

# Sydney Water

## A day tour of the water supply dams south of Sydney

In this whole-day tour by car you will see the major dams, canals and pipelines that provide water to Sydney. Some of these works still in use were built around 1880. The round trip tour from Sydney is around 350 km., all on good roads and motorway. The tour is through attractive countryside south of Sydney, and there are good picnic areas and playgrounds at the dam sites.



Upper Nepean Scheme during construction in 1885

## Self-guided tour by car



## In the beginning

Sydney's first water supply from the time of its settlement in 1788 was the little stream that wound its way from near Hyde Park through the centre of the town into Sydney Cove. It became known as the Tank Stream. By 1811 it was hardly fit for drinking. Water was then drawn from wells or carted from a creek running into Rushcutter's Bay. The Tank Stream was still the main water supply until 1826.

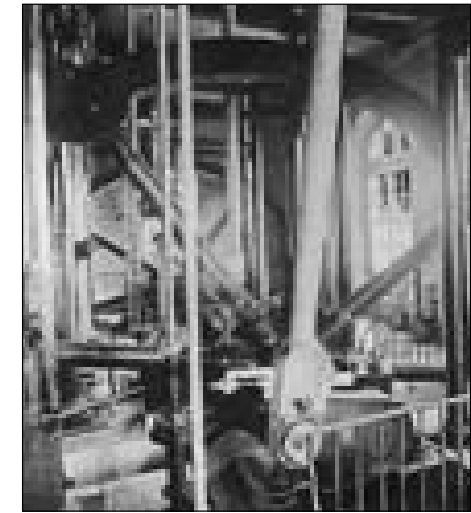


Tank stream in 1840, from a water-colour by J. Skinner Prout

The ponds known as Lachlan Swamp (now Centennial Park) only 3 km. away from the centre of the town became a good source of water, but carting it to the town was expensive. Surveys showed that the ponds could be drained towards the town by a tunnel. Work started on the tunnel, named Busby's Bore after its construction supervisor, in 1827 with convict labour. The 3.5 km. long tunnel ended in Hyde Park, and from there the water was piped to the port and to a point near the corner of Park and Elizabeth streets where carts could be filled.

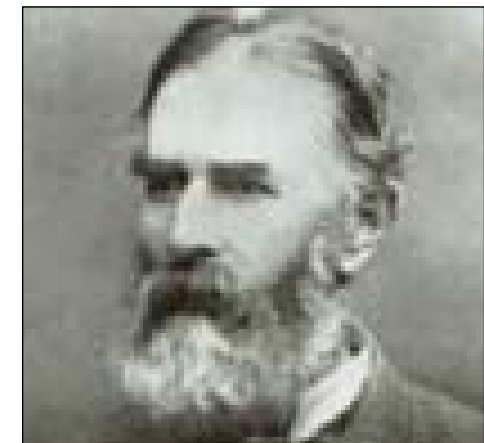
## The Botany Swamps Scheme

From 1844 reticulation pipes were connected to the tunnel which until 1858 was Sydney's sole source of reticulated water. By 1850, Sydney was seriously short of water, and official consideration was given to a new



Engines at Botany Pumping Station (demolished)

source of supply. In 1854 work started on the Botany Swamps Scheme, which began to deliver water in 1858. The Scheme included a series of dams feeding a pumping station near the present Sydney Airport. A few fragments of the pumping station building remain and can be seen beside General Holmes Drive. Water was pumped to two reservoirs, at Crown Street (still in use) and Paddington (not in use though its remains still exist).



E.O.Moriarty

## The Upper Nepean Scheme

By 1862 water was again in short supply. In 1867, a Royal Commission was appointed, and in 1869 it recommended a scheme developed by one of the members, the engineer E. O. Moriarty, that would meet the needs of a city of 540,000 people. In 1879, after a series of extensions to the Botany Swamps Scheme, and increasing problems with supply, the government approved the Upper Nepean Scheme that Moriarty had planned, and construction work commenced.

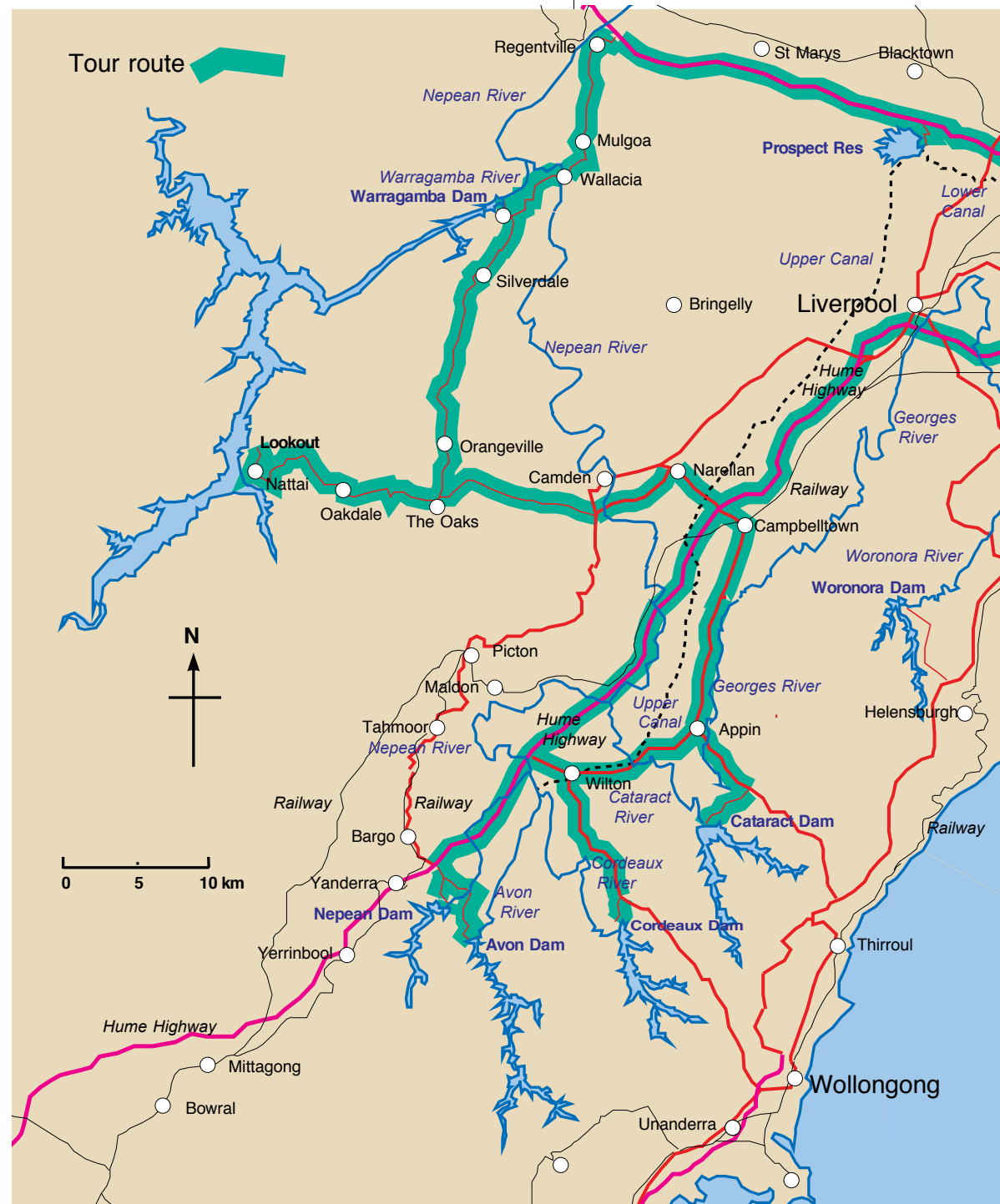
The Scheme, almost all still in use, draws water from a small dam across the Nepean River, near its junction with the Avon, and from another small dam across the Cataract River at Broughton's Pass. The water flows by gravity from these dams along the Upper Canal, part in tunnel, part in open channel, to Prospect Reservoir, the main storage. From Prospect water flowed by the Lower Canal (still existing but superseded by pipelines) to Guildford in western Sydney, and then by pipelines to reservoirs at Potts Hill and Petersham and the existing reservoir at Crown Street.



Hudson's temporary scheme, with permanent main under construction

## Hudson's temporary scheme

In 1885, with construction far from completion, supply from Botany Swamps was almost exhausted and a crisis was imminent. The government accepted a plan by the company Hudson Brothers to provide a temporary supply, joining the part completed works with pipelines and flumes built on trestles, to feed water from the Upper Nepean into the Botany Swamps. It was completed in six months and provided water to Sydney for two years. It was dismantled after completion of the main scheme in 1888.

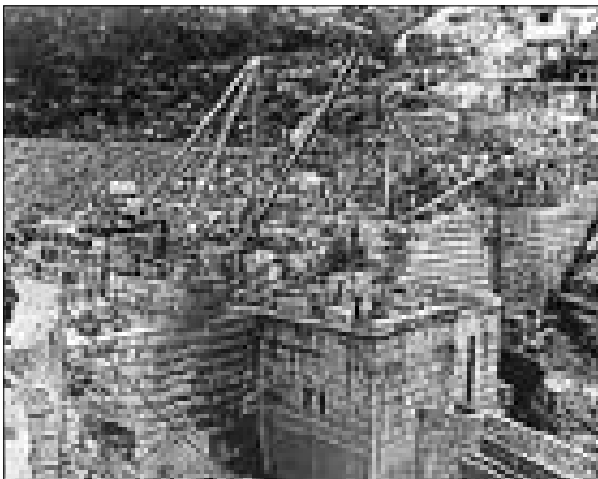


## The major dams

By 1902, Sydney's population was over 500,000, and a long drought had depleted water supplies to dangerous levels. That year the government authorised construction of the Cataract Dam, the first of four large dams feeding into the Upper Nepean Scheme. The dam was completed in 1908, and was followed by Cordeaux, completed 1926, Avon 1928 and Nepean 1935. You can visit all four dams on the tour. The Woronora Dam, shown on the map, but not part of the Upper Nepean Scheme and not visited on this tour, was completed in 1941.

In 1937, increasing water consumption and a serious drought led to hurried construction of a 15 m. high dam on the Warragamba River at the site of the present dam, and a pipeline to Prospect Reservoir, to avert a crisis. In 1946, work commenced on the Warragamba Dam, one of the largest city water supply dams in the world. It was completed in 1960.

At Warragamba Dam, a new spillway completed in 2002 ensures the safety of the dam by preventing it from overtopping in extreme floods.



Cataract Dam during construction in 1907

## The tour

**Leave Sydney by the M5 Motorway which near Liverpool becomes the Hume Highway. Set your car's odometer to zero at the traffic lights near Liverpool since all the travel distances on the tour are measured from this point, 32 km. from the centre of Sydney.**

**Leave the Hume Highway at the exit for Camden (21 km.) and follow the signs for Appin, South Coast and Wollongong. Pass through Appin (38 km.), and at 45 km. take the signposted turn to the right leading to Cataract Dam.**

## Cataract and Cordeaux Dams

Cataract Dam, designed by Public Works Department engineers L.A.B.Wade and T.W.Keele, and built by contractors Lane and Peters, is a mass gravity dam, 49 m. high above its foundations. The dam is of roughly triangular cross section, with the base approximately 80% of the height. It is built of cyclopean masonry, in which sandstone blocks are embedded in cement mortar. The upstream face is basalt concrete blocks set in cement mortar and the downstream face is basalt concrete.

The small museum at the dam site is usually locked up, but you can see in through the windows.

**On leaving Cataract dam, retrace the route back to Appin (62 km.), and from there take the road towards Wilton and Picton.**

Broughton's Pass, where the road crosses the Cataract River, is the site of the, 4 m. high dam which diverts water from the river into the tunnel that is the commencement of the Upper Canal leading to Prospect Reservoir. This dam also receives water via a tunnel from a similar dam on the Nepean River at Pheasants Nest. The small dams and tunnels are part of the Upper Nepean Scheme completed in 1888.

**At Wilton (70 km.), bear left following signs to Wollongong and the South Coast, and at 79 km. turn right at the signpost to Cordeaux Dam.**

Cordeaux Dam is of similar construction to Cataract, with some improvements including contraction joints and inspection tunnels. The dam now supplies the South Coast. Public Works Department engineer E M de Burgh was responsible for the design of Cordeaux, Avon and Nepean Dams. All three were built by day labour.

## Avon and Nepean Dams

These two dams are of similar construction to Cordeaux. Avon Dam now supplies the South Coast. The Nepean Dam, though having the smallest holding capacity in the group of four dams, has the largest catchment and consequently provides the greatest amount of water to the system.

**Leave Cordeaux Dam and return through Wilton towards Picton to the junction with the Hume Highway (98 km.). Take the Highway away from Sydney and towards Goulburn. Take the Bargo exit (108 km.), and follow the signs to Avon Dam (118 km.). After leaving Avon Dam, return towards Bargo and follow the sign to Nepean Dam (128 km.). Leaving Nepean Dam, return to the Hume Highway (132 km.), and head towards Sydney.**

**You may wish to shorten the tour by bypassing Avon and Nepean Dams. In this case, after leaving Wilton turn towards Sydney rather than towards Goulburn at the Hume Highway. This will reduce the journey by 45 km.**

Shortly after the Highway crosses under the Glenlee Road it crosses over the Upper Canal (163 km.). The point of the crossing is marked by semicircular grilles on either side of the Highway. The 56 km. long canal, part of the original Upper Nepean Scheme and still in use, carries the water from the Upper Nepean dams to the Prospect Reservoir. You will cross the canal again shortly after you leave the Highway and travel towards Narellan.

## Burratorang Lookout

Leave the Hume Highway by the Camden exit (166 km.), and turn towards Narellan and Camden. At Narellan (170 km.), take the Camden Bypass and at the end of the bypass (177 km.), take Burratorang Road through The Oaks, Oakdale and Nattai to reach the Burratorang Lookout (204 km.).

The Lookout provides a spectacular view of the Warragamba Valley and Lake Burratorang. There is a picnic area and playground.



Warragamba Dam during construction

## Warragamba Dam

From the Lookout, return towards Camden as far as The Oaks (219 km.), and turn left to Warragamba. At Warragamba (243 km.), follow the signposts to the dam.

The site had been identified as suitable for a water supply dam as early as 1845, but the height of the dam required was considered beyond the limits of safe technology at the time. Warragamba is a concrete gravity dam, designed

by Sydney Water Board engineers and constructed by the Board's day labour. It contains over 3 million tons of mass concrete. Aggregate for the concrete was carried over a 20 km. long aerial ropeway (since demolished) from near Emu Plains.

To ensure the safety of the dam, a new spillway has been constructed beside the dam. It will operate only in the event of an extreme flood. The viewing platform at the dam site provides a good view of the new spillway.

## Prospect Reservoir

Leave Warragamba Dam by Farnsworth Avenue (named after the Water Board's Engineer-in-Chief from 1937 to 1948) and then join Silverdale Road to Wallacia. At Wallacia (252 km.) turn left on Mulgoa Road and follow it through Mulgoa and Regentville to join the M4 Motorway (265 km.). Take the Motorway towards Sydney leaving it by the Prospect Highway exit (291 km.). After the exit turn right, crossing the Motorway and follow the signs to Prospect Reservoir (296 km.).

The reservoir was formed by building an earth wall with a puddled clay core. Until the Upper Nepean dams were built it was the main storage for Sydney's water supply. It is still in use for storage, but most of Sydney's water bypasses it and flows through the filtration plant nearby.

Water for Sydney originally flowed through the Lower Canal from Prospect to Guildford, and then by pipe to reservoirs at Potts Hill. Water now leaves the filtration plant at Prospect by a series of pipes serving nearly 100 smaller reservoirs around the metropolitan area. The Lower Canal remains and can be seen at the dam, but it is no longer used.

## End of the Tour

After leaving Prospect Reservoir, return to the M4 Motorway and head for Sydney. From the entry to the Motorway, the distance to Parramatta is 8 km. and to the centre of Sydney 32 km.

## ASHET self-guided tour brochures

This brochure is one of a series describing self-guided tours to places of engineering and technological interest in the Sydney area. All of the brochures are published in pdf form on the ASHET website [www.ashet.org.au](http://www.ashet.org.au) where they may be viewed and downloaded for printing on a desktop printer.

The full set of brochures is as follows:

### The Sydney Harbour islands

Self-guided tours by ferry

### Ryde to Tempe: discovering the history and industrial heritage of Rhodes, Concord, Canterbury and the Cooks River

Self-guided cycle tour

### Sydney's colonial fortifications

Self-guided tours

### Sydney Harbour Bridge

Self-guided walk

### The engineering heritage of Sydney's maritime industries

Self-guided tour by ferry

### Steam at the Powerhouse

Self-guided visit to the museum

### Parramatta River bridges

Self-guided tour by RiverCat

### Sydney Water: A day tour of the water supply dams south of Sydney

Self-guided tour by car

### Engineering and industry on three Sydney Harbour islands

Self-guided tours of Fort Denison, Cockatoo and Goat Islands

### An engineering walk around the Sydney Opera House

Self-guided walk

ASHET, the Australian Society for History of Engineering and Technology, was formed in June 2003. Its objects are to encourage and promote community interest and education in the history of engineering and technology in Australia. For more about ASHET, visit the website [www.ashet.org.au](http://www.ashet.org.au).