

THE LATEST ON LOCAL AREA TRAFFIC MANAGEMENT PRACTICE IN AUSTRALIA AND NEW ZEALAND – AN UPDATE AND COMPARISON FOR LOCAL GOVERNMENT

Peter Damen and Kassia Ralston

peterd@level5design.com.au

<https://www.level5design.com.au>

Abstract

Local area traffic management (LATM), otherwise known as traffic calming, has been effective in improving the safety, amenity and liveability of local areas in Australia and New Zealand for decades. In 2008 an Austroads local area traffic management guideline was released – an update on an earlier 2004 guideline developed for practitioners in this field. In order to inform the latest revision of this guideline currently being developed, extensive research was undertaken in 2014 to identify new, innovative and revised approaches to the application of LATM practice in Australia and New Zealand. A broad cross-section of local government agencies was consulted. This paper outlines the findings of that research, addressing questions such as the effectiveness of traffic calming measures used, the methods used in decision making, design considerations, and innovations in practice. The research evaluates and compares data over an 8 year period from 2006 to 2014 and draws conclusions that will be of wide interest to local government engineering and management professionals.

Key words: Traffic calming, speed management, local area traffic management, LATM

Introduction

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 road traffic within a local area using physical devices, street scaping treatments and other measures (Figure 1). The purpose of LATM is to reduce traffic volumes and speed in local streets, to increase amenity, 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. 2008).

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 2014 building on



Figure 1: Good practice example of the commonly used LATM road cushion device

earlier research undertaken in this field by the author (Damen 2003, 2007 and 2011).

Research method

The research that was undertaken incorporated the conduct and analysis of 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 2014 with those obtained in 2006 and 2010 (Damen 2007; Damen and Rodwell 2011).

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.

Survey response

In total, 189 practitioners responded to the 2014 survey, which compares well to the previous surveys in 2006 and 2010 with 161 and 109 respondents respectively. Out of the 189 respondents, 62% were from local government, 14% were from road agencies, 16% were consultants and 8% categorised themselves as other (e.g. retired professionals).

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 53. The breakdown of respondents by location is shown in Figure 2.

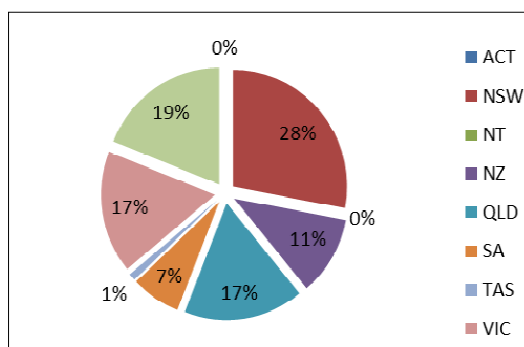


Figure 2: Breakdown of 2014 survey respondents

Scope of the research

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

Not all of the questions in the 2014 survey were the same as those used in previous surveys as the research was undertaken for a different purpose. Consequently not all the results obtained in 2006, 2010 and 2014 were directly comparable.

The survey did not require respondents to complete all questions and therefore each question or sub-question had the potential for a different number of responses. In this paper, the percentage of respondents followed by the number of respondents is often given, i.e. (30%, 38) which indicates the number and percentage of people that selected a particular response.

Devices in common use


Table 1 includes a ranked list of the LATM devices most commonly used by local governments in Australia and New Zealand.

Despite compatibility for cyclists scoring as one of the highest traffic-related issues (Figure 3) the survey results in Table 1 indicate that cycle-friendly roundabouts and dedicated cyclist crossings are not commonly used. Several respondents also indicated their desire for information to be made more easily accessible regarding the planning and designing of LATM devices for cyclists and pedestrians. Improved knowledge sharing on this topic may see an increased use/installation of cycle-friendly devices, and perhaps in time a greater public acceptance of these devices.

Roundabouts and stop/give-way signs were reported as the most commonly used devices in 2014. This is consistent with earlier research conducted in 2010.

The majority of survey respondents reported 'never' to have used driveway links (71%, 74), full road closures (51%, 55), half road closures (52%, 54) and diagonal road closures (88%, 88).

Table 1: LATM devices in common use in 2014 (most commonly used device descending to least commonly used)

	<i>Most commonly used</i>	Stop or give-way sign
		Standard roundabout
		Speed limit sign
		Lane narrowing/kerb extension
		Bicycle facilities
		School zone
		Threshold treatment
		Road cushion
		Flat-topped road hump
		Bus facilities
		Centre blister island
		Mid-block median treatment
		Road hump
		Left-in/left-out islands
		Prohibited traffic movement sign
		Marked pedestrian crossing
		One-way street sign
		Tactile surface treatment
		Wombat crossing
		Modified T-intersection
		Slow points
		Mini-roundabout
		Shared zone/local area traffic sign
		Shared zone
		Dedicated cyclist crossing
		Cycle/pedestrian friendly roundabout
		Raised intersection platform
		Mid-block raised pavement
		Full road closure
		Driveway link
	Other	
	Half road closure	
	Diagonal road closure	
	<i>Least commonly used</i>	

Some practitioners reported using LATM treatments other than those listed in Table 1 including in-lane bus stops, continuous footpath treatments, separated cycle ways, median islands at intersections and delineation beams between roads at intersections to denote priority.

There are some notable changes in the reported use of devices between 2006 and 2014 (Figure 4). The reported frequency of use of stop signs, give-way signs and roundabouts has decreased over this 8 year period. Bicycle facilities, bus facilities and shared zones are becoming more common

and the use of road cushions has increased dramatically.

Main traffic-related issues

The main traffic-related issues reported in the research conducted in 2014 were (listed in order of highest ranking):

- speeding
- hoorn behaviour
- through traffic
- compatibility for pedestrians and cyclists

This differs to the results obtained in 2010 which had the following top ranked issues:

- speeding
- road crashes
- access to parking
- traffic volumes

Speeding continues to be the highest ranked traffic related issue overall.

Effectiveness

Overall, standard roundabouts were most commonly viewed as an effective LATM device. This is consistent with previous research (Damen 2003, 2007 and Damen and Rodwell 2011).

Other devices that were considered 'effective' or 'very effective' included school zones, flat-topped road humps, wombat crossings and left-in/left-out islands (raised triangular island obstructing right turns and through movements).

School zones were not reported as being as effective in 2010 as they were in 2014. The increase in perceived effectiveness in 2014 may be due to the various school zone LATM device innovations that have since been introduced such as flashing speed limit signs, enhanced visibility school crossings with line markings, and wider use of signage.

Signage including shared zone/local area, give-way, speed limit, one-way street and prohibited traffic movement signs were considered to be 'not effective' by many survey respondents. Several respondents (39.2%, 40) selected speed limit signs as 'not effective'. 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 tactile surface treatments were also considered as 'not effective' (30.6% and 29.0% respectively). This is consistent with research conducted in 2010.

Overall, the 2014 results show a decrease in perceived effectiveness of LATM devices relative to 2006 and 2010 (Figure 5).

Interestingly, one respondent stated that due to constant change/improvement of vehicle designs, LATM devices are not as effective as they previously were in the past as some new vehicle models are able to negotiate some devices at higher speeds. This statement suggests the need to continuously research and refine the designs of LATM devices if they are to remain effective in the future. Taken to the obvious extreme, the progressive introduction of smarter and more highly automated vehicles, culminating in the fully driverless car, may see the need for a complete rethinking of LATM practice. In fact, LATM devices in their current physical form may not be needed when that occurs. While leading organisations forecast that we are still many decades away from a fully driverless vehicle fleet (IEEE 2012), planning for and adapting our traffic management practice to accommodate the changing vehicle fleet is both sensible and necessary.

Complaints and removal of devices

The research indicates that the devices most commonly removed in 2014 were road humps, road cushions and flat-topped road humps. These vertical deflection treatments are considered to be 'very effective' in slowing down traffic, however, they are also reported as receiving the most complaints by residents. Consequently, as a result of resident complaints, of the total respondents:

- 18% (34) reported removing road humps,
- 14% (27) reported removing road cushions, and
- 5% (10) reported removing flat-topped road humps.

The devices most commonly removed due to complaints made by public transport operators were road humps (8%, 16). Road cushions are perceived to be less of an issue for public transport (bus) operators with only 3% (6) of total respondents reporting the need to remove a device due to transport related complaints. One respondent claimed that modern public transport buses are high enough above the ground to avoid being impeded by road cushions.

Other LATM devices removed due to public transport operator related complaints included flat-top road humps and slow points. This is consistent with previous research.

Other reasons given for the removal of devices were 'device damaged beyond repair' with two local governments removing road cushions due to rubber deterioration. Bus route changes also resulted in the reported removal of harsh vertical deflection devices in one local government area.

Selection of LATM devices

Traffic speed, traffic volume and crash rate were the most common (>75%) criteria used for the selection of LATM devices (Figure 6).

Other criteria that are used in the selection of devices include the percentage of through traffic, the percentage of commercial vehicles, land use and activity generators, road hierarchy, bus routes, parking, level of community acceptance, and road geometry. Two local governments stated that they use the destination of the driver as a criterion in their device selection i.e. the demographics of the typical driver. Only a few respondents indicated that they consider noise levels.

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 (94%) local government LATM process (Figure 7). In addition, some respondents claimed that wide/extensive community consultation is the reason why they have had to remove very few or none of their LATM devices.

Collecting data (e.g. operation, design, environmental and social data) is another popular method used in 91% of local government processes. Performing a risk assessment and developing a council-wide LATM strategic plan were reported as being the least popular processes.

The research also identified that nearly 30% of local governments do not have an LATM warrant system currently in use (Figure 8). This is more than a 10% decrease on the number reported by practitioners in 2010. The most common type of warrant system reported in 2014 is a priority ranking system.

The documentation reportedly used by local government practitioners in terms of jurisdictional guidelines and practice, LATM process procedures, post-construction treatment evaluations, etc., includes:

- Austroads Guide to Traffic Management Part 8: Local Area Traffic Management, 2008
- Main Roads Western Australia website
- Roads and Maritime Services Technical Direction and Warrants
- Auckland Transport Code of Practice 2014
- Australian Standard AS1742.13, 1991
- own local government LATM policy and procedure documents

Post-construction monitoring

The research revealed that 11% of practitioners 'never' use post-construction monitoring, 52% 'occasionally' and 37% 'mostly' use the process.

Figure 9 indicates an overall increase in the use of post-construction monitoring from 2006 to 2014. The most common parameters used for post-construction monitoring of LATM devices include speed surveys, traffic volumes and residential/public attitudes obtained passively or actively. Residential/public attitudes significantly increased in popularity from 2010 to 2014 as a monitoring method.

Placement and spacing

The research indicates that the Austroads guideline on LATM (Damen et al. 2008) is used most frequently to guide the placement of LATM devices (79%). Speed-based design principles, the Australian Standard AS1742.13 (Standards Australia 1991) and community requirements are also frequently used as a guide for device placement by local government.

Perhaps due to budgetary constraints and perceived expertise, several respondents claimed to use local knowledge and judgement to guide the placement of LATM devices without consulting guidelines.

Innovations in practice

Recent best practice has identified new design concepts and approaches to safety and LATM. This includes the Safe System approach, context sensitive solutions, and shared-space concepts.

The Safe System approach has been adopted by road agencies around the world and forms the basis of Australian and New Zealand national road safety strategies. The four essential components of a Safe System are safer roads, safer vehicles, safer speeds and safer road use. LATM is an integral component of the Safe System approach. Based on the research it is apparent that LATM practices in Australia and New Zealand are progressively incorporating Safe

System design principles addressing human factors, human frailty, forgiving systems and shared responsibility.

Other approaches yet to be fully embraced within LATM schemes in Australasia are the shared-space concept and context-sensitive solutions. Feedback suggests that these approaches have a place within LATM practice and should be more widely adopted.

It is also evident from the research that clear guidelines for the application of some additional LATM devices would be useful including electronic speed signs, local-street variable message signs, roundabouts with pedestrian crossings, and continuous footpaths. More research is needed to be able to specify guidelines for some of these less common and more innovative devices.

Conclusions

Local area traffic management continues to be an effective means to improve the amenity and liveability of local communities. It is clear that there has been some progress in the development of new concepts, new treatments and an improved understanding of existing treatments over the 8 years between 2006 and 2014 that the research considered.

While innovation in LATM continues to occur in Australia and New Zealand the rate of progress has been slow. With the very real threat of a rapidly changing vehicle fleet in the near future, there will be a need to respond with new research and revised guidelines and standards.

A concerning trend is local government use of non-evidence-based practice in their decision making, driven at least in part by budget constraints. This ad hoc approach can potentially result in ineffective LATM schemes, leading to increased complaints, abortive works, and increased long-term spending.

Forward thinking local governments will benefit from new approaches such as the Safe System, context-sensitive solutions, and shared-space concepts across a broad range of traffic management practices. This will help to deliver greater transparency, and

achievable safety outcomes for the benefit of the entire community.

Finally, while Australian and New Zealand practitioners seem to have a reasonably good understanding of local area traffic management practice and are routinely applying their knowledge to the application of the science, increased research in the topic, and broader dissemination and sharing of the knowledge would help to increase awareness and improve the effectiveness of what is being done.

References

- Auckland Transport. (2014). 'Auckland Transport Code of Practice (ATCOP)', <https://at.govt.nz/about-us/auckland-transport-code-of-practice>, Auckland, New Zealand.
- 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., Brindle, R. and Gan, C. (2008). 'The Austroads Guide to Traffic Management Part 8 – Local Area Traffic Management', Austroads Inc., Sydney, Australia, pp. 205.
- IEEE (2012). '5 Sept 2012 Press Release' http://www.ieee.org/about/news/2012/5september_2_2012.html.
- 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.

Acknowledgements

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

Figure 3: Response count of the main traffic-related issues in local areas

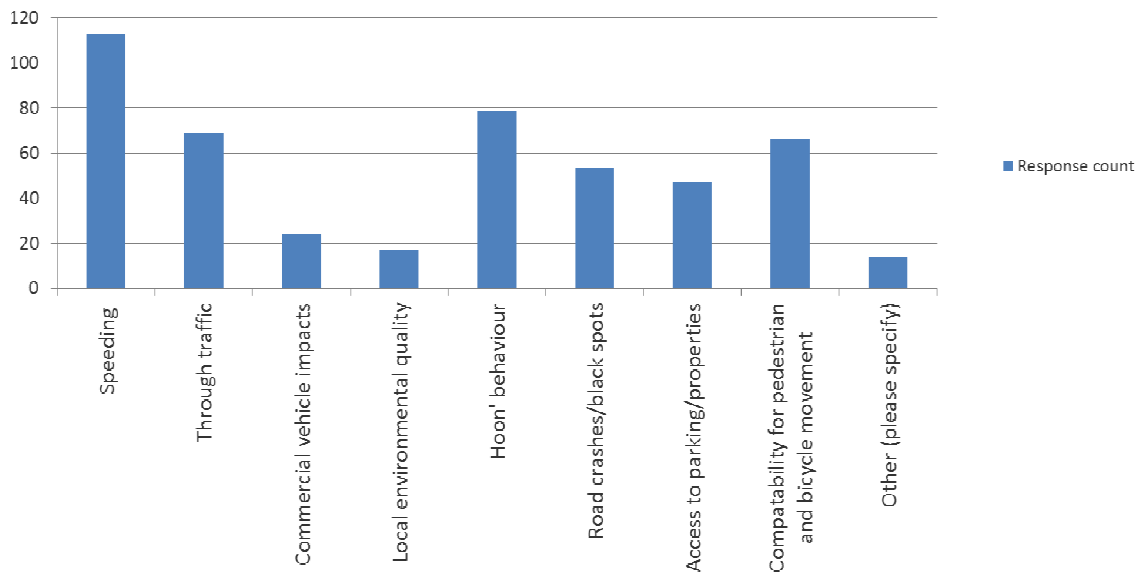


Figure 4: Comparison of commonly used devices for 2006 and 2014 survey results

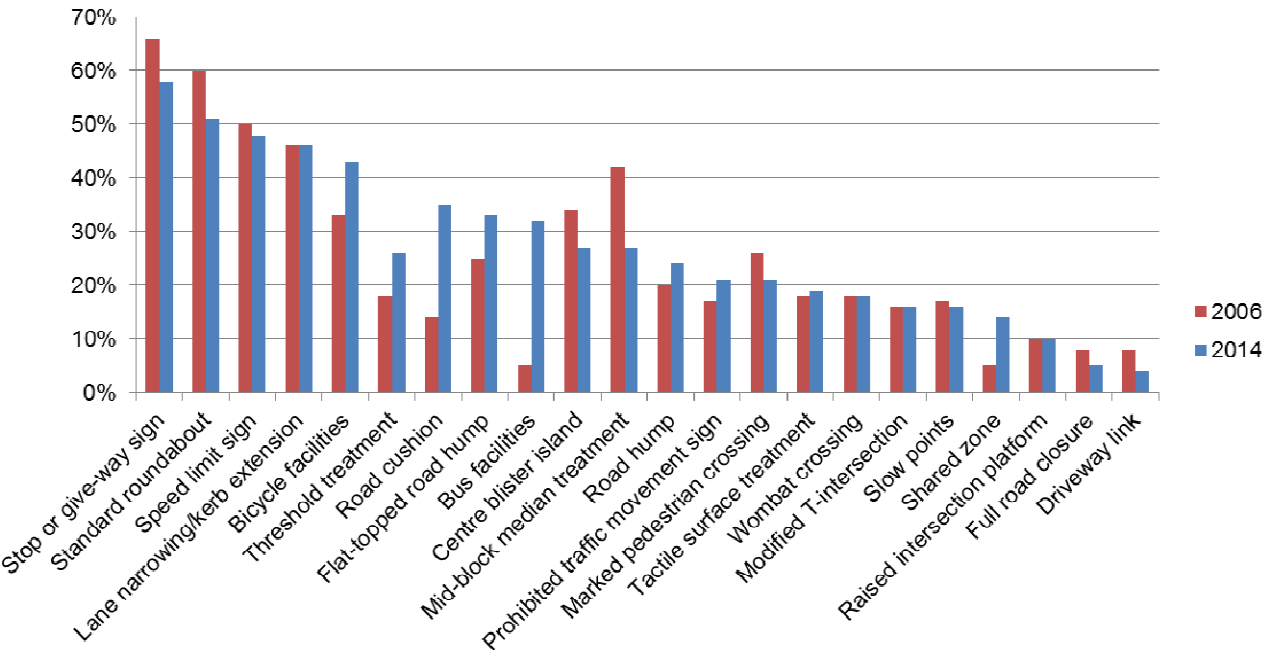


Figure 5: Comparison of device effectiveness for 2006, 2010 and 2014 survey results

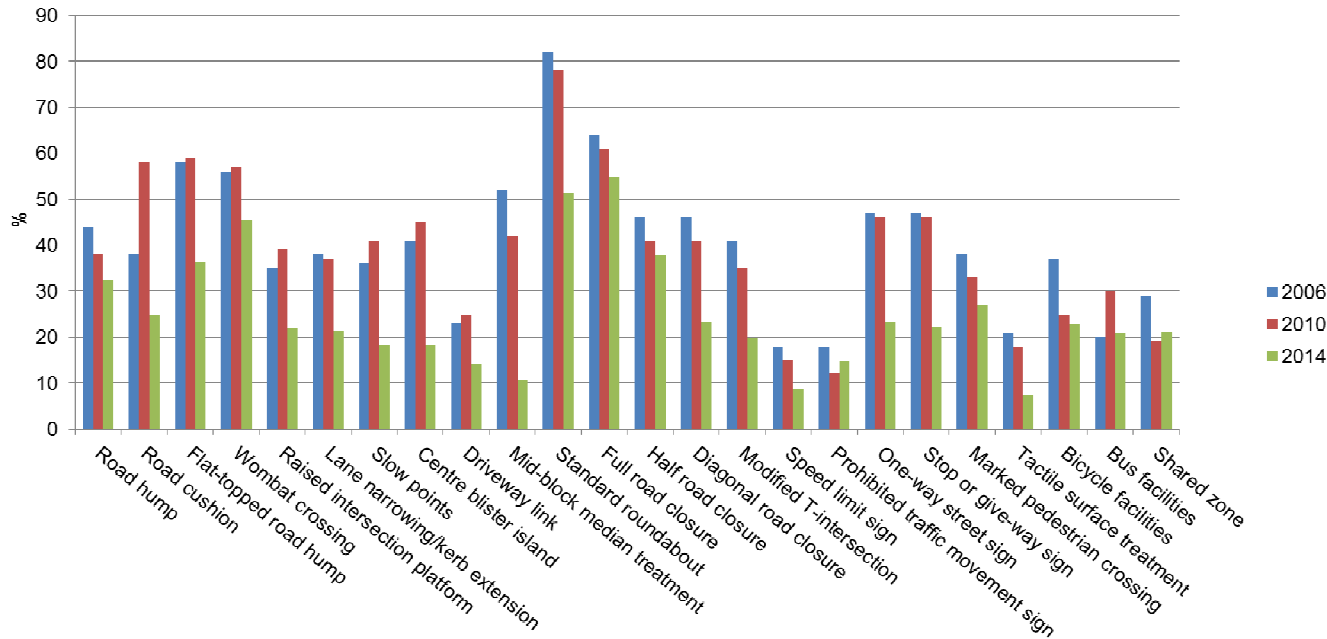


Figure 6: Percentage of respondents (frequency) using each criterion for selection of LATM devices, out of 70 responses

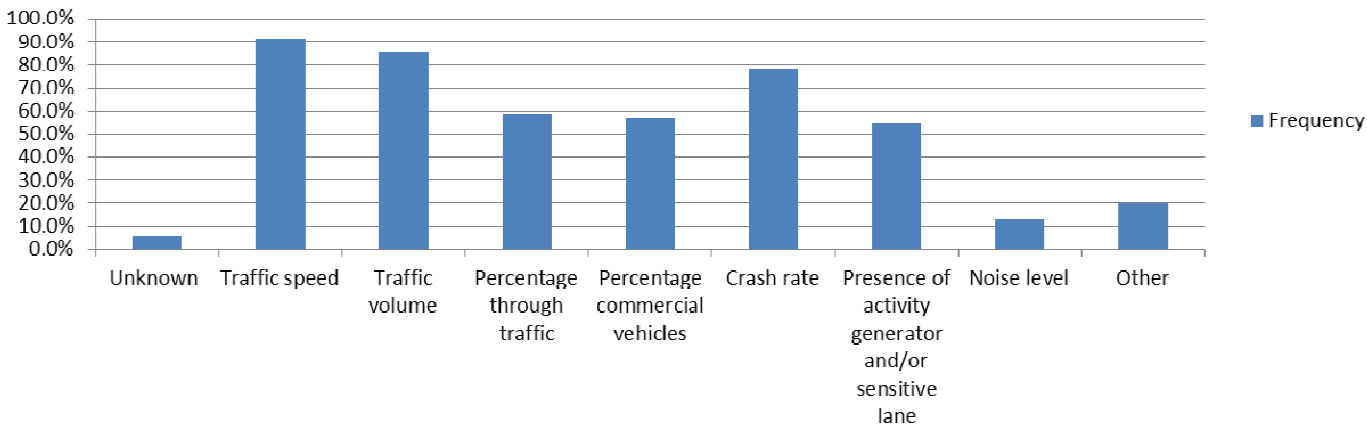


Figure 7: Percentage of respondents (frequency) using each process for LATM implementation, out of 97 responses

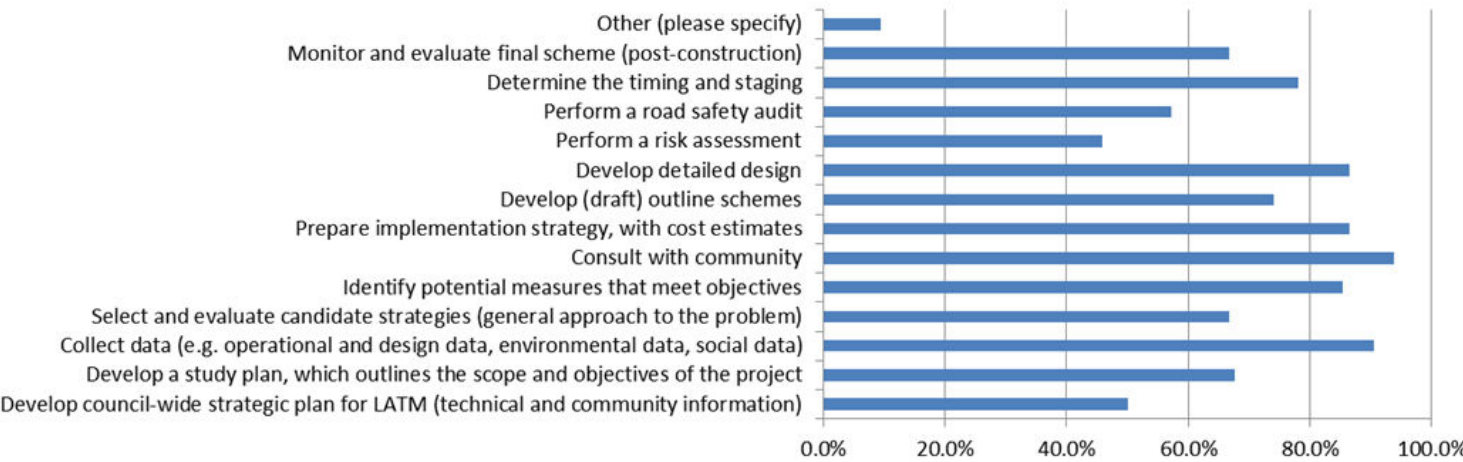


Figure 8: Percentage of respondents (frequency) that use each warrant system to determine whether LATM is warranted, out of 98 responses

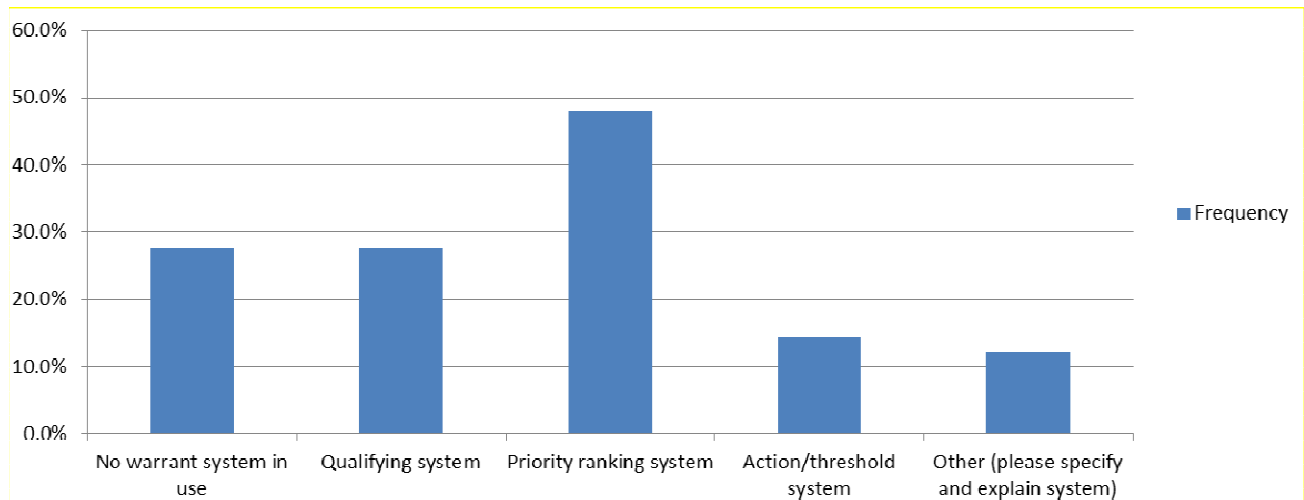


Figure 9: Trends in post-construction monitoring using 2006, 2010 and 2014 survey results

