:: ARTERIALS

LIVEABLE ARTERIALS IN AUCKLAND CITY: INTEGRATING TRANSPORT MODEL OUTPUTS WITH OTHER OBJECTIVES

As traffic on Auckland's arterial roads is fast reaching saturation point, Auckland City Council has developed the Liveable Arterials Plan to help manage the street network.

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The need for a new approach in Auckland

To manage growth challenges while complying with legislation calling for greater sustainability and integration in local governance, the Auckland City Council and community has developed seven comprehensive strategies and numerous supporting policies. These together enable a quadruple-bottom-line approach to environmental stewardship and community wellbeing. Numerous relevant region-wide tools have also been developed along these lines.

The Council's transport plan Connecting People and Places identifies the current arterial network (Figure 1). These are together the most important routes in the city for all movement modes. All large town centres, many community facilities (in particular secondary schools), and much non-CBD employment in Auckland City is based on or close to one of these arterials. They are critical to community wellbeing. These spatial relationships are not coincidental; they are a direct consequence of the low-density pattern of development that has occurred throughout the region. Many business and community facility catchments are today only viable through supplementation by passing traffic and the access to additional users this brings.

Connecting People and Places identified the 2004 average daily vehicular volumes observed across the network. A majority of the arterials carry over 20,000vpd, with a number carrying in excess of 30,000vpd. Some are already moving in excess of 50,000vpd. Sharing the streets with these vehicles are children trying to safely move to and from schools; people trying to talk with their neighbours or meet friends; retailers marketing and selling their goods; workers and shoppers interacting; people resting or playing; and others undertaking the many further forms of local contact that together make communities within the city strong.

The scale and intensity of through movement on the arterials is approaching a saturation point relative to the conditions necessary around them to maintain (let alone enhance) that local exchange. Continued growth in the movement function without more explicit consideration of those conditions may reduce the viability of the Isthmus to provide healthy, stimulating places to live, work, rest, learn, and prosper.

The Liveable Arterials Plan

These issues have led the Council to develop a new way of managing its arterial street network – the Liveable Arterials Plan. The Plan is based on the establishment of a functionality plan for the network that will best enable "effective equity" within available street space. This includes the optimum inducement of the Council's preferred land use and investment outcomes around each arterial. The Plan is articulated through two documents: an explanation and design guide, and a more detailed technical record. The design guide is available from the Council's website: http://www.aucklandcity.govt.nz/council/documents/liveablearterials/default.asp.
The Plan is included as Figure 2.

The Plan is underpinned by four key arterial segment types and supporting processes for how to go about prioritising scarce space at the corridor design stage. The ideal functional role of an arterial (what it 'does' to help facilitate specific use patterns) will vary depending on the range of influences acting upon it at any given location along its length. The segment types

FIGURE 1:: Auckland City Arterial Network, Source: Connecting People & Places, Auckland City, 2005

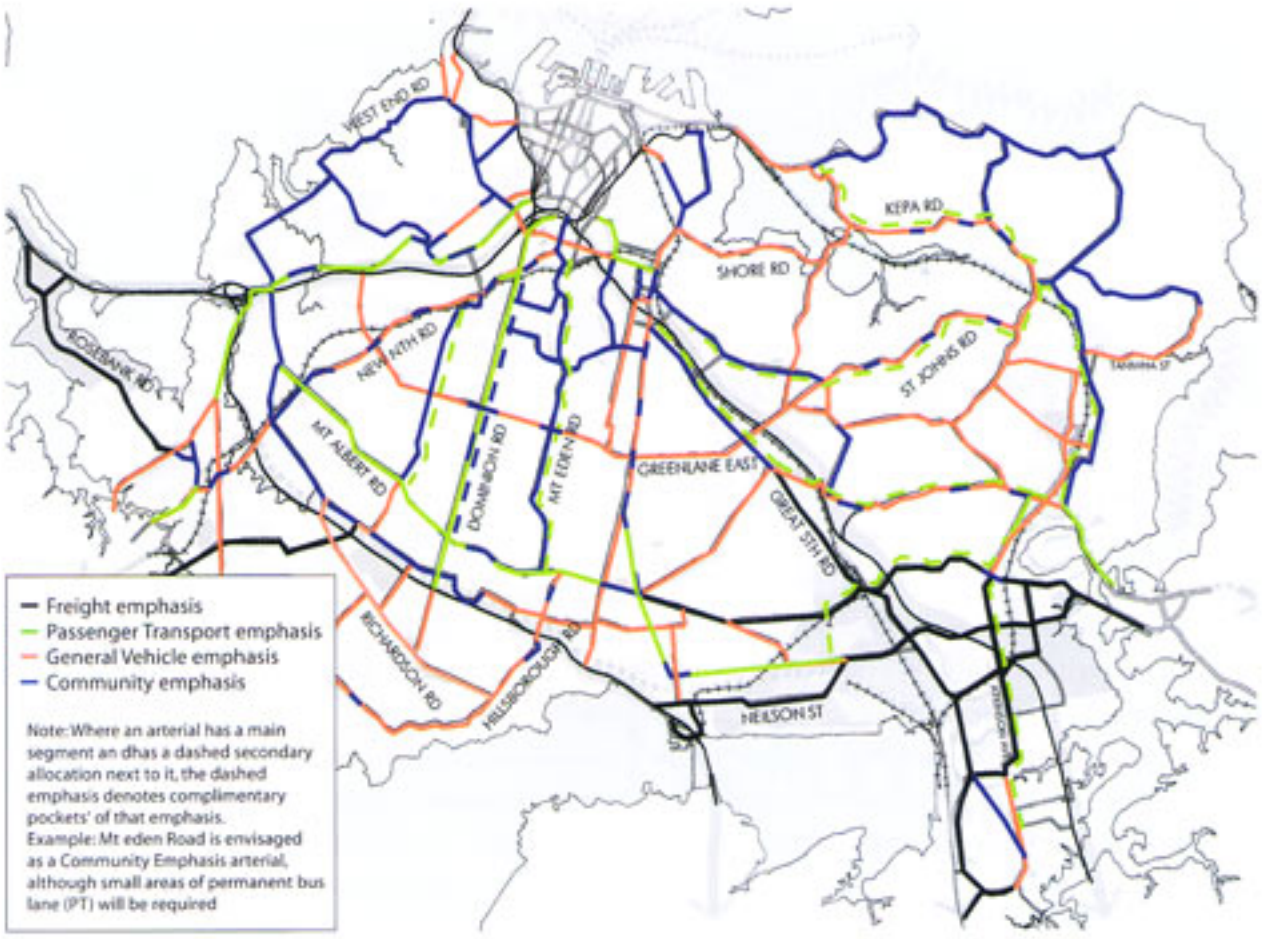


FIGURE 2:: Auckland City Liveable Arterials Plan, Source: Liveable Arterials Plan, Auckland City, 2008

FIGURE 3:: Liveable Arterial Segment Types, Source: Liveable Arterials Plan, Auckland City, 2008

were developed through the project process as a response to those different combinations of opportunity and constraint, and in particular the conflict between them. They relate to arterials or parts of arterials where the optimum response is broadly focussed around a core of like outcomes (see Figure 3).

The segment types do not denote any inherent exclusivity. While they have a clear emphasis towards particular user needs, they will also accommodate as many others as possible.

Of note: Permanent bus lanes are only used within the PT segment, but all other bus priority (including peak period bus lanes) is envisaged in all segment types. It is also possible that routes on ARTA's Quality Transit Network (identified in its Passenger Transport Network Plan) will use arterials with non-PT segment allocations.

Provision for dedicated cycling lanes, whether on-street or off-street, are envisaged where appropriate within all segment types.

The GV segment is most oriented towards the movement of large commuter volumes. But the other segments are also anticipated to share this function as appropriate, subject to travel demand, vehicle speed, and driver behaviour management.

All town centres have been allocated the 'C' segment in recognition of their critical roles as community hubs. This also applies to smaller and local centres on arterials, as well as around schools.

How transport modelling affected the project

Comprehensive transport modelling into the future has been undertaken at the regional and city levels. The outcomes of these models ask significant questions as to the future design and operation of Auckland City's arterials. The unique 'pinch point' geography of the Auckland region will place a permanent through movement demand on those streets. Traditional approaches would call for incremental land purchase and road widening once the progression of through-priority on lane space consumed existing land reservations. Such approaches, while expedient in the past, are no longer seen as sustainable. The costs of new land purchase alone would cumulatively run into the billions of dollars given the (internationally modest) 20.1m typical street reservation width within Auckland City. While minimising air pollution and other effects of congestion form the basis of well-known arguments for improving free-flow capacity, they are becoming increasingly questioned. The issues of induced travel, subsidised urban sprawl, and social equity (how the various advantages and disadvantages of major transport infrastructure are allocated) sit at the forefront of such arguments.

The Council's Transport Strategy Division briefed the project team that investment in additional travel lanes and road space, while often delivering many tangible benefits, will no longer be accepted as the inherently right outcome for the community in every instance. It sought an alternative approach whereby investment in the transport network – for whatever outcome – would be robustly justified from an overall quadruple-bottom-line perspective.

In the Liveable Arterials Plan the project team took 2016 transport model projections as a starting point. These projections took into account the effects of the completion of the SH20 motorway extension to link with the NW Motorway at Waterview plus other proposed improvements to the network. The model output was analysed to give an indication of the number of mid-block traffic lanes required and to identify those intersections expected to be operating under congested conditions. Possible means of dealing with those conditions were identified. In particular a quick assessment was made of whether widening within the existing road reserve, or whether additional land, was likely to be required. In some instances such as key intersections on the east-west Balmoral – Greenlane route, it was determined that grade separation was desirable to maintain the desired level of network performance.

Transport model output was also used to determine the projected number of peak period buses on the City's arterial network for the design year. This was combined with the Quality Transit Network (QTN) of bus routes as defined in ARTA's Passenger Transport Network Plan 2006-2016, November 2006. Criteria were developed (using projected bus numbers and whether the arterial was part of the QTN) for identifying those arterial segments where bus lanes were desirable in the design year.

Road carriageway and reserve widths (including existing designations for widening) were measured throughout the network using Auckland City's mapping information, which allowed widths to be determined electronically. Exact widths were not required. Other supporting information referred to included the Draft Regional Freight Strategy and plans identifying local crash data, tourism / coach routes, and over-dimension routes. Almost the entire network was cycled and conditions filmed.

General Vehicle Emphasis

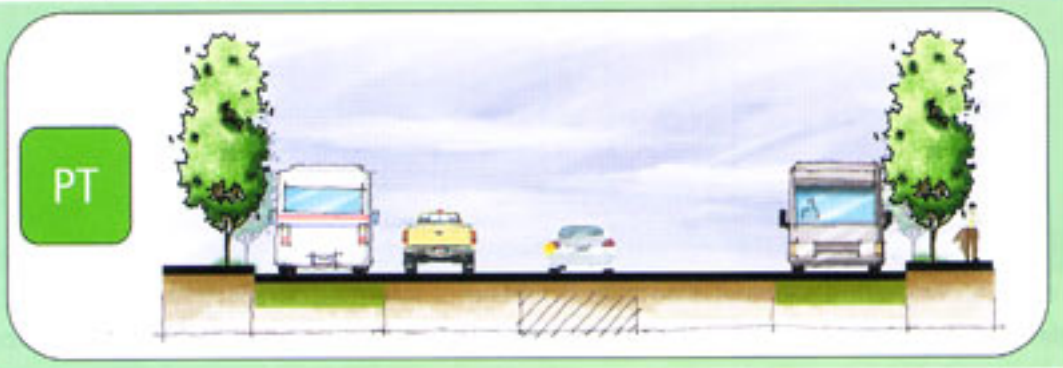
Where maintaining the through movement of vehicles is the primary role of the arterial. Arterials with this old concentrate on providing settings which manage property access and other conflicts. Typically, on-street parking may be removed or managed (such as by peak hour clearways) to facilitate additional travel lanes.

Community Emphasis

Where maintaining the local condition and amenity of 'place' is the primary role of the arterial. They relate especially to town centres. They involve speed managed environments, often with lowered design speeds of 40kmh or less. Emphasis on edge amenity this will help support local pedestrian use and community use.

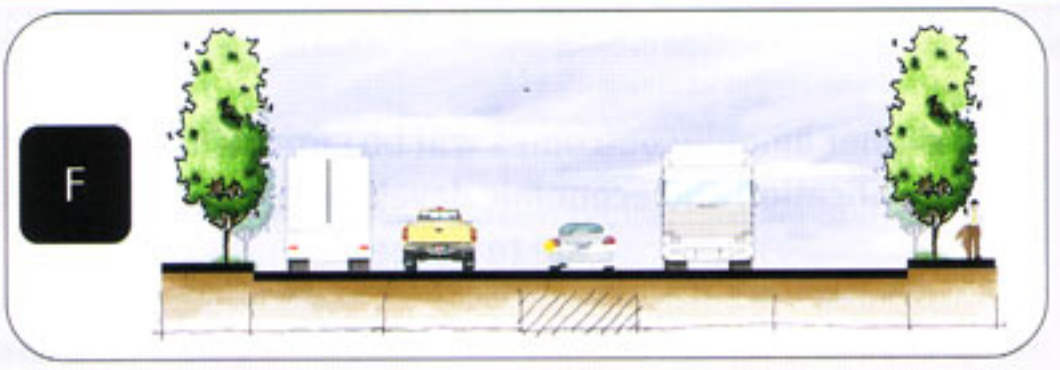
Passenger Transport Emphasis

Where maintaining the effective and efficient movement of commuters by passenger transport is the primary role of the arterial. These streets will involve permanent bus lanes, preferably configured to occupy the middle of the street carriageway (subject to design). This will best maintain edge amenity at peak periods.



Freight Emphasis

Where maintaining the viability of the Isthmus and CBD as a place to conveniently move goods and services is the primary role of the arterial. Typically freight allocation is used sparingly and mainly focussed around areas where the predominant land use is industrial. They relate strongly to the State Highway network.



The outcomes of the above general traffic and bus lane analysis were then overlaid to identify those arterial network segments where the model outputs suggested:

Two traffic lanes (one in each direction).

Two traffic lanes plus peak period bus lanes (usually inbound a.m. and outbound p.m).

Four traffic lanes.

Four traffic lanes plus bus lanes.

Six traffic lanes.

This information was then overlaid with the planned cycle route network allowing the following arterial segments to be identified:

Segments with "surplus" available road width.

Segments where it's possible to meet mid-block general traffic and bus lane requirements.

Segments where meeting both requirements or providing six general traffic lanes was not possible without substantially widening and requiring land acquisition.

Segments where providing cycle lanes may prove difficult without some carriageway widening.

Segments where providing the planned cycle lanes may be very expensive..

On-street parking provision was discussed at some length, as it generated numerous differences of opinion between practitioners. The discussion helped clarify the roles of on-street parking and identify circumstances where the role of on street parking on an arterial is more, or less, important. A tentative on-street parking policy was developed to guide decision-making.

Reaching consensus on the basis of an informed view of the network

The process enabled sections of the network to be identified where major road widening may be required, or alternatively where decisions would have to be made on the prioritisation of use of the available road space. Guidance was provided from a transport perspective on the most appropriate use of the available road space. This information was 'layered' with similar network analyses undertaken by parallel work streams that looked at the network from different perspectives. This allowed a common language (of sorts) to arise between participants and from which meaningful debate was enabled. This was based on actual parts of the network where real issues and specific tensions

RIGHT:: The Liveable Arterials Plan in Auckland City is looking to enable effective equity within available street space and allow them to flow more freely.

arose, rather than on the vision statements and objectives between professional disciplines where the same terms often had either very different or ambiguously defined meanings.

With this knowledge, multi-disciplinary teams were then equipped to generate concepts and prepare preliminary corridor sketch plans that incorporated the full range of ideas and influences. Using this information the project participants were able to reach an informed, genuinely integrated consensus on the appropriate management and development of the City's arterial road network.

It was agreed that for those parts of the network where modelled demands could not - or should not - be met, measures for managing any resulting congestion, should it eventuate, would be developed and articulated. Detailed corridor design tests were undertaken to ensure the strategic issues were clearly linked with real deliverability.

Higher amenity outcomes will be critical in that area if intensification and economic development aspirations for it are to be met.

To take a particularly important example, the Balmoral – Greenlane route was discussed with the wider Liveable Arterials team. As noted, traffic projections indicated that grade separation of key intersections would be ideal. The eventual consensus however, taking into account the total picture of urban sustainability, was that grade separation here was overall not compatible with the more liveable future envisaged by the full suite of Council strategies. The route, in addition to its strategic vehicle movement role, forms a key frame around the existing CBD and its mixed use periphery (Ponsonby to Parnell via Symonds / Khyber Pass and Newmarket). Higher amenity outcomes will be critical in that area if intensification and economic development aspirations for it are to be met. This consensus view was strongly supported by the Auckland City officers involved in the project including those from the Transport Strategy Division. Having made this decision, it was important to identify its implications. This included accepting that congestion at those key intersections may well increase, and then identifying how best to manage this should it eventuate.

This one example demonstrates how an overall view of the transport network as part of an interconnected urban system can lead to outcomes quite different to those developed when pursuing traditional transport objectives in isolation, or by simply defaulting to idealistic positions that do not take into account the real consequences and opportunity costs of decisions. Throughout the project process, other examples of this consensus occurred - frequently in reverse, where a more informed perspective changed the preference of other disciplines towards an outcome that provided for greater through traffic movement than had been originally wished for.

Implementing the Liveable Arterials project through Corridor Management Plans

The Liveable Arterials project is intended to be implemented primarily through the development of Corridor Management Plans (CMPs). While the segment types give a clear steer to guide these, the wide degree of variability across land use, movement, and access contexts on Auckland's arterial network precludes a more standardised approach being used.

Experience in the initial development of such plans has identified that participants in the CMP development process need to fully understand the objectives of the Liveable Arterials Plan and the process adopted to produce it. Most importantly they need to be able to interpret the outcomes beyond just the main 'plan' itself. This requires:

1 The preparation of a resource document that succinctly sets out the main elements of the Plan, including guidance on how to interpret the relevant outcomes and how to prioritise the use of the available road space in arterial route segments;

2 An initial workshop session, which brings all participants to the same broad level of understanding of the Liveable Arterials outcomes and intent;

3 Continuity of personnel involved in both the original project and subsequent workshops.

4 A willingness of the participants to be actively involved in an interactive, multi-disciplinary workshop process based on technical consensus.

The Regional Arterial Road Plan

ARTA has recently published its Regional Arterial Road Plan, dated February 2009. The Regional Arterial Road Plan (RARP) represents an important step in improving the management and effectiveness of the regional arterial road network. The purposes of the plan are:

To define the existing and future role and function of the regional arterial roads

To provide a framework for the integrated management of regional arterial roads, and their interaction with surrounding land uses and other parts of the road network

To provide a basis for project prioritisation

To develop a rationale for more appropriate funding for regional arterial roads

The RARP uses a layering process similar to that used in Liveable Arterials to identify deficiencies and competing demands for use of arterial road space. It also places emphasis on the development of Corridor Management Plans to identify appropriate projects and actions. However, it overall differs significantly from the Liveable Arterials approach.

The RARP identifies and prioritises deficiencies in the arterial road network based largely on the relative demands for the design year for a number of 'functions' and the assessed level of service for each function. The functions are general traffic, passenger transport, freight, safety and cycling. The demands are obtained primarily from transport model outputs and are measured by traffic flows,

bus numbers, freight traffic, crash rates and whether the arterial is part of the regional cycle network. Depending on the level of demand and the level of service, arterial segments are given a deficiency score for each function. Arterials with high deficiencies in more than one function are identified and are then given a Priority 1 or Priority 2 rating based on the combined deficiency across these functions. Land uses have only a minor influence on the outcome. Locations with a 'place' function are identified, but this information is not explicitly used in the analytical process.

The RARP applies a more numerical, transport model-based process process for identifying and prioritising the transport deficiencies which can be applied relatively easily to a large arterial network, and which benefits from the inclusion of crash rates. However, the process is almost exclusively transport-focused and takes little notice of the context of the network components. Corridor Management Plans based primarily on the RARP output would not adequately take into account a large amount of relevant information that can, and should, influence the management and development of the arterial road network.

However the RARP and Liveable Arterials Plans together present a comprehensive resource to ensure corridor plans within Auckland City are fully informed around sustainability issues.

Concluding the Liveable Arterials Plan

The Liveable Arterials approach used to identify future road space demands and potential deficiencies, and to determine the most appropriate solution taking all relevant urban sustainability factors into account, worked well. NZTA has supported it as a best practice process. It allowed conflicts to be identified and provided a good means of making decisions on the most appropriate prioritisation of scarce road space. It critically allowed an informed discussion to occur around how to respond in those instances where it was just not possible to always serve all interests.

An unexpected benefit was that it enabled, in many cases, much of the doubt and cynicism about the model from some non-transport team members to be allayed. In other instances, the limitation of relying on models as the sole basis for making transport network decisions was exposed. The model output was an essential component of the project, but importantly it was placed on a fairly equal footing along with other outputs in network planning decision-making tools, and was not elevated to the role of the prime decision making instrument as has tended to be the case in past.

All participants, including transport specialists, had to be prepared to argue their case and to be fully involved in the interactive workshops. This enriched the project and led to more robust and defendable outcomes. It also allowed an authentically integrated outcome to be achieved through consideration of broad-ranging evidence, professional debate, and consensus.

Experience gained in the development of corridor management plans following on from the Liveable Arterials Plan was that the participants who looked simply at the functional types and did not understand their implications took some time to become effective participants in the process. The outcome of the Liveable Arterials process must be seen as a series of diagrams, tables, and design aspirations not just one plan showing the segment types. Given that transportation specialists will be the main user group of the project outputs, a greater emphasis on the purely transport focussed parts of the project may have helped in this respect. However this issue should not negate the success of an innovative, comprehensive and inclusive process to help move network planning towards more sustainable outcomes.