

# VICTORIAN DESALINATION PROJECT

## FACT SHEET

December 2016

**WATER NOW  
AND FOR THE FUTURE.  
FOR SURE.**

## THE DESALINATION PROCESS

Desalination is the process of removing salinity (dissolved salts) from a salt water source.

It has been commonly used for more than 100 years in dry climates such as the Middle East, Spain, Malta, Cyprus and parts of the United States where access to traditional water supplies is limited.

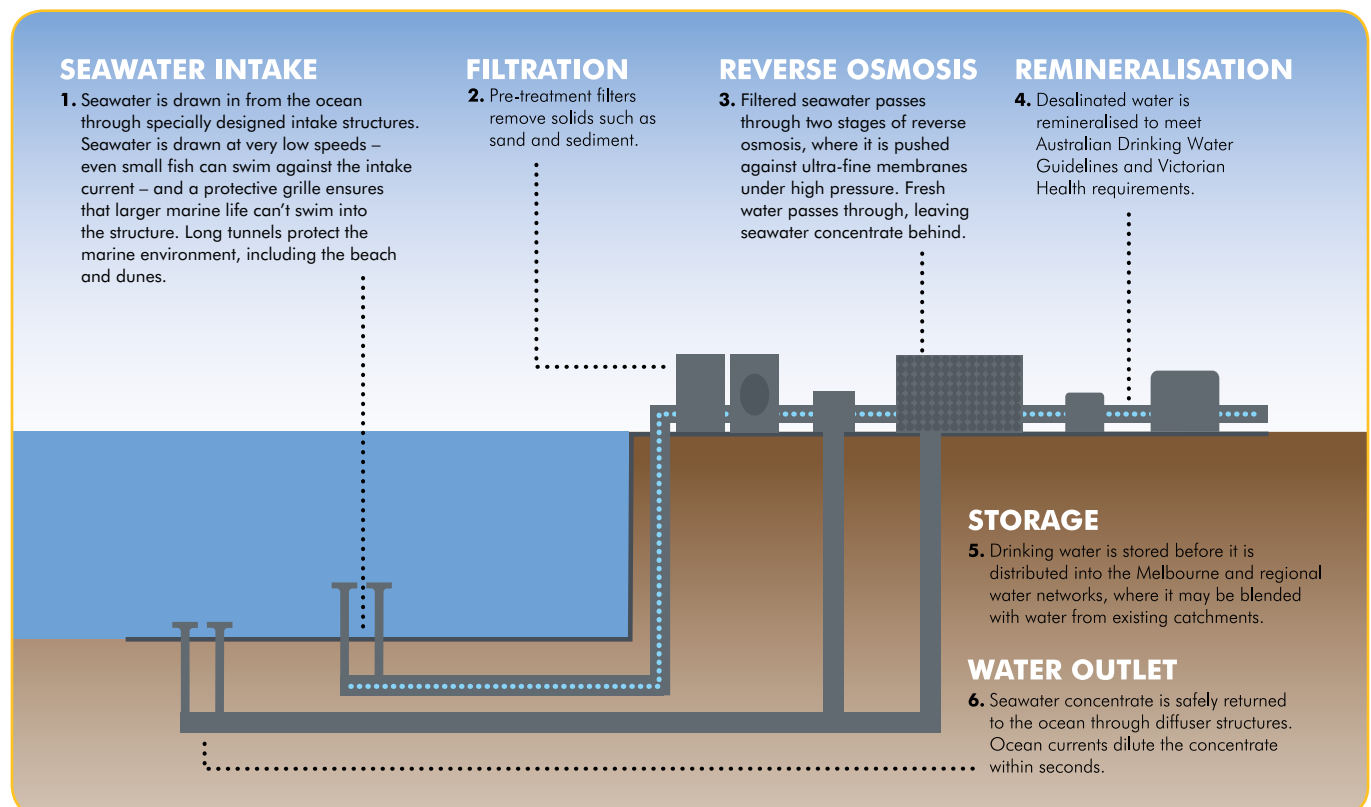
In Australia there are large-scale desalination plants in Sydney, Perth, the Gold Coast and Adelaide, as well as the Victorian Desalination Project at Wonthaggi.

Various methods can be used to desalinate seawater. Reverse osmosis technology is used at the Victorian

Desalination Project as it is more energy efficient and less visually intrusive than other methods.

Reverse osmosis is the process where pressure is applied to water to force it to move from an area of higher salt concentration to an area of lower salt concentration. Salt water is pushed against fine membranes under high pressure to separate the salt and water molecules.

Each reverse osmosis membrane has a surface area of 40.9 square metres. The membrane material is wrapped rather like a closed umbrella inside each cylinder.



AQSI15/001/002

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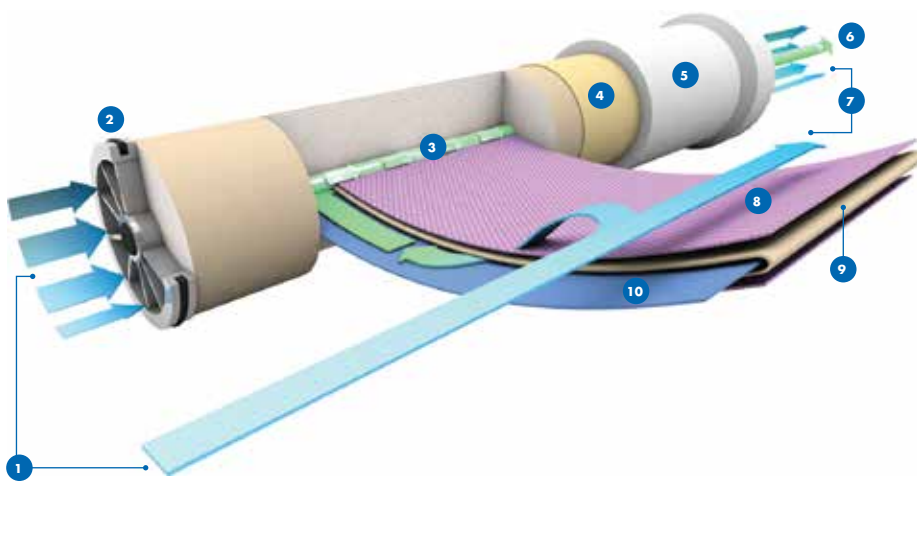
The Victorian Desalination Project uses a two pass reverse osmosis process to remove minerals and salts and produce a product that meets strict water quality requirements.

The major benefit of desalination is that it can continue to deliver high quality drinking water even if there is no rain.

## Did you know...

- The VDP can produce up to 440 megalitres of water per day
- 650 metres head pressure is involved in the reverse process. This is the equivalent of being 650 metres below the sea surface. A fire hose generally operates at about 290m head pressure. A human being can only survive to about 120 metres depth
- 440ml of freshwater is produced from 1000ml of seawater
- Salt water contains 3.7% of salt compared with 0.012% in drinking water
- It takes 12 hours for the desalinated water to move through the underground pipeline to Cardinia, at full flow
- The water takes 20 minutes to move through the two-pass reverse osmosis system
- The intake flow rate of the seawater is very slow – taking 20 minutes to move through the tunnel and get to the plant – travelling at 3.5 km per hour (half normal walking speed)

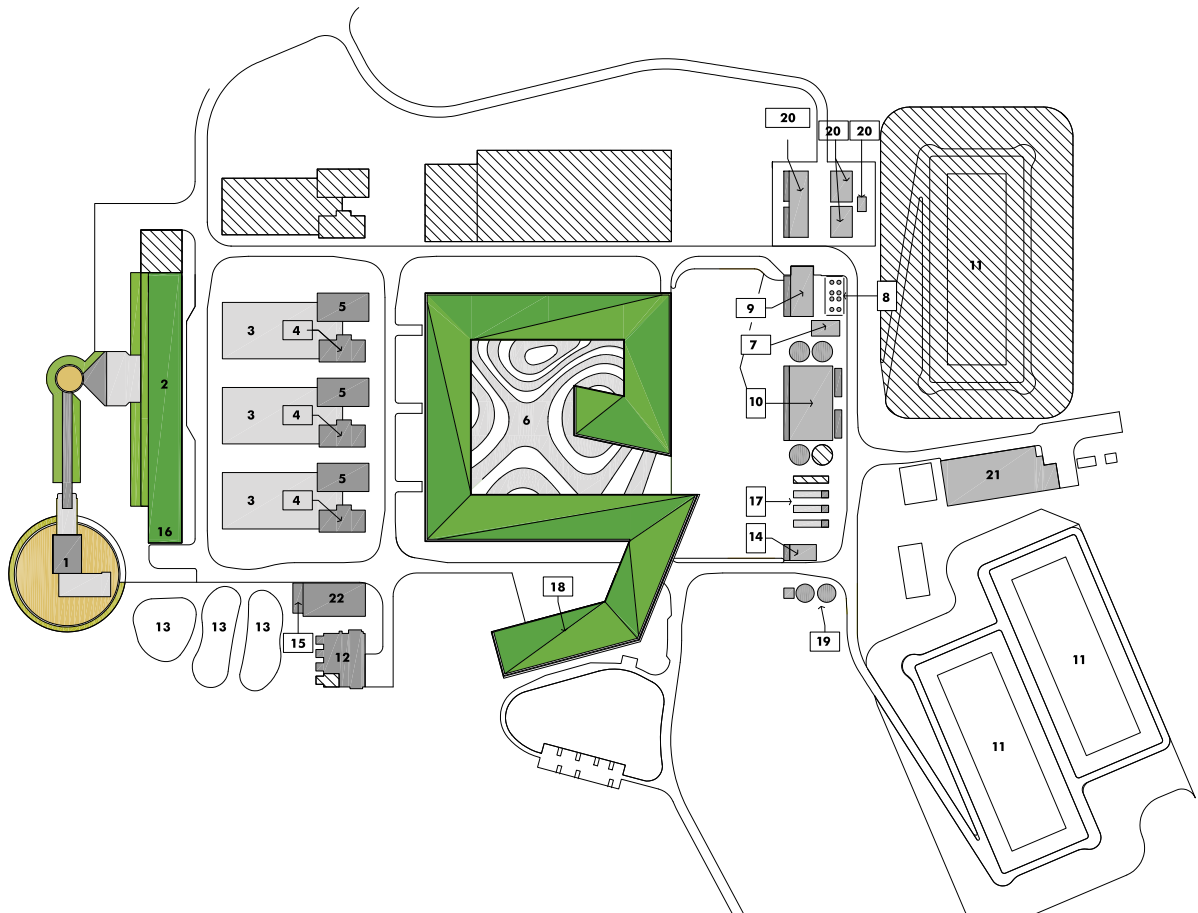
## Reverse Osmosis Membrane



- 1 Seawater
- 2 Brine seal
- 3 Permeate collection tube
- 4 Reverse osmosis (RO) membrane housing
- 5 Pressure vessel
- 6 Permeate
- 7 Concentrated sea water/brine
- 8 Brine side spacer
- 9 RO membrane
- 10 Permeate side

## Reverse Osmosis Processing Plant

This is a plan view of the layout of the reverse osmosis processing plant. Water moves through the process from left to right. It takes about one hour for a water drop to move through from the seawater lift pump station (1) through the plant to the treated water storage (11).



### 1 SEAWATER LIFT PUMP STATION

Transfers seawater to the pump station via intake structures located on the seabed.

### 2 SCREEN & FEED PUMP STATION

Houses screen filters that remove large particles from seawater.

### 3 PRETREATMENT DMPF

Houses Dual Media Pressure Filters (DMPF) to remove fine particles from seawater.

### 4 DMPF BACKWASH

Collects backwash from the DMPFs and pumps it through to the Backwash Treatment Building.

### 5 BACKWASH TREATMENT BUILDING

Treats and stores backwash from the DMPF process before it is pumped to the Solids Treatment Building.

### 6 REVERSE OSMOSIS BUILDING

Water passes through two stages of reverse osmosis where minerals and salts are removed.

### 7, 8 AND 9 CHEMICAL BUILDINGS

House chemicals like fluoride and carbon dioxide used to potabilise the desalinated water.

### 10 LIME STORAGE AND SATURATION

Houses lime used to remineralise the desalinated water.

### 11 TREATED WATER STORAGE

Stores potable water prior to distribution.

### 12 SOLIDS TREATMENT BUILDING

Settlement and centrifuge process used to dewater the backwash waste prior to transfer offsite.

### 13 STABILISATION PONDS

Treatment ponds used for the stabilisation and treatment of outfall waters.

### 14 UTILITIES BUILDING

### 15 AND 16 ELECTRICAL ENCLOSURES

### 17 POTABILISATION SYSTEM

Point for mixing of chemicals to produce safe drinking water.

### 18 ADMINISTRATION COMPLEX

Contains reception, offices, meeting rooms and plant control room.

### 19 FIRE SERVICES BUILDING

### 20 SUBSTATIONS

Contain electrical equipment and transformers.

### 21 TRANSFER PUMP STATION AND SURGE VESSELS

Pumps potable water into the transfer pipeline.

### 22 PROCESS BUILDING

Houses chemicals used to assist the reverse osmosis process.

FUTURE PLANT EXPANSION  
ZONES TO 200GL