
MOVING
AUCKLAND
FORWARD
Road Network Optimisation
Dealing with Auckland's congestion, today
NZ TRANSPORT
AGENCY
WAKA KOTAHI
[Draft for discussion]

Purpose of this document

With Auckland growing fast with an additional 700,000 to 1 million people expected to call Auckland home over the next 30 years, requiring over 270,000 jobs, an effective response is necessary to manage and offset traffic congestion on the road network today, and in the years that follow.

This document outlines Auckland's current operational response to increasing traffic congestion; how we keep tabs on performance through Network Performance Reporting and how optimisation can be enhanced into the future.

Why intervention?

- In order to support a growing and vibrant Auckland, there is a need to offset increasing levels of congestion.
- The introduction of large infrastructure interventions such as the Western Ring Route (with Waterview Tunnel) and Central Rail Link facilitate achieving this.
- The on-going application of Road Network Optimisation will manage congestion through making best use of the existing road network.

700k - 1m additional people over the next 30 years

Level of congestion increasing at 2 – 3% per year

Currently between **25 to 30%** of Auckland's main arterial road network experiences congestion during peak times, with March escalating to **33%**.

The level of congestion on the network is increasing at **2 – 3%** per year with ongoing growth in Auckland, increasing delays and adding to travel times.

Setting the direction for optimisation

Auckland Plan

ITP

RASF & NOP

Transport choices for a growing, vibrant Auckland

Auckland Transport's Integrated Transport Plan (ITP)

The ITP is Auckland Transport's response to the vision for Auckland set out in the Auckland Plan. The ITP provides a consolidated transport investment programme across the transport system over the next 30 years and includes setting out strategic multi-modal networks to facilitate the Auckland vision.

Roads and Streets Framework (RASF)

Based on the multi-modal networks and place significance identified in the ITP and Auckland Plan respectively, the Roads and Streets Framework (RASF) sets out aspirational typologies for each road and street on the network in the context of movement and place.

The Network Operating Plan (NOP)

The Auckland NOP, endorsed by the AT/NZTA Auckland Traffic Operations Centre Joint Management adopts a One Network (One Customer) approach and closely aligns with the strategic multi-modal networks identified in the ITP and the RASF.

The NOP provides modal priorities for routes, together with aspirational targets by mode and time of day. In particular, for commuting or people through- movement routes, the morning and afternoon peak periods are of primary concern, whilst for goods or freight through-movement routes the interpeak period is of primary significance.

In both instances, congestion is measured as those segments for which journey speeds are lower than half the relevant posted speed limit.

The NOP furthermore acknowledges place and the need to appropriately account for pedestrian movement in activity centres.

Strategic Context

With a shared interest in a successful Auckland, the Government and Auckland Council worked together to identify an aligned strategic approach for the development of Auckland's transport system, referencing the **Government Policy Statement** and the **Auckland Plan**. The recommended strategic approach is referred to the Auckland Transport Alignment Project (ATAP).

ATAP Alignment

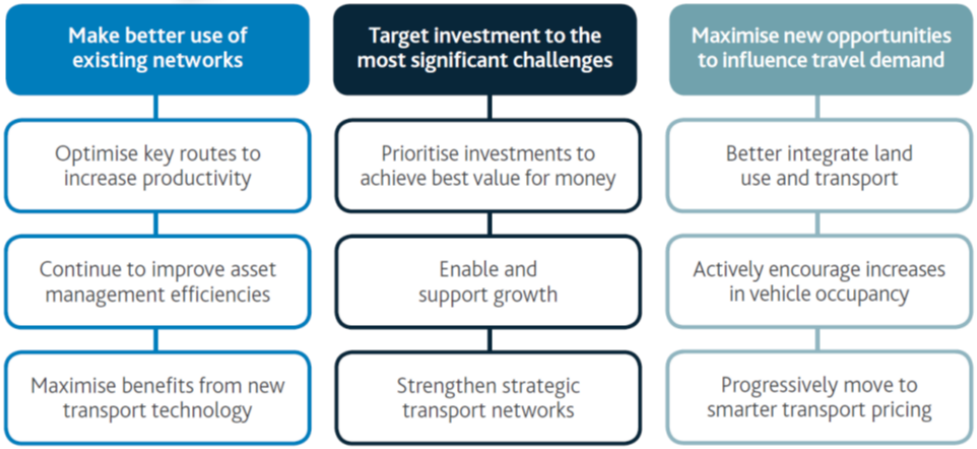
Two of the three integrated elements identified by ATAP to be progressed are:

- *"Make Better Use of Existing Networks", which includes to:*

  -Optimise key routes to increase productivity"

  -Maximise benefits from new transport technology.

- *"Maximise New Opportunities to Influence Travel Demand"*

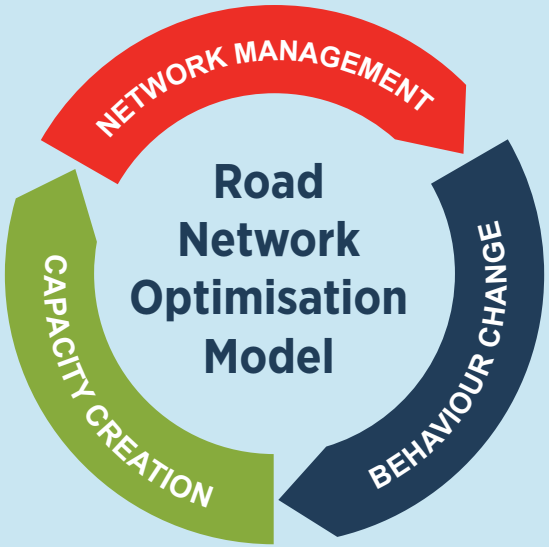


Road Network Optimisation

In broad terms

The Network Optimisation process is delivered through three network optimisation principles:

Broad Principles

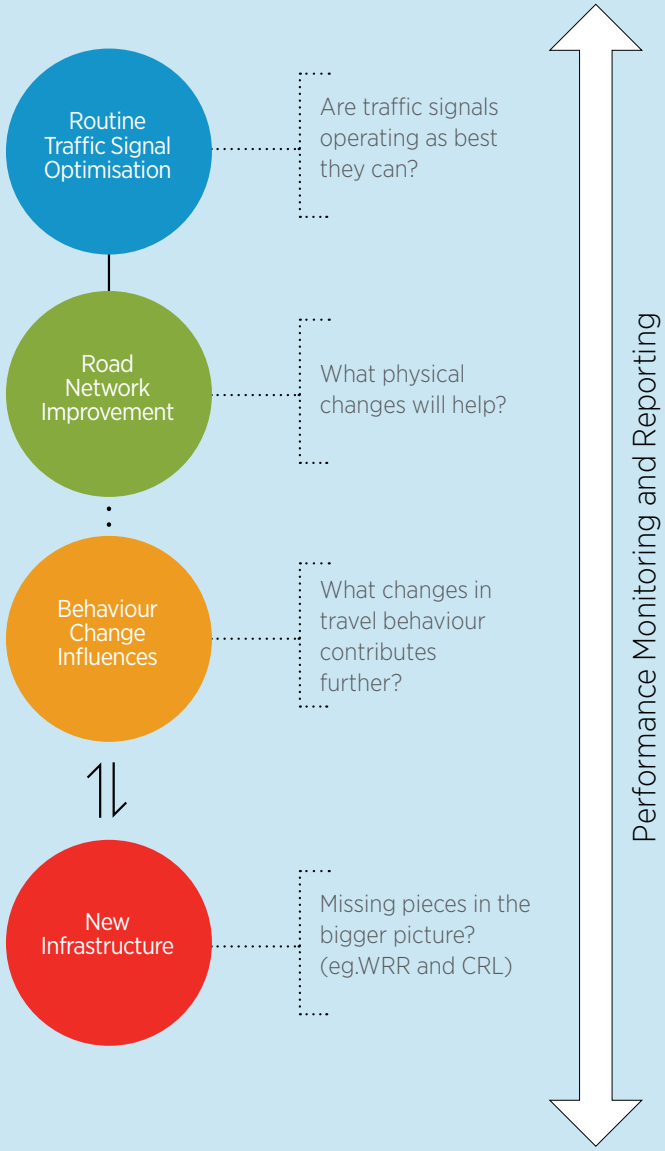


Understanding Road Network Deficiencies

More specifically

On this basis, the AT/NZTA Road Network Optimisation Model currently follows a two-fold process, with a third contributory component increasingly being integrated going forward.

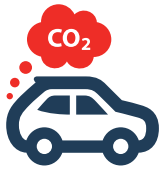
Optimisation Model



Road optimisation benefits achieved

Travel time savings of up to **500,000 hrs/year** on average

50% of Arterial routes optimised by per year



Vehicle emission (CO2) reduction of **550 tonnes/year** on average

Travel demand / modal change benefits **Reduction of 18,400 single occupant vehicle movements**

Fuel savings of **250,000 litres/year**

Freight Routes Retain good and reliable travel times year to year

25-50% reduction in bus travel times on optimised corridors

Reduced delays and **improved provision** for pedestrians and cycling

Routine traffic signal optimisation | Getting the best out of our traffic signals every day

Routine Traffic Signal Optimisation programme [Network Management]

By referencing the NOP, traffic signal optimisation is better informed with priority being encouraged for key through-movements during commuting peak periods where possible. Routine traffic signal optimisation is an ongoing scope of work covering the entire Auckland network undertaken by the Auckland Transport Operations Centre (ATOC) under AT and NZTA direction.

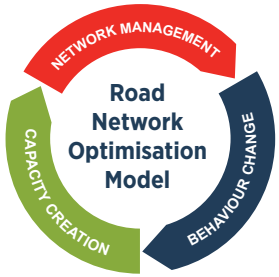
The programme has recently been transformed from a 4-year cycle programme to a more responsive 2-year programme, in an attempt to keep existing traffic signals, particularly on key routes, well optimised.

An example being annual travel time savings achieved through traffic signal optimisation on Great North Road, between Cowley Street and Rosebank Road, which accumulated to more than 53,000 hours.

A key opportunity is to expand the current routine optimisation process and function undertaken by ATOC into an active monitoring or real-time optimisation function as is currently the case on key routes within the city centre. This has proven effective in retaining optimised network operations despite the reduced physical network capacity. Adopting this approach, which includes responsive incident and network management, across all key routes across the region will effectively offset increased congestion and ensure optimised network operations on a daily basis.

This will require the need for BIG DATA intelligence being readily available regarding multi-modal network performance and congestion monitoring for both real-time monitoring and reporting purposes.
A further opportunity is in the roll-out of smart detection and technologies to further optimise network optimisation.

Road Network Optimisation Model



Routine Traffic Signal Optimisation

Road Network Improvement

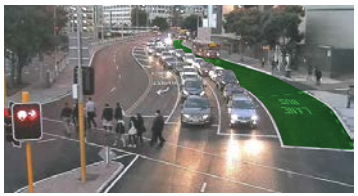
Behaviour Change Influences

Road Network Improvement | Making physical changes that help

Network Improvement programme [incorporating congestion relieving projects].

Based on network performance reporting and monitoring (congestion mapping), the known congested elements of the network are identified and listed as key congestion points on the network. These in turn are currently being put forward for investigation and ultimately inclusion into the Network Improvement Programme where appropriate and possible.

This process is developing and includes interfaces between the NZTA strategic network and the AT arterial network. These projects focus on minor to medium scale improvements to the network, and to varying degrees incorporate travel demand management, innovative and ITS-orientated solutions.



Re-purposing the existing road network (Bus or transit lanes)

Capacity improvement and physical changes (Roundabout metering)

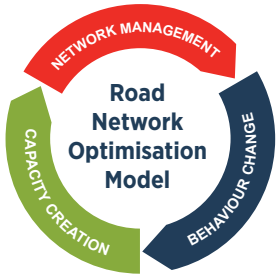
ITS intervention (Dynamic lane management)

By way of an example, recent re-purposing of Manukau Road and Pah Road to include a T3 lane has resulted in a 14 minute improvement for buses and T3 vehicles during the morning peak period, increasing people movement productivity by approximately 20% for this period. Under this current programme.

Typically improvements that can be done in the short to medium term.

Deficiencies are identified by under performance on the network for general traffic, for freight movements on the key freight network, for bus movements on key public transport corridors (in conjunction with Metro), and for walking (within activity centres for now) and cycling on key corridors (in conjunction with Walking and Cycling).

Road Network Optimisation Model



Routine Traffic Signal Optimisation

Road Network Improvement

Behaviour Change Influences

Behaviour Change | Influencing travel behaviour

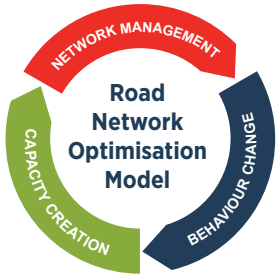
Behaviour Change Influences [Capacity Creation + Behaviour Change]

Through a series of general and targeted campaigns, programmes and travel planning initiatives there are opportunities to act as catalysts for change by influencing travel choices, reducing reliance on single occupant travel during commuting peak periods and thereby effectively creating capacity on the network. Enabling and incentivising walking, cycling, car-pooling and public transport use through education campaigns, events and promotions all contribute to reduce the number of vehicles on the road network. Tools such as AT Mobile (supporting public transport journeys across AT Metro's bus, train and ferry services) and Smart Travel (supporting car-pooling) facilitate travel choice and behaviour change. Larger-scale travel demand management interventions such as road pricing will further influence travel behaviour change.

Whilst this component has been a business-as-usual activity by AT, this component is increasingly being integrated as a third contributory component of Road Network Optimisation, and particularly complimentary with other capacity improvement and infrastructure repurposing interventions.

Reduced vehicular trips reduces congestion. A reduction in vehicular traffic of approximately **15%**, such as occurs during school holiday periods, leads to a **15 to 20% reduction in journey time**.

Road Network Optimisation Model



Routine Traffic Signal Optimisation

Road Network Improvement

Behaviour Change Influences

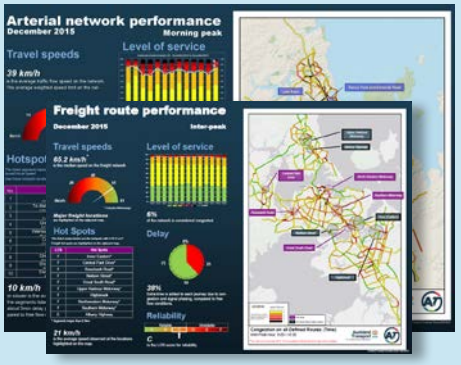
Network Performance Reporting | Identifying network deficiencies and quantifying successes

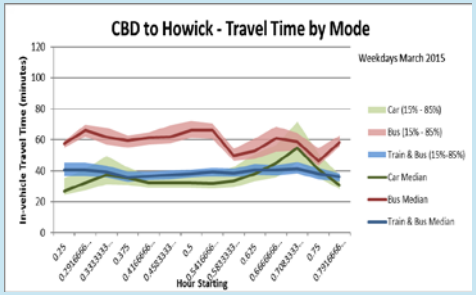
Road Network Monitoring and Multi-modal deficiencies

Measurement of multi-modal network performance and relating to well-defined aspirational user experience or level of service outcomes, provides a means of identifying how well the network is performing against strategic intent, and then also highlights which intersections, corridors and sub-regional areas require improvements.

Statement of Intent (SOI) performance monitoring and monthly Performance Indicators form high-level indicators as to how the network is performing.

Monitoring and reporting informs the successes of network optimisation interventions. Real-time monitoring capabilities enables active monitoring and immediate response by ATOC to under-performing segments of the network





Performance Monitoring and Reporting

Going Forward | Optimising Auckland's Road Network Now and for the Future

NOW

- Apply NOP to Routine Traffic Signal Optimisation (2-3 year cycle)
- Identify network deficiencies
- Minor and limited Medium scale Network Improvements
- Apply limited Behaviour Change (Travel Demand Management)

How do we get there?

Continue with current Road Network Optimisation programme

Agree and establish alignment with AT, AC, NZTA, MOT

Establish Governance structure

Apply Investment Logic Mapping (ILM) approach

Develop Programme Business Case (PBC) – a 10 year view

Increase Network Coverage - CCTV & Analytics

Apply agreed PBC- established Network Optimisation process

Mandate the RASF and NOP

Telling the Story - communications

FUTURE

+ 10 years
One Network Optimisation

- Optimised journeys - interface between road, rail and ferry trips
- Understanding impact of technology - driven disruption on travel behaviour i.e. MaaS; EV; AV etc
- Increase Active Network Monitoring through ATOC on key arterials referencing NOP
- Responsive incident management across the wider One Network
- Apply ITS interventions
- One Network monitoring - consolidated data and analytics platform
- Target Investment - Identify One Network deficiencies
- Incorporate re-purposing of existing infrastructure to prioritise people and goods movement
- Increase area-wide and targeted travel behaviour campaigns and introduce travel demand management (congestion charging)
- Introduce Minor, Medium and Major scale Network Improvements
- Apply NOP to Routine Traffic Signal Optimisation (1-2 year cycle)

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