Report

Environmental Controls for Rotorua District's Road Network

Access Management

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Prepared By

M Kivell, W McWha

Opus International Consultants Limited
Hamilton Office
Opus House, Princes Street
Private Bag 3057
Hamilton, New Zealand

Approved for Release By

S Hunt

Telephone: +64 7 838 9344

Facsimile: +64 7 838 9324

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1 Introduction

During 1999 the Engineering section of the Rotorua District Council sought advice on the means to safeguard the operational performance of the district's road assets.

A report prepared by Opus International Consultants titled "Environmental Controls for the Rotorua District Road Network" was presented to Council in late 1999. In the report the key parameters were identified likely to influence the performance of the road network. These parameters included:

- Noise resulting from increasing traffic volumes
- Traffic induced vibration
- Light and glare
- Access or side friction

Council has requested that further consideration be given to each of these issues.

This report considers access control measures to enhance of the operational performance of roads in the district hierarchy.

The inputs to this review provided by the District Council were:

- A report titled "Deficiency Analysis" (November 1999) prepared by Gabites Porter
- A section of a second report titled "Road Hierarchy" (March 2000) prepared by Gabites Porter
- Consideration of the provisions relating to access in the TNZ Planning Policy Manual (December 1999)

This report therefore provides a commentary on these contributing reports and suggests some approaches to access management that could be developed to enhance the operational performance of the district's road network in the future.

2 Description of District Roading Hierarchy and Level of Service

2.1 Overview

The following general observations are made from a review of the two Gabites Porter (GP) reports. A four level road hierarchy is proposed namely:

- Primary/Major Arterials
- Principal Roads (Minor Arterials)
- Collector Roads
- Local Roads

The specific roads and streets included in these categories are illustrated in Figure 15 and listed in Appendix 1 of the Gabites Porter "*Road Hierarchy*" report.

Our brief comments relating to the description of the hierarchy are:

- Major Arterial describes a road in Rotorua with traffic volumes presently or projected to carry more than 10,000 vehicles per day. This is a very broad classification.
- Major arterials clearly serve a "through traffic" function
- It may be desirable to have flush median provisions for roads below the suggested 14,000 vehicles per day "trigger" provided for in section 6.1 of the GP report
- The REM is listed as a Major Arterial

We concur that it is appropriate that the REM should be listed as a Major Arterial. The construction of this motorway will result in Te Ngae Road being "demoted" from *Major Arterial* status to *Minor Arterial* status on the basis that the REM will become part of the inter regional corridor to the north and east.

However even though Te Ngae Road will function as a *Minor Arterial*, it will still carry traffic far in excess of the 14,000 vehicles per day which has been suggested as a guideline as the upper limit for *Minor Arterials*. Because of the inconsistency between its future status as a *Minor Arterial* and its high traffic volumes, we recommend that Te Ngae Road be considered as an exceptional case.

2.2 Level of Service

In their "*Deficiency Analysis*" (November 1999), Gabites Porter highlighted those sections of the network which would be operating at Level of Service (LOS) C, D, E and F in year 2021 (Figure 12). This is based on the 2006 network, ie without the REM. Figure 12 indicates the following sections of the network to be operating at low LOS in 2021:

LOS F

- SH5 from Ngongotaha roundabout to south of Kawaha Point Road
- SH5 immediately north of Koutu Intersection
- Lake Road (Bennetts Road to Ranolf Street)
- Arawa Street (Ranolf Street to Rangiuru Street)
- SH30 Te Ngae Road

LOS E

- Section of Ngongotaha Road north of SH5
- SH5 Old Taupo Road between Pukuatua Street and Malfroy Road (does this take into account 4 laning?)
- Ranolf Street (Lake Road to Arawa Street)

LOS D

- Section of Ngongotaha Road north of SH5
- Lake Road (Koutu Intersection to Bennetts Road)

- Fenton Street (Whakaue Street to Pukuatua Street)
- SH30 (Amohau Street Extension to Marguerita Street)

2.3 Developing a Philosophy for Access Management

We note that apart from Arawa Street (*Minor Arterial*), Fenton Street north of Arawa Street (*Collector*) and Te Ngae Road (*Minor Arterial*) all the other roads where deficiencies have been identified in 2021, are *Major Arterials*. Access control is one tool, which will help address these deficiencies.

In summary, the GP reports (or part reports) concludes that capacity issues relating to the performance of the network can be addressed over the planning horizon; for example, the upgrading to four lanes of Fairy Springs Road and Old Taupo Road, and building the REM.

However, there is still a need to implement an overall philosophy to maintain and enhance the functionality or operational performance of the road network for Rotorua. Attention should focus on enhancing the operational performance of those roads classified as Major Arterials. Access management controls could be considered for these major arterials.

Access control provisions are not warranted for *minor arterials*. These roads serve residential catchments in Rotorua and direct property access is paramount. Furthermore, over the planning horizon the growth in traffic volume predicted on these minor arterials does not warrant additional access controls being considered.

The one exception is Te Ngae Road. This road will continue to carry significant traffic even when the REM is built notwithstanding its future status as a minor arterial. Specific access management controls may be desirable along Te Ngae Road for three reasons:

- The road will continue to carry more traffic than is normal for a Minor Arterial
- The future growth and intensification of land uses (residential, commercial) either side of the road
- The road functions as the primary corridor to the lakes and tourist/recreational areas.

Accordingly, it is appropriate that we concentrate on developing access control philosophies for the Major Arterials plus Te Ngae Road (because of its high traffic volumes as outlined above).

3 Current Policy Framework

3.1 TNZ Planning Policy Manual

Section 3 (Effects of Adjacent Activities on State Highways) and specifically section 3.4 (Access) and Appendix 4 provides a discussion on access and safety and efficiency matters along with a description of a road hierarchy. The hierarchy proposed for Rotorua would be consistent with this generic description if the TNZ term "Strategic Arterial" was replaced by the term "Major Arterial". In both cases the hierarchy provides for these

roads to carry "through traffic" and to carry major traffic movements in and out of the city/district.

Techniques for access management are presented in Table A4-6 under seven headings: namely:

- Access controls
- Driveway controls
- Local widenings
- Intersection
- Turn controls
- Medians and median openings
- Traffic controls/parking controls

The general benefits to result from these access management controls are noted in Table A4-7.

The Policy Manual therefore provides general guidance on access management, and these approaches could be further considered for the Rotorua network.

3.2 Rotorua Proposed District Plan

The District Plan sets out in Section 12 Transportation, the resource management issues, policies, methods of implementation and rules relating to the role of transportation to promote the efficient functioning of the district and the wellbeing and convenience of the residents.

Some relevant rules relate to permitted activities – parking and manoeuvring (R 12.3.3.5); Traffic Generation (R 12.4.2.3); Access (R12.4.2.5); Cumulative Effect (R12.4.2.9); and Subdivision (R12.8.1).

These rules only indirectly require consideration to be given to the status of the road/carriageway adjacent to the proposed land use or subdivision activity.

Section 16 (Subdivision and Development) also provides some policy (2.3.3.2; 2.3.3.3; and 2.3.5.1) relating to the integration of new development with the existing road network. Again the status of the road in the road hierarchy is not directly considered and therefore neither is its operational requirements.

4 Access Management

4.1 Reasons for Access Control

The following excerpts from two engineering publications summarise the importance of access control.

> *All evidence available leads the authors to conclude, in the interests of road safety and the need to preserve an efficient road network, that it is essential to control access onto major arterial roads. It is also evident that a highway exists for the free and safe passage of travellers and that although abutting landowners have rights, their rights should be subservient to the dominant rights of through traffic.* – Lock, J.B, Gelling, M.J. and Colquhoun-Kerr, D.J. *Limitation of Access onto Arterial Roads.* ARRB Proceedings Vol 11 (4) (1982)
>
> *The influence of access control on safety is so strong that the relationship has been established consistently over the years in spite of the difficulties associated with accident studies. One thing is very clear, the most important geometric design element in reducing accidents is access control. It would be ideal to control access on every roadway; ideal but not practical. Thus on those facilities that carry the most traffic, connect major activity centres, and/or are major regional arterials, access should be controlled wherever possible.* – Brindle, Ray. ARRB Transport Research Ltd. ARR 271 *Arterial Road Access Management: Source Document* (1995)

Provision of access control on arterial roads provides significant road safety benefits and substantially enhances the road's ability to preserve its initial operating level of service. While it is relatively easy to obtain the desired level of access control for new arterials, it is far more challenging to achieve this on existing arterials which already provide higher than desirable levels of access. The desirable model would be to have just two classes of road:

- Arterials which serve only a network function and provide no access to adjoining properties
- Access streets which exist only for land service and have no network function

Unfortunately it would be almost impossible to achieve this model given the proliferation of arterials which already have access functions. All we can now so is aim to obtain an appropriate balance between providing for traffic and providing for activities which occur adjacent to the road. This balance should favour traffic movement rather than the abutting access function. In the case for Rotorua this philosophy should apply to *Major Arterials*.

The principal advantages of control of access are the preservation or upgrading of service and safety. The difference between a highway with or without control of access is the degree of interference with through traffic by other vehicles or pedestrians entering, leaving and crossing the highway. With control of access, entrances and exits are located at points best suited to fit traffic and land-use needs and are designed to enable vehicles to enter and leave safely with a minimum of interference with through traffic. Vehicles are prevented from entering or leaving elsewhere so that, regardless of the type and intensity of development of the roadside areas, a high quality of service is preserved and the accident potential is lessened.

On highways where there is no control of access and roadside businesses develop, interference from the roadside can become a major factor in reducing the capacity,

increasing the accident potential and eroding the mobility function that the facility was designed to provide.

4.2 Access Management Techniques

For highways without full control of access, techniques are available to provide additional safety. These access management techniques aim to meet the following functional objectives:

- Objective 1 - Limit the number of conflict points
- Objective 2 - Separate conflict areas
- Objective 3 - Remove turning vehicles and/or queues from the through lane

Specific access management techniques to achieve these objectives for the *Major Arterials* in Rotorua include:

Access Management Technique	Achieves Objective(s)
Encourage shared use of accesses	1 & 2
Encourage access onto side rather than frontage roads	1 & 2
Provide localised road widening at accesses	1 & 3
Provide left turn deceleration lanes	1 & 3
Provide continuous left turn lane manoeuvring lane	1 & 3
Provide right turn bays	1 & 3
Provide flush painted medians	3
Provide physical raised medians	1 & 2
Construct service lanes along frontage	1 & 2
Construct service lanes at rear of sites	1 & 2
Provide onsite parking and manoeuvring	2 & 3
Provide movement control using splitter or seagull islands	1, 2 & 3
Prohibit parking adjacent to accesses	
Limit the number of movements per access	

Although not strictly an access management technique, arterial operating efficiency can be enhanced by providing parking off the through lane (eg using kerb indents) or banning parking altogether.

4.3 Next Steps

The road hierarchy as generally described in the GP report could be incorporated as a Variation or Plan Change in the Rotorua Proposed District Plan. Further explanation could be provided to describe the network in terms of: function, traffic flows (present and projected), and form (the physical description of the asset). Appendix 3 to the Opus Report "Environmental Controls for the Rotorua District Road Network" provides an example. Performance standards and objectives in the district plan could be strengthened for site use and development particularly as they relate to access to *Major Arterials*.

The planning maps could be annotated to identify the *Major Arterials*.

Strategies could be developed to "upgrade" these routes through the implementation of some of the access management techniques outlined in 4.2 above. Funding for programmes of physical works could then be included in the annual plan.

The Council's Engineering Code of Practice could stipulate specific design drawings or best practice for developers to consider as an integral part of the redevelopment of land adjacent these road corridors.

5 CONCLUSIONS

It is essential to maintain the safe and efficient operation of the district road network. It is desirable to concentrate on developing access control philosophies for the *Major Arterials* plus Te Ngae Road (because of its high traffic volumes) as the critical roads in the district road hierarchy.

Overseas research supports the view that access control is a major contributor to improving operating levels of service and reducing road accidents.

Provision for access controls can occur through a range of management techniques. The merits of these techniques for adoption by the Rotorua District Council warrants further consideration.