

THE COLIBAN ENGINEER

JOSEPH MARTIN BRADY (1828–1908)

Described by one biographer as: *‘probably the most accomplished civil engineer to have worked in Australia’*, Brady was born in Enniskillen, Ireland, on 18 August 1828 and served under his father Michael Brady for two years as a railway field surveyor and draftsman. He then worked through Kent and Lincolnshire under the great rail engineer Charles Vignoles.

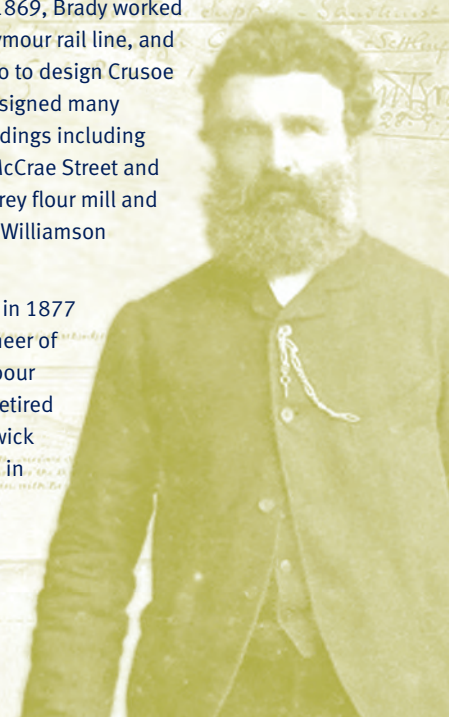
Brady came to Australia in 1850 and worked as a draftsman with the Sydney Railway Company. He surveyed Australia’s first railway line from Sydney to Parramatta, and was described as someone *‘...who would skin any man he had under him.’*

Brady left Sydney in 1856 –in time to help survey Melbourne’s first water scheme, Yan Yean. In 1858 he was appointed engineer to the Bendigo Water Works Co, then worked on the Melbourne to Sandhurst (Bendigo) rail line, before leaving to design Brisbane’s first water scheme.

Returning to Victoria in 1869, Brady worked on the Melbourne to Seymour rail line, and then resettled in Bendigo to design Crusoe Reservoir. Brady also designed many impressive Bendigo buildings including the Bishop’s Palace in McCrae Street and the former Webb’s 4-storey flour mill and granary on the corner of Williamson and Queen Streets.

He moved to Melbourne in 1877 to work as the first engineer of the new Melbourne Harbour Trust until 1891. Brady retired in 1894, died at Elsternwick in 1908, and was buried in the St Kilda Cemetery.

J. M. BRADY, C1866
PHOTO COURTESY
OF BRADY DESCENDANT,
GAVAN PRENDERGAST



COLIBAN SYSTEM

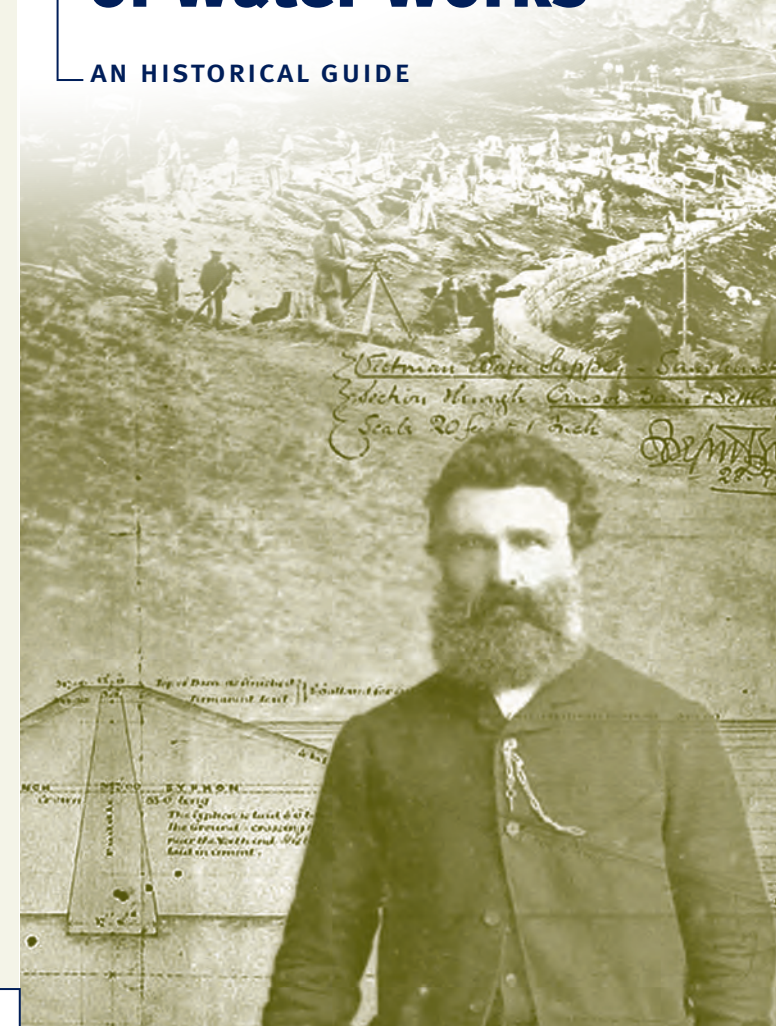
KEY FACTS & FIGURES

- › **Designer:** Joseph Martin Brady (Member, Institute of Civil Engineers)
- › **Length of Coliban Main Channel:** 70 kilometres
- › **Features:** Open water channels (lined and unlined), water races, aqueducts, rock and brick lined tunnels and inverted syphons.
- › **Area Supplied:** The Coliban Water Works today serves around 130,000 people in the Bendigo, Castlemaine and Kyneton areas.
- › **Coliban River Reservoirs:**
 - Malmsbury (built 1877 – current capacity: 12,000 megalitres)
 - Upper Coliban (built 1903 – current capacity: 37,500 megalitres)
 - Lauriston (built 1944 – current capacity: 20,000 megalitres)
- › **End of Channel Storages:** Sandhurst, No. 7 (decommissioned), Crusoe (decommissioned), Barkers Creek and McCay Reservoirs.
- › **Channel Water Flows:** The channel flows during the irrigation season and periodically, as needed during the remainder of the year, to replenish urban supplies.



Joseph Brady’s Coliban System of Water Works

AN HISTORICAL GUIDE



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JOSEPH BRADY'S COLIBAN WATER WORKS

TIMELINE

AN HISTORICAL GUIDE

ADDITIONS TO THE SYSTEM SINCE THE YEAR 2000

The \$80 million AQUA project which included three new water treatment plants using advanced microfiltration technology to purify water from the Coliban River catchments is one of the largest public works projects ever completed in Central Victoria. Built through a partnership between Coliban Water and Veolia Water, the facilities which are located in the Bendigo, Castlemaine and Kyneton areas are operated by Veolia owned company, Bendigo Water Services Pty Ltd (BWS) under a 25 year Build Own Operate Transfer (BOOT) contract.

AQUA opened in July 2002, bringing world class quality drinking water to over 110,000 Coliban Water customers in Bendigo, Campbells Creek, Castlemaine, Chewton, Elphinstone, Fryerstown, Guildford, Harcourt, Kyneton, Maldon, Malmsbury, Newstead, Taradale and Tylden.

The drought in 2003 brought the first in a succession of dry years which would see Bendigo's water supplies reduce significantly. By the end of 2004 all of the towns supplied by the Coliban System were on Stage 4 water restrictions.

A first step to improve water security was the building of a recycled water factory designed to treat water from the Bendigo Water Reclamation Plant at Epsom to produce Class A quality recycled water.

This water is used for public facilities including parks and sports grounds in Bendigo, and to supplement rural supply. It is also used for third pipe supply to some new housing development areas of Bendigo. The project which included the Epsom-Spring Gully pipeline was completed in April 2007.

Despite this measure the dry continued to deplete reserves to such an extent that Bendigo and other towns reliant on the Coliban System of Waterworks for their supply would be at risk of running out of water.

The solution was to construct a 46.5 kilometre pipeline to access Goulburn River water from the Waranga Channel at Colbinabbin (The Goldfields Superpipe Project-Bendigo Link). Water flowed through this pipeline for the first time at the end of August 2007.

Joseph Brady's supply system was visionary and still serves as the basis for providing customers in Central Victoria with water today. However it is clear that with an increasing population and the spectre of climate change we will need to continue to seek innovative solutions for sustainable water use and supply for the future.

1851: Gold discovered at Mt Alexander (Castlemaine) and Bendigo.

1858: Bendigo Water Works Co. hires Joseph Brady as Engineer; Brady designs 8 reservoirs (6 for mining, 2 for domestic); No. 1 built at Maple Street Golden Square – leaked, failed.

1861: Brady's No. 7 Reservoir supplies water to Pall Mall; Sandhurst's 15,000 residents consume 36,000 gallons per day. (Approx. 160,000 litres per day).

1862: Growing population and mining demands lead Victorian Government to offer a £500 prize for the best solution to bring water from the Coliban River to Castlemaine & Sandhurst.

1863: Brady, Wardle and Reilly submit plans to bring water (via a channel) from Malmsbury to Sandhurst and Castlemaine.

1873: Crusoe Reservoir completed; Victorian Government buys Bendigo Water Works from Sandhurst Borough Council; Government builds Coliban Channel.

1872: Bendigo Water Works bought out by Sandhurst Borough Council; metered water users include Bendigo Asylum, Bendigo Gold District Hospital, publicans, foundries and mines.

1869: Dept of Victorian Water Supply lets contracts to construct Malmsbury Reservoir.

1865: Major drought empties No. 7 Reservoir only four years after construction, halting goldmining and gold supply to Melbourne.

1864: Government awards prize to Brady.

1877: Malmsbury Reservoir completed; and water flows along Coliban Main Channel.

1887: Malmsbury Reservoir expanded.

1891: Sandhurst renamed Bendigo.

1903: Upper Coliban Reservoir completed to 'drought-proof' the Coliban Water Works.

1905: State Rivers & Water Supply Commission (SR&WSC) constituted (under Water Act 1905)

1980: Chlorine disinfection begins.

1965: Lake Eppalock completed to supply irrigators and Bendigo.

1944: Lauriston Reservoir completed 'solely as a reserve for town supplies to Bendigo and Castlemaine.'

1940: Malmsbury Reservoir capacity increased.

1906: Coliban Water Works transfers from Board of Lands & Works to SR&WSC.

1983: Sandhurst Reservoir completed.

1984: Bendigo Water Board succeeds Bendigo Sewerage Authority. SR&WSC turns into Rural Water Commission.

1992: Coliban Region Water Authority (Coliban Water) was established on 1 July 1992 under the Water Act 1989 as a Regional Urban Water Authority. Coliban Water was formed through the joining of seven water boards including the Bendigo Water Board and the Rural Water Commission.

2002: AQUA project delivers world class water to over 110,000 Coliban Water customers.

1992: Upper Coliban Reservoir capacity increased.

2007 (August): Water flows for the first time through the Bendigo Link of the newly constructed Goldfields Superpipe.

2007 (July): The Authority became the Coliban Region Water Corporation on 1 July 2007 and operates as Coliban Water.

2007 (April): Completion of Bendigo Recycled Water Factory and Epsom-Spring Gully Pipeline Project

LEGEND

WATER DISTRIBUTION SYSTEM TODAY

- WATER TREATMENT PLANT
- COLIBAN MAIN CHANNEL
- GOLDFIELDS SUPERPIPE – BENDIGO LINK
- WATER PIPELINE
- TOWNS SERVICED BY THE SYSTEM TODAY

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GOLD AND WATER

The cry of 'Gold!' rang out for the first time across Central Victoria in late 1851.



Almost overnight, thousands of hopeful diggers from across the globe rushed to the creeks around Mt Alexander, hoping to dig up a fortune from the world's richest alluvial goldfield.

Diggers also invaded the nearby Bendigo Valley in October 1851, following Margaret Kennedy's discovery of gold in the Bendigo Creek. Within six months the Mt Alexander (or Castlemaine) and Bendigo goldfields housed tens of thousands of diggers: panning, digging and cradling for gold by day, and living by night in canvas tents along the gullies.

Water was the key to winning this gold, because without water the diggers couldn't wash the tiny specks of gold from their pay-dirt. The diggers also needed clean water to drink. But each summer the Bendigo and Forest Creeks dried up. The mining communities that relied on these creeks for most of their water were left with only filthy pools that brought with them terrible diseases such as cholera, dysentery and diarrhoea.

It would take 26 years before the opening of the famous Coliban Water Works would largely end the annual summer drought on the Bendigo and Castlemaine goldfields.



THE ORIGINAL COLIBAN SYSTEM OF WATER WORKS

The original Coliban Water Works were designed in 1863 by the Irish engineer Joseph Brady. The system included 70 kilometres of open water channels, aqueducts, syphons and tunnels to carry water (by gravity) from the Coliban River at Malmsbury, north to Castlemaine and Bendigo.

Brady wrote that: 'Prior to 1858 Sandhurst (Bendigo) was ill-supplied with water, and that was bad in quality and insufficient in quantity. The best was a precarious supply of rain-water, stored for the most part in small tanks above ground.'

Working for the Bendigo Water Works Co. in 1858, Brady designed eight reservoirs along the Bendigo Valley – six for gold mining and two for domestic purposes.

No. 1 Reservoir was built in 1859 across the Bendigo Creek at the corner of High and Maple Streets. However, it leaked and was soon abandoned.

No. 7 Reservoir (now decommissioned) was built in 1861, and included Brady's clever water treatment plant that used sand to filter the water, and an underground cistern for clean water storage: an Australian first!

Brady also designed Crusoe Reservoir (built 1873, now decommissioned), which featured an even more complex water treatment plant. Before Crusoe was completed, Brady won a £500 Victorian Government prize to design a system to carry water from a reservoir, soon to be built across the Coliban River at Malmsbury, all the way to Bendigo (45 kilometres to the north 'as the crow flies').

His solution was a channel that would wind its way for 70 kilometres through the hilly country between Malmsbury and Bendigo. After much haggling by politicians over the cost, water finally flowed along the Coliban Main Channel in November 1877.

THE COLIBAN SYSTEM TODAY

Since 1877 Brady's Coliban System of Water Works has supplied most of Bendigo and Castlemaine's water. Two extra reservoirs have been built upstream from Malmsbury Reservoir (Lauriston and Upper Coliban Reservoirs), and the channel system has been extended to carry water to Kyneton, Maldon, Taradale and Harcourt.

And while the golden days of mining are gone, many other industries such as farms, orchards and food processors now rely on water from the Coliban System.

