

SDP Capital Works Project Summary



Project Title / Asset	Dual 132kV Feeder
Project Driver	Reliability / Availability

Purpose

The purpose of this document is to provide a high-level overview for major projects, further detailed information is available on request. Major projects have been defined as any capital expenditure that includes the addition of new assets to the Sydney Desalination Plant (Plant).

Information/justification on other elements of the proposed capex program (e.g. refurbishments and replacements of existing assets) are available on request.

Project Background

The Plant is an Ausgrid network high voltage customer. It receives a single supply at 132kV and a backup supply at 11kV from the Ausgrid Kurnell South Zone Substation (ZS), into its privately-owned high voltage electrical installation (the SDP Switchyard).

The 132kV feeder (91P) is laid in privately owned ducts, approximately 1.5km in length, between the SDP Switchyard and the Ausgrid Kurnell South ZS (see figure 1 below). The feeder 91P is connected to the 132kV busbar in the SDP Switchyard where it is transformed to 11kV for site reticulation. The 132kV feeder provides the full operational load of the Plant in its present configuration (250ML/day). In the event of planned or unplanned outages of the 132kV feeder 91P, the Plant will lose all drinking water production.

Figure 1 Aerial Photograph



The Plant was designed to have two 132kV power supply feeds with sufficient space left in the 1.5km corridor from the Ausgrid substation.

As part of the Expansion Plan, following a request from the NSW Government to begin the planning process for an expansion of the Plant capacity, a 'connection of load' application was lodged with Ausgrid on 12 February 2020 to commence the preliminary Design Information Package process to duplicate the 132kV supply to meet the expanded capacity. The current approved load for the Plant is 50 MVA, with the application request to double this to 100 MVA.

SDP Capital Works Project Summary



The NSW Government later put the expansion planning process on hold. However, to ensure the Plant remains highly available and to reduce maintenance outage times, there is an opportunity to install a second 132kV feeder in the 2023-2027 Regulatory Period and provide greater resilience for the Plant and reliability of supply for customers. An additional benefit of installing a second 132kV feeder now will future proof the Plant for an expansion, minimising the downtime of the existing Plant during the 132kV feeder installation.

Asset Details

Asset	132kV supply and high voltage switchyard
Asset durability/ design intent/ asset management Strategy	Electrical assets: 25 years Preventative maintenance will be required on the new assets, consistent with the current/existing maintenance schedules and OEM recommendations.
Asset Function/ Subsystem/ System	Provides the primary bulk power supply to the Plant from the Ausgrid substation.
Asset Failure and its consequence	Loss of the 132kV supply will result in loss of Plant production. A backup 11kV supply exists, however this only provides enough power for background systems such as lighting and cooling, administrative areas and asset protection and preservation e.g. flushing of the RO trains to preserve membranes in the event of loss of 132kV supply.

Justification

The primary justification for the project is:

1. Recent failure of the single feeder (91P) resulted in a significant interruption to Plant production, highlighting the lack of resilience of this system and the criticality of the single incomer.
2. Given the expected operating regime over the 2023-27 Regulatory Period and the requirement of high availability, installation of a second feeder will provide redundancy for the Plant power supply and will mitigate against failure of the single supply line by ensuring minimal disruption to drinking water production.
3. Regular maintenance is required by both SDP and Ausgrid on the high voltage equipment. Ausgrid are able to unilaterally determine the timing of their mandatory maintenance. A second feeder will reduce the duration of downtime and provide greater flexibility by allowing mandatory maintenance to occur whilst maintaining Plant production (reduction in downtime from days to hours – only disruption due to switching).

The secondary justification for the project is:

4. A key risk identified through the expansion planning process was the Ausgrid connection process as a task requiring third-party involvement and implementation. By implementing these works in the 2023-27 Regulatory Period, the future risk profile for an expansion will be reduced.
5. Works can be planned and carried out when disruption to drinking water supply is less critical i.e. outside of drought conditions.

SDP Capital Works Project Summary



Options Considered

When the Plant was originally constructed provision for a second feeder was made and spare conduits installed from the Ausgrid ZS to the SDP Switchyard. Only minor extensions at either end are required. As such, alternate options for construction are limited and not considered further.

When the expansion planning was placed on hold, SDP did consider options regarding the timing of these works as per below.

Option A – Proceed with developing and certifying a design and defer construction to the 2023-27 Regulatory Period:

- Delay the development process through discussions with Ausgrid.
- Aim for a certified design ready for construction with the 24-month validity period.
- Submit the project as part of the 2023-27 Regulatory Submission (as redundancy for existing Plant availability and Expansion readiness) and proceed with construction if approved.

Option B – Defer the design and construction process until 2023-27 Regulatory Period:

- Negotiate with Ausgrid to keep the works to date on hold so that the time or cost is not wasted.
- Submit the project as part of the 2023-27 Regulatory Submission (as redundancy for existing Plant availability, and for Expansion preparation) and proceed with design and construction if approved.

Option C – Do nothing:

- Retain the single point of failure and existing maintenance windows.
- These works will be necessary to accommodate an Expansion of the Plant and will need to be implemented at that time.
- Restart the process in line with a new Expansion notice from the State.

SDP determined Option B was the preferred approach as there was uncertainty at the time regarding the ability to perform the works within the validity period given the unknown operational state of the Plant (e.g. emergency response, potential mothball, etc.) and to prevent inefficiencies due to lost time and cost if rework was required.

Proposed Scope

The proposed scope is to proceed with Option B. The scope of works will generally include:

1. Connection of load application with Ausgrid (utilising any work already completed).
2. Design Information Package (DIP) prepared and agreed with SDP and Ausgrid.
3. Detailed design and pricing of the network change / connection requirements.
4. Installation of additional supply:
 - 4.1. New 132 kV underground cable feeder from Ausgrid's point-of-supply to the SDP Switchyard (laid in existing ducts).
 - 4.2. Modification to electricity supply network and sub-station, as required by Ausgrid.

SDP Capital Works Project Summary

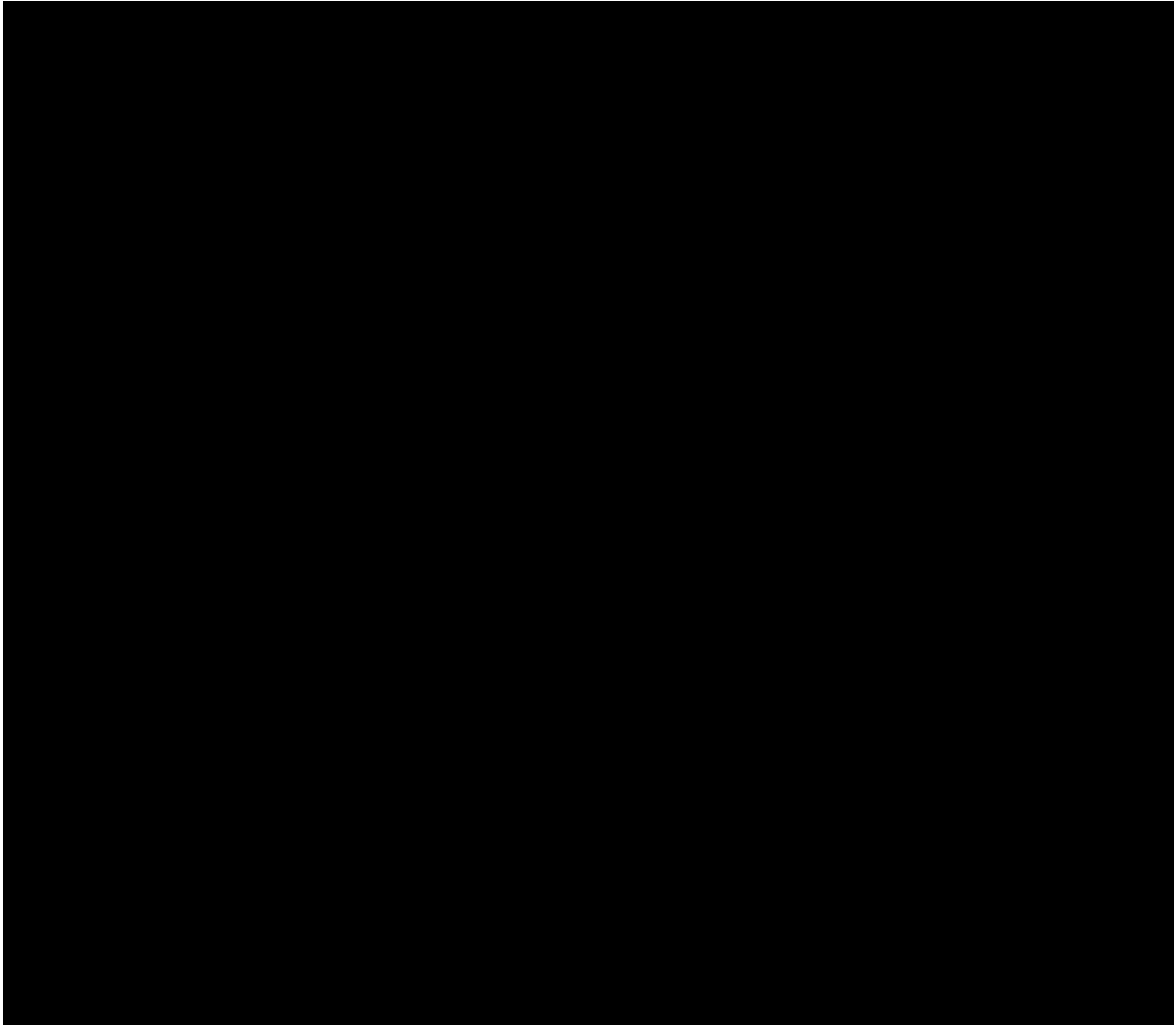


- 4.3. Installation of new switchgear and protection systems at SDP Switchyard including, new 132kV incomer, 132kV busbar, connection to existing 132kV busbar (refer to Cost Estimate and Proposed Layout for further detail).
5. Testing and Commissioning.

The scope excludes additional assets (transformers, switchgear etc) or other works that would be required for an expanded plant. These works to be completed as part of any future Expansion.

Cost Estimate

A high-level cost estimate has been prepared to assess the magnitude of the works (\$ base 2020). The estimated costs have mainly been derived based on the actual purchase price for the existing assets replaced during the Plant rebuild following the storm event. The cost estimate has been escalated to \$2023 for inclusion in SDPs 2023-27 Regulatory Submission.



SDP Capital Works Project Summary



Proposed Layout

