Victorian Desalination Project

D & C Utilities – Environmental Management Plan

Attachment B – Project Components

DOCUMENT NUMBER					
TDV	0	EV	PC	0012.B	02

ATTACHMENT B – PROJECT COMPONENTS

This attachment summarises the activities for each project component as follows:

- Area 3 - Utilities

Figure 1 shows the alignment of the utilities. The Power Supply and the Transfer Pipeline are co-located in a common easement from Wonthaggi to KP 78 where the power supply will separate from the pipeline corridor to follow an existing power line easement for 8km to the Cranbourne Terminal Station while the transfer pipeline continues north to Melbourne Water's Cardinia-Pearcedale main at Berwick. The typical utilities corridor is 40m wide consisting of a 20m permanent easement with an additional 20m for construction. The transfer pipeline construction easement north of KP 78 is reduced to 30m wide and the power supply easement between KP and the Cranbourne Terminal Station is 10m wide. The easement is also reduced through the Holden Proving Ground. Extra work spaces have been established along the utilities corridor for stockpiling of bedding material, spoil and for lay down areas.

The transfer pipeline is located on the eastern side of the easement with power supply offset 6.5m on the western side. The communications fibre optical cable is offset 3m to the east of the transfer pipeline on the eastern side.

The arrangement of the easement varies along the alignment depending on the position of the permanent easement and the utilities within the 40m construction corridor.

Table 1 shows the key design, construction and commissioning activities associated with the utilities. The construction sequence will be:

- Installation of the transfer pipeline and fibre optic cables
- Installation of the HVAC power supply cable
- Reinstatement and rehabilitation of the construction corridor.

Table 1: Area 3 – Utilities - Key activities

Activity	Description	Permanent or Temporary works
All utilities		
Survey	• Pre-construction surveys including features, geotechnical, flora and fauna	Temporary
Site establishment	• Establishment of access agreements with landowners • Access tracks to alignment • Access road adjacent to the alignment • Lay-down areas, including storage of sheet piling or caisson segments and the jacking pipe • Amenities	Temporary
Earthworks	• Clear and grade the construction corridor • Excavation to enable pipe/cable laying	Permanent

Activity	Description	Permanent or Temporary works
Transfer pipeline		
Pipe laying and communications fibre-optic cable	• Place bedding material • Excavate bell holes at each joint location • Lay and weld pipe sections • Place and compact bedding material	Permanent
Waterway and road crossings	• Construction techniques will depend specific circumstances but will include pipe jacking and horizontal directional drilling • Install temporary dams across watercourses where required • Construct launch and receipt pits on either side • Mobilise pipe jack / drilling equipment • Carry out operations • Demobilise • Install pipe	Permanent
Booster pump station Surge tanks	• Clear and grade the site • Earthworks • Excavation and concrete lining of pits for pumps • Building construction and fitout • Installation of pump station equipment and associated instrumentation	Permanent.
Power supply		
HVAC power supply cable and ancillary fibre-optic cables	• Excavation, trenching and placement of HVAC power supply cable • Installation of two fibre-optic cables within power supply trench	Permanent
Waterway and road crossings	• Construction techniques will depend specific circumstances but will include Horizontal directional drilling • Construct launch and receipt pits on either side • Mobilise drill rig • Carry out drilling operations • Demobilise drill rig • Install cable	Permanent
Cranbourne Terminal Station Reactive Compensation Stations	• Clear and grade the site • Earthworks and foundations • Construction and fitout	Permanent

Activity	Description	Permanent or Temporary works
Site reinstatement and rehabilitation	• Rehabilitation and reinstatement of construction corridor in accordance with agreements with landowners	Permanent

Figure 1: Utilities alignment

1 Transfer Pipeline

The transfer pipeline delivers water from the desalination plant at Wonthaggi to Melbourne Water's Cardinia-Pearcedale main at Berwick (Delivery Point 1). There are six additional delivery points to transfer water to regional townships and reservoirs between Wonthaggi and Cardinia. The transfer pipeline also includes a Booster Pump Station and two surge tanks.

1.1 Transfer Pipeline

The water transfer pipeline is a 1930mm diameter mild steel cement lined pipeline delivered to site in 12m lengths. The wall thickness of the pipeline ranges from 12-20mm depending on the depth at which the pipe is laid and the character of the material in which it is being laid.

The pipeline will be laid underground with a minimum cover of 800mm. The depth of the pipe will increase with vertical bends to in order to remain underground beneath topographical low points such as waterways. In flat areas the pipe will follow a saw tooth profile to create artificial high points for air valves while maintaining the minimum 800mm cover.

Road and waterway crossings will utilise tunnelling (pipe jacking) or modified standard trenching.

1.2 Booster Pump Station

The Booster Pump Station (BPS) at Cardinia assists the transfer pump station at the desalination plant site (Area 2) to pump water along the pipeline, however will only operate when flows exceed 100GL/yr (equivalent to 296 Ml/day). Flows under 100GL/yr will be transferred directly from the storage dams at the plant site to Delivery Point 1 by the transfer pump station.

The BPS will be constructed on a concrete slab on a compacted fill pad and the pumps are located below the final ground level. The main pumping station, electrical switch room and transformers will be housed in a framed steel structure with pre-cast concrete external walls panels for acoustic reduction and fire protection.

Earth mounds planted with native vegetation will be located to the north, north west, south and east of the BPS outside of security fencing.

1.3 Surge Tanks

Two surge tanks located at the highest topographical points along the pipeline ensure that the maximum and minimum pressure along the pipeline remain within the design limits including during an uncontrolled event such as a power failure at the transfer pump station or BPS. Without the surge vessels, the transient waves of a water hammer may result in the air entering the pipe.

1.4 Valves

The transfer pipeline will be completely underground with the exception of air scour and isolation valves. Air valves release air from the pipeline during filling, during normal operation and allow air into the pipeline during controlled drainage events. Scour valves drain the pipeline to facilitate maintenance or in the event of off-specification water. Isolate valves isolate sections of the pipeline to facilitate maintenance. All valves require above ground structures to access the pipeline.

2 Power Supply

Power supply will be delivered to the Desalination Plant by a 220kV high voltage alternating current (HVAC) underground power supply emanating from Cranbourne Terminal Station. In addition to the underground power cables, provision of the power supply will require upgrade of the Cranbourne Terminal Station, two Reactive Compensation Stations and a transformer at the Desalination Plant.

2.1 Power Cable

The 220kV cable system comprises of three single core 220kV cables laid in a trefoil arrangement. Each 220kV power cable will consist of a copper conductor, XLPE insulated single-core cable with a nominal diameter of 115mm and weight of 13kg/m. The power cables will be delivered in 1200m coils.

The power cable will be laid in a typical trench 800mm wide and 1550mm deep to provide 1200mm minimum cover and encased in a thermal bedding of flowable low strength (3MPa) cement stabilised backfill. Trenchless crossings may utilise horizontal directional drilling (HDD) or pipe jack construction techniques.

North of the Booster Pump Station (KP 74) the power supply will be direct buried. South of the Booster Pump Station to the desalination plant the power supply will be contained within 180mm HDPE conduits through which the cables will be pulled through following backfill of the trench.

Aboveground surface markers will be installed at 100m intervals and at any change of direction above the centreline of the cable route. Submarine cable warning signs will be erected over the centreline of the cable at creek crossings.

2.2 Cranbourne Terminal Station (CBTS)

A new double switched 220kV bay will be established at the existing CBTS to provide a 220kV connection point for the VDP. Cable termination equipment will be established at the connection point for termination of the new underground 220kV cable.

Line Protection and Control, Compensation Reactive Device Control (CRDC), Revenue and Check Metering, Quality of Supply Monitoring and Communications schemes will be established for this new VDP connection.

2.3 Reactive Compensation Stations

The power supply system includes two reactive power compensation stations to be erected at the Booster Pump Station (Northern Reactive Compensation Station) and north of the Holden Proving Ground (Southern Reactive Compensation Station).

The Northern Reactive Compensation Station (NRCS) will be established to provide Reactive Compensation and to provide BPS with a 22kV supply. The Booster pumps are required on the transfer pipeline to assist in the delivery of water. The BPS 22kV switchboard will be supplied via two off 220/22 kV 25MVA transformers. A Reactive Compensation Device Control scheme will be established at this location and include two off 54.7MVAr three phase oil filled Compensating Reactive Devices (CRDs) and associated primary and secondary equipment.

The Southern Reactive Compensation Station (SRCS) will be established to provide Reactive Compensation. A Compensation Reactive Device Control scheme will be established at this location and include two off 54.7MVAr three phase oil filled Compensating Reactive Devices (CRDs) and associated primary and secondary equipment.

Duplicate Communication Circuits will be provided between the sites via the SCADA fibre optic cables.

2.4 Wonthaggi Desalination Plant (WDP) Transformers

Connection of the power supply at the Desalination Plan (WDP) will comprise two off 220/22kV 80/150MVA transformers supplying the Desalination Plant main 22kV switchboards. In view of the proximity to the sea, the 220kV switchgear will be indoor gas insulated (GIS).

2.5 Optical Communication Fibres

Two fibre optic cables will be installed in the power supply trench. One SCADA (supervisory control and data acquisition) cable which to provide communication along the power supply and one DTS (distributed temperature sensing) cable to monitor the temperature of the power supply cables.

A third SCADA cable will be laid in a separate trench on the eastern side of the pipeline to provide communication along the transfer pipeline. The pipeline SCADA cable will be laid post-pipeline installation in a separate trench, except at crossings where a PVC conduit will be installed to allow the cable to be pulled through post construction.

The SCADA cables will also provide back up for one another and capacity for community purposes.

2.6 Below Ground Structure

Below ground joint bays, link boxes and optical fibre pits will be will be required along the power supply which will be consist of pre-fabricated reinforced concrete structures.

3 Ancillary Areas

Construction of the Victorian Desalination Project, including the marine inlets, plant site, power supply and transfer pipeline and associated facilities will require the use of ancillary areas during construction including lay down areas, warehouses and work yards.