PROPOSED ADELAIDE DESALINATION PLANT

Chapter 4 – Management Arrangements for Construction and Operational Stages

Contents

4.1 Introduction

This Chapter outlines the environmental management and monitoring framework that has been developed for the proposed Desalination Plant and describes how this framework will be implemented for the ADP.

The management of environmental issues for the ADP is underpinned by a series of environmental performance objectives. These objectives establish the minimum environmental performance requirements that must be achieved through all stages of the project. The objectives are supported by specific performance criteria (see Chapter 3) that address design considerations and requirements as well as the environmental management, mitigation and monitoring measures required to be implemented.

As outlined in Chapter 1, the performance objectives and criteria are included in the Contract documents as criteria that must be achieved for the ADP.

Table 4.1 Environmental Objectives.

Issue	Environmental Objective
Terrestrial flora and fauna	Protect biodiversity values of the site and avoid impacts to native vegetation or fauna.
Marine flora and fauna	Protect marine flora and fauna and associated habitats during construction and operation.
Coastal processes	Protect existing coastal processes.
Greenhouse gases	Minimise energy use and greenhouse gas emissions throughout the design, construction and operation.
Geology	Protect the cliff zone. The cliff zone comprises the area at the top of the cliff still influenced by coastal instability and erosion (approximately 10 metres back from the cliff edge) to the offshore edge.
Aboriginal Heritage	Protect sites of Aboriginal Heritage significance and avoid impacts. Manage interactions with known and unknown heritage sites.
Non-Aboriginal Heritage	Protect historic places and sites from disturbance where impacts can be avoided. Manage interactions with known and unknown heritage sites.
Groundwater	Protect the quantity and quality of groundwater consistent with relevant State water polices.
Sediment and Erosion	Minimise erosion and sediment movement.
Waste	Minimise waste production and manage wastes consistent with relevant State waste policies and guidelines.
Noise and Acoustics	Protect local amenity and minimise noise during construction and operation, including marine noise.
Vibration	Protect infrastructure and the local environment from vibration impacts.
Resource Efficiency	Maximise efficient use of resources including minimising resource use and maximising recovery and recycling.
Visual amenity	Protect visual amenity including landscape and amenity values of the coastline.
Air quality	Protect air quality during construction and operation.
Traffic and Transport	Manage effects of increased traffic and transportation during construction and operation to minimise

Issue	Environmental Objective
	impacts to the community and protect public safety.
Contaminated Land	Protect human health and the environment through management of any contamination.
Waterways	Protect waterways and surface water quality.
Marine and Coastal integrity	Protect the ecological integrity and values of the marine environment.
Marine amenity	Minimise impacts to marine recreational activities.
Marine Pests	Avoid the introduction, spread and establishment of marine pests.
Marine activities	Minimise impacts to commercial and recreational fishing and ensure safety of marine passage.
Land Management	Manage the site to enhance site environment values.
Social	Manage and maintain operational communication with the local community.
Site rehabilitation	Restore and rehabilitate disturbed areas including incorporating opportunities for enhancing site environmental values.

To support the implementation of the above objectives, the Contractor is required to develop Sustainability Plans for each project phase covering design, construction and operation addressing how sustainability principles and objectives will be achieved for the ADP. The Plans must identify monitoring and reporting of compliance.

4.2 Management and Monitoring Framework

4.2.1 Environmental Management System

Environmental management is to be addressed during all phases of the ADP including design, construction and operation. To support this, the Contractor is required to develop and implement an Environmental Management System (EMS) in accordance with the internationally recognised standard AS/ANZ ISO 14001:2004. The EMS will also be required to integrate with SA Water's existing certified EMS.

The Contractor's EMS must establish the overall framework for achieving the environmental performance objectives for the ADP, including compliance with approval conditions and regulatory requirements. In doing so, the Contractor's EMS must clearly define the organisational structure, planning activities, responsibilities, procedures and processes directed at managing environmental risks and impacts. The Contractor's EMS must include an Environmental Policy.

As part of the EMS, the Contractor is responsible for ensuring it provides adequate resources and necessary equipment and facilities to establish, implement, maintain and improve the EMS and its supporting plans.

An important component of the Contractor's EMS is the requirement for it to include a management review process that specifies arrangements for monitoring, evaluation and reporting on performance to ensure that the system is maintained and to identify opportunities for continual improvement.

The EMS must also set out the reporting of environmental performance, including reporting of compliance with approvals and licences, reporting of monitoring outcomes and the implementation and effectiveness of environmental management measures for the proposed Desalination Plant.

4.2.2 Environmental Management and Monitoring Plans (EMMPs)

The Contractor's EMS provides the first tier of environmental management planning for the ADP. The EMS is to be supported by EMMPs for specific project stages addressing construction and operation. The EMMPs will describe the environmental management requirements, processes and activities during the contract. In establishing these detailed plans, the Contractor must address the requirements of the project environmental performance criteria, regulatory requirements, EPA licence requirements and specific management and mitigation measures identified during the environmental assessment process.

The Contract requires that prior to commencing any activities, the Contractor must conduct an environmental risk assessment that informs the development of their EMMPs. The purpose of the risk assessment is to identify project risks, control measures to be implemented and responsibilities for the implementation of these measures. The risk assessment should be updated for each project phase in the event that there is a change in activity that had not already been considered.

The scope of the EMMPs need to address the following:

- The identification of the regulatory requirements for the ADP including a list of all licences, approvals, conditions and agreements that govern the works;

- The environmental impacts identified in the environmental assessment process, management and monitoring measures to address these impacts and the measures taken to meet the project environmental objectives and performance requirements;
- Detailed management processes and standard work procedures for all activities that rank as 'medium' and 'high' in the environmental risk assessment or as identified in the environmental assessment process, including timeframes and frequency of implementation, monitoring or maintaining control measures;
- The key performance indicators or acceptance criteria to be used to evaluate environmental performance, ensuring compliance with the environmental performance objectives and criteria, regulatory requirements or conditions of approval;
- Recording and reporting of monitoring outcomes and environmental performance;
- Roles, responsibilities and accountabilities for the implementation, management and monitoring of measures to ensure environmental management requirements are achieved;
- Emergency response and incident management, including detailed contingency plans, implementation of corrective actions and protocols for the response to and reporting of incidents; and
- Community consultation and notification strategies and complaint handling procedures.

Within the EMMPs, specific plans will be required to address environmental issues, including:

- Biodiversity protection including flora and fauna management;
- Pest and weed management (terrestrial);
- Marine pest management (including a Ballast Water Management Plan and Marine Equipment Inspections Plan);
- Marine works management (including dredge management and water quality monitoring during marine works);
- Waterways management;
- Construction air quality management (including dust);
- Construction erosion and sedimentation control;
- Construction noise and vibration management;
- Construction marine noise management;
- Operational noise management;
- Operational air quality management (including odour);
- Archaeological and cultural heritage management;
- Visual amenity;
- Landscaping and revegetation;

- Stormwater management (during construction and operation); and
- Traffic Management.

Further details on measures that would be considered as part of these plans are included in the relevant chapter (i.e. Chapter 7, Chapter 8 and Chapter 9) and in the environmental performance criteria included in Chapter 3.

4.2.2.1 Construction Environmental Management and Monitoring Plan (CEMMP)

A CEMMP will be required for the construction of the proposed Desalination Plant. The plan must include the elements detailed in the above sections, and specifically address the management of construction activities and the impacts associated with these activities.

The Contractor's CEMMP must be prepared and endorsed by SA Water to ensure it addresses environmental risks and performance criteria prior to the commencement of any works on site. The CEMMP must contain all of the relevant management plans and standard work procedures necessary to manage potential impacts and meet the environmental objectives and performance requirements.

The Contractor must provide work site maps that illustrate the location of areas of environmental or heritage sensitivity, including 'no go' zones, site compounds and offices, site access points, drainage lines, the works area and areas to be disturbed, stockpile locations, location of environmental controls and monitoring sites.

Further details on the management of construction effects are included in Section 4.4 of this Chapter.

4.2.2.2 Operational Environmental Management Monitoring Plan (OEMMP)

A detailed OEMMP (OEMMP) will also be required for the operation of the proposed Desalination Plant. The OEMMP will be developed to identify potential environmental risks and impacts associated with the Desalination Plant operations and mitigation measures developed to minimise impacts for the Contractor.

4.2.3 Environmental Training

The Contractor will be responsible for ensuring that all of its personnel involved in the project are provided with site-specific environmental training, including environmental inductions, to ensure they are aware of, and understand their obligations to implement environmental management measures for the ADP.

As a minimum requirement, all site personnel would be required to be inducted into the requirements of the CEMMP.

4.2.4 Monitoring and Evaluating Performance

The Contractor will be responsible for compliance with all environmental approvals and legislative requirements as well as implementation of the environmental performance criteria. As part of ensuring these outcomes, the Contractor will be required to monitor its compliance and the effectiveness of the management and mitigation measures

implemented for the project. Monitoring of the Contractor's environmental performance will include the following:

- System monitoring – monitoring of the activities and effectiveness of the Environmental Management System and associated plans. The focus of the system monitoring is to ensure that the procedures and processes implemented to protect the environment and minimise potential impacts are effective. System monitoring includes audit outcomes, monitoring of incidents and complaints as part of the ongoing Management Review process;
- Environmental monitoring – monitoring of the environment and environmental conditions including measures to ensure the performance of the Desalination Plant is within expected ranges and to detect any potential impacts to the environment and whether the operation of the plant needs to be modified. Environmental monitoring encompasses receiving water quality and habitat monitoring such as reef health monitoring. The outcomes of the environmental monitoring would identify any requirements for changes in management; and
- Process monitoring - process monitoring would include performance monitoring of the Desalination Plant to confirm that it is operating within an acceptable range as supported by the environmental assessments. Process monitoring would include monitoring of the discharge quality, including continuous monitoring of key water quality parameters (including flow, salinity, pH, dissolved oxygen and turbidity) to meet EPA licence requirements, monitoring of chemical dosing and equipment performance.

Further details on monitoring requirements are included in the table of performance criteria in Chapter 3, and monitoring measures are identified in Chapter 7, Chapter 8, and Chapter 9.

4.2.5 Site Inspections

Regular site inspections will be conducted by SA Water to ensure that environmental controls are in place, all risks are identified and the Contractor's employees, subcontractors and any personnel involved in the performance of the Contractor's activities are implementing the Contractor's EMS and EMMPs.

4.2.6 Environmental Audits

As part of the Environmental Management System for the project, a program of internal and external audits will be required to be implemented. The audits will comprise of:

- EMS audits to ensure compliance with the requirements of IS014001;
- Routine and random audits to verify compliance with the EMMPs; and
- Construction environmental management audits to ensure that the Contractor is complying with environmental management measures and regulatory or licensing requirements.

4.2.7 Management Review Process

To ensure that the environmental management framework is effective and remains so over the life of the ADP, an annual management review of the EMS will be undertaken by the Contractor. The review process would include consideration of the following:

- The scope of the EMS to ensure it is maintained and that activities with the potential for impacts on the environment are identified and managed, particularly during transition periods such as during commissioning and handover;
- That all regulatory and licence requirements have been identified and are up to date;
- The outcomes from monitoring and auditing have been fed back into the EMS and associated management plans to ensure a cycle of continual improvement; and
- The ongoing identification of opportunities for improved management practices and demonstration of due diligence.

4.3 Risk / Hazard Management

4.3.1 Introduction

This section considers risks and hazards relating to the presence of contaminated soil and groundwater, the potential impact of acid sulphate soils (if present), natural hazard (including landslips and seismic events), impact of the Mobil refinery (should operations re-commence) and security issues.

4.3.1.1 Geology and Hydrogeology

The 1:50000 scale "Noarlunga" geological map indicates that the Desalination Plant is within the Noarlunga embayment physiographic feature which is bounded to the south-east by the Ochre Cove-Clarendon Fault and to the north-west by the Eden-Burnside Fault.

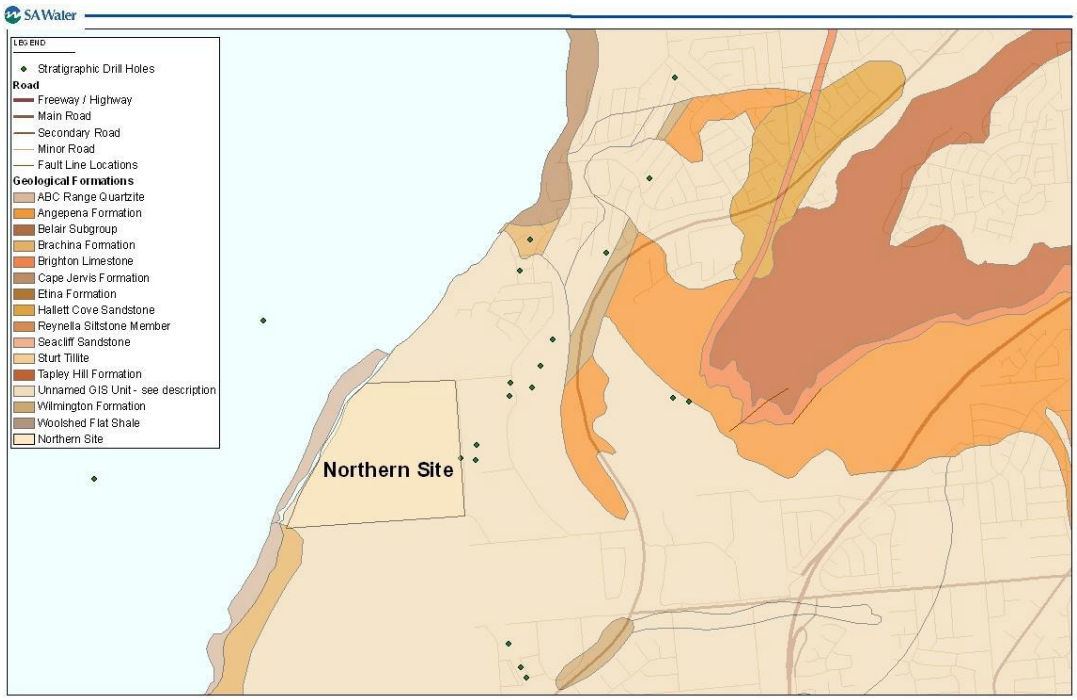

Figure 4.1 Geologic Map of the Port Stanvac area.

The near surface soils at the site comprise Quaternary and Tertiary sediments which are underlain by Proterozoic rocks interpreted to be the A.B.C. Range Quartzite. The rocks are exposed on the wave cut platform located at the base of the cliff in the western portion of the site. A summary of the subsurface profile at the proposed Desalination Plant site is included below in Table 4.2.

Table 4.2 Geological Profile at Desalination Plant Site.

Depth Below Ground Surface (m)	Geological Unit	Generalised Description
0 to 0.25	Topsoil	Sandy silty clay
0.25 to 1.5-2.0	Highly calcareous soil	Thin sheet and or rubble calcrete over friable sandy clay
1.5-2.0 to 6.5	Hindmarsh Clay	Mottled sandy clay, very stiff to hard consistency, medium to high plasticity
6.5 to 13	Tertiary Sands	Clayey sand and sand, dense to very dense
>13 typical (9-18 range)	Proterozoic Bedrock	Weathered sandstone and siltstone

The depth to bedrock is shallower close to the cliff face (generally 2 to 3 metres).

Groundwater was intersected in two aquifers below the site, a deeper fractured rock aquifer with standing groundwater levels ranging from approximately 22.6 metres (eastern portion of the site) to 40.38 metres (western portion of the site) below ground surface when measured in on-site monitoring wells. In addition, a perched water table was encountered in the near surface soils at a depth of approximately 3 metres below ground surface over some portions of the site.

4.3.2 Acid Sulphate Soils

The term 'acid sulphate soils' refers to soils, sediments and rock that contain elevated concentrations of metal sulphides which generate acid conditions when exposed to oxygen. The release of soluble or colloidal aluminium by acid conditions may have an impact on human health and the receiving environment and cause damage to infrastructure constructed on acid sulphate soils (EPA Guideline, Site Contamination – acid sulphate soil materials 2007).

The CSIRO has undertaken investigations to determine the distribution and properties of acid sulphate soils in South Australia. The information has been published in a map base that is part of the Atlas of Australian Acid Sulphate Soils and published as a web-served GIS on the Australian Soil Resource Information System (ASRIS) site (www.asris.csiro.au).

4.3.2.1 Identification

The ASRIS data was accessed to determine the risk of acid sulphate soils being present on the site. The information indicates that there is an extremely low probability of acid sulphate soil being present on the proposed Desalination Plant site.

The site contamination investigations indicated that the soil pH ranged from 6.5 to 10 with most samples having a pH of 8.5. These investigations concluded that it is unlikely that acid sulphate soils are present on the proposed Desalination Plant site. Assessment of the potential for the rock material that will be encountered in the shafts, tunnel and pumping sites to contain sulphides that could generate acid drainage will be required (refer to Section 4.8).

In addition, Environmental Projects (EP) undertook an assessment of offshore sediments in September 2008. The investigation included vibro-core drilling at 21

locations and the collection and analysis of sediment samples from each core. The sampling locations are indicated in Appendix C3.

The objective of the investigation was to provide information on sediment conditions to be considered during the design and construction phases, particularly if dredging was required for the installation of the intake and outfall conduits. The results of the assessment showed that acid sulphate sediments are not expected to be encountered.

4.3.2.2 Management

While the presence of acid sulphate soils at the site is highly unlikely, the selected Contractor is required to prepare a CEMMP and OEMMP which includes the preparation of procedures to manage acid sulphate soils in the unlikely event that they are encountered. The procedures will need to comply with SA EPA Acid Sulphate Soil Material Guideline, November 2007 and include the following general principles for assessment:

- Implement field identification indicators in accordance with Appendix A of the Guideline;
- Undertake detailed testing in accordance with Appendix B of the Guideline if field indicators indicate the presence of actual or potential acid sulphate soils; and
- Use criteria in Appendix C of the Guideline to classify acid sulphate soil material.

In addition, if actual or potential acid sulphate soil material is indicated by additional investigations, the following management protocols will need to be considered:

- Minimise the disturbance or drainage of acid sulphate soil materials;
- Prevention of oxidation;
- Minimise oxidation rate and isolate higher risk materials from exposure;
- Contain and treat acid drainage to minimise off-site impacts;
- Separate acid sulphate material;
- Manage stockpile areas; and
- Provide an agent to neutralise acid as it is produced.

4.3.3 Site Contamination

A review of the potential for site contamination present as a result of site history or as a result of contaminant migration from adjacent land uses was undertaken by Environmental Projects in September 2008. The assessment included a review of the historical land uses at the site and limited soil and groundwater investigations.

The objectives of the investigations were to:

- Determine whether contamination was present on the site; and
- Establish whether the potential extent of such contamination, if any, might affect the proposed development of the Desalination Plant.

A separate assessment of offshore sediment characteristics, including potential contamination, was also undertaken in accordance with the principles of the National Ocean Disposal Guidelines for Dredged Material (NODGDM) 2002. The objectives of the offshore assessment were to:

- Determine whether significant contamination exists in offshore sediments; and
- Establish whether the potential extent of such contamination, if any, might affect the proposed development.

4.3.3.1 Soil Contamination

4.3.3.1.1 Soil Profile

The general soil profile at the site consists of dark brown, slightly fine, organic top soil to a depth of approximately 300 millimetres, underlain by light brown, fine sandy silt with occasional sub angular to sub rounded gravel to a depth of approximately 1 metre underlain by red, fine sandy clayey silt, becoming more clayey from a depth of approximately 1.6 metres underlain by mottled sandy clay to 4 metres. The depth to bedrock is shallower close to the cliff face (generally 2 to 3 metres).

Soil at the site is generally alkaline, from 6.5 to 10 pH, with most samples tested having a pH of 8.5.

Further details on the soil contamination assessment and management measures to be implemented are included in Chapter 8.

4.3.3.1.2 Investigations

A review of the historical sources of contamination of the site was undertaken by Environmental Projects. They identified that potential historical sources of contamination could include:

- Herbicides or pesticides used on the land prior to transfer to Mobil;
- Impacts from the Mobil refinery and possible disposal of refinery wastes;
- Other adjacent industrial land uses; and
- Current cropping activities.

4.3.3.1.3 Soil Assessment Outcomes

The analytical results for the soil investigations indicated that all targeted metals were below the NEPM ecological investigation levels with the exception of vanadium in three samples. Given the site's history, (having been for agricultural use), the contamination assessment suggests it is likely that these concentrations are from natural sources.

In summary, it was concluded that the soils at the Desalination Plant site are not likely to pose significant health or ecological risk.

4.3.3.1.4 Management

The investigations did not indicate the presence of soil contamination at the locations tested. However, the results do not exclude the possibility that localised areas of

contamination may exist on site that could require management, particularly during construction.

As mentioned previously, the Contractor is required to prepare a CEMMP. The CEMMP requires preparation of procedures to manage contaminated soil, in the event it is found, to ensure the protection of human health and the environment and no adverse effects to the operation of the proposed Desalination Plant. In addition, the performance objectives and criteria for the project included that the site works should be balanced cut to fill as far as practical which would avoid the requirement for off-site disposal of any excavated material.

The CEMMP will need to take into consideration conditions of any approval and EPA licence conditions, the results of site contamination investigations and legal requirements, in particular the South Australian *Environment Protection (Site Contamination) Amendment Bill 2007*.

4.3.3.2 Groundwater Contamination

4.3.3.2.1 Groundwater

During on-site investigations groundwater was intersected at two aquifers below the site. One aquifer being a deeper fractured rock aquifer with standing groundwater levels ranging from approximately 22.6 metres (eastern portion of the site) to 40.38 metres (western portion of the site) below ground surface when measured in on-site monitoring wells. In addition, a perched water table was encountered in the near surface soils at a depth of approximately 3 metres below ground surface over some portion of the site.

4.3.3.2.2 Investigations

As a result of the historical activities that have taken place adjacent to the site, there is some potential for groundwater contamination to be present. Groundwater monitoring wells have previously been installed adjacent to the site, generally close to the boundaries to monitor for groundwater contamination potentially migrating from the refinery infrastructure or adjoining industrial land uses. The groundwater investigation undertaken was based on the objective of providing information with regards to the risk of significant groundwater contamination existing beneath the site.

4.3.3.2.3 Groundwater Assessment Outcomes

Groundwater flow direction in a fractured rock aquifer can be significantly controlled by rock jointing/cleavage planes. However, given the site topography, the results of previous investigations and the large groundwater hydraulic head driving to the west, as indicated by the standing water levels, EP suggested that the general bulk groundwater flow in the fractured rock aquifer could be expected to be in a westerly direction towards the coast. The regional groundwater flow direction for the shallow perched aquifer was interpreted to be in a west to north-west direction (refer to Appendix C3).

For the purpose of assessing groundwater contaminant levels, it is usual to take account of the potential uses of the groundwater and the possibility that the groundwater may discharge into sensitive receiving water bodies (marine or freshwater).

As groundwater below the site is not likely to be used, the laboratory, analytical results were compared to the *Environment Protection (Water Quality) Policy 2003* fresh aquatic ecosystem criteria.

The results of laboratory analyses indicate the following:

- Groundwater was slightly alkaline;
- Salinities were approximately 3,000 mg/L TDS in the shallow aquifer and approximately 23,300 mg/L TDS in the fractured rock aquifer; and
- Detectable (but low) concentrations of total petroleum hydrocarbons were found in the perched groundwater, with concentrations in the deeper aquifer being below the laboratory detection levels.

Concentrations of cadmium, nickel and selenium were noted to be above the fresh aquatic ecosystem criteria near the eastern boundary. Concentrations of selenium were above the fresh aquatic ecosystem criteria near the coast.

The investigation report concluded that some contamination of the shallow perched aquifer and the deeper fractured rock aquifer was possible near the northern boundary of the non-operational Mobil refinery site. However, this is not likely to have an impact on the proposed development of the site.

4.3.3.2.4 Management

The investigation indicated that deep excavation for the pump stations, water storages and tunnel chambers may encounter groundwater that is contaminated and will need to be managed. Further groundwater investigation work will be undertaken prior to construction to further inform the development of management requirements during both construction and operation.

The Contractor's CEMMP will include procedures to manage contaminated groundwater that may be encountered during development of the proposed Desalination Plant to ensure the protection of human health and the environment.

The management plan will address sampling and potential for treating and disposal of groundwater if dewatering activities are required during construction and must be in accordance with EPA licensing requirements as well as legal requirements, in particular the *Environment Protection (Site Contamination) Amendment Bill 2007*, (SA) and the *Environment Protection (Water Quality) Policy*, (SA).

In addition, the performance criteria for the project specify that the design of any below ground structures must ensure they will not be affected by any contaminated groundwater and that they are designed to prevent groundwater ingress. The design and construction must also ensure that during any tunnelling or drilling, measures are in place to ensure there is no migration of contaminants, particularly between aquifers.

The OEMMP to be developed by the Contractor will also be required to address any ongoing requirements for monitoring or management of contaminated groundwater if it is required. In addition, design mitigation needs to be implemented for the operation phase of the Desalination Plant, where there is potential for groundwater to leach into the intake / outlet tunnel, shaft, water storages and pipelines. A comprehensive Management Plan will be required to ensure that any contaminated groundwater is tested, monitored, collected, stored, treated and disposed to meet the EPA discharge criteria (i.e. it must not be allowed to enter the sea intake or outlet water streams).

4.3.3.3 Offshore Sediment Characterisation

Construction of the proposed Desalination Plant will involve the installation of intake and outfall structures, which may necessitate dredging activities, subject to the final design developed by the Contractor. An offshore sediment characterisation assessment was undertaken to provide information of sediment conditions, including identifying if contamination exists in off-shore sediments at the site. The objective of the assessment was to inform the development and evaluation of design options and identify any management requirements associated with dredging activities.

The sediment assessment was carried out by EP in accordance with the principles of the National Ocean Disposal Guidelines for Dredged Material (NODGDM) 2002. The assessment included the collection of sediment samples, by boat, from 21 locations and was based on vibro-core drilling (Refer to Appendix C3 for sample locations and details). Sediment cores were generally sampled at 0.5 metre intervals and analysed for a range of parameters consistent with NODGDM guidelines. An assessment of particle size was also undertaken to provide information on the sediment profile and composition and potential for sediment plumes.

4.3.3.3.1 Sediment Assessment Outcomes

The results from the sediment particle size analysis identified the potential for turbidity and fine sediment plumes to be generated during disturbance such as dredging due to the sediment containing high proportions of silt and clay. Further discussion on the potential impact to the marine environment associated with dredging activities is included in Chapter 7.

The results of the sediment contamination assessment did not identify the presence of residual sediment contamination that might have an adverse effect on the marine environment when compared to NODGDM 2002 guidelines. In addition conditions suggestive of the presence of acid sulphate sediments were not identified.

4.3.3.3.2 Management

Whilst the sediment contamination assessment did not identify the presence of contamination, the results did indicate that the presence of fine sand, underlain by silty clayey sand. This would require management to minimise potential impacts associated with the generation of sediment plumes during construction particularly involving dredging.

A CEMMP would be required for any offshore works, which would include a Dredge Management Plan if dredging is required. The plan would be required to incorporate measures for sediment and turbidity control including the following:

- Minimising the dredge footprint;
- Utilisation of turbidity trigger levels where, in the event levels are exceeded, work will cease;
- Timing of works to avoid recruitment periods for key reef species; and
- Management and disposal of spoil.

Further management and mitigation strategies are identified in Chapter 3 and Chapter 7.

Dredging activities would need to comply with approval and monitoring requirements included within the EPA licence conditions and permit for dredging. In addition all

dredging activities should comply with standards outlined within the EPA Guidelines for Dredging and Earthworks Drainage.

4.3.4 Risks to Infrastructure

The Desalination Plant will be located to the north of the former Mobil Port Stanvac Refinery (Mobil Refinery). While the site is not operational, Mobil has not made a final decision on whether it will be permanently closed or re-opened in the near or distant future.

A risk assessment was undertaken to assess whether the refinery could impact the proposed Desalination Plant (Lloyds 2008) and vice versa and the results are discussed below.

4.3.4.1 Proximity to Oil Refinery

The objectives of the study were to:

- Assess the risk exposure to Desalination Plant personnel and / or facilities due to hazards associated with the Mobil Refinery complex; and
- Assess the risk exposure to Mobil Refinery personnel and / or facilities arising from hazards associated with the Desalination Plant.

The risk assessment focussed on hazard originating from either the Desalination Plant or the Mobil Refinery which had potential for off-site impact. The hazardous materials which were applicable included chlorine, hydrogen sulphide, furfural, crude oil, gasoline and liquefied petroleum gas (LPG).

The methodology used is consistent with a quantitative risk assessment and included:

- Hazard identification;
- Consequence assessment;
- Frequency assessment; and
- Risk assessment.

4.3.4.1.1 Potential Impacts of the Refinery Operations on the Desalination Plant

Possible scenarios that were assessed related to potential for fire hazards and toxic gas dispersion and included:

- Chlorine drums – modelling indicated that the toxic consequence distance for chlorine drums used at the refinery cooling towers would not impact the proposed Desalination Plant;
- Vapour cloud explosion - modelling indicated that there would be no off-site overpressure impacts to the Desalination Plant;
- Fire hazards – heat radiation impacts would not impact the Desalination Plant;
- Fire hazards from pipelines – not expected to impact on the Desalination Plant;
- Tank top fires – tank top fires on the large tanks (TK100-104) would not have heat radiation impacts on the Desalination Plant;

- Furfural and hydrogen sulphide – off-site toxic consequence distances will not exceed the reduced boundary of the Mobil Refinery site;
- Heat radiation from the flare –would not impact the Desalination Plant; and
- Bund fires/boiling liquid expanding vapour fires - this would not impact the Desalination Plant.

4.3.4.1.2 Potential Impacts of the Desalination Plant on the Mobil Refinery Operations

The primary risk to the refinery from the proposed Desalination Plant was assessed to be the potential leaks from chlorine stored and used in the pre-treatment chemical area and hydrofluorosilicic acid stored and used in the fluoridation process.

Toxic impact distances from chlorine leaks with the potential to cause fatality extend off-site from a distance of approximately 660 metres. However, as the frequency of leaks from the handling and storage of the chlorine drums are relatively low, the resultant $50x10^{6}$ per year criterion risk contours do not extend off-site (approximately 35 metres from the source).

The outcomes of the assessment informed the site selection process and the proposed location of the Desalination Plant, which will minimise any potential for impacts. In addition, the location of the Desalination Plant includes a buffer between the Mobil Refinery and the Desalination Plant.

4.3.4.2 Natural Hazards

Potential natural hazards at the proposed site include seismic events and the impacts on buildings and other infrastructure and the stability of the adjacent cliff face.

4.3.4.2.1 Slope Stability

The environmental performance objectives and criteria for the ADP include the requirement that the infrastructure footprint will not impact the cliff zone (which includes ensuring that any works are located at a sufficient distance so as not to impact on cliff stability). If this buffer is provided, risks to the Desalination Plant infrastructure associated with cliff instability are considered negligible.

4.3.4.2.2 Seismic Activity

Australia has a low level of earthquake risk when compared to world global risk. Australian Standard AS 1170.4-2007, Structural Design Actions – Earthquake Actions in Australia provides guidelines for the design of structures for seismic events. The Standard specifies hazard factors for specific locations in Australia.

The Standard also applies a “Site Factor” which is to enable consideration of local site geological conditions. Soft deep sediments tend to amplify earthquake vibrations, but in general, this is less common in areas underlain by rock. The geotechnical investigations indicated the presence of calcareous soil that could be prone to softening and collapse if they become wet. The final design will need to take into consideration the material properties of the underlying soils and rock in developing a site factor.

4.3.4.2.3 Flood and Fires

The potential for flood events at the site is considered to be minimal as the topography (slope) provides sufficient drainage to the coastline. Also, the proposed Desalination Plant will be located near the upper reaches of the local catchment, hence large surface water flows that have the potential to cause flooding damage are not expected. The site will incorporate a stormwater management system, which is discussed further in Chapter 8.

The risk of bushfires is also minimal as the majority of the area is cleared of vegetation (significant fuel loads) and the site is surrounded by industry to the east and south, and the ocean to the west. There may be some risk associated with grass fires if the site is not maintained either during construction or operation, particularly associated with the use of vehicles and equipment or works such as welding. Management of this risk will be through the implementation of a land management plan, to manage grass, etc. as well as implementation of the CEMMP and safe work practices.

4.3.4.3 Infrastructure

Hazard and Operability (HAZOP) studies were undertaken to determine hazards identified and associated within the Concept Design phase of the proposed Desalination Plant.

The following key actions were identified as part of the HAZOP study:

- Storage and handling of gas chlorine:
    - design to be compliant with AS2927, with chlorine gas detection systems shutting off dosing systems when significant leaks detected; and
    - separation of chemical dosing (wet areas) and associated electrical systems;
- Chlorine dosing lines for intake pipeline biofouling control (whether sodium hypochlorite, acid gas chlorine solution or alternative biocide) to have flexible connections/expansion joints to accommodate sudden shut-down and minimise potential rupture. Isolation valves installed to prevent inadvertent discharge of chlorine solution into stagnant intake;
- Prevention of chlorinated seawater returning to sea via the intake pipeline:
    - non-return valves to be installed on raw seawater pumps; and
    - in-line chlorine neutralisation system for raw seawater and pre-treatment system will form part of the standard plant design;
- Powder chemicals storage and handling:
    - systems shall be designed to be explosion-proof, with all necessary protection and buffer zones with electrical systems;
- Chlorine dosing lines for intake pipeline biofouling control (whether sodium hypochlorite, acid gas chlorine solution or alternative biocide):
    - lines to have flexible connections/expansion joints to accommodate sudden shut-down and minimise potential rupture; and

    - isolation valves to be installed to prevent inadvertent discharge of chlorine solution into stagnant seawater intake conduit;
- Fire:
    - fire detection systems in accordance with MFS requirements;
- Waste Management:
    - refuse collected from seawater intake screens (located in intake shaft in the Concept Design) will be removed from site frequently (typically 2-3 times per week) to prevent the generation of nuisance odours. Details of OHS requirements for access to the significant confined space to be determined during detailed design;
- Reverse osmosis membrane preservative flushing wastes:
    - these solutions will be neutralised for pH control using caustic soda, with reducing agents (typically bisulphite) neutralised using sodium hypochlorite; and
    - neutralised waste to be segregated for off-site disposal to Trade Waste Receiving Station;
- Noise:
    - high noise activities, such as that from the high pressure pumps and energy recovery systems in the RO building may require acoustic enclosures to meet the required EPA standard, as well as the relevant state OHS regulation;
- Diffusers (outfall):
    - inspection and maintenance procedures and operating protocols to be developed during detailed design that take into consideration practical issues associated with low production flow periods from the Desalination Plant.

4.3.4.4 Hazardous Materials

A range of chemicals will be required at the proposed Desalination Plant and associated infrastructure depending on the final process selected during the detailed design by the Contractor. These include:

- Chlorine to limit the growth of marine organisms in the seawater intake and disinfection of the final water;
- Chemical coagulant (expected to be ferric based) for dosing the screened seawater at the inlet chamber;
- pH adjustment chemicals in the pre-treatment area;
- Cleaning In Place (CIP Chemicals);
- Flocculants for use in clarification;
- Antiscalants;

- Polyelectrolyte for use in filtration;
- Sodium metabisulphite for membrane preservation – 2 x 50 cubic metres of bulk storage;
- Post treatment chemicals upstream of the treated water reservoir;
- Hydrofluorosilicic acid (HFA) for fluoridation of the water;
- Chlorine gas for disinfection of the water; and
- Water conditioning chemicals.

Bulk storage tanks will be provided for the sulphuric acid, liquid coagulant and caustic soda and a dry store for solid polymers. The bulk storage capacities have been estimated to provide sufficient storage for a period of 14 days usage at average production plus the capacity to accept the full capacity of the anticipated delivery vehicles. This takes into consideration potential delays in delivery as a result of supplier shortages, weekends and holidays.

Chemical storage areas have been designed for the containment of spills during deliveries / transfers and whilst in storage and use in accordance with relevant Australian Standards. Impervious or low permeability pavement materials will be used to contain and minimise the potential for infiltration to the soil and ultimately groundwater. In addition, the design should ensure there is no risk of spills entering site stormwater systems.

The chemical storage areas will be required to comply with relevant standards, codes, acts and regulations, including the EPA Bunding and Spill Management Guidelines.

4.3.5 Public Safety Protocols

The proposed Desalination Plant is considered to be critical infrastructure of State importance and, as such, needs to have appropriate security during the construction and operating phases to mitigate adverse safety impacts to the public, operators and local community and remove or reduce potential adverse consequential damage to the environment and Plant.

The Contractor will be required to prepare a Safety Management Plan (SMP) that describes the functional requirements, processes and activities relating to safety management. The primary objective being to ensure that risks to personnel, assets and the general public is as low as reasonably practicable.

The SMP must comply with the requirements of the South Australian *Occupational Health Safety and Welfare (OHSW&S) Act and Regulations 1986*.

4.3.5.1 Construction

The site specific SMP will be developed by the Contractor in accordance with the following principles:

- Ensure that activities are carried out in a safe manner and that all construction plant is maintained at all times in a safe and operable condition;
- The Contractor is accredited under the Australian Government's Occupational Health Safety (OHS) Accreditation Scheme at all times during performance of the Contractor's activities;

- The Contractor is required to comply with all occupational health and safety policies, procedures implemented or adopted by SA Water; and
- Compliance with all SafeWork SA guidelines and regulations.

Additional requirements to comply with SA Water's procedures are:

- Participation by all parties / stakeholders in a hazard identification and risk assessment meeting prior to any activities being undertaken by the Contractor;
- Completion of Job Safety Analysis;
- Pre-commencement hazard checks;
- Start-up / kick off meeting;
- Induction of employees;
- Regular employee meetings / toolbox meetings; and
- Routine audits.

No public will be permitted access to the site at any time without prior approval by the Contractor and SA Water. The security of the site from the public will also be maintained to ensure proper and adequate safeguarding of the works, including fixed and unfixed material, during both working and non-working hours. This will include:

- Provision of warning lights;
- Fencing;
- Employment of security personnel and or safety patrol services; and
- Provision of fencing or barriers to prevent or limit access to the works, in particular unauthorised motor vehicles.

The contractor is required at all times to take all necessary steps to safeguard and ensure the safety of any person who may enter or trespass upon any part of the works under the Contract.

4.3.5.2 Operation

Security measures shall be established taking into consideration the Desalination Plant layout, the infrastructure assessment and SA Water's site security standards. The following minimum security provisions will need to be implemented:

- Perimeter fencing with automated gates;
- Alarm system with sensors in key buildings;
- Electronic access control to the site and buildings;
- CCTV; and
- Minimum specifications for building external doors and windows, external lighting, signage and for the protection of buried pipelines and services.

A regulated marine exclusion zone will be provided in accordance with Department for Transport Energy and Infrastructure (DTEI) requirements to reduce risks associated with anchors or other activities within the area. Consultation with DTEI will be undertaken to assess project requirements for possible further mitigation measures within the exclusion zone and along the exclusion zone boundary. Aids to navigation such as buoys may be used around marine structures to delineate the extent of the exclusion zone in accordance with maritime regulations.

4.4 Construction Effects

4.4.1 Anticipated Construction Timelines

4.4.1.1 Project Timeline

The project will be delivered in a number of phases:

- Phase One: Project Feasibility – end October 2008;
- Phase Two: Detailed Design – estimated end April 2009;
- Phase Three: Construction commencing April 2009;
- Phase Four: Commissioning with First Water by December 2010; and
- Phase Five: Operation and Maintenance – estimate from July 2011 onwards.

As part of the Contract, SA Water requires the Contractor(s) to develop a Time Management Plan that will detail the specific stages of construction and the timing of each stage.

4.4.2 Excavation

The site's topography is gently sloping over approximately the first 200 metres, after which it slopes relatively steeply over the remaining 400 metres towards the top of the cliff located above the foreshore. Due to the nature of the proposed Desalination Plant, there are various structures which will be buried, partially or completely, over the site area.

Construction of the Plant will involve both cut and fill operations, particularly in relation to excavation for intake and outfall shafts, pipework and service excavations, excavation for buried tanks, excavation for electricity supply substation benching and earthing grid and fill for road embankments and associated (partially buried) structures. Future detailed designs of the Desalination Plant must be refined to balance the cut and fill operations where possible. This may require earth mound buffers along the perimeter of the site. Removal of material from the site will be minimised as far as possible.

If contaminated soil is found on site or soil becomes contaminated during site works, the Contractor must prepare a management plan to manage, control and dispose of the soil in accordance with EPA requirements.

4.4.2.1 Reuse of Excavated Material as Fill

The topsoil layer is not suitable for re-use as structural fill due to its high organic content, but is ideal for use as a surface layer in landscaped areas.

The calcareous layer is not expected to be suitable for re-use as structural fill, especially below or around water retaining structures and pipes. This is due to its potential for undergoing significant settlement and softening should it become wet.

The Hindmarsh Clay layer may be considered for re-use as bulk structural fill. However, the general high plasticity and clay content of this material means that it will be difficult to moisture condition and compact. This also means that the Hindmarsh Clay is prone to significant swelling (and softening) should it become wet, and is prone

to significant shrinkage and cracking should it dry out. For these reasons, high plasticity Hindmarsh Clay material is unlikely to be used within several metres of the finished ground surface or in direct contact with the sides of buried structures.

The Tertiary sands and clayey sands are likely to be suitable for bulk structural fill, including for zones close to buried structures or finished ground surfaces. This is due to its predominantly granular nature.

The Proterozoic rock is likely to be suitable for re-use as bulk structural fill, provided that it is processed appropriately after excavation by crushing and screening to remove or break down oversized material. The lithology, strength and weathering of the rock varies with location and depth, so blending of excavated rock is suggested to obtain a reasonably consistent product for re-use as fill within the site. However, it is not recommended that rock fill derived from processing of excavated Proterozoic rock be used directly below footings to structures or as part of a granular pavement profile due to its variable nature. Rather, an imported quarry product is more likely to be used for these applications as the quality and consistency of the quarry rock material are generally well known and well controlled.

4.4.2.2 Ability to Excavate

It is anticipated that most of the geological strata above the Proterozoic rock will be excavated using conventional earthmoving equipment such as excavators, scrapers and dozers. Excavation may be difficult where the calcrete caprock for the calcareous layer is relatively thick, strong and continuous, or where the Tertiary sands are strongly cemented, and this may require local ripping or breaking with a hydraulic hammer to maintain reasonable productivity.

The Proterozoic bedrock is unlikely to be able to be excavated by digging and/or ripping with acceptable productivity, with the probable exception of the uppermost part of the rock unit which is expected to be weaker and more weathered than the underlying material. However, this geological unit may only be encountered in excavations for the inlet pumping station and the shaft pumping station. Breaking of the rock by a hydraulic hammer is unlikely to be productive for bulk excavations, but is likely to be feasible for smaller, more localised excavations.

For larger, bulk excavations, drill and blast is more likely to be an effective way to achieve acceptable productivity. Whilst drill and blast is a preferred method of excavation for mine, quarry and remote sites, any requirements for blasting at the site will need to be minimised. In addition, blasting must only be carried out in accordance with the environmental objectives and performance criteria. Blasting in the cliff, intertidal and subtidal zones will not be undertaken.

4.4.2.3 Management of Fill

As indicated, the Contractor is required to prepare a CEMMP that describes the functional requirements, processes and activities during the performance of the Contract. The CEMMP is required to satisfy, as a minimum, the project environmental performance objectives and criteria, conditions of approval and any EPA licence requirements. The CEMMP must include the development and implementation of a Soil Erosion Drainage Management Plan for the construction phase of the project, which would, as a minimum, need to address the management and monitoring requirements associated with the location and management of stockpiles. Further details on the management of fill are provided in Chapter 8.

4.4.2.4 Dredging

Fundamental to the design of the proposed Desalination Plant is the construction and operation of the intake and outfall conduit taking into consideration the sensitivities of the marine habitats in the area. Subject to the final design, there may be a requirement for dredging to be undertaken as part of the installation of the intake and outfall structures.

A CEMMP would be required for any offshore works, which would include a dredge management plan if dredging is required. The CEMMP would be required to incorporate measures for sediment and turbidity control, including minimising the dredge footprint, utilisation of turbidity trigger levels where, in the event levels are exceeded, then work will cease, timing of works to avoid recruitment periods for key reef species and management and disposal of spoil. Further management and mitigation strategies are identified in Chapter 3 and in Chapter 7.

Any dredging would need to comply with approval and monitoring requirements including EPA licence requirements. In addition, dredging activities would need to comply with requirements outlined within the EPA's Dredging and Earthworks Guidelines.

The Contractor will be required to ensure any activities carried out in the marine environment minimise impacts to the marine environment, including but not limited to quarantines and measures to manage the introduction or spread of marine pests and any other conditions imposed by planning approvals and licence conditions by EPA and other statutory authorities.

4.4.2.5 Source of Construction Materials

The design, selection, sourcing and installation of the various construction materials will need to consider a life cycle assessment, including material cost, raw material requirements, material and component production processes, delivery issues, ease of construction, maintenance costs, demolition, recycling and reuse.

Materials will be sourced locally (where practical) as procurement should consider minimisation of transportation and fuel costs and economic and social benefits to local communities. It is anticipated that by sourcing materials, equipment and services locally, a positive economic impact will be created for surrounding communities.

Consideration should also be given to use of materials that offer greatest benefits in insulating capability as well as function and performance to minimise heating and cooling costs.

4.4.2.6 Environmental Acceptable Work Practices

SA Water requires the Contractor(s) to comply with all relevant legislation and policies. These are outlined in Table 4.3. Managing compliance with these, together with the implementation of an EMS framework and CEMMP and OEMMP, will ensure best practice methods for construction are adopted.

Table 4.3 Legislation and Policy (SA Water 2008 (RFP))

Legislation or Policy	Brief Description	Key Issues
Building Code of Australia (BCA)	The goals of the BCA are to enable the achievement and maintenance of acceptable standards of structural sufficiency, safety (including safety from fire), health and amenity for the benefit of the community now and in the future.	This relates to the general design and construction of buildings and structures.
Environment Protection Act 1993	The goal of the EP Act is to provide for the protection of the environment; to establish the Environment Protection Authority and define its functions and powers; and for other purposes.	Aims to protect the environment from environmental harm.
Environment Protection (Air Quality) Policy 1994	The purpose of the Air Quality Policy is to achieve the sustainable management of air by protecting and enhancing air quality.	Any activity involving discharge to the atmosphere must address this Policy. This includes operating plant and equipment.
Environment Protection (Noise) Policy 2007	The purpose of the Noise Policy is to set out procedures for measuring noise to determine compliance and fix noise goals for most noise sources which will satisfy the general environmental duty under the Environment Protection Act.	Any activity creating excessive noise must address this policy. This includes operating plant and equipment, and acoustic design of buildings and structures.
Environment Protection (Water Quality) Policy 2003	The purpose of the Water Quality Policy is to achieve the sustainable management of the waters of the State by protecting and enhancing water quality while allowing economic and social development.	Any activity involving discharge to the waters of the State must address this Policy. This includes discharging to marine, estuarine surface and underground waters.
City of Onkaparinga Development Plan consolidated 10 April 2008 O'Sullivan Beach Precinct Guidelines (August 2004).	Contains the zones, maps and policies which guide property owners and others as to what can and cannot be done in the future on any piece of land in the City of Onkaparinga Provides detailed criteria against which development applications in the City of Onkaparinga will be	Any development within the City of Onkaparinga should consider the relevant provisions of this Plan.

Legislation or Policy	Brief Description	Key Issues
	assessed.	
Stormwater Pollution Prevention Code of Practice for the Building and Construction Industry (1999)	Provides minimum benchmarks of best practice for the control of site erosion and sediment control during the construction phase of building projects.	Any activity that has the potential to generate sediment-laden runoff as a result of construction activities must comply with this Code. This Code is linked to the Environment Protection (Water Quality) Policy (Water Quality EPP) 2003.
Natural Resources Management Act (2004) (Ground water)	This Act aims promote sustainable and integrated management of the State's natural resources; to make provision for the protection of the State's natural resources	Should consider to protect ground water , surface water and river and stream flows and resources
Native Vegetation Act 1991	The purpose of this Act is to provide incentives and assistance to landowners in relation to the preservation and enhancement of native vegetation; to control the clearance of native vegetation; and for other purposes.	Should ensure comply with this Act for any clearance of vegetation etc on the site

Source: SA Water 2008 (RFP)

4.5 Operation Effects

4.5.1 Introduction

This section discusses the likely impacts of the infrastructure requirements for the proposed Desalination Plant during the operation phase. It discusses the management agreements that have been established in relation to the proposed site and associated infrastructure. The various infrastructure requirements to support the ADP are detailed, including the way in which the Desalination Plant is to be integrated into the existing metropolitan water supply network. This section also considers the operational energy needs of the proposed Desalination Plant and how energy will be supplied to the proposed site.

Environmental impacts associated with the operation of the Desalination Plant are discussed in detail in the marine and terrestrial chapters (Chapters 7 and 8) and the noise, dust, odour and waste management chapter (Chapter 9).

4.5.2 Management and Site Access

4.5.2.1 City of Onkaparinga

SA Water has undertaken consultation with the City of Onkaparinga during the course of the project (see Chapter 5), which is anticipated to continue through both the construction and operation phases of the proposed development.

There are no management agreements anticipated between SA Water and the City of Onkaparinga in relation to the proposed development.

4.5.2.2 Land Ownership

SA Water is in negotiations with Mobil regarding for the purchase of the site. SA Water will negotiate access arrangements with the DTEI for the offshore infrastructure.

4.5.3 Infrastructure Requirements

4.5.3.1 Existing Infrastructure

The land proposed for the Desalination Plant is currently vacant but has been used for cropping activities by a local farmer under an agreement with Mobil. The existing public road network includes Christie Road and provides access routes to the site for construction and operation. Further information regarding traffic access is included in Chapter 10.

Mobil has not formally developed the Northern site and has informed SA Water that there is no known infrastructure on the site. Mobil's Port Stanvac to Birkenhead fuel pipeline is in the vicinity. Consequently, information concerning existing infrastructure on and around the subject site has been obtained from the 'dial-before-you-dig' service. This information remains subject to confirmation with individual service providers.

4.5.3.1.1 Gas

Information provided by the APA Group Pty Ltd. indicates that high pressure gas infrastructure is located within the vicinity of Christie Road and Meyer Road. The location of the gas main is subject to confirmation via detailed services survey and consequently may require relocation or diversion if affected by the proposed Desalination Plant works.

4.5.3.1.2 Electricity

ETSA Utilities has been requested by SA Water to provide a secure power supply of 60 MVA transformer capacity during Stage 1, when the Desalination Plant will provide 50 GL of water per annum, and 120 MVA transformer capacity during Stage 2, when the Desalination plant will provide 100 GL of water per annum.

The ADP requires two independent electrical supplies for the site. The existing 66 kV infrastructure comprises a 66/11 kV Substation at Port Stanvac. This does not have the capacity to supply the proposed Desalination Plant, therefore a dedicated substation on the site is proposed. This will be fed from the existing 66 kV supply and from a second dedicated 66 kV supply fed from Morphett Vale East Substation to provide network redundancy. For the substation, ETSA Utilities will require SA Water to provide a land area of approximately 10,000 square metres and an easement for access to the substation.

Information provided by ETSA Utilities indicates that high voltage (HV) infrastructure is currently present on Christie Road, adjacent to the site (currently with insufficient capacity to supply the Desalination Plant without significant network upgrades).

Development approval for ETSA's electricity supply network upgrades is being pursued by ETSA separately and is not part of the EIS submission. The new ETSA substation on the Desalination Plant site is part of the EIS.

4.5.3.1.3 Water

Drinking Water

SA Water has confirmed that there are water services present within Christie Road. Three service pipelines are present to the site for drinking water reticulation.

The proposed drinking water network for site reticulation consists of DN150 polyethylene (PE) pressure pipework, typically buried within a 900 millimetre deep trench. There are also valves and associated fittings required.

Fire Water

Future fire water supply for the proposed Desalination Plant needs to be obtained from the drinking water supplies. A fire water network will be constructed and reticulated around the site. The fire water reticulation for the proposed Desalination Plant will be supplied from the drinking water connection and shall include a fire water storage tank, fire pumps and a booster arrangement to meet the Metropolitan Fire Service and local authority requirements.

The fire system needs to be separate to the potable system to avoid potential contamination due to the stagnant water in the fire pipes and tank.

4.5.3.1.4 Sewerage

SA Water has confirmed that there are wastewater services within Christie Road. The plans indicate that a 350 millimetre diameter MSCL pressure pipe is present for the entire length of Refinery Road and also within Sigma Road.

The proposed sewer reticulation for the site consists of minimum DN150 mPVC gravity pipework typically buried in trenches up to 1500 millimetres depth. The network will drain to a sewerage pumping station which will pump waste water from the site and connect into the existing mains which are adjacent to the site.

4.5.3.1.5 Stormwater

Stormwater infrastructure information is being provided by the City of Onkaparinga. There are no significant stormwater pipes or channels present within the vicinity of Christie Road, but a natural stormwater channel is located immediately south of the proposed site.

4.5.3.1.6 Communications

Telstra has confirmed that there are services in Christie Road. Discussion and assessment with Telstra will be required to discuss the capacity and future tie in for the ADP.

Mobile telephone coverage is available on the site, although it should be noted that restrictions on the use of mobile phones are currently in place at the Mobil Refinery.

4.5.3.2 Infrastructure to be Installed or Enhanced

4.5.3.2.1 Site Infrastructure Requirements

Utilities for the proposed Desalination Plant include a drinking water supply, fire water, stormwater drainage, wastewater, recycled water, electricity and communications. The requirements for each service is summarised below.

No gas infrastructure is anticipated to be required for any operation of the proposed Desalination Plant, but this will be subject to the requirements of the Contractor.

Consideration will be given to the potential impacts of Desalination Plant expansion works (up to 100 GL per annum) which may be undertaken when the initial 50 GL Desalination Plant is operating. The Contractor will need to prepare a management plan to mitigate and minimise any such impacts.

Site Roads

Roads will be provided around the site to give general access to buildings, provide safe delivery of chemicals, safe removal of sludge and to facilitate installation and removal of equipment.

Site roads will be designed for T44 and B-Double truck loadings for deliveries, for crane and other heavy maintenance vehicles as these will be required occasionally on the site. The Contractor will consider the following issues and address management of these issues within an Operation Management Plan:

- Chemical delivery;

- Spill management and containment;
- Evacuation procedure; and
- Alternative access.

4.5.3.3 Integration with Water Supply Network

4.5.3.3.1 Recycled Water

Suitable recycling of water will be considered for the site, in particular collection of roof water to supply possible future irrigation systems and non-potable reuse.

Opportunities for such a supply will require further consideration at subsequent design stages of the ADP.