Final **Welland Transport and Parking Plan**

June 2013

Prepared for the **City of Charles Sturt** by

City of Charles Sturt

Jensen PLANNING + DESIGN

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TABLE OF CONTENTS

1 Introduction

1.1 The Welland Transport and Parking Plan

The City of Charles Sturt is embarking on a program of preparing transport and parking plans for several Precincts within the council area. One of the first to be prepared is the Welland Transport and Parking Plan (WTPP), covering that part of the suburbs of Allenby Gardens, Welland and West Hindmarsh located north of Grange Road.

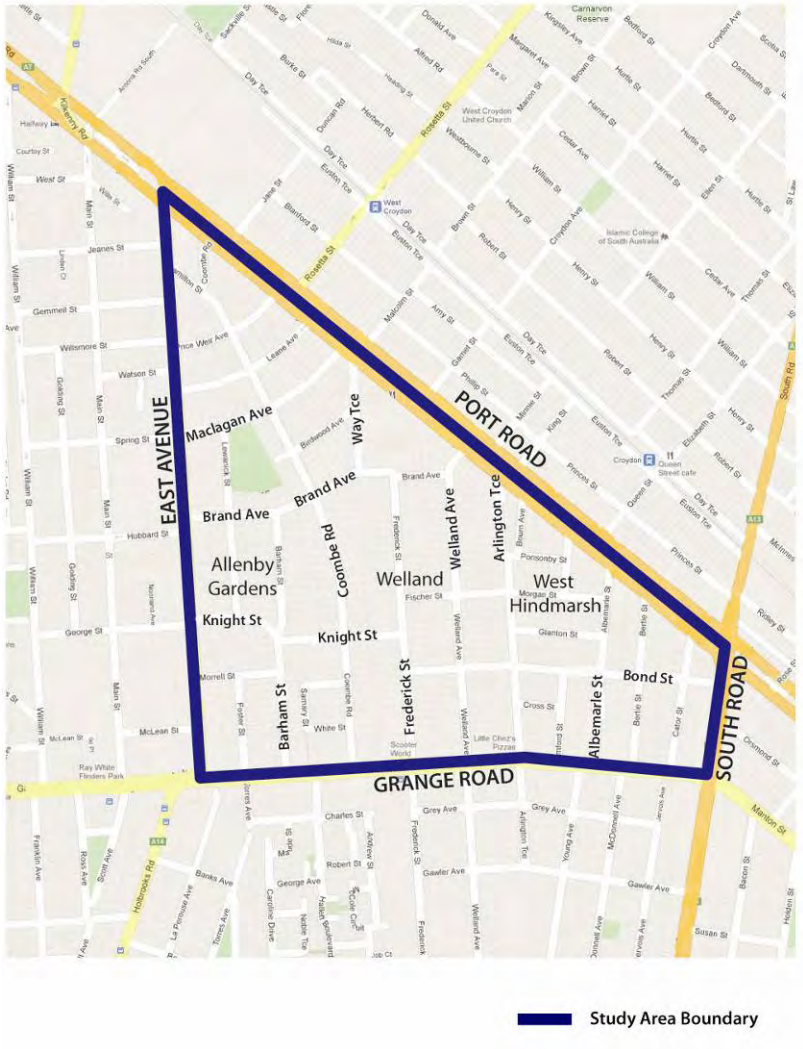
The study area is shown right, and is bounded by Port Road, South Road, Grange Road and East Avenue.

The Objectives of the Plan are:

- To better link transport and parking needs with other aspects of prosperous, socially and culturally cohesive community and encourage healthy and active lifestyles
- To plan for future demands of streets and open spaces in response to changing expectations about how we move around our neighbourhood and about what makes a safe, attractive and healthy community.

Prior to commencing the study Council was already aware of several traffic and parking issues that have been raised by residents in various parts of the study area, these will be addressed as a part of this Plan.

The Plan deals with a variety of transport and urban improvement topics, including walking, cycling, local traffic improvements, car parking, public transport, and improvements to the look and feel of streets, parks and walking paths.



Study Area

1.2 Strategic Context

Previous transport studies undertaken by Council relevant to the study area have been reviewed and analysed to ensure that past recommendations can be considered as part of this latest work. These Strategic Documents are:

- 30 Year Plan for Greater Adelaide
- City of Charles Sturt Development Plan
- Charles Sturt Traffic Management Strategy (QED Pty Ltd, 2005)
- North-West Growth Corridor Transport Study (GTA Consultants, 2011)
- Charles Sturt Transport Strategy 2005-2025 (Parsons Brinkerhoff, 2005)
- Residential Growth and Character Study, Strategic Context (Jensen Planning + Design, 2010)

The 30 Year Plan for Greater Adelaide, which is the State Government's Strategic Plan for Adelaide, has been reviewed. The key implication of this is the expectation that there will, over time, be increased commercial / residential and mixed use development along the key corridors of Port Road and Grange Road. The main implication of this is that, in order to ensure the amenity of the residential areas within the study area are enhanced over time, traffic and parking aspects of this increased development must be carefully managed. This would, for example, require ensuring that new developments provide adequate car parking within them so as to not spill over into the surrounding residential streets, plus reflect the transport options available within higher density Activity Corridors.

Please refer to Appendix 4 For the Strategic Overview Summary Document for a more detailed explanation of the strategic implications for the Welland Transport and Parking Plan.

1.3 Site Investigations and Data Analysis

The study team has inspected the study area on several occasions, focussing on understanding the local traffic network, key trip generators such as schools, Welland Plaza (and other commercial developments along Port Road and Grange Road), the Sikh Temple / Community Centre, etc.

We have also analysed the existing traffic data obtained from Council (e.g. traffic volumes and speeds on particular streets) and new data obtained specifically for this study. New data was obtained where there were either significant gaps or more up to date data was felt to be beneficial. Details of the data obtained and how this has informed the study recommendations are included in the relevant sections of the report.

We have assessed the public transport network and identified where key linkages beyond the study area occur.

We have also mapped walking catchments for the key trip generators such as schools, Welland Plaza and the two train stations nearby.

2 Consultation Summary

Stakeholder Workshop

In preparing the Welland Transport and Parking Plan stakeholder and community engagement has occurred. On the 10th of October 2012 the Design Team held a workshop with Council and key stakeholders to outline the strategic implications for the plan and identify and discuss the known transport and linkage issues within the study area. These stakeholders included members of the Department for Planning, Transport and Infrastructure (DPTI), SA Police (SAPOL), representatives from the Way2Go program and St Michaels College, Kilkenny Primary School and Allenby Gardens School. It provided a forum for discussion of the following topics:

- Through Traffic
- Traffic Speed
- Issues associated with Major Trip Generators
- Walking Cycling
- Public Transport
- Linkages beyond the Precinct
- Safety
- Parking Demand
- Public Realm Improvements
- Change Over Time

In addition to holding the Stakeholder Workshop, the Design Team liaised separately with those who were unable to attend or unknown (to be key stakeholders) at the time to adequately ascertain all the key issues and aspirations for the future of transport in the area.

Community Workshop

Following the Stakeholder Workshop, a Community Workshop was held on the 24th of October 2012. This provided an opportunity for the broader resident and trading community to become informed about the project and background issues and provide the Design Team and Council with their ideas about the above listed topics and any existing problems. They were also asked to complete a survey at the Workshop which was also available online. The survey was completed by 94 participants and provided valuable information about the following:

- If and where there is too much traffic
- If and where traffic travels too quickly and dangerously
- If and where there are parking problems
- If there are any problems relating to public transport
- How the environments for cycling and walking could be improved

Due to the extensive consultation that was undertaken the Design Team were provided with a solid basis for undertaking further investigations leading to the development of an Issues and Discussion Paper.

Issues and Discussion Paper

The intention of the Issues and Discussion Paper was to distribute an informed and detailed document back to those who had already been involved in engagement processes, that outlined all the key issues within the study area and provide options for their improvement. The Paper was also available to the wider community (who may have not been involved in the project before) via Council's Website in order to confirm that all of the issues raised had been identified.

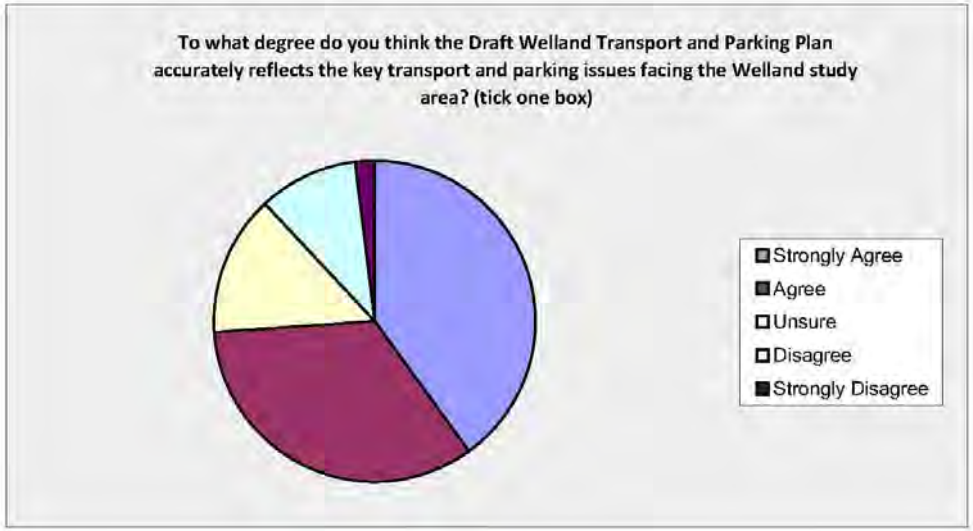
The Paper provided a detailed list of solutions to perceived problems relating to traffic volumes and speed at various locations throughout the study area, the access to Welland Plaza, parking, walking and cycling and how the "look and feel" of the public realm environment could be improved. The benefits and disadvantages of each solution were then discussed so that members of the community could accurately and fairly assess and rate the options available. The solutions suggested by the Design Team considered best practise approaches to traffic management and streetscape design and wherever possible were suitable to the residential context of the study area.

Nearly 60 responses were received with detailed commentary about whether the Paper covered all the issues and included feedback about which solutions were preferred or not preferred, as well as putting forward other ideas for consideration. The Issues and Discussion Paper, the Survey Information and feedback collected as well as further investigations and evaluation options have provided the basis for the recommendations within the Welland Transport and Parking Plan.

Final Consultation

To conclude the community consultation process (following endorsement of the Draft Welland Transport and Parking Plan by Council), 498 letters were sent to residents inviting comment. An information session was also held at the City of Charles Sturt Civic Centre on Thursday 30th May where the Plan was presented by the consultants and provided the opportunity to ask questions and comment.

50 responses were received (a response rate of 10%), some of which were from people who had been previously involved and others that were new to the project (and providing input for the first time). The below pie chart illustrates to what degree people thought the Plan accurately reflected and discussed the key transport and parking issues.



As is evident from the chart, there was overwhelming support from the community that the Plan addresses the key issues (74% of respondents *Strongly Agreed* or *Agreed* that this was the case). Most responses agreed with and reiterated the recommendations outlined in the Plan and felt the improvements should be implemented. However, 12% of respondents did not feel that the Plan reflected their concerns. These new issues have been recorded in Appendix 1 – *Final Consultation Reponses.*

3 Strategy for Transport + Parking

A number of key issues have been identified relating to transport and parking through the processes described in Section 2. The following recommendations have been made based on the feedback received from the Issues and Discussion Paper, further investigations and more detailed design work.

The recommendations described in Section 3 will be further prioritised in Section 4 – Implementation Plan, allowing Council to more easily and effectively implement the works to create the most impact and improvement to transport and parking in Welland.

3.1 Traffic Volume + Speed

3.1.1 General Discussion

Speed and Volume

The issues of traffic speed and volume within the Study Area are closely related, in that usually traffic speed is an issue where volumes are a little higher and when streets are straighter and longer without any traffic devices to slow vehicles down.

Furthermore through traffic in some streets has been identified as a problem for some residents, and again this has led to increased volumes and speeds.

Community feedback indicated that the following streets had too much traffic:

- Brand Avenue, Frederick Street, Welland Avenue, Barham Street and, to a lesser extent Coombe Road

Analysis of traffic data obtained from the surveys suggests that the identified streets do carry the highest traffic volumes but are not excessive in terms of exceeding typical neighbourhoods. Traffic volumes in these are all influenced by the two major traffic generators in the precinct, namely Welland Plaza shopping centre and Allenby Gardens Primary School.

Residents thought that traffic moved too fast in:

- Brand Avenue, Frederick Street, Welland Avenue and Coombe Road

Frederick Street and Welland Avenue traffic speeds appear to be excessive for a typical neighbourhood. Although the new data has not fully supported this, overall it is considered that reductions in vehicle speeds would be beneficial.

However, this is not to say that these traffic volumes and speeds elsewhere in the precinct are not a problem that needs to be addressed, particularly if the intention is to improve the overall amenity of the area and make it safer and more enjoyable for walking and cycling.

Through traffic mainly occurs along the major routes adjacent to Welland Plaza (Frederick Street, Welland Avenue and Brand Avenue) and on Coombe Road. The presence of significant volumes of trucks on the roads leading to and from Welland Plaza has been identified as a key part of the through traffic that would not be expected on such a local road network. It should, however, be noted that Welland Avenue has been designated as a local secondary freight route in earlier studies, and as such would be expected to carry some level of local freight traffic. This designation is reviewed as part of an assessment of the local road network hierarchy.

The through traffic was also related to concerns over vehicle speeds throughout Frederick Street and Welland Avenue, and on some sections of Brand Avenue and Coombe Road. Through traffic was also identified in Knight/Barham Street and Morrell/Foster Street arising from motorists using these streets to bypass the East Avenue/Grange Road signalised intersection This "short cutting" occurs mostly, but not exclusively, during peak periods due to congestion at the intersection and covers the left-turn (and also right turn in the opposite direction) from East Avenue into Grange Road and the right turn from Grange Road in to East Avenue.

Traffic Safety and Accidents

The most recent 5 year crash data along the arterial roads including Port Road, South Road, Grange Road and East Avenue for the period 2008 - 2012 has been sourced from The Department of Planning, Transport and Infrastructure.

The significant crash clusters are identified at the major arterial road intersections, and further consideration of these is largely outside of this study.

A number of the local roads recorded a high incidence of crashes at their intersections with arterial roads, notably Welland Avenue and Port Road and Frederick Street and Grange Road.

On the higher volume local roads, the following crash numbers were recorded:

- Coombe Road – 11 crashes at 8 different locations
- Welland Avenue – 7 crashes at 3 different locations
- Frederick Street – 6 crashes at 4 different locations
- Brand Avenue – 4 crashes at 3 different locations

Of the above, 2 crashes occurred at the Frederick Road/Brand

Avenue intersection and 1 crash occurred at the Brand Avenue/Coombe Road intersection.

The intersection with the highest number of crashes was Welland Avenue/Bond Street with 3, two right angle (vehicles turning) crashes and 1 hitting a fixed object (typically a tree or stobie pole).

3 crashes were also recorded at the intersection of Bond Avenue and Albermarle Street.

There was only one fatal crash recorded within the study area, which occurred on Welland Avenue and involved a vehicle reversing from their driveway in to a motorised wheelchair/gopher.

No crashes were recorded at the intersection of Brand Avenue and Lewanick Street, despite the concerns of residents over the safety of the intersection and poor observance of the stop signs and evidence of this poor observance noted during recent traffic count observations. The most frequent causes of crashes on the local road network were right angle crashes (vehicles turning at junctions) and vehicles hitting parked cars.

Pedestrian and Cyclist Safety

Recorded crashes are classified as those where an injury requiring medical or surgical treatment or a fatality has occurred or where property damage was above $3,000. As a result there are often large numbers of pedestrian and cyclist crashes that are unreported as no injury occurs that requires medical treatment and there is little or no significant property damage.

Very few crashes have been recorded that have involved pedestrians within the study area (Crash Severity information is included in Appendix 6). On the arterial road network there were 3 crashes involving pedestrians on Port Road and one at the Grange Road and South Road intersection. It is noted that the most recent accident recorded on 03 May 2012 involved a crash between a vehicle and a pedestrian crossing Port Road which resulted in serious injury. This crash appeared to occur close to, but not at, the pedestrian crossing adjacent to Welland Plaza. On the local road network, the only recorded pedestrian crash occurred at the junction of Coombe Road and White Street. However, cyclist crashes present a very different picture with a much higher level of involvement in crashes.

On the arterial road network the following cyclist crashes were recorded:

- Port Road – 18 crashes at 11 different locations (notably 5 crashes between Way Terrace and Maclagan Avenue and 5 crashes between Albermarle Street and Linden Street which are both relatively short sections of road)
- Grange Road – 7 crashes at 7 different locations (notably 3 crashes between Welland Avenue and Frederick Street)
- East Avenue - 6 crashes at 6 different locations
- South Road – 3 crashes at 2 different locations (notably 2 crashes between Osmond Street and Grange Road)

Overall the majority of cyclist crashes resulted in minor injuries and there were no fatalities.

3.1.2 Recommendations for Improvement

Local Road Hierarchy

It is understood that the most recent review of the road hierarchy was undertaken as part of the 2005 Traffic Management Strategy prepared by QED Pty Ltd. The existing road hierarchy defined in this study identifies all streets within the Welland study area as local streets with the exception of Welland Avenue, which is designated as a Collector Street.

Recommendation 1: **Redesignate Welland Avenue as a Local Access Street**

Welland Avenue is not considered to provide any additional or enhanced road characteristics that would warrant its classification as a Collector Road above other precinct roads such as Brand Avenue, Way Terrace or Coombe Road. It is almost exclusively residential in nature, provides no direct access to any local or neighbourhood level facilities or industrial or commercial properties and has design standards expected of a local street. With the recommendation to mitigate the traffic volume and speed along Welland Avenue to improve the residential amenity, it is recommended that Welland Avenue should be redesignated as a Local Access Street.

Proposed Hierarchy Changes

Recommendation 2: **Remove designation of Welland Avenue as a Local Secondary Freight Route**

It is also noted that Welland Avenue is designated as a Local Secondary Freight Route. This is defined as a route that *"provides connection for standard freight vehicles between local freight generators, such as industrial estates and the arterial or primary freight network."* As no such facilities directly access from Welland Avenue, it is not considered that it can provide such a freight route function. It is therefore recommended that it should

not continue to be designated as a local secondary freight route.

All local roads are permitted for use as a freight route where this is required to service an existing land use. Within the precinct study area, the only location that is considered to require regular freight route access that cannot be contained immediately local to Port Road, Grange Road and East Avenue is Welland Plaza. Given the locations of the existing service yards, the freight route access for Welland Plaza should be limited to the section of Welland Avenue and Brand Avenue accessed from Port Road as far as Way Terrace and Way Terrace from Port Road to Brand Avenue. However, as this is a local access requirement, it is not considered that there is a need to define these routes as local secondary freight routes. As a result, the local road hierarchy is recommended as shown on the figure below.

Recommendation 3: **Seek to engage with Welland Plaza owners and tenants and other local business to develop routing agreement for local freight traffic**

It is recommended that Council seeks to engage with the owners and tenants of Welland Plaza to ensure that the use of the Way Terrace and Brand Avenue routes is observed for all larger freight vehicles. Similar arrangements should be sought with any other local businesses that are observed using the local streets as short cuts for inappropriate vehicles.

Welland Avenue

Welland Avenue is used as a through traffic route for city bound motorists wanting to connect from Port Road through to South Road via Welland Avenue and Grange Road. This is partly due to the ability to cross the Port Road median in line with Welland Avenue. It is also used for outside traffic wanting to access the Welland Shopping Centre, including some service vehicles.

The attraction of the southbound route is confirmed by the traffic surveys, with southbound weekday traffic volumes averaging almost 1000 vehicles, compared with less than 800 vehicles travelling northbound on a typical weekday. This combined total traffic volume of almost 1800 vehicles, is above what would typically be expected for a local street such as Welland Avenue.

Welland Avenue is also a long, straight road with only one roundabout at the intersection with Fischer Street. This does result in high speeds between Brand Avenue/Fischer Street and between Fischer Street and Grange Road. The most recent surveys recorded overall 85th percentile traffic speeds of 53 km/h, with even higher 85th percentile speeds recorded during periods when traffic volumes are lower, particularly in the evenings.

Recommendations for Welland Avenue are therefore a mixture of measures to reduce the level of through traffic and measures to reduce vehicle speeds.

Recommendation 4: **Relocate the road across the Port Road median to the west of Welland Avenue**

The relocation of the Port Road median crossing will remove the direct route for southbound traffic wanting to link from Port Road via Welland Avenue through to Grange Road. The next median to the south would not provide such an attractive through route via Welland Avenue or Arlington Terrace.

This recommendation should form part of a broader review of median openings along this section of Port Road so the problem is not simply moved elsewhere.

Existing Port Road median crossing location adjacent to Welland Avenue

Potential new Port Road median crossing location – further west

Initial discussion with DPTI, who is responsible for Port Road, has indicated that a review of median openings in Port Road would be considered. The exact location also needs to be determined with DPTI to ensure safe movements for vehicles exiting Welland Avenue onto Port Road and then making a U Turn at the relocated median opening.

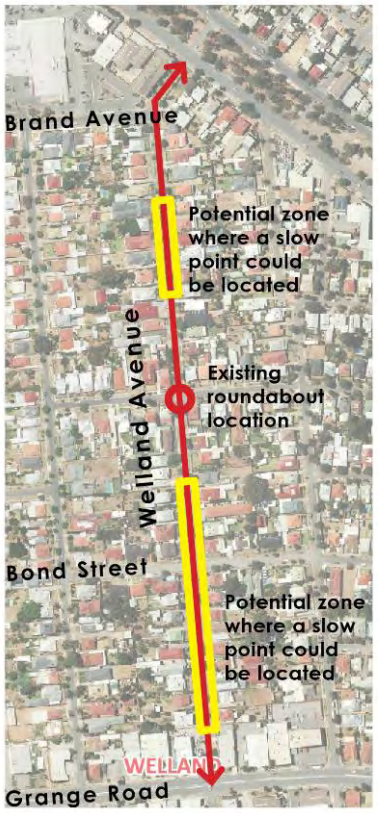
Recommendation 5: **Install single lane angled slow points along Welland Avenue**

The implementation of a series of slow points is recommended as the most appropriate method of reducing vehicle speeds on Welland Avenue. The use of angled slow points is considered preferable as this will still achieve reduced speeds in lower traffic volume conditions where cars are less likely to have to give way to each other. They would also have a lower impact on driveway access and kerbside parking than other alternatives.

An example of a typical Single Lane Angled Slow Point

An example of a typical Two Lane Angled Slow Point

The recommended angled slow points would reduce the traffic to a single lane, and an example is shown above (the image has been sourced from the Manual of Legal Responsibilities and Technical Requirements for Traffic Control Devices Part 2 – Code of Technical Requirements). More than one slow point is usually provided on a section of road for traffic calming to be effective. For the length of Welland Avenue between Brand Avenue and Bond Street, two slow points would probably be appropriate. Three slow points would probably be appropriate between Bond Street and Grange Road.



A combination of traffic management devices should be installed (locations and spacing are suggestions only - to be further explored)

Recommendation 6: **Change priority of Welland Avenue/Brand Avenue junction to give right of way to Brand Avenue traffic**

Changes to this junction are recommended as part of the improvements to the access and road network around Welland Plaza. It is recommended that the priority of the intersection is changed to force motorists heading south along Welland Avenue from Port Road to give way to traffic moving on Brand Avenue. Further details on this are provided in Section 3.2 – Improving Access to Welland Plaza.

Frederick Street

Frederick Street provides a direct link between Grange Road and the Welland Plaza rear car park entry. There are three side road junctions along its length, with the only factor limiting vehicle speed being whether or not there are parked vehicles on both sides of the road, which forces motorists to slow down and weave between them.

Traffic volumes and speeds on Frederick Street are therefore high because of the access options and the long, straight street with no need to stop along its length. This is confirmed through all of the surveys, with typical weekday traffic volumes of up to 2,000 vehicles and 85th percentile sections of up to 53 km/h recorded in the most recent surveys on the northern section of Frederick Street. The traffic volumes were very similar travelling in both directions.

The older surveys from 2007 showed lower volumes at around 1,600 vehicles, but 85th percentile speeds recorded at 58 km/h. Within these older surveys almost half of all vehicles were

recorded travelling at above the posted 50 km/h speed limit. The increase in traffic volumes over the 5 year period from 2007 to 2012 will, at least in part have lead to the reduction in recorded speeds.

The junction between Frederick Street and Brand Avenue is considered somewhat confusing and dangerous, incorporating a dog-leg in Brand Avenue as well as rear access into the Welland Plaza, including proximity to the service vehicle loading bay. It is also a difficult point for pedestrian access, with no pedestrian footpath on Brand Avenue nearest the shopping centre.

Recommendation 7: **Install single lane angled slow points along Frederick Street**

In order to slow traffic down on Frederick Street and also provide a consistent treatment within the local area, a series of angled slow points are proposed along Frederick Street. This can be achieved through installing "slow points" or "driveway links" between the various junctions. Changes to the junctions are not recommended as the side roads all terminate on to Frederick Street. Given that Frederick Street is a "linking" street, traffic volumes may only decrease to a minor extent but traffic speed will decrease significantly.

Examples of slow points are shown in the previous section in relation to Welland Avenue.

"Slow points" should be installed (locations are suggestions only - to be further explored

Recommendation 8: **Improve the delineation of travel lanes and clarify priority of the Brand Avenue/Frederick Street junction**

Traffic volumes along Frederick Street can also be influenced by the format and access available at the junction with Brand Avenue. The primary recommendation is to realign Brand Avenue, with minor amendments to the Frederick Street approaches to improve the clarity of the intersection operation (forming a 'T' Junction).

It is also recommended to change Frederick Street to be left-in and left-out only on to Brand Avenue through the use of a raised central median. This would prevent traffic leaving Welland Plaza from heading southbound on Frederick Street. The raised median would also assist in maintaining low vehicle speeds, but would need to be designed to maintain access for the Coles Supermarket delivery vehicles.

Location of junction which should be changed to reduce through traffic, See Section 3.2 – Improved Access to Welland Plaza for further information

Coombe Road

Some concern has been expressed at traffic volumes and speeds on Coombe Road, as well as the format and operation of the three roundabouts towards the northern end. Coombe Road provides a direct link street between East Avenue in the north and Grange Road in the south, passing by Allenby Gardens Primary School. It is the most attractive street in the study area due to the wide verges either side of the roadway and large street trees, particularly south of Brand Avenue.

Coombe Road is one of the roads that provide access to Allenby Gardens Primary School, which is a large Primary School by metropolitan standards. The recorded traffic data for the sections of Coombe Road north and south of Knight Street confirms the impact of school traffic. The afternoon peak volume on weekdays is recorded between 3.00pm and 4.00pm, coinciding with school finish times. This hour is approximately 30 to 40 vehicles more that the volume recorded in the traditional network peak between 5.00pm and 6.00pm. The morning peak hour (8.00am-9.00am) is however busier than the afternoon, reflecting the school and work travel peaks coinciding.

The section of Coombe Road north of Knight Street is slightly busier with around 1700 vehicles on a typical weekday, with around 1600 south of Knight Street. Between the peak hours, traffic volume reduces to around 100 vehicles, which is considered typical for this type of local street.

Vehicle speeds recorded indicate an 85th percentile speed of 51 km/h north of Knight Street and 50km/h south of Knight Street. This means that around 15% of vehicles are currently exceeding

the speed limit. Whilst this is not untypical for sections of local streets, the presence of the school indicates that reducing the traffic speeds would be beneficial for creating a safer and more pedestrian and cycle friendly environment. The proposed 40 km/h precinct wide speed limit (see section below) will assist in reducing the recorded speeds to some extent, however site specific measures would help to enforce this.

The focus of the recommendations is therefore, on reducing traffic speed, which is likely to discourage some unnecessary through traffic (e.g. traffic using Coombe Road as a shortcut between East Avenue and Grange Road).

Recommendation 9: **Install traffic 'slow point' in Coombe Road between Brand Avenue and Knight Street roundabouts**

The roundabouts along Coombe Road from Brand Avenue through to Price Weir Avenue control speeds in this northern section. However the sections between Brand Avenue and Grange Road, are approximately 300 metres in length and do not have any traffic devices to slow traffic down in these sections.

A 'Slow point' is therefore recommended to be inserted on Coombe Road approximately halfway between Brand Avenue and Knight Street. This slow point could also provide some landscaping to add to the existing attraction of Coombe Road.

Recommendation 10: **Install traffic 'slow point' in Coombe Road between Knight Street roundabout and Grange Road**

A 'Slow point' is therefore recommended to be inserted on Coombe Road approximately halfway between Knight Street and Grange Road. This slow point could also provide some landscaping to add to the existing attraction of Coombe Road.

The figure below shows the approximate locations of the slow points identified in Recommendations 9 and 10.

'Slow points' should be installed to supplement roundabouts (locations are suggestions only - to be further explored

Recommendation 11: **Undertake a review of the Coombe Road roundabout layouts and if necessary reconstruct to meet current Standards**

There is a series of roundabouts along Coombe Road forming intersections with Price Weir Avenue, Leane Avenue, Maclagan Avenue, Brand Avenue and Knight Street. These roundabouts assist in controlling traffic speeds in the section north of Brand Avenue. However the roundabouts were installed a number of years ago and do not necessarily continue to provide the same benefits to the local network or to conform to modern design standards. Whilst the roundabouts do reduce speeds, there is scope to amend them to reduce speeds and improve conditions for pedestrians and cyclists.

It is recommended that a design review of all of the roundabouts is undertaken to create a reduced vehicle path through the roundabouts, encouraging reduced speeds. The use of raised medians on the approaches should also be considered to reduce the actual road space and amend the visual perception of the road space on the approaches to the roundabouts. The raised medians could also be used to assist pedestrians crossing. The current roundabouts provide no landscaping and therefore vehicles can clearly see long sections of road on the opposite side of the roundabout, which can further encourage increases in speed. The introduction of landscaping on the roundabouts could be used to reduce the vehicle sight distances to levels consistent with a lower speed and would also improve the amenity value.

Brand Avenue

Traffic volumes on Brand Avenue are higher because it provides one of the key routes across the study area east to west between East Avenue and Port Road and access to Welland Plaza including service yards. The recent traffic surveys recorded were located between Coombe Road and Way Terrace.

The recent traffic surveys recorded two-way traffic volumes of almost 2,300 vehicles. This is likely to be one of the busiest sections of Brand Avenue as it will include all traffic travelling to and from the west to Welland Plaza and Port Road. This traffic volume is considered high for a local collector road, although the access traffic to Welland Plaza will form a significant part of the traffic.

Whilst Brand Avenue is relatively straight between East Avenue and Way Terrace, the various intersections and presence of parked cars assists in reducing vehicle speeds. 85th percentile traffic speeds on this section were recorded at 46 km/h, indicating a good observance to the posted speed limit.

In combination with the traffic volumes, the alignment of Brand Avenue with the pronounced bend at the Way Terrace intersection and “dog-leg” alignment at the Frederick Street intersection with adjacent 90 degree bends, creates a disrupted and potentially confusing road.

There are three specific locations where alternative solutions along Brand Avenue are recommended. Details of these are provided below

Recommendation 12: **Improve the safety of the Brand Avenue / Lewanick Street intersection – add new stop signs to a central median**

Our observations at the Brand Avenue and Lewanick Street intersection have confirmed the anecdotal comments of a number of vehicles appearing to miss or ignore the existing stops signs on Band Avenue. There is no apparent reason for some drivers failing to obey the stop sign as there is considered to be adequate sight distance to the signs in both directions. This has not resulted in any recent crashes that have been recorded, but is still considered a safety concern.

Whilst other options were considered, the recommended option is to increase the visibility of the existing stop signs by duplicating the stop signs in new medians located in the centre of the road on the approach to the intersection. The medians are recommended to be raised as shown in the image below, however this will need to be considered at the next design stage to accommodate the existing school bus turns.

Source: Google maps

Recommendation 13: **Improve the Brand Avenue / Way Terrace intersection – amend priority, reduce Brand Avenue approach width and improve pedestrian crossing points**

As part of the proposed changes to the access to Welland Plaza, it is proposed to change the priority at the Way Terrace and Brand Avenue intersection and reduce the width of Brand Avenue, particularly to the west of Way Terrace. The concept sketch for the intersection changes are shown in Section 3.2 – Improved Access to Welland Plaza.

The current intersection between Way Terrace and Brand Avenue has a pronounced bend, reducing the sight distance of Brand Avenue traffic, particularly travelling westbound. Brand Avenue also widens significantly on the approach from the west, with drivers unsure of the continuing route to follow through the intersection. This creates uncertainty for vehicles giving way when emerging from Way Terrace. The lack of any road markings or road signs appears to add to the uncertainty.

There is also a low volume access on the south side which has very poor sight distances to the east. Whilst the recommended intersection will provide two give way intersections in close proximity, this is considered a preferable solution as westbound Brand Avenue traffic will be much slower.

Current pedestrian facilities at this intersection are also poor, and the revised intersection layout would enable the footpaths to be provided or widened throughout the intersection and formal kerb ramp crossings to be provided. Central medians could also be provided to assist pedestrians crossing. This is discussed further as Recommendations 47 and 48 in section 3.4 on Walking.

East Avenue to Grange Road Short – Cut

Through traffic currently uses Knight Street / Barham Street and Morrell Street / Foster Street as a shortcut between East Avenue and Grange Road (avoiding the traffic signals at the East Avenue / Grange Road junction). This is particularly, but not exclusively a problem during peak periods when motorists can see a long queue as they approach the intersection along Grange Road or East Avenue and decide to turn off to avoid the congestion.

Traffic data has recorded two way traffic volumes on a typical weekday of around 800 vehicles on Foster Street, 1100 vehicles on Morrell Street and 850 vehicles on Knight Street. The Morrell Street and Knight Street counts were undertaken on the first section of road to the east of East Avenue. These traffic volumes are not considered excessive in comparison to many local streets, particularly given the proximity to the school, but are high in relation to the number of properties located on the streets, indicating that there is a significant volume of through traffic. The surveys also confirm that the right turn from Grange Road is at least as significant as the left turn from East Avenue.

Foster Street and Morrell Street have a very pronounced peak of traffic in the morning peak (8.00am to 9.00am), whilst on Knight Street it is the afternoon peak (3.00pm to 4.00pm) that is the busiest. On all three roads the afternoon peak is recorded during the school pick up time (3.00pm-4.00pm) rather than the typical evening peak hour of 5.00pm to 6.00pm, reflecting the proximity of the school.
Morrell Street and Knight Street also provide a logical access route in to parts of the precinct from various routes to the south, north and west. As a result, they could be expected to carry additional local traffic volumes. Notwithstanding that, there is some evidence of their use as a through route, which the streets would benefit from being reduced.

The vehicle speeds recorded on Foster Street were quite high given the length of the street with 85th percentile speeds of 50 km/h northbound, meaning that 15% of vehicles in this direction are currently exceeding the speed limit. Southbound the 85th percentile speeds were recorded as 47 km/h, indicating less traffic currently exceeding the speed limit.

Vehicle speeds were not recorded as a significant concern on Morrell Street with a very consistent 85th percentile speed of 44 km/h recorded in both directions, reflecting high levels of observance to the current 50 km/h speed limit. Traffic speeds on Knight Street were also not recorded as excessive, with 85th percentile speeds of 47 km/h recorded.

As a result of the recorded data, the initial recommendations are to seek to deter through traffic through the use of signage and monitor the success of this. Should this not achieve the desired reduction in traffic volumes, additional measures may need to be considered. Some measures to control vehicle speeds, particularly on Foster Street are also recommended in addition to the precinct wide 40 kmh zone discussed further below.

Recommendation 14: **Prohibit left turn into Knight Street and Morrell Street from East Avenue in afternoon peak periods**

This recommendation would provide a signed restriction to prevent traffic entering Knight Street and/or Morrell Street from East Avenue, during the afternoon peak period. The time period recommended is 4.00pm to 6.00pm. This would discourage use of the route by short cut traffic seeking to avoid the traffic signals.

This restriction is not recommended during the morning peak period. Whilst there is some likelihood of through traffic, a morning peak period restriction would create access difficulties for large areas of the designated catchment areas that would rely on Morrell Street or Knight Street to access Allenby Gardens Primary School.

Traffic could still enter from East Avenue by turning right and exit on to East Avenue and turn right or left.

Recommendation 15: **Prohibit right turn into Foster Street from Grange Road in peak periods**

This recommendation would prohibit traffic from entering Foster Street from Grange Road during the morning (7.30am to 9.00am) and afternoon (4.00pm to 6.00pm). This restriction would deter some through traffic in the northbound direction.

Recommendation 16: **Introduce 'slow points' at specific locations along Foster Street**

The only street in this part of the precinct that recorded issues with vehicle speeds is Foster Street. Whilst there is some evidence that speeding is associated with peak hour traffic, the removal of some through traffic as a result of the turning restrictions may result in the lower traffic volumes being able to travel faster.

'Slow points' may therefore need to be considered to slow down traffic to make them safer for residents and assist in making the routes less attractive for motorists to use the street as a 'shortcut'. Images of slow points are shown above in relation to Welland Avenue options.

Recommendation 17: **Continue dialogue with Department for Transport for decreasing congestion at the Grange Road /East Avenue intersection**

The design and operation of the existing Grange Road/East Avenue/Holbrooks Road intersection is complicated as a result of the road layout and there are no readily available options that could be implemented to decrease congestion at the intersection. Council should however continue to advocate to DPTI to identify any potential future improvements to the traffic signal operation of the intersection.

Recommendation 18: **Advocate to the Department for Transport to seek funds to implement a larger scale upgrade at the Grange Road /East Avenue intersection**

In addition to monitoring the operations of the traffic signals and seeking to identify minor amendments to the signal operations, Council should advocate to DPTI to seek to secure the necessary funds to provide a large scale upgrade of the intersection to improve the operation of the intersection, reduce congestion and the impact of the intersection on the local road network.

Arlington Terrace

Arlington Terrace runs parallel to Welland Avenue to the east. It is also a long straight road with no traffic controls from south of Ponsonby Street. A driveway link is provided at the Ponsonby Street intersection which reduces vehicle speeds on the northern section of Arlington Terrace.

No significant issues were initially raised with regards to Arlington Street as it is not currently an attractive through route. In response to the community consultation on the Discussion Paper, one respondent identified the speed of vehicles as a concern.

If the recommended traffic control measures are implemented on Frederick Street and Welland Avenue, it is considered that there is a slight risk of some vehicles transferring to Arlington Terrace, particularly from south of Fischer Street. Traffic speeds would be expected to reduce slightly if the recommended 40 km/h precinct wide speed limit is introduced. Future traffic volumes and speeds should therefore be monitored on Arlington Terrace.

Recommendation 19: **Monitor traffic volumes and speeds on Arlington Terrace and install traffic control devices if conditions change**

In order to ensure that there are no additional impacts on Arlington Terrace and that traffic volumes and speeds do not increase, Council should ensure that future traffic volumes and speeds are monitored on Arlington Terrace.

Maclagan Avenue

Some concerns on traffic volumes and speed on Maclagan Avenue have been made through the community consultation. Previous data obtained from Council has indicated a daily traffic volume of around 800 vehicles and 85th percentile speeds on 42 km/h. As Maclagan Street is only around 200 metres in length, vehicle speeds would not be expected to be high and this 85th percentile speed is considered reasonable. Only just over 1% of vehicles exceeded the 50 km/h speed limit. Similarly the daily traffic volumes are considered reasonable for a local street.

Some parking was observed at the Port Road end of the street, primarily anticipated to relate to the commercial properties adjoining Port Road. The parking was largely observed to be confined to the commercial frontages with only limited encroachment in front of residential properties. Whilst parking on both sides of the street will restrict traffic flow, it will also assist in managing traffic speeds. Whilst parking controls could be considered, these would be likely to result in spreading the parking over a wider area. Restricting parking to one side only could also result in higher traffic speeds.

Recommendation 20: **Monitor traffic volumes and speeds and parking on Maclagan Avenue and install traffic control devices or parking restrictions if conditions change**

As a result of the recorded traffic volumes and speeds, there are no immediate recommendations for any treatments to be implemented on Maclagan Avenue. However, in order to ensure that there are no additional impacts on Maclagan Avenue and that traffic volumes, speeds and parking levels do not increase, Council should ensure that future traffic volumes and speeds and the levels of parking should be monitored at least annually on Maclagan Avenue.

Bertie Street

The community consultation responses generated one response regarding frequency of trucks using Bertie Street. Other than localised parking concerns around St Joseph's School, no other issues have been raised or observed with regards to traffic volume, traffic speeds or vehicle types on Bertie Street.

The use of Bertie Street as a through route by trucks would not be expected and is not considered appropriate. There may be some use by trucks from the car dealerships that front Port Road adjacent to the Bertie Street junction.

Recommendation 21: **Monitor traffic volumes and the use of trucks on Bertie Street and install traffic control devices if conditions change**

It is recommended that the use of Bertie Street by trucks is monitored to confirm whether regular use occurs, and if so the nature and time of the trucks. Should regular use by trucks occur, Council should seek to install appropriate traffic control devices to limit the opportunities for trucks to be able to travel along Bertie Street.

40 Km/h Speed Limit

Volumes and speeds within the Welland precinct are generally what would be expected for local streets, with only a few localised exceptions. Frederick Street and Welland Plaza have recorded noticeably higher than normal speeds and the posted speed limit. Other routes exhibit some localised or short term speed issues.

However, local streets should not necessarily be considered only as routes for traffic and therefore general reductions in vehicle speeds can facilitate an improved amenity for local streets, discouraging through traffic.

Recommendation 22: **Implement a 40 km/h precinct speed limit**

It is recommended that a 40km/h speed limit is implemented on all roads within the study area. 40km/h area wide speed limits are in force in a number of precincts within the Greater Adelaide metropolitan area.

The principle of a 40 kmh zone is that the majority of roads should achieve this speed without the need for enforcement of the speed limit. The requirements are set out in a State Government document which identifies that:

"The lower limit of 40 km/h is appropriate in those precincts where existing speeds are not too high. These may be areas where higher speed streets have been treated with physical speed restraints, or where speeds are naturally lower because of existing road and traffic characteristics."

"A 40 km/h speed limit may be applied within a built-up precinct if the arithmetic average of current mean speeds on all relevant streets is not more than 50 km/h. Relevant streets are any streets longer than 200 metres.

GTA has investigated the operation of the precinct speeds in terms of meeting the State Government requirements. The overall precinct traffic speeds recorded meet the requirements and therefore the precinct wide 40 km/h could be submitted for approval without any additional traffic control measures being implemented. We have prepared a draft submission document for Council to review and consider for submission.

Example of a 40km/h Speed Limit Change

3.2 Improving Access to Welland Plaza

3.2.1 General Discussion

Welland Plaza Shopping Centre has a wide variety of retail and dining tenancies and attracts many people to shop, eat and meet. This location therefore could be considered the "community heart" or "village centre" of the Welland area.

Site Plan of Welland Plaza

The Shopping Centre is oriented to face towards the Port Road car park area and the Port Road frontage. As a result the local streets surrounding Welland Plaza, namely Way Terrance and Brand Avenue, face the rear of the Plaza, which are primarily blank walls and service yard accesses. These rear areas of Welland Plaza therefore provide limited pedestrian footpaths and crossing opportunities and link poorly both to the Plaza and the adjoining neighbourhood. See figure left for site plan of Welland Plaza.

Site Access

The site provides access opportunities from all of the adjoining roads and all are observed to be well used. The level of use of each access is broadly related to the status of the adjacent road, although no specific traffic counts have been undertaken. Exit on to Way Terrace to subsequently access Port Road to the north was observed to occur, particularly for vehicles exiting via the access in front of Dan Murphy's.

All of the site accesses appear to provide an appropriate standard of design relative to the status of the road. The accesses from Port Road are both approximately 7 metres wide which meets current design standards. The accesses from Brand Avenue are wider at up to 10 metres, reflecting likely use for service vehicles. The Way Terrace accesses are between 6 and 7 metres wide. The prevailing speed of vehicles entering the site from Port Road is considered to contribute to some of the circulation and conflict issues set out in the vehicle circulation section below. Furthermore, the access points to the shopping centre from Port Road are not particularly visible and the proximity of the petrol station exit and northern Welland Plaza access and exit is poor design practice and creates the potential for conflicting movements. However recent crash data

does not appear to indicate that this design has resulted in a poor crash record at this location.

As previously discussed, there are two site access points to the Brand Avenue parking area, opposite Frederick Street and close to the Way Terrace junction. Neither access junction would meet current design standards for layout and sight distances.

Vehicular Circulation

The current site layout permits vehicles to circulate in both directions along all of the aisles. This is a standard design practice and does not normally cause undue conflicts.

However because of the layout of the car park as determined by the shape of the site and the location of the petrol station, KFC and adjoining buildings to the south, there are a number of locations where the two way circulation leads to conflicts.

Aside from the petrol station exit noted above, the main vehicle to vehicle conflict location occurs at the southern access from Port Road. Vehicles entering the site from Port Road have limited sight distance to traffic emerging from the KFC drive through entrance area and turning right to exit the site. The prevailing traffic speeds means that vehicles could be entering the site at a potentially inappropriate speed. The removal of the ability of vehicles to exit and turn right from the KFC drive through access would improve the potential safety of this location. The potential for vehicles to turn right into the parking zone towards the petrol station at this location adds to the complexity of movements and potential conflict. At a main site entrance, a 4-way intersection immediately after entering the car park is not desirable due to the inherent potential for vehicle conflicts.

The other location of potential conflict relating only to vehicles is adjacent the north west corner of the petrol station. Vehicles emerging from the car park area to the rear of the petrol station have limited sight distance to vehicles entering the site alongside the fence. It appears that previous modifications to the car park may have sought to reduce this. Whilst there may be little more that could be done at this location for vehicles, other than speed reduction devices, this location does also potentially conflict with some pedestrian movements from the north east section of the car park towards the shopping centre.

There are also locations where a number of vehicle aisles converge (with some aisles at an oblique angle) on locations with significant pedestrian movements. Many of these locations result from the shape of the car park. The primary locations are adjacent to the south east corner of Dan Murphy's, at the end of the pedestrian walkway opposite the petrol station access, adjacent to the northern taxi park and part time Coles exit and at the corner of the shopping centre adjacent the Sushi Train shop. In these locations there are between three and five converging vehicle movements, creating a large expanse of open tarmac. Two of the locations are also key locations for pedestrian access into the centre. The location adjacent to the north east corner of Coles would also conflict with pedestrians if the southern car park area was more heavily used, particularly as there is no footpath provided adjacent to the eastern side of Coles.

Pedestrian Routes

A number of issues have been observed in relation to the pedestrian routes into the site and across the car park. The car park is generally a low speed environment and there will be an expectation of vehicle and pedestrian movements occurring. Potential conflicts can therefore usually be managed although clearly marked pedestrian routes will assist the car park operations.

The main pedestrian access into the centre is between Bakers Delight and the Cheesecake Shop. This area has been designed to provide a pedestrian focal point with the only vehicle access required being Australia Post. A full specification wombat crossing is provided across the adjacent vehicle aisle, with a formal pedestrian route through the subsequent parking. There is no crossing provided over the next aisle and then a lower specification, but appropriate route through the next parking area. However after this, there is no further pedestrian provision. At this point pedestrians in the parking area are opposite the petrol station access.

There has been a painted Zebra crossing provided adjacent to the part time exit location from Coles. However this zebra only provided a route across the immediately adjacent road aisle, leaving pedestrians in a location where three vehicle aisles converge with no further pedestrian facilities. The crossing has since been removed as per previous recommendations from the centre's traffic consultants (GTA). However, the kerb ramp and the remaining markings are still observed as a pedestrian route (refer to the below image).

Removed Pedestrian Crossing at Welland Plaza

There are no pedestrian facilities provided at the corner of the shopping centre by Sushi Train to assist with pedestrians accessing this section of the car park. There is a narrow footpath along the southern side of Dan Murphy's. However, as vehicle wheelstops are not provided at this location, the footpath is observed to be completely blocked by overhanging vehicles in a number of locations, resulting in pedestrians having to walk in the car park area.

Pedestrian routes from the Port Road and Brand Avenue frontages similarly lack continuity and result in pedestrians in the middle of car park areas or circulation aisles. There is a signalised pedestrian crossing on Port Road, located immediately to the south of the petrol station entrance. This coincides with a pedestrian crossover into the site and a zebra crossing marked area across the first row of parking spaces. Pedestrians are then opposite a mixture of parking spaces and vehicle circulating carriageway that appears to have replaced previous parking spaces. There is a demarcated pedestrian route across a

subsequent row of car parks further in to the site, but this does not link directly to any other pedestrian routes.

The short marked zebra crossing from Brand Avenue through the parking spaces is located opposite the circulation aisle with no obvious continuation route for pedestrians.

Whilst the pedestrian accesses from Port Road link to wide and well surfaced footpaths and are also close to a controlled pedestrian crossing, the pedestrian access from Brand Avenue has only a narrow footpath to the east (Port Road) direction. There is no pedestrian footpath on the north side of Brand Avenue between this eastern site entrance and Way Terrace. There is also a pedestrian entrance into the centre from Way Terrace. Whilst not well signed, this entrance does appear to be well used, primarily by vehicles parking on street rather than local walk - in access. The footpath in this location is quite narrow and there are no crossing facilities on Way Terrace. There is also a pedestrian entrance into the centre from Way Terrace. Whilst not well signed, this entrance does appear to be well used, primarily by vehicles parking on street rather than local walk - in access. The footpath in this location is quite narrow and there are no crossing facilities on Way Terrace.

Frederick Street/Brand Avenue Junction

The Frederick Street/Brand Avenue junction, which also incorporates an access in to the Welland Plaza shopping centre provides a non-typical junction layout. Traffic on Frederick Street is required to give way even though traffic turning left would normally have priority. As a result, the priority status would be unclear to traffic exiting Welland Plaza. There is also no pedestrian footpath on the north side of Brand Avenue, closest to the shopping centre. Further details have been discussed in Section 3.4 – Walking.

Frederick Street / Brand Avenue Junction, Source: Google Images

Way Terrace

Some localised congestion has been observed on Way Terrace around the Welland Plaza accesses. Much of this relates to overspill parking from the shopping centre and access for service vehicles.

3.2.2 Recommendations for Improvement

Welland Plaza Shopping Centre

As Welland Plaza forms a key focal point for the local precinct, it is considered essential that it provides an appropriate level of design interaction with the local streets. Many comments in the consultation responses have identified the poor relationship between Welland Plaza and the surrounding streets, Brand Avenue and Way Terrace in particular. The internal operation and layout of the site was also noted by a number of respondents.

Recommendation 23: **Develop a working partnership with Welland Plaza owners to discuss the role and impacts of the centre and advocate for improved pedestrian, cyclist and vehicle access and circulation**

In order to secure the recommended improvements to the local streets around Welland Plaza and the access in to the centre, it is important for Council to develop a strong working partnership with the Shopping Centre owners to seek to improve the relationship of the centre with the local area and the operation of the car park and centre access points to create a more vibrant and attractive local centre.

Brand Avenue

Recommendation 24: **Realign Brand Avenue and provide minor alterations to the Welland Plaza and Frederick Street alignments.**

It is recommended to significantly transform the design of Way Terrace, Brand Avenue and the junctions of Brand Avenue / Frederick Street and Brand Avenue / Welland Avenue to:

- Reduce traffic speed and unnecessary through traffic
- Improve safety for pedestrians and vehicles
- Provide improved pedestrian crossing points from surrounding suburbs into the centre
- Improve the amenity of the streetscape, including new footpaths

The figure and description on the following pages illustrate the principles of the proposed changes.

Indicative Concept Plan
Subject to Detailed Design and Consultation
1 : 1500 at A4

Recommendations for Improved Access to Welland Plaza

Recommendation 25: **Remove western Brand Avenue access to Welland Plaza**

The western access to Welland Plaza from Brand Avenue is located very close to Way Terrace with resulting confusion and uncertainty over turning movements. Sight distances are also limited. It is therefore recommended that Council seeks to work with the owners of Welland Plaza to seek to close this access to the car park area and retain it only as access to the service and refuse area in this location. The volume of traffic associated with the service and refuse functions will be very low and reduce the risks associated with the close proximity of the accesses.

As well as removing the majority of vehicle conflicts, closing this access will assist in developing pedestrian footpaths on the north side of Brand Avenue.

Agreement on the recommendation will be required from the owners of Welland Plaza. If it is implemented, it would allow the car park layout and operation to be reviewed to ensure a safe and efficient operation for vehicles and assist in providing an improved pedestrian route in to the Plaza.

Way Terrace/Brand Avenue Intersection

Recommendation 26: **Change the priority at the Way Terrace and Brand Avenue intersection**

As set out in Section 3.1.2 above, it is recommended to change the priority at the Way Terrace and Brand Avenue intersection and reduce the width of Brand Avenue, particularly to the west of Way Terrace. The concept sketch for the intersection changes are shown in the above figure.

The recommended change will assist in reducing vehicle speeds along Brand Avenue, particularly eastbound and provide a clearer intersection in terms of defining priority. The revised intersection layout would also enable the footpaths to be widened throughout the intersection and formal kerb ramp crossings to be provided. Central medians could also be provided to assist pedestrians crossing.

Way Terrace

Recommendation 27: **Modify the Way Terrace and Birdwood Avenue intersection**

The current intersection between Way Terrace and Birdwood Avenue is at an oblique angle, resulting in a large junction bell-mouth and poor sight lines to northbound traffic for vehicles emerging from Birdwood Avenue. The recommendation is to build out the Birdwood Avenue intersection and reduce the width of Way Terrace at this location. This will improve vehicle sight lines, assist in reducing vehicle speeds on Way Terrace and improve the provision for pedestrians wishing to cross Way Terrace or Birdwood Avenue at this location. A distinctive pavement treatment through the intersection may also assist in encouraging reduced vehicle speeds.

Recommendation 28: **Improve pedestrian facilities for crossing Way Terrace**

It is recommended that a designated crossing point, including some form of build out or protuberance is provided across Way Terrace opposite the existing pedestrian entrance to Welland Plaza from Way Terrace. It is also recommended that kerb ramps are provided to enable pedestrians to cross in the vicinity of Birdwood Avenue, as part of the recommended changes to that intersection set out above.

Existing (low amenity and inactive) pedestrian conditions along western side of Welland Plaza (Way Terrace)

Vehicle and Pedestrian Access and Circulation

Recommendation 29: **Advocate for Welland Plaza car park amendments**

As identified, the shape and layout of the existing Welland Plaza car park is not ideal, resulting in large underused areas of the car park in some locations and overspill parking on the street in other locations.

Through the partnership development identified as Recommendation 23, one of the early considerations should be to advocate for gradual improvements to the internal layout and operation of the car park and pedestrian routes to achieve a more balanced car park utilisation, activation of blank facades, improvements to pedestrian routes in to and within the site and clearer vehicle circulation.

In addition, should the opportunity arise, it is recommended that consideration is given to seeking to rationalise and/or relocate the Port Road accesses to improve vehicle and pedestrian access from Port Road and remove or reduce the conflict points.

3.3 Parking

3.3.1 General Discussion

Sikh Temple

The Sikh Temple and community facility on Barham Street in the former church building is understood to be used as a multi-purpose community facility for the Sikh community for a wide catchment of the Adelaide Metropolitan area. The facility is reported to operate from early in the morning (around 6am) through to late evening (11pm).

Residents reported significant travel demand to the centre, with regular on street car parking demand. Furthermore, the site is poorly located in relation to bus and rail services which are confined to Port Road and Grange Road, being at least 600 metres from the nearest bus stop and significantly further from the train.

Feedback from surrounding residents indicates that there are a range of amenity issues associated with the on-street parking that takes place on several occasions during the week. These include:

- the centre is being used late at night on several evenings
- some users of the centre are parking close to or across residents driveways, making it difficult or impossible to access their properties,
- the large amount of on-street parking makes it difficult / impossible for visitors to surrounding residents to park in the street
- Some users of the centre create noise late at night as they leave the centre, both at the centre and as they approach their vehicles
- The large amount of on-street parking on both sides of the street makes it difficult to navigate the street due to the narrow roadway.

From the various consultation exercises undertaken it has been noted that parking problems exist and are of concern to residents and a strategy for dealing with them has to be investigated.

Allenby Gardens Primary School

Observations were made to investigate the traffic and parking impact during the school drop off period of 8.30am-9.00am and pick up period of 3:00pm-3:30pm. The extent of the traffic and parking impacts are shown in the image below. The pick up and drop off zones are signed as two minute maximum wait.

Extent of school traffic and parking impact

The primary affected roads included Bridges Street, Coombe Road (south of Knight Street) and Knight Street (between Barham Street and Coombe Road) for both the AM drop off and PM pick up periods. The PM pick up was noticeably worse than the AM drop off due to the increased time that parents park waiting to pick up their children.

During the AM, whilst all roads were busy, there was little vehicle conflict and parking spaces turned over quickly. During the PM pick up period, the extent of parking along those roads was generally observed to be at capacity. As with any short term on-street parking demand associated with uses such as schools, vehicles manoeuvring in and out of the parking spaces created temporary obstructions and conflict points, both for other vehicles and pedestrians.

A number of motorists were observed to park illegally over solid yellow line markings or inappropriately in relation to the traffic demands, due to the difficulty of finding a parking space within the adjacent roads of the school. Knight Street was observed to be the most congested section with parents seeking to wait or park as close to the Knight Street entrance as possible.

The above traffic conditions did not continue over an extensive period of time, and traffic had dissipated within 20 to 30 minutes after school dismissal.

25kmh School Zones are currently provided on Coombe Road (Bridge Street – Knight Street), Knight Street (30 metres west of Coombe Road – Barham Street) and Barham Street (Knight Street – Morell Street).

It was observed that there is kerb side parking available to the north and east of the Knight Street and Coombe Road intersection, which is within a reasonable walking distance of the school. Further encouragement to promote the utilisation of those parking spaces and active transport options would reduce the intensity of parking along the roads adjacent to the school.

Way Terrace

Observation suggested that Way Terrace is experiencing an undesirable amount of on-street parking activity which has intensified the traffic conditions. It is anticipated that this on street parking arises because of the popularity of the northern side of the car park compared to the overall use of the car park. The car park areas located at the south-eastern corner are currently heavily underutilised. This is a direct result of poor access arrangements both into the car park and from the car park into the shopping centre. This has led to customers parking along Way Terrace when the immediately adjacent car park sections are fully occupied.

Welland Plaza

Observations on the car park utilisation broadly split the car park in to three distinct sections. The main section of car park covers the area between the KFC at the southern end of the site, around the petrol station and in front of the main shopping centre up to and around the Dan Murphy's store. These car parks were generally observed to be well used. The car park where the utilisation was lower was the area adjacent to the petrol station to the south. This is considered to be primarily related to the distance from the centre entrance when demand

is at a lower level, although the pedestrian routes from this area are not clear.

The second section is the area of car park located between the KFC, the eastern side of the Coles supermarket and the western side of the adjoining buildings to the south of Welland Plaza. This car park was observed to be very poorly utilised with very few cars parked, yet comprises approximately 160 spaces, or almost a third of the total provision. This section of car park does not have a direct access from the adjacent road or a direct access in to the shopping centre. It is therefore not a convenient location from the perspective of a driver entering the site or as a pedestrian walking from their car to the centre. This lack of convenience to the road and the centre therefore gives this section of car park a feeling of remoteness, which in turn may leave customers with a potential security concern given that the car park has no active frontages to provide natural surveillance.

The final section of car park is the small area located towards the south west corner of the site. This car park has two direct access points from Brand Avenue and also a direct pedestrian access in to the shopping centre. This zone is convenient for vehicular access from local residential areas to the south and convenient to access the shopping centre once parked. There are approximately 60 spaces in this zone and there was a high level of car traffic circulating within this area, with a good proportion of the spaces occupied.

St Joseph's School

St Joseph's School is located on Grange Road between Albermarle Street and Bertie Street. The school has a maximum of 300 pupils and a mixed catchment area, with a number from local suburbs extending out to Croydon and Flinders Park and others from further afield. The school does not provide any school buses. Although there is a local catchment, there is very little walk in with around 99 percent car based travel generating a high demand of parent pick up and drop off.

Parking associated with the school largely takes place on Albermarle Street and Bertie Street. A formal, indented drop off zone is provided on Albermarle Street, a short distance north of the Grange Road junction, whilst short term parking is also signed on Bertie Street. The formal drop off zone has reportedly improved the parking arrangements, although use for parking rather than pick up only reportedly creates many of the ongoing issues.

The school parking creates high levels of short term congestion and travel issues on the two immediately adjacent roads. Traffic waiting to access the indented drop off zone created some short term blockages of Albermarle Street. Poor practice pick-ups were also observed taking place in the intersection of Albermarle Street and Grange Road, which appears to create much of the congestion. Traffic speed, of both school and through traffic is reported as a concern on Albermarle Street, and it is noted that this road has priority at the Bond Street intersection, where there is a small cluster of crashes recorded.

The provision of a controlled pedestrian crossing on Grange Road immediately in front of the school may encourage some parent parking to take place on the south side of Grange Road, although the pedestrian crossing was not observed to be extensively used.

Overall, there were not any significant, site specific parking issues identified around the school, with the issues observed related to poor, inconsiderate or illegal parking such as parking across driveways, within the drop off zone or within intersections.

St Michael's College

St Michael's College is located on the west side of East Avenue immediately south of Hubbard Street. It provides the Primary (Years R to 7) campus for the College (the secondary campus is located at Henley Beach) and as with St Joseph's has a wide catchment area.

The school is served by two dedicated school bus services, routing to West Beach and Port Road depot. These services are advertised on the DPTI website to route via Brand Avenue, Lewanick Street and Knight Street. Service M typically carries around 25 pupils, whilst Service W typically carries only around 6 pupils.

Following the introduction of bike lanes to East Avenue implemented by DPTI in 2010, the school drop off area is now located in Hubbard Street and the bus zone is located on East Avenue. A controlled pedestrian crossing was installed at the time of the DPTI changes No other stopping or parking is now permitted on East Avenue, effectively making the bike lanes permanent.

As Hubbard Street is one way, some parents are now choosing to drop off or park on the east side of East Avenue, primarily in Brand Avenue, Knight Street and Lewanick Street. Parking in Knight Street in particular conflicts with the parking demands for Allenby Gardens Primary School. However, Hubbard Street remains very popular for pick up during the afternoon and parents waiting to pick up queued back on to East Avenue, with up to approximately 8 cars observed queuing in to East Avenue. The queues extended beyond the start of the bus zone, reducing the ability for northbound through traffic to pass on East Avenue.

3.3.2 Recommendations for Improvement

Sikh Temple

Recommendation 30: **Establish a working relationship with the Sikh Community Centre management to improve local amenity**

Consultation with the Sikh community responsible for the operation and management of the Sikh temple is required, and should be initiated and maintained on a regular basis with the view to make improvements to the functioning of Barham Street in particular during Temple activities, and through better management improve amenity for residents. It is clear that there is a large amount of parking in the street due to the fact that there is very limited on-site parking, as well as the fact that the temple serves a wide catchment, with nearly all users of the centre coming by car.

Amenity issues associated with noise late at night will need to be dealt with by the managers of the centre, and a protocol for parking in the street could be developed and enforced to avoid impacts on driveway access for residents.

Recommendation 31: **Monitor the parking and traffic access associated with the Sikh Temple at regular intervals**

It is hoped that through the consultation an operational and parking strategy can be devised and agreed that will support the activities of the centre and reduce the impacts on the adjacent community. However, during the initial period of this consultation, it is recommended that monitoring of the level of traffic and parking activity is undertaken at regular intervals, and reflecting the varying levels of activity that occur on a regular basis. This will assist in informing on the key issues and locations that would need to be addressed by management or traffic control measures.

Options for traffic control measures could include:

- On site parking layout and management
- Implement or increase the visibility of existing line marking to prevent/discourage inconsiderate parking (e.g. blocking driveway crossovers)
- Time based parking management
- Location based parking management

Options to improve the function of the street for motorists during temple activities could include limiting parking to only one side of Barham Street, but this would result in spreading the impact of on-street parking further afield, therefore affecting more residents.

A religious / community facility servicing a wide catchment area needs off-street car parking sufficient for the needs of the centre, while acknowledging that all such facilities occasionally do have overspill during special, larger events. Therefore relocating the facility to a site that incorporates off-street parking would be desirable, but is beyond the scope of this study.

Allenby Gardens Primary School

Recommendation 32: **Continue to support Allenby Gardens Primary School to develop active travel initiatives**

The school has operated occasional walk to school and park and stride initiatives to encourage increased walking to school generally or parking slightly further away from school to encourage some walking and reduce the level of congestion immediately around the school.

It is understood that the school is now actively participating in the State Government Way2Go programme and the OPAL programme. The development of these initiatives in to permanent arrangements is likely to reduce the parking demand and congestion in the immediate vicinity of the school.

The walking (and cycling to school) initiatives will need to be supported by improvements in local pedestrian and cycle networks to ensure that the routes are of appropriate standard and width and provide safe crossing points where necessary. These are considered further in the walking section below. Specific recommendations in relation to parking around Allenby Gardens Primary School are noted below.

Recommendation 33: **Implement localised parking restrictions at school times in the vicinity of the existing Emu crossing on Barham Street**

Observations around the school noted the presence of parked cars on the west (non-school) side of Barham Street between the Emu crossing and Knight Street intersection. These cars were observed to create delays and difficult manoeuvres for vehicles seeking to pass them and turn in and out of Knight Street and could also restrict sight distances to the Emu crossing.

Stopping or parking is therefore recommended to be restricted on this/these sections during the school pick up and drop off times. This would be consistent with the restrictions on the west side of Barham Street between the Emu crossing and Morrell Street.

Recommendation 34: **Implement localised parking restrictions at school times in the vicinity of the proposed Emu crossing on Knight Street**

As set out in the walking recommendations in the next section, it is recommended for Council to consider the warrant for the installation of an Emu crossing towards the western end of Knight Street, in the vicinity of the footpath along the eastern side of Barham Street. Significant levels of crossing activity take place in this location.

In addition to this recommendation, it is recommended that the section of Knight Street that falls within the school zone is made No Stopping instead of No Parking during school pick up and drop off times. This would assist in reducing the congestion in this location and disperse some of the longer term parking to other streets where there is available on street parking only a short walk from the school. The upgrades to local footpaths and crossing points would assist with encouraging the dispersed parking.

Recommendation 35: **Encourage 'park and stride' from Welland Plaza car park with appropriate pedestrian upgrades on the route**

It is understood that the school has previously used the Welland Plaza car park as a location from which to encourage 'park and stride' and walk to school initiatives. The south east section of the Welland Plaza car park is currently poorly utilised and therefore use of this car park area for the school would be unlikely to impact on the operation of the Shopping Centre.

It is recommended that the school and Council seek to agree a formal arrangement with the owners of Welland Plaza to further encourage this practice. Improvements to the most direct pedestrian route between Welland Plaza and the school have been identified as part of the walking recommendations below.

The use of Way Terrace for shopper car parking is addressed in Section 3.3 of this Paper, as suggestions for improvement also relate to improving pedestrian access to Welland Plaza from the surrounding street network and making the street far more attractive given the long blank walls of the shopping centre on the eastern side and the general lack street tree planting.

Recommendations that would address the parking issues along Way Terrace are incorporated in Recommendations 26 to 28 above.

Welland Plaza

Recommendation 36: **Advocate for improved car park layout and use within Welland Plaza**

As identified in Section 3.2 above, the shape and layout of the existing Welland Plaza car park is not ideal, resulting in large underused areas of the car park in some locations and overspill parking on to Way Terrace and other local streets.

Recommendation 23 identifies that Council seeks to engage at least annually with the owners and managers of the Welland Plaza shopping centre. This would explore options that could be implemented by the centre and/or Council around the centre that would improve the parking operation and management with the centre. Specific options for improvement could include:

- Improved pedestrian access from and across the car park areas
- Activation/access options for the centre and/or the street frontages, particularly for the Way Terrace and eastern internal frontages
- Traffic access options to the car parks, particularly from Brand Avenue and Way Terrace
- On site parking management to increase the use of the current under used areas of car park.

Recommendation 37: **Establish Council / Welland Plaza working group**

As identified above under Recommendation 23, it is recommended that Council seeks to engage with the owners of the Shopping Centre to develop a formal partnering arrangement for the future improvement of the centre. In additional at an operational level, it is recommended that a working group is established with the owners of the Welland Plaza that meets at least annually that reviews general operational issues and advocates for the gradual improvements to the internal layout and operation of the car park and pedestrian routes to achieve a more balanced car park utilisation, and reduce the incidence of overspill parking.

St Joseph's School

Recommendation 38: **Encourage St Joseph's School to implement active travel initiatives**

As a reasonable proportion of pupils are reportedly relatively local, it is recommended that Council seeks to engage with the School to assist in encouraging some increase in walking activity. Some pedestrian infrastructure provision may be required to support this. This school is reportedly in the process of engaging with the Way2Go and OPAL programmes and therefore this engagement may be achieved through these programmes.

Recommendation 39: **Enforce and educate parents on poor and illegal parking around schools**

As noted in the discussion on parking above, many of the parking issues observed are common to many short term, high demand locations with poor and illegal parking practices causing most of the congestion and concerns. It is recommended that Council works with the School and SAPOL to initiative suitable education and enforcement strategies to seek to discourage the poor and illegal parking. This should be delivered in conjunction with the Way2Go and OPAL programmes to provide the encouragement to walk or cycle to school or to park slightly further away from the school and walk a short distance to the school to disperse the localised congestion.

St Michael's College

Since the commencement of this study, site specific discussions have taken place between the College, DPTI and Council regarding the current parking availability around the school. The discussion has focused on the removal of all parking from East Avenue and the operation of the pick-up and drop off in Hubbard Street, which causes significant queues back on to East Avenue.

It is understood that DPTI has agreed to narrow the painted median on East Avenue in the vicinity of the College and allow parking outside of the bike lane operating times on both sides of East Avenue adjacent to the school. The final timing of the line marking and sign changes is still to be confirmed with the School to advise on any localised parking requirements.

The proposal also includes extending the bike lane operation in the afternoon from 4.00pm-6.00pm to 3.00pm-6.00pm so that the existing congestion on East Avenue is not made any worse.

Potential concerns that have been identified and will need to be monitored are:

- Cars continuing to line up to access Hubbard Street along the kerb that would line up alongside legitimately parked cars, further blocking East Avenue through traffic.
- The lack of road space for parking / non parking manoeuvres, i.e. reverse parking
- Avoiding parking and associated visibility issues around the pedestrian crossing before and after school

The operation of the pick-up / drop off and congestion on Hubbard Street around the school was also discussed.

It is understood that Charles Sturt Council does police the location on a regular basis and the School also sends out reminders almost every term reminding parents on the operation of the pick-up and drop off zone that both parties are frustrated with the behaviour of the parents. Whilst good practice is generally observed inspectors are present, the previous poor behaviour is observed the next day.

It is understood that all parties have agreed to trial closing gate 5 and using gate 6 only further down Hubbard Street to promote more efficient use of the pick-up /drop off and reduce the Extent of queues along Hubbard Street. The School has also

agreed to send out further reminders and advise of the change, with Council undertaking a concurrent enforcement programme.

Recommendation 40: **Continue to engage with St Michael's College and DPTI and monitor the initiatives that are implemented**

The success of the various initiatives should be monitored with the all party dialogue continuing to seek to improve the parking and traffic concerns. Recommendations regarding the operation of the school buses are considered further in the public transport section below.

3.4 Walking

3.4.1 General Discussion

Local Streets (General)

Observation of the Welland study area has identified that footpaths are generally available and in most cases are of adequate to good quality and condition. Within the wider area, the footpaths were a variety of surfaces, including concrete, bitumen and block paving. Kerb 'pram' ramps varied from a few locations where they were missing through to recently installed, high quality ramps with improved alignments and tactile paving and widths to current design standards.

There are two key sections of the local road network that currently have no footpath provision:

- Lewanick Street east side, between Maclagan Avenue and the pedestrian entrance in the south west corner of Allenby Gardens Reserve; and
- Brand Avenue north side, between Way Terrace and the informal pedestrian access to Welland Plaza car park midway between Frederick Street and Welland Avenue.

Both of these locations are adjacent to major local attractors and would be expected to attract pedestrian use.

Schools

A number of locations were observed with footpaths in poor surface condition and verges poorly maintained, including areas around Allenby Gardens Primary School, particularly on Coombe Road. As well as footpath surfaces, a number of broken or damaged utility pit lids were observed. There are also locations around the school where footpaths are of minimum width and could be widened to better accommodate the school pedestrian demand. The immediate area around the school also has a number of locations where parent and child crossing occurred with no footpath or kerb ramp provision, resulting in unexpected conflict with vehicles. This was particularly evident crossing Knight Street approaching from the north. Access from the west is supported by an Emu Crossing located on Barham Street, which is the only formal crossing provision within the local road network.

Welland Plaza

Over spill parking from Welland Plaza into Way Terrace has resulted in shopping trolleys being abandoned on the already narrow footpath along Way Terrace (this is shown in the image on the following page). The shopping trolleys left on the street would be hazardous to all type of road users and result in a rather poor street environment which would likely act as a deterrent to encourage any pedestrian activity.

An example of footpath obstructions on Way Terrace

Arterial Roads and Links to Surrounding Areas

All of the arterial roads around the study area have full footpath provision. However, as with the local street network the quality of the provision varies in terms of width, surface and kerb ramp provision. In some locations, the alignment of the footpath is poor due to the presence of street furniture. Generally around the higher volume activity locations such as Port Road adjacent to Welland Plaza, the footpath is wide and has a good quality surface. However other areas, particularly the Port Road footpath adjacent the southbound road carriageway has a minimum width and varying quality, and has a primarily concrete surface.

The majority of minor road intersection crossings along the arterial roads are provided with kerb ramps, again ranging from narrow and poorly aligned kerb ramps, to recently installed, high quality ramps providing direct alignments and tactile paving and widths to current design standards.

However, there are very limited opportunities for crossing the arterial roads to access destinations outside the study area, as noted below and shown in the image opposite.

- Port Road: South Road intersection, Welland Plaza, Rosetta Street, East Avenue intersection (north side);
- South Road: Port Road and Grange Road intersections;
- Grange Road: South Road and East Avenue intersections, adjacent St Joseph's School;
- East Avenue: Grange Road and Port Road intersections, adjacent St Michael's College.

Signalised Pedestrian Crossings

There are no further formal crossing opportunities along any of the arterial roads between the above crossing locations, such as median refuges or gaps. There are some informal footpaths located within the median of Port Road between South Road and Welland Plaza, although the majority of these do not have any kerb ramps or visual aids to traffic to facilitate safe crossing. As a result of this limited provision, there are large gaps in the safe, formal crossing provision of the arterial road network.

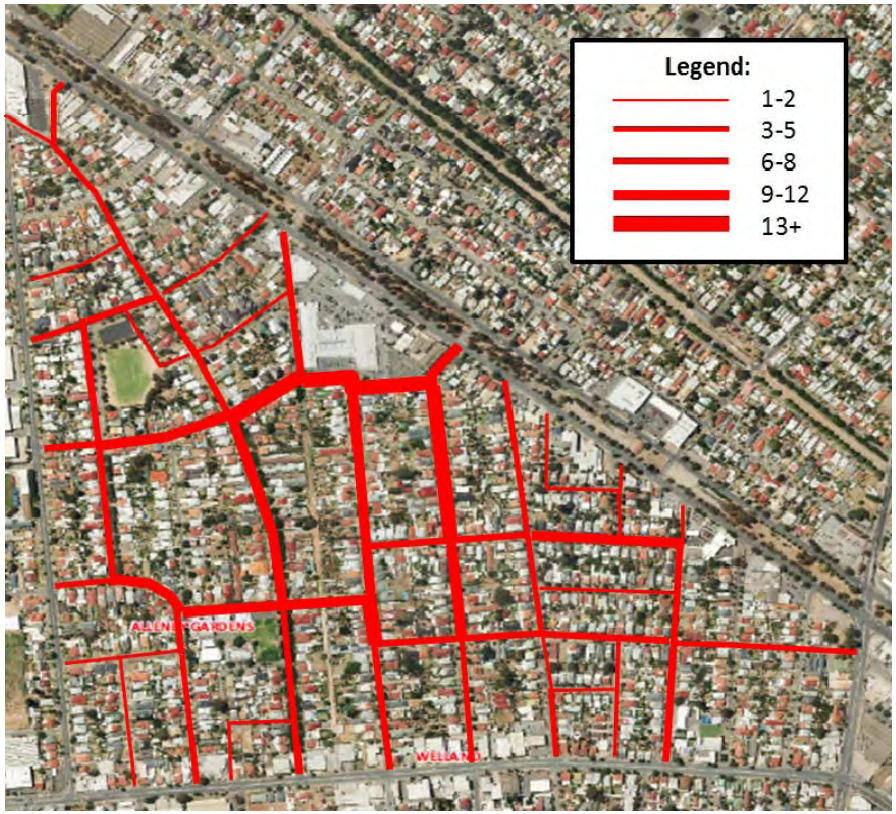
As noted above in relation to access to the bus stops and rail stations, access beyond the study area is largely constrained by the lack of formal and safe crossings of the surrounding arterial road network.

A series of catchment maps have been prepared to indicate the walking routes within and immediately surrounding Welland Plaza (these are included as Appendix 5). The maps have identified the following locations as key origins or destinations within or close to the Welland precinct.

- Welland Plaza Shopping Centre;
- Grange Road Local Shopping Centre;
- Allenby Gardens Primary School;
- Croydon Rail Station; and
- West Croydon Rail Station.

It can be seen from these maps that in all cases, the lack of crossings on the arterial road network restricts the walking catchments from the opposite side. This is particularly evident crossing Port Road and Grange Road. At Croydon Station, the 400 and 800 metre catchments barely cross Port Road despite the east side being well within 400 metres of the station. On Grange Road south of Allenby Gardens Primary School, the 800 metre catchment barely goes south of Grange Road, despite Grange Road being only about 400 metres from the Barham Street entrance to the school and the Local Shopping Centre that actually fronts Grange Road, barely crosses Grange Road, within a 400m catchment.

Residents identified a number of routes that they regularly use to walk within the precinct. These are shown on the figure on the following page.



Regularly Used Pedestrian Routes

"Walk to school" programs

These programmes have the potential to achieve significant benefits in terms of family health and well-being, reductions in parking and traffic congestion around schools, improved road safety and improvements in local air quality. These principles relating to accessible and walkable neighbourhoods are now integrated in many strategic planning and guidance documents for South Australia, including the 30 Year Plan, Streets for People Compendium and Inner Metro DPA amendments.

3.4.2 Recommendations for Improvement

Local Streets

As indicated most footpaths are in reasonable condition within the study area, although there will always be places that are in need of upgrade and, as with all areas of the council, Council should continue to monitor these and improve areas over time.

It is recommended that focus should be given to increasing the width of footpaths where possible, particularly around the major destinations of Welland Plaza and Allenby Gardens School, improving kerb ramp crossings around the key local destinations and ensuring that the footpath surfaces and width are adequately maintained.

Recommendations on the local streets in relation to the key local facilities are set out below:

Allenby Gardens Primary School

Recommendation 41: **Maintain, upgrade and widen footpaths in the vicinity of Allenby Gardens Primary School**

The majority of the footpaths around the school are of reasonable width and quality. However a number of locations were recorded with poor surfaces and over-growing vegetation. The width of some of the footpaths is also at a minimum provision, which is often not wide enough for the level of pedestrian activity around a large school. The need for increased footpath width around activity centres with high pedestrian activity such as schools is reflected in Council's requirements for footpath widths contained in their Road and Path Design Guidelines".

It is recommended that a strategy is developed to gradually widen and upgrade the footpaths around the school in line with the width requirements identified in the Council's design guidelines. Detailed observations and recording of the current pedestrian activity will be required to inform this analysis. Improvements are recommended to focus in particular on Barham Street south of Knight Street, Knight Street (Lewanick Street to Coombe Road) and Coombe Road (Knight Street to Bridges Street). However observations may indicate other locations would also benefit from improvements and school walking initiatives may identify further locations.

The provision of wider footpaths on the approaches to the school can also assist in providing a safe facility for children to ride to school to support the Way2Go and OPAL initiatives. Children up to the age of 12 are legally permitted to ride on footpaths, however the footpaths will need to provide suitable width for potentially large numbers of children to ride. It is considered unlikely that significant sections of the footpaths would achieve the Council's standard of 3.0 metre shared paths for the anticipated level of use without significant removal of street trees, which is not considered appropriate. However, where suitable sections of 3.0 metre shared path can be provided without impact on street trees, this upgrade should be explored further.

Recommendation 42: **Upgrade Knight Street footpath and install additional crossing provision**

A significant level of crossing activity was observed on Knight Street, particularly towards the Barham Street end where the footpath from Barham Street runs to the east of the landscape area. There are no kerb ramps in this location.

As a minimum, it is recommended that kerb ramps are installed where this footpath meets Knight Street with corresponding kerb ramps on the southern side of Knight Street. There are also existing kerb ramps on Knight Street that have not been upgraded with tactile treatments.

It is also recommended that the installation of a second Emu crossing is explored for this location, as significant crossing activity takes place towards the western end of Knight Street.

It is also recommended that a footpath is installed on the north side of Knight Street between the Barham Street intersection and the Barham Street eastern footpath that runs adjacent to the

landscape area. The footpath could be located adjacent to the road or through a gap in the existing landscaping.

Recommendation 43: **Upgrade Samary Street footpath link between Samary Street and Grange Road**

There is an existing walkway that links from the southern end of Samary Street through to Grange Road. It is understood that this walkway is within the ownership of the Council. At the Grange Road end there is a sign identifying it as a walking route to Allenby Gardens school.

It is recommended that this walkway is upgraded with a fully sealed surface, access mazes and appropriate levels of lighting for use as a pedestrian and cycle route. In conjunction with this upgrade, the section of Grange Road footpath immediately to the east should also be upgraded using the full width of the existing footpath to create a short section of shared path to link to the recommended controlled crossing for Grange Road. Full details of the recommended crossing are set out in the arterial road section below.

This link would fall within the walkway category in the Council Road and Path design guidelines. Whilst it would not meet the overall width requirement of 5 metres, it would satisfy all other walkway design requirements, as it is of sufficient width to provide a 3 metre wide sealed surface. The benefits of upgrading the link given that it is clearly already used are considered to outweigh this shortfall from the design guidelines.

Samary Street Footpath Link

Recommendation 44: **Upgrade Samary Street to a single surface "Shared Use" Style Street**

To complement the proposed footpath link upgrade that connects to the southern end of Samary Street, it is recommended that Samary Street is upgraded to provide a single surface, "shared use" treatment. Only one house has direct frontage to Samary Street, although it does provide access to rear garages for a number of properties that front on to Barham Street.

Due to the access arrangements and existing length of the street, vehicle volumes and speeds are already likely to be low and the conversion to a single surface street would provide a more pedestrian and cycle friendly environment as a continuation of the walkway link. The upgrade would also offer an opportunity to provide enhancements to the existing verge and trees on the eastern side in to a more formal landscape and amenity area.

Recommendation 45: **Promote "Walk to School" programs**

Allenby Gardens Primary School is understood to have recently started to actively participate in both the Way2Go and OPAL programmes to build on some of the informal initiatives that the school has previously encouraged. It is recommended that Council continues to encourage the school to follow these programmes and develop suitable activities and initiatives to promote the take up, as well as a monitoring programme to identify and build on the successes over a minimum 5 year period.

Through the programmes locations the school and parents should be encourage to identify locations that create a barrier to additional cycling and walking and to work with Council to develop initiatives to overcome or remove these barriers.

Recommendation 46: **Change the extent of the School Zone at Barham Street and Knight Street**

The current school zone on Knight Street ends immediately prior to the Barham Street intersection. As a result the zig-zag pavement does not fall within the school zone and the End School Zone sign on Knight Street partially obscures and distracts from the Stop Sign. Vehicles turning in to Knight Street from the north will also have little opportunity to observe the school zone sign.

It is recommended that the School Zone be amended to start and end slightly further east on Knight Street to enable better separation of the signs and ability for drivers to observe the signs and pavement marking away from the intersection. This recommendation is unlikely to impact on vehicle speeds at school times due to the level of pedestrian activity and the proximity of the intersection.

Welland Plaza

Current pedestrian facilities along Brand Avenue between Way Terrace and Welland Avenue are poor. There is no footpath on the north side of Brand Avenue between Way Terrace and the marked pedestrian access in to the Welland Plaza car park and the section of footpath to the east of this up to Welland Avenue is also narrow. On the south side, the footpath is also generally very narrow from Welland Avenue through to west of Way Terrace and in parts, particularly opposite the Way Terrace intersection is heavily obstructed and obscured by trees.

Recommendation 47: **Complete missing footpath on the north side of Brand Avenue**

In conjunction with the revised intersection arrangement recommended around Welland Plaza, it is recommended that a continuous footpath is provided along the north side of Brand Avenue, with appropriate crossing provision of the Welland Plaza

accesses. The width of the footpath should be in accordance with the Council guidelines and specifications, reflecting the desire to increase the levels of pedestrian activity around the Welland Plaza Shopping Centre.

Recommendation 48: **Upgrade existing footpath on the south side of Brand Avenue from Welland Avenue to west of Way Terrace**

In conjunction with the revised intersection arrangements recommended for Frederick Street and Way Terrace, it is recommended that the existing footpath along the south side of Brand Avenue is upgraded to provide improved width and surface and appropriate crossing provision at Frederick Street. The width of the footpath should be in accordance with the Council guidelines and specifications, reflecting the desire to increase the levels of pedestrian activity around the Welland Plaza Shopping Centre.

Recommendation 49: **Provide formal pedestrian linkages from the south across Brand Avenue into Welland Plaza**

Brand Avenue is quite a wide road and therefore presents a poor pedestrian crossing environment, particularly for elderly or mobility impaired pedestrians. It is recommended that designated crossing points are provided opposite the eastern edge of the Coles building and between the two existing vehicle accesses points to the west of Frederick Street. Due to the road width, the provision of some form of build out or protuberance to reduce the crossing width is recommended. These should also assist in encouraging lower vehicle speeds. It is considered unlikely that there would be a warrant for any formal crossing provision, but the use of the crossing locations should be monitored to establish whether a suitable warrant arises.

Recommendation 50: **Improve pedestrian connections from residential areas to the west across Way Terrace**

As with Brand Avenue, Way Terrace is a wide road by local road standards and also presents a poor pedestrian crossing environment. It is recommended that a designated crossing point, including some form of build out or protuberance is provided across Way Terrace opposite the existing pedestrian entrance to Welland Plaza from Way Terrace. It is also recommended that kerb ramps are provided to enable pedestrians to cross in the vicinity of Birdwood Avenue, as part of the recommended changes to that intersection set out above.

It is also recommended that kerb ramps are provided as part of the amended design for the Way Terrace and Brand Avenue intersection to enable safer crossing of Way Terrace by pedestrians.

Recommendation 51: **Improve pedestrian linkages from Brand Avenue into Welland Plaza**

It is recommended that Council seeks to work with the owner of the Welland Plaza shopping centre to develop a pedestrian path along the east side of the Coles building to provide an appropriate access route from Brand Avenue to the main entrance of Welland Plaza. Provision of this route should also assist in encouraging greater use of this area of the car park, which is heavily underused and subject to anti-social behaviour,

particularly at weekend evenings. It appears that the additional width for the footpath can be achieved by reducing the aisle width in the car park, which measures wider than required. A vehicle free route through the car park to the entrance located on the south side of the shopping centre should also be considered.

Recommendation 52: **Improve pedestrian linkages from the existing signalised pedestrian crossing point on Port Road to the Welland Plaza main entrance**

It is recommended that Council seeks to work with the owner of the Welland Plaza shopping centre to improve the pedestrian route from the Port Road frontage to the main Welland Plaza Shopping Centre access. Whilst sections of this route are well defined and of high quality, the sections closer to Port Road are poorly defined and aligned creating a difficult and confusing route for pedestrians.

Allenby Gardens Reserve

Recommendation 53: **Provision of a footpath on the east side of Allenby Gardens Reserve**

There is currently no footpath on east side of Lewanick Street between Maclagan Avenue and the southern edge of the reserve. It is recommended that Council seeks to implement a footpath along this section to assist with access to the reserve and to Allenby Gardens Primary School. The footpath could be provided immediately adjacent to Lewanick Street or as an attractive, winding footpath along the edge of the reserve and integrate it with, for example, a fitness trail or similar.

Recommendation 54: **Upgrade Birdwood Avenue pedestrian access to Allenby Gardens Reserve**

The primary vehicle access to Allenby Gardens Reserve is from a short cul-de-sac extension of Birdwood Avenue. It is recommended that this access is upgraded to provide a more appealing access "gateway" to the reserve with improved pedestrian facilities, including lighting.

St Michael's College and St Joseph's School

Recommendation 55: **Council seeks to work with St Joseph's School and St Michael's College to support any Way2Go or OPAL initiatives that the schools are seeking to implement.**

There is currently very little local walk in catchment to St Michael's College or St Joseph's School and this basis is expected to continue. In this context, both schools are reasonably well provided in terms of immediate pedestrian accesses with controlled pedestrian crossings on East Avenue and Grange Road respectively and local footpath provision throughout.

However both schools are understood to be in the process of implementing Way2Go or OPAL based programmes and there should be opportunities for St Michael's College and St Joseph's School to consider such programmes. Whilst walking as a direct access option may only be feasible for a small number of students, initiatives such as park and stride, cycling, increased use of school buses and car sharing may be options to reduce the level of parking demand and congestion, and improve safety around the school.

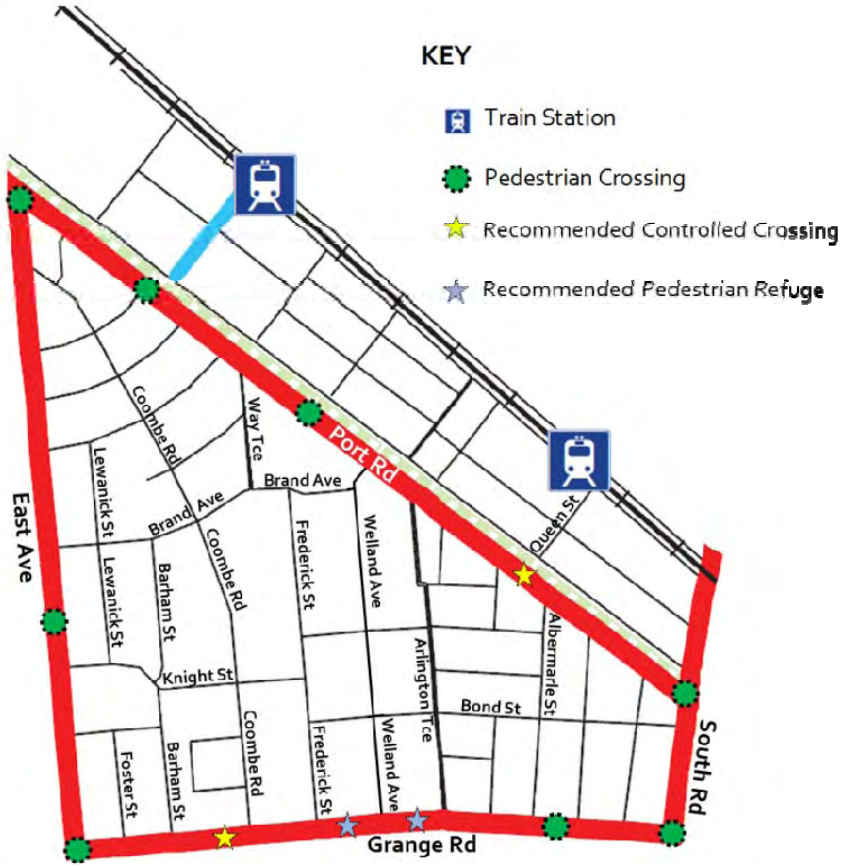
Arterial Roads and Links to Surrounding Areas

Recommendation 56: **Advocate for the installation of additional pedestrian activated crossing on Port Road**

The existing controlled pedestrian crossing provision identifies an evident gap between the South Road intersection pedestrian facilities and the pedestrian actuated crossing at Welland Plaza. Approximately half way between the existing provision is Queen Street, which provides access to Croydon railway station and the local shops on Queen Street and Elizabeth Street.

Initial discussion with DPTI has indicated that this proposed crossing could be supported even if the traditional numerical warrant is not currently recorded. It is recommended that Council identifies the current and anticipated future pedestrian (and cyclist as discussed further below) demand levels and seeks to work with DPTI to implement a controlled pedestrian crossing in this location. The crossing will improve access to Croydon station, the Queen Street stops and also access to and from the northbound and southbound bus stops. The crossing will considerably improve access to the transit options in this corridor.

It is recommended that the crossing is provided as a shared pedestrian and cyclist facility and further discussion on this is contained in the cycling section below. Recent cycle crash records at this location are likely to be the main justification for securing the recommended Black Spot funding source.



Recommended Crossing Locations

Recommendation 57: **Advocate for the installation of additional pedestrian activated crossing on Grange Road near the Samary Street Walkway**

The existing safe pedestrian crossing facilities on Grange Road also identify an evident gap in provision between the East Avenue traffic signal pedestrian facilities and the controlled pedestrian crossing adjacent St Joseph's School near the South Road intersection.

It is therefore recommended that Council seeks to work with DPTI to implement a controlled pedestrian crossing in the vicinity of the proposed Samary Street walkway link. The preferred location identified is immediately to the east of Hallett Boulevard. The crossing will improve access to Allenby Gardens Primary School from the school catchment area to the south of Grange Road, as well as assisting general crossing activity of Grange Road. This would include access to and from the adjoining westbound and eastbound bus stops.

The crossing is also recommended as a conjoined pedestrian and cycle crossing to cycle and walking access to the River Torrens Linear Park and shared path.

Recommendation 58: **Install additional pedestrian refuge crossings on Grange Road at suitable locations**

In order to assist pedestrian to cross Grange Road at other locations where there are local facilities, it is recommended that formal pedestrian refuges are developed within existing sections of raised median, together with associated kerb ramps on the Grange Road footpaths.

Two locations have been identified that are recommended for further assessment and discussion with DPTI. These are adjacent numbers 73 and 75 on the north side of Grange Road, where there are a number of shops and a petrol station with local convenience store and immediately to the west of the local shopping centre that currently includes Subway and Chemist King.

At both locations there are existing medians that should provide sufficient width to accommodate pedestrians. The provision of the formal medians would enable pedestrians to safely wait in the median and feel safer crossing Grange Road in two stages. There is not expected to be any impact on vehicles as a result..

Recommendation 59: **Upgrade kerb ramps and footpaths along arterial roads**

Along the Port Road and Grange Road arterial roads there are several sections of footpath of poor width and surface quality and many of the side road crossings have missing or poorly aligned kerb ramps that are not to current design standards and have no tactile provision. It is recommended that a strategy is developed to gradually upgrade all sections of footpath and kerb ramp crossings on the arterial road network to provide consistent width and crossing treatments.

Recommendation 60: **Develop and implement a wayfinding strategy for the local area**

Wayfinding and signage networks can assist in improving connectivity to key destinations and promote the use of

designated walking / cycling routes. It is recommended that opportunities are explored and a strategy developed for improved wayfinding and signage within and beyond the study area. Key destinations within or immediately adjoining the precinct are likely to be:

- Welland Plaza
- Allenby Gardens Primary School
- Allenby Gardens Reserve
- Croydon and West Croydon Railway Stations
- Kilkenny Primary School
- Queen Street shops
- River Torrens Linear Park and Shared Path

Wayfinding and Signage Examples, images Sourced: Google and JP+D

3.5 Cycling

3.5.1 General Discussion

There are currently no formal cycling facilities on the local road network within the study area, and only a limited number of locations where local "Bike Direct" route signs are provided. Extensions to the marked "Bike Direct" routes and signs are in the course of implementation, although some concern on the viability and appropriateness of these routes from a safety perspective was raised at the community consultation event.

Dedicated bicycle lanes have been provided on both sides of Port Road, East Avenue and Grange Road. These bike lanes provide a mixture of operational times, with Port Road bike lanes available in both peak periods and Grange Road eastbound in the AM peak and westbound in the PM peak. Although signed as available only in both peak hours, the East Avenue bike lanes are effectively available all day, as the road is subject to "No Stopping" restrictions, other than a short section at the southern end where some parking is permitted. There is no cyclist provision on the short section of South Road within the study area. Similarly to the pedestrian movements, cyclists would find it difficult to cross the arterial road at reasonable intervals. None of the pedestrian crossings have formal cycle crossing provision incorporated and there are no advanced stop line bike boxes provided at the arterial road intersections to assist cyclists when turning right.

Bicycle parking facility has been provided around the primary shopping frontage of Welland Plaza. The exact number of bicycle parking spaces was not confirmed, although approximately 6 stands were identified to be available.

There are currently strong State Government initiatives to improve cycling facilities and increase the levels of cycling activity within South Australia and Greater Adelaide in particular. Council has already recognised this with Council initiatives and policies and this should continue.

3.5.2 Recommendations for Improvement

In general, it is considered that the majority of the local road network provides a reasonable environment for. Cycling activity was observed on a number of the local streets and with a few exceptions the generally low traffic volumes and speeds can readily accommodate safe cycling.

There are a number of cycling recommendations identified and some of these are linked to pedestrian improvements.

Recommendation 61: **Develop local footpaths around Allenby Gardens School as shared paths to accommodate local cycling to school**

It is recommended that the immediate footpaths around the school, particularly on Barham Street south of Knight Street, Knight Street (Lewanick Street to Coombe Road) and Coombe Road (Knight Street to Bridges Street) should be considered for creating the footpaths as wide as possible to provide a safe facility for children to ride to school to support the Way2Go and OPAL initiatives.

Recommendation 62: **Implement "Bike direct" routes in local streets**

A local bike direct network has been designated within the Welland study area. Observations have indicated that the majority of the existing local streets ions are already suitable for most levels of local cycling activity and ability and the recommendations to implement measures on some of the higher traffic volume and traffic speed route should improve cycling conditions on these routes as well.

It is therefore recommended that the bike direct route network be implemented as programmed.

It is noted that some concern has been raised over the use of Coombe Road as a bike direct route, particularly with the number of roundabouts along its length. Coombe Road offers many advantages as a cycle route as it runs the entire length of the precinct, provides easy connections to and from the rest of the precinct and can readily connect (either directly or via Samary Street) with the proposed cycle crossing of Grange Road and the continuing route along Hallett Boulevard to the River Torrens Linear Park and Shared Path.

It is therefore recommended that Coombe Road continues as a primary bike direct route, but that the recommended review of the roundabouts is undertaken and implemented to provide raised central medians and more constrained vehicle paths to reduce vehicle speeds into, through and out of the roundabouts, thereby ensuring that vehicle speeds at the roundabouts are more consistent with anticipated cycle speeds.

Recommendation 63: **Advocate for the installation of a controlled cycle crossing on Port Road in conjunction with Recommendation 56**

In conjunction with the recommended pedestrian actuated crossing on Port Road at Queen Street, it is recommended that the crossing is provided as a shared pedestrian and cyclist facility. As well as pedestrian access to Croydon railway station and the local shops on Queen Street and Elizabeth Street, this would facilitate cycle access.

It is recommended that Council seeks to work with DPTI to implement the controlled crossing in this location. It should be noted that the crash records indicate a history of cycle related right turn crashes at the Queen Street and Port Road intersection and it is therefore recommended that council and DPTI seek to pursue the implementation of the crossing as a Black Spot scheme, as the cycle crossing would provide a safe right turn environment for cyclists.

Recommendation 64: **Advocate for the installation of a controlled cycle crossing on Grange Road near Hallett Boulevard in conjunction with Recommendation 57**

In conjunction with the recommended pedestrian actuated crossing on Grange Road near Hallett Boulevard, it is recommended that the crossing is provided as a shared pedestrian and cyclist facility. The recommended controlled crossing facility will provide a link to the proposed Samary Street link and therefore safe cycle access to Allenby Gardens Primary School link and cycle access to the River Torrens Linear Park and shared path.

Recommendation 65: **Upgrade Samary Street link to Grange Road as a Shared Pedestrian and Cycle link**

In conjunction with Recommendation 43 above, the proposed Samary Street walkway is recommended to be upgraded to provide a shared pedestrian and cycle route. This will improve cycle access to Allenby Gardens Primary School from the catchment area to the south of Grange Road and provide connections to the River Torrens shared path from the Welland precinct.

Recommendation 66: **Upgrade Grange Road footpath to a shared path on the north side between Samary Street walkway link and Coombe Road**

In conjunction with the proposed pedestrian and cycle crossing of Grange Road, the Samary Street link upgrade and the bike direct routes along Coombe Road, the section of Grange Road footpath between Samary Street link and Coombe Road should be upgraded to create a short section of shared path to link between the two facilities.

Recommendation 67: **Provide a Shared use Route that Connects to River Torrens Shared Path**

It is recommended that the primary route designation to the River Torrens Shared Path is via Hallett Boulevard. Whilst this route does contain some roundabouts, it has generally been designed as a low speed route, with narrow roads, pavement surface treatments and winding roads.

The Hallett Boulevard route also facilities direct connections via the proposed routes in to the precinct and would represent a better route than the alternative options of Frederick Street or Welland Avenue, which are both more industrial in nature, have extensive on street parking and could not provide the direct connection to the River Torrens path.

It is recommended that the primary designation of the Hallett Boulevard route is through Bike Direct signs and a clear wayfinding strategy for cyclists. It is not considered that there are any significant infrastructure improvements required to accommodate the cycle route other than the final access in to the Linear park and path from the Moorfield Terrace roundabout.

Recommendation 68: **Advocate for Upgraded Cycle lanes on arterial roads**

It is recommended that Council maintains ongoing dialogue and discussions with DPTI regarding opportunities to improve or upgrade the format and status of bike lanes on the arterial roads. Items and opportunities that should be regularly reviewed, either annually or as part of any maintenance or improvement work include:

- Opportunities for increased separation of the cycle lanes from traffic
- Longer hours of operation of the arterial road bike lane with associated parking restrictions. Removing parking is also likely to assist the movement of freight traffic, particularly along Port Road and Grange Road.

- Implementation of cyclist priority measures at intersections

Recommendation 69: **Develop and implement a wayfinding strategy for the local area**

Wayfinding and signage networks can assist in improving connectivity to key destinations and promote the use of designated cycling routes. It is recommended that opportunities are explored and a strategy developed for improved cycling based wayfinding and signage within and beyond the study area. Key destinations within or immediately adjoining the precinct that could form cycle destinations are likely to be:

- Welland Plaza
- Allenby Gardens Primary School
- Allenby Gardens Reserve
- Croydon and West Croydon Railway Stations
- Kilkenny Primary School
- Queen Street shops
- River Torrens Linear Park and Shared Path

Recommendation 70: **Develop a strategy for identifying and implementing additional local bike parking**

There is currently little or no formal bike parking in the Welland area with only a limited provision at Welland Plaza identified. It is recommended that Council develops a strategy to identify and prioritise locations to provide or increase the level of safe and secure bike parking. Initial locations that are recommended as priority locations to investigate, in conjunction with the site owners/ occupiers are:

- Welland Plaza
- Allenby Gardens Primary School
- St Michael's College
- St Joseph's School
- Allenby Gardens Reserve
- Grange Road Neighbourhood Shopping Centre
- Port Road and Grange Road road reserves, particularly around potential short term, high frequency visitor locations.

Creative Signage and Parking Solutions Promote Cycling, Images Sourced: Google

3.6 Public Transport

3.6.1 General Discussion

The encouragement of public transport is not solely dependent upon the quality of the service itself, bus stop and rail station facilities and ease of access would also contribute to the whole experience and should be adequately addressed.

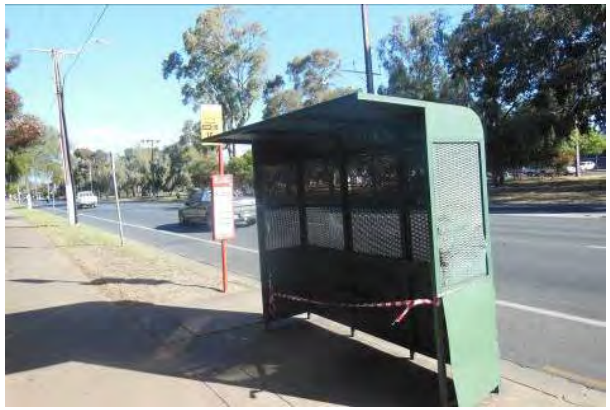
Within the Welland study area, bus based public transport is available along Port Road and Grange Road, both of which are Go Zone 15 minute frequency corridors. Whilst some of the bus stops provide adequate facilities, others provide rather poor or limited facilities. A review of facilities has considered the provision of a shelter, seating, litter bin, pedestrian crossing access and boarding arrangements. An example of a bus stop indicating good practice that provides a high quality shelter and seating, modern litter bin, and a well surfaced boarding area is Stop 10 southbound, towards Adelaide CBD, as shown in the first image (right). In contrast, bus stop 15, towards Adelaide CBD and shown in the second image (right) has a smaller, older shelter, broken seats and no litter bin.

Other bus stops similarly provide either no shelter, a wheelie bin for litter, or are located within an unsealed verge.

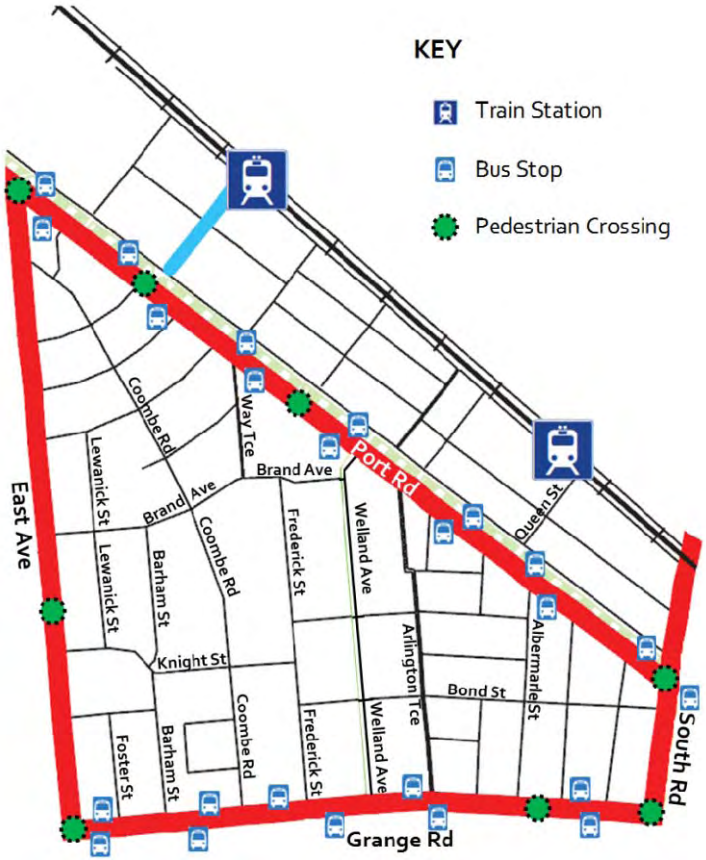
Further to the above, the provision of crossing opportunities along Port Road and Grange Road are inadequate to facilitate direct pedestrian routes to a number of the bus stops. Investigations of the 24 bus stops in the study area indicated only 9 bus stops are located within close proximity to a formalised pedestrian crossing, shown in the below image. This is not to suggest the provision of pedestrian crossings are required at every bus stop, but rather the bus stop and pedestrian crossing should be strategically placed to offer a convenient access to a nearby crossing.

Similarly, the nearest bus stops to Welland Plaza, one of the key destinations in the precinct are poorly located in relation to the primary pedestrian routes in to the centre.

Good Practice – Stop 10



Poor Quality – Stop 15



Bus Stops and Pedestrian Crossings

Similarly with the two local rail stations that would serve the Welland area, West Croydon station to the north has a direct link to a controlled pedestrian crossing of Port Road. In contrast, the direct pedestrian route to Croydon station to the south along Queen Street, is some distance from a controlled crossing of Port Road.

School Buses

There are currently two school bus routes that serve St Michaels School, operating AM and PM between the school and Henley Beach and Outer Harbor. The buses pick up and drop off on East Avenue, and as the routes head south Brand Avenue, Lewanick Street and Knight Street form part of the advertised route. The impact of these school buses routing through the residential routes was raised as a significant concern by a number of residents.

Discussions have taken place with the DPTI bus operations team and the operator of the services, Torrens Transit. The current school buses form part of a wider service that serves a number of schools within the same route.

3.6.2 Recommendations for Improvement

The following suggestions will assist in the improved functionality of bus and train services and promote use within the local community. These have been considered in conjunction with the recommendations regarding upgrades to the walking and cycling networks.

Recommendation 71: **Advocate for improved bus and rail services**

It is recommended that Council maintains close dialogue and advocates to the relevant teams within DPTI to seek to secure improvements in the frequency and coverage of public transport services. This should also include supporting initiatives to secure upgrades to the rail line and rail stations.

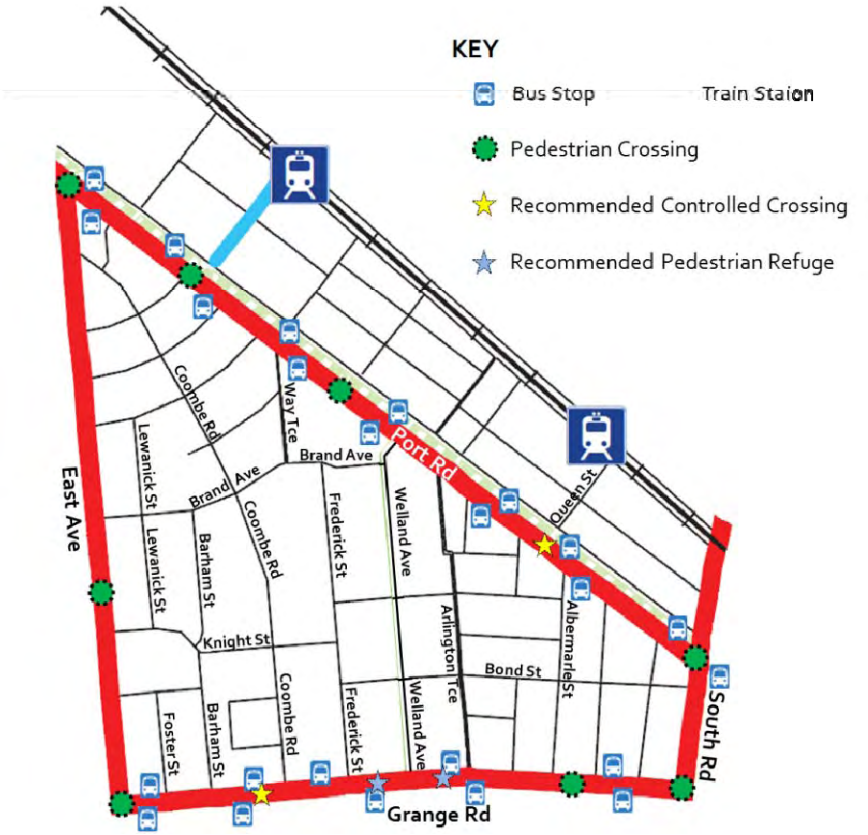
Of particular note are the sections of the precinct along East Avenue, which is not currently served by public transport. This means that there are a number of streets within the precinct that are not within the DPTI recommended walking distance to a public transport service.

Recommendation 72: **Undertake a review of bus stop locations and accessibility to routes**

It is recommended that Council, in conjunction with DPTI, undertakes a review of bus stop locations along Port Road and Grange Road. This review should focus particularly in relation to existing and potential pedestrian crossing provision in order for passengers to have safe access to both directions of travel.
It is considered that there is potential to rationalise some of the existing bus stops on Port Road, as a number of the bus stops are in quite close proximity to each other, but are remote from pedestrian crossing opportunities. A strategy to locate bus stops in the vicinity of South Road, Queen Street, Welland Plaza, Rosetta Street and East Avenue would provide a good level of bus stop accessibility and proximity to existing or recommended pedestrian crossings. The section north of Welland Plaza is likely to require less modification than the section south of Welland Plaza.

A similar situation exists along Grange Road, where the bus stop provision could be linked to existing and proposed crossing upgrades.

The figure below shows the existing bus stop locations in conjunction with the additional pedestrian crossings recommended.



Bus Stops and Recommended Pedestrian Crossings

Review of the priority footpath links to the local bus stops, including kerb ramp provision where appropriate.

Recommendation 73: **Upgrade Bus stops and facilities to DDA compliance by 2022**

It is recommended that Council seeks to implement the defined, DDA compliant minimum specification for bus stop shelter and facilities provision based on an identified prioritisation considering route, destinations served in the direction of travel, service frequency and existing and anticipated use.

It is then recommended that Council develops a strategy to implement the identified specification at all bus stops. Within the Port Road corridor, it is recommended that the minimum specification should be based on the current southbound stop 10 with a modern covered shelter, seating, modern litter bin and a sealed or paved waiting area. Options for local branding as provided on stop 10 should also be considered.
Along Grange Road a similar standard of provision should be made, although it is recognised that the current footpath and any adjoining road reserve outside the roadway may be too narrow in some locations to enable provision of a covered shelter.

In order to achieve the desired upgrade of the bus shelters, it is recommended that Council advocates to DPTI over the potential for future funding initiatives to deliver the level of quality that will attract additional public transport usage.

Recommendation 74: **Advocate for increased and continuous funding by State Government for bus stop upgrades**

Whilst it is important to set targets for the delivery of upgrades to ensure that there is a focus and a target for completion, the flow of funding to ensure that the targets can realistically be met without compromising other funding demands is equally essential.

Council should therefore advocate to DPTI to establish a specific fund to enable the upgrade of bus stop facilities at an accelerated rate in conjunction with the travel related aspirations contained in the 30 year plan for Greater Adelaide to increase the level of use of public transport.

Recommendation 75: **Establish forum and basis for regular and ongoing review of school buses**

Due to the linkage of the existing routes with other schools, the existing St Michael's College school buses need to return south. The existing route was identified through discussions between Council and DPTI a number of years ago and was based on the streets (Brand Avenue, Lewanick Street and Knight Street) all providing at least the recommended minimum width for bus routes. No operating issues along these streets, such as inability to pass through the streets due to parked cars, have been reported by the bus drivers.

It is recommended that a regular dialogue (6 monthly intervals is recommended) is developed between Council, the DPTI bus operations team (who in turn liaise with the operator regularly) and the schools to identify and for Council to advocate for

potential changes or improvements to the bus services in advance of future contract tenders. It is noted that one of the school buses from St Michaels College was very lightly used, with only around 6 pupils, however there may be more extensive use of this service from other schools. The review should consider the potential for changes to the routes to reflect any changes to school catchment areas. Opportunities for additional routes should also be considered as this could encourage greater use of public transport to access the school, reducing the pressure on the available parking.

The forum should also consider the contractual basis for the operation of the school buses to enable responses to changing school circumstances or catchments. This should ensure that there is sufficient flexibility within the contracts to enable changes to be implemented without waiting for an existing contract to run its full course. A comprehensive review should be undertaken in advance of all new contracts.

Recommendation 76: **Undertake regular review and monitoring of routing of school buses**

Due to the linkage of the existing routes with other schools, the existing St Michael's College school buses need to return south. The existing route was identified through discussions between Council and DPTI a number of years ago and was based on the streets (Brand Avenue, Lewanick Street and Knight Street) all providing at least the recommended minimum width for bus routes. No operating issues along these streets, such as inability to pass through the streets due to parked cars, have been reported by the bus drivers.

It is recommended that the operation of the existing routes is monitored regularly to identify if there is a pattern of any issues occurring. In the short term, should on street parking restrict the passage of buses, consideration may need to be given to short tern parking restrictions, possibly on one side of the road. In the longer term a review of the school bus routes and operation may be able to identify an alternative route and school combination that does not rely on the use of local residential streets.

3.7 Improving the "Look and Feel"

3.7.1 General Discussion

One of the key aims of the Welland Transport and Parking Plan is to improve the general environmental quality of the neighbourhood as part of addressing any transport and parking issues. By making improvements to streetscape amenity and incorporating landscape and open space areas where possible when implementing the recommendations in this Plan it will encourage greater and more frequent usage of the streetscape by the community, promoting well being and social interaction. In order to develop more meaningful destinations within the Study Area improvements to community facilities and social infrastructure have also been considered.

During the investigations and feedback from the community, a number of opportunities for improving the quality of the residential environment were identified. These include:

- Improving the quality and range of facilities within Allenby Gardens Reserve
- Providing more 'green' spaces, particularly in West Hindmarsh and Welland
- Providing more high quality street trees throughout the whole precinct and ensure the planting has continuity of species and is along the entire length of road
- Planning for the future replacement of street trees
- Planting more street trees to soften the appearance and improve the amenity of Grange Road
- Improving ground level planting in verges and roundabouts
- Improving street lighting
- Improving Way Terrace and Brand Avenue around the Welland Plaza Shopping Centre
- Improving the pedestrian walkway linking Grange Road with Samary Street
- Improving the quality of streets and footpaths around Allenby Gardens Primary School and St Josephs Primary School
- Building on the success of streets such as Queen Street and introducing some public artwork to create a "sense of place" and individuality to the precinct

3.7.2 Recommendations for Improvement

Recommendation 77: **Upgrade community facilities / activities and improve linkages and amenity in Allenby Gardens Reserve to increase use of the space**

Allenby Gardens Reserve is an attractive park servicing the whole study area. It comprises a playing field, community tennis courts and children's playgrounds within an attractive landscaped setting.

Council has indicated that it has not prioritised the upgrade of this reserve for several years due to higher commitments in other parts of the Council area. Notwithstanding this, and as this is a study making recommendations for the longer term, there are a number of improvements to the park that could be contemplated. These include:

- Consultation with the community to determine the preferred range of passive and active recreation facilities to be provided
- Improvements to some landscaping areas
- Improvement to pathway network (in particular to the East side of Lewanick Street as previously described in Section 3.4.2 – Walking, Recommendations for Improvement)
- Improved connection / amenity link through to Birdwood Avenue / Coombe Road
- Increased use of the park for community and local school events

Recommendation 78: **Create additional "green" landscaped areas where possible when space becomes available within the streetscape / public realm**

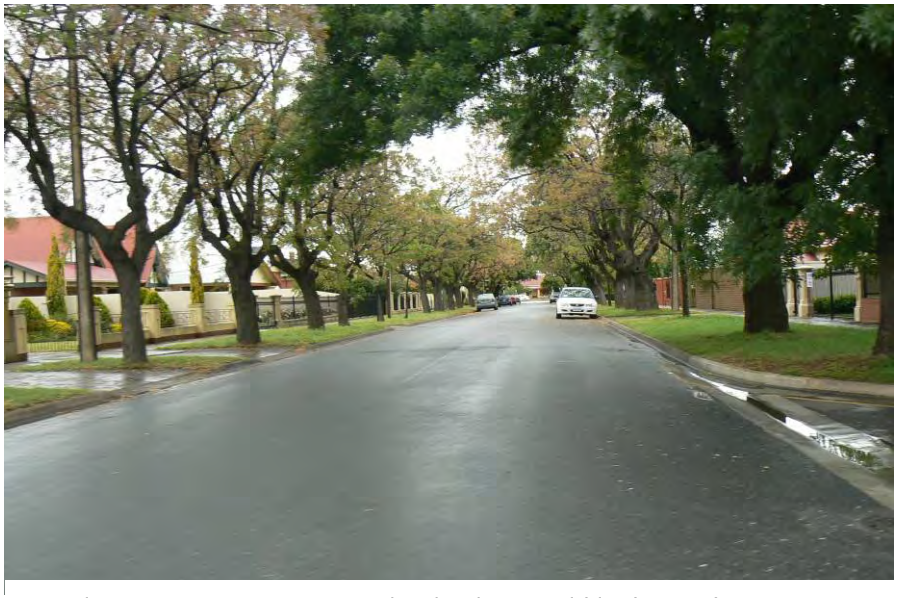
The West Hindmarsh and Welland components of the study area are devoid of public open space. It is recognised that it will be very difficult to expand the area of public open space in these areas due to the fact that the whole of the area is fully developed.

However, there may be some opportunities to provide additional 'green' space providing passive amenity spaces as part of partial road closures or traffic management devices / slow points.

Example of Road Closure within the Study Area and the creation of green space

Recommendation 79: **Implement a street tree improvement program in local streets**

Attractive, mature street trees are not common within the study area. The most attractive streetscapes include Coombe Road (south of Brand Avenue), Lewanick Street (south of Brand Avenue), Morgan Street and Knight Street adjacent Allenby Gardens Primary School. Council has, however, undertaken additional street tree planting in various parts of the neighbourhood, and these will mature over time.



Consistent, mature street tree planting is rare within the Study Area

Overhead powerlines and other overhead infrastructure will limit the potential for larger street trees in all situations. However, it is recommended that a street tree improvement program be initiated throughout the study area.

The assessment of suitable street trees should take into account a range of factors, including the desirability of 'theming' streets depending on the function of the street, priorities for walking, orientation, and width of footpath area / potential impact on below ground infrastructure.

Neighbourhoods with attractive street trees are generally more valued by residents, resulting in improved property values, attract walking and cycling, modify the micro-climate to reduce heat loads in summer, and provide habitat for bird life.

Recommendation 80: **Transform Grange Road into a welcoming "Gateway" by undertaking streetscape and amenity improvements**

It has been noted that Grange Road, in particular, lacks continuity in amenity and street tree planting. As a major entry road into the western suburbs (and to the study area) the improvement of Grange Road and it's transformation into a "Gateway" should be of high priority. It should provide a welcoming access into the high quality residential areas that lies beyond and provide a visual cue to motorists and pedestrians that they are entering a different type of precinct from the surrounding industrial uses.

The 30 Year Plan for Greater Adelaide identifies Grange Road as a potential mass transit corridor. As such it is envisaged that land use intensification would occur along tis length (particularly at the city end) as well as reconfiguration to accommodate higher frequency, quality public transport.

Scope therefore exists to undertake an integrated transport and land use masterplan for Grange Road (similar to recent work by the City of Prospect that led to the major upgrade of Churchill Road) that will set the scene and facilitate the transformation of development along Grange Road into a mixed use and thriving main street environment while still performing the transit functions expected of it.

Recommendation 81: **Assess and upgrade street lighting to Australian Standards**

This study will not be assessing the overall performance of the study area in terms of adequacy of street lighting. However, some residents have indicated concerns with the level of street lighting in particular locations, and over time this can be improved as Council embarks on a street lighting program to bring lighting up to current Australian Standards.

Recommendation 82: **Improve the pedestrian environment in Way Terrace / Brand Avenue adjacent to Welland Plaza** *(Refer to Recommendations in Section 3.2 – Improving Access to Welland Plaza)*

As has been outlined in more detail earlier in the Transport and Parking Plan, there are significant opportunities to improve the quality of these two streets as they integrate with Welland Plaza. These improvements relate to improved pedestrian crossing, traffic management and street tree planting.

These improvements are aimed at better integrating the shopping centre with the surrounding neighbourhood and attracting more residents to walk or ride their bike to the centre rather than drive.

Recommendation 83: **Upgrade Samary Street Pedestrian Walkway** *(Refer to Recommendations in Section 3.5 Cycling)*

This walkway / cycling link is in very poor condition and needs to be upgraded. Improvements to the path itself and to lighting for security are urgently needed.

Recommendation 84: **Improve the pedestrian environment around Allenby Gardens Primary and St Josephs School** *(Refer to Recommendations in Section 3.4 – Walking)*

As has been outlined previously in the Transport and Parking Plan, there are great opportunities to improve the quality of the streets and pathways around Allenby Gardens Primary School and St Josephs School. With the encouragement of slower vehicle speeds and more attractive streets, walking to and from school can be encouraged and the schools can better take their place as important community places within the neighbourhood

Recommendation 85: **Create and enhance the local "sense of place"**

Wherever possible, but in particular around Allenby Gardens Primary School and St Josephs School, artwork and colour should be integrated with the streetscape. There is potential for Council to engage with the local primary schools and local artists to create artworks reflective of the community character and vision for the future. By introducing art and design features into the public realm it will encourage a sense of ownership and community pride throughout the precinct. Sculptures, signage or murals could be initially incorporated along the walking routes to school as wayfinding devices and interesting and welcoming elements to find along the way for children and parents.

Public Art can have a great impact on community ownership over the public realm

4 Implementation Plan

In order to provide Council with an indication of the relative importance of the 85 Recommendations within the Welland Transport and Parking Plan, consideration has been given to the relative importance of each of the Recommendations in terms of their contribution to creating a safe and attractive neighbourhood in which to live, work and be educated. In particular, greater priority has been given to issues concerning safety.

As is clear, some of the Recommendations can be implemented at relatively low cost and potentially in a short time period, while others may require much greater funding and take more time to implement. However, prioritisation in accordance with improved safety outcomes will mean that, in some cases, Recommendations that may have higher cost implications and may take time to implement will still be given high priority, while those with few safety benefits but which can be implemented cost-effectively may be identified as low priority.

Notwithstanding this, Recommendations can be acted upon opportunistically depending on other Council infrastructure projects, and the aim should be to integrate the Recommendations with Council's annual infrastructure improvement programs wherever possible.

In order to streamline the Implementation Plan, Recommendations have been grouped into individual 'projects', are divided into High Priority, Medium Priority and Low Priority, and are in order of priority.

High Priority

1. ***Improve the safety of the Brand Avenue / Lewanick Street intersection – add new stop signs to a central median*** *(Recommendation 12)*

2. ***Reduce through traffic and traffic speed on Welland Avenue*** *(Recommendations 1, 2, 3, 4, 5, 6, 23)*

3. ***Implement a 40 km/h precinct speed limit*** *(Recommendation 22)*

4. ***Improve traffic and parking conditions around and pedestrian connection from surrounding neighbourhoods to the Welland Shopping Centre*** *(Recommendations 13, 23, 25, 26, 27, 28, 37, 47, 48, 49, 50, 51, 52, 82)*

5. ***Reduce through traffic and traffic speed on Frederick Street*** *(Recommendations 7, 8, 24)*

6. ***Improve safety and amenity for school children in the vicinity of Allenby Gardens Primary School, St Joseph's School and St Michael's College*** *(Recommendations 32, 33, 34, 35, 38, 39, 40, 41, 42, 43, 44, 45, 46, 55, 61, 65, 66, 83, 84)*

7. ***Establish an additional safe crossing point on Port Road adjacent Queen Street for pedestrians and cyclists*** *(Recommendations 56, 63)*

8. ***Establish additional safe crossing points on Grange Road for pedestrians and cyclists*** *(Recommendations 57, 58, 64)*

9. ***Improve parking and amenity issues around the Sikh Temple in Barham Street*** *(Recommendations 30, 31)*

10. ***Reduce traffic speed in Coombe Road*** *(Recommendations 9, 10, 11)*

Medium Priority

11. ***Reduce through traffic short cutting between East Avenue and Grange Road*** *(Recommendations 14, 15, 16, 17, 18)*

12. ***Improve pedestrian / cyclist connection to the Torrens Linear Park*** *(Recommendation 67)*

13. ***Upgrade facilities and way finding for cyclists throughout the Study Area*** *(Recommendations 62, 68, 69, 70)*

14. ***Upgrade facilities for users of buses in the Study Area*** *(Recommendations 71, 72, 73, 74, 75, 76)*

15. ***Upgrade footpaths and way finding for pedestrians throughout the Study Area*** *(Recommendations 59, 60)*

16. ***Improve the streetscape amenity throughout the Study Area*** *(Recommendations 78, 79, 85)*

17. ***Transform Grange Road into a welcoming "Gateway" by undertaking streetscape and amenity improvements*** *(Recommendation 80)*

Low Priority

18. ***Monitor Arlington Terrace, Maclagan Avenue and Bertie Street for traffic and parking issues*** *(Recommendation 19, 20, 21)*

19. ***Upgrade Allenby Gardens Reserve*** *(Recommendations 53, 54, 77)*

20. ***Improve on-site parking arrangements within Welland Shopping Centre*** *(Recommendation 29, 36)*

Two key outcomes and actions identified in the study brief for the Welland Transport and Parking Plan project and which will impact many of the above recommendations were to identify the priority locations for safe pedestrian and cyclist crossings and to consider an area wide 40km/h precinct speed limit. This work has been detailed in Appendix 2 and 3.

More detailed design work will be required prior to construction of many of the recommendations (in particular those relating to streetscape upgrade work and traffic control/calming devices such as slow points).It is also understood that Council will undertake further consultation on specific projects with affected residents.

Appendix 1 Final Consultation Responses

Final Consultation Responses

Issue Raised	Response	Proposed Change to Welland Transport + Parking Plan
The speed vehicles travel while using the short cut to avoid East Avenue to Grange Road is a problem not the volume of traffic. Recommendations may potentially cause inconvenience to residents	It was understood that both the volume and speed of traffic was a concern	▪ Monitor impact of introduction of 40km/h Precinct Speed Limit ▪ Investigate use / implementation of speed control devices on Knight Street / Barham Street and Morrell Street / Foster Street
Illegal parking and congestion at drop – off and pick – up times around St Joseph's School	Acknowledged – these issues are typical of those observed around most schools during these periods	Recommend that Council more actively enforce parking restrictions at these times
Vehicle speed along Albermarle Avenue is perceived as an issue now	Acknowledged - was not originally observed	Traffic volume and speed to be monitored on Albermarle Avenue and install traffic control devices if required
There may be potential for an increase in speed and volume of traffic on Arlington Terrace once traffic control measures are implemented on Frederick Street / Welland Avenue	Acknowledged	Traffic volume and speed to be monitored on Arlington Terrace once traffic control measures are implemented on Frederick Street / Welland Avenue
Roundabouts are currently devoid of landscaping and unattractive	Acknowledged	Recommend improved landscaping (using appropriate plant species) and maintenance of existing roundabouts
Those residents living near to the western side of the Brand Avenue / Way Terrace Intersection find it difficult to reverse into fast – travelling oncoming traffic	Acknowledged – The Indicative Concept Plan illustrates proposed improvements to Welland Plaza and this intersection which may address this issue	Detailed design of the new intersection alignment to acknowledge and provide a safe environment and to facilitate safe access to driveways

Concern for new intersection alignment at Frederick Street / Brand Avenue and need for restricting access	Acknowledged	Review the proposal to install a median that allows only left in, left out and analyse if speed and volume is decreased by other means
Poor quality of existing footpaths	Acknowledged	Review recommendations to include full audit of all footpaths in study area and then staged implementation of improvements
Brand Avenue west of Way Terrace is currently used by heavy vehicles (generated by Welland Plaza) and this is inappropriate for a residential area	Acknowledged	Heavy vehicle traffic should be limited to the streets immediately surrounding / adjacent to Welland Plaza I.E. Brand Avenue / Way Terrace / Welland Avenue. Consider installation of signage preventing access to Brand Avenue west of Way Terrace
Brand Avenue is currently being used for parking generated by St Michaels College and problems also arise from use of this section of Brand Avenue by the school bus	Acknowledged	If new changes to parking and circulation that have been proposed (by Council / DPTI) do not result in any improvement consider restricting parking to the south side of Brand Avenue only
Parking generated by the Sikh Temple / Community Facility on Barham Street is a significant problem	Acknowledged	Elevate the recommendation to improve parking and amenity around the Sikh Temple to become a short term (high) priority for implementation by Council
Issue of speeding generally throughout study area (not observing 50km/h speed limit)	Acknowledged	Council to engage with SAPOL to better enforce the speed limit
Selection of one way angled slow points may prove inconvenient to residents	Acknowledged – these are seen to be the most effective way of managing excessive through traffic (due to need for cars to slow down or stop to deviate)	Review during the detailed design phase if slow points should be one way or two way
Will further input be sought by the community prior to implementation of the recommendations	Acknowledged	Further consultation with effected residents will be undertaken during the detailed design phase of the proposed recommendations

Appendix 2 40km/h Precinct Speed Limit Study

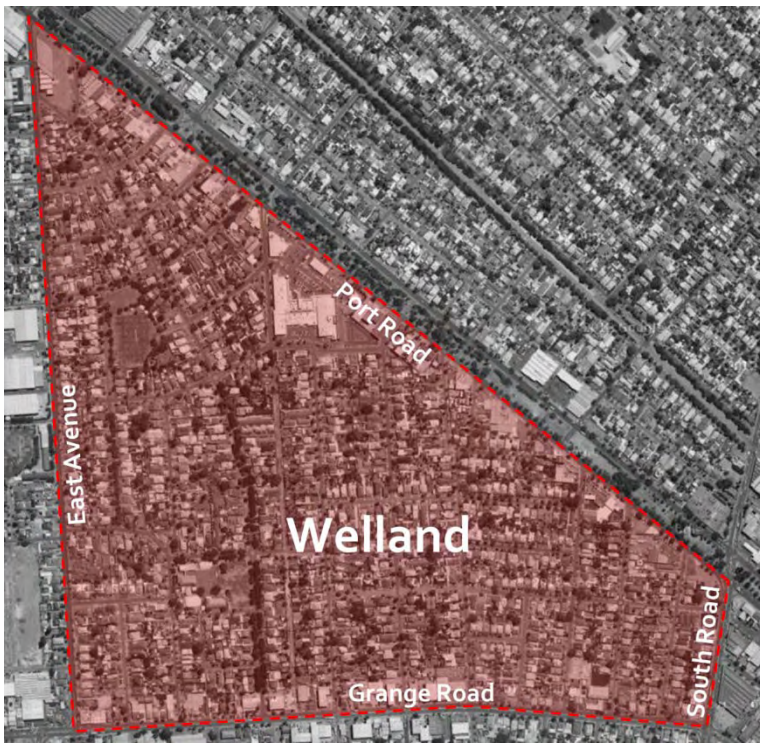
Welland Transport and Parking Plan – 40km/h Precinct Speed Limit Study

As part of the Welland Transport and Parking Plan a key outcome and action identified in the study brief was for a proposed area wide 40km/h precinct speed limit in Welland to be considered and recommended. This document assesses the internal road network of the Welland precinct with regards to the 'Traffic Control Standard – 40km/h Precinct Speed Limit, August 1998'.

Subject Precinct

The City of Charles Sturt (Council) is considering an area wide 40km/h speed limit to be implemented in Welland. The proposed precinct is within the bounds of four arterial roads, Port Road, East Avenue, South Road and Grange Road, shown in Figure 1.

Figure 1: Subject Precinct



(Photo Map Courtesy of Google Map)

Community Consultation

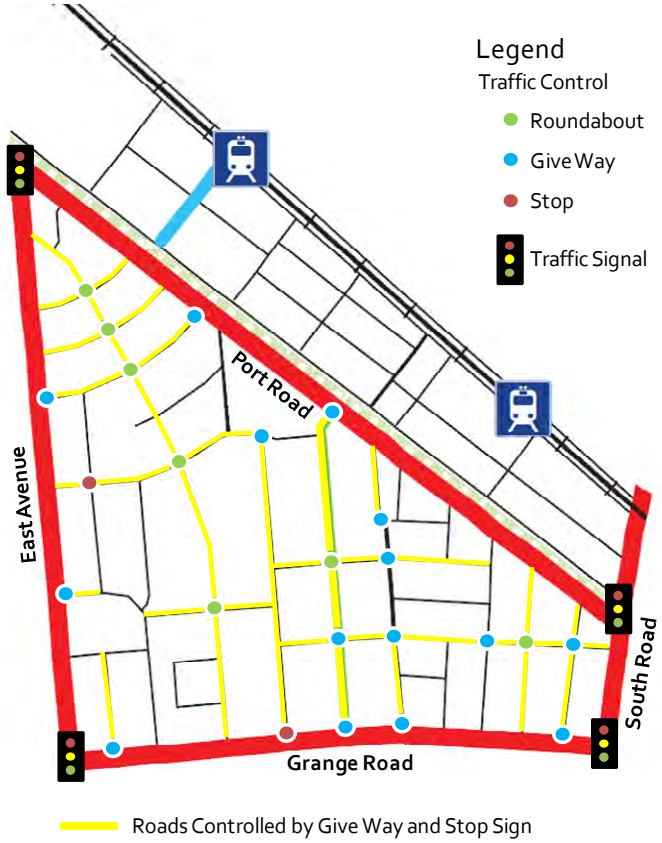
Community Consultation sessions were undertaken at three stages during the study, Issues identification, Issues and Discussion Paper and Draft Transport and Parking Plan. At all stages of consultation, the issue of excess vehicle speed on some of the roads within the study area was raised. There was some concern that the current vehicle speeds indicated that there was insufficient enforcement of existing speed limits and that a 40 kph precinct speed limit was not necessary, however, in general there was a good level of community support for a 40 kph speed limit as a measure to assist in reducing vehicle speeds.

Street Network

Existing Streets and Intersections

Welland is serviced by an internal local road network with linkages to all four arterial roads. The internal road network is controlled by a mix of Roundabouts, Stop and Give Way signs. The location of roads that are controlled by Stop and Give Way signs, roundabouts and traffic signals at the arterial road intersections, together with the type of traffic control have been summarised in Figure 2. All other locations that are not indicated would operate as give way intersections but without any requirement for the provision of give way signs.

Figure 2: Welland Road Network and Traffic Control



Further to the above, GTA understands that the existing traffic control signs and their location generally conform to the relevant Australian Standards.

Streets Sections below 200m in Length

AustRoads Guide states a car acceleration of '1km/h for every 5m of travel is possible' from stop along a straight road section with good visibility. This statement implies that under normal conditions, a car can reach a maximum speed of 40km/h along a road section of 200m in length and would therefore conform to the 40km/h speed limit.

On the above basis, streets and street sections between traffic control devices that are below 200m in length within the subject precinct are listed below with reference to Figure 3.

1. *Coombe Road*
2. *Price Weir Avenue*
3. *Leane Avenue*
4. *Brand Avenue*
5. *Barham Street*
6. *Knight Street*
7. *Bridges Street*
8. *Samary Street*
9. *White Street*
10. *Fischer Street*
11. *Bond Street*
12. *Morrell Street*
13. *Arlington Terrace*
14. *Bourn Avenue*
15. *Ponsonby Street*
16. *Linden Street*
17. *Bertie Street*
18. *Cross Street*
19. *Birdwood Avenue*

Figure 3: Street and Street Sections below 200m (Highlighted)

Relevant Streets

The Traffic Control Standard for 40km/h Precinct Speed Limit by Department for Planning, Transport and Infrastructure provides the following definition for a 'Relevant Street':

20. *Relevant streets are any streets longer than 200 metres, including those with existing high-level physical speed control treatments. It excludes streets that will have new high-level physical speed control treatments when the speed limit is lowered, or streets that will retain the existing speed limit of 60km/h.*

On the above basis, the geometry, speed and volume data on all relevant streets and street sections between traffic control devices has been summarised in Table 1.

Table 1: Relevant Streets and Street Sections

Street	Street Dimension		Existing Traffic Conditions		
	Length (m)	Width (m)	Year of Survey	24hr Weekday Average Volume (vh)	Mean Speed (km/h)
Hamilton Street	210	9	N/A	N/A	42.0*
Maclagan Avenue (W)	213	7.5	N/A	N/A	42.6
Maclagan Avenue (E)	215	7.5	2010	1,769	43.6
Lewanick Street (N)	207	9	2011	231	41.2
Lewanick Street (S)	245	7	2011	296	39.1
Knight Street	222	7	2012	863	38.2
Foster Street	239	7	2012	634	39.5
Barham Street	237	7	2011	1,047	40.9
Way Terrace	266	10	2007	1,769	40
Coombe Road	340	8	2012	1,709	42.5
Frederick Street	720	6.8	2012	1,987	43.7
Welland Avenue (N)	364	8	2012	1,749	44
Welland Avenue (S)	400	8	2011	1,603	44.1
Morgan Street	232	7	2010	494	35.5
Glanton Street	220	8	N/A	N/A	44*
Bond Street	208	8	2012	745	38.4
Arlington Terrace	220	7	N/A	N/A	44.0*
Romford Street	215	8	N/A	N/A	43.0*
Albemarle Street	480	8	2006	707	38.2
Bertie Street	213	8	N/A	N/A	42.6*
Cator Street	330	7	N/A	N/A	66.0*
				Arithmetic Average of the Mean Speeds	**42.5km/h**

*Where no speed data is available, the mean speed has been calculated utilising the AustRoad Guide's acceleration rate of 1km/h for every 5m.

Based on Table 1, the arithmetic average of the mean speeds on all relevant streets is calculated to be 42.5km/h and falls below the 'Traffic Control Standard – 40km/h Precinct Speed Limit' requirement of 50km/h.

It is noted that a number of streets do not have traffic data. The traffic volumes and speeds on these streets have not been raised as concerns through the community consultation and the streets are not expected to carry excessive volumes of traffic. In addition, given the length of these streets are all within 220m, which implies a maximum theoretical speed of 44km/h can be achieved, the speed would not be expected to be excessive.

Physical Speed Control Treatments

The existing speeds on all relevant streets have already met the requirement for a 40km/h precinct without further treatments. However, a number of options have been recommended with the Welland Transport and Parking Plan to improve the traffic conditions at key street sections to assist with unnecessary volumes and maintain appropriate speeds. Whilst indicative options have been recommended within the Welland Transport and Parking Plan, the final options and exact locations would be subject to further assessment and design and community consultation. Therefore no further details of the physical treatment can be provided.

The options and locations of physical treatments recommended are set out in the 'Welland Transport and Parking Plan prepared by Jensen Planning & Design and GTA Consultants dated June 2013.

Existing Bus Routes

It is understood that the school bus servicing the St Michael's College currently utilises a route through Brand Avenue, Lewanick Street and Knight Street to access East Avenue, shown in Figure 4.

Figure 4: Existing School Bus Route

The distances of travel along Brand Avenue, Lewanick Street and Knight Street are approximately 100m, 250m and 100m respectively. Utilising the AustRoads guide's acceleration rate of 1km/h for every 5m, the bus is expected to reach a maximum speed of 20km/h on Brand Avenue and Knight Street. Furthermore, the recorded mean speed along Lewanick Street is under 40km/h.

On the above basis, the existing bus route would be unaffected by a 40km/h precinct speed limit.

Traffic Impact Statement

Implementation of a precinct wide 40km/h speed limit in Welland would encourage motorists to maintain a more appropriate speed within the local area. Furthermore, the lower speed limit would likely deter some existing through traffic using the local area due to greater travel times and therefore inconvenience being perceived.

It is understood that post implementation, motorists within the precinct could attempt to find alternative routes within the area to decrease travel time. However, given the layout of the internal street network of the subject precinct, it is unlikely that an alternative route would decrease travel time to a significant extent. On this basis, the route choice and traffic conditions would be expected to be largely unchanged post implementation of the 40km/h speed limit.

It is noted that the existing average mean speed on all relevant streets is calculated to be 42.5km/h and therefore a 40km/h speed limit would not cause a significant change in the speed environment and adversely impact the traffic conditions within the subject precinct.

Monitoring Program

A suitable monitoring program will need to be established to ensure that the objectives of the 40 kph precinct speed limit are achieved.

Placement of Area Speed Limit Signs

The installation and location of the 40km/h speed limit signs (R4-10) will be in conformance with the requirements set out below, reproduced from the 'Traffic Control Standard – 40km/h Precinct Speed Limit, August 1998'.

Longitudinal placement of Area speed limit signs

21. *Drivers must have an unobstructed view of the sign from a distance of 40m until 10m from the sign.*
22. *To ensure an adequate legibility distance, signs must not be placed closer than 40m after an intersection, bend or other physical feature that may divert driver's attention to negotiate it.*
23. *To maintain the low speed resulting when drivers must turn into a 40km/h precinct, the entry sign must be no more than 50m from the intersection.*
24. *Signs must not be placed closer than 25m (about 0.6V where V is the speed limit of 40km/h) before another sign, intersection, bend or other physical feature that may divert driver's attention to negotiate it.*
25. *Roads with a mean speed over 50km/h require duplicated R4-10B signs spaced at a maximum of 200m apart.*
26. *Signs on roads with steep grades must be placed so drivers see the sign before their vehicle is sufficiently influenced by the gradient to maintain their low speed.*

Lateral placement of Area speed limit signs

27. *To standardise the lateral placement of signs, and to ensure the signs will not lose prominence and association with the road, and therefore respect by drivers, signs must not be more than 5m from the centre of the road or separation line.*
28. *A kerb extension or a traffic island in the middle of the road for the sign may be required.*

School facilities

29. *The 40km/h Area Speed Limit sign, R4-10 must be used on the End School Zone sign as shown in the traffic sign specifications within the 'Traffic Control Standard – 40km/h Precinct Speed Limit, August 1998'.*
30. *The 40km/h Area Speed Limit sign must be used to indicate the speed limit after a Koala crossing.*

Appendix 3 Pedestrian and Cyclist Crossings

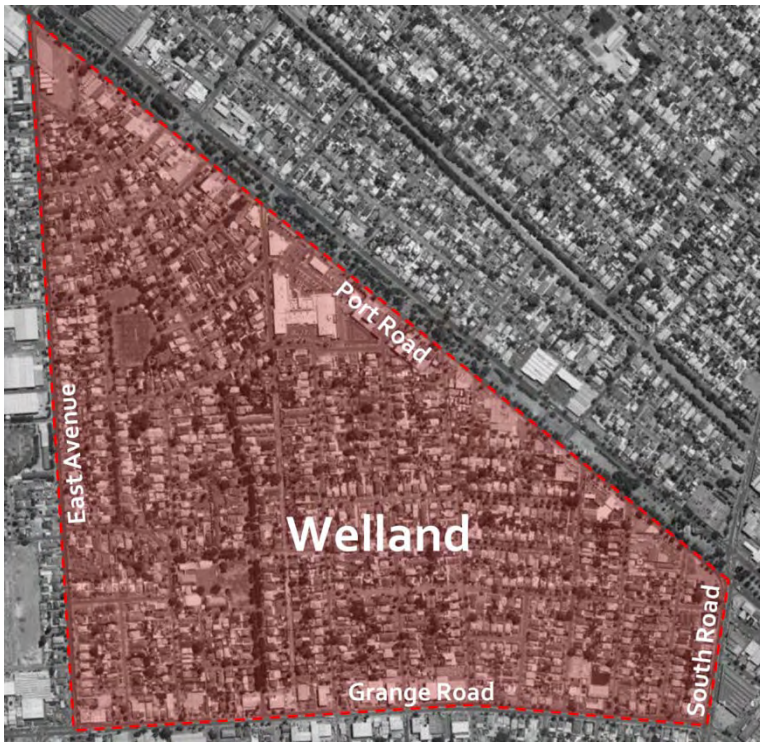
Welland Transport and Parking Plan – Pedestrian and Cyclist Crossings

As part of the Welland Transport and Parking Plan a key outcome and action identified in the study brief was to identify the priority locations for safe pedestrian crossings and if appropriate conjoined cyclist crossings. This document notes the proposed pedestrian and cyclist crossing locations within the Welland Transport and Parking Plan, including the recommended format and location.

Subject Precinct

The City of Charles Sturt (Council) is considering improvements to the pedestrian and cyclist environment in the Welland area. The proposed precinct is within the bounds of four arterial roads, Port Road, East Avenue, South Road and Grange Road, shown in Figure 1.

Figure 1: Subject Precinct



(Photo Map Courtesy of Google Map)

Community Consultation

Community Consultation sessions were undertaken at three stages during the study, Issues identification, Issues and Discussion Paper and Draft Transport and Parking Plan. At all stages of consultation, a number of issues related to the general pedestrian and cycling environment within the precinct were identified. This included difficulty of crossing the arterial roads, related poor access to public transport services, excess vehicle speeds on some of the local roads that deterred cycling on the local road network, pedestrian provision around and within Welland Plaza and the levels of street lighting. Concerns over the safety of children walking around the schools located within the precinct were also noted.

In general there was a good level of community support for improvements to be made to the pedestrian and cycling environments within the study area, from both an amenity and saftey perspective.

Existing Pedestrian and Cycling Provision

Observation of the Welland study area has identified that footpaths are generally available but could be upgraded. Within the wider area, the footpaths are a variety of surfaces, including concrete, bitumen and block paving. The quality of kerb 'pram' ramps vary across location, some are missing through to being recently installed, high quality ramps with improved alignments and tactile paving and widths to current design standards.

There are two key sections of the local road network that currently have no footpath provision:

- Lewanick Street east side, between Maclagan Avenue and the pedestrian entrance in the south west corner of Allenby Gardens Reserve; and
- Brand Avenue north side, between Way Terrace and the informal pedestrian access to Welland Plaza car park midway between Frederick Street and Welland Avenue.

Both of these locations are adjacent to major local attractors and would be expected to attract pedestrian use.

A number of locations were observed with footpaths in poor surface condition and verges poorly maintained. As well as footpath surfaces, a number of broken or damaged utility pit lids were observed. There are also locations where footpaths are of minimum width and locations with no footpath or kerb ramp provision, resulting in unexpected conflict with vehicles.

A network of local Bike Direct routes within the precinct has been identified and Council is in the process of implementing this in conjunction with DPTI.

Existing formal pedestrian and cyclist crossing provision within the precinct is currently very limited. The only formal crossing provision within the local road network is an Emu Crossing located on Barham Street to the west of Allenby Gardens Primary School.

There are also very limited opportunities for crossing the arterial roads to access destinations outside the study area, as noted below and shown in Figure 2.

- Port Road: South Road intersection, Welland Plaza, Rosetta Street, East Avenue intersection (north side);
- South Road: Port Road and Grange Road intersections;
- Grange Road: South Road and East Avenue intersections, adjacent St Joseph's School;
- East Avenue: Grange Road and Port Road intersections, adjacent St Michael's College

Figure 2: Welland Precinct Arterial Road Crossings

Proposed Pedestrian and Cycling Provision

There are a number of recommendations identified within the Welland Transport and Parking Plan for improvements to the pedestrian and cyclist crossing facilities.

There are four different formats of pedestrian crossing improvements identified within the recommendations of the Welland Transport and Parking Plan; two formats on the local road network and two formats for the arterial road network. These are identified below

Local Road Network Crossing Locations and Formats

Emu Crossing: Knight Street to the east of Barham Street

Median Refuges and Defined Crossing Locations around Welland Plaza: The following locations have been identified around Welland Plaza for median refuges and clear definitions of pedestrian crossing locations to improve local pedestrian access routes in to Welland Plaza

- Birdwood Avenue
- Opposite Welland Plaza pedestrian entrance on Way Terrace
- Way Terrace north of Brand Avenue
- Brand Avenue east of Way Terrace
- Brand Avenue west of Frederick Street
- Brand Avenue opposite eastern side of Coles Building
- Brand Avenue/Welland Avenue Intersection

There are currently no site specific constraints on the local road network that would appear to preclude the above crossing being implemented in an appropriate location. However, all of them will need to be designed in consideration of appropriate sight distances and crossover driveways to adjoining residential properties.

Arterial Road Network Crossing Locations and Formats

Figure 3 below shows the recommended crossing locations and formats for the arterial road network, and in particular Port Road and Grange Road to improve local walking and cycling access to Allenby Gardens school, public transport facilities and the local shopping centres.

Figure 3: Welland Precinct Arterial Road Crossings

Pedestrian/Cyclist Actuated Crossings: Port Road opposite Queen Street and Grange Road between Barham Street and Coombe Road.

Median Refuges: Grange Road in the vicinity of Frederick Street and Welland Avenue.

- Initial discussions have been held with DPTI regarding the recommended crossings. DPTI would be prepared to support the proposed crossing locations subject to Council funding and an appropriate design that achieved all required design standards. A supporting submission setting out the comparison of existing and anticipated pedestrian and cyclist demand in relation to the warrants for such facilities would also be required. DPTI may be able to assist with funding where Black Spots or existing warrants are established, although any funding would be subject to assessment against other competing schemes within the State.
- There are no specific site constraints identified with the recommended locations, although a preliminary design would need to be developed to confirm feasibility in relation to sight distances, utility infrastructure, access crossovers, existing bus stops and pedestrian and cyclist desire lines.

Next Steps

In order to develop the recommended crossing locations, Council will need to undertake the following tasks for each of the locations:

- Obtain existing pedestrian and cyclist volumes in accordance with the existing crossing warrants and survey specifications as set out in Appendices E and F of the "Manual of Legal Responsibilities and Technical Requirements for Traffic Control Devices (The Code)".
- Develop preliminary design options for the recommended crossing locations to a level of detail sufficient to confirm that all required design standards can be achieved.
- Obtain the most recent crash records in the vicinity of the proposed crossing locations.

For the recommended arterial road crossing locations, and specifically the recommended pedestrian/ cyclist actuated crossings, the following additional tasks have also been identified.

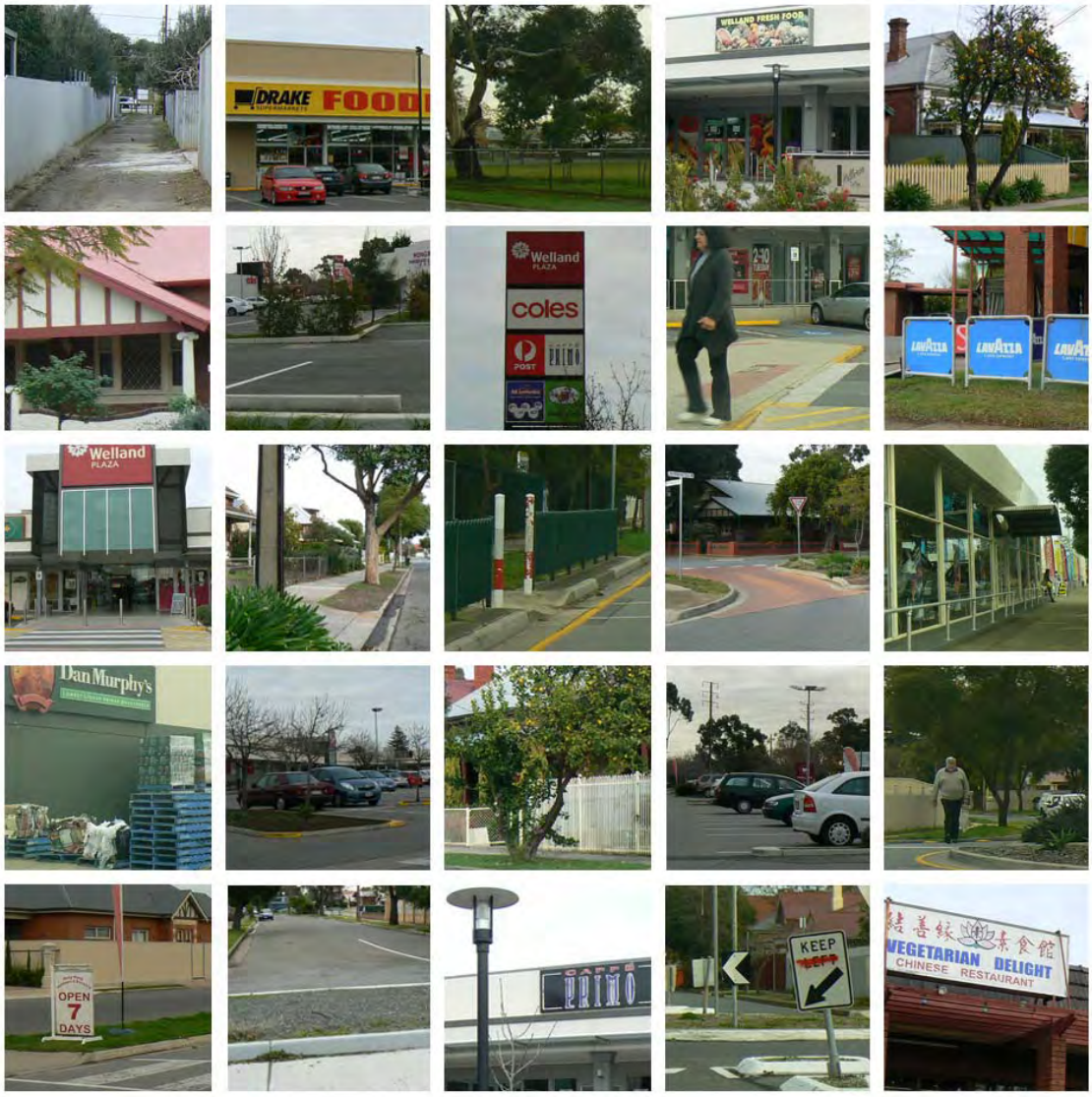
- Develop a future pedestrian demand scenario taking account of the existing latent pedestrian and cyclist demand and the anticipated future operation of the local transport network in the context of the 30 Year Plan for Greater Adelaide and the wider policy framework to encourage increased levels of walking, cycling and use of public transport.
- Undertake further discussions with DPTI on the basis of the above surveys, demand analysis and demand for the proposed arterial road crossing locations.

In all cases, undertaking an independent road safety audit may also assist in supporting the development, funding and implementation of the recommended crossings. This would particularly apply if safety concerns have been raised but there is no specific adverse crash record.

Appendix 4 Strategic Overview Summary Document

Welland Transport + Parking Plan (Welland TPP)

Strategic Overview (Summary Document)



For The City of Charles Sturt
September 2012

Jensen PLANNING + DESIGN

in association with

GTAconsultants

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TABLE OF CONTENTS

1 INTRODUCTION

There are a several strategic documents relevant to the inception stages of the Welland Transport and Parking Plan (Welland TPP), each of which has been outlined within the project brief prepared by the City of Charles Sturt. Each of these document offer considerations around the matters of transport and parking within the wider council area of the City of Charles Sturt. The purpose of undertaking this review is to distil from the broader commentary any information relevant to the preparation of the Welland TPP, and in particular, to the matters outlined in the City of Charles Sturt 'Assignment Summary'.

As detailed in our response to the brief (submitted to Council in July 2012), Jensen Planning + Design will review the framework and policy references identified within the brief, and from our knowledge and experience, develop this to a high level direction and vision relevant to the Welland precinct and the City of Charles Sturt.

The following strategic documents are considered and discussed within the 'Strategic Documents' section below:

- 30 Year Plan for Greater Adelaide
- City of Charles Sturt Development Plan
- Charles Sturt Traffic Management Strategy (QED Pty Ltd, 2005)
- North-West Growth Corridor Transport Study (GTA Consultants, 2011)
- Charles Sturt Transport Strategy 2005-2025 (Parsons Brinkerhoff, 2005)
- Residential Growth and Character Study, Strategic Context (Jensen Planning + Design, 2010)

Following consideration of each of the above strategic documents, a number of broad/higher level directions will be offered for consideration.

2 STRATEGIC DOCUMENTS

2.1 30 Year Plan for Greater Adelaide

A significant strategic role of the 30 Year Plan for Greater Adelaide ("the 30 Year Plan") is to ensure that good transit options, and transport opportunities, are provided across Adelaide to achieve the "new" urban form sought by the Plan (refer **Figure 1**).

The primary intent is to create a transit-focused city for the efficient movement of people, goods and services. This intent is evident in the development of transit and transport strategies, which have a clear focus on locating new development around existing and proposed transport networks and nodes (i.e. Transit Oriented Development). In this regard, the Welland neighbourhood is no exception, with the area being well placed to witness first hand the effects of the Plan through the future development of the North-Western Growth Corridor.

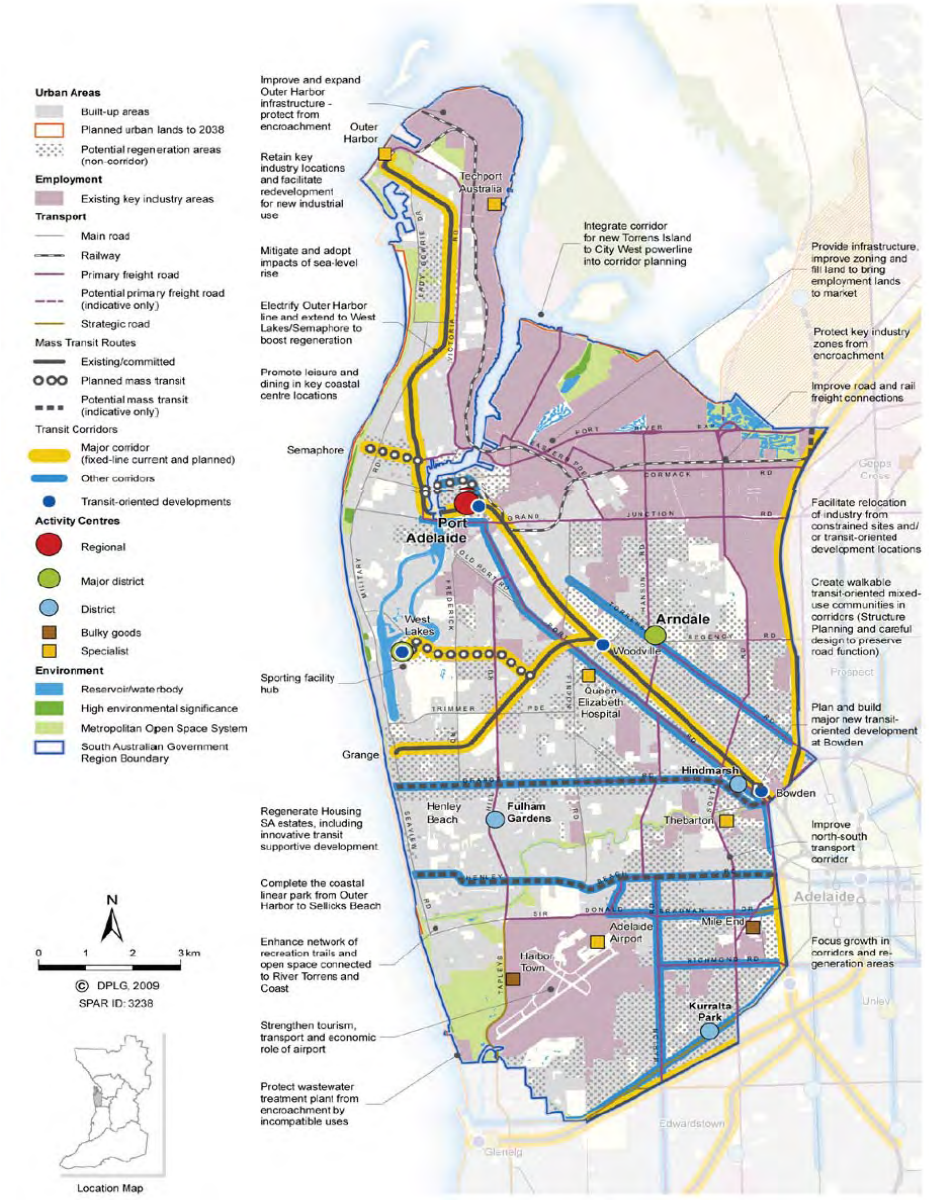


Figure 1: 30 Year Plan for Greater Adelaide (extract)

The development of the North-Western Growth Corridor is framed in the 30 Year Plan by the North-Western Corridor Structure Plan (currently being finalised), which encapsulates a large portion of the Welland area, and extends some distance into the Welland suburban neighbourhood west of Port Road. The Structure Plan will inevitably influence the development of future transport and parking options in and around the Welland neighbourhood, and as such, ought to be taken into particular account in developing the Welland TPP strategies.

The 30 Year Plan also contains 15 broad strategic planning principles, along with a series of targets which are sought to be met. The transport policies and targets seek to:

- take advantage of existing transport networks
- align the land-use priorities for housing and jobs with the proposed expansion of the public transport network during the next 20 years. This will ensure there is a critical mass of people and economic activity to financially support the upgrading and extension of the network

In order to maintain an appropriate level of consistency between the proposed Welland TPP and the 30 Year Plan, it will be necessary that some transport and parking strategies for the Welland TPP be brought into line with the transport strategies of the 30 Year Plan. The 30 Year Plan Transport policies and targets, where relevant, are reproduced as follows, for the benefit of this strategic research summary:

Policies

1. *Protect the transport functionality of road and rail corridors through planning policy in Development Plans.*
2. *Designate and protect strategic freight corridors as identified on Map D15.*
3. *Designate major freight routes in Structure Plans and protect their transport functionality through design guidelines that specify buffer zones, access points and setbacks from the thoroughfare. The Plan seeks to avoid compromising major freight routes by the inappropriate location of residential development.*
4. *Identify and protect land for planned upgrades of major transport networks in Structure Plans.*
5. *Increase the amount of new residential housing in those transit corridors earmarked for network expansion and upgrade.*
6. *Give priority to increasing densities and designating types of services, such as retail, around existing interchanges and planned upgrades of railway and tram stations and bus interchanges.*

12. *Provide and extend a connected bicycle network across Greater Adelaide, using bike lanes and cycle ways as shown on Map D16.*
13. *Integrate into Structure Plans for major transit corridors off-road shared-use paths, on-road bicycle lanes, footpaths and cycling friendly streets to promote walking and cycling.*
14. *Provide direct and safe cycling links to public transport stations and interchanges.*
15. *Provide for non-stop travel along the strategic north–south corridor, linking the Northern Expressway, the proposed Northern Connector, the Port River Expressway, South Road, and the Southern Expressway.*

Targets

A. *Reduce car dependency and increase public transport to 10 per cent of all transport use by 2018 (South Australia's Strategic Plan, target T3.6).*
B. *Prioritise residential and employment growth in areas where transport infrastructure is planned (see Table D3).*
E. *Protect primary and secondary freight roads that are gazetted for use by restricted access vehicles (identified on Map D15).*

F. Create dedicated walking and cycling corridors along major transit corridors to improve access to activity centres, public transport nodes, and local walking and cycling routes.
G. Maintain, extend and improve Adelaide's Bike direct network, including the development of greenways.

2.2 City of Charles Sturt Development Plan

The following consideration of the City of Charles Sturt Development Plan, is primarily aimed at summarising the nature of each relevant zone, policy area and/or precinct which may be affected by the proposed Welland TPP. In order to developed appropriate transport and parking strategies for the Welland neighbourhood, it is critical to understand the nature and function of current and desired future land use within the area, and additionally, to consider the requirements already placed on land use planning by the Development Plan in relation to transport and car parking.

Council Wide Provisions

There a large number of provisions relating to Transportation and Access contained within the General (Council Wide) Section of the Charles Sturt Development Plan. As is the case with all general provisions, these policies are applicable to all development applications and development assessment matters dealing with transport, parking and access. In addition to the relevant Council Wide provisions contained within the City of Charles Sturt Development Plan, the Welland area is also occupied by a variety of zones, policy areas and precincts, including:

Zones, Policy Areas and Precincts (refer Figures 2, 3 and 4)

- Local Centre Zone (LCe)
- Mixed Use Zone (MU), and Precincts 47 and 49
- Neighbourhood Centre Zone (NCe), and Policy Area 14 and Precincts 61 and 62
- Residential Character Zone (RC), and Precincts 70, 71 and 72
- Residential Zone (R), and Policy Area 16.

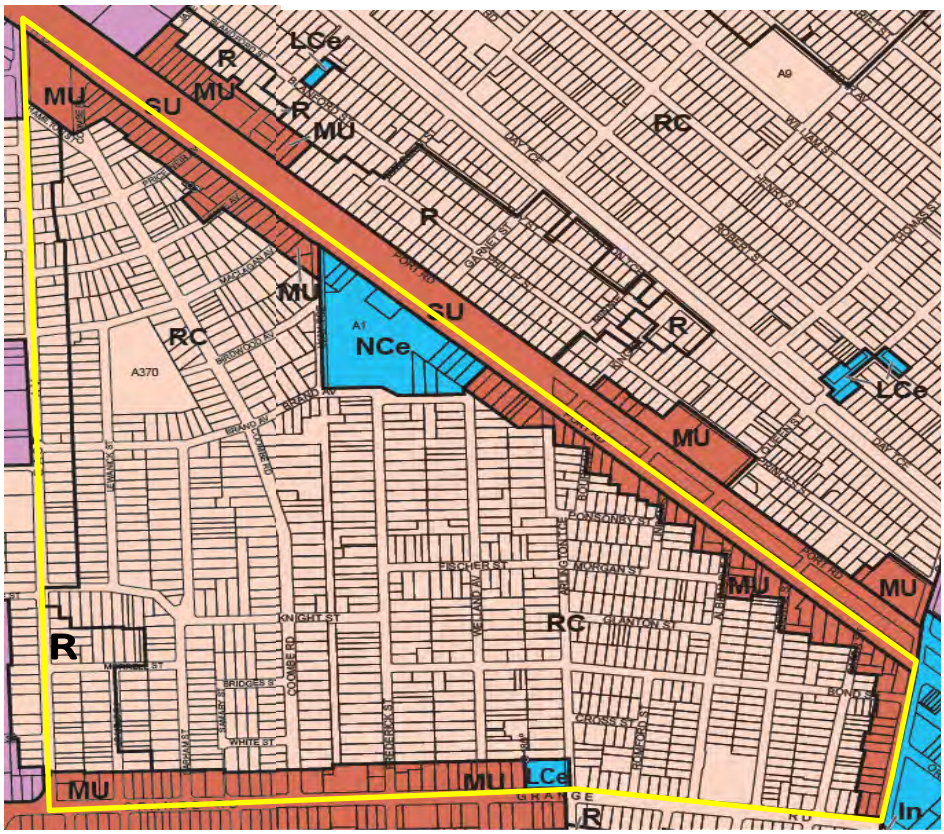


Figure 2: Zone Map for Welland Study Area

Figure 3: Policy Area Map for Welland Study Area

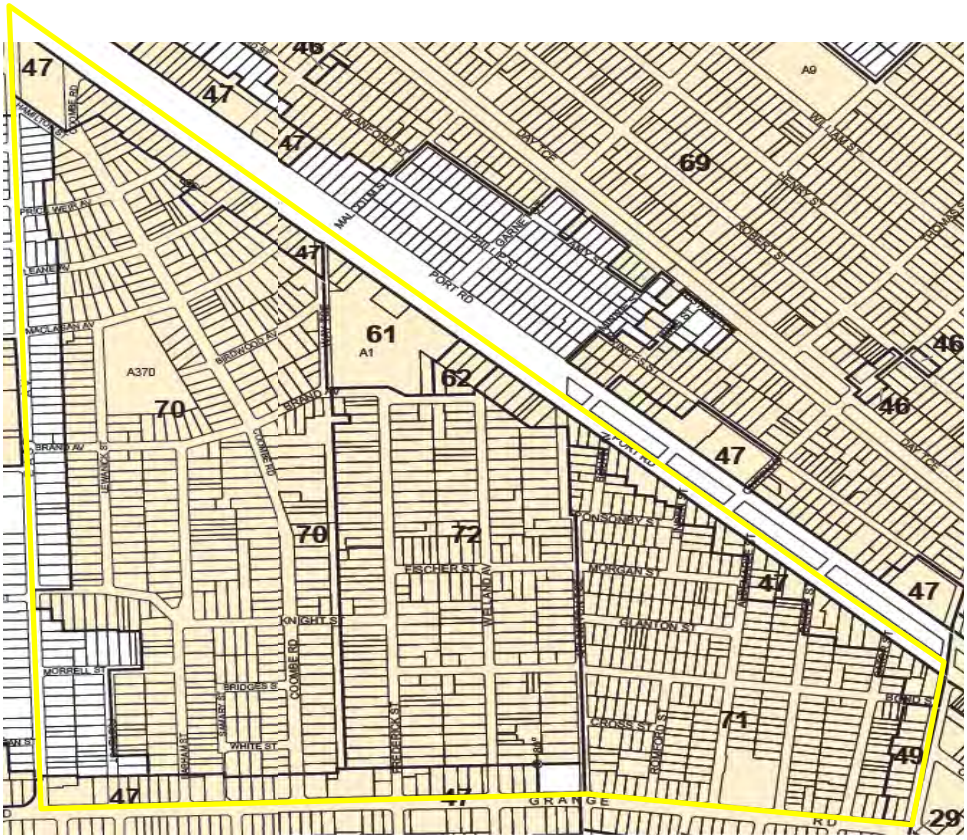


Figure 4: Precinct Map for Welland Study Area

The following provides a summary of the nature, intent and key characteristics of each zone, policy area and precinct. It is essential that each is thoroughly understood, both in terms the influences of existing strategic documentation, and also relative to the development of the Welland TPP. The following summary is in no particular order, and summarises the zones, policy areas and precinct in the order that they appear in the City of Charles Sturt Development Plan.

Local Centre Zone

The Local Centre Zone is situated along the Grange Road carriageway, interfacing both the Residential Character Zone (to the east) and the Mixed Use Zone (to the west). Behind is the Residential Character Zone. The Local Centre zone is intended to accommodate small scale and local convenience options including office, retail and service facilities, primarily servicing the local area.

The Welland Neighbourhood Local Centre Zone accommodates a small number of speciality shops and services along Grange Road. The nature of the centre is fairly nondescript in terms of its presence within the locality, and requires some degree of consideration in regards to its existence and benefit to the locality. To this end, the Desired Character Statement for the Local Centre Zone identifies the Grand Road, Welland Local Centre as one which will improve over time '… through the development of an adequate range of local retail services, including a quality seven day mini-mart'.

Mixed Use Zone

The Mixed Use Zone interfaces the Port Road, South Road and Grange Road carriageways and encompasses the vast majority of land immediately adjacent each of these roads, with the exception of the Welland Shopping Centre (Neighbourhood Centre Zone) on Port Road, and segments of the Residential Character Zone and Local Centre Zone along Grange Road.

As described by the Desired Character Statement, a functional and diverse range of uses, including a mix of commercial, community, light industrial, medium density residential, office, and small-scale shop developments are envisaged within the Mixed Use Zone. It will be essential to consider the Mixed Use Zone and its anticipated range and integrity of land uses within the Welland TPP.

The extent of the Mixed Use Zone along the Port Road carriageway is contained within the north-western growth corridor identified by the 30 Year Plan for Greater Adelaide. The nature of development anticipated for the Mixed Use Zone is such that it would lend itself readily to the intent of the 30 Year Plan in terms of increasing the housing (and therefore) population densities in and around major transport corridors.

Precinct 47: Comprises a commercial character of motor trade, showroom and industrial activities, interspersed by residential dwellings. Much of the precinct fronts arterial roads, such as Grange and Port Road, which will be further developed as a mixed commercial and high density residential area. It is desirable to integrate rear parking areas between adjoining sites, and site amalgamations are very desirable.

Precinct 49: Accommodates a number of buildings of heritage value, including a former church, hall, and nursing home, as well as a number of character dwellings. It is envisaged by the Development Plan that the precinct would retain existing contributory buildings, with new development comprising new complementary buildings. Mixed use housing developments is encouraged, with the intention that the precinct be developed to accommodate commercial and medium density residential activities.

Neighbourhood Centre Zone

The Neighbourhood Centre Zone interfaces the Port Road Carriageway. The zone services the general retail and commercial needs of the Welland and surrounding communities, accommodating the Welland Shopping Centre. The shopping centre provides for a variety of office, retail, bulky goods and service facilities. It is considered that this zone will further develop over time, for the continued benefit of both existing and future residents, taking account of projected population increases.

The centre provides the main focus of business and community life outside a district centre, and provides for the more frequent and regularly recurring needs of the surrounding communities. The centre can also accommodate residential development in conjunction with non-residential development

Welland Policy Area 14: Intends to provide for the weekly shopping and business needs for the surrounding areas. The policy area provides for supermarkets, a range of convenience and specialty shops and offices. Development will consolidate the existing Welland Centre and provide additional shopping, services and community facilities which are lacking in the existing policy area.

Precinct 61: Is described as 'Retail Core' and comprises a precinct with a focus on shopping, business and community activities. New Development will provide additional shopping, institutional and community facilities which are lacking.

Precinct 62: Is described as 'Commercial Fringe' and comprises a precinct primarily aimed at accommodates banking, large space retailing, office, service trade restaurant facilities and community type uses. nature are appropriate. The precinct will be developed in a visually and functionally cohesive manner.

Residential Character Zone

The vast majority of the Welland area is occupied by the Residential Character Zone. This zone encompasses 15 individual heritage precincts, each comprising a '… distinct historical character', as described in the Desired Character Statement for the zone.

The zone is considered to encompass a high level of residential amenity, producing an ideal living environment for its residents. Important features of the zone include a low residential density (comprising dwellings constructed mostly in the early 1900's), tree lined streets and attractive public landscaped areas.

Small increases in residential density are anticipated, albeit only in limited circumstances, and on corner sites where the proposed dwelling will replace a non-complying land use, or an existing dwelling not identified as a contributory item.

Precinct 70: The 'Allenby Gardens' Precinct comprises more than one third of the Residential Character Zone within the westernmost portion of the Welland TPP study area. As described by the Desired Character Statement for the zone, Allenby Gardens accommodates good quality detached housing from the 1920–30's period, comprising a range of character home styles. These houses are characterised by their use of consistent materials, finishes, roof forms and architectural styling (relative to the construction period). The precinct accommodates tree-lined streets and can be described as having an 'established' and attractive residential amenity.

Precinct 71: The 'Pre World War One' Precinct comprises around one third of the Residential Character Zone within the easternmost portion of the Welland TPP study area. As described by the Desired Character Statement for the zone, the 'Pre World War One' precinct accommodates late 1890s to the late 1910s dwellings, with houses characterised by their use of consistent materials, finishes, roof forms and architectural styling (relative to the construction period). The housing is very uniform, with little new residential development to date. The mature trees which line the streets contribute significantly to the area's established older character.

Precinct 72: The 'Welland Character' Precinct comprises the remaining area of the Residential Character Zone, and is central to the Welland TPP study area. As described by the Desired Character Statement for the zone, the 'Welland Character' precinct also accommodates houses from the 1910–1920 period, with houses characterised by their use of consistent materials, finishes, roof forms and architectural styling (relative to the construction period). This is consistent through the precinct, although there are also a number of recent housing developments.

Residential Zone

The extent of the Residential Zone occupies only a small proportion of the Welland area along East Terrace. The City of Charles Sturt Residential Zone envisaged a range of dwelling types and styles, with an '… increase in dwelling densities in close proximity to centres, public transport and public open spaces.

The Residential Zone within the Welland area is likely to remain relatively unaffected by the 30 Year Plan, North-Western Corridor Structure Plan. However, given the growth motivated policies of the Residential Zone, density increases within the zone along East Terrace are likely. Given the likelihood of these density increases AND THE ROLE OF East Terrace as an important 'distributor' road, there must inevitably be consideration toward the provision of sufficient off street car parking for new development along East Terrace.

Policy Area 16: This Policy Area applies to the Residential Zone within the study area, and envisages a mix of dwelling types, including lower density detached and semi-detached, and medium density group dwellings and residential flat buildings. It is desirable that dwellings be designed to complement pre and post war building styles, ensuring consistency with and enhancement of the established character. Two storeys development is appropriate.

2.3 Charles Sturt Traffic Management Strategy (QED Pty Ltd)

The QED Traffic Management Study is perhaps the most comprehensive reference relating to the functionality and use of roads within the City of Charles Sturt. The study outlines a series of maps, relating to road hierarchy and road use within the city. The study provides several transport maps for consideration (refer **Figures 5-10)**.

The maps comprise both "classical" (i.e. Arterial, Distributor, Collector roads, etc) and "functional" (i.e. Freight, Commuter, Public Transit, etc) hierarchies. It is acknowledged that the study was undertaken in 2005, however the vision, particularly relating to the functional road hierarchy, is considered to be relevant, particularly with respect to the 30 Year Plan, and the North-Western Corridor Structure Plan. The strategy identified the need to review Council's bicycle plan and prepare a comprehensive pedestrian plan, and established a road hierarchy used to determine the types of abutting land uses.

Welland Study Area Encircled

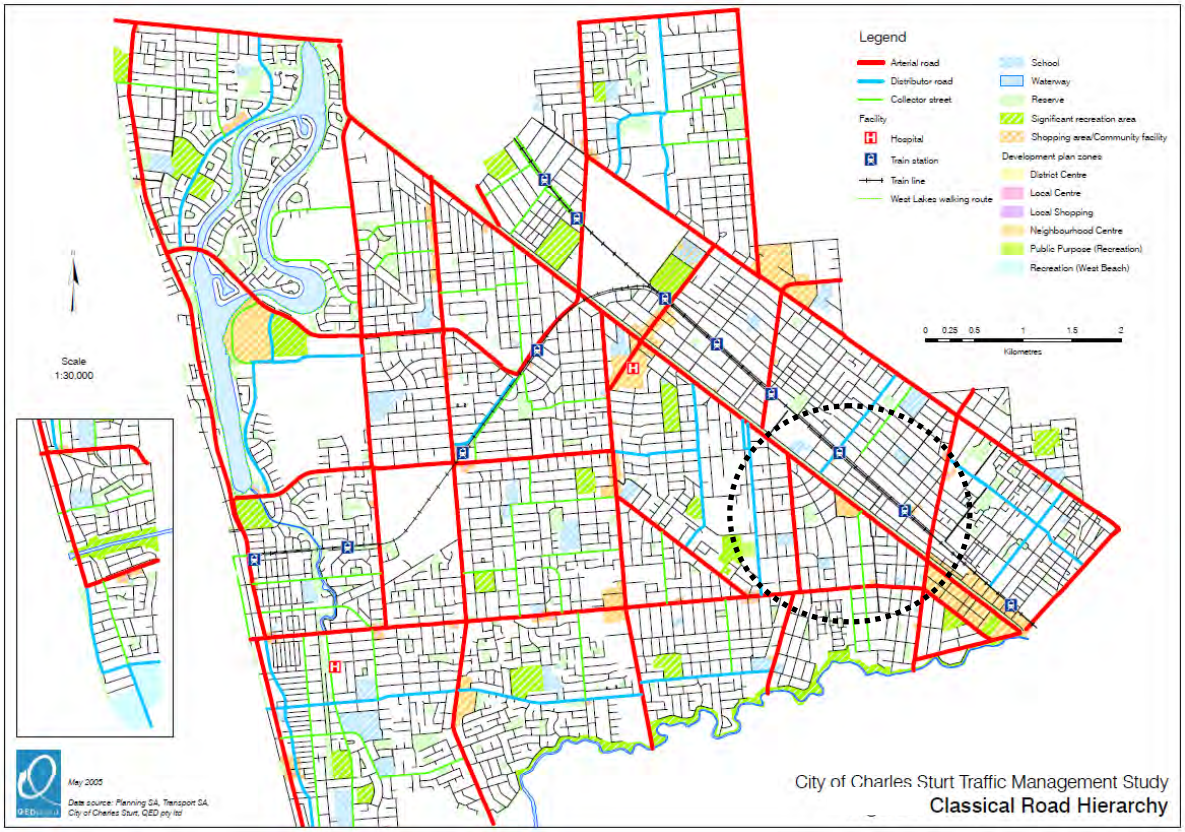


Figure 5: Classical Road Hierarchy (Refer QED Traffic Management Strategy)

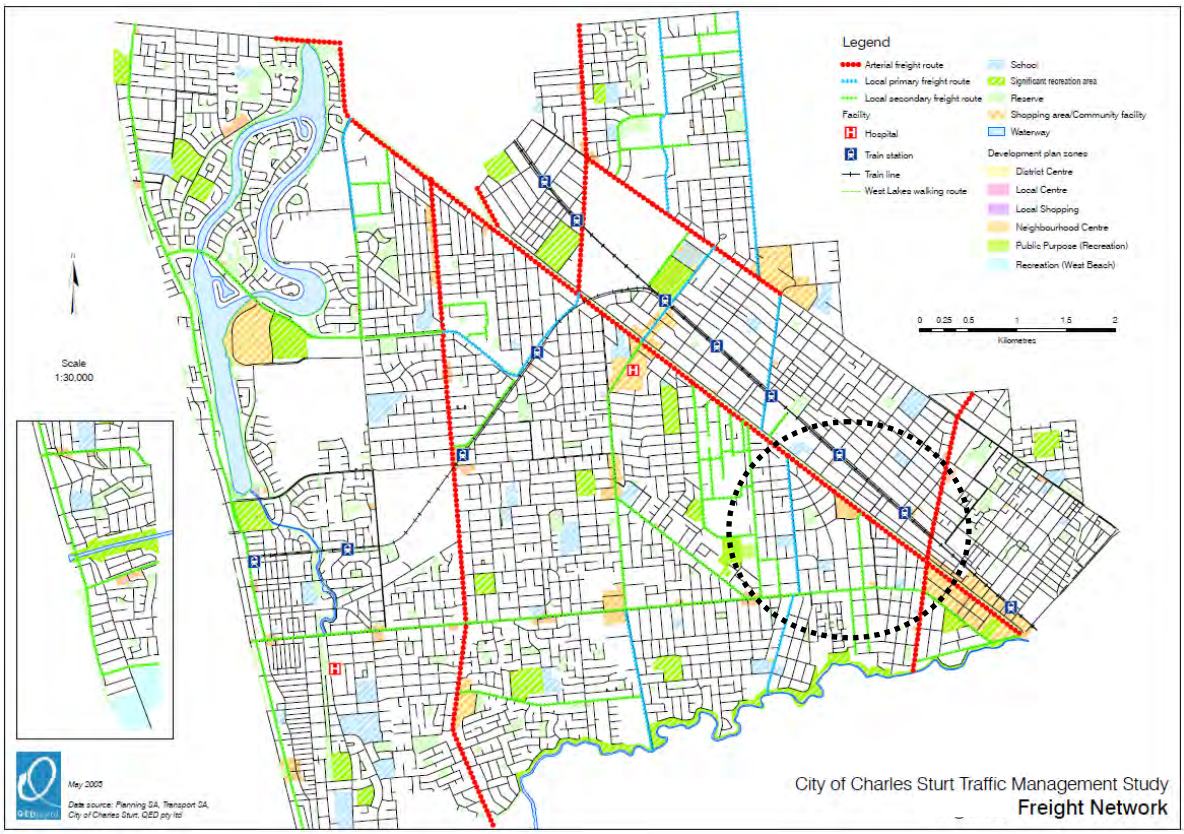


Figure 6: Functional Road Hierarchy - Freight Network (Refer QED Traffic Management Strategy)

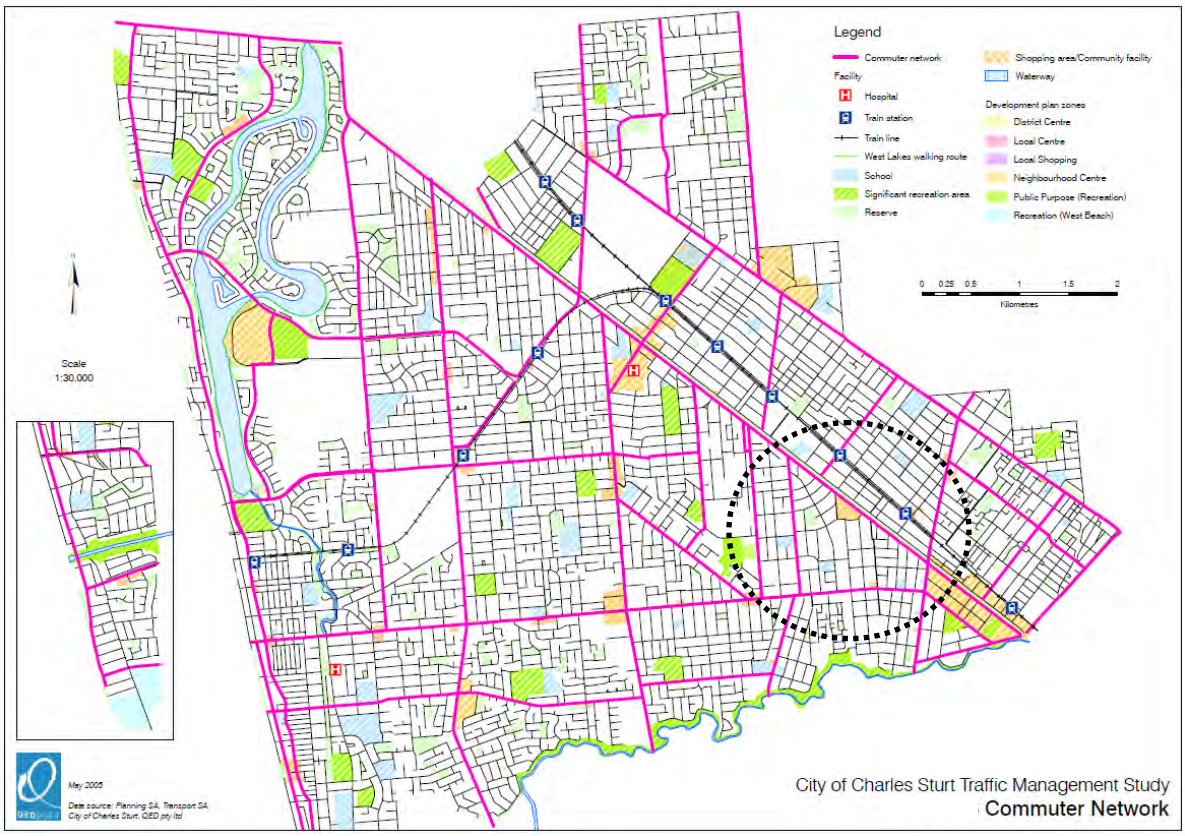


Figure 7: Functional Road Hierarchy - Commuter Network (Refer QED Traffic Management Strategy)

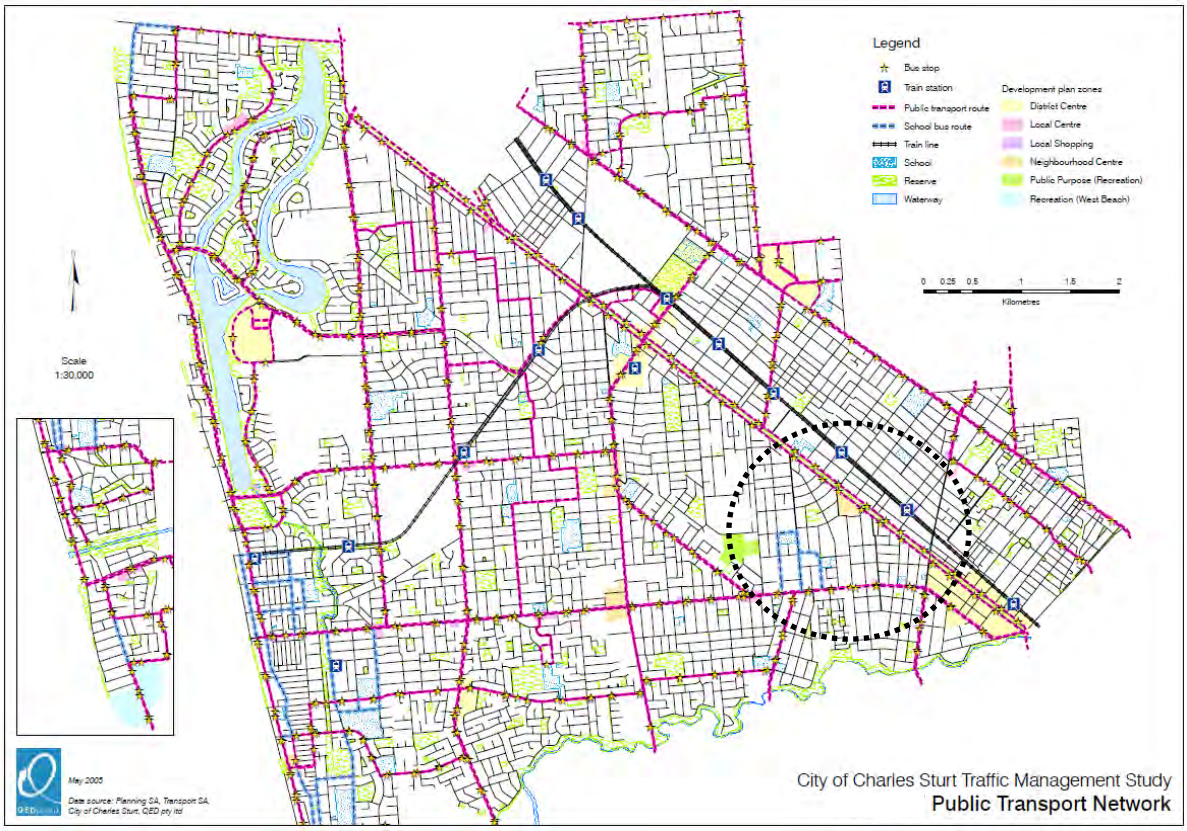


Figure 8: Functional Road Hierarchy - Public Transport Network (Refer QED Traffic Management Strategy)

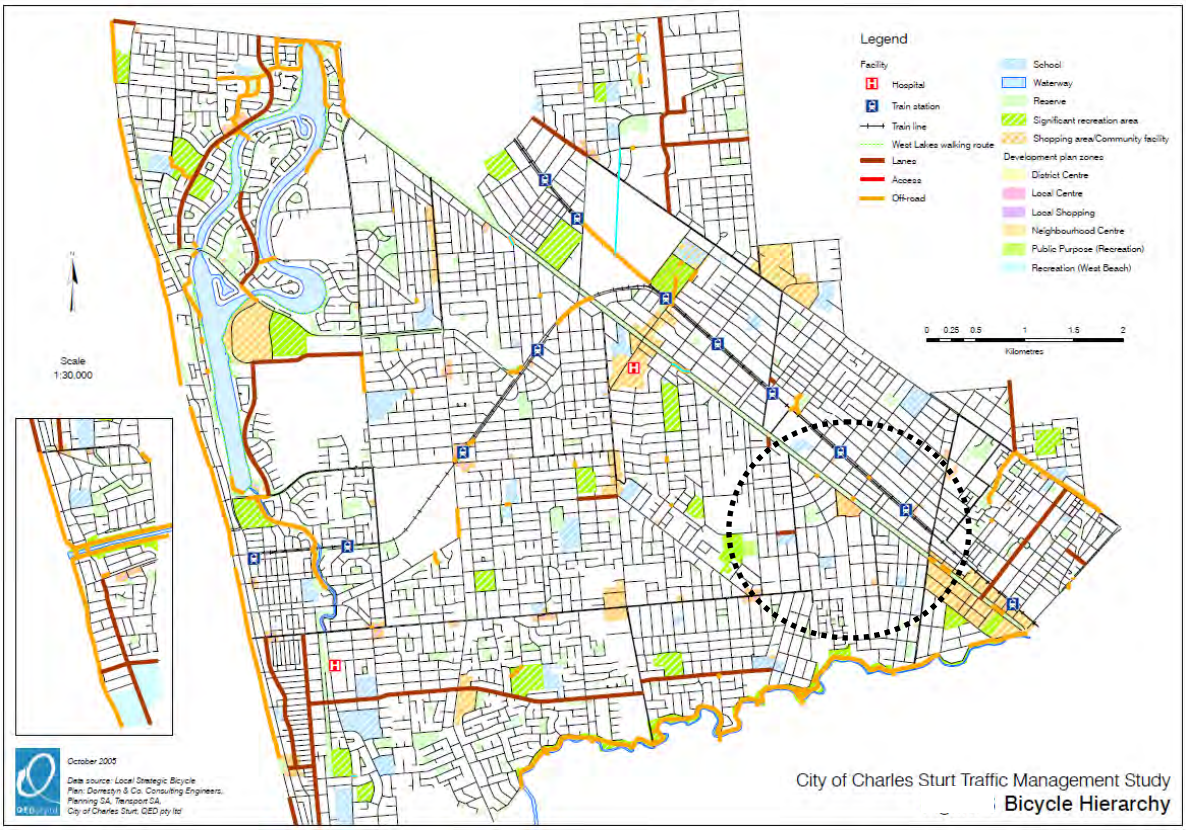


Figure 9: Functional Road Hierarchy - Bicycle Network (Refer QED Traffic Management Strategy)

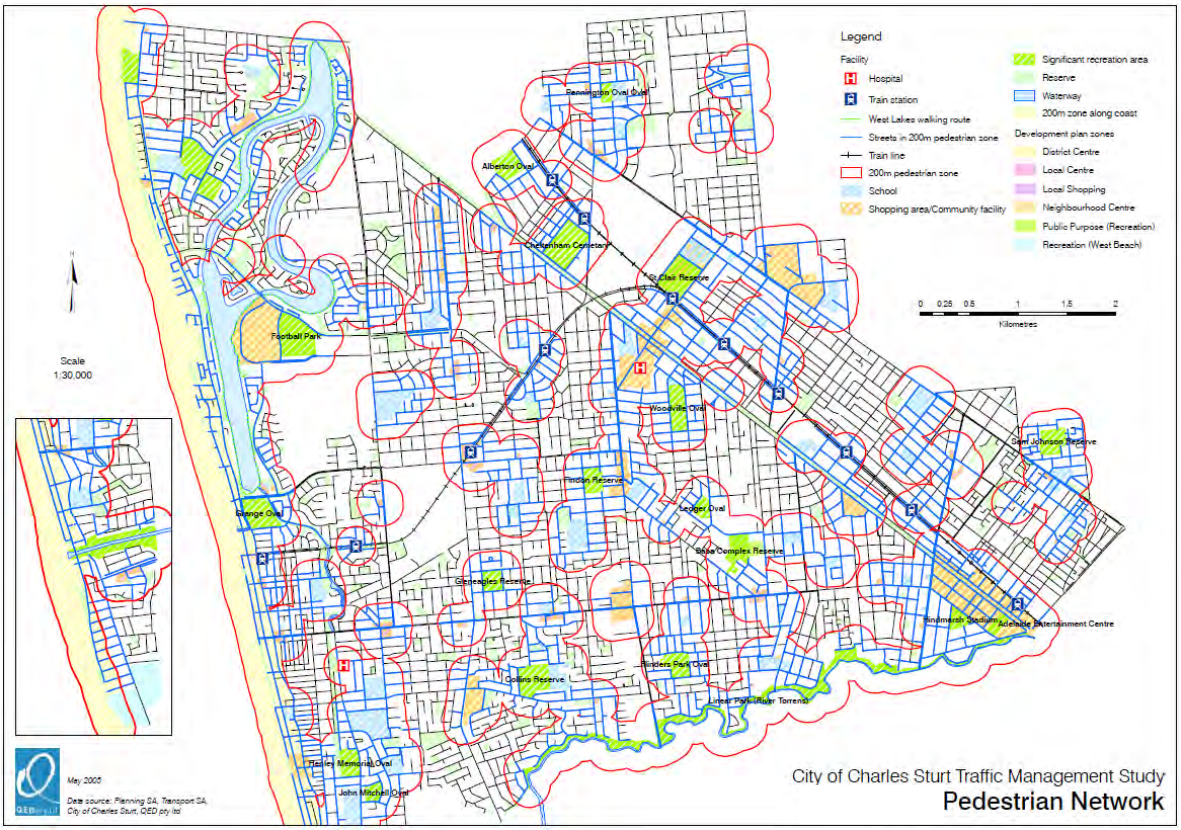


Figure 10: Functional Road Hierarchy - Pedestrian Network (Refer QED Traffic Management Strategy)

Road networks affecting streets/carriageways within the Welland TPP Study Area:

Classic Hierarchy
Arterial Roads: East Avenue, Grange Road, Port Road, South Road
Distributor Roads: Nil
Collector Streets: Welland Avenue

Freight
Arterial Freight Route: Port Road, South Road
Local Primary Freight Route: East Avenue
Local Secondary Freight Route: Grange Road, Welland Avenue

Commuter
Commuter Network: East Avenue, Grange Road, Port Road, South Road

Public Transport
Public Transport Route (Bus): Port Road (14 stops), Grange Road (10 stops). It is noted that there are no stops along South Road within the study area, however, bus stops are quite accessible along Port Road and Grange Road for those living in proximity to South Road.
School Bus Route: School buses loop through Barham Street and East Avenue stopping at St Michaels College (west f the study area) and Allenby Gardens Primary School within the study area.
Train Line: North of Port Road (Croydon and West Croydon Stations)

Bicycle
There is no identifiable bicycle network within the Welland TPP study area. Small sections of bicycle network exist on the periphery of the study area, however, would have a limited impact on the establishment of the transport and parking plan. This is a matter that may require further consideration in term establishing appropriate bicycle networks within the local area to coincide with the Welland TPP.

Pedestrian
Pedestrian catchments acknowledge proximity of local services with walking distance, including train stations, bus stops, shopping centres, recreation areas, etc. Refer to Pedestrian Network Plan.

Key Recommendations of the Strategy area outlined as follows, and includes the subsequent 'Recommended Actions' table:

- Development of a Road Hierarchy structure and application of it to the City of Charles Sturt.
- Definition of Local Traffic Areas and Precincts and prioritisation of these for study
- Development of a standard process for undertaking Local Area Traffic Management Studies.

2.4 Charles Sturt Transport Strategy 2005-2025 (Parsons Brinkerhoff)

The Charles Sturt Transport Strategy 2005-2025 was undertaken to better understand transport issues across the council area, and how they relate to the use of land and the provisions in the Development Plan. The study recommended defining precincts based on commercial, residential, and industrial land uses for the future development of traffic management and land use strategies, as well as reviewing the Development Plan to allow for the gradual removal of inappropriate or conflicting land uses from each precinct. Lastly, the study encourages medium and high density urban development around existing transport nodes and along transport corridors, built on the significant analysis by the then Planning SA, of the opportunities to introduce Transport Orientated Developments.

Parsons Brinkerhoff provides a synopsis of both short term (2 years) and medium term (5 years) priorities and recommendations which are reproduced in summary form below.

Key Recommendations of the Strategy are outline as follows:

Short Term

- Define precincts based on commercial, residential, and industrial land uses
- Develop a Traffic Management Strategy
- Prioritise traffic and parking issues for treatment
- Review the Local Area Bicycle Plan
- Undertake an audit of council-maintained transport infrastructure
- Engage the local community and embrace multi-user facilities
- Develop Master Plans for urban rejuvenation and/or redevelopment (e.g. North-Western Corridor)
- Continue develop council's strategy for Community Transport services
- Develop an agreed network of designated routes for B-double and other Restricted Access Vehicles
- Monitor the effectiveness of existing public transport routes and services
- Adapt to the City of Charles Sturt programs aimed at changing people's travel behaviour
- Develop guiding principles for revegetating existing road corridors and prioritise corridors for treatment.

Medium Term

- Prepare Local Area Traffic and Parking Management Plans for defined precincts
- Develop a program for the implementation of the local area bicycle plan.
- Review the program for maintaining existing and constructing new footpaths to comply with guidelines for disability access
- Develop detailed design plans for multi-user paths in the city and schedule for implementation
- Expand community transport services to improve access to essential services
- Implement commuter parking around railway stations.
- Commence the implementation of the strategy to revegetate road corridors

2.5 Transport Study, North West Growth Corridor (GTA Consultants)

GTA Consultants prepared a Transport Study for the City of Charles Sturt in 2011, with an intent on focusing on the North-Western Growth Corridor of the city. The North-Western Growth Corridor was defined by GTA Consultants as being the area bound by Torrens Road, Port Road, Woodville Road and Park Terrace.

This strategy identifies best practice in transport planning for recognised Transit/Transport Oriented Development areas and speculates on a best practice design for the local road network to support sustainable transport modes. The study was also aimed at assisting the City of Charles Sturt to prepare for the increase in population in the growth corridor, and sought to demonstrate a best practice model for walkable and bikeable communities on the existing street networks in the corridor.

The North West Growth Corridor Strategy updates the two previous traffic and transport strategies prepared for the City of Charles Sturt in 2006 and 2005 (namely the Charles Sturt Traffic Management Strategy prepared by QED Pty Ltd and Charles Sturt Transport Strategy 2005-2025 (Parsons Brinkerhoff). Both of the previous strategies were prepared using a more traditional approach to traffic planning, emphasising road network priority and efficiency for motor vehicles.

More recently, the 30 Year Plan seeks urban in-fill along the North West Corridor through Transit Oriented Development, and as such, the North West Growth Corridor Transport Study responds to future population growth and associated travel demand for the corridor between Bowden and Woodville and surrounded by Port Road, Woodville Road, Torrens Road and Park Terrace.

2.6 Regional Bike Routes

Figure 11 indicates a number of bike direct routes through the Study Area, as well as confirming the status of the bike routes on the arterial roads. There are routes on part or all of Coombe Road, Brand Avenue and Knight, Bond, Bertie and Frederick Streets. On the arterials there are long standing peak period bike lanes on Grange Road (WB AM, EB PM) and Port Road (AM and PM both directions) and more recent (March to June 2010 implementation) on East Avenue.

Figure 11: Bike Routes through the Study Area (Bikedirect May 2012)

2.7 Residential Growth and Character Study, Strategic Context (Jensen Planning + Design)

The Residential Growth and Character Study was undertaken by Jensen Planning + Design in 2010 in collaboration with SGS Economics and Planning and Tonkin and Associates for the City of Charles Sturt. The study examined future residential growth and character issues across the City of Charles Sturt.

In regards to the Welland TPP, the study provides some overview of the nature and characteristics of the Welland neighbourhood in relation to growth and population changes, in addition to commentary regarding the future development of identified areas in regards to the demands of the 30 Year Plan.

The Residential Growth and Character Study was comprised of 6 individual reports prepared for the City of Charles Sturt

- The first report (Strategic Context Report) analyses population trends, policy approaches and legislation within the State Government and the City of Charles Sturt relating to residential growth and character.

- The second report (Opportunities and Constraints) summarises future population and housing projections specific to Charles Sturt based on a range of population scenarios. It also summarises major environmental, infrastructure and other constraints to achieving future housing growth.

- The third report (Future Social Infrastructure Requirements) provides a broad overview of the context and supply requirements of future social infrastructure needs across Charles Sturt.

- The fourth report (Character and Form of Potential Growth Opportunities) provides recommendations about the future character, form and extent of primarily residential growth in areas that have been identified as having potential for increased residential density in the City of Charles Sturt.

- The fifth report (Development Plan Policy Analysis for Growth Areas) assesses current Development Policy relating to the identified residential growth areas. It proposes new residential design policy and zoning changes for the identified residential growth areas that will inform a forthcoming Residential DPA. This report also incorporated a series of maps identifying potential growth areas and their proximity to railway stations and activity centre's.

- The sixth, and final report (Review of Certain Historic Conservation Areas) reviews the zone boundaries and policies for a number of existing Residential Historic Areas. It identifies opportunities for the refinement of the zone boundaries.

Figures 12 and 13 are contained within the fifth report, and cover a substantive portion of the study area for the Welland TPP. The maps clearly demonstrate corridor growth opportunities within the Mixed Use Zone along Port Road and Grange Road, and the Neighbourhood Centre Zone along Port Road. But for the Mixed Use Zone along Grange Road, the identified growth areas are located within 800 metres of the Croydon train station (although current pedestrian crossing restrictions on Port Road would reduce the actual extent of this catchment).

It is noted that a large part of the Welland TPP study area is located within an 800 metre radius of the Croydon station, however, areas within the Residential Historic (Conservation) Zone (now the Residential Character Zone) have not been identified as a growth area.

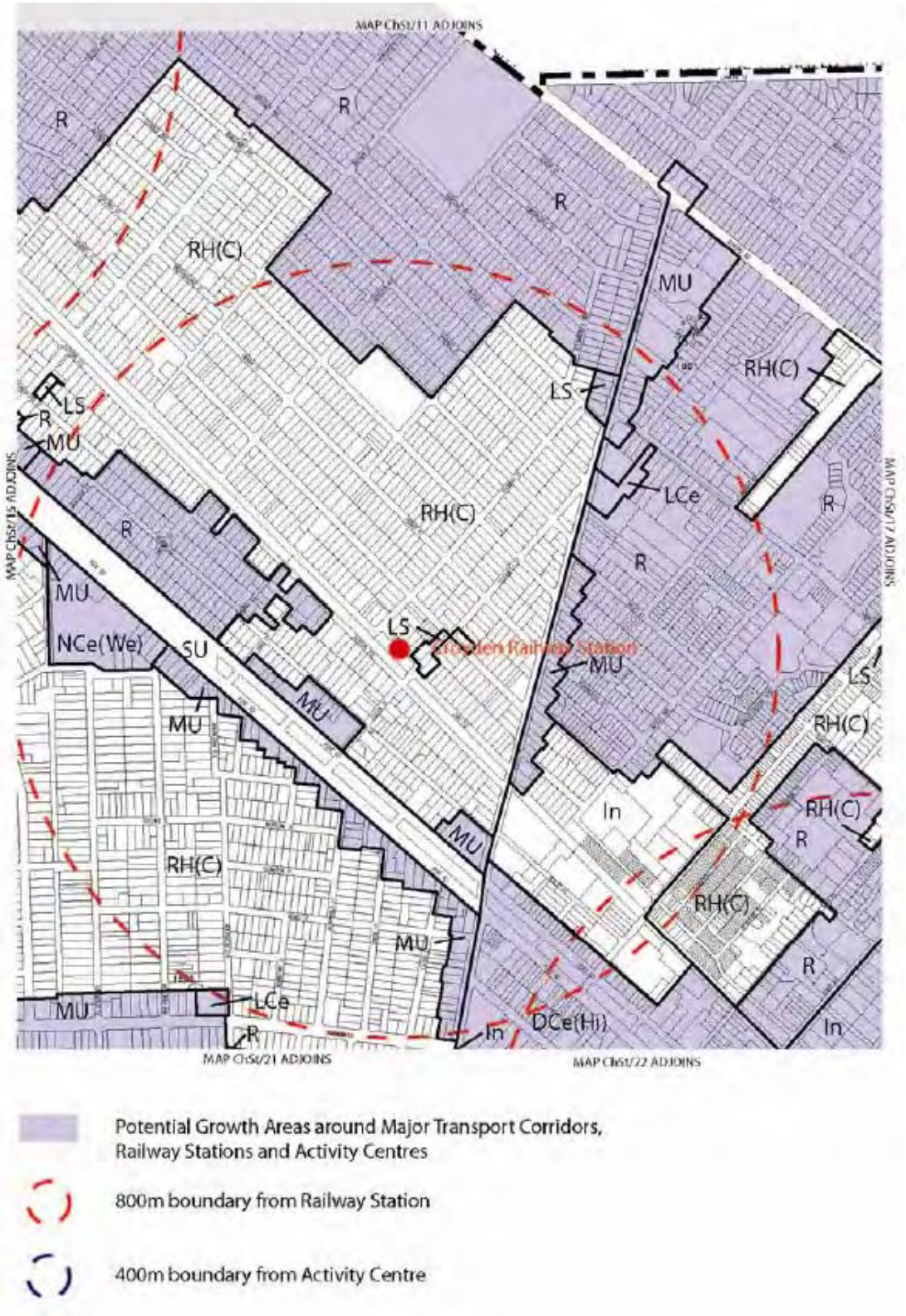


Figure 12: Potential Growth Areas (Refer Residential Growth and Character Study Jensen)

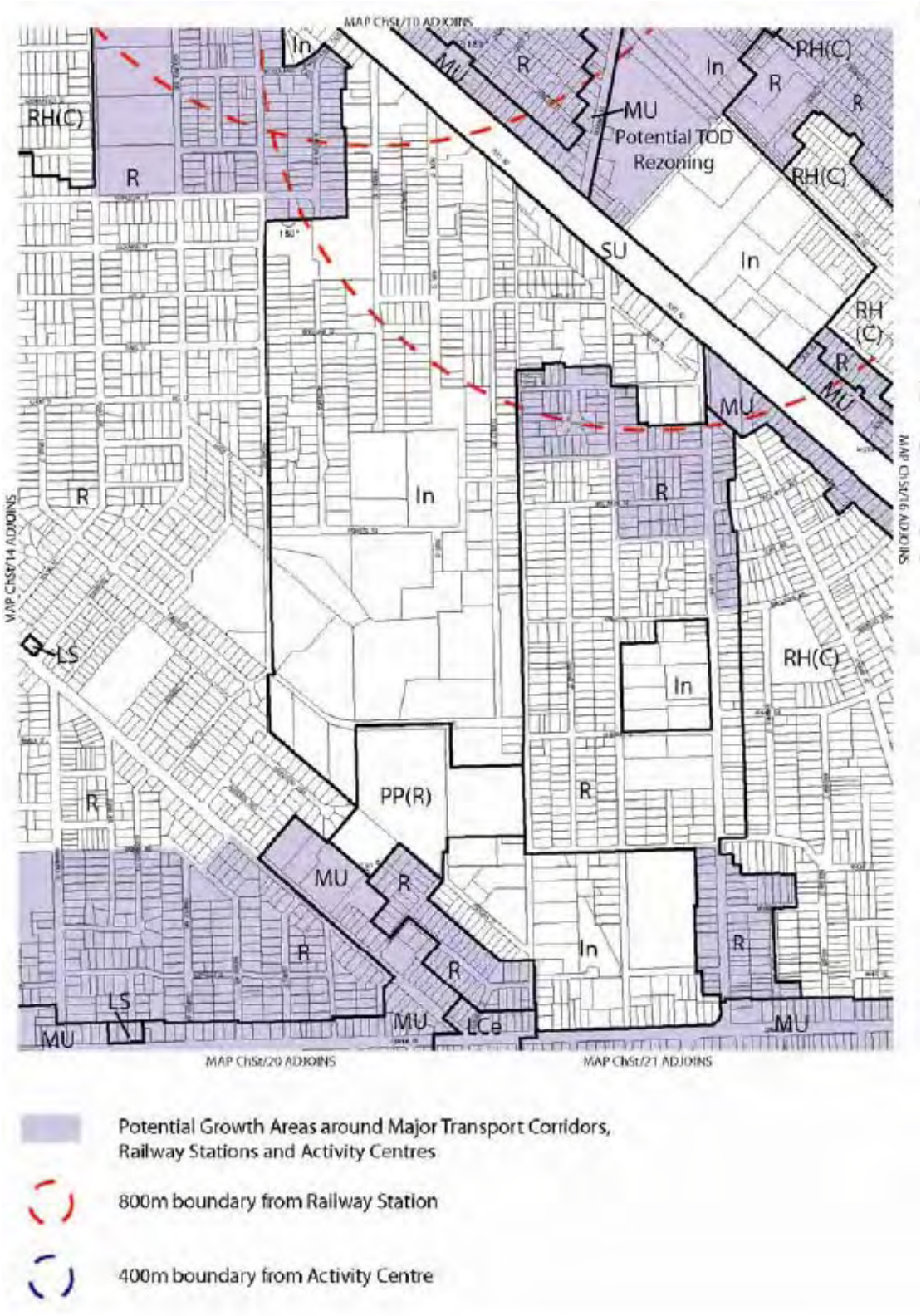
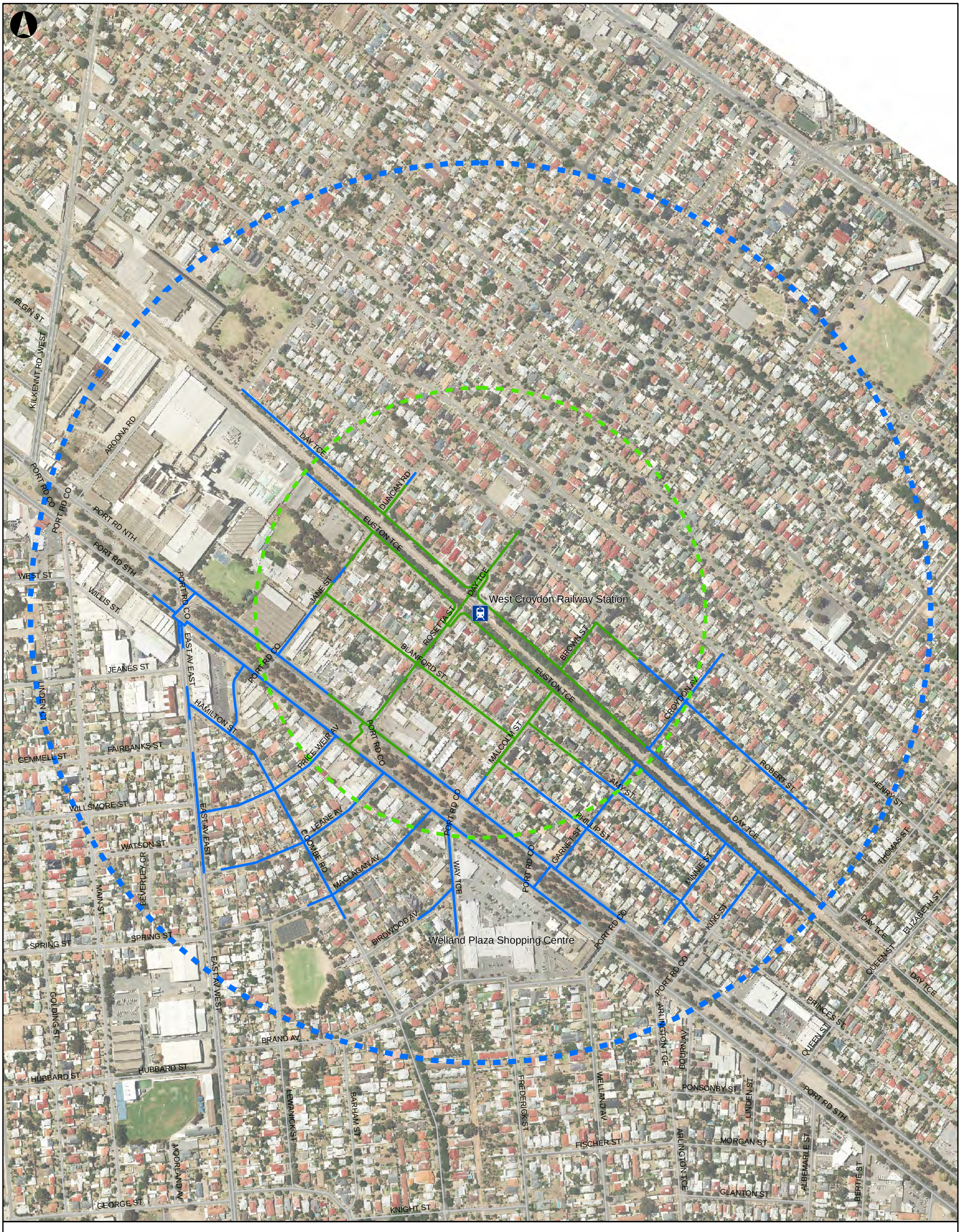


Figure 13: Potential Growth Areas (Refer Residential Growth and Character Study Jensen)

Appendix 5 Catchment Maps



Legend

- West Croydon Railway Station
- 400m Catchment
- 800m Catchment
- 400m as the crow flies
- 800m as the crow flies

Issue	Date	By	Chkd	Appd
P1	15-11-12	BLL	PF	PF

Client

City of Charles Sturt

Job Title

Welland Transport and Parking Plan

Drawing Title

West Croydon Railway Station Pedestrian Catchment Map

Metres

0 80 160 320

GTAconsultants

www.gta.com.au

Scale at A3

1:6,500

Drawing Status

Preliminary

Job No	Drawing No	Issue
12A1138000	001	P2

Legend

- Local Shopping Centre
- 400m Catchment
- 800m Catchment
- 400m as the crow flies
- 800m as the crow flies

Issue	Date	By	Chkd	Appd
P1	15-11-12	BLL	PF	PF

Client

City of Charles Sturt

Job Title

Welland Transport and Parking Plan

Drawing Title

Local Shopping Centre Pedestrian Catchment Map

Metres

0 80 160 320

GTAconsultants

www.gta.com.au

Scale at A3

1:6,500

Drawing Status

Preliminary

Job No	Drawing No	Issue
12A1138000	001	P2

Legend

- Croydon Railway Station
- 400m Catchment
- 800m Catchment
- 400m as the crow flies
- 800m as the crow flies

Issue	Date	By	Chkd	Appd
P1	15-11-12	BLL	PF	PF

Client

City of Charles Sturt

Job Title

Welland Transport and Parking Plan

Drawing Title

Croydon Railway Station Pedestrian Catchment Map

Metres

0 87.5 175 350

GTAconsultants

www.gta.com.au

Scale at A3

1:6,742

Drawing Status

Preliminary

Job No	Drawing No	Issue
12A1138000	001	P2

Legend

- Railway Stations
- Bus Stops
- Allenby Gardens Primary School
- 400m Catchment
- 800m Catchment
- 400m as the crow flies
- 800m as the crow flies

Issue	Date	By	Chkd	Appd
P1	15-11-12	BLL	PF	PF

Client

City of Charles Sturt

Job Title

Welland Transport and Parking Plan

Drawing Title

Allenby Gardens Primary School Pedestrian Catchment Map

Metres

0 80 160 320

GTAconsultants

www.gta.com.au

Scale at A3

1:6,500

Drawing Status

Preliminary

Job No	Drawing No	Issue
12A1138000	001	P2

Legend

- Key Access Points
- 200m Catchment
- 400m Catchment
- 600m Catchment

Issue	Date	By	Chkd	Appd
P1	15-11-12	BLL	PF	PF

Client
City of Charles Sturt

Job Title
Welland Transport and Parking Plan

Drawing Title
Welland Shopping Plaza Pedestrian Catchment Map

Metres
0 50 100 200

GTAconsultants
www.gta.com.au

Scale at A3
1:4,000

Drawing Status
Preliminary

Job No	Drawing No	Issue
12A1138000	001	P2

Appendix 6 Crash Severity Statistics

GTAconsultant

avante MAPPING SOLUTIONS

Crash Statistics

Crash Severity 2007-2011

Welland

Legend

- Railway Stations
- Railways
- Suburbs

Roads

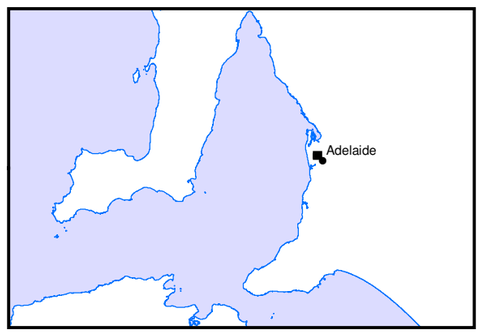
- Freeway / Highway
- Arterial
- Sub-arterial
- Collector
- Local

N

Scale at A3 1:7,000

0 100 200 400

Metres



Data Properties

Lamberts Conformal Conic Projection.
Geocentric Datum of Australia 1994 (GDA94)
Map generated December 2012 by
Avante Mapping Solutions
www.avantemapping.com.au
Land Body, Water Bodies, Main Roads,
LGAs, ASD: DEWNR
Crash Statistics Data * : DPTI
* Crash Data from 2007 - 2011