28 Transport

28.1 Introduction

Currently Port Wakefield Road is a divided four-lane controlled access arterial road and forms part of the National Network providing the link from Adelaide to Perth and Darwin. The subject section is oriented in a north–south direction from Taylors Road in the north to Salisbury Highway in the south.

There was general recognition and concern by some respondents during early consultation that changes to access to Port Wakefield Road will benefit some and require others to change their access patterns. The effects of additional freight and other traffic congestion on Port Wakefield Road were highlighted as a concern.

28.2 Existing transport network

28.2.1 Arterial road network

The fold-out plan at the back of this Environmental Report shows the road network within the study area. Port Wakefield Road is an important link in the National Network and is considered a significant freight route. Arterial roads linking with the southern section of Port Wakefield Road include Salisbury Highway, Bolivar Road and Waterloo Corner Road. Salisbury Highway provides a direct link from Port Wakefield Road to the Salisbury residential area and to the Port River Expressway, Port Adelaide. Bolivar Road links with the Salisbury North area and with Waterloo Corner Road forming a direct route towards the Salisbury District Centre.

28.2.2 Local road network

The local road network within the study area generally forms a grid pattern (oriented 45° to Port Wakefield Road) of connecting roads linking with arterial roads within the surrounding northern suburbs in the Salisbury area.

The Local Government Association's *Metropolitan Transport Strategy Contract Report* (ARRB Group and Tonkin Consulting 2005) identified various local roads as having particular importance within the Port Wakefield Road Upgrade study area. These roads have been identified based on their particular function and include:

- primary freight route Taylors Road
- primary tourism route St Kilda Road.

The majority of the local roads in the study are sealed although there are a number of access roads that are unsealed such as Summer Road and Undo Road. The speed zones on the local roads vary but are typically the default speed limit in urban areas (50 km/h) increasing to 100 km/h in the rural areas.

The local roads generally have a two-lane cross-section of varying width.

28.2.3 Existing traffic volumes

Existing traffic volumes along Port Wakefield Road vary from 15,000 vehicles per day (vpd) north of Waterloo Corner Road to 48,000 vpd north of Salisbury Highway. Of all vehicles currently travelling on Port Wakefield Road, 15% are commercial vehicles, with a significant proportion (55%) of this 15% being large commercial vehicles such as B-doubles and road trains.

Traffic volumes for arterial roads intersecting with Port Wakefield Road are as follows:

 Waterloo Corner Road 	14,600 vpd
Bolivar Road	17,700 vpd
Kings Road	8,200 vpd.

Traffic volumes for connecting local roads along Port Wakefield Road are as follows:

 St Kilda Road 	1,280 vpd
Burton Road	2,900 vpd
Summer Road	160 vpd
Jobson Road	30 vpd
Deuter Road	210 vpd
Hodgson Road	1,900 vpd
Victoria Drive	2,700 vpd
Ryans Road	1,500 vpd
Daniel Avenue	1,200 vpd
Martins Road	8,400 vpd
Globe Derby Drive	750 vpd.

28.2.4 Existing level of service

Levels of service (LOS) along the midblock sections of Port Wakefield Road range from LOS A north of Waterloo Corner Road to LOS C north of Salisbury Highway. The major operational difficulties along Port Wakefield Road are most likely to occur at the junctions. The maximum existing levels of service for junctions along Port Wakefield Road have been determined for peak period traffic as follows:

 Port Wakefield Road/Waterloo Corner Road junction 	LOS C
 Port Wakefield Road/Bolivar Road junction 	LOS E
Port Wakefield Road/Globe Derby Drive junction	LOS C
 Port Wakefield Road/Salisbury Highway intersection 	LOS C.

28.2.5 Road crashes

A crash analysis has considered all recorded accidents that have occurred at midblock sections along Port Wakefield Road and at all junctions for the period 2001 to 2005 inclusive, based on DTEI data. Figure 28.1 illustrates existing road crash data on Port Wakefield Road. Crashes that occurred at junctions along Port Wakefield Road are also shown in Table 28.1.

Table 28.1

Road crash sum	mary – junctions	(2001-2005)
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Road name	Intersecting road	Fatal	Casualty	Property damage	Total
Port Wakefield Road	Bolivar Road	0	13	34	47
Port Wakefield Road	Waterloo Corner Road	0	4	17	21
Port Wakefield Road	Ryans Road	0	1	2	3

A total of 47 crashes occurred at the junction of Port Wakefield Road and Bolivar Road, with two crashes requiring treatment and two resulting in an injury treated by a doctor. A total of 21 crashes occurred at the junction of Port Wakefield Road and Waterloo Corner Road, of which seven crashes were treated by a doctor, five crashes required treatment and a single crash resulted in an injury admitted to hospital. A total of three crashes occurred at the Port Wakefield Road and Ryans Road junction. A single accident resulted in an injury admitted to hospital.

No fatalities were recorded at junctions along Port Wakefield Road between St Kilda Road and Salisbury Highway for the five-year period.

For this same period, a total of 185 crashes were recorded at midblock sections including minor junctions along Port Wakefield Road. Of the 185 crashes there were:

- 5 fatalities
- 75 resulting in some form of injury
- 105 resulting in property damage only.

Crashes that occurred at unsignalised intersections along Port Wakefield Road were predominantly right angle crashes. The majority of crashes that occurred at midblock locations along Port Wakefield Road resulted from vehicles hitting either a fixed object or parked vehicle. Several of the midblock crashes also resulted from vehicle loss of control and leaving the roadway.

28.2.6 Freight routes

Port Wakefield Road (National Network road link 1) is designated as a key freight route for B-doubles, double road trains and articulated vehicles. It forms a key route for intrastate and interstate travel to Adelaide linking with the Eyre and Yorke Peninsulas, Perth, Darwin and parts of New South Wales. Port Wakefield Road is also designated as an over-dimension vehicle route.

A Caltex service station/truck stop refuge area is located on Port Wakefield Road just north of Bolivar Road providing for passing travellers.

28.2.7 Public transport

Public transport bus services that operate along Port Wakefield Road include the 224 and 900 services. The 224 service travels from the City of Adelaide to Elizabeth via Port Wakefield Road and Salisbury Highway. The 224 service also serves Globe Derby Park via a Saturday night service. The 900 service travels from Virginia to Salisbury return via Port Wakefield Road north, Port Wakefield Road and Waterloo Corner Road.

Additional bus services surrounding Port Wakefield Road include the 401, 402, 411 and 412 services. These bus services operate in close proximity to Port Wakefield Road area between the Salisbury Interchange and the Mawson Connector.

Daily regional bus services serving intrastate travel to the north of Adelaide operate along Port Wakefield Road.

28.2.8 Non-motorised transport

The current pedestrian facilities along Port Wakefield Road are limited to informal tracks in some places, to no facilities in others. At the signalised intersections with Salisbury Highway and Bolivar Road, pedestrian crossing facilities are provided for pedestrian activity generated by the caravan park, Whitehorse Inn and service stations within the area.

Many of the rural living properties in the study area have tracks for equestrian usage. On this basis, it is expected that some of the local roads would be used by horses. The area immediately surrounding Globe Derby Park is likely to have a high number of equestrians using the local road network.

28.2.9 Future network without the Expressway

Without the Expressway, the road network along Port Wakefield Road is not expected to change significantly. The expected growth in traffic (without the Expressway) can be catered for by the existing road. However, the junctions and local access would need to change to improve safety and operating conditions.

28.3 Effects of the project

Port Wakefield Road Upgrade will involve upgrading the existing divided Port Wakefield Road at a number of intersections along the project length, including at Waterloo Corner Road, Bolivar Road, Ryans Road, Martins Road and the Salisbury Highway, as well as changes to service roads, traffic controls and access to properties at other locations. In most of these locations, Port Wakefield Road will be widened along the outside edge of the road. It is proposed that the posted speed limit on Port Wakefield Road will be typically 90 km/h, but may vary at certain times to better manage safe traffic operations.

28.3.1 Arterial road network

The Port Wakefield Road Upgrade will extend for a total length of 12 km from the Northern Expressway connection, just north of Taylors Road, to the Salisbury Highway interchange. The upgrade is unlikely to have a significant effect upon the adjacent arterial road network.

Northern Expressway Environmental Report



Casualty Fatality Figure 28.1 Road crashes Port Wakefield Road The major effect of the proposed Northern Expressway will be the increase in traffic volumes along Port Wakefield Road. Subsequently the junctions with existing arterial and key local roads will need to be modified to accommodate the additional traffic. The proposed design layout for each of the major intersections is described below:

Port Wakefield Road/Northern Expressway junction

The proposed Port Wakefield Road/Northern Expressway junction design includes two northbound and two southbound through lanes along Port Wakefield Road. Two right-turn lanes on Port Wakefield Road are provided for right-turn movements onto the Northern Expressway. Two left-turn lanes are also provided on the Northern Expressway approaching Port Wakefield Road.

Port Wakefield Road/Waterloo Corner Road junction

The current design proposal for the Port Wakefield Road/Waterloo Corner Road junction consists of two through lanes for northbound and southbound travel along Port Wakefield Road, and on Waterloo Corner Road two signalised right-turning lanes onto Port Wakefield Road, with an unsignalised left-turn lane.

Port Wakefield Road/Bolivar Road junction

The proposed Port Wakefield Road/Bolivar Road junction design includes two through lanes for northbound and three lanes for southbound travel along Port Wakefield Road. Two right-turn short lanes are provided on Port Wakefield Road turning into Bolivar Road. Two short right-turn lanes are provided on Bolivar Road for right-turn movements onto Port Wakefield Road with a single left-turn slip lane.

Port Wakefield Road/Ryans Road junction

The proposed Port Wakefield Road/Ryans Road junction will be signalised and will contain three through lanes southbound and two northbound lanes for through travel along Port Wakefield Road. A single left-turn slip lane is provided from the Port Wakefield Road southbound approach turning into Ryans Road. No access to Ryans Road is provided from the Port Wakefield Road northbound approach. Ryans Road consists of two right-turn lanes and a single left-turn slip lane providing access to Port Wakefield Road.

Port Wakefield Road/Martins Road junction

The proposed Port Wakefield Road/Martins Road intersection will be signalised and contain three through southbound lanes and two northbound lanes for travel along Port Wakefield Road. A single left-turn slip lane is provided from the Port Wakefield Road southbound approach turning into Martins Road. A single left-turn slip lane is provided on Martins Road for access onto Port Wakefield Road. Two right-turn lanes provide access from Port Wakefield Road into Martins Road.

Port Wakefield Road/Globe Derby Drive junction

The proposed Port Wakefield Road/Globe Derby Drive junction layout contains three southbound and northbound through lanes for travel along Port Wakefield Road. A single left-turn slip lane is provided from the Port Wakefield Road northbound approach turning into Globe Derby Drive. Globe Derby Drive consists of two right-turn lanes and a single left-turn slip lane providing access to Port Wakefield Road.

Port Wakefield Road/Salisbury Highway (north) junction

This junction remains unchanged with two through lanes for northbound and southbound travel along Port Wakefield Road. Two right-turning lanes into Salisbury Highway are provided from the Port Wakefield

Road northbound approach. The Port Wakefield Road southbound approach has three through lanes and a single left-turning lane entering Salisbury Highway.

Port Wakefield Road/Salisbury Highway (south) junction

This junction remains unchanged with two through lanes for northbound and southbound travel. Two rightturn lanes are provided on the southbound approach of Port Wakefield Road for right-turn movements into the Salisbury Highway. A single short left-turning lane is provided for vehicles entering the Salisbury Highway. The merge arrangement for westbound traffic on the entry ramp and Salisbury Highway will be modified to improve merging capacity and safety.

28.3.2 Local road network

Table 28.2

Port Wakefield Road Upgrade will result in a reduction of direct access to Port Wakefield Road from some local roads and abutting properties. The increase in traffic on Port Wakefield Road is expected to have a moderate impact on access from adjacent properties, particularly for right turning traffic. Consequently, a number of local road connections providing access to Port Wakefield Road have been modified to improve safety on Port Wakefield Road with these modifications set out in Table 28.2.

Road	AADT	Access change	Effect – Alternative route
Taylors Road	1,900	No right turn onto Port Wakefield Road	Alternative route via King Road
Symes Road	718	Left in and left out only	Alternative access via Brown Road or St Kilda Road
Anjanto Road	242	Left in and left out only	Alternative access via Brown Road or St Kilda Road
Greyhound Road/ Mumford Road	92	Left in and left out only	Alternative right turn access via Heaslip Road
Undo Road	90	Left in and left out only	Alternative access via Brown Road or St Kilda Road
Burton Road	2,900	Left in and left out only	Alternative access via Angle Vale Crescent to Waterloo Corner Road
Deuter Road/Summer Road/Jobson Road	210	Left in and left out only	Separate U-turn facilities to be provided to assist with access
Victoria Drive	2,700	Left in and left out only	Alternative access via Martins Road or Bolivar Road. Separate U-turn facilities also provided.
Ryans Road (west)	1,500	Closed to Port Wakefield Road	Alternative access via Globe Derby Drive, Daniel Avenue and service roads
Ryans Road (east)	1,500	New signalised junction with no right turn in	Alternative route via Martins Road
Service roads	N/A	Service roads on both sides of Port Wakefield Road between Ryans Road and Whites Road	Service roads to have some restrictions in access
Daniel Avenue	1,200	Left in and left out only	Alternative access via Globe Derby Drive
Martins Road	8,400	No right turn out	Alternative access provided at Ryans Road

Safety improvements of local road connections

Note: AADT = average annual daily traffic.

The effect of the following proposed road closures is that some local traffic will be redirected onto other local roads or modified service roads to access Port Wakefield Road. As most of these roads to be modified have existing Average Annual Daily Traffic volumes (AADT) not exceeding 500 vpd, the effects of the changes to access on the local road network are expected to be minimal.

28.3.3 Predicted traffic volumes with and without the Expressway

The predicted increase in traffic volumes by 2011 and 2016 with and without the construction of the Northern Expressway are shown in Table 28.3 and Table 28.4.

Table 28.3 Predicted traffic volume comparison 2011

Location	Existing (2006)	2011 Without Expressway	2011 With Expressway
Port Wakefield Road – north of Northern Expressway connection	14,000	19,800	19,000
Port Wakefield Road – Northern Expressway to Waterloo Corner Road	17,600	20,800	32,700
Port Wakefield Road – Waterloo Corner Road to Bolivar Road	27,300	32,000	38,100
Port Wakefield Road – Bolivar Road to Ryans Road	39,700	48,800	58,800
Port Wakefield Road – north of Salisbury Highway	47,600	58,800	61,100
Waterloo Corner Road – Heaslip Road to Deuter Road	7,500	11,800	14,200
Martins Road – Ryans Road to Port Wakefield Road	8,300	10,600	14,000
Bolivar Road – Burton Road to Kings Road	17,700	21,200	17,000
Salisbury Highway – north-east of Port Wakefield Road	33,800	42,200	35,500
Salisbury Highway – south-west of Port Wakefield Road	48,200	56,700	53,800

Table 28.4

Predicted traffic volume comparison 2016

Location	Existing (2006)	2016 Without Expressway	2016 With Expressway
Port Wakefield Road – north of Northern Expressway connection	14,000	21,200	21,600
Port Wakefield Road – Northern Expressway to Waterloo Corner Road	17,600	23,200	38,300
Port Wakefield Road – Waterloo Corner Road to Bolivar Road	27,300	34,900	42,200
Port Wakefield Road – Bolivar Road to Ryans Road	39,700	45,100	49,900
Port Wakefield Road – north of Salisbury Highway	47,600	59,800	63,400
Waterloo Corner Road – Heaslip Road to Deuter Road	7,500	13,200	11,300
Martins Road – Ryans Road to Port Wakefield Road	8,300	9,500	14,000
Bolivar Road – Burton Road to Kings Road	17,700	22,400	16,000
Salisbury Highway – north-east of Port Wakefield Road	33,800	49,500	38,100
Salisbury Highway – south-west of Port Wakefield Road	48,200	70,200	58,200

28.3.4 Traffic volumes

The predicted traffic volumes on Port Wakefield Road and surrounding roads have been determined for the current and proposed road networks. Selected traffic volumes are given in Tables 28.2 and 28.3.

The expected proportion of commercial vehicles on Port Wakefield Road will be in the range 10–15% of total traffic.

Traffic volumes are expected to increase significantly along Port Wakefield Road irrespective of the proposed Northern Expressway. When the Northern Expressway is constructed, a large number of vehicles will be directed along Port Wakefield Road to link with the new road. Therefore, Port Wakefield Road will require significant upgrading (as proposed) to accommodate the increased levels of traffic.

28.3.5 Effects of predicted traffic volumes

The Austroads Guide to Traffic Engineering Practice (1988) – Roadway Capacity defines level of service (LOS) as a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers. The guide describes six levels of service: level of service A (best operating conditions) to Level of Service F (worst conditions – capacity exceeded, forced flow conditions).

The predicted maximum level of service for Port Wakefield Road during peak periods after the proposed upgrade is as follows:

 Northern Expressway to Waterloo Corner Road 	LOS B
Waterloo Corner Road to Bolivar Road	LOS C
Bolivar Road to Ryans Road	LOS E
 Ryans Road to Salisbury Highway 	LOS C.

Maximum levels of service for the following junctions along Port Wakefield Road have been determined for peak period traffic as follows:

 Port Wakefield Road/Waterloo Corner Road junction 	LOS D
 Port Wakefield Road/Bolivar Road junction 	LOS C
 Port Wakefield Road/Ryans Road junction 	LOS D
Port Wakefield Road/Martins Road junction	LOS D
Port Wakefield Road/Globe Derby Drive junction	LOS D
 Port Wakefield Road/Salisbury Highway intersection 	LOS E.

As can be seen from the predicted levels of service, it is likely that all sections of the proposed Expressway will operate with a relatively high level of service. For the junctions along Port Wakefield Road, levels of service are reduced to LOS D at Ryans Road and LOS E at Salisbury Highway during the peak periods; however, they remain within an acceptable limit, as verified with micro-simulation modelling conducted by DTEI.

28.3.6 Freight routes

Port Wakefield Road will remain an essential link in the National Network, and cater for the existing range of vehicle types. Access to local commercial businesses within the area will be less direct as a result of the reduced right-turn access points along Port Wakefield Road.

28.3.7 Road safety

Road safety is expected to improve with a reduction in right-turning movements onto or from Port Wakefield Road. However, the increased traffic volumes due to the Expressway are expected to increase the risk of crashes.

28.3.8 Public transport

Public transport is limited to bus movements along Port Wakefield Road. Three bus services using Port Wakefield Road may be affected:

- the 900 service three bus stops (both sides of Port Wakefield Road) are located between Waterloo Corner Road and the Northern Expressway south of intersections at Anjanto Road, Symes Road and Taylors Road. The scheme will impact on these bus stops by requiring the stops at Symes Road and Taylors Road to be rationalised into one stop. This is due to the roadworks proposed at Taylors Road/ Northern Expressway creating an environment that does not support bus set-down and pick-up activities
- the 224 service that serves Globe Derby Park via a Saturday night service should be able to be accommodated using Globe Derby Drive or Daniel Avenue.

The regional bus services that serve the northern areas and stop at the Caltex Service Centre will not be affected by the proposed works.

28.3.9 Non-motorised transport

The project proposes to retain the current standard and level of pedestrian facilities, with the addition of pedestrian crossing facilities at the new signalised intersections with the Northern Expressway, Ryans Road and Bolivar Road.

Existing cyclist facilities are limited to one short approach marked cycling lane, southbound at Waterloo Corner Road. The proposed scheme aims to retain this facility, and where possible provide a similar facility at all the signalised intersections. Sealing the shoulder of the road in areas where works are undertaken will also provide some additional sealed space for cyclists.

Equestrian access and access to equestrian facilities at locations where roads will be closed or modified may be reduced. The service road on Port Wakefield Road near Globe Derby Park will be sealed as part of the proposal; equestrian access will be maintained through the provision of a wide unsealed shoulder.

28.4 Management

28.4.1 Principles adopted to minimise effects

To minimise any adverse effects from Port Wakefield Road Upgrade on the transport network, a series of principles have been adopted including reducing the number of access points to provide a safe, free

flowing roadway, and providing safe access to Port Wakefield Road for all users by installing service roads.

28.4.2 Measures to minimise effects during planning and design

Measures include provision of service roads where it is necessary to restrict access onto Port Wakefield Road, determining alternative routes for vehicles where roads are to be closed or modified, provision of suitable alternative routes for pedestrians, cyclists and equestrians where current routes have been modified, and defining discrete packages of works and appropriate staging for these packages. Several junctions are to be converted to left in and left out only access, prohibiting right-turn movements. This is expected to improve safety along Port Wakefield Road.

28.4.3 Measures to minimise effects during construction

It is proposed to construct the Port Wakefield Road Upgrade works between late 2007 and late 2008. Measures proposed to minimise any adverse effects during construction, include:

- · staging works to reduce operational delays
- undertaking work during normal working hours under traffic management with some work scheduled at night or in low traffic times
- · sourcing construction materials locally to reduce transportation requirements
- monitoring of traffic from road closures.

28.4.4 Measures to minimise effects post-construction

Post-construction, the measures undertaken to minimise any adverse effects of the Port Wakefield Road Upgrade are to monitor the operation of Port Wakefield Road and the surrounding road network to determine if the road is operating as predicted and to identify any unforeseen problems within the network. Particular attention will be paid to the Northern Expressway connection, the signalised intersections, the roads closed due to the project and the alternative routes around the road closures including service roads.

28.5 Conclusion

Port Wakefield Road is a significant freight route for South Australia forming an essential link in the National Network. The local road network connects with primary freight routes, secondary freight routes, primary social access routes and primary tourism routes.

Existing traffic volumes along Port Wakefield Road are currently in the range of 15,000 vpd (northern section) and up to 48,000 vpd (southern section). The proportion of commercial vehicles is approximately 15%. It is anticipated that this proportion of commercial vehicles is likely to remain unchanged throughout the operational lifespan of the Port Wakefield Road Upgrade. Traffic volumes along Port Wakefield Road are expected to increase significantly as a result of the proposed Northern Expressway.

Intersections along Port Wakefield Road will require significant upgrading to accommodate the increased levels of traffic. This includes the junctions of Port Wakefield Road with Waterloo Corner Road, Bolivar Road, Ryans Road and Martins Road. As a result of the proposed Northern Expressway, the number of access points along Port Wakefield Road will be reduced as a safety measure; however, service roads

alongside Port Wakefield Road will be modified and formalised to uphold direct access to local roads and abutting properties reducing the impacts on local road users. Alternative routes for motorists, pedestrians, cyclists and equestrians will be determined prior to local road closures.

Existing levels of service for midblock sections along Port Wakefield Road range from LOS A north of Waterloo Corner Road to LOS C north of Salisbury Highway. Levels of service at the junctions along Port Wakefield Road are currently at LOS C to LOS E.

With the proposed Northern Expressway and upgrading of Port Wakefield Road, levels of service along Port Wakefield Road will be LOS B north of Waterloo Corner Road, LOS E south of Ryans Road and LOS C between Waterloo Corner Road and Bolivar Road for the period 2011. For the major intersections along Port Wakefield Road, both Ryans Road and Waterloo Corner Road intersections will be at LOS D. Bolivar Road and Salisbury Highway intersections will be at LOS C and E respectively.

Public transport along Port Wakefield Road consists of bus services only. Bus services may be affected where bus stops located at Symes Road and Taylors Road will be merged into a single bus stop.

The changes to local road access will reduce the number of crashes on Port Wakefield Road. However, this decrease would be offset by an expected increase due to traffic flows from the Northern Expressway.

All traffic will be monitored as a result of local road closures, ensuring the safe and efficient flow of traffic along and surrounding Port Wakefield Road Upgrade, both prior to construction and post-construction.

With the proposed Northern Expressway, Port Wakefield Road Upgrade will be able to accommodate the increased levels of traffic, providing a safe and efficient roadway with minimal adverse impacts on the local surrounding community and road commuters.