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10.1 Introduction

This Chapter discusses the potential socio-economic impacts of the proposed Adelaide Desalination Plant. It begins with an assessment of the economic effects of the proposed development with particular emphasis on employment impacts, investment opportunities and the possible implications of the Desalination Plant on the cost of water to the South Australian community.

A traffic assessment of the impacts on the local/regional road network of the proposed development is then presented. This assessment proposes a number of minor changes to existing road infrastructure in order to accommodate the expected increase in traffic arising from the construction of the Desalination Plant.

The impacts of the proposal on the local and regional communities is also considered in light of the effects of the project on nearby residents, businesses, service providers, community and recreational activities, as well as the community’s sense of place and identification with the locality. The development and operation of the proposed Desalination Plant is also discussed in the context of Indigenous and European cultural heritage values and Native Title issues, including any legislative requirements.

Throughout the Chapter, consideration has been given to appropriate management and mitigation strategies that seek to address identified socio-economic issues and enhance the positive impacts of the proposed development. These strategies are considered to be important means of ‘giving back’ to those communities that are potentially most affected by the proposed development.
10.2 Economic Issues

SA Water has prepared the following economic assessment from information supplied by KPMG.

Various modelling techniques have been employed in this assessment, in particular the quantification of the macroeconomic impact of the proposed development on South Australia’s Gross State Product (GSP) over the period 2008 – 2017 and beyond. The objective of this part of the analysis is to forecast the effect of a fresh injection of funds into the Construction and Electricity, Gas and Water sectors of the South Australian economy on the growth path of total output, measured by GSP.

Total construction costs were provided by Currie and Brown, principal quantity surveyor to SA Water for the ADP. These costs were used to inform the analysis that follows. Two types of macroeconomic modelling approaches were employed in this analysis, including:

1) **Structural time series modelling (STS).** This is the primary modelling framework used. The advantage of this approach, as opposed to a conventional econometric model with explanatory variables, is that it is less demanding in terms of the data requirements and it also makes ex ante forecasting a simple procedure. The analysis uses the most recent information regarding the state of the South Australian economy (published by the ABS).

   The structural time series modelling framework and associated outputs have been reviewed and validated by Professor Moosa from Monash University (Melbourne).

2) **The Computable General Equilibrium (CGE) modelling framework.** The South Australian economy-wide impacts of recently proposed planning reforms are estimated by MMRF3. MMRF3 is an Australian economy-wide multi-regional, multi-sectoral computable general equilibrium (CGE) model developed by Centre of Policy Studies, Monash University.

   The results of the two modelling frameworks are comparable in terms of the impact of the proposed planning reforms on economic activity.

### 10.2.1 Economic Sustainability of Desalination Plant

The economic impact of the proposed Desalination Plant on the South Australian economy is significant. While the cost of the proposal is to be borne by water consumers, the impact of the capital expenditure and direct job creation will result in a net benefit to the South Australian GSP. The STS and CGE economic modelling undertaken for the 50 GL per annum Plant demonstrates that South Australia’s GSP is expected to increase by more than $2.8 billion (or 0.4% of GSP) to 2017. The effects on the economy are outlined in more detail in Section 10.2.3 below.

Accordingly, the proposed Desalination Plant is economically sustainable when compared to the base case, which is the economy without the investment into the proposed development.

---

In the event that the inflows to the River Murray remain low or continue to fall in future years, the sustainable economic benefits of the proposed development will increase further as it provides even greater water security to the metropolitan population and State economy. That is, the proposed development of the Desalination Plant provides a level of insurance in water security for Adelaide’s water supply that is not climate dependent.

10.2.2 Employment Impacts

A project of the size of the proposed Desalination Plant will have a significant impact on employment. Whilst there is a modest need for full time equivalent (FTE) workers during the normal operation of the Desalination Plant, there is a significant need for trained skilled workers during the construction phase. This will have significant flow on effects in the economy. The following sections outline the direct construction and operational employment benefits, and the indirect employment benefits that flow on through the economy through the economic multipliers.

10.2.2.1 Direct Construction Employment Impact

The proposed Desalination Plant is a significant project for South Australia. The construction phase of the ADP is expected to generate approximately 500 FTE jobs in Construction, Engineering, Transport and related services on site for slightly more than two years. This result reflects a calculation based on hours worked in the year, and has been prepared from Currie and Brown estimates. Actual employment numbers on site will be higher during some times as not all trades will be employed for the entire duration of the construction phase (for example, excavation plant operators employed at the beginning of the ADP will be replaced by electrical and mechanical workers towards the end of the proposed development). Other employment opportunities are generated in those industries that supply materials, and through ancillary construction and building processes (equipment hire for example) which flow through the economy as mentioned below. The flow on effect of these activities has been calculated as part of the economic modelling analysis.

10.2.2.2 Direct Operation Employment Impact

The operation of the ADP requires management, operational and maintenance personnel to operate and maintain the Desalination Plant. The economic modelling has assumed a 100% capacity operation, however, in the event that the Desalination Plant operates at a reduced capacity (at times when there are sufficient alternative sources of water) the need for operational staff does not change materially due to the need for operational standby capability, membrane preservation and maintenance and other functions in order that the Desalination Plant is available when required.

The operation of the Desalination Plant is likely to generate approximately 20 new FTE jobs in operation and management for the Operations and Maintenance Operator. Although minor, other employment opportunities result from ongoing management at SA Water, and the Transport, Energy and Chemical industries that will supply the Desalination Plant with ongoing services. This is covered though the indirect employment impacts mentioned below.

10.2.2.3 Indirect Employment Impacts

The stimulus provided in the economy through the direct job creation associated with the construction and ongoing operation of the Desalination Plant provides further
benefits through indirect job creation. Indirect benefits are created through the ancillary services such as Transport, Energy and other goods and services that are supplied to the proposed Desalination Plant, as well as the economic activity and jobs created by additional spending in the economy resulting from the development.

Figure 10.1 illustrates the net positive employment benefit from the project over the period to 2017. For the life of the investment, the net effect of the proposed development on employment is positive, peaking at eight thousand additional employed persons in 2010 alone, and decreasing thereafter. To 2017, the net impact is 42,000 additional employed “person years” over the ten year period. This incorporates both the direct and, more importantly, the indirect flow on through the economy (via the multiplier effect) as a result of the creation of the direct jobs resulting from the construction and operation of the Desalination Plant. Employment is primarily generated in the Construction and Electricity, Gas and Water sectors, with some additional employment flowing through to other sectors of the economy (such as Transport and Chemical sectors which support the Desalination Plant) via the multiplier effect.

10.2.2.4 Opportunities for Aboriginal Employment

The proposed construction of the Desalination Plant offers opportunities to boost the employment of Indigenous people in the local economy. The objectives and performance criteria established by SA Water for the project requires the successful Contractor to maximise employment opportunities for local Aboriginal people. In addition, SA Water has established a Consultation Agreement with the Kaurna Heritage Board (KHB); the terms of which include identifying and progressing opportunities for input and employment as part of the ADP.

Given the increased business activity of the local KHB in the Onkaparinga Council area and SA Water’s performance criteria for the proposed Desalination Plant, the Contractor will be required to consult with the Board in affording opportunities for Aboriginal employment on the ADP. Aboriginal employment on the ADP, in the form of cultural
heritage services such as monitoring, has been ongoing and will continue throughout the duration of the ADP.

### 10.2.2.5 Economic Effects of the Proposed Development

The net economic effects of the implementation of the proposed development result from a combination of the impact of increasing water prices, and the positive effects of stimulating the economy through additional capital expenditure. The net effect is a boost to GSP as demonstrated in Figure 10.2, which illustrates the net impact of the two impacts on GSP over the period to 2017.

![Figure 10.2 Net Impact of Increased Water Prices and ADP Construction Activity on GSP.](image)

These results have been prepared from a structured time series model and checked with a CGE model as calculated by the KPMG economics team. The area under the line represents the boost of approximately $2.8 billion over that period.

Figure 10.2 shows that in combination of the water price increase and the increased activity in the economy the net effect is positive, although this decreases over time.

Although Figure 10.2 indicates that the benefits from the proposed development will be experienced primarily in the early phases of its lifespan (due to the significant boost in capital expenditure), this figure only refers to the benefits and costs from water price rises and construction activity.

It should be noted that these net benefits have been projected forward on the basis that current consumer behaviour patterns will continue into the future. The demand management measures within the Four Way Strategy are more likely to assist in reducing the demand for water by consumers in the future.

There are structural rigidities, however, in the methodology of the economic modelling that does not take these factors into account.
10.2.3 Economic Sectors Positively Impacted by the Desalination Plant

Considering the benefits of the proposed development to the economy as a whole over time, it is possible to examine the sectors that are forecast to benefit from flow on economic activity. These are shown as investment opportunities generated from the proposed Desalination Plant.

Table 10.1 outlines the net impact on the South Australian economy resulting from the development of the Desalination Plant.

Table 10.1  Impact of the intervention applied to selected sectors in the SA economy through injection of the ADP construction and operation. (Note, only GSP in total, and the Electricity Gas Water and Construction sectors are detailed).

<table>
<thead>
<tr>
<th>Sector</th>
<th>Forecast Post Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity, Gas and Water supply</td>
<td>0.00%</td>
</tr>
<tr>
<td>Construction</td>
<td>0.00%</td>
</tr>
<tr>
<td>Gross State Product</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

Table 10.1 shows the additional activity in the Construction and Electricity, Gas and Water sectors, both initially from the capital injection, but also increased over time beyond the initial rise as identified in the STS and CGE modelling. The ongoing activity in the construction sector is evident, with higher growth out to 2032 from the Desalination Plant. This is caused by the reinvestment of the profits, staff and experience from the proposed development into other capital works in following years that would otherwise not have occurred.

Some other sectors of the State’s economy will benefit from spillover effects from the Construction and Electricity, Gas and Water sectors into services sectors, such as the Accommodation, Cafés and Restaurants and Retail Trade sectors. These benefits are brought about by the consumption expenditure of additional employees on the Desalination Plant. Some sectors may experience a slight decline in consumption as resources are redistributed in the State’s economy in response to the injection brought about by the proposed development. Accordingly, some sectors will not grow as quickly as they would have otherwise, and the changes in the growth patterns will be achieved through redirecting resources between sectors before investment decisions are made, and not through reversing existing investment decisions.

The overall impact of the proposed development on the State’s economy is evident in the table above. An increase of 0.62% in the period from 2009 to 2013 recognises a significant improvement in the State economy as compared to the forecasts without the proposed development.

10.2.4 Cost of Desalinated Water

SA Water’s investment in the proposed Desalination Plant will be approximately $1.374 billion (2007/08 dollars and subject to final costing), which takes into account the design and construction of the Desalination Plant and associated infrastructure, subject to final
costings of the project. This will provide metropolitan Adelaide with a desalination plant that has a capacity of 50 GL of drinking water per annum and associated infrastructure to allow for Plant capacity to be expanded, if required, to 100 GL of drinking water per annum.

The final cost of the proposed Desalination Plant is subject to a competitive tender process and will not be known until the contracts are signed in 2009 and any financial contributions from the Federal Government (through grants available for water projects announced before the last Federal election and, more recently, the potential grants available from the Infrastructure Australia Fund) are determined.

The cost of the ADP will result in increases in water prices to customers. In December 2007, the Government of South Australia announced that a new water pricing structure would be introduced.
10.3 Traffic and Access Issues

10.3.1 Introduction

This Section provides an assessment of the traffic and access impacts likely to be generated as a result of the construction and operation of the proposed Desalination Plant. It is anticipated that there will be significant increases to traffic movement to and from the subject site by construction employees as well as through the supply and delivery of construction materials. The traffic impact of the ongoing operation of the Desalination Plant is not expected to be as significant.

10.3.1.1 Access to the Subject Site

The proposed site for the Desalination Plant may be accessed off Lonsdale Road and its extension Dyson Road, one of the major north-south arterial routes in the southern Adelaide region. Lonsdale Road is a four lane, two-way divided arterial road with a medium width of approximately 8.5 metres and posted speed limit of 80 km/hour. Dyson Road is also a four lane, two-way divided arterial road with a median width of 8 metres and a posted speed limit of 80 km/hour. Both roads effectively mark the eastern edge of the road network surrounding the subject site.

The following route options from Lonsdale Road have been considered in analysing the likely traffic impacts of the proposal:

- Sigma Road (off Meyer Road);
- Christie Road (off Meyer Road); and
- Sigma Road (off Meyer Road) and St Vincent Road (off Sherriffs Road) or similar link (see Appendix G1 – Traffic Impact Assessment).

**Sigma Road** is a two lane, two-way undivided road with bitumen edge shoulders, running east-west from Meyer Road to the subject site. Sigma Road is accessed off Meyer Road via a roundabout and provides direct access to the north-east corner of the subject site.

**Meyer Road** is accessed off Lonsdale Road and is a two lane, two-way undivided collector road with a signed speed limit of 60 km/hr. The speed limit reduces to 50 km/hr ahead of the Sigma Road roundabout. There is a grade separated intersection with the Noarlunga railway line at the northern end of Meyer Road.

Meyer Road currently provides access to industrial areas to the west and south of the subject site and residential areas to the north. Accordingly, this road carries both domestic and heavy vehicles.

**Christie Road** is accessed off Meyer Road and approaches an existing (but closed) entrance towards the southern end of the proposed site. Christie Road is a two lane, two-way undivided road with a speed limit of 50 km/hr. There is a signalised level railway crossing to the immediate east of this southern entrance to the subject site. Christie Road provides access to an industrial area only and carries both domestic and heavy vehicles.
10.3.2 Existing Traffic and Access Conditions

10.3.2.1 Traffic Volumes and Existing Road Network

Traffic volumes data has been obtained from DTEI and is presented in Appendix G1.

10.3.2.1.1 Lonsdale Road

Lonsdale Road currently carries:

- Approximately 1430 light vehicles and 90 heavy vehicles during the morning peak hour in the southbound; and
- Approximately 1540 light vehicles and 40 heavy vehicles during the evening peak hour in the northbound.

According to the Austroads capacity manual, the allowable one-way mid-block capacity for a 4-lane divided road is 1900 vehicles/hour. Lonsdale Road is considered to be operating well at present and has spare capacity to accommodate additional traffic.

10.3.2.1.2 Dyson Road

Dyson Road currently carries:

- Approximately 1400 light vehicles and 60 heavy vehicles during the morning peak hour in the southbound; and
- Approximately 1300 light vehicles and 20 heavy vehicles during the evening peak hour in the northbound.

According to the Austroads capacity manual, the allowable one-way mid-block capacity for a 4 lane divided road is 1900 vehicles/hour. Dyson Road is also considered to be operating well at present and has spare capacity to accommodate additional traffic.

10.3.2.1.3 Meyer Road

Traffic volumes for Meyer Road are currently not available from DTEI. It is estimated that Meyer Road currently carries:

- Approximately 85 light vehicles; and
- Approximately 20 heavy vehicles generated from nearby residential and industrial areas during the morning and evening peak hours (in one direction).

Based upon the guidelines outlined in the Roads and Traffic Authority (RTA) ‘Guide to Traffic Generating Developments’, traffic numbers were derived from the assumption that 85 vehicle trips are generated from the 100 residential dwellings located north of Sigma Road. This assumption was based on Section 3.3.1 of the RTA Guide which estimates that weekday peak hour trips are equivalent to 0.85 per dwelling.

According to the Austroads capacity manual, the allowable one-way mid-block capacity for a 2 lane undivided road is 900 vehicles per hour. Accordingly, Meyer Road is considered to be operating well at present and has spare capacity to accommodate additional traffic.
10.3.2.1.4 **Sigma Road**

Traffic volumes for Sigma Road are currently not available from DTEI. It is estimated that Sigma Road currently carries less than 20 vehicles generated from the nearby industrial area during the morning and evening peak hours (in one direction). According to the Austroads capacity manual, the allowable one-way mid-block capacity for a 2 lane undivided road is 900 vehicles per hour. Accordingly, Sigma Road is considered to be operating well at present and has spare capacity to accommodate additional traffic.

10.3.2.2 **Existing Intersection Performance**

10.3.2.2.1 **Lonsdale/Meyer Road**

An analysis of the intersection of Lonsdale Road and Meyer Road was undertaken by Connell Wagner using the SIDRA computer based modelling package that calculates the performance of an intersection. The results of this analysis are presented in the table below.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Traffic Control</th>
<th>AM Peak</th>
<th>PM Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Degree of Sat.</td>
<td>Max. delay</td>
</tr>
<tr>
<td>Lonsdale / Meyer Rd</td>
<td>Give-way</td>
<td>0.39</td>
<td>63</td>
</tr>
</tbody>
</table>

Typical measures of intersection performance are considered to be the degree of saturation, the average delay and the 95th percentile queue. As the primary measure of performance, the degree of saturation equates to the ratio of demand over capacity (supply) of the subject intersection. Degree of saturation levels in the range of 0.5 to 0.75 are considered to be very good to excellent, whereas saturation levels in excess of 1.0 are considered to be poor. SIDRA defines the maximum 'ideal' operating conditions at both signalised and unsignalised intersections as 0.95 and 0.9 degree of saturation respectively.

SIDRA results for the Lonsdale/Meyer Road intersection indicate that this intersection is currently operating satisfactorily with acceptable delays and queues during the morning peak period, but is operating poorly during the afternoon peak period. The degree of saturation for the afternoon peak is 1.0 and the longest queue on the Meyer Road approach to the intersection is 106 metres (or approximately 15 - 16 car lengths). A longer waiting time of 105 metres is also expected during the afternoon peak hour for right turning vehicles on the Meyer Road approach.

10.3.2.2.2 **Lonsdale/Sherriffs Road**

An analysis of the signalised intersection of Lonsdale Road and Sherriffs Road, immediately to the south of the Lonsdale/Meyer Road intersection was also undertaken by Connell Wagner. The results of this analysis are shown in the following table.
Table 10.3  SIDRA Analysis of Existing Performance of Lonsdale/Sherriffs Road Intersection.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Traffic Control</th>
<th>AM Peak</th>
<th></th>
<th></th>
<th>PM Peak</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Degree of Sat.</td>
<td>Max. delay</td>
<td>95%ile Queue</td>
<td>Degree of Sat.</td>
<td>Max. delay</td>
</tr>
<tr>
<td>Lonsdale / Sherriffs Rd</td>
<td>Signal</td>
<td>0.88</td>
<td>65</td>
<td>202</td>
<td>0.86</td>
<td>57</td>
</tr>
</tbody>
</table>

This intersection is controlled by the traffic signal with ‘lead-lag right turn’ signal phase on the Lonsdale Road – Dyson Road approaches and ‘diamond’ signal phase of the Sherriffs Road approaches. The intersection is currently operating at a degree of saturation of 0.88 and 0.86 during the morning and evening peak periods respectively, with average vehicle delays of 202 metres (28 car lengths) on the northern approach during the morning peak and 186 metres (26 car lengths) during the evening peak. Accordingly, the current intersection conditions are considered acceptable and the intersection is operating satisfactorily.

10.3.3 Traffic Impacts

10.3.3.1 Construction

10.3.3.1.1 Traffic Volumes

During construction of the proposed Desalination Plant, there will be a significant increase in the number of light vehicles, construction vehicles and heavy articulated vehicles moving to and from the subject site. Current estimates by Connell Wagner indicate that, at peak, approximately 1200 worker\(^2\) vehicle trips along with 600 construction vehicle trips are expected daily. Of these vehicular trips, 200 light vehicles trips and 150 heavy vehicle trips are anticipated during peak hour periods.

A summary of the anticipated vehicle movements is provided below.

Table 10.4  Anticipated Traffic Volumes During Construction.

<table>
<thead>
<tr>
<th>Vehicle type</th>
<th>Expected daily traffic volume</th>
<th>Expected vehicle trips (AM peak)</th>
<th>Expected vehicle trips (PM peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light vehicles (site personnel vehicles)</td>
<td>1,200</td>
<td>200 IN</td>
<td>100 IN</td>
</tr>
<tr>
<td>Heavy construction vehicles (including bulk earthmovers, concrete trucks, etc)</td>
<td>400</td>
<td>100 IN</td>
<td>50 IN</td>
</tr>
<tr>
<td>Heavy articulated vehicles</td>
<td>200</td>
<td>50 IN</td>
<td>25 IN</td>
</tr>
</tbody>
</table>

\(^2\) This number does NOT represent full time equivalents.
It should be noted that the above traffic numbers are predicted on the basis of the construction experiences from desalination plants of similar design capacity across Australia.

These traffic volumes are anticipated for peak or major periods of construction activity only, with traffic volumes decreasing during other periods. It is envisaged that the construction activities may be carried out in two shifts (7 am and 3 pm) and that the peak hour operation would fall outside the peak hour traffic periods on the local road network (8.00 am – 9.00 am and 4.00 pm – 5.00 pm).

For the assessment of impacts on local traffic movement patterns, it is expected that the majority of traffic during the construction period (including heavy articulated vehicles) would originate from north of the subject site. While every effort will be made to encourage the contractor to use locally sourced materials for construction of the Desalination Plant, it is anticipated that the great majority of these materials will be delivered to the subject site from the north. For the purposes of this traffic assessment, a directional split of 90:10 (north:south) has been assumed.

### 10.3.3.1.2 Impact on the Existing Road Network

An analysis of the capacity of the existing road network to cater for the increased demands brought about by the construction of the proposed Desalination Plant was undertaken (refer Appendix G1). This analysis confirmed that the expected peak hour construction traffic volumes on the surrounding road network are within the acceptable mid-block capacity as prescribed in the Austroads capacity manual (Roads and Traffic Authority 2002). Accordingly, it was considered that the roads surrounding the subject site would continue to perform satisfactorily with the current number of lanes.

Given this result, it was determined that no road widening or further increases to the existing capacity of the road network would be required to meet construction traffic demand.

### 10.3.3.1.3 Impact on Intersections

SIDRA intersection analysis was undertaken by Connell Wagner on the Lonsdale Road/Meyer Road intersection to determine the potential impact of the traffic likely to be generated by the proposed development according to the entrance route options identified above. This analysis found that the significant increase in traffic volumes likely to be experienced during the construction of the proposed Desalination Plant would impact on the operation of this intersection.

The Lonsdale/Meyer Road intersection was analysed with forecasted traffic volumes during the local peak hour periods. For a worst case approach, it was assumed that 50% of the construction traffic would use the road network during the local peak hour periods. SIDRA analysis of the key Lonsdale Road/Meyer Road intersection is presented in Table 10.5.
Table 10.5  SIDRA Analysis of Future Performance of Intersections.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Traffic Control</th>
<th>AM Peak</th>
<th>PM Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Degree of Sat.</td>
<td>Max. delay</td>
<td>95%ile Queue</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lonsdale / Meyer Rd</td>
<td>Give-way</td>
<td>1.08</td>
<td>206</td>
</tr>
<tr>
<td></td>
<td>Proposed signal</td>
<td>0.73</td>
<td>35</td>
</tr>
<tr>
<td>Lonsdale / Sherriffs Rd</td>
<td>Signal</td>
<td>0.84</td>
<td>65</td>
</tr>
</tbody>
</table>

The intersection of Lonsdale Road with Meyer Road is proposed as the main entry route into the proposed site. The SIDRA analysis indicated that there would be a significant impact on this intersection, to the extent that the current give-way traffic control would be unable to efficiently accommodate the expected increase in construction traffic volumes. The analysis shows that the maximum vehicle delay on the Meyer Road approach would increase from 105 seconds to 3974 seconds (or 66 minutes) during the afternoon peak period, while the 95% back queue increases from 106 metres (or 15 cars) to 1563 metres (or 223 cars). While the results for the morning peak period are not as significant, the analysis nonetheless shows that the maximum vehicle delay would increase from just over 63 seconds to 206 seconds (or 3.5 minutes), and the 95% back queue would increase from 38 metres (or 5 cars) to 115 metres (or 16 cars).

Given these results, an analysis of the Lonsdale/Meyer Road intersection was undertaken as if it were a signalised intersection, which demonstrated a significantly improved performance (refer Appendix G1). Maximum vehicle delay decreases to just under 1 minute and the 95% back queue to 258 metres (or 36 cars) during the afternoon peak period, while for the morning peak period, the maximum delay reduces to 35 seconds and the 95% back queue to 90 metres (or 13 cars).

The SIDRA analysis of the intersection of Lonsdale Road with Sherriffs Road indicates that an increase in construction traffic volumes would have some impact, but this is considered to be within the acceptable limits of the traffic parameters. The degree of saturation shows a slight decrease from 0.88 to 0.84 during the morning peak period, but increases marginally from 0.86 to 0.88 during the evening peak. The 95% back queue increases from 202 metres (28 car lengths) to 246 metres (35 car lengths) during the morning peak and from 186 metres (26 car lengths) to 239 metres (34 car lengths) during the evening peak. Hence this intersection is likely to perform better than a signalised intersection at Lonsdale/Meyer Road during the evening peak period.

10.3.3.2 Operation

10.3.3.2.1 Traffic Volumes

During operation of the proposed Desalination Plant, the total number of operators on site is expected to be between 20-40 people, generating a maximum of 35 light vehicle trips per day.

Heavy vehicle (i.e. truck) movements into and out of the site have been estimated from the process requirements detailed in Table 10.6. Accordingly, it has been assumed, as
a worst case, that 5 waste removal trucks and 4 chemical delivery trucks will enter and leave the site each day (with the Desalination Plant at final capacity).

From the analysis presented above, it is evident that the current road network will accommodate this operational traffic volume and no capacity analysis is required. Intersection analysis was also undertaken using SIDRA and it was found that there is no significant impact to the Lonsdale Road/Meyer Road intersection in its current configuration. This intersection can support the minor additional traffic during the operation phase. The detailed analysis for the operation is presented in Appendix G1.

**Table 10.6 Operational Phase Vehicle Movements.**

<table>
<thead>
<tr>
<th>Incoming</th>
<th>Description/Comments</th>
<th>Vehicle Allowance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chemicals etc</strong></td>
<td><strong>Daily Demand</strong></td>
<td><strong>Delivery Vol.</strong></td>
</tr>
<tr>
<td>Antiscalants</td>
<td>6 m³/day</td>
<td>20 m³</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>8.5 m³/day</td>
<td>13 m³</td>
</tr>
<tr>
<td>Caustic Soda</td>
<td>17.5 m³/day</td>
<td>13 m³</td>
</tr>
<tr>
<td>Coagulant</td>
<td>8.5 m³/day</td>
<td>14 m³</td>
</tr>
<tr>
<td>Sodium Bisulphite</td>
<td>5 m³/day</td>
<td>16 m³</td>
</tr>
<tr>
<td>Fluoride</td>
<td>1.5 m³/day</td>
<td>20 m³</td>
</tr>
<tr>
<td>Lime</td>
<td>17 m³/day</td>
<td>25 m³</td>
</tr>
<tr>
<td>Soda Ash</td>
<td>2 m³/day</td>
<td>8 m³</td>
</tr>
<tr>
<td>Sulphuric Acid</td>
<td>8.5 m³/day</td>
<td>10 m³</td>
</tr>
<tr>
<td><strong>Waste Sludge</strong></td>
<td>120 m³/day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>75 m³/day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>40 m³/day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adopt 75 m³/day</td>
<td></td>
</tr>
<tr>
<td><strong>Staff/Operators</strong></td>
<td>20 to 30 people</td>
<td></td>
</tr>
</tbody>
</table>

* Daily demand based on 14 day storage.

**10.3.3.2.2 Access Route Options**

The following options were considered during the traffic analysis (refer Appendix G1) to determine suitable access to the subject site with minimal impact to both the existing road network and surrounding residential areas. These access routes pass through industrial areas only as follows:

- **Sigma Road** (off Meyer Road/Lonsdale Road). This access utilises an existing grade separation (bridge crossing) of the Noarlunga Rail Line on Meyer Road, and provides direct access to the subject site on existing public roads;

- **Christie Road** (off Meyer Road/Lonsdale Road). The existing level crossing on Christie Road is used to access the site using existing public roads; and

- **Sherriffs Road/St Vincent Road**. This access would require the reconstruction of St Vincent Road as a possible link road through to Christie Road.
10.3.3.2.3 **Preferred Access Routes**

The assessment of traffic impacts during both construction and operation of the proposed development has determined the preferred access routes to the subject site as follows:

- **Sigma Road (off Meyer Road/Lonsdale Road).** Both Meyer Road and Sigma Road are within industrial zones where the road network has sufficient capacity to support the proposed construction vehicles. An upgrade to the existing roundabout at the intersection of Meyer Road and Sigma Road will be required to support the turning movements of articulated vehicles proposed to access the site.

- **Christie Road (off Meyer Road/Lonsdale Road).** This access utilises Christie Road and the existing level crossing of the Noarlunga Rail line to access the southern end of the subject site on existing public roads. Christie Road is located within an industrial zone and is of sufficient width to accommodate the proposed construction vehicles.

Given the frequency with which the Noarlunga Rail Line operates, the existing grade separated intersection at Meyer Road (i.e. Sigma Road access) is preferred over the level crossing on Christie Road. In the interests of safety and risk mitigation, Sigma Road provides a more appropriate access to the proposed site, noting the requirement to improve the existing roundabout geometry.

In addition, while the existing intersection of Lonsdale and Meyer Roads is currently operating satisfactorily, the traffic analysis indicates that the current give-way traffic control is unlikely to be suitable for the anticipated increase in construction traffic. This junction was, however, found to perform satisfactorily as a signalised intersection.

Accordingly, it is proposed that the proposed site be accessed from Sigma Road, which is likely to require upgrades to both the geometry of the roundabout at the junction of Meyer and Sigma Roads, and signalising the intersection of Meyer Road and Lonsdale Road. This access is considered favourable as it provides grade separation of the Noarlunga Rail line and is through an industrial area. It is noted that following the construction period, signalisation at Lonsdale Road may not be warranted.

Alternatively, construction traffic could avoid the intersection of Meyer Road and Lonsdale Road by using the link road (St Vincent Road) between Sherriffs Road and Meyer Road. This would require traffic to travel through the existing signalised intersection of Sherriffs Road and Lonsdale Road. Currently, St Vincent Road is an unsealed road, which is heavily vegetated and not suitable for vehicle access. Accordingly, the reinstatement of St Vincent Road between Sherriffs Road and Meyer Road would necessitate the clearing of significant vegetation. A further option would be to utilise only the northern portion of St Vincent Road along with a section of Ellensea Court or the adjacent open paddock (with a dust suppressing temporary access). If the road were to be upgraded and linked to Sherriffs Road, then signalisation of the intersection of Meyer Road and Lonsdale Road would not be required. Sherriffs Road is able to accommodate the construction traffic, as the current traffic volume on the western approach to the intersection is low during peak hours. It is expected that there will be no changes required for the traffic signal phasing of the intersection of Sherriffs Road and Lonsdale Road, although phasing times need to be adjusted to absorb the construction vehicle demand.

The ability to reinstate part or all of the disused St Vincent Road or create a similar temporary access in the adjacent paddock would need to be explored with both DTEI and the City of Onkaparinga before it could be considered viable.
10.3.3.3 Implications for Road Safety and Capacity

10.3.3.3.1 Crash Statistics
A review of the crash history surrounding the subject site has been sourced from the DTEI ‘Road Crash Register’ database for the last available five-year period.

These crash statistics indicate that on Lonsdale Road near to the intersections with both Sherriffs Road and Meyer Road, there have been no serious or fatal casualty crashes over the past five years, with only one ‘other’ injury recorded. These results indicate that there are no significant road safety issues associated with the road network leading into the subject site.

10.3.3.4 Requirements to Upgrade Road Infrastructure
Given the results of the SIDRA analysis of the Lonsdale/Meyer Road and Lonsdale/Sherriffs Road intersections discussed above, it is proposed that the subject site be accessed from Sigma Road. The Sigma Road access is considered to present the most favourable option (in terms of safety and efficiency) as it:

i) provides grade separation of the Noarlunga Rail Line; and

ii) provides access through an industrial area with little (if any) impact on residential areas.

This will require upgrades to the geometry of the roundabout at the junction of Meyer/Sigma Roads and the establishment of traffic signals at the intersection of Lonsdale/Meyer Roads. These traffic signals would not be required, however, after construction of the proposed Desalination Plant.

The alternative proposal to avoid the need for traffic signals at the Lonsdale/Meyer Road intersection is to direct traffic to use St Vincent Road to connect Sigma Road to Sherriffs Road. This would require road upgrades to St Vincent Road (which is currently unsealed and comprising remnant vegetation) and adjustment of phasing times for the Lonsdale/Sherriffs Road intersection.

10.3.4 Management and Mitigation Strategies

10.3.4.1 Construction
There will be a significant increase in vehicles accessing and egressing the subject site during the construction phase of the proposed development. The analysis of the existing road network (both local and regional) and key intersections indicate that this additional traffic can be satisfactorily accommodated provided that a number of improvements are made to the existing infrastructure as follows:

- Upgrade to the geometry of the roundabout at the Meyer/Sigma Road intersection to accommodate heavy vehicles accessing the site during construction;
- Signalisation of the intersection of Lonsdale Road and Meyer Road, although it is acknowledged that this may not be acceptable to DTEI as it may compromise the through-flow of traffic on Lonsdale Road; and
- Upgrade to St Vincent Road in order to divert traffic away from the Lonsdale/Meyer Road intersection to the existing signalised intersection of Lonsdale/Sherriffs Road.
This option would also require a slight adjustment to phasing times at this intersection. This option is compromised by the significant extent of vegetation towards the northern end of the street, which would need to be cleared. The southern portion of St Vincent Road, along with Ellensea Court, could be utilised to provide a link between Meyer Road and Sherriffs Road.

10.3.4.2 Operation

There will be a negligible increase in traffic accessing the subject site during the operation of the proposed Desalination Plant. Analysis of the existing road network and key intersections indicates that this additional traffic (including trucks delivering chemicals and removing waste) can easily be accommodated with no further improvements required to road infrastructure.

It should be noted that whilst signalisation of the Lonsdale/Meyer Roads intersection is recommended during the construction phase, these signals may not be required after completion of construction i.e. during the operation phase.
10.4 Effects on Communities

10.4.1 Introduction

This Section considers the impacts of the Desalination Plant on the local and regional communities located in and around the proposed site. It presents the findings of a social impact assessment (SIA) undertaken by Janet Gould and Associates for SA Water to determine potential impacts on affected communities with a view to developing appropriate management and mitigation strategies.

10.4.2 Description of Existing Socio-Economic Environment

10.4.2.1 Affected Communities

Two separate communities have been identified for assessing potential social impacts from the proposed development as follows (Figure 10.3):

- The local community, incorporating the suburbs of Lonsdale, O’Sullivan Beach, Hallett Cove and Christies Beach, and
- The regional community, extending from the coast in the west, Main South Road to the east, the Onkaparinga River to the south and Majors Road to the north.

![Local & Regional SIA Communities](image)

**Figure 10.3** Affected Communities – Local and Regional.
A demographic profile and analysis of social characteristics (using the ABS Census of Population and Housing, the Social Atlas of South Australia and various studies undertaken by the Cities of Onkaparinga and Marion) relevant to both the local and regional communities are presented in Appendix F8.

Key characteristics of these communities arising from this analysis can be summarised as follows:

- In 2006, the local population comprised approximately 40% regional population;
- Both the local and regional communities are ageing more rapidly than the metropolitan population as a whole;
- The local and regional communities have similar income profiles (which are lower than the metropolitan average);
- The local and regional communities have similar employment and occupation profiles to the metropolitan population;
- The local and regional communities are generally better educated than the metropolitan population as a whole;
- Unemployment in the local community in and around Port Stanvac (at 6.2%) is slightly higher than the metropolitan average (at 5.2%); and
- Residents in the Cities of Onkaparinga and Marion demonstrate higher levels of community wellbeing, happiness, community participation and attachment to place compared with the State average.

It should be noted that these community characteristics are based on aggregated figures for the local and regional communities respectively. Typically, such communities demonstrate socio-economic difference within their ranks and particular socio-economic differences are evident within the local and regional communities around Port Stanvac (see Appendix F8). These differences have been taken into account when considering appropriate mitigation strategies and proactive measures aimed at ensuring that both local and regional communities benefit from the proposed development. These strategies will be an important mechanism in gaining the support of the surrounding communities and in engendering their sense of stewardship over the proposed development.

10.4.3 Community and Stakeholder Engagement

A range of methods have been used to seek feedback from individuals and organisations throughout the development of the concept for the proposed Desalination Plant, including government, environment and community organisations, industry, service providers and the general public.

The purpose of the engagement process was to identify stakeholder and community views and issues so that these could be addressed during the decision-making and design of the proposed development and in the environmental assessment process, where appropriate.

10.4.3.1 Engagement Process

The engagement process was developed in accordance with the South Australian Government EIS guideline requirements and the principles of the International Association of Impact Assessment (IAIA, 2006).
The engagement approach included a range of information and consultation activities spread across the engagement continuum (Figure 10.4). Information and consultation activities such as the project community newsletter and public displays had a relatively low level of engagement while involvement activities such as the Local Groups Discussion Forum and negotiations with the Kaurna Heritage Board (KHB) had a high level of engagement.

![Engagement Continuum and Activities](image)

**Figure 10.4 Engagement Continuum and Activities.**

The main steps in the engagement process were to:

- Identify stakeholders;
- Develop and implement a consultation program appropriate for an EIS; and
- Record and report stakeholder feedback.

Each of these steps is discussed in the following sections.

### 10.4.3.1.1 Key Stakeholders

A list of key stakeholders for the proposed Desalination Plant was developed early in the EIS process and reviewed and expanded throughout the consultation program. The range of stakeholders and members of the general public provided with the opportunity to participate in the EIS engagement process is shown in Table 10.7.
Table 10.7  List of Stakeholders.

<table>
<thead>
<tr>
<th>Category</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>South Australian Government representatives, State Government agencies and service providers, local government representatives</td>
</tr>
<tr>
<td>Non-government organisations and service providers</td>
<td>Community groups, environmental groups, private service providers and research groups</td>
</tr>
<tr>
<td>Industry and business</td>
<td>Regional Development Boards, local and regional industries and businesses</td>
</tr>
<tr>
<td>Indigenous groups</td>
<td>Kaurna Heritage Board Incorporated</td>
</tr>
<tr>
<td>Landholders</td>
<td>Local and regional land and property owners and managers</td>
</tr>
<tr>
<td>General public</td>
<td>Local, regional and State population</td>
</tr>
<tr>
<td>Potentially affected communities</td>
<td>Communities in O’Sullivan Beach, Christies Beach and Hallett Cove</td>
</tr>
</tbody>
</table>

10.4.3.1.2  Engagement Activities

The engagement program was designed to provide a wide range of opportunities for ongoing community and stakeholder involvement in the project planning, design and assessment process.

Communication tools and consultation methods were designed and targeted to maximise opportunities for feedback from stakeholders and the community. These activities are presented in Table 10.8 with participation numbers current to the end of October 2008.

10.4.3.1.3  Identification and Management of Key Issues

A Key Issues Management System was developed to capture, collate and analyse feedback from consultation events via a dedicated project database. The key issues were subsequently communicated to the project team to assist the assessment and decision-making processes, including the development of appropriate management and mitigation measures.
Table 10.8 Stakeholder and Community Engagement Program.

<table>
<thead>
<tr>
<th>Technique/Method</th>
<th>Extent of consultation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Information materials:</strong></td>
<td>Project materials were delivered to approximately 40,000 households and businesses in southern area as well as to community and environmental groups, elected members and CEOs of councils and other stakeholders. They were also available at all public consultation events.</td>
</tr>
<tr>
<td>• Community Information Forums</td>
<td></td>
</tr>
<tr>
<td>• Project Overview and Timeframes</td>
<td></td>
</tr>
<tr>
<td>• What is Desalination and How Does it Work?</td>
<td></td>
</tr>
<tr>
<td>• The Pilot Plant</td>
<td></td>
</tr>
<tr>
<td>• Environmental Investigations</td>
<td></td>
</tr>
<tr>
<td>• FAQ Information Sheet</td>
<td></td>
</tr>
<tr>
<td>• Transfer Pipeline</td>
<td></td>
</tr>
<tr>
<td>• Community Newsletter September 2008</td>
<td></td>
</tr>
<tr>
<td>• Up Coming Events</td>
<td></td>
</tr>
<tr>
<td><strong>Displays</strong></td>
<td></td>
</tr>
<tr>
<td>• Marion Shopping Centre – 29 September – 5 October 2008</td>
<td></td>
</tr>
<tr>
<td>• Noarlunga Colonnades Shopping Centre – 16 - 18 October 2008.</td>
<td></td>
</tr>
<tr>
<td><strong>Telephone Information Line</strong></td>
<td>SA Water Toll-free Information Line 1800 812 362 (record of calls not available).</td>
</tr>
<tr>
<td><strong>Email Enquiries</strong></td>
<td>Email enquiries were directed to <a href="mailto:desalination@sawater.com.au">desalination@sawater.com.au</a> (record of emails received not available).</td>
</tr>
<tr>
<td><strong>Website - <a href="http://www.sawater.com.au">www.sawater.com.au</a></strong></td>
<td>Approximately 4,500 website ‘hits’ were received between 1 April - 31 October 2008.</td>
</tr>
<tr>
<td><strong>Media Advertisements</strong></td>
<td>Advertisements were placed in the Messenger to promote the display program.</td>
</tr>
</tbody>
</table>
### Stakeholder and Community Engagement Program

<table>
<thead>
<tr>
<th>Technique/Method</th>
<th>Extent of consultation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Telephone Quantitative Research</strong></td>
<td>Telephone survey with 600 (425 metropolitan, 175 regional) participants conducted in May 2008.</td>
</tr>
</tbody>
</table>
| **Interviews**                  | • Conducted 12 interviews with academics, interstate desalination team key consultants and adjacent and/or active residents, and others with information relevant to the ADP project between April – June 2008.  
• Interviews conducted with open space and recreation planners at City of Marion and City of Onkaparinga and staff of the Office of Recreation and Sport. |
| **Information Days**            | • Royal Adelaide Show between 5 – 13 September 2008.  
• Marion Shopping Centre on 2 October 2008.  
• Noarlunga Colonnades Shopping Centre between 16 - 18 October 2008.  
• Rundle Mall Information Day held on 24 October 2008. |
| **Local Government Briefings**  | • City of Onkaparinga on 7 May 2008.  
• Metropolitan Seaside Councils on 18 September 2008.  
• City of Marion on 7 October 2008.  
• City of Onkaparinga on 21 October 2008. |
| **Feedback Form**               | 1,000 feedback forms returned by 31 October 2008. |
## Stakeholder and Community Engagement Program

<table>
<thead>
<tr>
<th>Technique/Method</th>
<th>Extent of consultation</th>
</tr>
</thead>
</table>
| **Workshops**             | • Due Diligence Workshop on 25 January 2008.  
                          | • Agency briefing on 12 May 2008.  
                          | • Marine Integration Workshop on 16 May 2008 (18 participants).  
                          | • Local Groups Discussion Forum on 16 July 2008 (64 participants).  
                          | • Terrestrial Assessment Agency Workshop on 16 October 2008.  |
| **Public Information Sessions** | • 31 March 2008  
                              | • 7 October 2008 |
| **Local community and environmental groups** | Ongoing involvement with representatives from 42 community and environmental groups from the southern Adelaide metropolitan area. |
| **Kaurna Heritage Board Incorporated** | Kaurna Heritage Board ongoing engagement. |
10.4.4 Review Process to Inform Social Impacts

In addition to issues raised during community and stakeholder engagement, social impacts have been identified through a review of relevant local and regional projects, and research into Australian and international desalination case studies.

A summary of the outcomes of this research is provided below with a detailed discussion attached in Appendix F8.

10.4.4.1 Relevant Local Projects

A number of local projects have been identified within the local area (Hallett Cove, O’Sullivan Beach, Lonsdale and Christies Beach) that may have some impacts on the local community. These projects include:

- Christies Beach Wastewater Treatment Plant upgrade;
- Hallett Cove Shopping and Civic Centre Redevelopment;
- Hallett Cove Surf Lifesaving Club Redevelopment;
- Greater Southern Urban Forest Initiative;
- Hallett Cove open space projects;
- O’Sullivan Beach open space and landscaping projects;
- O’Sullivan Sports and Social Club building works;
- O’Sullivan Beach boat launching facility;
- Bice Oval Upgrade, Christies Beach;
- Electrification of the southern (Noarlunga) rail line;
- Coast Park and Foreshore Access Plan;
- Road Network Plan and road works;
- Coast to Vines Trail (2009-2011);
- Christies Beach Tourist Park Master Plan (2008-2009);
- Beach Road (West) Redevelopment (2009-2010); and
- Witton Bluff Base Trail.

The potential impacts on local residents and businesses arising from these projects will need to be considered during the construction phase of the proposed Desalination Plant. It should also be noted that the benefits arising from the open space and coastal parks projects noted above are likely to be strengthened during the operational phases of the proposed development. The successful Contractor will be required to contribute to the development of some community assets listed in the environmental objectives and performance objectives (see Chapter 3).

10.4.4.2 National and International Desalination Experience

A review of the experiences of national and international desalination projects has been undertaken to identify the key issues associated with the development and operation of large-scale desalination plants (Janet Gould and Associates 2008).
Australian examples included:

- Gold Coast Desalination Plant;
- Victorian Desalination Plant;
- Perth (Kwinana) Desalination Plant (WA);
- Southern Seawater Desalination Plant (WA); and
- Sydney Desalination Plant.

International examples were drawn from desalination plants in:

- California, USA;
- India;
- Saudi Arabia;
- Algeria; and
- London.

The information gained from this review has informed both the Social Impact Assessment and community engagement program undertaken for the proposed development (Appendix F8).

10.4.4.3 Issues Identified from Community and Stakeholder Feedback and Review Process

Based on the experience of interstate/international desalination projects, the results of stakeholder and community feedback as well as the demographic and social analysis of the affected communities, the key social impacts arising from the proposed Desalination Plant have been grouped into the following categories:

- Impacts on residents;
- Impacts on businesses;
- Impacts on service providers;
- Impacts on community activities and services; and
- Impacts on the community’s sense of community and attachment to place.

The following sections discuss each of these categories as they relate to the proposed development.
10.4.5 Social Impact Assessment

10.4.5.1 Impacts on Residents

10.4.5.1.1 Construction Impacts

**Equity**

The review process demonstrated that potential issues of equity may arise from a local community feeling that they must bear a greater proportion of a project’s impacts for the benefit of others. However, the significant benefit of gaining a secure water source should alleviate this concern. Given the level of support for the proposal during the engagement process (i.e. over 70% survey respondents stating they were in favour of the proposal) it can be reasonably assumed that appropriate mitigation strategies will allay any feelings of ‘unfairness’ within the local community.

**Housing**

It is estimated that an additional workforce of approximately 1,200 people\(^3\) will be required during the 18 to 20 month construction phase of the proposed Desalination Plant. During operation, the workforce requirements will be in the order of 20-30 staff.

Notwithstanding the large workforce required in the short term, potential impacts on local housing demand are likely to be manageable given the Desalination Plant’s proposed location in a metropolitan setting and its proximity to a large resident workforce. While some workers and their families may seek housing within the local community, this additional demand is likely to be dispersed across the regional community and Southern Adelaide rather than intensified within the local area.

Potential flow on impacts such as increased rents, and decreased housing availability and security of tenure is unlikely to be significant beyond normal market conditions.

**Physical Health and Safety**

During the construction phase, potential impacts could be expected in relation to dust, vibration, odour, noise and vehicle emissions. These impacts are discussed in Chapter 9.

The traffic analysis in Section 10.3 also indicates the expected increase in vehicle movements to and from the site during construction. Given the site’s accessibility via the existing industrial road network, together with the proposed mitigation strategies to address the expected increase in vehicle movement patterns, it is considered that the local residential community is unlikely to be adversely affected by the proposed development.

**Mental Health**

Noise, dust and vibration impacts associated with the proposed development will need to be carefully managed in accordance with the CEMMP (as approved by the EPA) in order to alleviate the potential anxiety these impacts may cause to local residents.

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\(^3\) This number does NOT represent full time equivalents.
Employment and Workforce

Section 10.2 demonstrates that employment opportunities for residents within the local and regional communities will increase substantially during the construction phase of the proposed Desalination Plant. Direct employment opportunities will be concentrated in skilled trades and engineering sectors, although there will be opportunities for the employment of unskilled labourers. Indirect employment generated as a result of the flow on effects through the economy of the increased spending arising from the project are likely to provide further opportunities for local and regional communities to benefit.

As discussed in Section 10.2, a benefit of the proposed development is the opportunity for the Contractor to employ local people.

It is noted, however, that the additional workforce requirements of the proposal has the potential to impact on the local and metropolitan workforce by decreasing the availability of skilled and unskilled workers.

10.4.5.1.2 Operational Impacts

Health and Safety

Health and safety impacts resulting from the operation of the proposed Desalination Plant are expected to be negligible. Studies into ongoing water quality standards, dust, odour and noise (including marine noise) emissions have been undertaken and will continue during the development of the final design of the proposed Desalination Plant, and will incorporate a number of management and mitigation strategies that accord with all relevant regulatory and licensing requirements.

Mental Health

The operation of the proposed Desalination Plant is not expected to generate mental health impacts. While it is recognised that mental health issues are an important consideration, these will be managed during the construction phase with ongoing monitoring as required to ensure that residents are properly informed throughout the construction and operational phases.

Employment and Workforce

In the long term, ongoing workforce requirements for the proposed Desalination Plant will be relatively minor (approximately 20-30 staff). The flow on effects of this employment impact are discussed in Section 10.2.

10.4.5.2 Impacts on Businesses

10.4.5.2.1 Construction Impacts

Business Development

As noted in Section 10.2, the increased workforce and level of construction activities likely to be generated by the proposed Desalination Plant will provide additional business development and start up opportunities across different sectors of the metropolitan economy. Small servicing businesses in the locality are likely to directly benefit from the proposed development, particularly in the retail, food, entertainment
and leisure business sectors. These additional business opportunities will have further flow on employment benefits to local and regional communities.

**Business Disruptions**

During the construction phase, some disruption to local businesses could potentially occur as a result of dust, noise, vibration and traffic impacts. As discussed previously, these impacts will be carefully managed in order to minimise and avoid disruption to normal business operations in the locality of the proposed development.

**10.4.5.2.2 Operational Impacts**

**Water Based Business Impacts**

There is some possibility of disruption to recreation-based business (e.g. boating, diving, fishing) as a result of the likely extension of the marine exclusion zone arising from the proposed development. These impacts are expected to be minimal to negligible due to the existence of the current exclusion zone and the small area that would be affected.

**10.4.5.3 Impacts on Service Providers**

**10.4.5.3.1 Construction Impacts**

**Housing Providers**

As indicated above, the proposed Desalination Plant would be expected to source its construction workers from across the wider metropolitan area (and possibly beyond) although some impact on local housing provision is expected. Workers wanting to live in the local area are unlikely to utilise housing providers (e.g. Housing SA, aged care housing or community housing services) within the area and may seek other housing options. It is envisaged that the Contractor will assist workers in obtaining suitable housing and will consult with the Cities of Onkaparinga and Marion to facilitate this process.

**Emergency Service Providers**

The construction of the proposed Desalination Plant is unlikely to require changes to existing emergency services arrangements. The successful Contractor will establish appropriate management strategies within the CEMMP to address any unforeseen emergency event.

In addition, the proposed development will not change existing access arrangements for surrounding residential and industrial uses during construction. Accordingly, there will be no impact to emergency services access, levels of service or response times to the local or regional communities as a result of the development.

**Health Care Providers**

Despite the significant increase in workers associated with the proposed Desalination Plant, local health care services (such as general practice and allied health care services) are unlikely to be in heavy demand as a result. Should workers on the
Desalination Plant choose to use local health care providers, demand for these services may increase temporarily. This is not expected to unduly constrain, however, the availability of health services for the local and regional communities.

It should also be noted that the Contractor is required to provide a dedicated first aid facility on site.

**Education Providers**

The proposed Desalination Plant is unlikely to impact on existing education providers in the locality and broader region. Although there may be a slight increase in demand for pre-school, primary and secondary education facilities from family members of the construction workforce, according to Department of Education and Children’s Services this additional demand can be accommodated by existing education facilities in the region.

**Local Government Services and Facilities**

The Cities of Marion and Onkaparinga provide a wide range of municipal services to residents in the areas of community and business services, art and culture, recreation and open space, infrastructure, waste management, regulatory services and environmental management. Given that the construction workforce for the proposed Desalination Plant is unlikely to impact on population growth in any significant way, it is anticipated that any impacts on these local government services would be minimal.

As indicated above, any dust, noise, vibration and traffic impacts arising from the proposed development will be appropriately managed through the CEMMP and the requirements of the environmental objectives and performance criteria established for the project.

**10.4.5.3.2 Operational Impacts**

**Emergency Service Providers**

During operation of the proposed Desalination Plant, there are unlikely to be any impacts on emergency service provision over and above normal circumstances.

As noted above, the proposed development will not change existing access arrangements for residential and industrial uses in the locality. Accordingly, no impact to emergency services access, levels of service or response times is anticipated as a result of the operation of the Desalination Plant.

**Local Government Services and Facilities**

Waste services for the Desalination Plant would be expected to be provided through a contractor and impacts on local government waste management operations would be negligible.
10.4.5.4 Impacts on Community Activities and Services

10.4.5.4.1 Construction Impacts

Entertainment and Leisure Facilities
Given that the proposed Desalination Plant is unlikely to increase population significantly beyond normal projections, the potential impact of the construction workforce on community activities and services is expected to be limited to the use of after-hours entertainment and leisure facilities.

10.4.5.5 Impacts on Sense of Community/Attachment to Place

10.4.5.5.1 Construction Impacts

Sense of Community
A key reason for locating the proposed Desalination Plant on the northern site was the fact that it provides a significant buffer between the facility and existing residential areas to the north, east and south. For this reason, the development of the Desalination Plant is not considered to affect residents’ strong attachment to the locality and the sense of community that is characteristic of the resident population in southern Adelaide. These communities have expressed their identification with the industrial legacy of the Port Stanvac area, and given that the proposal will enhance the area’s industrial base. Ongoing community and stakeholder engagement through the construction and operational phases of the project will be an important mechanism to encourage community ‘ownership’ of the proposed Desalination Plant.

It is also possible that the local community’s sense of safety and fear of crime may be impacted by the significant increase in workforce activity during the construction phase. The Contractor will be required to address this matter with the local community and implement positive performance indicators to enhance community perceptions in this area.

10.4.5.5.2 Operational Impacts

Sense of Community
It is considered highly unlikely that the operation of the proposed Desalination Plant will adversely affect the community’s sense of place and attachment to the local area. In fact, it could be argued that by increasing the intensity of industrial development in Port Stanvac, the community’s identification with the proposed development will be enhanced.

Attachment to Place
As discussed, the affected communities are characterised as having a historically strong connection to industrial activity in Lonsdale, which has developed over time through employment associations as well as strong visual connections with the Port Stanvac oil refinery.
The establishment of the proposed Desalination Plant is likely to reinforce this historical connection. Although the connection is not expected to be as strong as that created by the former Mitsubishi plant or the oil refinery (especially given the plant’s small operational workforce), the proposed development will not significantly alter Lonsdale’s traditional industrial base and will provide the local community with opportunities to participate in new industrial development in the locality. At a time when both State and local governments have made a commitment to support industrial diversification, the proposed development is likely to have a positive effect on the community’s attachment to its local industrial landscape.

Possible changes to the communities’ sense of place and identity from the proposed Desalination Plant may arise from:

- The visual impact created by locating the Desalination Plant on land historically used for buffering purposes; and

- Potential conflicts and intensification of industrial activity along roads used by residential traffic accessing the residential areas of southern Hallett Cove (along Christie, Meyer and Sigma Roads).

In relation to the visual impact, the analysis presented in Chapter 8.5 confirms that the proposed development will have a relatively low level of impact owing to the visual dominance of the existing industrial infrastructure (in particular, the oil refinery). While the community’s attachment to the beach and the coast is acknowledged, the visual analysis demonstrates that the proposed Desalination Plant is unlikely to have an adverse impact. Indeed, the analysis suggests that from a longer term perspective, the proposed development may have a beneficial visual impact given the extent of proposed landscaping and biodiversity enhancement initiatives.

The strong connections of local Kaurna to the proposed site is acknowledged and discussed below in Section 10.5. The proposed development is unlikely to adversely affect this sense of connection given the ongoing consultation with the KHB and heritage monitoring work undertaken as part of the environmental assessment process.

In relation to the traffic impacts of the proposed Desalination Plant for residents, the traffic analysis presented in Section 10.3 demonstrates that the surrounding road network will operate satisfactorily during the construction and operational phases of the Desalination Plant. While it is acknowledged that construction requirements will lead to a significant increase in vehicular movements in and around the locality, this is unlikely to impact on residents’ sense of place.

### 10.4.6 Recreation and the Metropolitan Coast Park

A recreation assessment was undertaken of existing open space within the vicinity of the proposed site. This assessment identified key recreational activities, user groups and community benefits of open space and recreation associated with the proposed Desalination Plant, particularly in relation to integrating the site with the metropolitan coast and the existing open space and trail network.

#### 10.4.6.1 Adelaide Metropolitan Coast Park

Planning SA’s Coast Park initiative is to develop a continuous coastal park extending approximately 70 kilometres along the coast, from Sellicks Beach in the south to North Haven in the north. The Coast Park is part of Adelaide’s open space network and it is intended to provide access to the waters of Gulf St Vincent. It includes public land along the foreshore and offshore features, and links to watercourses and other public
spaces adjacent to the coast. These public spaces in turn link with the Hills Face Zone and other open space land, forming the basis for Adelaide’s Metropolitan Open Space System. South Australia is predicted to experience significant demographic changes over the next 20 years and such changes will increase the use of the Coast Park for the local and regional communities.

The Coast Park and trail exists in part in the vicinity of the Port Stanvac site. To the north the trail runs through the City of Marion from Marino to Headland Reserve and to the south of Port Stanvac to Christies Beach. Works are underway to complete the section of trail between Christies Beach and Port Noarlunga.

10.4.6.2 Council Plans and Local Open Space

10.4.6.2.1 Foreshore Access Plan, City of Onkaparinga

In response to Planning SA’s Coast Park Initiative, the City of Onkaparinga produced the Foreshore Access Plan which addresses the Coast Park objectives, as well as traffic management outcomes for the Esplanade.

One of the nine stages of the Coast Park is the link from Christies Creek to the northern boundary of the Council area. The Port Stanvac (Mobil) and SA Water sites currently act as a significant social and physical barrier to this access. Whilst SA Water allows access across its land at the Christies Beach Wastewater Treatment Plant, the Port Stanvac site remains closed to public access. The Foreshore Access Plan identifies options for traversing the site or travelling around the site to link the City of Onkaparinga to the City of Marion. Council’s preferred link is through the site or along the foreshore.

10.4.6.2.2 Recreational Trails Network Strategy and Action Plan, 2007-2012

The Recreational Trails Network Strategy and Action Plan for the City of Onkaparinga aim to develop a diverse network of recreational trails throughout the municipality. The strategy recognises the importance of interconnected trails, linking major trails, such as the Coast to Vines Trail to regional and local trails. The extension of the trail along the coast through the Port Stanvac site is identified as an important link by the City of Onkaparinga.

In addition, the Open Space Strategy for the City of Onkaparinga supports the development of a linear park along the metropolitan coast as outlined in the Coast Park Concept Plan.

10.4.6.2.3 Local open space

There are a number of local or regional open space areas in the vicinity of Port Stanvac where opportunities for linkages with the Port Stanvac site exist. These include the following:

Headland Reserve

Headland Reserve is a natural area currently used for informal open space and recreation by the local community, with a number of informal trails running through the site. Headland Reserve is a significant reserve as it contains the largest piece of remnant native vegetation along the City of Marion coastal cliffs. Headland Reserve is adjacent to the northern boundary of the proposed site.
**Tingira Reserve**

Tingira Reserve is located on the foreshore at Tingira Drive and is a large reserve featuring picnic areas and shelters. The remainder of the reserve is covered by a Native Vegetation Management Plan and, in 2005, Council purchased three large residential properties on the cliff edge to incorporate into the coastal reserve. Significant Aboriginal cultural heritage areas are also located in the Reserve. The reserve is popular with local residents.

**Coast to Vines Trail**

The Coast to Vines Trail (formerly the Willunga to Marino trail) follows the disused rail line providing a shared use trail and key recreation link. A study was undertaken in 2005 to review marketing outcomes and upgrade requirements, including signage, track construction and associated facilities such as shelters and seating. Implementation is subject to funding by the Cities of Marion and Onkaparinga and the State Government. The City of Onkaparinga has allocated $174,000 over the next two years.

10.4.6.3 **Key Recreational Activities and User Groups**

10.4.6.3.1 **Recreational Fishing**

According to the Boating Industry Association of SA, in 2004 there were 51,844 registered power boats in the State, one of the highest per capita boat ownership rates in the country. The O’Sullivan’s Beach boat ramp is located south of the proposed site and is one of the major access points for recreational boaters in the southern suburbs, providing a protected boat launching facility for year round access.

Although the waters off this area are popular for recreational boating and fishing, a Marine Restricted Area extends from the high water mark out to Gulf St Vincent for some distance so there is presently restricted public access along the foreshore and the marine environment directly adjacent to the subject site. The Marine Exclusion Area is covered under Regulation 14 of the *Harbours and Navigation Regulations 1994* (SA).

10.4.6.3.2 **Diving**

There are several popular diving sites in close proximity to the proposed site (but located outside the Marine Exclusion Area) including:

- Stanvac Barges (5km west of Port Stanvac);
- Stanvac Moorings (2km west of the Port Stanvac Jetty); and
- Stanvac Dump (north of the Port Stanvac Jetty).

Although the Stanvac Dump diving site is located outside of the current Marine Exclusion Area, it may be affected by the proposed Desalination Plant due to the construction of the intake and outfall structures. Although the site is popular with diving enthusiasts, there are numerous other diving opportunities in the region.

10.4.6.3.3 **Walking/Cycling Trails**

Although there is a network of trails within the Cities of Marion and Onkaparinga, there are only two key trail linkages in close proximity to the proposed site.
To the south of the site, the Christies Creek Trail is located near Christies Beach and the Coast Park Trail currently exists in part from Port Stanvac to Christies Beach. To the north of the site, the Coast Park Trail runs from Headland Reserve along the coast through the City of Marion to Marino. The City of Marion has no short-term proposal to extend the trail through Headland Reserve to the Council boundary whilst access through the Port Stanvac site remains closed.

10.4.6.3.4 Tjilbruke Dreaming

The Tjilbruke Dreaming is the predominant dreaming of Southern Kaurna country and follows the creation of numerous sites, including the creation of seven freshwater springs along the coast of the Fleurieu Peninsula. The trail starts at Kingston Park and continues south along the coast to Cape Jervis. The Tjilbruke Dreaming has enormous cultural significance to the Kaurna people and a number of sites along the trail are believed to be special sites of deep spiritual significance.

10.4.6.4 Stakeholder Consultation

As part of the recreation assessment, meetings were held with open space and recreation planners at the Cities of Marion and Onkaparinga and staff at the Office of Recreation and Sport.

The Cities of Onkaparinga and Marion both identified a demand for increased trail networks, recreation space and marine access from the community. The proposed Desalination Plant will not impinge on any existing trail networks.

10.4.6.5 Constraints

10.4.6.5.1 Access and Security

The proposed Desalination Plant will be essential to the supply of drinking water to metropolitan Adelaide’s population and to secure and augment Adelaide’s water supply. Measures will be taken to ensure the security not only of the site, but also the intake and outfall structures located in the adjacent marine environment.

An extension of the Coast Park trail and open space within the site would need to ensure that the security of the site and its structures is not compromised.

10.4.6.5.2 Marine Exclusion Area

A Marine Restricted Area extends from the high water mark out to the Gulf St Vincent so there is presently restricted public access along the foreshore and the marine environment directly adjacent to the proposed site. The Marine Exclusion Area is covered under Regulation 14 of the Harbours and Navigation Regulations 1994 (SA). The marine restricted area will need to be maintained, and possibly extended, to secure the site and associated infrastructure.
10.4.7 Benefits to the Community

10.4.7.1 Open Space and Trail Linkages

10.4.7.1.1 Opportunities

SA Water will consult with the Cities of Onkaparinga and Marion, Planning SA, local Kaurna (through the KHB) and the local community regarding possible community benefits associated with the development of the proposed Desalination Plant. The key opportunities that SA Water will pursue in relation to the proposed Desalination Plant include:

- An extension of the Tjilbruke Dreaming Trail at the site and an acknowledgement of its cultural heritage significance;
- Opportunities in the creek corridor, including rehabilitation and weed management strategies at the site; and
- On-site interpretation and education on water conservation and Kaurna connection with the site.
10.5 Indigenous Cultural Heritage

10.5.1 Introduction

The following sections report on the findings of the Aboriginal archaeological and anthropological cultural heritage survey conducted as part of the environmental and heritage investigations for the proposed Desalination Plant at Port Stanvac (see Appendix F4).

The cultural heritage survey was undertaken on four days, between 14 and 27 October 2008, and involved representatives of the Kaurna Heritage Board (KHB) and Australian Cultural Heritage Management Pty Ltd (ACHM) in order to ensure that no Aboriginal sites, objects or remains would be impacted by the proposed development.

10.5.1.1 Survey Participation

Consultation with the Kaurna people of the Southern Adelaide plains, represented by the KHB, has been ongoing throughout the planning of the proposed development.

The survey involved two archaeologists and two anthropologists from ACHM and six representatives from the KHB.

10.5.2 Relevant Aboriginal Heritage Legislation

The cultural heritage survey is primarily concerned with recording sites of archaeological or anthropological significance in terms of the South Australian Aboriginal Heritage Act 1988 (AHA). The AHA provides the following definition of an Aboriginal site in Section 3:

“Aboriginal Site” means an area of land

(a) That is of significance according to Aboriginal tradition; or

(b) That is of significance according to Aboriginal archaeology, anthropology or history.

Any Aboriginal site or object, whether it has been previously recorded or is yet to be discovered, is covered under the blanket protection of the AHA.

It is an offence under Section 23 of the AHA to damage, disturb or interfere with Aboriginal sites, objects or remains unless written authorisation from the South Australian Minister for Aboriginal Affairs and Reconciliation has been obtained.

It is an offence under Section 35 of the AHA to divulge information relating to an Aboriginal site, object, remains or Aboriginal tradition without authorisation from the relevant Aboriginal group/s or traditional owners.

Indigenous sites are also protected by Commonwealth legislation, namely the Aboriginal and Torres Strait Islander Heritage Protection Act 1984. The Commonwealth Act takes preference over the State Act where there is inconsistency.
10.5.3 AARD Register Search and Previous Research

10.5.3.1 AARD Central Archive

The Central Archive, including the Register of Aboriginal Sites and Objects, is maintained by the Aboriginal Affairs and Reconciliation Division (AARD) and is a record of all previously recorded Aboriginal sites within South Australia. It is a mechanism by which a proponent can identify Aboriginal sites on a parcel of land prior to conducting ground disturbing activities.

The Central Archive was searched for records of Aboriginal sites within and adjacent to the proposed site of the Desalination Plant. The search revealed that the following registered and recorded sites are located within the searched area (Table 10.9). All identified sites were located to the south of the proposed Desalination Plant site within the buffer area between the site and the refinery.

Table 10.9 Registered Sites Within the Surveyed Area.

<table>
<thead>
<tr>
<th>AARD Site ID</th>
<th>AARD Site Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>8396</td>
<td>Port Stanvac Artefact Site 1 (PSAS1)</td>
</tr>
<tr>
<td>8395</td>
<td>Port Stanvac Artefact Site 2 (PSAS2)</td>
</tr>
<tr>
<td>8394</td>
<td>Port Stanvac Artefact Site 3 (PSAS3)</td>
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<td>8393</td>
<td>Port Stanvac Artefact Site 4 (PSAS4)</td>
</tr>
<tr>
<td>8392</td>
<td>Port Stanvac Artefact Site 5 (PSAS5)</td>
</tr>
<tr>
<td>8391</td>
<td>Port Stanvac Artefact Site 6 (PSAS6)</td>
</tr>
<tr>
<td>8389</td>
<td>Port Stanvac Artefact Site 9 (PSAS9)</td>
</tr>
</tbody>
</table>

There are also a number of sites located in the broader region surrounding the proposed site, as shown in Table 10.10.
Table 10.10 Registered Sites in the Region Surrounding the Proposed Site.

<table>
<thead>
<tr>
<th>AARD Site ID</th>
<th>AARD Site Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>3565</td>
<td>Field River Campsite 1</td>
</tr>
<tr>
<td>3566</td>
<td>Field River Campsite 2</td>
</tr>
<tr>
<td>3568</td>
<td>Lonsdale Campsite</td>
</tr>
<tr>
<td>8390</td>
<td>Port Stanvac Artefact Site 7</td>
</tr>
<tr>
<td>12457</td>
<td>Port Stanvac Campsite</td>
</tr>
<tr>
<td>2687</td>
<td>Hallett Cove Artefact Site</td>
</tr>
<tr>
<td>3567</td>
<td>O'Sullivan Beach Campsite</td>
</tr>
<tr>
<td>10255</td>
<td>Christies Creek Artefact Scatter 1</td>
</tr>
<tr>
<td>12455</td>
<td>O'Sullivan Beach Campsite 2</td>
</tr>
<tr>
<td>3655</td>
<td>Christies Creek Artefact Site</td>
</tr>
</tbody>
</table>

10.5.3.2 Previous Research

A number of previous studies in the southern Adelaide region have demonstrated that the entire region is rich in Aboriginal heritage, of both archaeological and mythological significance. The two areas of most relevance to the proposed Desalination Plant are Hallett Cove and the associated Field River, and Christies Creek, immediately south of the oil refinery site.

Most of the information for cultural sites along the Field River relate to the archaeological sites recorded at Hallett Cove. Numerous localities (many now within the Conservation Park) on the higher ground directly north of the Field River mouth have been recorded, as well as several to the south of the mouth.

There are 14 archaeological sites at Hallett Cove. These sites were originally thought to be of great antiquity due to the presence of typologically defined stone artefacts (cobble ‘choppers’), but recent research on Kangaroo Island and the mainland confirmed that these sites are Holocene in age (Draper 1987). These sites contain characteristic large stone implements (due to the poor quality of the stone material for flaking), hearths and small flakes of mainly quartz and quartzite. Many of the recorded sites are now under residential suburbs.

The area is also of mythological significance to the Kaurna. The region is encompassed by the Tjilbruke Dreaming. The association of the Kaurna creation Ancestor Tjilbruke with the Fleurieu Peninsula is summarised in Tindale’s (1987) account of the Tjilbruke Dreaming Track along the Adelaide and Fleurieu Peninsula coastline.

The one recorded ethnographic account of Aboriginal connection to the Field River is the Tjilbruke spring site at Waterfall Creek.

Christies Creek also contains areas where there are important cultural sites with archaeological, anthropological and contemporary Aboriginal heritage significance.
These include old campsites, shield manufacture and possum hunting, and the funerary rites of one of the first Kaurna men to come into contact with Europeans.

10.5.4 Field Survey Methods

10.5.4.1 Field Survey

An archaeological survey and ethnographic consultation were undertaken over the entire area delineated in Figure 10.5 (see next page).

The survey method was developed after identification of surrounding sites and reconnaissance of the survey area using aerial photography and visual vehicular inspection. During the survey, a combination of vehicle and pedestrian (foot) survey was used. This was because large portions of the area are already highly disturbed and heavily overgrown in some sections, with the result that a pedestrian survey would not identify Aboriginal archaeological material.

At areas where ground surface visibility was good, pedestrian survey was undertaken to identify any surface evidence of archaeological sites. Open fields were pedestrian surveyed in parallel, linear transects, with KHB field workers and the ACHM archaeologists spaced at regular intervals according to the width of the property and visibility of the ground surface.

Owing to the danger of snake-bite and the futility of attempting to locate surface artifacts in conditions of no ground visibility, areas containing thick vegetation or crops were not surveyed.

![Figure 10.5 The Surveyed Area.](image)

The ethnographic survey was conducted in the ACHM boardroom using the aerial photography and GIS data supplied by SA Water, along with photography from and the knowledge of two members of the archaeological survey team.
10.5.4.2 Aboriginal Site Identification and Recording

As an archaeological convention, Aboriginal sites were defined as artefact concentrations with a density of at least five artefacts within a 25 square metre area. Lower densities could be included in the category of site where a spatial relationship could be demonstrably the result of intent or activity (e.g. conjoining flake and core; muller and millstone of a seed-grinding pair). Isolated artefacts were defined in relation to sites, with densities and spatial relationships to other artefacts used to verify isolation.

Sites were described and photographed, with their boundaries spatially documented using a hand held Geographical Positioning System (GPS). Isolated artefacts were described, photographed and recorded with a GPS.

A number of sites were known to exist within the boundaries of the Mobil land; part of the brief was to locate and provide a condition report on these. The sites were identified by reference to geographical coordinates, and the information contained on the Register of Aboriginal Sites held by AARD and the report in which they were originally documented. They were then assessed to determine whether their condition had changed and recorded using digital photography.

10.5.5 Field Survey Results

The survey area comprised a field, owned by Mobil and leased for commercial agricultural purposes, known colloquially as the ‘northern paddocks’. At the time of the survey the field contained a thick, green wheat crop, meaning that visibility was low. Considering the poor visibility, coupled with the heavily disturbed nature of the surface, the paddock was not surveyed in systematic transects. Instead, the tracks and the cliffs were targeted, due to these being areas with the highest visibility and the known occurrence of sites along the western boundary.

The northern paddock is home to a number of recorded Aboriginal sites, consisting of low to high density flaked stone artefact scatters. While the recorded sites are concentrated along the seaward cliffs, the interior of the paddock is characterised by a lower density background scatter of flaked artefacts, which may have originally consisted of intact sites that have since been disturbed by intensive ploughing.

The inspection of the cliffs and creek banks identified one new site and relocated the seven sites previously recorded within the survey area.

The newly identified site is a stone artefact scatter on the cliffs. Of the previously recorded sites, only two were found to be in largely original condition (Port Stanvac Artefact Site [PSAS] 4 and 9). Geographical coordinate searches located the areas where the remaining sites were supposed to be located.

The tracks also yielded a number of isolated artefacts, mainly flakes of quartz and quartzite. These artefacts were dispersed at fairly regular intervals across the landscape, suggesting that the background concentration of artefacts for the region is high.
Table 10.11 Registered Sites in the Region Surrounding the Proposed Site.

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Type of Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adelaide Desalination Plant 01</td>
<td>Artefact scatter</td>
</tr>
<tr>
<td>Port Stanvac Artefact Site 1</td>
<td>Altered</td>
</tr>
<tr>
<td>Port Stanvac Artefact Site 2</td>
<td>Altered</td>
</tr>
<tr>
<td>Port Stanvac Artefact Site 3</td>
<td>Altered – recommend archiving</td>
</tr>
<tr>
<td>Port Stanvac Artefact Site 4</td>
<td>As described</td>
</tr>
<tr>
<td>Port Stanvac Artefact Site 5</td>
<td>Altered – recommend archiving</td>
</tr>
<tr>
<td>Port Stanvac Artefact Site 6</td>
<td>Altered – recommend archiving</td>
</tr>
<tr>
<td>Port Stanvac Artefact Site 9</td>
<td>As described</td>
</tr>
</tbody>
</table>

10.5.5.1 New Site (ADP01)

The single newly identified site (ADP01) is located on sandy ground with sparse grass on the western boundary of the surveyed area, to the south of the site.

The site consists of two small concentrations of flaked stone artefacts, with densities of approximately 5 per square metre, each approximately 1.5 metres in diameter and around 30 metres apart, and a low density flaked stone artefact scatter in between (less than or equal to 1 / 5 square metres). Artefacts include at least one large multi-platform pink and grey quartzite core and numerous flakes of pink, yellow and black quartzite. The black quartzite is particularly siliceous and appears to be uncommon in the area. The total population of the site is estimated to be approximately 30 artefacts.

10.5.5.2 Recommendations for Development

The sites identified within the boundaries of the northern paddock are protected under the AHA. All of these identified sites are located to the south of the proposed Desalination Plant site. All ground disturbing works will take place well away from these areas.

10.5.6 Ethnographic Survey

The proposed Desalination Plant was considered from an ethnographic perspective and while there are no specific ethnographic sites within the survey areas, the survey area falls within an extensive complex of sites and tracks which have ethnographic significance.

The significance of this complex relates to the Tjilbruke and Seven Sisters stories, and a number of other Dreaming stories important to Kaurna and neighbouring groups. The survey areas are also within a network of traditional trading routes, camping and ceremonial grounds, and areas associated with traditional food and water sources.
10.5.7 Summary

10.5.7.1 Summary

The Aboriginal cultural heritage survey of the proposed site of the Desalination Plant and surrounds identified one new Aboriginal archaeological site and relocated a number of previously recorded sites, although it failed to relocate a number more. The new site is within the boundaries of the northern paddock, located on the cliffs to the west and adjacent to a number of the previously recorded sites. All sites identified were located to the south of the proposed Desalination Plant site, in the buffer area between the site and the Refinery.

There are no specific ethnographic sites within the proposed site, although the entire survey area falls within an extensive complex of sites and tracks of ethnographic significance. The significance relates to creation ancestors, Dreaming stories, trading routes, food and water resources and traditional camping and ceremonial grounds.

In light of the Aboriginal cultural heritage and ethnographic surveys the following recommendations were made:

- Kaurna field workers should be employed to monitor all ground disturbing activities for the discovery of Aboriginal archaeological materials;
- All Aboriginal sites within the boundaries of the surveyed area are protected under the AHA. Measures will be implemented to ensure that all ground disturbing works take place well away from these sites;
- Isolated artefacts may not constitute Aboriginal sites under the AHA, although it is recommended that ongoing consultation occurs during the construction phase with KHB to obtain their input regarding the appropriate treatment of any artefacts discovered; and
- In the event of the discovery of Aboriginal archaeological materials during earthworks, the site discovery procedures as agreed with the Kaurna are to be enacted.
- Kaurna wish to be included in designing appropriate signage to acknowledge their traditional connection to this area; and
- Kaurna want a keeping place developed for any artefacts salvaged during the construction process.

Implementation of these recommendations will be undertaken through the development and implementation of the Cultural Heritage Management Plan for the works. This Plan will specify induction requirements, cultural awareness training for all Contractors and all appropriate protocols.
10.6 Native Title

10.6.1 Introduction
This Section reports on the status of the land proposed to accommodate the Desalination Plant in relation to Native Title (see Appendix F6).

10.6.2 Consultation
SA Water sought advice from the Crown Solicitor’s Office of the South Australian Attorney-General’s Department concerning Native Title claims within the area of the proposed development on 11 March 2008 (for the Pilot Plant) and 13 August 2008 for the full-scale Desalination Plant.

Advice received from the Native Title Section of the Crown Solicitor’s Office noted the following:

- The entirety of the ADP is within the area of the Native Title claim Kaurna peoples (SAD) 6001/2000 which has not been determined.
- Native Title has been extinguished on all of the freehold titles comprising the subject site (Certificate of Titles 5608/586, 5752/89, 5752/73, 5752/84, 5753/580 and 5752/88).
- Native Title has been extinguished within the Harbour of Port Stanvac, which will entirely accommodate the proposed marine intake and outfall pipelines and structures.

10.6.3 Native Title Issues
The Crown Solicitor’s Office has confirmed that any Native Title and rights which may have existed over the subject land and adjacent waters (entirely encompassing the gazetted area of the proposed Desalination Plant) have been extinguished. Accordingly, there are no Native Title issues in relation to the proposed Desalination Plant and works can proceed without any further regard to Native Title provisions of the requirements of the Commonwealth Native Title Act 1993 and the South Australian Native Title Act 1994.
10.7 European Cultural Heritage

10.7.1 Introduction

This Section discusses the findings of an assessment of European cultural heritage for the proposed site for the Desalination Plant and associated intake/outfall pipelines and structures undertaken during July – September 2008 (see Appendix F5). It discusses heritage issues concerning the Port Stanvac site as well as the marine environment to the west of the Port Stanvac site.

10.7.2 Site History

10.7.2.1 Early European Settlement

The sections comprising the Hundred of Noarlunga are shown in the Arrowsmith Survey of 1840. No section that is the subject of this study had been taken up by that time. The first sections appear to have been taken up from 1847, primarily as farming land.

The first sections that are the special focus of this assessment – Sections 575 and 577 – were acquired on 1 November 1850. The other relevant sections – Sections 587, 602 and 603 – were acquired on 1 September 1851.

10.7.2.2 Early Land Use

The subject land for the proposed Desalination Plant was used mainly for farming purposes (primarily cropping) with physical development on the land being minimal, aside from fencing. Assessment records indicate few dwellings on any sections that are the particular focus of the current study.

Section 603 was subdivided into two titles on 18 August 1923 with only the northern portion later being acquired for refinery purposes. The eastern portion of this part section continued to be used for farming with a small farming complex being built in the south-eastern corner. The western portion provided sites for several holiday homes. These are shown on the aerial photograph dated 3 January 1959 (see Appendix F5) that also shows the farms and buildings depicted in the Department of Mines and Housing Trust plans referred to above.

Despite changes of ownership, all the land remained as open farming land except for the farming complexes noted and the development of holiday shacks at the south-western end of part Section 603 that were accessed via Sullivan Terrace.

10.7.2.3 Land Acquisition

Negotiations concerning the establishment of an oil refinery in South Australia began in 1955 between the Playford Government and Standard Vacuum. Premier Thomas Playford sought to ensure the State’s self-sufficiency in petroleum products and the establishment of a refinery was a key feature of his plans for industrialisation of the South Australian economy.

The bulk of the land for the refinery - Sections 581, 581, 586, 587, 588, 602, part Section 603 and 604 - were transferred to the Standard Vacuum Refining Company in early 1958.
The Oil Refinery (Hundred of Noarlunga) Act passed on 23 October 1958 clearing the way for construction of the refinery.

10.7.3 Refinery History

Having acquired the required land in early 1958 and having had the South Australian Parliament accept the indenture agreement, work began on planning and constructing the refinery, with site works beginning in August 1961.

Standard Vacuum became Petroleum Refineries (Australia) Pty Ltd in April 1962 following restructuring and renaming of the parent companies forming the original joint company; thereafter the newly-named parent companies Mobil and Esso owned 74% and 26% respectively of Petroleum Refineries (Australia) Pty Ltd. Successive company restructuring had no effect on refinery operations.

The first shipment of crude oil arrived aboard the *Mobil Endeavour* on 14 December 1962 with the refinery starting-up in February 1963. The refinery was officially opened on 10 May 1963.

The following year a 30 kilometre pipeline was built to take gas to the South Australian Gas Company’s plant at Brompton where it was reformed into simulated coal gas. A year later, work began on building a pipeline to the fuel storage area at Birkenhead.

Development on the site increased with work beginning in August 1973 on construction of a lube refinery on 50 acres of land adjacent and to the south of the fuels refinery. This began production in April 1975 and was opened officially on 5 March 1976.

Sections 575 and 577 immediately north of the refinery site were acquired by the refinery in October 1979 for future expansion and to act as a buffer against encroaching urbanisation.


Company restructuring continued when Petroleum Refineries (Australia) Pty Ltd became Mobil Refining Australia Pty Ltd in 1992 after Mobil acquired all of Esso’s marketing and refining assets in Australia.

Continuing changes in the oil industry, the development of larger refineries elsewhere, and the small size and ageing of the Port Stanvac refinery meant that continuing operations became problematic. Mobil Refining Australia Pty Ltd found it increasingly difficult to make the necessary investment in new plant to ensure the refinery’s continued viable operation. Consequently, the company announced the indefinite cessation of plant activities on 8 April 2003, with production ceasing at the end of July 2003.

Since that time the plant has been maintained on a care and maintenance basis. The open areas on which it is proposed to locate the Desalination Plant have been leased for cropping and grazing purposes.

10.7.4 Heritage Value of Site

10.7.4.1 Subject Site

The subject site for the proposed Desalination Plant appears to have been used exclusively for farming and grazing, even after the land was acquired by the refinery.
The only physical development on the site occurred in the south-east corner of Section 577. This is indicated on the South Australian Housing Trust plan (Figure 2 in Appendix F5) and in aerial photographs taken on 3 January 1959 and 9 January 1969. The complex had been removed before aerial photographs were taken on 9 March 1979 and before the refinery acquired the site.

The only other development is the planting of a vegetated strip close to the eastern and southern boundaries near the corner of the property. This was planted by the refinery operators and is not considered to be of heritage value.

There are no places or features on this site considered, or likely to be considered, of local heritage value by the City of Onkaparinga or considered to be of State heritage value by the State Heritage Branch.

10.7.4.2 Refinery Site in General

No consideration has been given to recognising the larger refinery site as a place of local heritage value by the City of Onkaparinga nor as a place of State heritage value by the State Heritage Branch.

For the purposes of this EIS, a detailed heritage assessment of the refinery site is not considered necessary.

It is extremely doubtful, given the current history of listing heritage places in their entirety in South Australia, that the whole of the refinery site would ever be considered for heritage listing. It should be noted that in some instances, representative elements of major complexes have been listed.

In any event, the proposed Desalination Plant would have little adverse effect on the heritage listing of a representative structure were this to occur on the refinery site.

10.7.5 Marine Heritage

10.7.5.1 Legislative Aspects

Works associated with development of the proposed Desalination Plant will extend westwards into Gulf St Vincent. These works include an intake structure to about 1-1.5 kilometres offshore to take seawater from Gulf St Vincent, and an outfall structure at a distance of approximately 1.5-2 kilometres offshore to return seawater discharge to Gulf St Vincent.

The marine environment immediately west of the subject site has already been disturbed by the building of a jetty, construction of the underground pipeline to permit the discharging of crude oil, and by dredging to permit the secure anchorage of large vessels. Nevertheless there is the possibility that cultural heritage material could be found off the coast.

Guidelines prepared by the Heritage Branch of DEH indicate procedures to be followed concerning development near declared shipwrecks. In addition, Schedule 8 of the Development Regulations 2008 outlines the procedures to be followed for development in the vicinity of shipwrecks.

10.7.5.2 Documented Objects

Heritage Branch records indicate two (2) wrecks lying approximately five kilometres to the west of Port Stanvac in 27 metres of water. These wrecks have been identified as...
two iron-hulled barges, including the barge *Saurian* (wreck 540) and one unnamed Telfor barge (wreck 923). Both barges belonged to the Department of Marine and Harbours and were scuttled on 24 November 1954. Both barges are identified although neither is protected under the *Historic Shipwrecks Act 1981* (SA).

The shipwreck nearest the subject site at Port Stanvac that is protected under the *Historic Shipwrecks Act 1981* (SA) is the Cutter *Glenelg* that lies about four (4) kilometres south of Port Stanvac. Maritime heritage officers of the Heritage Branch are not aware of other cultural heritage material that might lie west of Port Stanvac, as no systematic surveys have been undertaken in the area.

### 10.7.5.3 Survey Results

A side scan sonar survey of the seabed to the west of the subject site was undertaken by 3D-Marine Mapping, which concluded that:

> The side scan mosaic clearly shows a variety of features and patterns of differing seabed types. The features shown circled to the west of the wharf may be natural features, however they are distinct from the surrounding patterns/features. The features shown circled in the near vicinity of the wharf and those circled to the north of the wharf appear to be objects rather than natural features (Connell Wagner 2008, 6).

Subsequent video examination of these objects during dive surveys has shown them to be concrete pipes that have been dumped offshore. These pipes are clustered closely together at a depth of twelve (12) metres, 500 metres north of the Port Stanvac jetty. The pipes are approximately three (3) metres in length and one (1) metre in diameter and are densely covered by macroalgae (e.g. *ecklonia radiata*) and invertebrates (e.g. ascidians and sponges). Three pipes are clearly distinct in shape and size, whilst the remaining two are partially buried in the sand. They would not be considered items of cultural heritage material that need to be brought to the attention of maritime officers of the Heritage Branch of DEH except as a matter of courtesy.

Nevertheless, care should be taken to ensure that any development works associated with the seabed west of the subject site do not disturb cultural heritage artefacts that could potentially be buried, although the likelihood of such artefacts being present is remote.

### 10.7.5.4 Conclusion

Research into the European cultural heritage of the proposed site for the Desalination Plant suggest that there are no places or features that are considered, or likely to be considered, of local heritage value by the City of Onkaparinga or places or features of State heritage value by the State Heritage Branch. There are also unlikely to be items of cultural heritage material on the seabed west of the subject site.

### 10.7.6 Management and Mitigation Strategies

Given that the assessment of the European cultural heritage has found there to be no sites or objects of cultural heritage significance in and around the site of the proposed Desalination Plant, it is considered that no management or mitigation strategy is required. Nonetheless, the proponent has resolved to take the following actions:

- Inform maritime officers at the Heritage Branch of the Department for Environment and Heritage of the existence of five (5) cylindrical pipes located at a depth of twelve (12) metres, 500 metres north of the Port Stanvac jetty.
During construction of the proposed intake and outfall pipelines and structures, due care and regard will be taken to ensure that any works in and around the seabed west of the subject site will not disturb cultural heritage artefacts that could potentially be buried there.