Traffix Group

Traffic Engineering Assessment

Proposed Quarry Expansion

130 McMahons Road, Launching Place

Prepared for
Dandy Premix Pty Ltd

June 2023

G23731R-01B

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1. Introduction

Traffix Group has been engaged by Dandy Premix Pty Ltd to prepare a traffic engineering assessment for the proposed quarry expansion at 130 McMahons Road, Launching Place.

This report provides a Traffic Safety Assessment of the proposed operations.

2. Existing Conditions

2.1. Site Locality

The subject site is located on McMahons Road which runs to the north of Dalry Road, as shown in Figure 1 below.

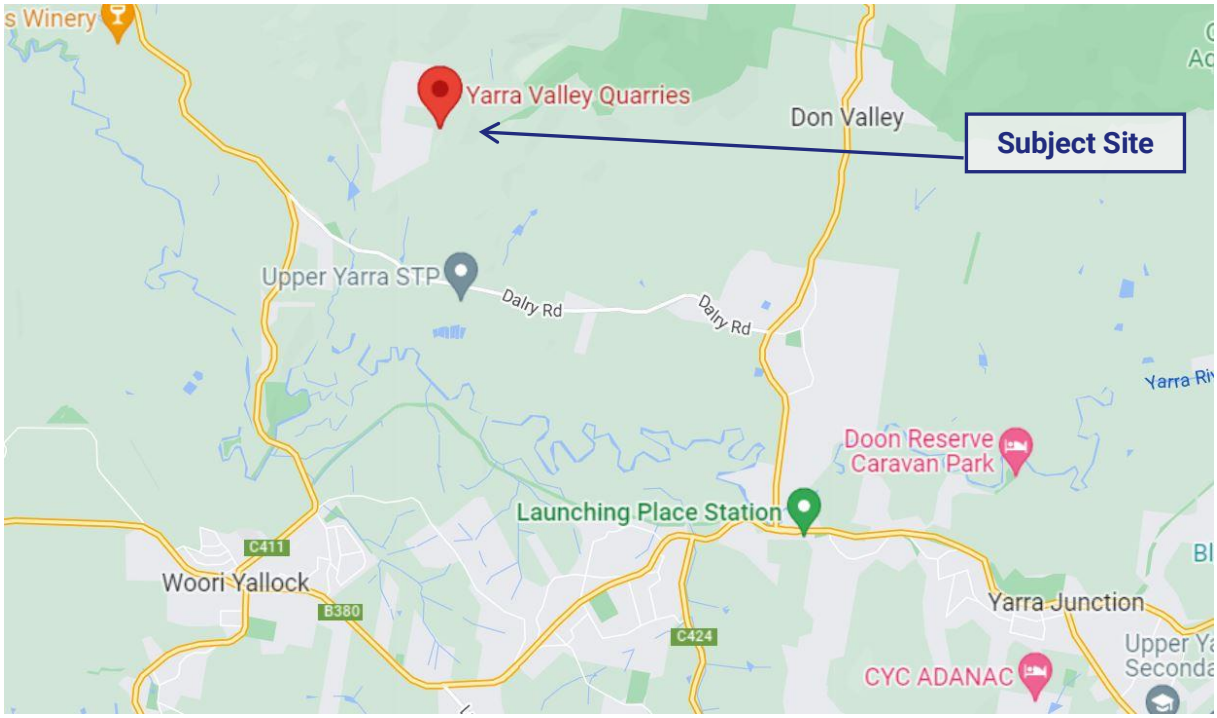
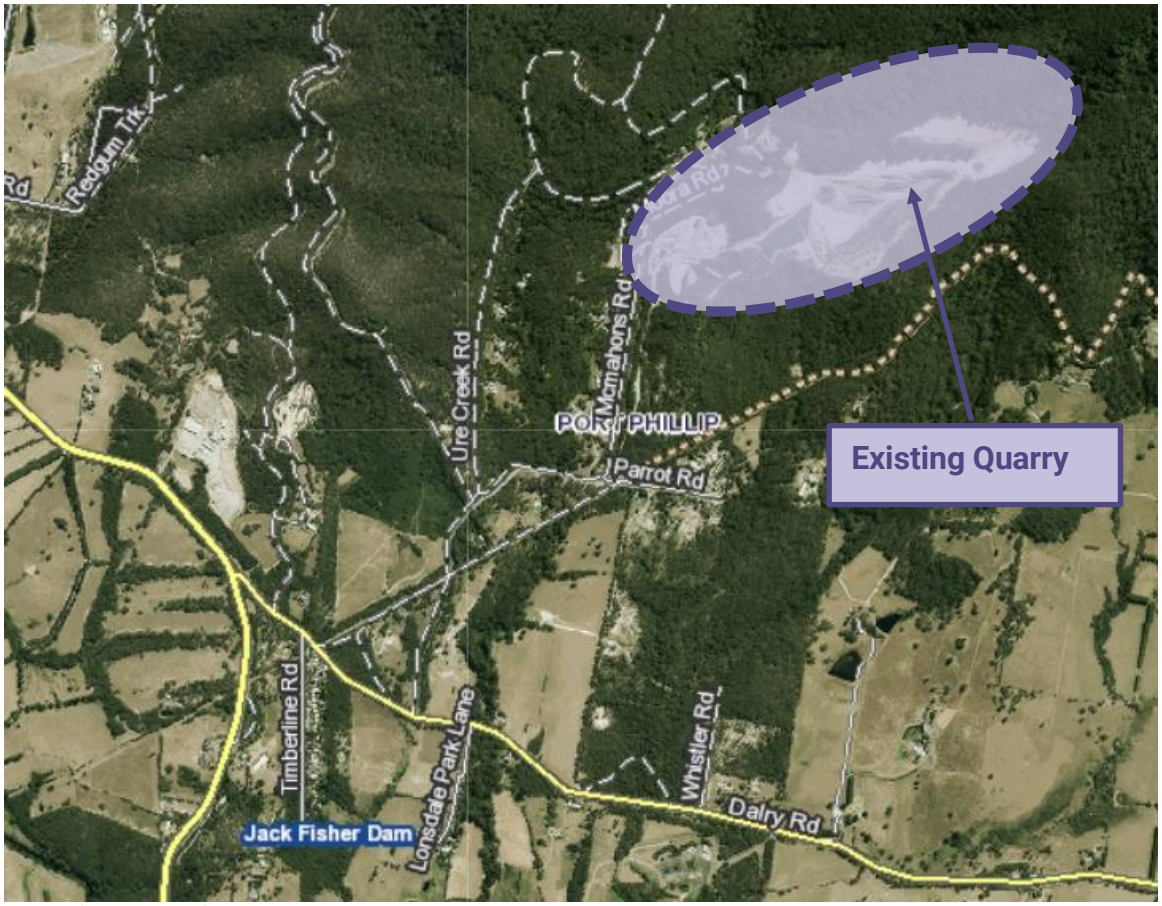


Figure 1: Locality Map

The existing quarry, which has operated on the current site for over 40 years, is located at the northern end of McMahons Road as presented in the aerial photograph image at Figure 2 below.



Source: https://mapshare.vic.gov.au/

Figure 2: Existing Quarry Location

2.2. Road Network

McMahons Road

McMahons Road is predominantly a sealed dead-end road that runs for a distance of approximately 1.4km between Dalry Road and the quarry entrance is to the north of Parrot Road. There is also an extension of McMahons Road that continues beyond the quarry entrance as an unsealed road to the immediate west of the quarry, providing access to five residential/lifestyle properties on the western side of the quarry.

The main section of McMahons Road, to the quarry entrance, is a sealed carriageway constructed to a width generally between 6m and 7m. There is a marked centre line along this part of the road. There is no posted speed limit, so the default 100km/h speed limit applies.

There are a number of bends located along the length of McMahons Road, with guide posts provided along the sides of the road in a number of locations, including at some of the bends.

Dalry Road

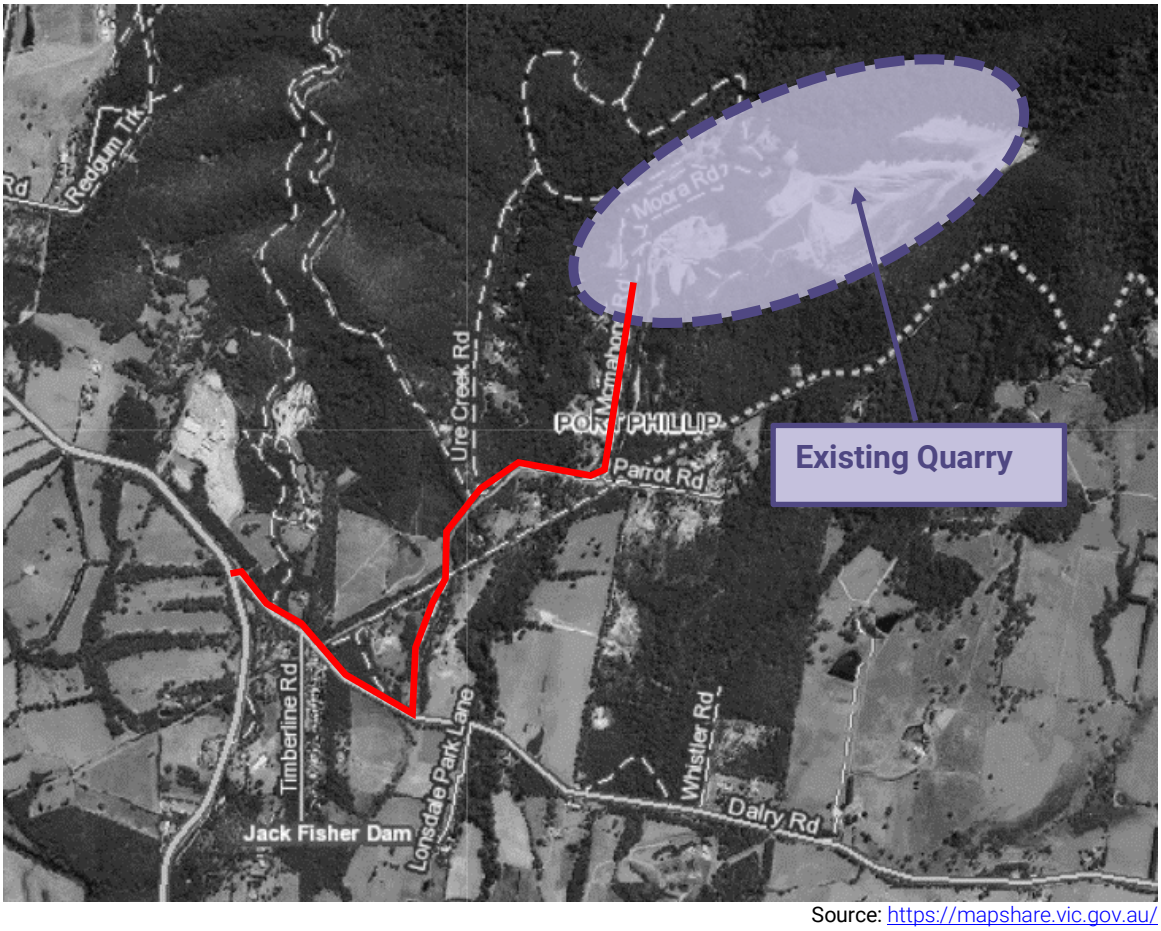
Dalry Road is a major Council managed road that runs in an east-west direction between Healesville-Koo Wee Rup to the west and Don Road to the east. It forms part of the most direct (shortest) route between the regional centre of Healesville and the towns of Launching Place, Yarra Junction and Warburton to the east, while avoiding transit through Woori Yallock.

Dalry Road is a sealed road which has a posted speed limit of 80km/h in the vicinity of the T-intersection at McMahons Road and increases to 100km/h further east towards Don Road (C506). It contains a marked centre line as well as edge lines on both sides of the carriageway.

2.3. Travel Route to the Quarry

Access to the quarry involves travel along McMahons Road and Dalry Road (both local roads) to access the arterial road network at Healesville-Koo Wee Rup Road, where most Dandy Premix heavy vehicles head south through Woori Yallock to travel to and from south-east Melbourne, i.e. Cranbourne, Pakenham, Tyabb and Dandenong.

A diagram illustrating the route for trucks to access the quarry site from Healesville-Koo Wee Rup Road is presented in Figure 3 below.



Source: https://mapshare.vic.gov.au/

Figure 3: Travel Route to Healesville-Koo Wee Rup Road

3. Proposal

3.1. Existing Quarry Operation

Over the preceding five years, the existing quarry has an average weighbridge activity (sales) of approximately 325,000 tonnes of material each financial year.

The existing (permitted) quarry operating hours are 6.30am to 6.00pm on weekdays and 7.00am to 2.00pm on Saturdays. The quarry does not operate on Sundays. Staff availability for sales loading and despatch operations are managed to ensure no loading before 6.30am and after 5.00pm Monday to Friday, or before 7.00am and after 1.00pm at latest on a Saturday, with most Saturday operations confined to plant maintenance only.

Traffix Group undertook traffic surveys at the Dalry Road/McMahons Road intersection over a one-week period in June 2022 to identify existing truck movements along McMahons Road accessing the quarry. The existing truck volumes varied from an average of 119 movements per day (two way) on a weekday to 46 movements (two way) on the Saturday. There were no truck movements recorded on a Sunday.

The existing truck volume equates to approximately 6 trucks exiting the site per hour or an average of one truck exiting every 10 minutes.

The existing trucks that access include a mix of 42 tonne net weight articulated truck and (dog) trailer trucks that are operated by the quarry and smaller 6 to 8 tonne rigid trucks that are operated predominately by local road maintenance contractors to Yarra Ranges Shire Council and a number of other local private customers, e.g., garden supplies, civil contractors, etc.

Statistically, 15,600 trucks depart the quarry per annum with an average (loaded) net weight of 22.6 tonne per truck.

3.2. Proposed Quarry Work Plan Variation Operations

The proposed quarry expansion will result in the footprint area of the existing quarry Extraction Pit expanding into adjacent land to the north-west, owned by Dandy Premix and known as Lot 50C, to ensure continued access to the hard rock resource.

The amount of material extracted from the quarry is expected to increase from 325,000 tonnes per year up to 500,000 tonnes per year. This represents an increase in production of approximately 53% compared to existing conditions.

No additional, or the expansion of existing crushing and materials processing facilitates are proposed to be installed on the site as part of the planned quarry expansion, with any increased production capacity requirements to be achieved through technology and plant upgrades. All vehicles will continue to enter and leave the site via McMahons Road and Dalry Road route as per the existing quarry operation.

4. Traffic Impacts of Proposed Expansion

The anticipated 53% upper-level increase in production compared to existing conditions, could be expected to have a corresponding increase in truck movements accessing the site, with

the number of trucks exiting the site increasing from 6 vehicles per hour to 9 vehicles per hour, which represents a truck exit every 6 to 7 minutes.

We note that this is a conservative estimate as the increase in production will only result in an increase in the larger 42 tonne trucks operated by the quarry and not the smaller 6 to 8 tonne trucks operated by Council contractors and other local customers.

This level of additional truck movements can easily be accommodated by the existing road network in terms of network capacity, although it increases the exposure for existing safety issues. The existing safety issues and recommended improvements are discussed further below.

5. Road Safety Assessment

5.1. Dalry Road/McMahons Road Intersection

The Dalry Road/McMahons Road intersection is a T-intersection controlled by a Stop sign facing McMahons Road. The intersection is located on the inside of an east-west directional curve of Dalry Road, which also slopes downwards to the east of the intersection. As such, there is very limited visibility to the left on Dalry Road for vehicles turning right out of McMahons Road into Dalry Road.

To address this sight distance deficiency, there are a number of mitigation measures that have been implemented as noted below:

- There is a 1000mm convex mirror installed on the south side of Dalry Road, opposite McMahons Road, such that motorists approaching the T-intersection on McMahons Road, can look into the mirror to get a better view of traffic approaching along Dalry Road from the east.
- A dynamic solar powered active warning system (AWS) has been installed, including a vehicle detection induction loop at the stop line of the McMahons Road approach to Dalry Road to detect when vehicles have arrived, or are waiting at the T-intersection. Vehicle entering active warning (AWS) signs facing both Dalry Road approaches (east and west) to the McMahons Road T-intersection, were installed by Dandy Premix in 2012. The two Dalry Road AWS signs flash each time a vehicle approaches the T-intersection from McMahons Road.
- A warning sign with flashing lights has also been installed in Dalry Road at the T-intersection, such that it faces McMahons Road, to indicate to drivers at the McMahons Road stop line, that the AWS flashing lights are operating on the Dalry Road approaches to the T-intersection.

Photographs of the above features are included in the table below, whilst a more detailed description of the active warning system (AWS) is attached at Appendix A

McMahons Rd Approach to Dalry Rd

Convex Mirror Opposite McMahons Rd

Visibility to Left from McMahons Rd

Dalry Rd East Approach to McMahons Rd

Dalry Rd East Approach to McMahons Rd

Advance Warning Sign on Dalry Rd East Approach

A review of crash information from the www.data.vic.gov.au website reveals that there have been no casualty crashes reported at the Dalry Road/McMahons Road intersection over the most recent six year reporting period between January 2015 and February 2021.

5.2. Healesville-Koo Wee Rup Road/Dalry Road Intersection

The Healesville-Koo Wee Rup Road/Dalry Road intersection is a T-intersection controlled by a 'Give Way' sign facing the Dalry Road approach. The intersection also incorporates an auxiliary right turn lane for northbound right turn movements from Healesville-Koo Wee Rup Road into Dalry Road, a left turn slip lane for southbound traffic entering Dalry Road and a traffic island on the Dalry Road approach.

A curve is provided in Dalry Road immediately prior to the intersection, such that the two roads intersect at 90 degrees in a 'T' formation rather than a 'Y' formation which would be the result if the curve did not exist. The intersection is located on the outside of a slight curve in Healesville-Koo Wee Rup Road such that there is excellent visibility to the right for vehicles turning left into Healesville-Koo Wee Rup Road from Dalry Road.

Photographs of the Healesville-Koo Wee Rup Road/Dalry Road intersection are included in the table below.

	
Dalry Rd Approach to Healesville-Koo Wee Rup Road	Dalry Rd Approach to Healesville-Koo Wee Rup Road

	
Healesville-Koo Wee Rup Road North Approach	Healesville-Koo Wee Rup Road South Approach

A review of crash information from the www.data.vic.gov.au website reveals that there were two casualty crashes that occurred at the Healesville-Koo Wee Rup Road/Dalry Road intersection in the most recent five-year period between May 2015 and April 2020.

Both these crashes occurred in 2017, with one involving a northbound right turning vehicle on Healesville-Koo Wee Rup Road colliding with a vehicle heading southbound and the other involved a motorcycle approaching from Dalry Road losing control and overshooting the intersection at night. Neither of these incidents were related to the quarry operations.

5.3. Road Safety Review and Recommendations

A site inspection was undertaken on Tuesday 4th August 2020 which included both the Healesville-Koo Wee Rup Road/Dalry Road and Dalry Road/McMahons Road intersections as well as the length of Dalry Road between Healesville-Koo Wee Rup Road and McMahons Road and the length of McMahons Road between Dalry Road and the quarry entrance.

The purpose of the site inspection was to identify existing safety deficiencies that should be addressed in order to facilitate the proposed expansion of the quarry. It is important to note that each of the measures identified in this assessment are proportionate to the future quarry operation and do not involve wholesale changes to the existing road geometry, noting that truck movements to and from the quarry are not proposed to change from what occurs currently.

5.3.1. McMahons Road Section

The section of McMahons Road between Dalry Road and the quarry entrance was generally considered to be of an appropriate condition to facilitate access by quarry trucks. In particular, the pavement appeared to be maintained to an appropriate standard and at an appropriate width to allow quarry trucks to safely pass.

Whilst guideposts are installed in a few locations along the road, it was noted that there were a small number of low radius curves where no guideposts were provided including a section

of the road where there is a deep concrete spoon drain on one side, but no guideposts to delineate the edge of the road from the drain.

The locations where guideposts are missing are presented in the photographs below.

	
McMahons Rd Curve Without Guideposts	Section of McMahons Rd Without Guideposts to Delineate Between Edge of Pavement and Drain

Recommendation:

Install guideposts around all curves along McMahons Road in accordance with AS 1742.2-2009 and along the straight section of McMahons Road where it abuts the open drain.

5.3.2. Dalry Road Section

There were no safety issues identified along the section of Dalry Road to be used by quarry trucks between the McMahons Road intersection and Healesville-Koo Wee Rup Road.

5.3.3. Dalry Road/McMahons Road Intersection

The existing sight distance deficiency at the Dalry Road/McMahons Road intersection is an existing situation within the local road network and there is no simple physical rectification which could reasonably be addressed as part of the proposed quarry expansion.

The existing dynamic warning system was found to be operating as intended on the eastern approach to the intersection, with the flashing warning signs observed to operate each time a quarry truck arrived at the intersection from McMahons Road. There was, however, one deficiency observed which was that only one of the warning lights flashed, with the other light remaining on for an extended period when a truck was exiting McMahons Road.

A second deficiency observed at the Dalry Road/McMahons Road intersection was that although a stop sign is provided facing the McMahons Road approach, the line marking that is provided in conjunction with the stop sign is a 'Give Way Hold Line' consisting of a series of give way bars, rather than a continuous 'Stop Line' in accordance with AS 1742.2-2009.

In addition, there have been problems with the operation of the flashing lights on the Dalry Road western approach to the intersection where the lights fail due to insufficient solar power

reaching this sign. This is due to tree cover reducing solar access to the solar panels located above the existing flashing sign.

Photographs of the incorrect operation of the warning sign and the 'Give Way Hold Line' are provided below.

Dalry Road Warning Sign with One Light Displaying Continuously

Incorrect 'Give Way Hold Line' Marking at Intersection

Recommendations:

- *Fix the operation of the dynamic active warning system (AWS) sign facing the east approach of Dalry Road such that both lights flash when a truck is exiting McMahons Road.*
- *Replace the existing 'Give Way Hold Line' facing the McMahons Road approach to the intersection with a 'Stop Line' to coincide with the existing 'Stop' sign.*
- *Relocate the solar panels that power the flashing lights on the western approach to the intersection to a new location where there is less tree cover or have the extent of tree cover restricting solar panels access and therefore AWS operation, removed by Council to ensure the integrity of power supply and full system operation. Relocation of the solar panels will require the installation of underground cabling to connect the new solar panel location to the location of the existing AWS warning sign.*

5.3.4. Healesville-Koo Wee Rup Road/Dalry Road Intersection

Although it was observed that the length of the existing northbound auxiliary right turn lane on Healesville-Koo Wee Rup Road was only 55m long, which is less than the desirable length of 100m based on the existing 80km/h speed zone, it was considered that extending the length of the lane would be impractical, noting that on Healesville-Koo Wee Rup Road is located within a cutting to the south of the intersection.

Accordingly, it is likely that substantial earthworks would be required to extend the right turn lane which is considered beyond the scope of what could reasonably be implemented because of the proposed quarry expansion. It is noted that there is an existing advance direction sign provided prior to the start of the right turn lane, to give motorists advance knowledge that they are approaching the Dalry Road intersection.

The existing northbound right turn lane is only approximately 2.8m wide which is not sufficient to accommodate large quarry trucks without protrusion into the adjacent through traffic lane. To address this deficiency, it is suggested that Healesville-Koo Wee Rup Road be widened slightly to the west where there is existing shoulder such that a 3.5m wide right turn lane could be provided to more adequately accommodate quarry trucks turning right into Dalry Road.

There are many existing signs located on the Dalry Road approach to the Healesville-Koo Wee Rup Road intersection. While there were no accidents recorded, to improve delineation of the intersection from Dalry Road, the following additional traffic safety measures are recommended:

- Provision of an edge line and RRPMs adjacent to the edge of the traffic island located within the Dalry Road approach to improve delineation of the curve in the road.
- Provision of a sight board (bi-directional hazard markers) located beneath the existing directional signs facing Dalry Road on the opposite side of Healesville-Koo Wee Rup Road.
- Provision of a single streetlight over the intersection (flag lighting) to draw attention to the presence of the intersection at night, noting that the quarry operating hours include periods before sunrise and after sunset in winter.

Photographs illustrating the existing narrow right turn lane and the Dalry Road approach are presented below.

Narrow Right Turn Lane into Dalry Road

Dalry Road Approach to Healesville-Koo Wee Rup Road

Recommendations:

- *Increase the width of the Healesville-Koo Wee Rup Road right turn lane into Dalry Road to 3.5m by widening into the existing shoulder to the west.*
- *Provide edge lines and RRPMs adjacent to the edge of the traffic island located within the Dalry Road approach to improve delineation of the curve in the road.*

- *Provide a sight board beneath the existing directional signs facing Dalry Road on the opposite side of Healesville-Koo Wee Rup Road.*
- *Provide a single streetlight over the intersection to draw attention to the presence of the intersection at night.*

6. Conclusion

Having undertaken a detailed traffic engineering assessment and safety review for the proposed quarry expansion at 130 McMahons Road, Launching Place, we are of the opinion that:

a) there are several safety improvements which should be considered for implementation in conjunction with the proposed quarry expansion, namely: -

   i. Install guideposts around all curves along McMahons Road in accordance with AS 1742.2-2009, as well as along the straight section of McMahons Road nearing the quarry entrance where it abuts the open drain.

   ii. Fix the operation of the active warning system (AWS) sign facing the east bound approach of Dalry Road such that both AWS system lights flash when a truck is exiting McMahons Road.

   iii. Replace the existing 'Give Way Hold Line' facing the McMahons Road approach to the intersection with a 'Stop Line' to coincide with the existing 'Stop' sign.

   iv. Relocate the solar panels that power the flashing lights on the western approach to the intersection to a new location where there is less tree cover restricting solar access to the panels.

   v. Increase the width of the Healesville-Koo Wee Rup Road right turn lane into Dalry Road to 3.5m by widening into the existing shoulder to the west.

   vi. Provide edge lines and RRPMs adjacent to the edge of the traffic island located within the Dalry Road approach to improve delineation of the curve in the road.

   vii. Provide a sight board beneath the existing directional signs facing Dalry Road on the opposite side of Healesville-Koo Wee Rup Road.

   viii. Provide a single streetlight over the intersection to draw attention to the presence of the intersection at night.

b) subject to the undertaking of the safety improvements in a) above, the increase in traffic associated with the expansion of the quarry operations will have no adverse impact on the existing traffic environment, and

c) subject to the undertaking of the safety improvements in a) above, there are no traffic engineering reasons why the quarry expansion should not be approved.

Appendix A

Dynamic Warning System Information

YARRA VALLEY QUARRY ADVANCED WARNING SYSTEM

Intersection Dalry Road & McMahons Road

Dandy Pre Mix Pty Ltd operates the Yarra Valley Quarry on McMahons Road in Launching Place. Aldridge Traffic Systems were approached by Yarra Valley Quarries to provide an active warning system to advise motorists travelling along Dalry Road that vehicles are entering from McMahons Road.

Trucks entering from McMahons Road are slow moving and they occupy both sides of Dalry Road for a reasonable period of time (several seconds). This is depicted in Photos 1 & 2. This represents a hazard for vehicles travelling along Dalry Road. It is expected with Advanced Warning Signs that the degree of hazard will be significantly reduced.

A number of Site visits and meetings were held between Garry Cranny (Dandy Pre Mix) and Brendan McIntosh (Aldridge Traffic Systems)

Both Roads are controlled by the Local Council. Any treatment will require ultimate approval from the Council.

Vic Roads were contacted for advice on treatments for similar situations. There are a number of locations throughout Victoria where Advanced Warning Systems have been installed.

Aldridge Traffic Systems proposes similar treatment for this location.

Three Active Signs will be installed. These will display a fixed message supplemented with alternating flashing yellow signals to draw attention to the sign.

There is restricted availability of Mains Power in general and a Solar Powered option initially appeared doubtful due to the dense tree canopy in the area.

With additional Site visits suitable locations have been found which attract significant amounts of direct sunlight. The sign facing into McMahons Road (Sign 3) has large clear sun access due to the break in trees afforded by McMahons Road. The two signs on Dalry Road (Signs 1 & 2) have been located on the opposite side of the road to the approaching traffic, where good sun access is available and importantly these signs are in advance of the exiting “Trucks Entering” signs and their location gives improved advanced warning beyond the bend in the road. Typical layout is shown in Figure 1. The final design is for all three signs to be solar powered.

Key Solar Design Factors are:

- Estimated exiting vehicles per day 80 (Ratio Report 35 – March 2009)
- Daily load for each Sign 15Ah (based on above and 40% margin for battery efficiency)
- Solar System – Battery 100Ah Solar Panel 30W
- Days Autonomy (operation without any sun) – 5 days
- Sun hours to recharge daily battery use – 1 hour (assuming 50% charging efficiency)

Significant margins have been allowed in this design. Actual operation is expected to exceed these figures.

Control of the signs will be by radio signal between each sign.

The Dalry Road signs (Signs 1 & 2) will display “Vehicle Entering”, similar to the sign shown in Photo 3

The McMahons Road sign (Sign 3) will display “Look Both Ways”.

The general layout of the signs is shown in the attached drawings W3-V101 (Signs 1 & 2) and W3-V109 (Sign 3). All signs will be the Intermediate “B” size.

Description of Operation

When a vehicle is at the stop bar on McMahons Road (Zone A), all 3 Signs are activated

When the vehicle leaves Zone A, Sign 3 switches off, Signs 1 & 2 remain operating

After a predetermined time Signs 1 & 2 switch off

This time can be set to give sufficient time for vehicle to advance along Dalry Road (Zone B)

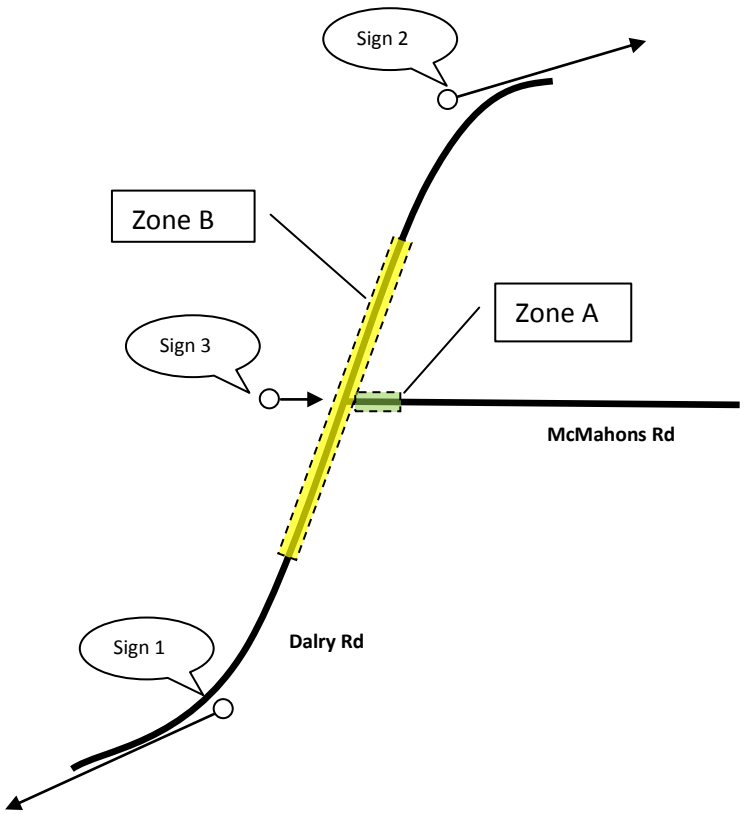


Figure 1

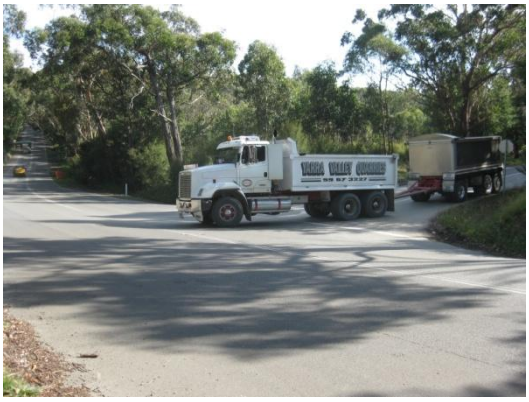


Photo 1
Truck exiting McMahons Road

Photo 2
Truck fully blocking Dalry Road

Photo 3
Typical Advanced Warning Sign

YARRA VALLEY QUARRY ADVANCED WARNING SYSTEM

Intersection Dalry Road & McMahons Road

Typical Warning Sign
Yellow lights (2) flash alternately when activated

Operation

1. Vehicles will be detected in McMahons Road at the Stop Bar
2. This will generate two signals, “VEHICLE PRESENCE” and “WARNING CONTROL”
3. Both Signals commence as soon as the vehicle is detected in McMahons Road
4. The Vehicle Presence signal remains active until the vehicle has left McMahons Road
5. The Warning Control Signal will activate the Warning Signs on each approach.
6. Sign Operating feedback signals combine with the Vehicle Presence signal to activate the Advisory Sign
7. When the vehicle leaves McMahons Road, the Advisory Sign will turn off
8. The Warning Signs will continue to operate for an additional duration (say 30 sec) to allow for the vehicle to fully exit the intersection and be travelling along Dalry Road
9. All equipment is Solar Powered.