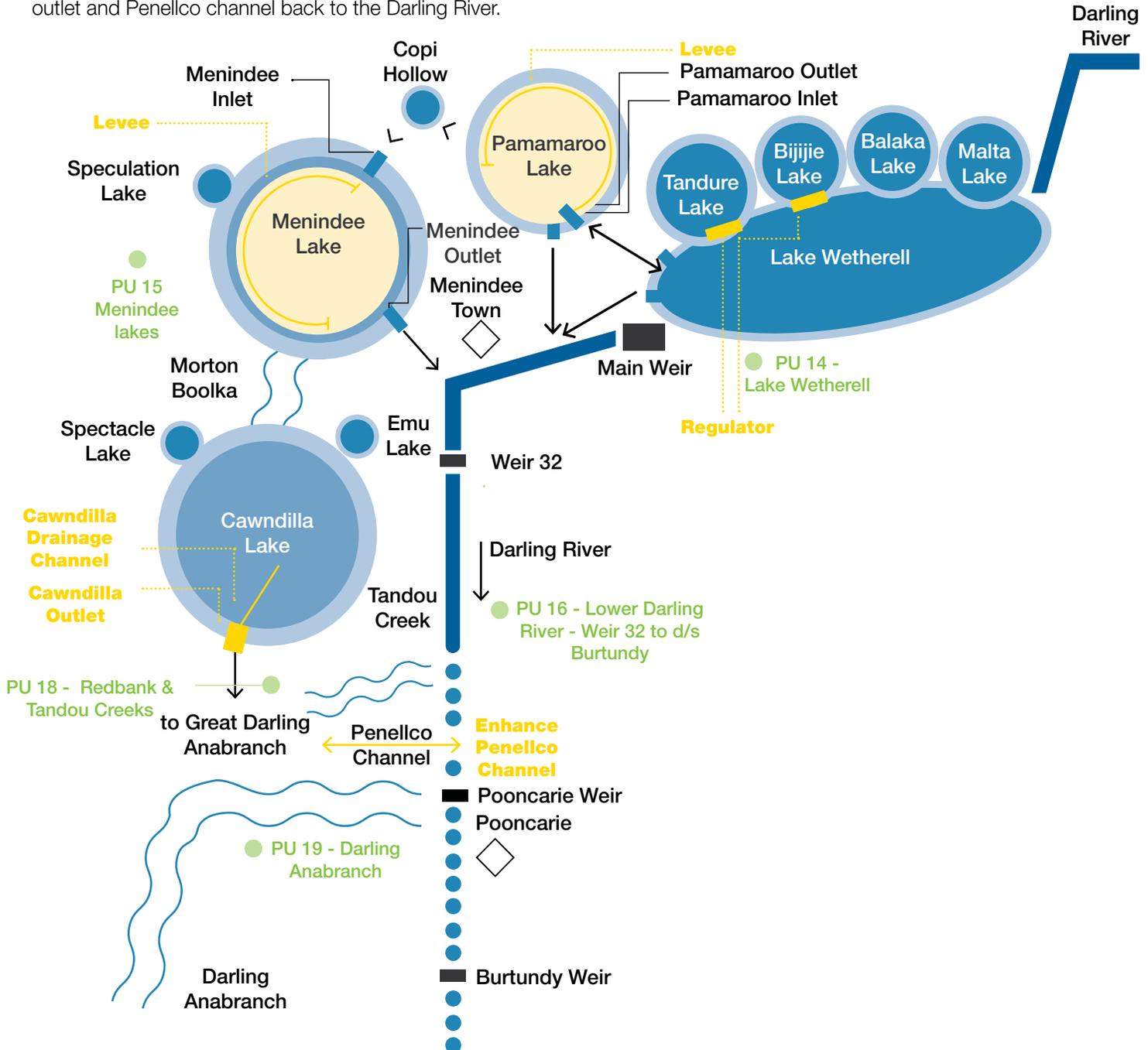
- Potential reduction against SDLAM 605 scenario due to retention of water in the smaller upper lakes

### *Capital Cost movement relative to SDLM605 scenario*

- Substantially higher cost relative to the SDLAM 605 scenario due to additional works at Tandure, Bijijie, Cawndilla and Penellco channel

## Scheme I: Alternate Scheme to minimise Pamamaroo and Menindee storage area and utilise Pennellco to discharge back to the Darling River

The purpose of this scheme is to test the impact on the project objectives of using new and upgraded infrastructure and modifying the proposed operating rules to improve storage capacity in the upper lakes, restrict the use of lakes Pamamaroo and Menindee through construction of an internal perimeter levee from the inlet to the outlet in each lake (thereby reducing surface area and evaporation). Cawndilla would be drained through an enlarged Cawndilla outlet and Penellco channel back to the Darling River.



## Scheme I – Alternate Scheme to minimise Pamamaroo and Menindee storage area and utilise Pennellco to discharge back to the Darling River

The purpose of this scheme is to test the impact on the project objectives of using new and upgraded infrastructure and modifying the proposed operating rules to improve storage capacity in the upper lakes, restrict the use of lakes Pamamaroo and Menindee through construction of an internal perimeter levee from the inlet to the outlet in each lake (thereby reducing surface area and evaporation). Cawndilla would be drained through an enlarged Cawndilla outlet and Penellco channel back to the Darling River.

### *Structure Options*

- Regulators at Tandure and Bijijie to enable water to be retained once Wetherell floodplain is drained
- Perimeter levee around northern and western edge of lakes Pamamaroo and Menindee to divert water from the respective inlets and outlets direct to Cawndilla
- Lake Cawndilla outlet to 2000 ML/d and improved drainage channel
- Enhance Penellco Channel to enable flow from Lake Cawndilla to Darling River (larger channel, reverse grade and 2 regulator structures)

### *Operational Options(to be refined)*

- Keep Lake Wetherell as full as possible for as long as possible
- Modify MDBA agreement to remove inaccessible water from the drought reserve

### *EWR benefit/risk relative to SDLM605 scenario*

- Potential benefits for Cawndilla, downstream and Anabranh EWR
- Impacts Wetherell EWR
- Impacts Menindee EWR

### *Evaporative water savings relative to SDLM605 scenario*

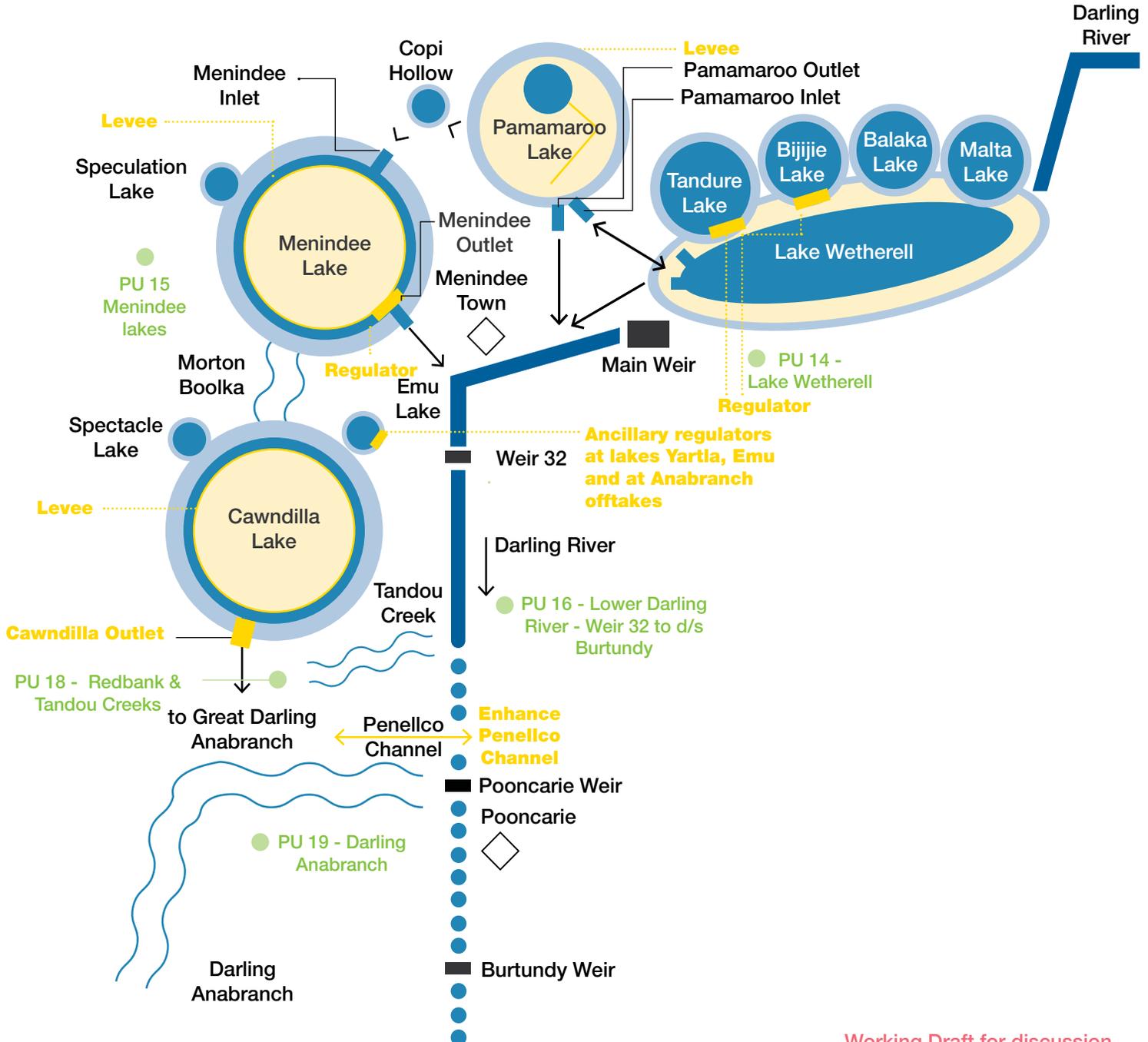
- Likely increased evaporative water savings from SDLAM 605 scenario through a substantial reduction in water storage surface area

### *Capital Cost movement relative to SDLM605 scenario*

- Substantially higher cost relative to the SDLAM 605 scenario due to substantial earthworks required for the levees and additional works at Tandure, Bijijie, Cawndilla and Penellco channel

## Scheme J: Alternate Scheme to maximise upstream storage, minimise Menindee and Cawndilla storage area and utilise Pennellco to discharge back to the Darling River.

The purpose of this scheme is to test the impact on the project objectives of using new and upgraded infrastructure and modifying the proposed operating rules to improve storage capacity in the upper lakes, restrict the use of lakes Menindee and Cawndilla through construction of interior perimeter levees in each lake (thereby reducing surface area and evaporation). Cawndilla would be drained through an enlarged Cawndilla outlet and Penellco channel back to the Darling River.



## Scheme J – Alternate Scheme to maximise upstream storage, minimise Menindee and Cawndilla storage area and utilise Penellco to discharge back to the Darling River

The purpose of this scheme is to test the impact on the project objectives of using new and upgraded infrastructure and modifying the proposed operating rules to improve storage capacity in the upper lakes, restrict the use of lakes Menindee and Cawndilla through construction of interior perimeter levees in each lake (thereby reducing surface area and evaporation). Cawndilla would be drained through an enlarged Cawndilla outlet and Penellco channel back to the Darling River.

### *Structure Options*

- Menindee Outlet to 14,000 ML/d to facilitate downstream transfers
  - Ancillary infrastructure (regulators + other works) required to contain flows in main channel particularly at Yartla Lake and at Anabranche offtake
- Regulators at Tandure and Bijijie to retain water once Wetherell floodplain is drained
- Levee around entire interior perimeter of Menindee and Cawndilla to retain water on margins of lakes
- Lake Cawndilla outlet to 2000 ML/d and enhance drainage channel
- Enhance Penellco Channel to enable flow from Lake Cawndilla to Darling River (larger channel, reverse grade and 2 regulator structures)

### *Operational Options*

- Keep Lake Wetherell as full as possible for as long as possible
- Modify MDBA agreement to remove inaccessible water from the drought reserve

### *EWR benefit/risk relative to SDLM605 scenario*

- Potential benefits for downstream and Anabranche EWRs
- Impacts Wetherell EWR
- Impacts Menindee and Cawndilla EWR

### *Evaporative water savings relative to SDLM605 scenario*

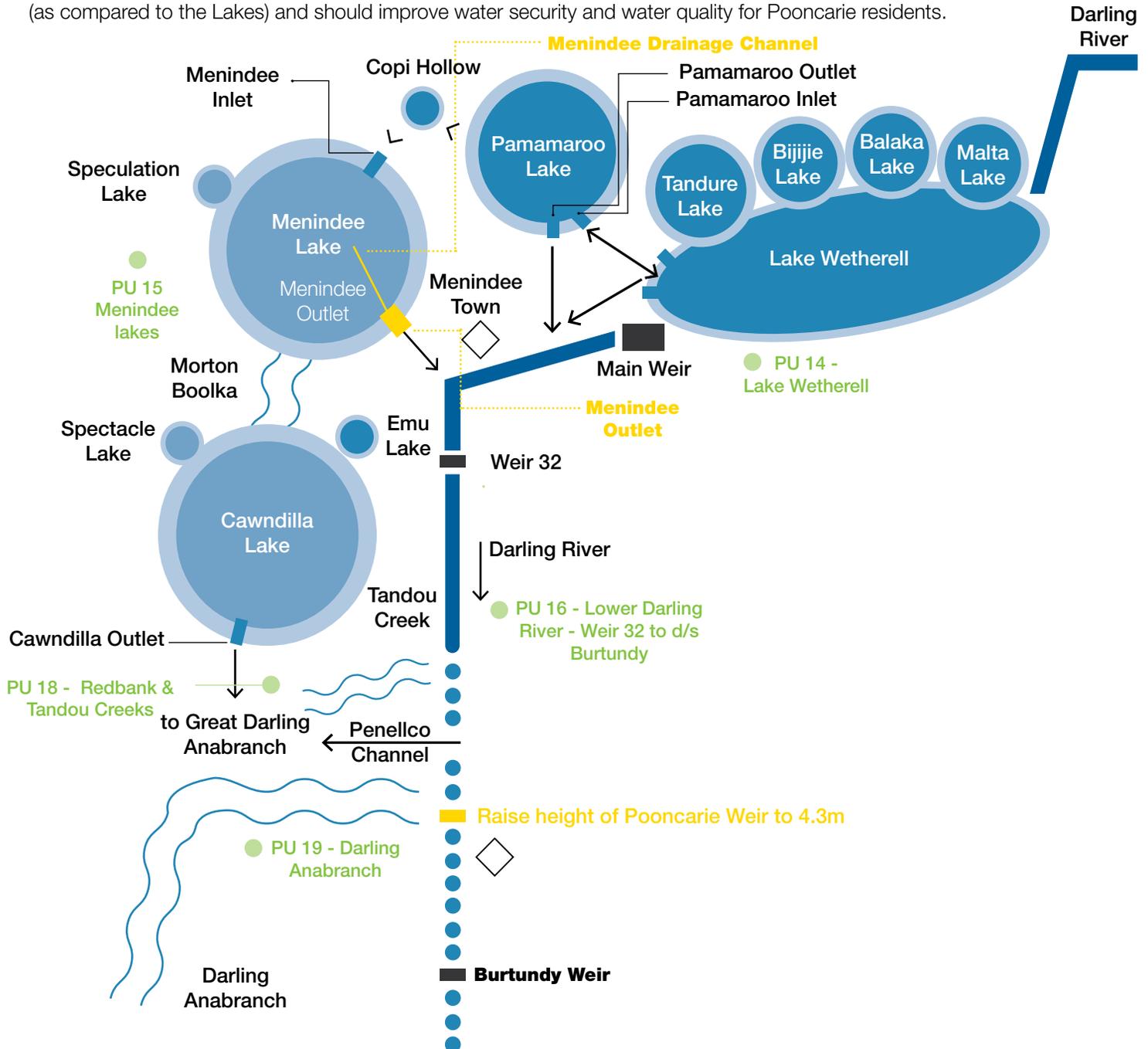
- Likely substantial increase in evaporative water savings from SDLM 605 scenario through a substantial reduction in water storage surface area

### *Capital Cost movement relative to SDLM605 scenario*

- Substantially higher cost relative to the SDLM 605 scenario due to substantial earthworks required for the perimeter levees and additional works at Tandure, Bijijie, Cawndilla and Penellco channel

## Scheme K: Alternate Scheme to increase storage in the Darling River channel and reduce reliance on storing water in the lakes

The purpose of this scheme is to test the impact on the project objectives of increasing the height of Pooncarie Weir from 0.8m to 4.3m (an increase of 3.5m). This will increase the storage capacity of the main channel at this location (extending the weir pool from 9 km to 44 km) and potentially reducing the reliance on water stored in Menindee Lakes (storage volume to be determined). The main channel will improve storage efficiency by reducing evaporation (as compared to the Lakes) and should improve water security and water quality for Pooncarie residents.



## Scheme K – Alternate Scheme to increase storage in the Darling River channel and reduce reliance on storing water in the lakes

The purpose of this scheme is to test the impact on the project objectives of increasing the height of Pooncarie Weir from 0.8m to 4.3m (an increase of 3.5m). This will increase the storage capacity of the main channel at this location (extending the weir pool from 9 km to 44 km) and potentially reducing the reliance on water stored in Menindee Lakes (storage volume to be determined). The main channel will improve storage efficiency by reducing evaporation (as compared to the Lakes) and should improve water security and water quality for Pooncarie residents.

### *Structure Options*

- Raise height of Pooncarie Weir from 0.8m to 4.3m
- Enlarged Menindee Outlet (9,000 ML/d to avoid need for ancillary infrastructure)
- Menindee drainage channel for access to residual pool

### *Operational Options*

- Maintain Order of Lake filling and draw down
- Modify MDBA agreement to remove inaccessible water from the drought reserve and include increased storage at Pooncarie Weir

### *EWR benefit/risk relative to SDLM605 scenario*

- No change to Wetherell, Menindee and Cawndilla EWR
- Improved Cawndilla EWR low and medium fill outcome due to no Morton Boolka
- Potential benefits for downstream and Anabranche EWRs
- Impacts to downstream EWRs due to new inundation area
- Potential impacts to fish habitat through a reduction to fast flowing habitat and the introduction of barriers to fish passage
- Potential impact to littoral vegetation and groundwater gradients
- Potential impact to water quality

### *Evaporative water savings relative to SDLM605 scenario*

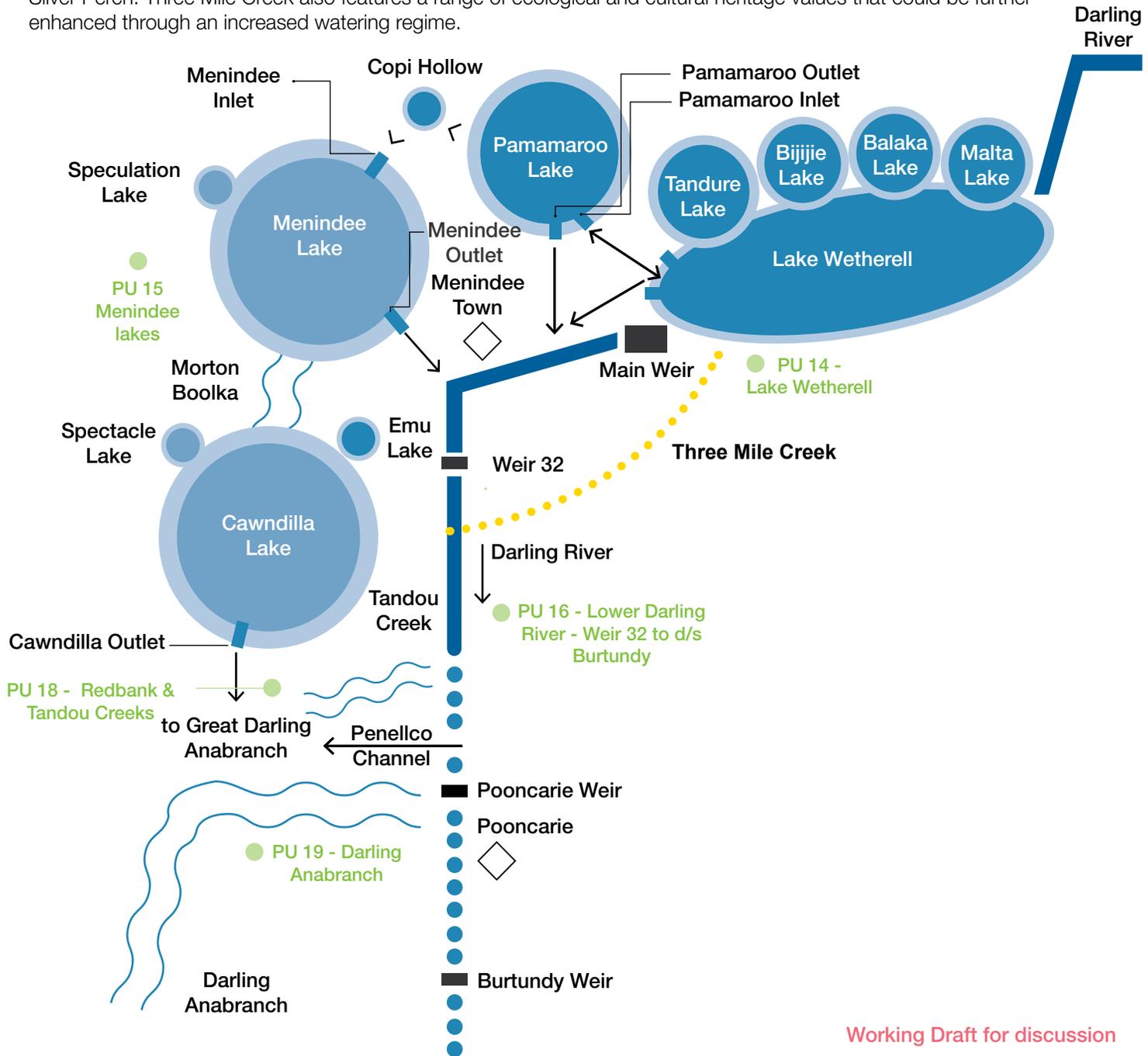
- Likely reduction in evaporative water savings from SDLAM 605 scenario due to no separation of Menindee and Cawndilla however may be offset by creation of additional (more efficient) storage in channel

### *Capital Cost movement relative to SDLM605 scenario*

- Potential decrease due to less works at Menindee but dependent on cost of Weir raising

## Scheme L: Alternate Scheme to incorporate Three-Mile Creek as potential fast flowing fish habitat and improve ecological outcomes

Three Mile Creek is an ephemeral creek system with an off-take from Lake Wetherell upstream of the Main Weir which reconnects with the main channel of the Darling River downstream of Weir 32. There is an opportunity to provide water to Three Mile Creek during normal operation of Wetherell through some targeted sill lowering, creating approximately 40km of fast flowing habitat. Fast flowing habitat (>0.3m/s) is under-represented within the southern connected Basin and is a preferred habitat type for large bodied native fish such as Murray Cod, Golden Perch and Silver Perch. Three Mile Creek also features a range of ecological and cultural heritage values that could be further enhanced through an increased watering regime.



## Scheme L – Alternate Scheme to incorporate Three-Mile Creek as potential fast flowing fish habitat and improve ecological outcomes

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### *Structure Options*

- Lowering sill level of Three-Mile Creek at three small locations to potentially create a watering regime whenever ecologically desirable, as the Creek would be fed from the Wetherell normal full supply level (FSL).
- The existing inlet regulator would need to be modified to facilitate fish passage
- A new regulator (plus fishway) may also be required at the outlet of Three Mile Creek depending on additional investigations.

### *Operational Options*

- Maintain Order of Lake filling and draw down and current MDBA agreement
- Determine volume of water required to meet flow requirements for Three Mile Creek, which will be influenced by the environmental and cultural heritage objectives

### *EWR benefit/risk relative to SDLM605 scenario*

- No change to Wetherell, Menindee and Cawndilla EWR
- Improved Cawndilla EWR low and medium fill outcome due to no Morton Boolka
- Benefits for downstream low flow EWRs

### *Evaporative water savings relative to SDLM605 scenario*

- Reduction in evaporative water savings from SDLAM 605 scenario due to no improvement in lake efficiency (noting that the water regime may result in water flowing into Lakes Menindee and Cawndilla less often)

### *Capital Cost movement relative to SDLM605 scenario*

- Reduction due to less works required at Menindee but dependent on cost of creek works and associated fishways