



# Amendments C58, C60, C61, C62, C63 & C64

## Swan Hill South West Development Precinct

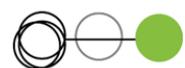
### Traffic Engineering Evidence

**Expert //** David Graham  
**Clients //** River Street Investments, Piranox, Monahan & Pearson  
**Instructed by //** Andrew Natoli, Equipe Lawyers  
**Reference //** 15M1420100  
**Hearing Date //** 10/12/15  
**Report Date //** 02/12/15

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Swan Hill South West Development Precinct  
Traffic Engineering Evidence

Issue: Final 02/12/15

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Reference: 15M1420100  
GTA Consultants Office: VIC



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# 1. Introduction

## 1.1 Background

Proposed Amendments C58, C60, C61, C62, C63 and C64 to the Swan Hill Planning Scheme seek to rezone land in the south west of the Swan Hill township from mostly farming and low density residential zoning to mostly general residential zoning.

On 20 October 2015, Swan Hill Rural City Council resolved to refer submissions concerning Amendments C58, C60, C61, C62, C63 and C64 to an independent Panel Hearing. The Minister for Planning has appointed a Planning Panel to review submissions about the exhibited amendment.

## 1.2 Expert Witness Details

**David Graham BE (Hons), BSc, VPELA, MIEAust**  
**Director – GTA Consultants (Vic) Pty Ltd**

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**Areas of Expertise:** Traffic Engineering & Transport Planning

I have over sixteen years' experience in traffic engineering built across roles in both the public and private sector. I have a Bachelor of Engineering with Honours and a Bachelor of Science from the University of Melbourne.

I have extensive experience in the preparation of traffic impact assessments, traffic engineering advice on developments, intersection and traffic signal design and analysis, and car park design on various community, retail, commercial and residential developments. I have been involved in the management and delivery of a number of key traffic engineering projects ranging from bicycle route scoping to the development of traffic management treatments to improve route performance or address accident black spots, and the development of park and ride facilities. I am a highly experienced VicRoads accredited Senior Road Safety Auditor.

Further details of my experience are provided in Appendix A.

## 1.3 Relationship to Applicant

I have no ongoing private or business relationship with my clients, and have been retained to provide expert witness services at this hearing for a mutually agreed fee.

## 1.4 Instructions & Scope of Report

Prior to preparing this evidence I was briefed by Andrew Natoli of Equipe Lawyers regarding the proposal via oral and written instructions.

This evidence sets out an assessment of the anticipated traffic and transport implications of the proposed rezoning, including consideration of the:

- i existing traffic and road conditions surrounding the site
- ii traffic generation characteristics of the proposed rezoning
- iii the need for road upgrade works to facilitate the rezoning
- iv the appropriate apportionment of costs associated with the road upgrade works

## 1.5 References

In preparing this evidence, reference has been made to the following:

- Swan Hill Planning Scheme
- 'Swan Hill South West Development Precinct Traffic Strategy', Swan Hill Rural City, version 2.2, dated 25 February 2015
- 'Swan Hill South West Development Precinct Planning Report for Planning Scheme Amendments C58, C60, C61, C62, C63 and C64', Swan Hill Rural City, dated May 2015
- 'Swan Hill South West Development Precinct Traffic Impact Assessment', Traffix Group, dated 14 May 2015
- various technical data as referenced in this report
- an inspection of the site and its surrounds
- other documents as nominated.

## 1.6 Tests, Experiments & Assistance

I prepared this evidence without assistance.

## 2. Existing Conditions

### 2.1 Subject Site

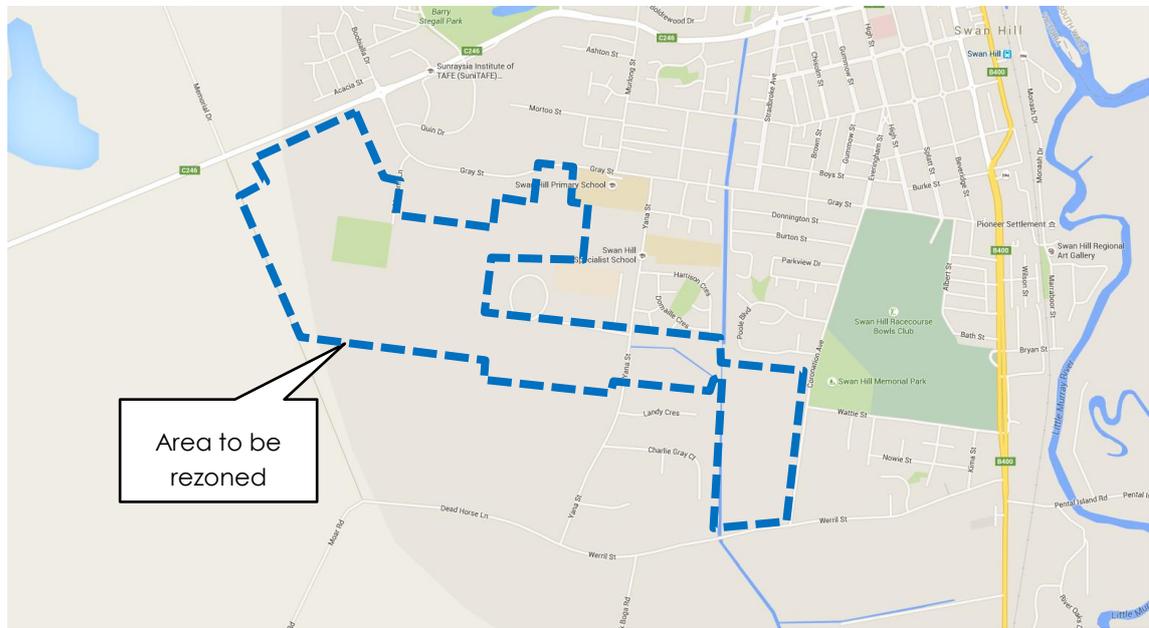
The area proposed to be rezoned is located to the southwest of the Swan Hill township.

The area is located partly within a Farming Zone (FZ), partly within a Low Density Residential Zone (LDRZ) and partly within a Public Park & Recreation Zone (PPRZ) and is currently occupied by rural properties.

The surrounding properties are generally rural to the south and west, and residential to the north and east.

The location of the subject area and the surrounding environs is shown in Figure 2.1, and the current land zoning is shown in Figure 2.2.

**Figure 2.1: Subject Area and its Environs**



Source: Google Maps

Figure 2.2: Current Land Zoning Map



Source: Land Channel

## 2.2 Road Network

### 2.2.1 Adjoining Roads

#### Sea Lake – Swan Hill Road

Sea Lake – Swan Hill Road functions as a primary arterial road. It is a two-way road aligned in a northeast-southwest direction and is configured with a two-lane carriageway set within a 60 metre wide road reserve (approx.). The carriageway has a sealed surface which is approximately 8m wide. Sea Lake – Swan Hill Road has a 100km/h speed limit in the vicinity of the site.

#### Gray Street

Gray Street functions as a local collector road. It is a two-way road, generally aligned in an east-west direction, set within a 20 metre wide road reserve (approx.). It has a two-lane carriageway with a sealed surface which is approximately 7 to 9m wide. Gray Street has a 50km/h speed limit.

#### Yana Street

Yana Street functions as a local collector road. It is a two-way road, generally aligned in a north-south direction, set within a 52 metre wide road reserve (approx.). It has a two-lane carriageway with a sealed surface which is approximately 8m wide. Yana Street has a 50km/h speed limit.

#### Other Roads

Other roads within the vicinity of the area include Dead Horse Lane, Coronation Avenue and Feldtmann Lane.

### 2.2.2 Surrounding Intersections

Key intersections in the vicinity of the area include:

- Sea Lake – Swan Hill Road / Dead Horse Lane / Memorial Drive (unsignalised X-intersection)
- Sea Lake – Swan Hill Road / Gray Street / Boobiulla Drive (roundabout)
- Gray Street / Yana Street (unsignalised T-intersection)
- Dead Horse Lane / Yana Street / Werril Street (unsignalised T-intersection).

## 3. Proposed Road Network

### 3.1 Funding of Road Upgrade Works – General Comments

In order to determine the appropriate contribution by the land owners to potential road works in the area I have considered the document 'Understanding Development Contributions', prepared by the former Department of Sustainability and Environment (DSE). This document outlines the mechanisms that can be used for development contributions, and provides some guidelines on issues such as cost apportionment.

Consistent with this document, in order for a land owner to fund external works, it is usual practice in Victoria for consideration to be given to the 'need', 'nexus', 'equity' and 'accountability' of the proposed arrangements, as follows:

- Need – is the treatment needed?
- Nexus – is there a direct link between the proposal and the infrastructure provision?
- Equity – is the provision fair in terms of who is and isn't required to pay? Would another method be more appropriate?
- Accountability – what are the financial arrangements? How will the provision be monitored and reviewed?

Each of these factors need to be considered for each of the potential external road works associated with the proposed rezoning.

### 3.2 Internal Road Network

Werril Street currently provides an east-west link along the southern boundary of the area to be rezoned. The proposed internal road network also includes a new east-west link forming an extension of Wattie Street, to the north of Werril Street. Given the spare capacity in Werril Street, I consider that the need for an additional high-standard east-west link, including new roundabouts at major intersections, is questionable, and future traffic modelling of the area should consider whether this link is necessary.

### 3.3 Access to Sea Lake – Swan Hill Road

The proposed future road network within the area to be rezoned includes a new road connection to Sea Lake – Swan Hill Road, located approximately half way between Dead Horse Lane and Gray Street. I understand that VicRoads is seeking to not have a new intersection at this location in order to minimise congestion, or to restrict turning movements at such an intersection to left-in / left-out only.

Sea Lake – Swan Hill Road currently carries low traffic volumes for an arterial road and, even if the whole SHSWDP was developed with residential uses, the traffic volumes on Sea Lake – Swan Hill Road will continue to be moderate and there is more than adequate capacity in the road for a new intersection to be installed without adversely impacting through traffic on Sea Lake – Swan Hill Road.

There are a number of other existing intersections and property accesses along Sea Lake – Swan Hill Road at relatively frequent intervals which allow full turning movements, and a new intersection which is separated by approximately 300m from the adjacent intersections would not be inconsistent with the existing treatments along the road. Safety at the new intersection could be maximised by providing channelised left and right turn lanes into the new road.

Therefore, I consider that providing a new access intersection to Sea Lake-Swan Hill Road between Dead Horse Lane and Gray Street which allows full turning movements won't detrimentally affect the safety or operation of Sea Lake-Swan Hill Road.

## 4. Traffic Impact

### 4.1 Background

Swan Hill Rural City Council engaged Traffix Group to undertake a traffic impact assessment of the proposed South West Swan Hill Development Precinct. The scope also included an assessment of the expected relative traffic volumes from each land holding that will travel through nominated intersections and along nominated roads. The results of this assessment are contained within a report dated 14 May 2015 (the 'Traffix Group report').

It is very important to note that this assessment included the entire area which is designated within the Swan Hill South West Development Precinct, whereas the current rezoning proposals only include part of the land within the SHSWDP, and the remainder of the land with the SHSWDP may never be rezoned. Therefore, this traffic analysis should not be used as a basis for estimating the impact of traffic generated by the land which is actually proposed to be rezoned, and hence should also not be used as a basis for apportioning costs of infrastructure works to the landowners within the area to be rezoned.

Notwithstanding, below are my comments on the Traffix Group report.

### 4.2 Traffic Generation

Section 3 of the Traffix Group report outlines a number of assumptions regarding the likely traffic generation within the SWSHDP.

I assume that the nominated expected residential density is in accordance with reasonable expectations, however this is outside my area of expertise.

The nominated traffic generation per lot, and split of in/out traffic during the peak periods, are in accordance with typical industry standards.

It is unclear as to what the basis is for the assumed split of traffic by trip purpose. It is likely that this came from data collected as part of the Victorian Integrated Survey of Travel and Activity (VISTA) surveys. The splits generally seem reasonable, albeit that the percentage of travel for shopping seems quite high.

It is unclear as to exactly which external road links are considered to be north, east, south and west. With regard to the nominated directional splits for each trip purpose, it is likely that some educational trips would travel somewhat to the east to/from St Mary Mackillop College. Notwithstanding, the overall trip distributions by direction appear reasonable.

Based on the assumed number of lots, traffic generation per lot, and traffic distribution, Traffix Group determined the likely future traffic volumes on the existing and proposed roads within the vicinity of the SWSHDP. These are shown in Figure 9 of the Traffix Group report. Without access to the spreadsheet model which is used as a basis for the analysis, it is difficult to review the details of the expected volumes shown at each location.

Notwithstanding, the first paragraph on Page 33 of the Traffix Group report indicates that:

*"the model developed for this study assumes that parcels of land ("zones") within the Development Precinct have one access point to the road network., ie there is no movement through zones to travel to and from the precinct."*

This level of modelling is somewhat crude and can lead to over-simplifications of expected traffic movements, particularly if the "zones" are large. It is unclear as to how many "zones" were

included in the model. However, if the “zones” correspond with the land holdings then there is significant potential for unrealistic results for the larger landholdings which have frontages to multiple existing and/or future roads and therefore would actually generate traffic on multiple road frontages.

For instance, the expected volumes at the southern end of Link 4 and on Dead Horse Lane are unrealistically low. Conversely, the expected volumes on the northern end of Link 4 appear to be very high.

### 4.3 Future Traffic Volumes

Section 4 of the Traffix Group report provides more detailed analysis of the expected future turning movements at key existing and proposed intersections within the vicinity of the development area. This analysis takes the results of existing traffic volume counts and adds the expected site-generated traffic based on the spreadsheet model. As previously indicated, without access to the spreadsheet model which is used as a basis for the analysis, it is difficult to review the details of the expected volumes shown at each location.

However, it is noted that the expected future volumes on Sea Lake-Swan Hill Road include not only the existing volumes, and the volumes expected to be generated by the SWSHDP, but volumes expected to be generated by the Tower Hill development, which has been sourced from a report prepared by TTM Consulting. Given that the Tower Hill development is already partly developed, it is unclear whether there is 'double counting' of some of the traffic generated by Tower Hill in both the existing traffic volumes and the future traffic volumes. Also, the SWSHDP should not be responsible for the impact on roads and intersections of traffic generated by Tower Hill.

My other comments regarding the expected traffic distributions are as follows:

- i Not only are the traffic volumes at Intersection #1 extremely low, the expected directional split of all traffic travelling to/from the east is unrealistic. In reality, some traffic will travel to/from the west.
- ii The existing volume of traffic turning left from Coronation Avenue into Wattie Street is shown in Figure 12 as being 123 vehicles per hour in both the AM and PM peak periods. Whilst it is possible that this is correct, it is unlikely that there would be exactly the same volume of turning traffic in both peak periods and hence this should be checked to see if there is an error.
- iii The expected directional split at Intersection #6 is considered to be unrealistic. Traffix Group suggest that over 99% of the traffic accessing the future internal road from Gray Street will travel to/from the east. In reality, whilst the majority of traffic is likely to travel to/from the east, there is likely to be a more significant minority of traffic travelling to/from the west than has been estimated by Traffix Group.
- iv The expected directional split at Intersection #7 is considered to be unrealistic. Traffix Group suggest that approximately 90% of the traffic accessing Feldtmann Lane from Gray Street will travel to/from the west. In reality, whilst the majority of traffic is likely to travel to/from the west, there is likely to be a more significant minority travelling to/from the east than has been estimated by Traffix Group.
- v Consistent with previous comments, the traffic volumes at Intersection #9 are considered to be too low and the traffic distribution is unrealistic as they assume that no traffic generated by the site will turn right from Dead Horse Lane into Sea Lake-Swan Hill Road. In reality, some residents living in the southwest area of the development are likely to use Dead Horse Lane to access the Swan Hill township through Sea Lake-Swan Hill Road.

- vi The expected directional split at Intersection #13 is considered unrealistic. Traffix Group suggest that over 95% of the traffic travelling west along Link #5 will turn right into Link #6. In reality, whilst the majority of traffic is likely to turn right into Link #6, there is likely to be a more significant minority continuing along Link #7(1) than estimated in the Traffix Group report.

## 4.4 Intersection Treatments

Section 5 of the Traffix Group report details the expected future intersection treatments that will be required to cater for the additional traffic generated by the development of the SWSHDP.

My comments regarding the proposed treatments are as follows:

- i Given the proposed road network, with Links #1, #2 & #3 forming cross intersections with Yana Street and Coronation Avenue, the provision of roundabouts at these intersections is considered to be appropriate treatments to ensure adequate safety. However, an alternate road network that did not include cross intersections would potentially avoid the need for roundabouts, which could lead to reduced road construction costs.
- ii Intersection #7 has been modelled with separate left and right turn lanes out of Feldtmann Lane, and shown to operate satisfactorily. Subject to further modelling, consideration should also be given to having a shared left/right turn lane out of Feldtmann Lane, which would reduce the construction cost of the intersection.
- iii The Traffix Group report models Intersection #12 as both a roundabout and a priority controlled T-intersection. Whilst the modelling shows that both intersection configurations would operate satisfactorily, Traffix Group recommends that the intersection be constructed as a roundabout to assist speed management. However, a T-intersection would be a significantly lower cost whilst also providing adequate intersection operation.
- iv Similarly, the Traffix Group report also recommends a roundabout at Intersection #13 whereas a T-intersection would be a significantly lower cost whilst also providing adequate intersection operation.

## 4.5 Traffic Apportionment

Consistent with previous comments, without access to the spreadsheet model which is used as a basis for the analysis it is difficult to review the estimated apportionment of the traffic through the modelled intersections from each of the land holdings within the study area.

Notwithstanding, with regard to the estimated apportionments to the intersections in Table 16 and Table 21, the following are my comments:

- i A significant volume of traffic through Intersection #3 is shown as coming from Landowner #5. However, it is likely that minimal traffic from Landowner #5 would travel through this intersection, as most of the traffic from this land parcel to/from the Swan Hill CBD, schools etc. would utilise other road links, and traffic to/from the south on the Murray Valley Highway would use Werril Street.
- ii A moderate volume of traffic through Intersection #7 is shown as coming from Landowner #14. However, it is likely that minimal traffic from Landowner #14 would travel through this intersection, as traffic from this land parcel to/from the Swan Hill CBD, schools etc. would utilise other road links.
- iii Similarly, the volume of traffic through Intersection #7 which has been attributed to Landowner #5 seems quite high, as the majority of traffic from Landowner #5 to/from the Swan Hill CBD is likely to prefer alternate routes.

With regard to the estimated apportionments to the road links in Table 17 and Table 22, the following comments are made:

- i Consistent with the comments above regarding Intersection #3, the volume of traffic shown as coming from Landowner #5 on Links #1 & #2 is considered to be too high as most of the traffic from this land parcel to/from the Swan Hill CBD, schools etc. would utilise other road links, and traffic to/from the south on the Murray Valley Highway would use Werril Street.
- ii All of the traffic shown as using Link #8 (Dead Horse Lane) is shown as coming from Landowners #18 & #22. This is considered to be unrealistic, as Dead Horse Lane will provide access for some residents of Landowners #2, #5 & #14, and these parcels are likely to generate the majority of traffic on Link #8.

## 4.6 Traffic Impact Summary

As previously indicated, the Traffix Group report, upon which some of the proposed infrastructure cost apportionments are made, is based on the assumption that the entire area which is designated within the Swan Hill South West Development Precinct will be rezoned, whereas the current rezoning proposals only include part of the land within the SHSWDP, and the remainder of the land with the SHSWDP may never be rezoned.

Further, the assessment appears to be fairly crude, with a limited zoning structure and some assumptions that I consider to be unrealistic.

Therefore, this traffic analysis should not be used as a basis for estimating the impact of traffic generated by the land which is actually proposed to be rezoned, and hence should also not be used as a basis for apportioning costs of infrastructure works to the landowners within the area to be rezoned.

In order to appropriately apportion costs of infrastructure works a revised traffic analysis should be undertaken which includes only the land which is actually proposed to be rezoned, and uses realistic assumptions of traffic distributions, or the apportionment be determined by an appropriate alternate mechanism. Preferably, any modelling would be undertaken using strategic traffic modelling rather than a spreadsheet model, and would assess the infrastructure works that need to be undertaken rather than what is desirable to be undertaken.

## 5. Summary of Opinion & Other Statements

### 5.1 Summary of Opinion

Based on the analysis and discussions presented within this evidence, the following is a summary of my opinion:

- i In order for a land owner to fund external works, consideration should be given to the 'need', 'nexus', 'equity' and 'accountability' of the proposed arrangements.
- ii Given the spare capacity in Werril Street, I consider that the need for an additional high-standard east-west link, including new roundabouts at major intersections, is questionable, and future traffic modelling of the area should consider whether this link is necessary.
- iii The Traffix Group report, upon which some of the proposed infrastructure cost apportionments are made, is based on the assumption that the entire area which is designated within the Swan Hill South West Development Precinct will be rezoned, whereas the current rezoning proposals only include part of the land within the SHSWDP, and the remainder of the land with the SHSWDP may never be rezoned. Therefore, this traffic analysis should not be used as a basis for estimating the impact of traffic generated by the land which is actually proposed to be rezoned, and hence should also not be used as a basis for apportioning costs of infrastructure works to the landowners within the area to be rezoned.
- iv In order to appropriately apportion costs of infrastructure works a revised traffic analysis should be undertaken which includes only the land which is actually proposed to be rezoned, and uses realistic assumptions of traffic distributions, or the apportionment be determined by an appropriate alternate mechanism.
- v I consider that providing a new access intersection to Sea Lake-Swan Hill Road between Dead Horse Lane and Gray Street which allows full turning movements won't detrimentally affect the safety or operation of Sea Lake-Swan Hill Road.

### 5.2 Other Statements

- i No opinion provided in this evidence is provisional.
- ii No questions or statements outside of my expertise have been addressed in this evidence.
- iii This evidence is not incomplete or inaccurate.

#### Declaration

I have made all the inquiries that I believe are desirable and appropriate and that no matters of significance that I regard as relevant have, to my knowledge, been withheld from the Panel.



**David Graham**  
**Director**

2 December 2015

# Appendix A

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## David Graham – Curriculum Vitae

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