

# Major Projects application



NSW GOVERNMENT  
Department of Planning

Date received: 10/11/05

Project Application No. 05-0082

## 1. Before you lodge

This form is required to apply for the approval of the Minister to carry out a Project to which Part 3A of the *Environmental Planning and Assessment Act, 1979* (the Act) applies.

Before lodging this application, it is recommended that you first consult with the Department of Planning (the Department) concerning your Project.

Please be aware that you may need to conduct a Planning Focus Meeting before lodging this application involving the Department, relevant agencies, Council or other groups identified by the Department. If you are required to conduct a Planning Focus Meeting, you will need to provide details and outcomes arising from the meeting.

To ensure that your application is accepted as being duly made, you must

- complete ALL parts of this form, and
- submit all relevant information required by this form.

**All applications must be lodged with the Director-General, by courier or mail.**

Ground floor, 23-33 Bridge Street, SYDNEY NSW 2000  
GPO Box 39 SYDNEY NSW 2001  
DX 10181 Sydney Stock Exchange  
t: 02 9228 6111  
f: 02 9228 6455

## 2. Details of the proponent

Company/organisation/agency		ABN			
Sydney Water Corporation		49 776 225 038			
<input type="checkbox"/> Mr	<input type="checkbox"/> Ms	<input type="checkbox"/> Mrs	<input checked="" type="checkbox"/> Dr	<input type="checkbox"/> Other	
First name		Family name			
Judi		Hansen			
STREET ADDRESS					
Unit/street no.		Street name			
115-123		Bathurst Street			
Suburb or town		State		Postcode	
Sydney		NSW		2000	
POSTAL ADDRESS (or mark as above)					
PO Box 53					
Suburb or town		State		Postcode	
Sydney South		NSW		1235	
Daytime telephone		Fax		Mobile	
1800 685 833		(02) 9261 3167			
Email					
desalination@sydneywater.com.au					

### 3. Identify the land you propose to develop

#### STREET ADDRESS

Unit/street no.

Street or property name

Suburb, town or locality

Postcode

Local government area

#### REAL PROPERTY DESCRIPTION

OR: detailed description of land attached:

The real property description is found on a map of the land or on the title documents for the land. If you are unsure of the real property description, you should contact the Department of Lands.

Please ensure that you place a slash (/) to distinguish between the lot, section, DP and strata numbers. If the Major Project applies to more than one piece of land, please use a comma to distinguish between each real property description.

**Where the Major Project is subject to Clause 8F of the *Environmental Planning and Assessment Regulation 2000* and in lieu of completing the above, a description or detailed plan of the land affected must be included with the documents required with Part 4 below.**

### 4. Proposed Major Project – Description and other Requirements

Provide a brief title for your Project that includes all significant components. If the application relates to only part of a Project, include a clear title that describes the relevant part.

Sydney's Desalination Project - construction and operation of a desalination plant on the Kurnell Peninsula, and associated infrastructure, with a capital investment value of more than \$10 million for the purposes of the supply of up to 500 megalitres of drinking water per day.

This includes:

- Intake/inlet and outlet pipelines to draw seawater into the plant and return seawater concentrate to the ocean (including tunnelling under Botany Bay National Park);
- Pipelines and/or tunnels from the plant across Botany Bay to the Sydney Water Corporation water supply system for the distribution of drinking water;
- Pipelines from the plant to Miranda water supply system for the distribution of drinking water;
- The connection of the plant to the electricity grid; and
- Temporary laydown areas for construction use.

Is the application related only to a part of a Project?  Yes  No

**You are also required to provide a Project Description Report and address any matters required by the Director-General in accordance with 75E of the Act. Failure to do so may lead to your application being rejected.**

Is a Project Description attached:

Hard copy:  Yes  No

Electronic version:  Yes  No

(NB: An electronic copy is required as all applications must be provided on the Department's website. You should contact the Department on the correct electronic format).

Is the Project Description Report consistent with the requirements of any Guideline produced by the Department (including any draft)?  Yes  No

Does the Project Description Report include additional matters required by the Director-General, such as evidence of a Planning Focus Meeting and consultation?  Yes  No

### CONCEPT APPROVAL

If you are applying for a **concept approval**, the Department's *Concept Approval Guideline* should be consulted and the matters identified therein must be addressed as part of your application.

Does the Project Description Report submitted address the relevant guidelines for Concept Approvals?

Yes  No

### FULL TIME EQUIVALENT JOBS

Please indicate the number of jobs created by the proposed Major Project. This should be expressed as a proportion of full time jobs over a full year.

Construction jobs (full-time equivalent)

1,000

Operational jobs (full-time equivalent)

20

## 5. Approvals from state agencies

Does the proposed Major Project require any of the following: (tick all appropriate)

- an aquaculture permit under section 144 of the *Fisheries Management Act 1994*
- an approval under section 15 of the *Mine Subsidence Compensation Act 1961*
- a mining lease under the *Mining Act 1992*
- a production lease under the *Petroleum (Onshore) Act 1991*
- \* an environment protection licence under Chapter 3 of the *Protection of the Environment Operations Act 1997* (for any of the purposes referred to in section 43 of that Act)
- a consent under section 138 of the *Roads Act 1993*

\* NB: an environment protection licence may be required – to be determined

## 6. Application fee

You are required to pay a fee for the assessment of a Major Project. This fee is based on the estimated cost of the Major Project.

The Department requires that you pay a proportion of the total fee with this application and you should consult with the Department before lodging this application to determine the proportion to be paid.

Estimated Project Cost

\$2,000,000,000 for a 500ML/d plant

## 7. Owner's Consent

As the owner(s) of the above property, I/we consent to this application being made on our behalf by the Proponent:

Signature

NA

Signature

NA

Name

Name

Date

Date

Note: The Department will not accept an application for a Major Project without having the signature of the owner of the land, **unless** the Major Project is subject to Clause 8F of the *Environmental Planning and Assessment Regulation 2000*.

## 8. Proponent's Signatures

As the proponent(s) of the proposed Major Project and in signing below, I/we hereby:

- provide a description of the proposed Project and address all matters required by the Director-General pursuant to Section 75E of the Act, and
- apply, subject to satisfying Clause 8D of the *Environmental Planning and Assessment Regulation 2000*, for the Director-General Environmental Assessment Requirements pursuant to Part 3A of the *Environmental Planning and Assessment Act 1979*, and
- declare that all information contained within this application is accurate at the time of signing.

Signature



Name

Judi Hansen  
General Manager, Sustainability

Date

10/11/05

In what capacity are you signing if you are not the proponent

Name, if you are not the proponent

Sydney Water

**Sydney's Desalination Project**

Major Projects Application Attachment  
Project Description Report

November 2005

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# 1. Project Description

*To satisfy section 4 in the Major Projects Application, the project is described in terms of its component parts and how it will be constructed and operated. Target drinking water quality is also discussed together with planned operational regimes.*

## 1.1 Overview

Drinking water produced by desalination is not a new concept. It has been implemented for many decades and is the principal source of drinking water in some countries. It is also used to produce fresh water on ships. The desalination processes available today can readily achieve health and aesthetic (salt content, taste and odour) water quality standards superior to the criteria set down in the Australian Drinking Water Guidelines as published by the National Health and Medical Research Council (NHMRC). In the case of Sydney, a desalination plant will achieve water quality that meets the NSW Health requirements and the Australian Drinking Water Guidelines and as set out in Sydney Water's operating licence.

The concept plan involves treating and delivering up to 500 ML/day of drinking water into the existing water distribution network.

It is proposed to build the desalination plant in stages ranging from 125 to 500 ML/day as the need arises. This can be achieved by constructing the intake and outlet structures close offshore in the Tasman Sea and infrastructure across Botany Bay for the ultimate capacity of 500 ML/day. Once across Botany Bay the distribution will be sized to the built capacity of the desalination plant.

Options include:

- ▶ 125 ML/day plant with local distribution at Kyeemagh;
- ▶ Plant initially built at 125 ML/day and then expanded up to 500 ML/day; or
- ▶ 500 ML/day plant initially constructed with distribution to City/Pressure tunnels.

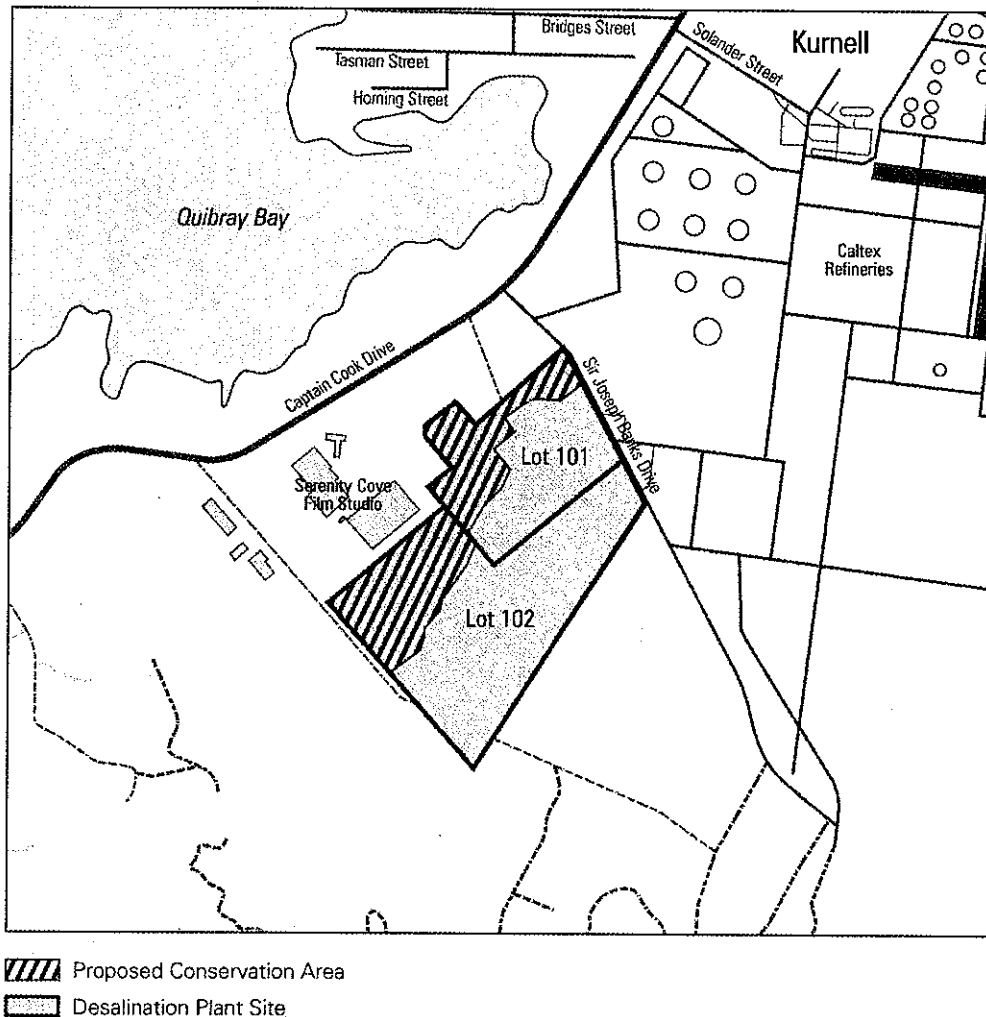
Each of these options could also deliver up to 50 ML/day locally from the desalination plant by connecting to the water distribution system at Caringbah, which delivers water to the Sutherland area. Pipes would be laid along roadways and easements.

The major elements are:

- ▶ A reverse osmosis (RO) desalination plant on industrial land at Kurnell sized in approximately 125 ML/day modules. The desalination site is composed of two parcels of land as follows:
  - Lot 2 in DP 1077972 owned by Valad Property Group (referred to as Lot 101 in Figure 1.1); and
  - Lot 1 in DP 1088703 being part of Lot 102 in DP 1027438 owned by Serenity Cove Business Park (Referred to as Lot 102 in Figure 1.1).
- ▶ Intake and outlet structures sized to full plant capacity of 500 ML/day and located close offshore in the Tasman Sea. These will be linked to the desalination plant by tunnels;
- ▶ Infrastructure to deliver water to the existing distribution network, allowing any of the following:
  - 50 ML/day delivered locally to Caringbah;
  - 125 ML/day delivered to Kyeemagh and then to the existing distribution network;
  - Up to 500 ML/day delivered to the major water distribution system consisting of the City and Pressure Tunnels via a pipeline or tunnel across Botany Bay.



**Figure 1.1 The desalination plant site at Kurnell**



To date, two water distribution methods (that is, distribution route and method of construction) are under consideration to connect the desalination plant to the water network. A pipeline and/or a tunnel could be used to distribute the water. Figures 1.2 and 1.3 show examples. Other distribution methods will be considered.

Alternative distribution methods may arise during the detailed design process. Decisions on the route and method of construction will be made during detailed design.

The precise details of the site layout, distribution routes and other infrastructure will not be available until further investigation and design is undertaken as part of the detailed design in the project procurement strategy.

## **1.2 Staging of the Plant**

If severe drought were to be sustained, the desalination plant could be needed in late 2008. To achieve this, construction would need to start in late 2006.

As the project is a response to drought, it is quite possible that the plant will be built in stages of 125 ML/day modules. This could be achieved by constructing intakes and outlets for 500 ML/day and treatment units for a lesser amount with delivery infrastructure also staged. The initial size of the plant will be determined during the procurement phase with due consideration to dam storage levels. The treatment units will be designed in modules to allow staging up to 500 ML/day.

Factors which will influence decisions to increase capacity will depend on inflows into the water storages and rate of depletion of those storages.

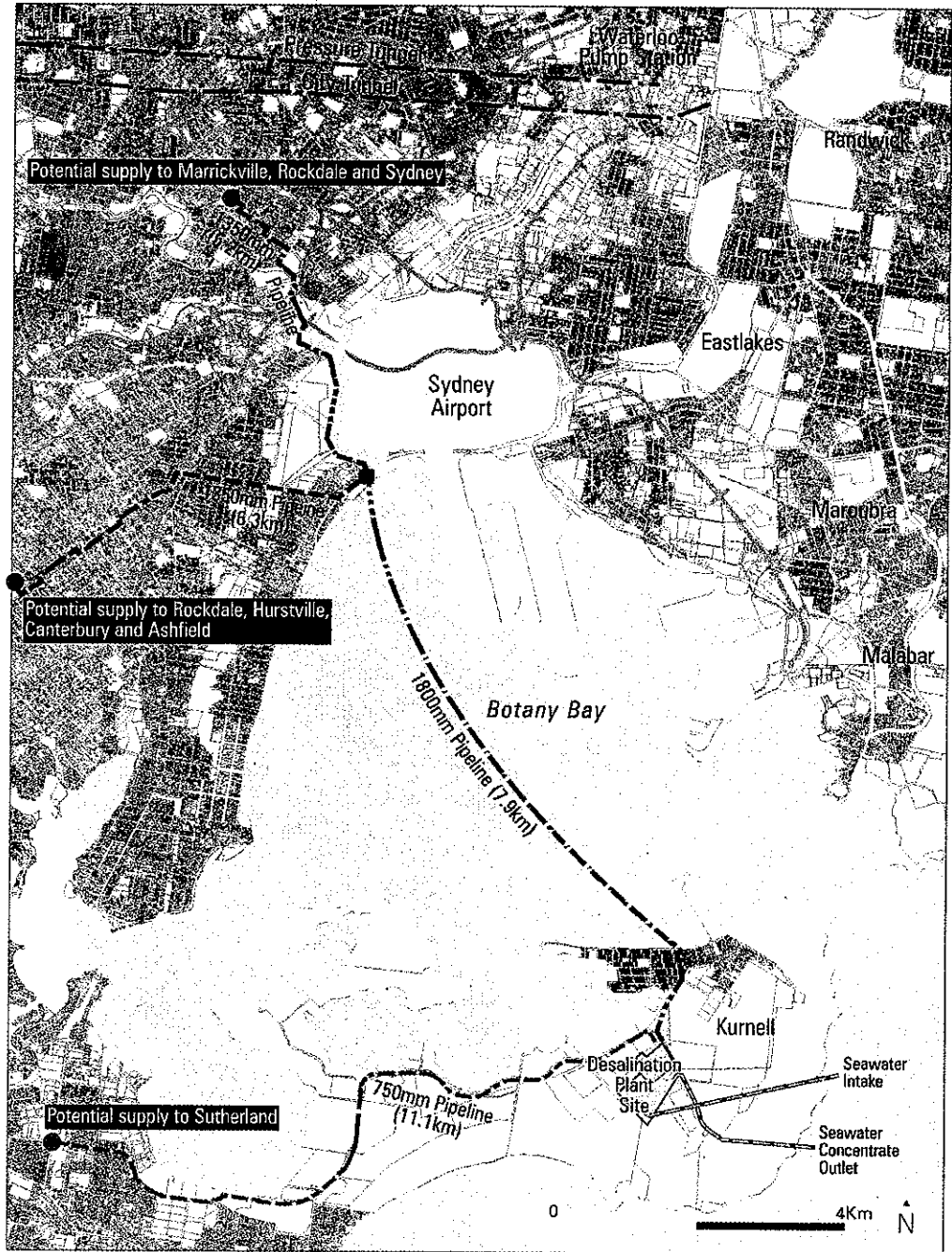
## **1.3 Localities**

The study area for the environmental assessment is focussed on the area of impact of the proposed project and includes sites that could potentially be affected by the construction or operational phases:

- ▶ The plant location site at Kurnell;
- ▶ The intake and outlet locations;
- ▶ The Botany Bay impact zone for either a pipeline, tunnel, microtunnel and the locations where tunnel shafts may occur; and
- ▶ The area covering the distribution routes.

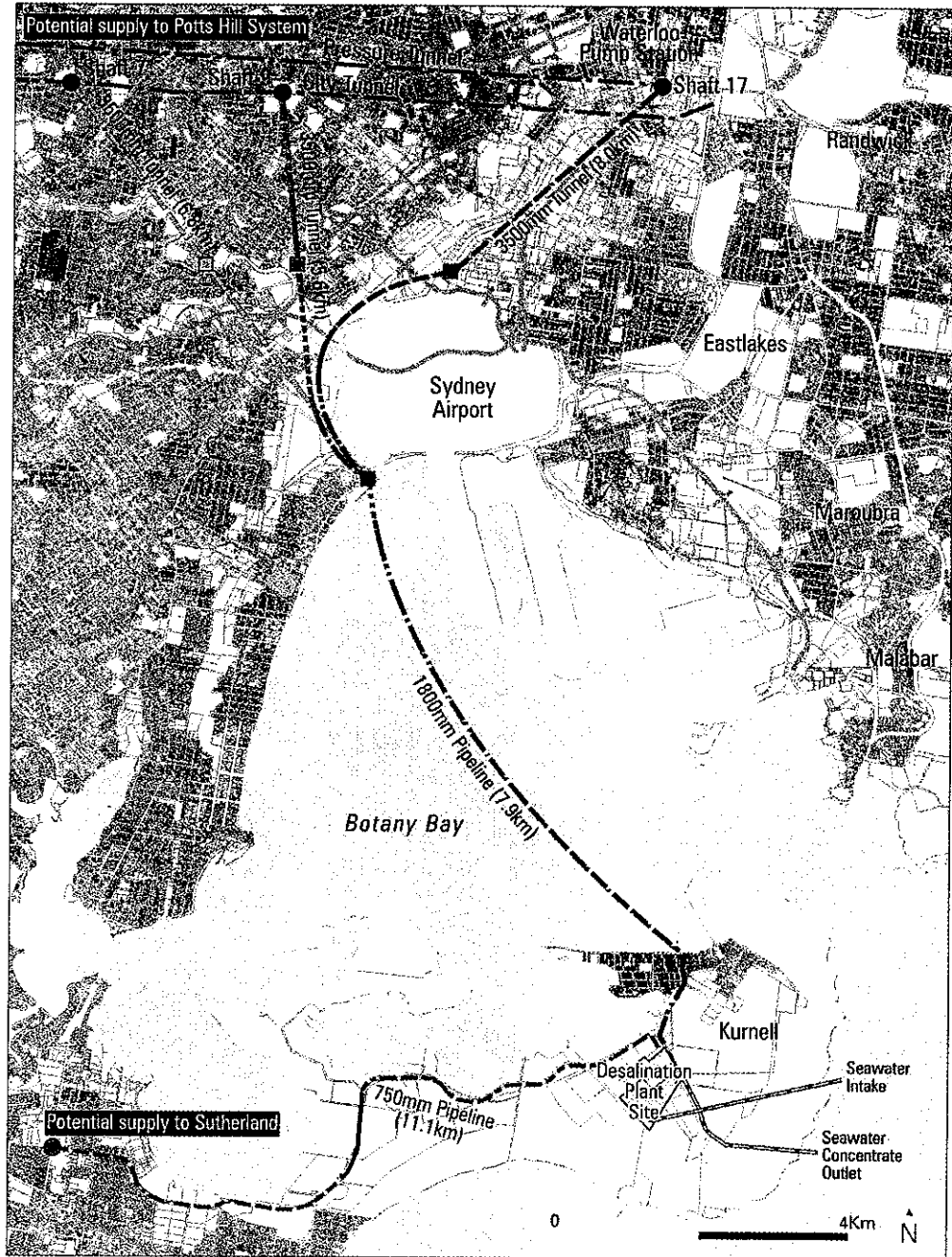
Potentially affected Local Government Areas (LGAs) include Sutherland, Botany, City of Sydney, Rockdale, Marrickville, Canterbury, Kogarah and Ashfield. However this will not be known until the final size of the plant and delivery routes are determined.

**Figure 1.2 Indicative potential water distribution systems for a 125 ML/day desalination plant at Kurnell**



- ≡≡≡ Potential local delivery route
- Botany Bay pipeline option
- Connection to the water network
- Temporary shaft

**Figure 1.3 Indicative potential water distribution systems for a 125 ML/day desalination plant at Kurnell then expanded to 500 ML/day**



- Local delivery route
- ▨ Potential delivery route to Potts Hill System
- Connection to the water network
- ▣ Temporary shaft
- Pipeline across Botany Bay

## **1.4 Project Phases**

### **1.4.1 Feasibility and Pre-construction activities**

Before construction commences, additional feasibility studies need to continue. This will focus on routine feasibility studies associated with assessment of various distribution routes, sites and other infrastructure needs. These are likely to include geotechnical, groundwater, soil and sediment studies along with other surveys and minor tasks required to assess routes, sites and other infrastructure needs.

Other tasks associated with pre-design and construction are likely to include consideration and optimisation of the concept design.

### **1.4.2 Construction**

Construction will take approximately 26 months. Tunnelling and plant development will occur simultaneously. A variety of construction methods could be used, including:

- ▶ Site preparation;
- ▶ Temporary construction compound areas;
- ▶ Temporary wharves and barges;
- ▶ Tunnelling;
- ▶ Dredging and pipe laying across Botany Bay;
- ▶ Trenching, directional drilling, boring, or other means for installing pipelines;
- ▶ Blasting may occur for shaft construction on inland sites (no blasting will occur in the ocean); and
- ▶ Heavy lift for plant items.

Construction will include pipelines/tunnelling areas, trenching, dredging, directional drilling, wharves/barges, clearing plant site, construction of tanks and buildings and associated infrastructure including connection to the electricity grid. The exact impact zones are not defined at this stage, as these will be determined at completion of detailed design in line with the approval conditions set by the Minister.

There are various options for constructing pipelines and the method to be selected depends on circumstances encountered and the outcomes of the detailed design stage.

### **Temporary Compounds**

Temporary compounds are required during construction for administration offices, parking for engineering staff and workers, open areas to lay-down and store materials, plant and equipment, and covered areas for the storage of perishable materials. For safety, fencing will be installed around construction areas such as pipe trenches, shafts, and adits (an entrance to a tunnel). All temporary structures will be removed at the completion of construction.

### **Workforce**

The workforce involved in the project will be approximately 1,000 construction and commissioning staff and up to 20 permanent operational staff. It is likely that the workforce will include local contractors as well as international experts, particularly during the commissioning phase.

### **Spoil Management**

An estimated 1.1 million tonnes of spoil will be excavated from tunnels and the delivery infrastructure. This is less than other recent projects in Sydney that include the Northside Storage Tunnel that produced 1.8 million tonnes of spoil and the Chatswood Epping Rail Link at 1.7 million tonnes

Spoil will range from clean sandstone to sediments, so disposal methods will vary accordingly. Most of the spoil will be clean material that can be beneficially reused. Some of the spoil may need to be sent to landfill. Little contaminated material is expected.

#### **1.4.3 Commissioning**

Before the plant is brought on line there will be a commissioning period where all plant systems are tested thoroughly and water quality targets are confirmed. During this period the plant's output will not be sent into the delivery system. This water will be discharged through the outlets with the seawater concentrate. Similarly as the delivery systems are finalised, tunnels and pipelines will be tested. This water will be discharged to either sewer or to the stormwater system.

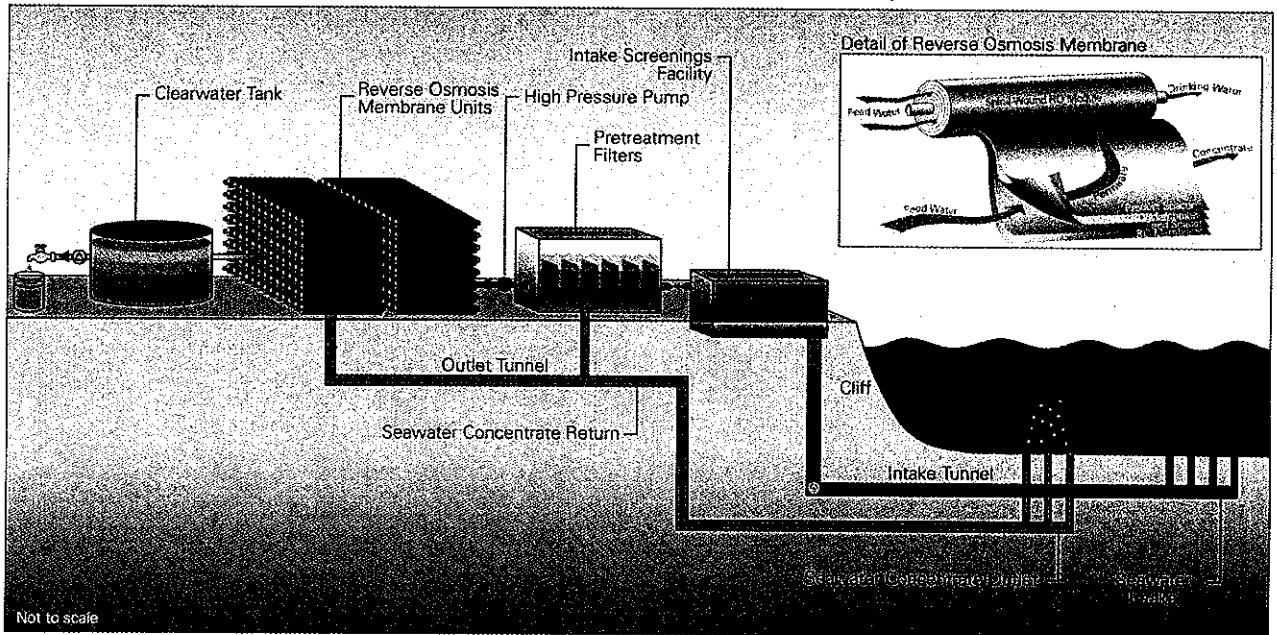
#### 1.4.4 Operation

The desalination plant will provide up to 500 ML/day of drinking water into the existing drinking water network. As with all supplementary sources of drought supply, should the level of Sydney's water supply dams increase significantly, production may be reduced, suspended and recommenced as required.

The desalination plant will operate as follows as shown in Figure 1.4:

- ▶ Seawater will be extracted from the ocean and pumped to the desalination plant. The intakes will be designed to minimise impacts to aquatic ecology;
- ▶ The seawater will pass through pre-treatment processes to remove suspended solids and other solid matter. This will be achieved through coagulation and sedimentation followed by filtration, or by using microfiltration or ultrafiltration membranes upstream of the reverse osmosis membranes;
- ▶ The seawater will then be passed through Reverse Osmosis (RO) membranes. The RO process uses a semi-permeable membrane to separate salts from seawater. The membrane retains the salts, viruses, micro-organisms and other impurities, while desalinated water diffuses through the membrane;
- ▶ The desalinated water will be potabilised, fluoridated and disinfected to maintain chlorine residual to meet Australian Drinking Water Guidelines (published by the National Health and Medical Research Council) and NSW Health requirements, in accordance with normal Sydney Water practice. Desalinated water will then be delivered to a clear water tank before distribution to the network via a system of tunnels and/or pipelines; and
- ▶ Backwash water from the pre-treatment filters and the water that does not pass through the RO process will be discharged to the ocean via an outlet designed to maximise dilution and dispersion of the discharge.

Figure 1.4 Schematic of the reverse osmosis process





## 2. Detailed Description of Land

*To satisfy section 3 in the Major Projects Application, the land is described in terms of address, real property description and local government area.*

### 2.1 Overview

The land proposed to be developed for the desalination plant and associated infrastructure includes the following:

- ▶ Kurnell Peninsula and other land required for the construction and operation of the seawater intake and seawater concentrate structures, the desalination plant and associated potable water distribution.
- ▶ Lands comprising the bed of Botany Bay for potable water distribution and State coastal waters to the east of Kurnell Peninsula for seawater intake and concentrate discharge structures.

Sydney Water is negotiating to purchase the industrial land identified below for the desalination plant site as shown in Figure 2.1:

- ▶ 67 Sir Joseph Banks Drive, Kurnell 2231 NSW. ICA Property Development Fund No3 SPV T'EE Ltd, part of the Valad Property Group (Lot 2 in DP 1077972) and
- ▶ 238-258 Captain Cook Drive, Kurnell 2231 NSW. Serenity Cove Business Park Pty Ltd (Lot 1 in DP1088703 being part of Lot 102 in DP1027438).

Both lots are in the Local Government area of Sutherland Shire Council.

The previous sections provide details on the land proposed to be developed for intake and outlet infrastructure and possible distribution routes.

Figure 2.1 Proposed land for the desalination plant

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Sydney  
**WATER**

**FICHTNER**

DESALINATION PLANNING STUDY

FIGURE 1