2 Cycling Demand

2.1 Cycle Traffic Counts

Roads ACT have a program of cycle traffic counting on shared paths around Canberra. Data has been collected at some locations since 1994 and is available in a variety of formats. The locations of the cycle traffic counting points are shown in Figure 3.

The report *Bicycle Volumes in the ACT*, printed in February 2000 is the most recent analysis of this data. The following relevant points can be drawn from the document and the other raw data that is available:

- there are daily peaks in cycling numbers on week days that correspond to commuter times;
- weekday cycling numbers are generally greater than weekends, attributable to commuter and education related trips;
- there are very large variations in counts at single locations even on consecutive days. The weather is often suggested as a contributing factor;
- there is strong evidence of major seasonal variations, with cyclists avoiding the colder months (this is no surprise);
- a busy path in Canberra is likely to be carrying between 400 and 1000 cyclists per day, this generally accounts for the top 6 count locations; and
- many paths carry between 100 and 400 cyclists, approximately 20 locations operate at this level.

Cordon Counts around town centres have also been periodically conducted in the 1990's by Roads ACT and in 2004 and 2005 by Pedal Power.

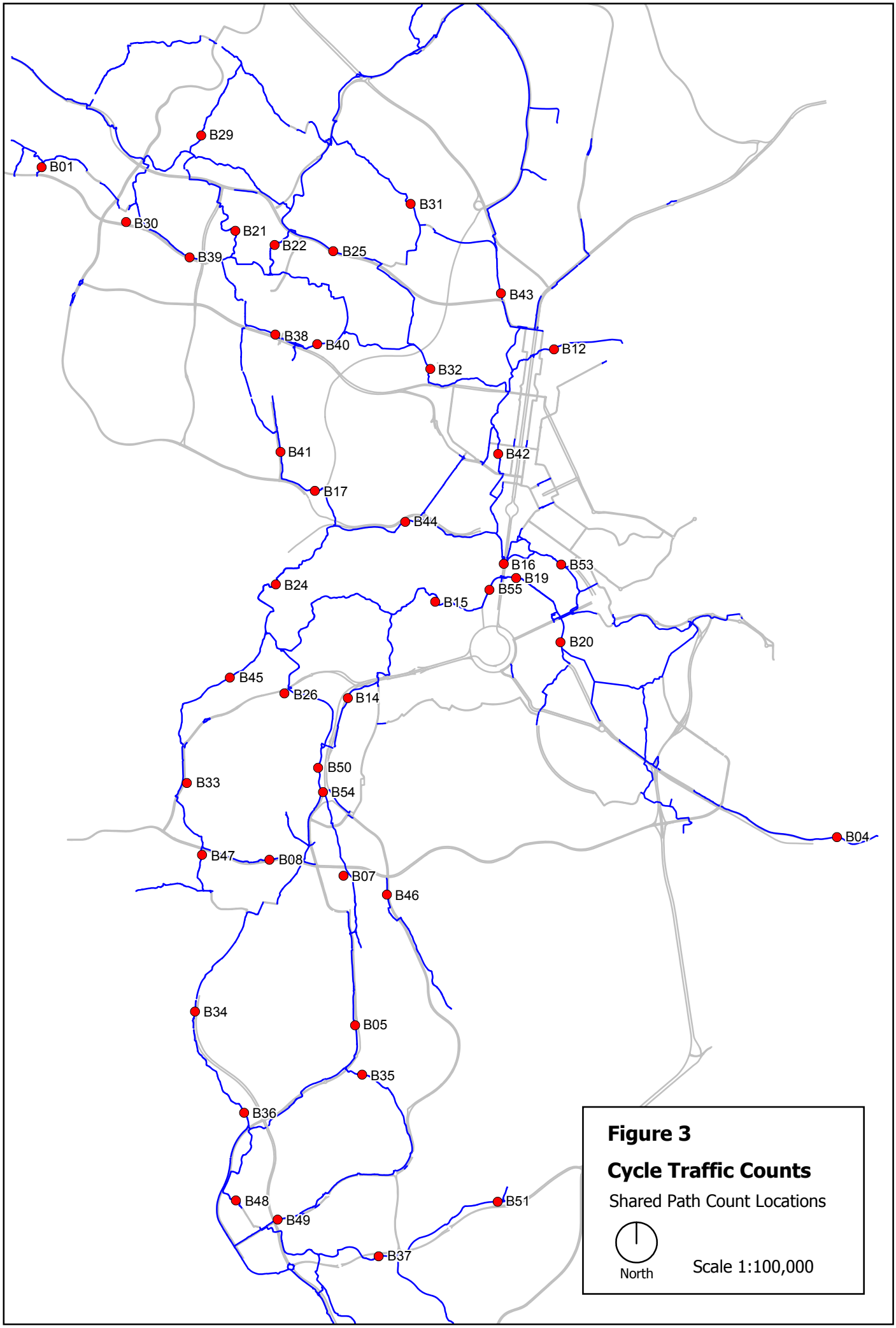
Of great value are the Pedal Power cordon count numbers that correspond to locations measured by automated traffic counters. In each case (B16, B42 and B44), the cordon counts have measured very nearly half the mechanised weekday average counts – assuming the bulk of riders are commuters and that they will return in the evening, this appears to be a good correlation and suitable reality check.

Table 1 – Comparison of Cycle Counts, Automatic Counter and Cordon Counts

Automatic Counter	(1999)	Cordon Count	(2005)
B16	857	CC31	256
B42	397	CC11	179
B44	399	CC01	205

A general rule of thumb for vehicle traffic counts is that the daily flow is 10 times the peak hourly flow. This does not appear to hold true for cycling in Canberra, probably due to the greater impact of light and temperature on cyclists than car drivers. Analysis of the relationship between mechanised daily counts and cordon count data suggests that a ratio of 3 times the 2.5 hour cordon count number is appropriate.

Using a combination of traffic count data, cordon count data and individual spot counts where available, the likely utilisation rates of each link in the main network can be estimated. The known cycle count data is presented in Figure 4.


B29
B01
B31
B30
B21
B22
B25
B39
B43
B38
B40
B12
B32
B41
B42
B17
B44
B16
B53
B19
B24
B55
B15
B20
B45
B26
B14
B50
B33
B54
B04
B47
B08
B07
B46
B34
B05
B35
B36
B48
B51
B49
B37
Figure 3
Cycle Traffic Counts
Shared Path Count Locations
North
Scale 1:100,000

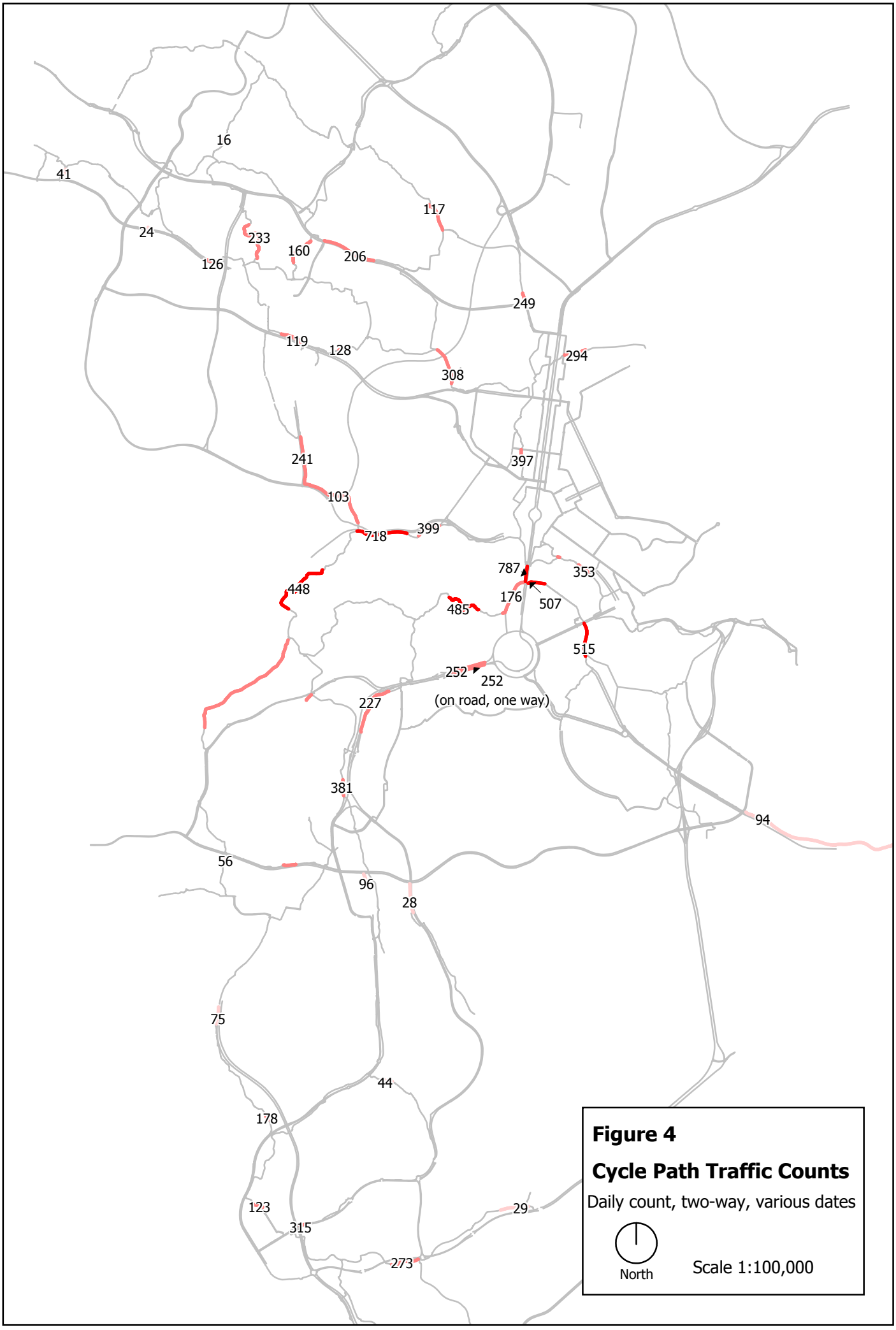


Figure 4

Cycle Path Traffic Counts

Daily count, two-way, various dates

North

Scale 1:100,000

2.2 On Road Cycle Counts

Given that the provision of on road cycle lanes is relatively new in the ACT, there is little data available on their usage. In order to assist in the evaluation of the new facilities, Roads ACT propose to initiate counts during 2005/06. These counts will determine the current level of usage and lay the foundation for counts into the future. It is expected that future counts will demonstrate a progressive increase in the use of on road lanes as a connected network is established and more people become familiar with the routes available.

Counts are to be conducted twice annually, in March and August. March will correspond to the expected peak demand. It is during warm weather, daylight savings and university semester will have commenced. August is expected to be the lowest demand being the end of winter.

Roads ACT have identified 10 main commuter links that they wish to conduct counts on. These are listed below with suggested count location numbers alongside.

Table 2 – Recommended on-road cycle count locations for 2005/06

Link	**Count Location**
Belconnen to City	A05 and A07
City to Belconnen	A06 and A08
Dickson to City	A11
City to Dickson	A12
City to Woden	A18 and A20
Woden to City	A17 and A19
Gungahlin to Dickson	A01 and A03
Dickson to Gungahlin	A02 and A04
Woden to Tuggeranong	A26
Tuggeranong to Woden	A25

In addition to the locations suggested above, some locations have been suggested for future counts in anticipation of the development of on road cycling facilities.

The suggested count locations are shown in Figure 5. The logic behind the locations is described below.

All locations have existing on-road cycle lanes as indicated in Figure 2 of the 10 Year Masterplan. Generally counts are suggested where the lane on the arterial road would be an important commuter link and there is not a good alternate shared path. Count locations are also sited to avoid being close to bus stops to avoid counting buses as they approach the stop.

Each location is described on the following page with reason given for its inclusion.

Table 3 – Recommended on-road cycle count locations, longer term.

Number	Description
A01 northbound A02 southbound	Gungahlin Drive, Mitchell. The primary link from Gungahlin to Civic.
A03 northbound A04 southbound	Flemington Road, Mitchell. Secondary link from Gungahlin to Civic, but likely to grow with ongoing development in Gungahlin.
A05 eastbound A06 westbound	Ginninderra Drive, Lyneham. Important link from Belconnen to Civic.
A07 eastbound A08 westbound	Belconnen Way, Bruce. Primary link from Belconnen to Civic.
A09 northbound A10 southbound	Northbourne Ave, O'Connor (and Dickson). Count cyclists entering inner North from Gungahlin and North Belconnen
A11 northbound A12 southbound	Northbourne Ave, Turner (and Braddon). Count traffic along Northbourne Ave.
A13 northbound A14 southbound	Northbourne Ave, City. Count cyclists entering Civic. Corresponds to Cordon Count Location.
A15 northbound A16 southbound	Commonwealth Ave, Acton (and Parkes). Will provide split of cyclists using arterial and shared network to enter civic from south.
A17 eastbound A18 westbound	Adelaide Ave, Yarralumla (and Deakin). Count usage of Civic – Woden Lanes.
A19 northbound A20 southbound	Yarra Glen Drive, Curtin (and Garran). Count usage of Civic – Woden Lanes at Southern end.
A21 northbound A22 southbound	Monaro Highway, Symonston. Count commuters to Jerrabomberra and Tuggeranong. Also count training cyclists.
A23 northbound A24 southbound	Drakeford Drive, Greenway and Oxley.
A25 northbound A26 southbound	Athllon Drive, Kambah (and Wanniassa)

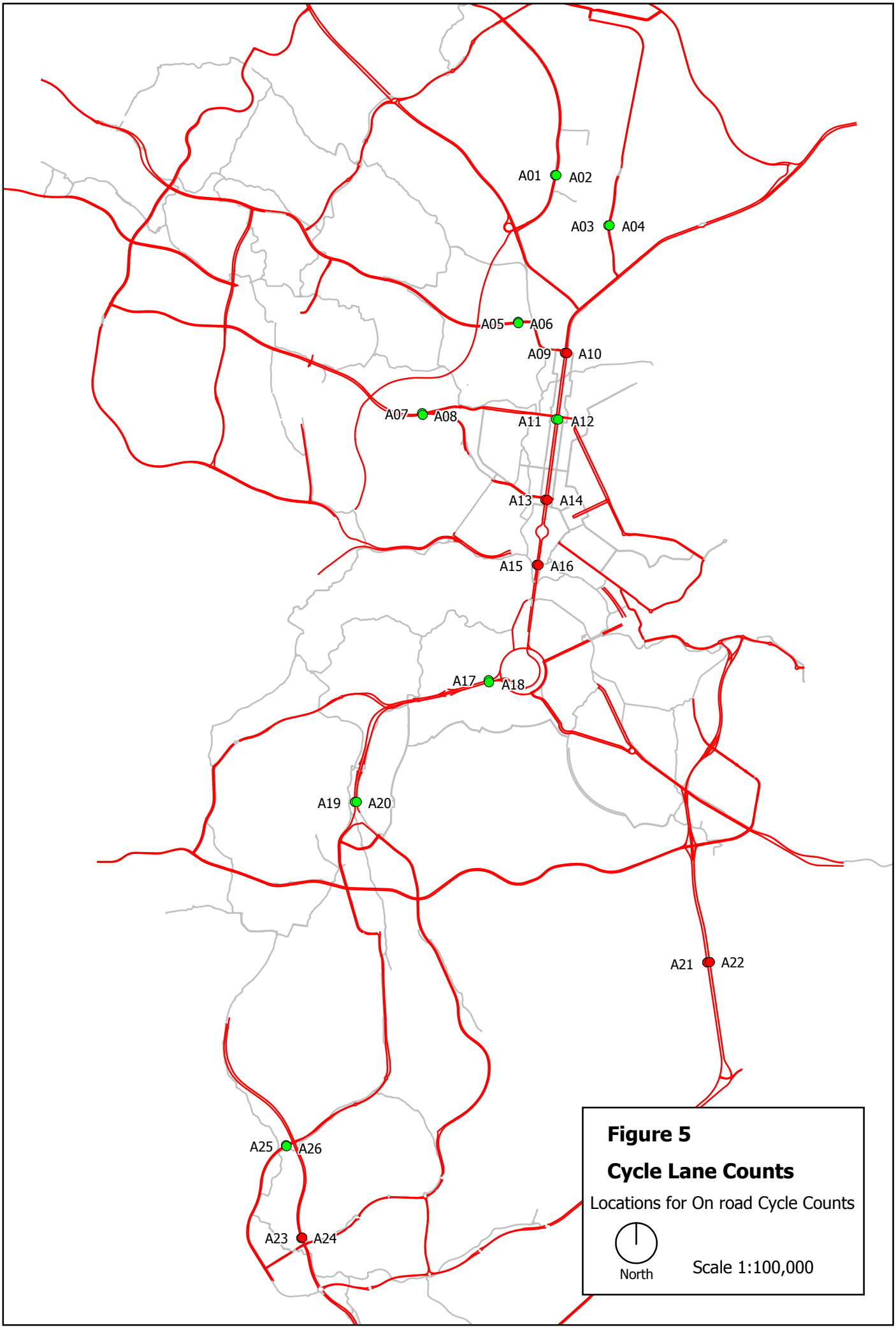


Figure 5

Cycle Lane Counts

Locations for On road Cycle Counts

North

Scale 1:100,000

2.3 Count Variability

As described above, the variations in daily cycle counts are significant. Reports by Roads ACT in 1994 and 2000 discuss the variations from weekends to weekdays, and on a daily, monthly and seasonal basis.

Understanding the seasonal variation is of particular importance, as it allows counts from any time of the year to be compared with a predicted peak.

The data variation indicates that, as expected, more people ride in summer and autumn than winter. The magnitude of the variation is impossible to define, however the relative number could reasonably be described as tabulated below. It appears that the start and end of daylight savings also causes a step change in the number of cyclists.

Table 4 – Predicted monthly cycle count variability (% of maximum)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
65	85	100	55	45	40	35	40	50	75	75	76

The data also indicates that weekend cycle traffic is approximately 25 per cent less than weekday traffic. The higher weekday counts are due to commuter traffic. The ratio is highly variable depending on the recreational utilisation of the measured path.

2.4 Predicted Cycling Demand

This discussion refers to the predicted commuter cycling demand that was presented in the 10-year Masterplan. The predicted demand generally aligns with common sense expectations however there are some issues with the data that reduce the confidence of the predictions for use in detailed analysis.

As expected, the highest numbers of riders are predicted to originate in suburbs that are close to employment or education nodes. These include Ainslie, Braddon, Belconnen, Downer, Kayleen, Lyneham, O'Connor, Turner and Watson. This correlates to census data that indicates that people who live close to their workplace are much more likely to walk or ride to work. In 1996 the Canberra wide average ratio of trips to work by walking or bicycle was 6 per cent but the suburbs of Turner, Braddon and Reid averaged 30 per cent.

The destinations expected to attract the highest numbers of riders are employment or educations nodes. These include Acton (ANU), Barton, Belconnen, Bruce (AIS and University of Canberra), City, Gungahlin and Greenway.

The uncertainties arise because the future cycling demand is extrapolated from 2001 Census data, so lower demand routes can be skewed by 1 or 2 riders on that day. For example the prediction of 8 riders with a destination of Dickson, 4 from Giralang and 4 from Palmerston, appears unlikely.

Similarly extrapolations from zero appear to have remained at zero, so some likely origin – destination pairs appear low. For example, of the 30 cyclist predicted to ride to Turner, none of them come from Ainslie, Braddon or Turner itself. There are however 4 cyclists predicted to ride to Turner from Nicholls.

Finally, the generation of origin and destination pairs does not indicate the likely route, nor the preference for on road cycle lanes or a shared path network.

For these reasons, the forecast future (2013) cycle journeys to work, as presented in the 10 year Masterplan were not used to determine the demand or priority of the Commuter Bicycle Network in this report.

3 Cycling Network Design

3.1 Requirements for Network

Commuter cyclists are generally interested in reaching their destination in a relatively direct manner. They tend to be willing to substitute between roads and paths to achieve the shortest route.

In order to encourage people to commute by bicycle, the network needs to display the following design characteristics:

- Direct and efficient
- Safe
- Equal priority to cars
- Easy to follow

A high standard of maintenance and end of trip facilities are also essential, but beyond the remit of this report.

Specifically, the three elements that make up the main commuting network generally subscribe to the principles described below.

Arterial Road cycle lanes

- Designed in accordance with Austroads Part 14 (with lane widths as per Roads ACT agreement and DUS Design Standard 13)
- Continuity of lanes along chosen roads
- Frequent ramps to provide connection with adjacent shared paths
- Avoidance of right turns at multi-lane roundabouts
- Maintaining priority over side streets

Main Shared paths

- Designed in accordance with Austroads Part 14
- Design speed of 25 km/h
- Avoid crossing streets and driveways
- Only crossing arterial roads at controlled intersections or where there is a median refuge and nearby traffic controls to ensure traffic flow is platooned
- Frequent ramps to provide connection with adjacent on road lanes

Connector streets

- Used where necessary to provide links in the network
- Preference for local access streets over collector roads.
- Collector roads may be used and cycle lanes may be provided if traffic volumes and speed warrant them
- Avoiding right turns

3.2 Definition of Links and Nodes

The Main network has been digitised using five sets of base data.

- ACT Path database
- ACT kerblines
- ACT Block boundaries
- The network as proposed in the 10 year masterplan
- Aerial Photography flown in May 2004

Additional information has been gained through field investigation, primarily on bike.

A significant part of the 10 year masterplan was the survey of the existing on road cycle lane network and the classification of its compliance with Austroads Part 14. Many of the lanes deemed to be too narrow are however in compliance with the Roads ACT agreed standards for retro fit of lanes during resurfacing. The differences are in Table 5 below.

Table 5 – Required Cycle and Traffic Lane Widths

	Cycle Lane	Traffic Lanes		Wide Left Lane
Speed		ACT Retrofit	Austroads (Urban Rd)	
60	1.2-2.5	3.00	3.50	3.7-4.5
70	1.5-2.6	3.15	3.50	4.0-4.8
80	1.8-2.7	3.30	3.50	4.3-5.0
90	1.9-2.9	3.40	3.50	n/a
100	2.0-3.0	3.50	3.50	n/a

The ACT Path database was used as the base data, with the additional network information added to it. This allowed previously measured path widths and other information to be used.

The kerb lines and block boundaries were used to ensure the proposed network was correctly located and does not cross private leases.

The aerial photography was used to check for grade separation at intersections, verify kerb lines, identify desire lines and measure path and lane widths (approximate accuracy +/- 10 cm).

Using this methodology, the level of confidence that the proposed network is actually feasible is high. Detailed design and costing will obviously have to confirm this for each link.

3.3 Priority of Links

In order to assign priority to projects, a list of criteria must be considered. While there are numerous tools available in Australia for assessing the importance of each link in a cycling network, there is not a single tool that has been adopted for use in the ACT.

For this reason, the following simplistic model has been used. It is based on a multi-criteria analysis used by Vic Roads.

When considering a project, a score is given against each of the eight criteria. The sum of these scores then gives the project a total score. The project with the highest score is assigned the highest priority.

An issue with this system is the definition of projects. Projects could be defined as a single intersection or stretch of pathway, or they could be an origin-destination pair and the definition may impact on the resulting priority.

The projects defined for this report are generally recognisable, contiguous links between significant points. In some cases they involve several intersections and individual sections of lane or path. The important consideration is that the whole link is generally required for it to be useful.

Table 6 – Prioritisation Criteria

Prioritisation Criteria[3]	Max possible score = 36			
1 Link is on the main commuter network	yes	no		
Score	**5**	**0**		
2 Link connects to existing main network	at both ends	at one end	no	
Score	**5**	**2**	**0**	
3 Link connects to planned main network	at both ends	at one end	no	
Score	**3**	**2**	**0**	
4 Link is on route to a destination	town centre	group centre	local centre	
Score	**5**	**3**	**2**	
5 Predicted number of cyclists per day	more than 400	100 - 400	less than 100	
Score	**5**	**3**	**0**	
6 Estimated cost (reflects complexity)	$200 k	$400 k	$500 k	$1 million
Score	**6**	**4**	**2**	**0**
7 Alternate (safe) route available	no	inconvenient	yes	
Score	**6**	**4**	**0**	
8 Improves recreation network	directly	indirectly	no	
Score	**4**	**2**	**0**	

Twenty-five projects have been identified as High Priority links in the Main Commuter Network. They are ranked and described in detail later in this report.

[3] Based on a methodology used by VicRoads to assess cycling projects.

3.4 Feasibility of Links

In digitising the main network, based on the 10 year Masterplan, the feasibility of links has been considered. Modification of the network has been influenced by the following:

- Completion of connections in some employment nodes or town centres.
- Relocation of routes to avoid private leases
- Use of some additional existing paths to connect to employment nodes
- Deletion of links that are impractical to construct

Consideration was given to cycle lanes along the Tuggeranong Parkway between Hindmarsh Drive and the Glenloch Interchange. It is not considered to be a cost effective option due to the 5 bridges that do not allow sufficient road width for a cycle lane. The bridges include crossing Heysen St, Weston, and the Molonglo River. In some cases there could be alternate routes or bridges constructed however the existing Woden to City cycle lanes provide a viable alternate route for most of the cyclists who would use the parkway.

4 GIS Data Table

An important output of this project is the electronic data, an explanation of the data table is presented below.

The columns in the data table are the same as the ACT Path data supplied by Roads ACT. Appended to this table are the following additional columns:

Network

A – Arterial Road cycle lane

S – Main Shared Path

M – Connector street links

Count

The most reliable known daily cycle count for weekday traffic on that link.

Count Code

The ID number for the count location corresponding to that link

Compliance

The status of compliance with Austroads Part 14 as listed in the 10 year Masterplan

Road Width

3 – pavement is not wide enough and there appears to be a significant barrier to widening it (i.e. a bridge that is fully utilised by vehicle lanes)

1 – pavement is generally wide enough to incorporate cycle lanes

0 – pavement is generally not wide enough

Lane Width

1 – cycle lane is of suitable width

0 – cycle lane is either absent or too narrow

Signs and Symbols

1 – present and compliant

2 – present but not compliant

3 – absent

Priority

In the database priority from 0 to 5 is given to each link according to the following:

0 – Link exists and needs no or only minor capital works

1 – Highest priority, immediate need, high demand

2 – High priority, immediate need but lesser demand

3 – Medium priority

4 – Low priority.

5 – Lowest priority.

Priority 0

Priority 0 is given to existing infrastructure that requires little or no capital expenditure. This includes shared paths with width of 2 metres or more and on road cycle lanes that are generally in compliance with the necessary standards.

Where existing on road lanes do not meet the current standards, fixing them has been given a priority according to their place in the network, i.e. depending on expected demand.

Priority 1 and Priority 2

Priority 1 and 2 is given to links that clearly have an immediate high demand. These projects have then been ranked using the above methodology to confirm their rating as either priority 1 or 2.

Priority 3 and Priority 4

Priority 3 and 4 is given to links that are of lesser demand but still warrant inclusion in the main network. They will increase in priority as the level of network utilisation grows, and as other links bring more cyclists to them. Often lower priority is given to a link where there is a suitable alternate route that would constitute only a very minor diversion for cyclists.

Priority 5

Priority 5 is given to links that either serve a very low expected demand, contain substantial practical barriers to construction (such as narrow bridges), or are parallel to a high quality alternate route.