

**Traffic Impact Assessment
Proposed Subdivision
94-100 Explorers Way, St Clair**

May 2015

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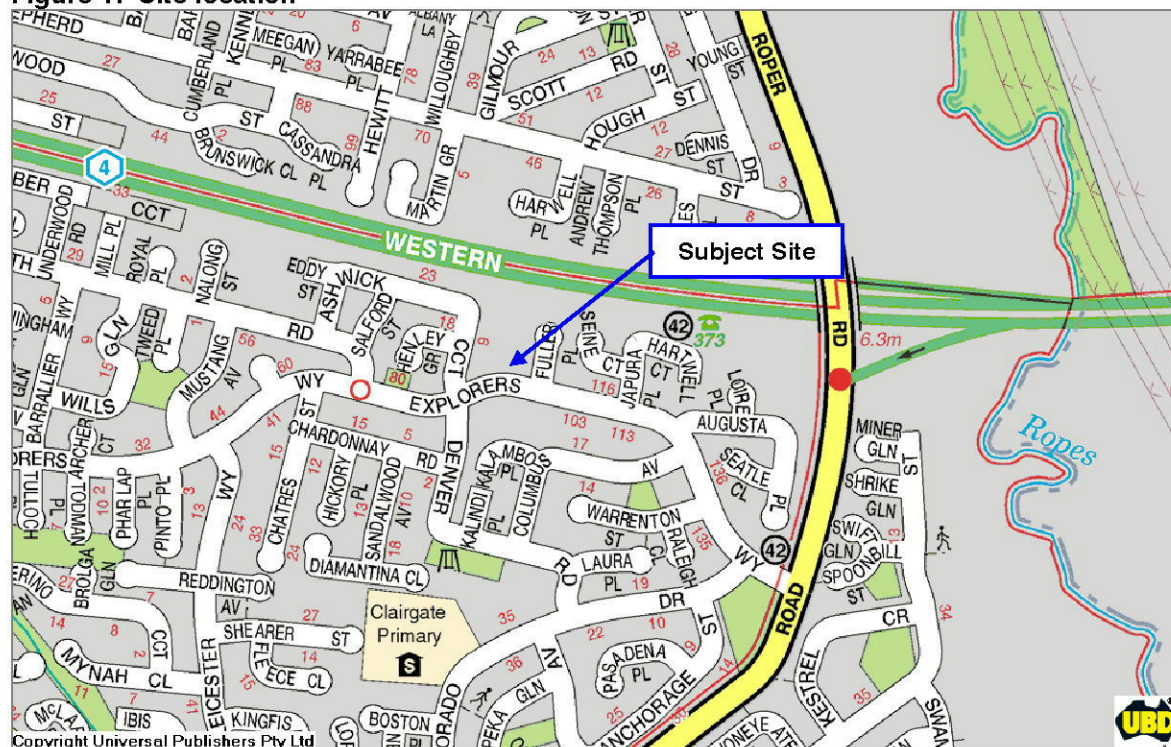
1 INTRODUCTION

This report has been prepared on behalf of Silky Constructions Pty Ltd to accompany a development application to Penrith City Council. The proposal is to develop a new subdivision of Lot 36 DP 239502, 94-100 Explorers Way, St Clair (refer **Figures 1 & 2**).

This report will:

- Describe the site and surrounding land use.
- Describe the road network serving the site and the prevailing traffic conditions.
- Describe the proposed development.
- Assess the traffic volumes generated by the proposed subdivision and potential traffic implications.
- Assess the adequacy of the proposed vehicle access.

The assessment was undertaken by Garry Kennedy, Director gtk consulting pty ltd. Garry has extensive (42 years) experience in Traffic Engineering, Road Safety and Car Parking. Garry chaired a Local Traffic Committee for seventeen years at a major metropolitan Council. In 2006 Garry established gtk consulting and since that time has undertaken many traffic and car parking assessments and studies for Local and State Government Agencies and private developers. Garry consults to the New South Wales Roads and Maritime Services and a number of Metropolitan and Regional Councils. Garry provides expert evidence in the NSW Land and Environment Court, Local Magistrates Court and District Court. Garry's court experience covers a wide range of traffic activities, such as, the suitability of development proposals, heavy vehicle prosecutions, parking offences and many other offences under the Local Government Act and the Roads Act.

Figure 1: Site location

Source: UBD Australian City Streets v6.0 (licensed to gtk consulting)

Figure 2: Aerial view of site

Source: NSW Land & Property Information

2 THE SITE, SURROUNDING USES AND EXISTING ROAD NETWORK

2.1 THE SITE AND SURROUNDING USES

The site, presently occupied by two existing dwellings and outbuildings, is zoned R2 *Low Density Residential* and has an area of approximately 1.06 hectares. It is located on the northern side of Explorers Way, east of Ashwick Circuit. Explorers Way is 13.0 metres wide between kerbs and has an asphaltic concrete surface which is in good condition. A concrete footpath is provided along the southern side of the street, however, there is no footpath on the northern (subdivision) side. Properties surrounding the site consist of detached residential dwellings and the M4 Western Motorway adjoins the northern boundary of the site.

2.2 EXISTING ROAD NETWORK

The road network servicing the site comprises:

- *Explorers Way* – a Local Road (collector) servicing adjoining streets between Bennett Street and Roper Road.
- *Roper Road* - a State Arterial Road (MR 629) providing a connection between the Western Motorway and Mamre Road.
- *Bennett Road* - a Local Road (distributor) servicing the Mark Lee Sporting Complex and St Clair Shopping Complex and providing a connection between the Great Western Highway and Erskine Park Road.
- *M4 Western Motorway* – a Motorway (6004) linking the inner western suburbs of Sydney and Penrith.

The physical features of the streets providing access to the site are described in **Table 1**:

Table 1: Description of streets providing access to the site

Street Name	Street Configuration
Explorers Way	Undivided two lane/two-way
Roper Road	Undivided four lane/two-way
Bennett Road	Undivided two lane/two-way
M4 Western Motorway	Divided six lane/two-way

Source: gtk consulting 2015

2.3 EXISTING TRAFFIC VOLUMES

Traffic and pedestrian volume surveys were undertaken by gtk consulting Pty Ltd on Tuesday 12 May 2015 at the location of the proposed intersection of Explorers Way and the new subdivision road. The survey summary sheets are reproduced in **Appendix 1**.

The surveys revealed the following peak hour traffic (**Figure 3**) and pedestrian (**Figure 4**) volumes on Explorers Way:

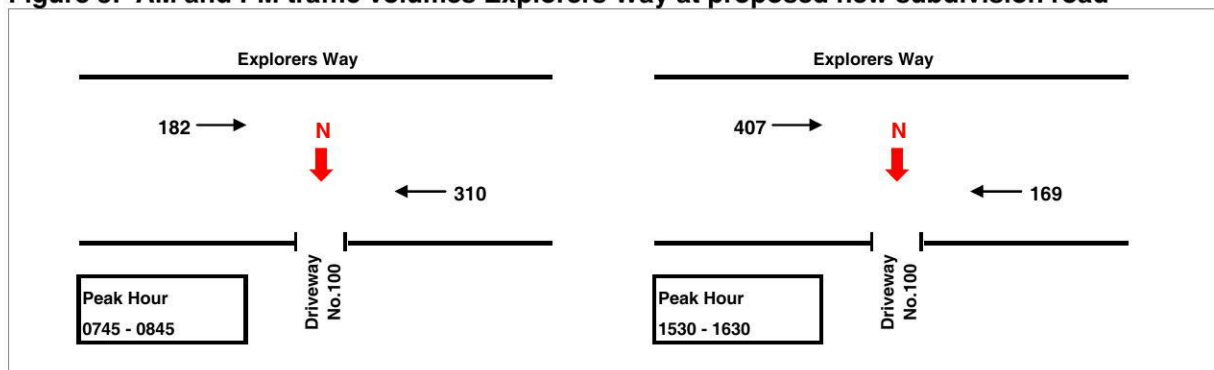
Vehicles

- AM peak hour volume (0745 – 0845) - 492 vehicles
- PM peak hour volume (1530 – 1630) - 576 vehicles

Pedestrians

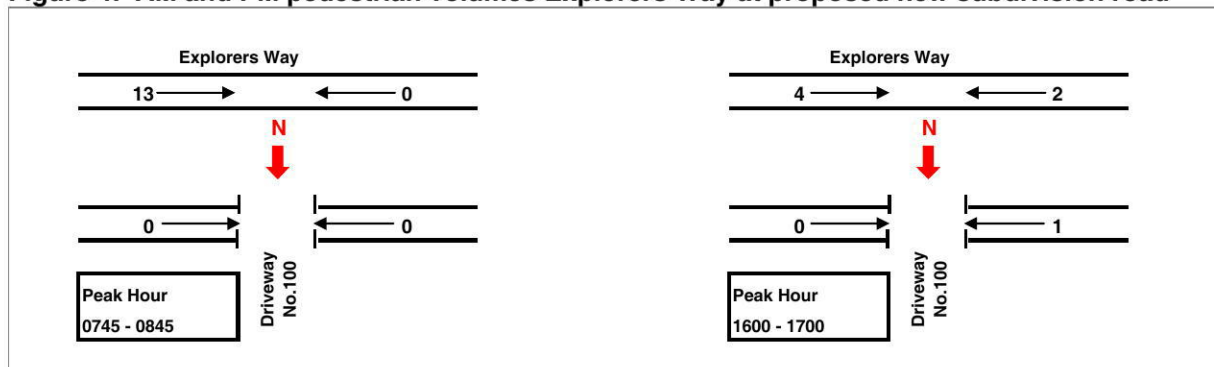
- AM peak hour volume (0745 – 0845) - 13 pedestrians
- PM peak hour volume (1600 – 1700) - 7 pedestrians

Figure 3: AM and PM traffic volumes Explorers Way at proposed new subdivision road



Source: gtk consulting 2015

Figure 4: AM and PM pedestrian volumes Explorers Way at proposed new subdivision road



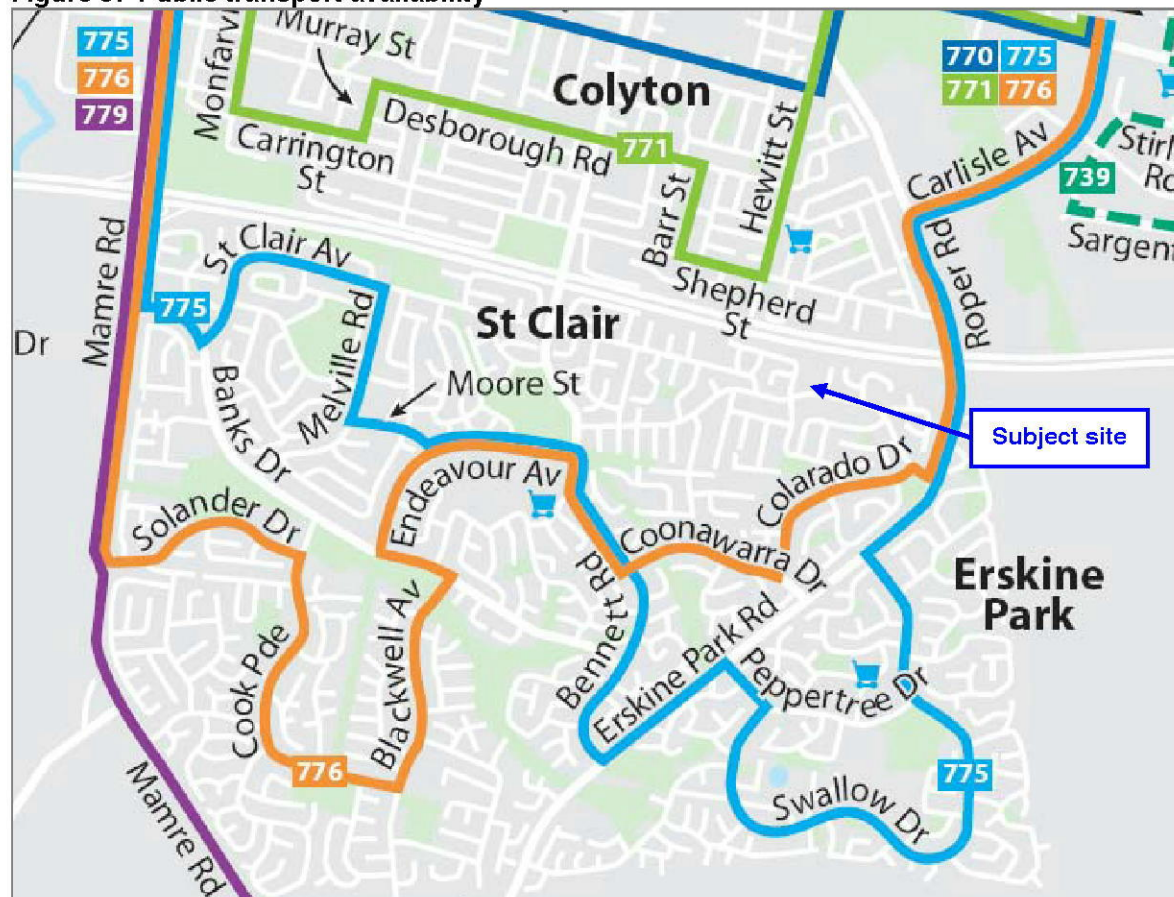
Source: gtk consulting 2015

Peak hour pedestrian volumes on the southern footpath are low and only 1 pedestrian was recorded on the northern (proposed subdivision) side during the entire survey period.

3 PUBLIC TRANSPORT

Explorers Way is not provided with regular bus services. School bus routes 4570 and 4602, however, pass the site on Explorers Way. Route 775 Penrith to Mt Druitt via St Marys, St Clair and Erskine Park and Route 776 Penrith to Mt Druitt via UWS, St Marys and St Clair (refer **Figure 5**) travel along Endeavour Avenue and Roper Road and provide a 30 minute service during the AM and PM peak periods.

Figure 5: Public transport availability



Source: Transport Infoline 2015

4 THE PROPOSAL

The proposal is to subdivide Lot 36 DP 239502 known as 94-100 Explorers Way, St Clair into 14 new lots ranging in area from 548m² to 859m² (refer **Figure 6**). Explorers Way is a Collector Road under Penrith City Council's Road Hierarchy Plan.

A new road 14.0 metres wide will be constructed east of Ashwick Circuit to service the proposed subdivision. The new road will intersect Explorers Way and end in a cul-de-sac at its northern end.

gtk consulting

5 PROPOSED TRAFFIC VOLUMES AND ENVIRONMENTAL CAPACITY

5.1 PROPOSED TRAFFIC VOLUMES

Roads and Maritime Services (RMS) provide average traffic generation rates for a range of different land uses within their *Guide to Traffic Generating Developments*. The rates were updated in 2012 following surveys of 11 sites throughout the Sydney Metropolitan Area. Based on RMS guidelines, the vehicle trips generated by residential dwellings constructed on the proposed 14 lot subdivision are set out in **Table 2**:

Table 2: Proposed residential dwellings peak hour trip generation

Land Use	Peak Trip Generation	Proposed Dwellings	Trip Generation (phvt)
Residential dwelling	0.99 phvt per dwelling	14	14 phvt
TOTAL			14 phvt

Source: RTA 2012

Traffic volumes of this magnitude:

- Are minimal and will have negligible impact on existing traffic flows, intersection capacities or neighbourhood amenity.
- Will be readily able to enter and leave the new access road without delay.
- Will not present any unsatisfactory traffic safety or capacity issues on the surrounding road network.

5.2 ENVIRONMENTAL CAPACITY

Explorers Way is a collector road under Penrith City Council's Road Hierarchy Plan. Collector roads typically carry traffic between local roads (primarily 'residential' roads) and arterial roads (primarily 'main' roads).

RMS has published guidelines which provide advice for the assessment of environmental capacity for streets with direct access to residential properties (RMS *Guide to Traffic Generating Development* 2002 Ver.2). These guidelines were developed following considerable research and have taken into account residents' attitudes to traffic in their streets. The guidelines are summarised in **Table 3**:

Table 3: RMS recommended environmental capacity performance standards for residential streets, i.e. local and collector roads

Road Class	Road Type	Maximum Speed (km/h)	Maximum Peak Hour Volume (veh/h)
Local	Access way	25	100
Local	Street	40	200 environmental goal 300 environmental maximum
Collector	Street	50	300 environmental goal 500 environmental maximum

Source: RMS Guide to Traffic Generating Development 2002 Ver.2

Two sets of performance standards have been recommended for the maximum peak hour volume in **Table 3**. For example, the recommended desirable number of vehicles per hour (vph) for a collector street is 300 vph and the maximum is 500 vph. However, it is acknowledged that some streets carry volumes greater than the recommended maximum due to their location and connectivity within the road network. It should also be noted that Explorers Way is a major access route for local schools in the area which is evidenced by the AM and PM peak hour traffic volumes coinciding with school arrival and departure times.

The traffic generated by the proposed new subdivision is estimated at 14 vehicles per hour. Existing and post development traffic on Explorers Way, at the peak traffic times, is compared to the environmental capacity goal in **Table 4**:

Table 4: Environmental capacity Explorers Way compared with existing and post development volumes

Location	Existing Volumes		Post Development		Environmental Capacity
	0745-0845	1530-1630	0745-0845	1530-1630	
Explorers Way	492	576	506	590	500

Source: gtk consulting 2015

During times of peak traffic on Explorers Way the environmental capacity goal is exceeded slightly during the AM peak and moderately during the PM peak.

6 ACCESS

The minimum requirement in assessing the safety of the proposed new access road at its intersection with Explorers Way is the need to provide sufficient sight distance for drivers to observe a possible conflict with other vehicles and allow for sufficient time to take evasive action should it be required.

An accepted approach to calculating the provision of safe and efficient access to and from the proposed road is to ensure that there is sufficient sight distance to enable non-priority traffic (i.e. traffic turning into and out of the proposed road) to carry out their turning movements without unduly interfering with mainstream traffic flow. AUSTROADS *Guide to Road Design – Part 4A* sets out the *Safe Intersection Sight Distance* (SISD) requirements for intersections. The speed zone on Explorers Way is 50 km/h and sight distance from the location of the proposed road is set out in **Table 5**:

Table 5: Safe Intersection Sight Distance

Source	Sight Distance Required	Sight Distance Available
AUSTROADS (Rt 2.0 sec @ 50km/h)	97 metres (east)	>200 metres (east)
	97 metres (west)	128 metres (west)

Source: AUSTROADS *Road Design Part 4A* and gtk consulting 2015

The sight distance in both directions from the proposed driveway access, therefore, exceeds the requirements of AUSTROADS *Guide to Road Design – Part 4A*.

7 CONCLUSION

The proposed new road for the subdivision of Lot 36 DP 239502, known as 94-100 Explorers Way, St Clair has been assessed to determine likely traffic impacts on Explorers Way and compliance with AUSTROADS *Guide to Road Design – Part 4A*.

Assessment of the proposal indicates that:

- The proposed new intersection exceeds the sight distance requirements of AUSTROADS *Guide to Road Design – Part 4A*.
- The proposed new intersection will not create any adverse impacts on pedestrian movements which are negligible on the northern side of Explorers Way.
- The traffic generated by the proposed subdivision will not present any unsatisfactory traffic safety or capacity issues on the existing road network.

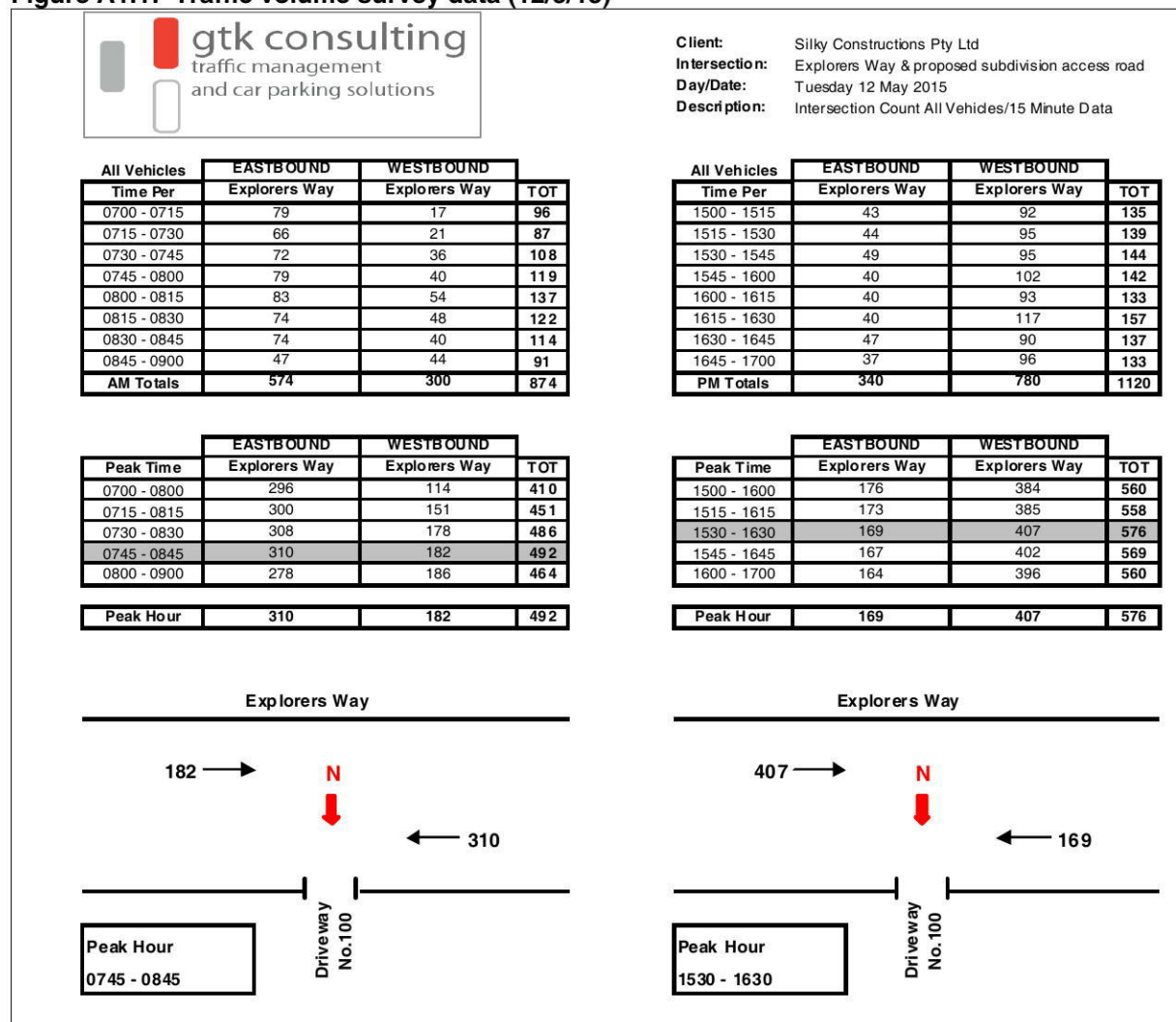
Garry Kennedy



Director

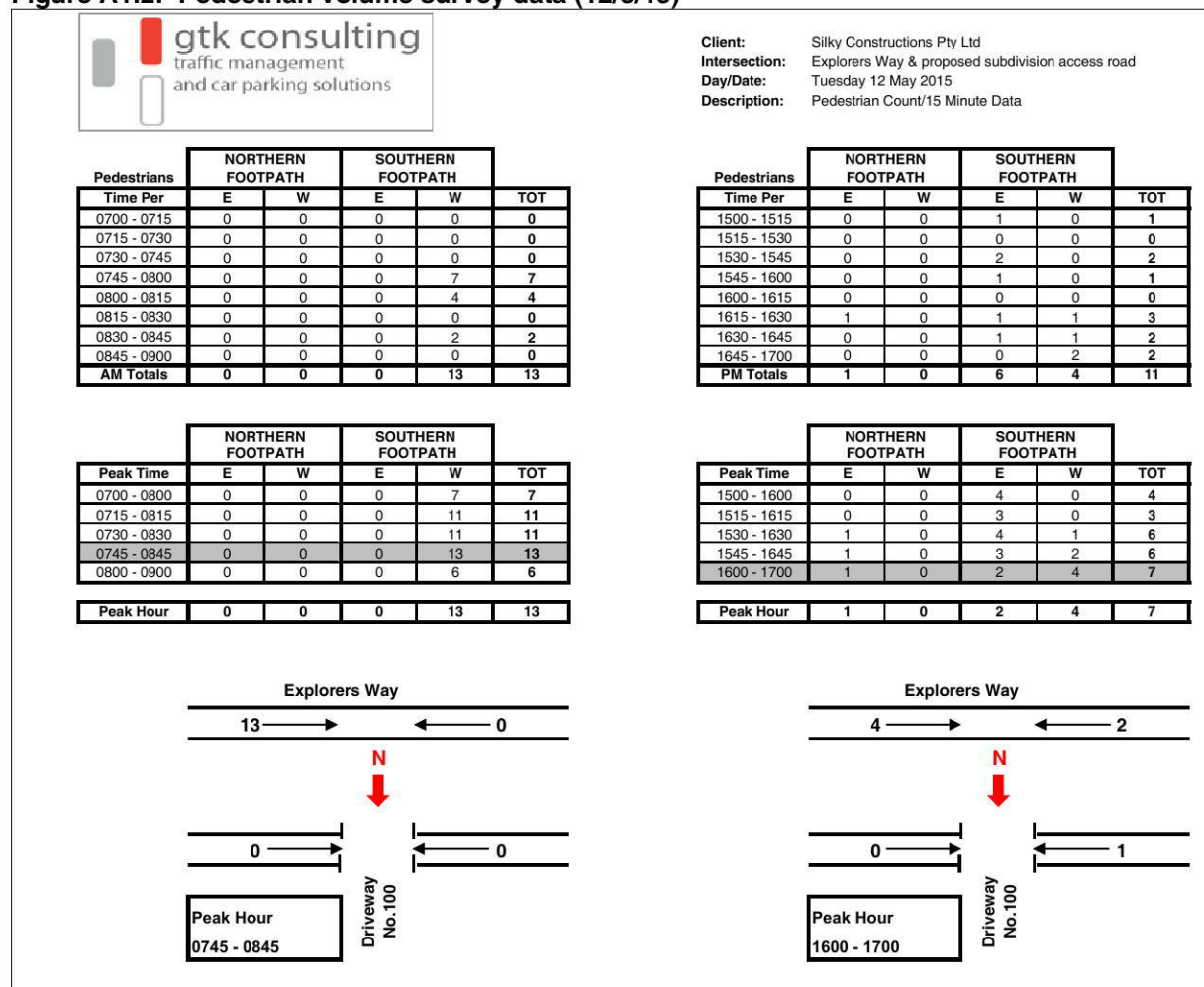
APPENDIX 1 TRAFFIC & PEDESTRIAN VOLUME SURVEYS

Figure A1.1: Traffic volume survey data (12/5/15)



Source: gtk consulting 2015

Figure A1.2: Pedestrian volume survey data (12/5/15)



Source: gtk consulting 2015

Penrith City Council

Road Safety Audit
Stage 2 – Preliminary Design
(Road Construction Works)

PROPOSED SUBDIVISION
94-100 EXPLORERS WAY

St CLAIR

June 2015

Audit Conducted by



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**Road Safety Audit
Stage 2 – Preliminary Design
(Road Construction Works)**

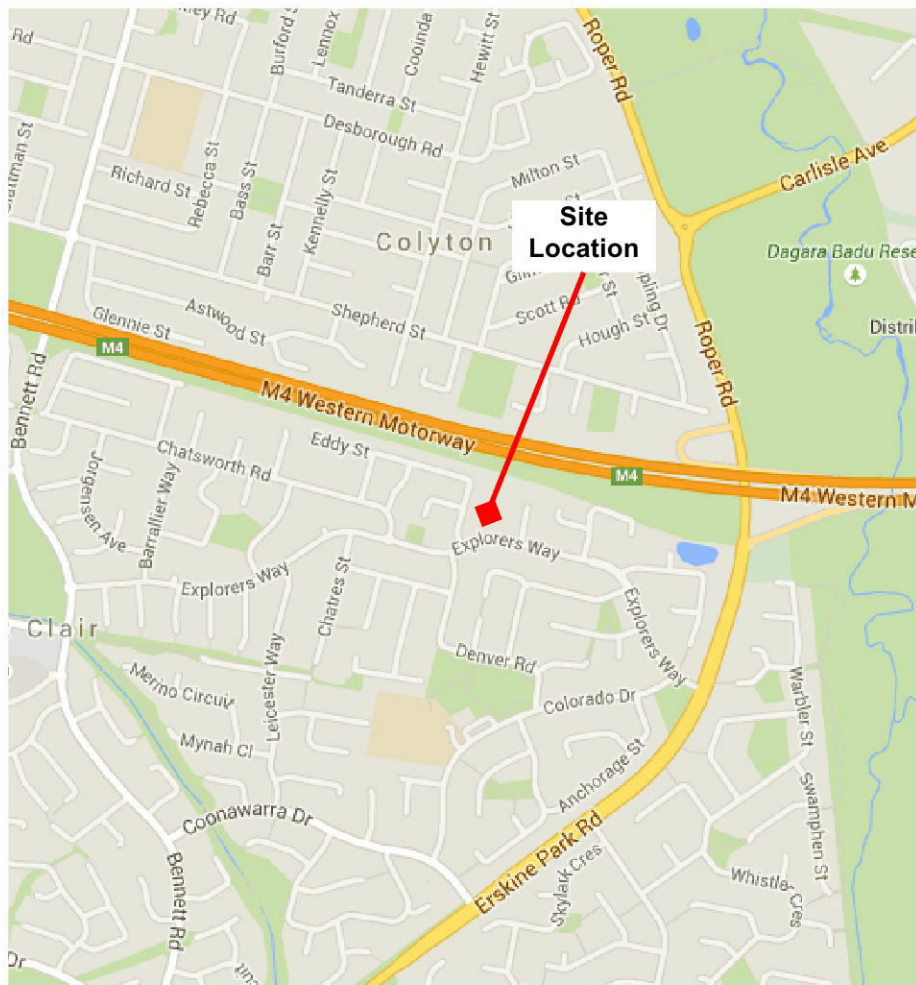
**PROPOSED SUBDIVISION
94-100 EXPLORERS WAY
St. CLAIR**

1. Introduction and Site Map

Silky Property Group has engaged Winning Traffic Solutions Pty. Ltd. (WTS) to undertake an independent Road Safety Audit of a Preliminary Road Design for the road connections of the subject proposed subdivision in support of the DA.

This report has been prepared in accordance with Austroads Guide To Road Safety - Part 6: Road Safety Audit and RMS publication Guidelines for Road Safety Audit Practices and also to address a request of Penrith City Council that a Stage 2 Road Safety Audit be submitted accompanying the DA and undertaken by an appropriately experienced professional demonstrating how the road proposal provides for the safe usage of all road users including service and passenger vehicles, pedestrians and cyclists.

Following is the locality map indicating the subject proposed subdivision and surrounding precinct.



Locality Map

2. Project Description

The overall proposed subdivision contains fourteen (14) new Lots and ranging in area from 548m² to 859m² (refer Appendix 1), an assumed occupancy rate for dwelling houses and two-way peak hour vehicle trips (phvt) of 14 phvt/hr (refer gtk Consulting – Traffic Impact Assessment May 2015).

The following figure demonstrates the existing road formation and the proposed road location that is to be employed in developing the subject site and is the basis for this road safety audit.



Proposed Subdivision Road Location

3. Road Safety Audit

A Road Safety Audit is a series of formal checks of road and traffic works, both existing and future, in relation to their accident potential and safety performance. It is conducted by a team independent to the Project who can provide an objective safety assessment. The purpose of the audit process is to pro-actively manage road safety by identifying and addressing risks associated with identified road safety deficiencies.

The aim of audits at the preliminary design stage is to assist in identifying road user safety considerations at an early stage in the development process when there is the greatest scope for change.

Other objectives of the Project are to:

- Avoid obvious safety problems that can be 'locked in' once designs commence or land is acquired;
- Check the concept is compatible with the type of road and user expectations;
- Check what design standards are to be employed and assess conformance;
- Check that all likely users have been considered;
- Check the adequacy of the road reservation width;
- Check intersection layouts and other conflict points conform with accepted design practice;
- Alert designers to areas where attention will be needed at the later design stages; and

- Check connectivity to the existing road network and assess effects in transition areas.

4. Checklist and Reference Material

This Audit has been conducted based on the following information provided:

- Preliminary Design –Civil Engineering Works – Prepared by DIVERSI Consulting; Project No. 14140 (refer Appendix 1);
- Draft Traffic Impact Assessment – Prepared by gtk Consulting (May 2015).

The audit has been carried out following the procedures set out in the Austroads/Standards Australia publication Guide To Road Safety Audit (Part 6: Road Safety Audit 2009), using “Checklist 2 – Preliminary Design Stage Audit” and the RTA publication Guidelines for Road Safety Audit Practices as guides and compliance also compared against the following documents.

- Austroads “Guide to Road Design”;
- RTA “NSW Bicycle Guidelines”;
- RTA Delineation Guidelines;
- RTA Guide to Road Design Supplements;
- Austroads “Guide to Traffic Engineering Practice”
- RTA “Changes to NSW Road Rules”

5. Auditors and Audit Process

The audit was carried out by:

Terry Winning (WTS) - Team Leader (Level 3 – RSA-02-0063)

R. Glen Morgan (WTS) - Team Member (Level 1 – RSA-02-0963)

Members of the audit team have had no involvement in the design or implementation of on road facilities of the work audited.

The audit included a commencement meeting with the Project Manager Mr David Gerardis (Diversi Consulting), via telephone on Tuesday 26 May 2015. The presented drawings were discussed with the Project Manager as well as the audit process and information exchanged on the project development to date.

A field inspection and observations of the project was carried out on Friday 29 May 2015.

The supplied materials were reviewed in detail prior to formulating the audit findings.

A completion meeting was held on Thursday 4 June 2015 where the identified road user safety issues (described below) were discussed.

6. Road Description

Explorers Way is a local access collector/distributor road administered by Council speed regulated to 50 km/hr.

The proposed access road of the subject subdivision is located on the northern side of Explorers Way, east of Ashwick Circuit (refer above). Explorers Way is operates as an undivided two-lane, two-way road accommodating a 13m wide bitumen sealed carriageway with kerb & gutter and unrestricted parking both sides. A concrete footpath is provided along the southern footway area with no footpath on the northern side at the subdivision road access. The overhead road lighting is commensurate with a Council local access road.

Peak hour traffic volumes along the road are considered commensurate with a local access road being around 500-600 AM and PM. It was observed the traffic stream

WTS – RSA Stage 2 Preliminary Design – Proposed Subdivision Explorers Way, St Clair

June 2015

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along Explorers Way tended to platoons regulated by the roundabout at Chatsworth Road (in the west) and the junction of Erskine Park Road (in the east).

Pedestrian volumes along the road are light and focussed to the southern side of the road.

The proposed subdivision road access is located on the outside of a curve, is to be 14m wide with a 7m road carriageway, 3.5m footways, on straight alignment, level grades with a cul-de-sac at its northern end and is understood to comply with Council's DCP requirements for local road subdivision

7. Road Safety Audit Findings

This audit addresses the physical features of the Project that may impact road user safety and is sought to identify potential safety hazards. However, the auditors point out that no guarantee is made that every deficiency has been identified.

Further, if all the unsafe issues identified in this report were to be acted upon, this would not confirm that the constructed facility is "safe" rather; remedial action should improve the level of safety of the facility.

The main focus of this audit is the anticipated increase in the volume of road users that will be generated within the precinct along Explorers Way and its intersections with the adjoining existing road network.

A "Road User Risk Assessment" was undertaken of the Preliminary Design based on how often a problem is likely to lead to a crash (Frequent, Probable, Occasional, Improbable) and the likely severity of the resulting accident type (Catastrophic, Serious, Minor, Limited), Refer Austroads – Road Safety Audit: Part 6 – Section 4, Tables 4.1, 4.2, 4.3).

As a result of applying the above, the following road user safety elements of the project should be assessed to ensure that identified road user safety issues are considered in developing the design:

- The radius of western kerb return to Explorers Way may need to be increased to reduce the risk of left turning vehicles (specifically SRV service vehicles) crossing the centreline into the opposing carriageway;
- Existing pavement markings are not shown in Explorers Way and to this end the centerline markings will need to be removed opposite the proposed junction to legally permit turning movements to and from the subdivision road of the eastbound carriageway in Explorers Way;
- Lighting of the proposed subdivision road will need to be considered and ideally a lamp should be considered at the junction of Explorers Way to highlight the road junction for drivers in Explorers Way

It is considered that the feasibility of the proposed design is consistent with Council and RMS standards in terms of alignment and required mutual sight lines of both vehicles and pedestrians commensurate with the regulated speed of the road and width of roads to accommodate all road users subject to consideration of the points raised above.

In conclusion, it is considered that the risk of an incident occurring within the proposed road environment is low and should an incident occur that could be directly attributable to the constructed works the resulting severity is considered would be "limited".

8. Responding to this Audit Report

As set out in the road safety audit guidelines, responsibility for implementing and or accepting/rejecting the audit findings, always rests with the Project Manager (or equivalent), and not with the auditors.

A Project Manager is under no obligation to accept all the audit findings and comments. Also, it is not the role of the audit team to accept or approve of the Project Manager's response to the audit. Rather, the audit provides the opportunity to highlight potential problems and risks and to have them formerly considered by the Project Manager in developing the final works for opening, in conjunction with all other road management considerations.

9. Summary and Conclusions

This report addresses concerns relating to the road user safety issues applying to the preliminary design supplied.

It should be noted the while every effort has been made to identify potential safety hazards, no guarantee can be made that every deficiency has been identified.

We recommend that points of concern be investigated and corrective actions implemented as soon as practicable.



Terry Winning (Lead Road Safety Auditor)

Winning Traffic Solutions
Road Safety Auditor – Level 3
RSA-02-0063



R. Glen Morgan (Team Member)

Winning Traffic Solutions
Road Safety Auditor – Level 1
RSA-02-0963

DATE: 4 June 2015

RELEVANT PLAN EXTRACTS

