PETER DAMEN
Chief Executive Officer
Level 5 Design

peterd@level5design.com.au

A NEW COMPARATIVE UPDATE ON EXPERIENCES WITH LOCAL AREA TRAFFIC MANAGEMENT IN AUSTRALIA AND NEW ZEALAND

Local area traffic management (LATM) has been effective in improving the safety, amenity and liveability of local areas in Australia and New Zealand for decades. In order to identify common practices and emerging trends, extensive research was undertaken in 2018 to identify new, innovative and revised approaches to the application of traffic management practice in Australia and New Zealand. This research forms part of a 20-year longitudinal research project focussing on local government practices that commenced in 2006. This paper outlines the findings of that research, addressing questions such as the popularity and effectiveness of devices used, the methods employed in decision making, post-construction monitoring processes, and trends in practice over time. The research evaluates and compares data over a 12-year period from 2006 to 2018 and draws conclusions that will be of wide interest to traffic management professionals.

1. Introduction

The purpose of local streets is primarily to provide a place for the local community – both to access their homes and other local destinations, and to provide an active place to walk, cycle, play, relax and interact. Local streets support local land use and community activity and are part of the public open space network where people come together with their neighbours. Naturally the speeds on local streets should be low, consistent with their form and function. Local streets differ from roads, which provide a through traffic movement function for those travelling outside the local community. It is in this local street context that local area traffic management applies.

Figure 1: A typical street in a local community neighbourhood in Australia

Local area traffic management (LATM), otherwise known as traffic calming, is a constantly evolving and widely applied practice. It is involved with the planning and management of street traffic within a local area using physical devices, street scaping treatments, placemaking and other measures. The purpose of LATM is to reduce through traffic volumes and vehicle speeds in local streets, to increase amenity and sense of place, and to improve safety and access for residents and visitors, especially vulnerable road users such as pedestrians and cyclists. It is described in further detail in the Austroads Guide (Damen et al. 2016).

LATM is essentially system based and area-wide. It considers neighbourhood traffic-related problems and their proposed solutions in the context of the local area or a group of streets within it, rather than only at isolated locations. In addition, it requires that physical traffic measures be seen as a sequence of interrelated devices rather than individual treatments (Damen et al. 2016).

The practices used throughout Australia and New Zealand vary quite considerably. In order to get a better understanding of commonly accepted practice and to identify new innovative techniques being employed, research was undertaken in 2018 building on earlier research undertaken in this field by the author (Damen 2003, 2007, 2011 and 2015).

2. Research method

The research that was undertaken employed an online survey, which was distributed to local government practitioners in Australia and New Zealand. The analysis focussed on comparing the most recent results obtained in 2018 with those obtained in earlier years, i.e. 2006, 2010 and 2014 (Damen 2007; Damen and Rodwell 2011; Damen and Ralston 2015). The intent is that the survey will be repeated again every 4 years until 2026 to provide a study of longitudinal trends over a 20+ year period.

Local government practitioners were consulted on a broad spectrum of different topics ranging from the types of devices that are in common use, device effectiveness, through to LATM planning, implementation and monitoring processes. Survey respondents were also given an opportunity to provide additional information/comments.

It should be noted that survey responses were based on the experiences of the survey participants rather than in-field or laboratory evaluation studies. The results were therefore relatively subjective and required multi-criteria analysis and interpretation to draw useful conclusions.

3. Survey response

In total, 124 practitioners and 116 Local Governments responded to the 2018 survey, which compares well to previous surveys conducted in 2006, 2010 and 2014 that had 161, 109 and 189 respondents respectively. A 15-20% sample size of all local governments in Australia and New Zealand was targeted and a sample size of 18.9% was achieved.

A fair distribution of responses was received from states and territories across Australia, and from New Zealand. New South Wales had the most respondents, with 26%. When compared

to the actual distribution of local governments across Australia and New Zealand as shown in Table 1, there was no significant bias noted.

Table 1 Local Government State and Territory Distribution

Category	WA	NSW	NT	NZ	QLD	SA	TAS	VIC	ACT	Total
Respondent distribution	18%	26%	1%	11%	10%	10%	6%	18%	0%	100%
Actual LG distribution	22%	21%	3%	12%	12%	12%	5%	13%	0%	100%

The breakdown of respondents by local government classification is shown in Table 2. Approximately 79% of respondents were from urban or metropolitan local governments whereas 21% were from rural and remote local governments including those with large townships. This is quite consistent with previous survey results.

Table 2 Local Government Classification (Respondent Count)

Category	WA	NSW	NT	NZ	QLD	SA	TAS	VIC	ACT	Total
Rural & Remote LG	7	5	0	4	1	4	2	3	0	26
Urban LG	16	27	1	10	5	9	5	4	0	98
Total	23	32	1	14	12	13	7	22	0	124

4. Scope of the research

A summary of the major findings is given in the following sections.

Most of the questions in the 2018 survey were the same as those used in earlier surveys in order that longitudinal trends could be established. As some new questions were asked in 2018, and some other questions were purposely varied with respect to earlier years, not all the results obtained in 2006, 2010 and 2014 were directly comparable.

The survey generally required respondents to complete all questions, therefore each of those questions or sub-questions received the same number of responses.

5. Devices in common use

The local area traffic management devices in most common use in Australia and New Zealand are given in Figure 2. This figure depicts how commonly the devices were reported as being used in the period 2006 to 2018. Table 3 lists these devices in order of their stated popularity in 2018. Some treatments included in the 2018 research, e.g. school zones, were not included in the research undertaken in some previous years.

There has been very good consistency in what devices are in common use over the past 12 years. In recent times, some devices like mid-block median treatments, slow points and round profile road humps have fallen out of favour. Some devices like roundabouts, while still popular, are being used a lot less in local area traffic management schemes than was previously the case.

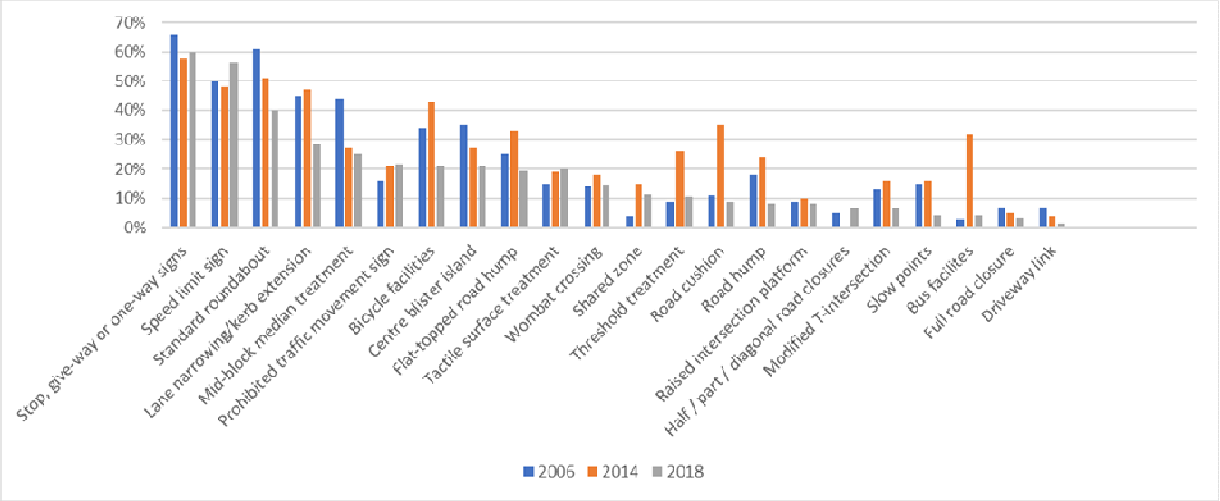

Figure 2: Comparison of most commonly used LATM devices

Speed limit signs and stop, give-way or one-way signs have been reported as the most commonly used devices in 2018. This is consistent with earlier research.

Most survey respondents reported 'never' to have used driveway links (50%), bus bypasses (62%), half/part/diagonal road closures (31%) and full road closures (31%).

Table 3 LATM devices in common use in 2018
(most commonly used device descending to least commonly used)

Most commonly used	Stop, give-way or one-way signs
	Speed limit sign
	School zones
	Standard roundabout
	Lane narrowing/kerb extension
	Prohibited traffic movement sign
	Bicycle facilities
	Centre blister island
	Tactile surface treatment
	Flat-topped road hump
	Marked pedestrian crossing
	Wombat crossing
	Shared zone
	Threshold treatment
	Road cushion
	Road hump
	Raised intersection platform
	Modified T-intersection
	Half / part / diagonal road closures
	Slow points
	Mid-block median treatment
Less commonly used	Full road closure
	Driveway link

School zones and shared zones are becoming more common and the use of road cushions did spike in the 2010 to 2014 period but has since dropped away dramatically.

In some instances the popularity of devices varies quite considerably from state to state. One example is mid-block median islands. While 25% of local governments across Australia and New Zealand report using them within LATM schemes, they are used much more widely (39%) by local governments in Western Australia. Another example is driveway links. Only 2% of local governments report commonly using them, but all of those are located in South Australia. And of those local governments that report using driveway links 'sometimes', 25% of those are also located in South Australia. On the other hand, every New Zealand local government respondent indicated that they 'never' or 'very rarely' use driveway links. This highlights the jurisdictional popularity of driveway links in South Australia.

Another interesting finding has been that bicycle facilities within LATM have seen a significant decrease (22%) in use from 2006 to 2018 despite reporting a significant rise in their perceived effectiveness. This indicates that despite the additional emphasis being given to cycling within local communities, it has not translated very well to local area traffic management schemes. In fact, several large metropolitan local governments indicated that they never incorporate bicycle facilities into their LATM schemes. Clearly if bicycle facilities are as effective as most local governments report then this is an area that needs much more attention moving forward.

Long experience in Denmark and the Netherlands shows that traffic calming is compatible with high levels of cycling. The keys are quality of detailing and speed management. Traffic conditions in local streets should be based on the expectation that bikes and vehicles will share the same space. Bike considerations should be an integral part of the LATM planning process, not merely an afterthought. LATM should improve conditions for cyclists and accord with their primary needs, which is to:

- Enhance access (aim at a coherent network that reaches all likely local destinations);
- Enhance safety;
- Enhance convenience (opportunities, short cuts);
- Ensure continuity (including provision for crossing of traffic routes).

6. Main traffic-related issues

The main traffic-related issues reported in the research conducted in 2018 were (listed in order of highest ranking):

- speeding
- road crashes
- compatibility for pedestrians and bicycle movement
- hoon' behaviour

This differs to the results obtained in 2014 which had the following top ranked issues:

- speeding
- 'hoon' behaviour
- through traffic
- compatibility for pedestrians and bicycle movement

Speeding continues to be the highest ranked local area traffic management related issue overall (refer Figure 3).

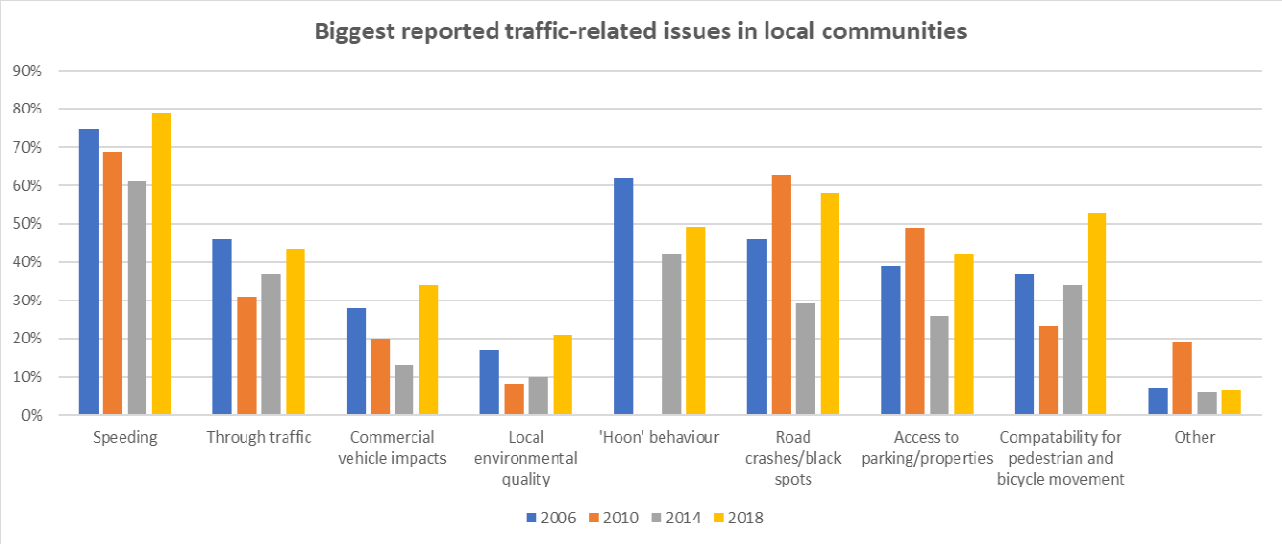

Figure 3: Main traffic-related issues in local areas

7. Effectiveness

The perceived effectiveness of local area traffic management devices for the period from 2006 to 2018 is illustrated in Figure 4. With few exceptions, such as raised intersection platforms, the results have remained quite consistent over the period from 2006 to 2018.

Overall, standard roundabouts are consistently viewed as the most effective LATM device with more than 80% of practitioners rating them as being effective.

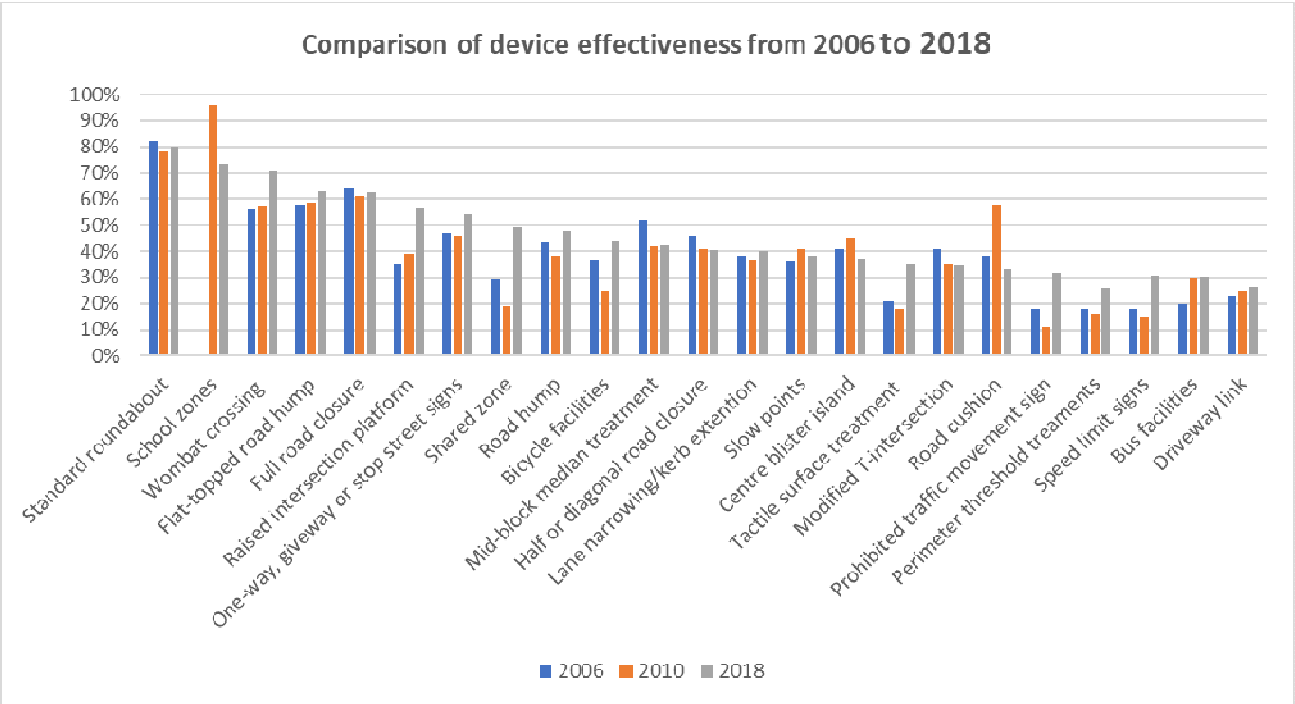

Figure 4: Comparison of perceived LATM device effectiveness

Other devices that are considered 'effective' or 'very effective' include school zones, flat-topped road humps, wombat crossings and full road closures.

Signage including speed limit signs and prohibited traffic movement signs are considered to be 'not effective' by many survey respondents. Perhaps this is because signage is a complementary LATM device that is most effective when implemented with other LATM devices as part of a whole-of-street treatment.

Driveway links and bus facilities are also considered as 'not effective' (26% and 30% respectively). This is consistent with earlier research from 2006 to 2014. Interestingly, those local governments predominantly located in South Australia that tend to use driveway links tend to have a much more positive view about their effectiveness than others.

Road cushions had a significant uptake in their use from 2006 to 2014. This coincided with the introduction of new innovative rubber moulded cushions in the early part of the decade. In 2006 they were considered as 'not common' and yet they were generally considered as being 'effective'. In 2006 only 11% of local governments reported using them commonly but this number increased to 35% by 2014. By 2010 their perceived effectiveness had considerably increased along with a wide-scale uptake across the nation. But by 2018 this trend had turned around with only 9% of local governments reporting commonly using road cushions. Their perceived effectiveness dropped back down over the same time period. This also coincided with a marked increase in the number of complaints being reported with respect to these devices.

8. Complaints and removal of devices

The research indicates that the devices most commonly removed in 2018 were road cushions, road humps, and one-way, stop or giveway signs. These LATM devices are reported as being moderately 'effective' by local government practitioners, however, they are also reported as receiving the most complaints.

- 20% (25) of local governments reported removing road cushions
- 14% (18) of local governments reported removing road humps
- 10% (13) of local governments reported removing one-way, stop or giveway signs

And of the local governments removing these devices:

- 48% (12) reported removing road cushions due to complaints
- 50% (9) reported removing road humps due to complaints
- 38% (5) reported removing one-way, stop or giveway signs due to complaints

While the majority of complaints were from residents, often complaints were from other sources including public transport companies.

Other reasons given for the removal of devices were 'device was damaged', 'device was not effective', 'device was not safe', 'device was noisy', and to improve access.

Table 4 The percentage of device removal because of complaints

Complaints	Percentage of removal because of complaints
Round profile road humps	50%
Road (speed) cushions	48%
Flat-topped road humps	45%
Shared zones	40%
Driveway links	40%
One way, stop and giveway signs	38%
Median treatments	36%
Modified 'T' intersections	30%
Bicycle lanes / bypasses	29%
Prohibited traffic movement signs	29%
Bus only lanes / bus bypasses	25%
Angled or straight slow points	25%
Speed limit signs	20%
Centre blister islands	18%
Kerbside lane narrowings / kerb extensions	17%
School zones	17%
Wombat or raised pedestrian crossings	17%
Full road closures	14%
Roundabouts	11%
Tactile surface treatments	0%
Perimeter threshold treatments	0%
Raised pavements / intersection platforms	0%
Half / part / diagonal road closures	0%

9. Selection of LATM devices

Budget constraints are the most common reason (14%) stated for local government not implementing local area traffic management (refer Figure 5).

Other reasons for not implementing treatments include political pressure, community opposition, state government intervention, service utility conflicts, and the treatments being contrary to policy.

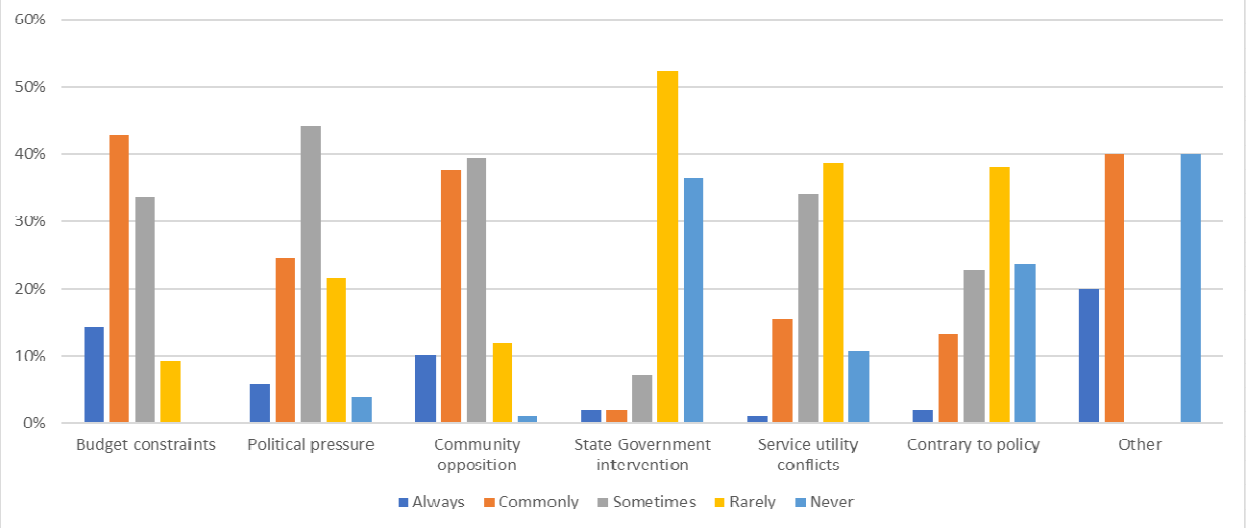

Figure 5: Most common reasons why LATM recommendations are not adopted/implemented in 2018

10. Methods and documentation used in decision-making:

The research identified what implementation processes, warrants, guidelines and other tools are used by local government practitioners. It showed that consultation with the community is the most widely used (77%) local government LATM process (refer Figure 6). Nonetheless, the results also indicate that community consultation may be widely used to inform decision making and to define traffic calming schemes but is decreasingly being employed post-construction.

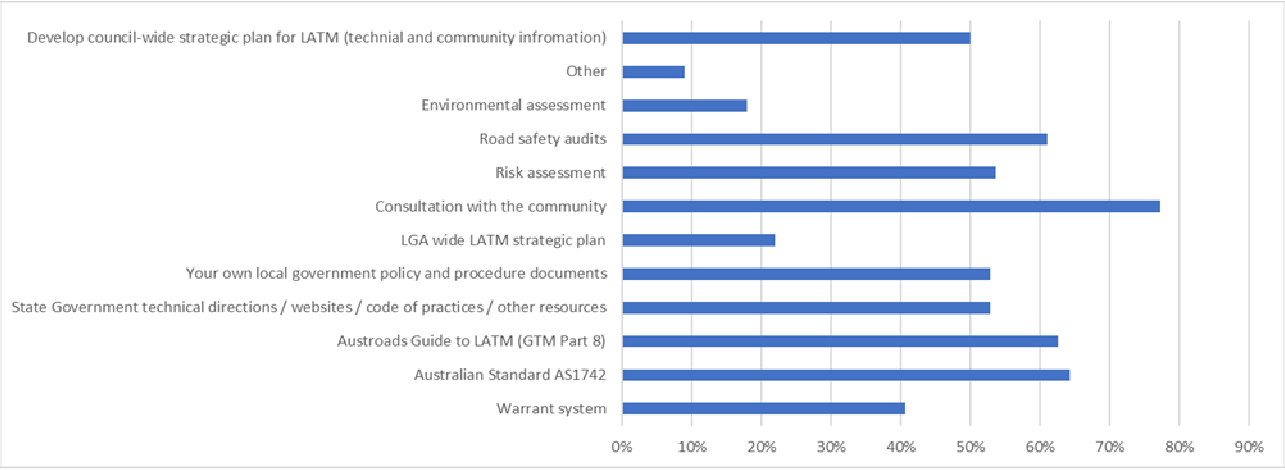

Figure 6: The main processes and resources used in decision making for LATM/Traffic calming projects

Road safety audits is another popular method used in 61% of local government processes. Environmental assessment and the development of local government wide strategic LATM plans are reported as being the least popular processes.

The research also identified that nearly 33% of local governments do not have an LATM warrant system currently in use (refer Table 5). Figure 7 reveals a trend over time of increasingly fewer local governments using their own community specific warrant systems,

and a clear move towards simpler (less analytical) warrant systems like qualifying warrants. The most common type of warrant system reported in 2018 was a priority ranking system.

Table 5 Frequency of warrant systems in use

Warrant systems	Frequency that warrant systems are used
Qualifying system	24%
Priority ranking system	25%
Action / threshold system	8%
No warrant system used	33%
Other	10%

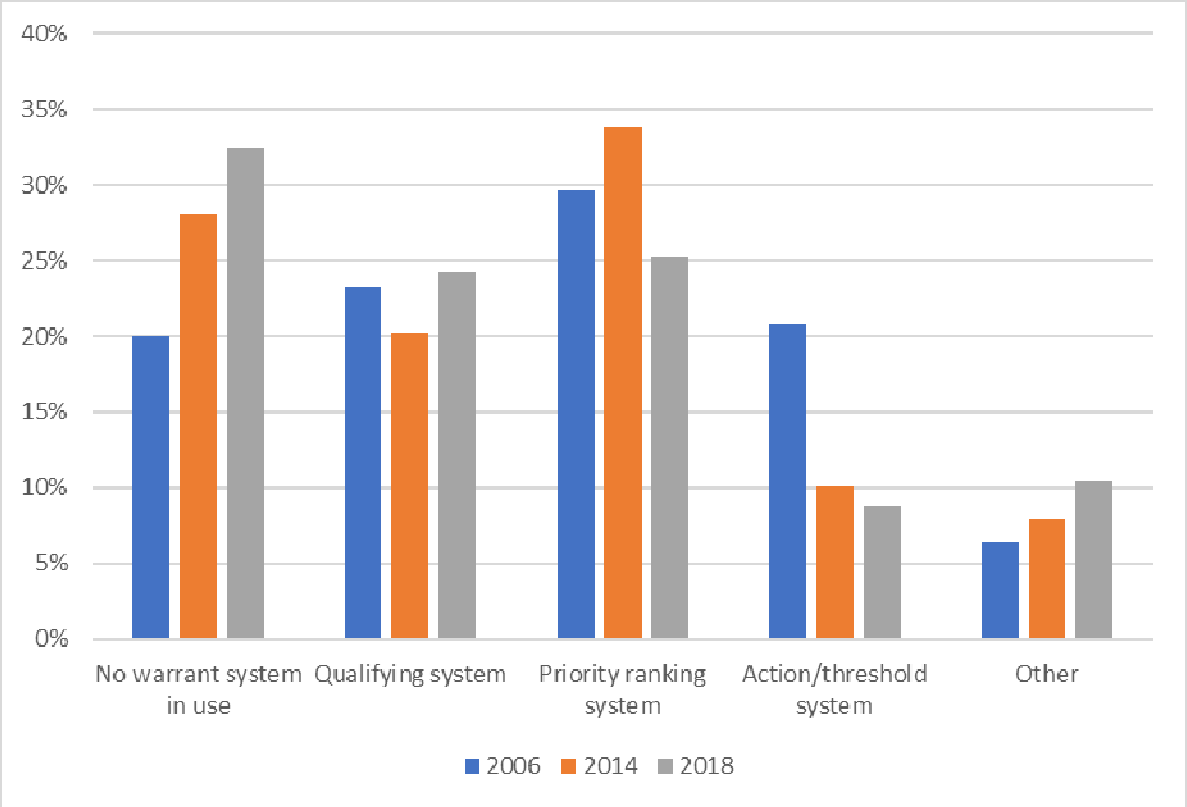

Figure 7: Percentage of respondents (frequency) that use each warrant system

11. Post-construction monitoring

The research revealed that 100% of practitioners use post-construction monitoring some of the time. Only 9% of practitioners use post construction monitoring rarely with the majority using it commonly or sometimes.

The most commonly used post construction monitoring methods used are speed surveys, traffic volumes and crash analysis. The results (refer Figure 8) indicate an overall decrease in the use of post construction monitoring over time, and in particular a major decline in post-construction public engagement.

The use of origin-destination surveys as a post-construction monitoring technique continues to decline despite its very low number. Considering that this form of post-construction monitoring is becoming increasingly easy with the introduction of new cheaper data sources such as GPS probe data and mobile telephony data, it suggests local government could be doing better if it were to adopt more innovative techniques.

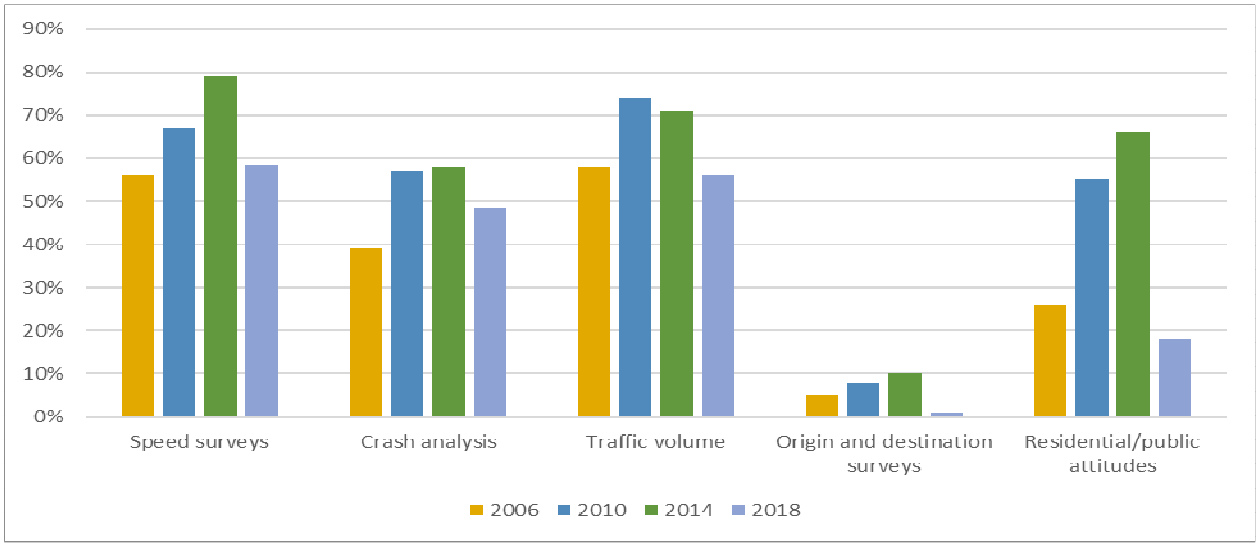

Figure 8: How common different post-construction monitoring is used

12. Placement and spacing

The main reasons given for the placement of devices have remained relatively consistent over the study period. The research indicates Australian Standards requirements (Standards Australia 1991) is used most frequently to guide the placement of LATM devices (74%). Speed-based design principles based on community requirements and are also frequently used as a guide for device placement by local government.

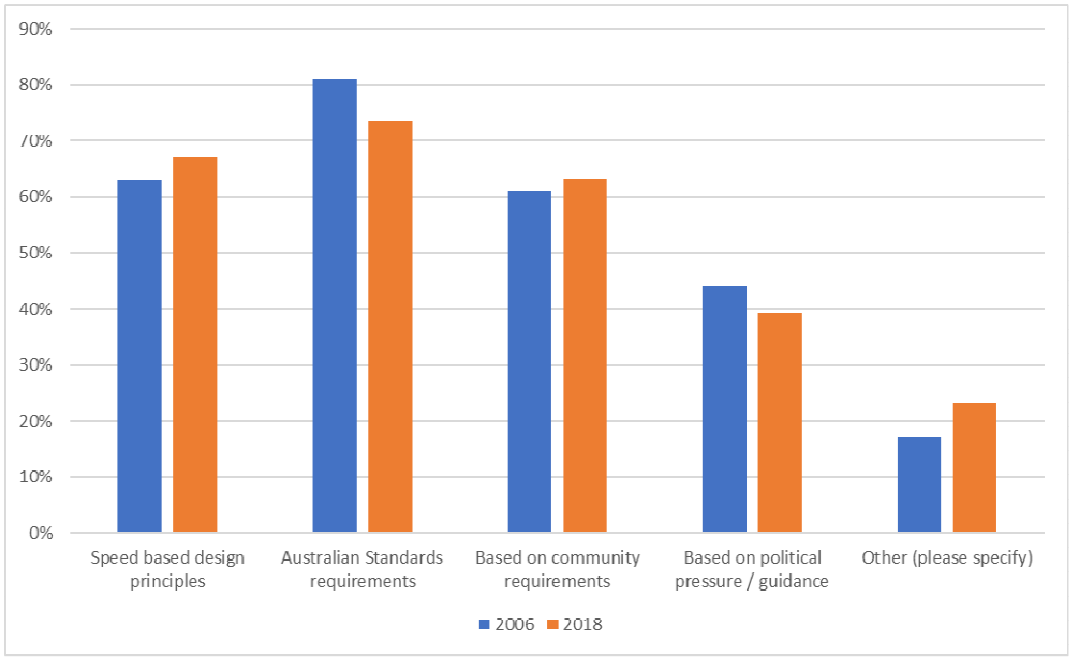

Figure 9: Reasons for placement of LATM devices

13. Alternatives to physical devices

Local government uses a range of alternative actions to physical LATM devices to manage or calm traffic in local neighbourhoods. Figure 10 illustrates the most common methods employed including 'urban design and landscaping treatments' and 'education programs'.

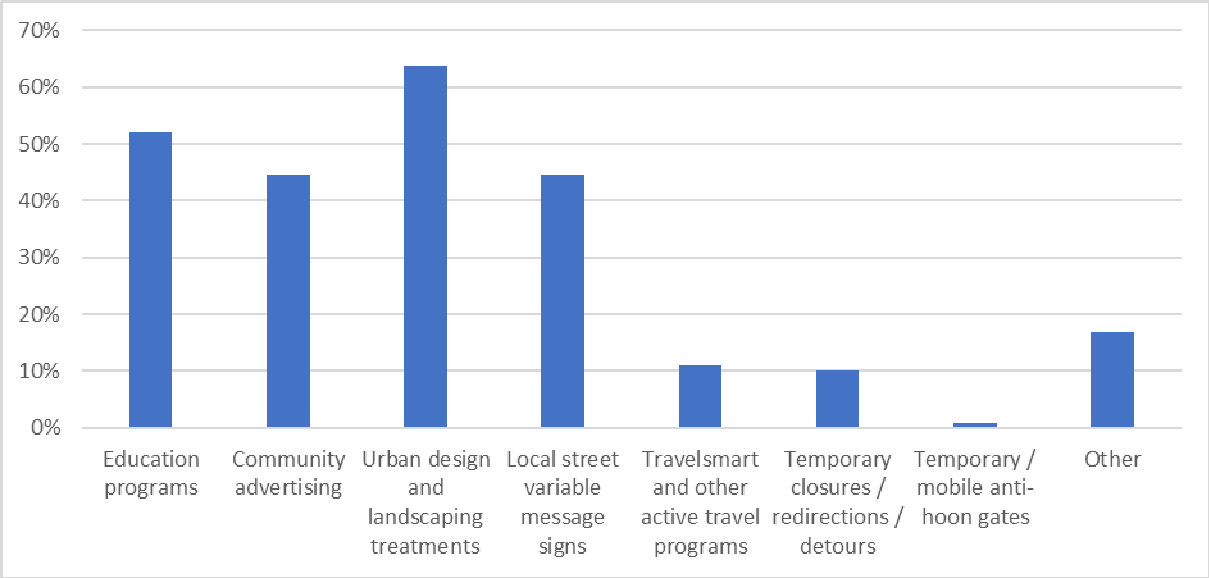

Figure 10: Alternatives to physical LATM devices

14. Conclusion

The professional thinking on local streets as community places has evolved quite considerably in Australia and New Zealand over the last few decades. Planners, architects and local government leaders recognise that local streets are not just there to move traffic around but instead are community places for people to do many other things. Yes they provide local access but they are also part of the extended open space network in our communities. In this context one might have expected more evolution of the science of local area traffic management over the past decade, more consistent with the latest contemporary practice.

Instead, while innovation in local area traffic management continues to occur in Australia and New Zealand it would appear that there continues to be very little change in relation to what is well-accepted practice. Some practices have become more popular while others less so. But the lack of a clear relationship in most cases between the perceived effectiveness of a treatment and the popularity of its use is a concern. It appears that local area traffic management decisions are routinely being made that are not evidence based. An example is the use of bicycle friendly facilities, which has apparently reduced despite a significant increase in perceived effectiveness. This is concerning and needs to be addressed as a priority.

Local governments have also revealed that they have decreased their use of post construction monitoring, particularly the level of community engagement post construction. This highlights the likely possibility that many local governments do not actually know how effective their schemes are post implementation. Based on the evidence it would appear that many treatments are likely to be ineffective or not as effective as intended and as a result not fulfilling their intended purpose.

New vehicle technologies are also emerging quite quickly including advanced driver assistance technologies, and highly automated and connected driving systems. There is very little evidence to suggest that practice is starting to change to reflect these changes.

The importance of providing highly walkable connected and active street networks should be a priority in the context of LATM, and yet it continues to play a secondary role in many places, which needs to change.

While Australian and New Zealand practitioners seem to have a reasonably good understanding of local area traffic management practice, further research on the topic, and broader dissemination and sharing of the knowledge between local governments would help to increase awareness and improve the effectiveness of what is being done and allow the profession to adapt and remain current.

15. References:

Damen, P. (2003). 'Recent Local Area Traffic Management Experiences in Australasia', IPWEA, Australia.

Damen, P. (2007). 'The Whole Box'n'Dice of Traffic Calming Experiences in Local Government', IPWEA, Australia.

Damen, P., and Rodwell, L. (2011). 'Local Area Traffic Management Practice – A Comparative Update', IPWEA, Australia.

Damen P and Ralston K (2015). 'The Latest on Local Area Traffic Management Practice in Australia and New Zealand – An Update and Comparison for Local Government', International Public Works Conference, 18th, 2015, Rotorua, New Zealand, Institute of Public Works Australia (IPWEA).

Damen P, Brindle R and Rueda M (2016). 'Guide to Traffic Management Practice, Part 8: Local Area Traffic Management', 2nd edn, Austroads, Sydney, pp. 188.

Standards Australia, Road Signs and Traffic Signals. (1991). 'Australian Standard AS1742.13-1991, Manual of uniform traffic control devices, Part 13': Local area traffic management, Standards Australia, Sydney, Australia, pp. 44.

16. Acknowledgements

We would like to acknowledge the support of all those local government practitioners that responded to our request for information.

Peter Damen is the Principal and Chief Executive Officer of Level 5 Design Pty Ltd. Peter is responsible for leading all activities of the company from strategy through planning, design and implementation. He believes that innovation is the key to Australia's future – in making better investment decisions and accomplishing more for the community.

Peter is considered a national and international expert in emerging transport technologies, automated vehicles, parking and traffic management and operations, road safety and future transport planning. He is a qualified civil engineer with over 25 years' experience in the industry including both government and the private sector. He has been involved in some of Australia's largest transport infrastructure projects and he has an industry network that extends across the globe.

Peter has chaired or participated in numerous industry associations, state advisory committees, accreditation panels, and learned societies and amongst other roles he is currently the Chairman of the Board of Directors of Innovate Australia and an Executive Director with the Australian Asphalt Pavement Association (AAPA). Prior to establishing Level5design, Peter was the Chief Operating Officer of Australia's national road and transport research agency, where he was responsible for all operations nationally including programs such as the National Road Safety Partnership Program and the National Assets Centre of Excellence. Peter was also instrumental in establishing the Australia and New Zealand Driverless Vehicle Initiative (ADVI), to address the challenges and future requirements of emerging connected and automated vehicle technologies in Australia and NZ. He went on to become the inaugural Chair of that national peak body.