



# Application of the Auckland Network Operating Plan

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## What you need to know about the Auckland Network Operating Plan?

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In order to operate Auckland's transport network safely and efficiently, different transport modes must be integrated and appropriately prioritised to move people, goods and services.

In 2021, Auckland Transport and Waka Kotahi established the Auckland Network Operating Plan 21-24 (ANOP 21-24) to document the agreed approach to managing and optimising the strategic road network to deliver on the strategic objectives for the Auckland transport system.

In addition to providing the direction to make decisions towards optimal network operations for today, the ANOP 21-24 also guides the development of a targeted optimisation programme, developed every three years, in this instance for 2021-2024 as part of a ten year programme.

This document, Application of the Auckland Network Operating Plan, specifically outlines how Auckland Transport applies the ANOP 21-24 in the context of Auckland Transport plans and strategies. For simplicity, the ANOP 21-24 is referred to as the ANOP in this document.

Within Auckland Transport (AT), the ANOP uses the Future Connect Strategic Networks and the Roads and Streets Framework (RASf) to ensure consistent application of strategy across the road network. Future Connect is AT's long-term vision for Auckland's future integrated transport system. It maps the most critical links of our current and future transport systems, our Strategic Networks, and will ultimately set a 30-year long-term plan for all transport modes: public transport, general traffic, freight, cycle and walking.

Future Connect uses data driven analysis to identify the most significant problems and opportunities along the Strategic Networks over

the next 10 years and beyond. Where multiple deficiencies occur, focus areas are identified as critical locations for potential future projects and programmes which inform the next Regional Land Transport Plan. The RASf is a first-step strategic planning tool which sets the role of individual roads and streets within the context of the network and the land use pattern of the region.

The RASf acknowledges the important role that roads and streets play as part of the public realm, as well as the impacts that transport and land use have on each other. It recognises both the Place value and the Movement value of a street, and therefore sets the individual modal priorities for each road and street, to guide both design and network operation. These principles and associated goals are embedded in the ANOP.

By comparing the current experience of various users to the goals set out in the ANOP, deficiencies in the network can be known. This information then empowers decision makers to make changes that reduce and remove these deficiencies through adjustments to dynamic components of the network, undertaking physical improvements and encouraging behaviour change.

#### The ANOP can be used to:

- Inform Auckland Transport Operations Centre how the network should be operating for different modes at various times of the day.
- Inform Traffic Management Plans to ensure the correct priorities for different sections of road are maintained.
- Highlight infrastructure improvement opportunities.
- Set out customer expectations.

# 1 What is the Auckland Network Operating Plan?



Auckland is growing fast, with a population increase of

**720,000 projected in the next 30 years.**

This population growth brings increasing demand on Auckland's transport system and its ability to move people, goods and services about effectively. To meet this challenge changes are needed today that will enable optimal outcomes for the future.



A network operating plan is an agreed plan of how the transport network should be operated at different times of day for the different transport modes. In 2021, Auckland Transport and Waka Kotahi established the Auckland Network Operating Plan 21-24 (ANOP 21-24) to document the agreed approach to managing and optimising the strategic road network to deliver on the strategic objectives for the Auckland transport system. The ANOP 21-24 document is included in the Transport Plans and Strategies landing page on the AT website.

In addition to providing the direction to make decisions towards optimal network operations for today, the ANOP 21-24 also guides the development of a targeted optimisation programme, developed for 2021-2024 as part of a ten year programme.

Being agreed by Auckland Transport and Waka Kotahi, the ANOP 21-24 therefore enables a consistent and singular approach to network management and operations for the Auckland network, and refers to the strategic networks in Future Connect.

In the Auckland Transport context, the ANOP 21-24 (referred to as the ANOP) is based on the strategic aspirations identified in the Roads and Streets Framework (RASf) and Future Connect, with strategic networks clearly reflected in the Future Connect Viewer.

The ANOP prioritises different modes in different locations to inform decision makers where to focus investments and which trade-offs are appropriate. Operational deficiencies in the network can be identified by comparing the existing network operation against the optimal state. The ANOP is a live document continually being updated with network changes, and expected to be formally confirmed every three years in conjunction with ongoing development of the targeted network optimisation programme beyond 2024.



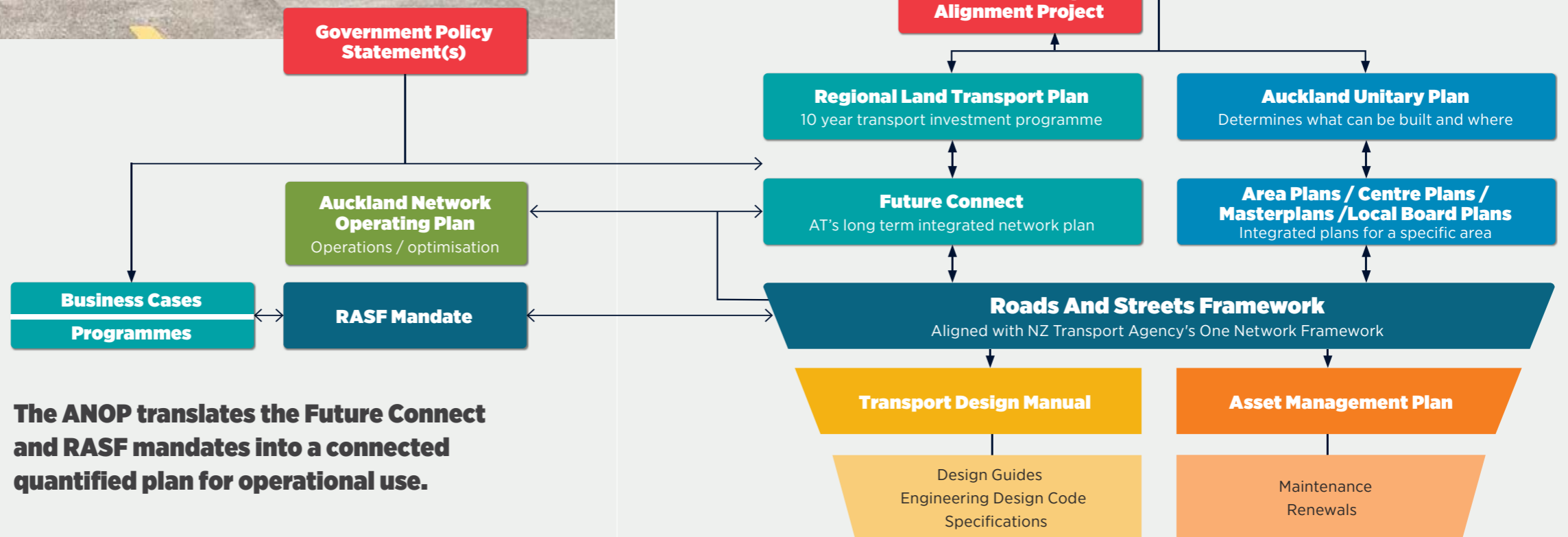
The ANOP directs the way the network should operate to ensure Auckland's transport vision, strategic goals and aspirations are met.

# 2 Where does the Auckland Network Operating Plan fit?



**Safety**  
Vision Zero for Tāmaki Makaurau

**Customer focus**



The strategic framework and direction for Auckland has been set within the Auckland Plan and the Auckland Transport Alignment Project. Future Connect is AT's long term integrated network plan to enable the Auckland Plan. The Future Connect Strategic Networks and Roads and Streets Framework (RASF) combine to determine appropriate and ideal modal aspirations for the Auckland network. The RASF categorizes each section of road into typologies by movement and place significance and highlights the aspirational intent for each mode of transport. The ANOP provides the link between this aspirational intent and network operation by translating the individual street and segment RASF mandates into a connected continuous network with quantifiable measures.

The existing operation for different modes can then be compared to the ANOP to identify deficiencies. These deficiencies

can be addressed through changes to the network, through various low to medium cost interventions, including routine traffic signal optimisation interventions. Larger scale interventions would more typically be included in potential future projects and programmes forming part of the Regional Land Transport Plan (RLTP). This process ensures that the optimal modal outcomes to support the movement of people, goods and services identified in the RASF are achieved.

The ANOP reflects and reinforces the Vision Zero strategy for Auckland. The operation of the network outlined by the ANOP will continue to be aligned with the goal of 'zero deaths and serious injuries by 2050'. Safety for all modes is the foremost priority and the ANOP aims to achieve safe mobility in an efficient manner on today's network.

# 3 Components of the Auckland Network Operating Plan



Future Connect Strategic Network



Roads and Streets Framework



Auckland Network Operating Plan

## Movement of people, goods and services



To meet the long-term challenge of population growth and road user demands, a shift towards more sustainable and efficient transport modes is necessary. It is therefore important to consider the movement of people rather than the movement of vehicles. The ANOP takes into consideration the relative people-movement efficiency of each mode at each location. In a similar way, it is also important to consider the movement of goods and services rather than the movement of vehicles.

The movement of people, goods and services is fundamental to the ANOP and forms a basis for comparison. Applying the ANOP therefore supports the shift towards public transport and active modes, in particular where critical in the context of the Future Connect strategic networks. This shift and focus on the movement of people furthermore supports Safety and Climate Change outcomes.

## Multi-modal



Future Connect includes a plan that outlines the Strategic Networks. These represent key links for the movement of people, goods and services as part of an integrated multi-modal system. Based on these networks, the RASF details the significance of each mode by location and therefore what should be prioritised.

While maximum access is important for all road users, the RASF aims to ensure that appropriate modes have priority in the appropriate places. The ANOP adopts this same movement and place focus.

The RASF outlines 7 transport modes, of which 2 are Loading and Parking, whereas the ANOP streamlines these to focus on the key contributors to the movement of people, goods and services: Walking, Cycling (and micro-mobility), Public Transport, Freight and General Traffic. The ANOP inherently considers loading, servicing and parking as an interrelated component and detail to the movement-related modes.

The multi-modal networks in Future Connect under the 'Current' tab is the ANOP network plan.



Pedestrian



Cycling



Public Transport



Freight



General Traffic

## Principles

The ANOP incorporates principles outlined by the RASF and Future Connect Strategic Network to ensure a strong link between strategic aspirations and day to day operation. These principles, when applied to the ANOP, ensure a multi-modal integrated network by promoting modes where and when they are of high strategic importance on the network. These principles can be summarised as follows:

-  **Promote walking in high pedestrian areas**
-  **Promote cycle links to activity centres and on designated routes**
-  **Promote high priority on key bus routes**
-  **Promote on designated freight network**
-  **Promote on preferred traffic routes**
-  **Specify requirements by time of day**
-  **Promotes safe outcomes**
-  **Promote 'places' and activity centres**

Consideration of modal requirements by time of day is an important feature of the ANOP so that appropriate priorities are assigned during peaks and off-peak times. In locations where there are competing modes and limited space, assigning priority at specific times of day maximises performance to achieve a win - win outcome.






Town centres present an example of competing modal priorities throughout different times of the day. They often experience high pedestrian demand during shopping hours both on weekdays and weekends, a need for servicing in the early morning, public transport demand throughout the day both to the area and through the area and high general traffic demand during weekday peaks.

The ANOP directs the management of the network towards enabling these outcomes by time of day and day of the week.



## User Experience

User experience definitions are key. These enable user experience to be quantifiable and used to define both sought aspirational outcomes and the current operational performance of the network by mode. Factors include both quantitative and qualitative measures, and incorporates guidance from the Transport Design Manual (TDM). Qualitative measures are applied when considering active modes where factors such as perceived safety, street lighting and good design as per the TDM can contribute to defining and establishing the user experience. While there are a number of factors which can be considered, the ANOP uses the measures outlined below. These measures are detailed further in Appendix 1.






Active mode	Movement/ throughput focused mode
 Walking	 Bus / PT
 Cycling	 General traffic
	 Freight
<b>Measures</b>	<b>Measures</b>
Physical facility Imposed delays	Journey time Journey time reliability



In order to provide a common measure for user experience, ratings have been defined for each mode which describe what good and poor user experience or level of service looks like. The ANOP uses six levels of service (LOS) ratings ranging from A, which defines very good user experience, through to F, depicting a very poor user experience.

Typically, a user experience or LOS rating of A, B or C is considered as a positive outcome for that particular mode, whereas D, E or F increasingly highlights a deficiency for that mode at that time and location.

On this basis, the ANOP provides benchmarks for user experience or LOS across the network that reflects the aspirational and optimal operational outcomes sought by Future Connect and the RASF for today's current network. These benchmarks can be generally summarised as follows, and expanded further in the ANOP21-24:

User / Mode	Aspirational User Experience or Los (as stated or higher)	
 Pedestrians	B/C	At high pedestrian demand locations and times
	C/D	At all other locations
 Cycling	B	Within activity areas with cycle network connections
	B/C	On the strategic cycle network
 Public Transport	B	On the Rapid Transit Network
	B/C	On the Frequent Transit Network
	C/D	On remaining bus network
 General traffic	C/D	On the strategic general traffic network during the commuting peaks
		Lower on local streets
 Freight	C/D	On key Level 1A/1B Strategic Freight Network routes at all times
	B	On the Level 1A/1B Strategic Freight Network during the interpeak

Multi-modal network plan

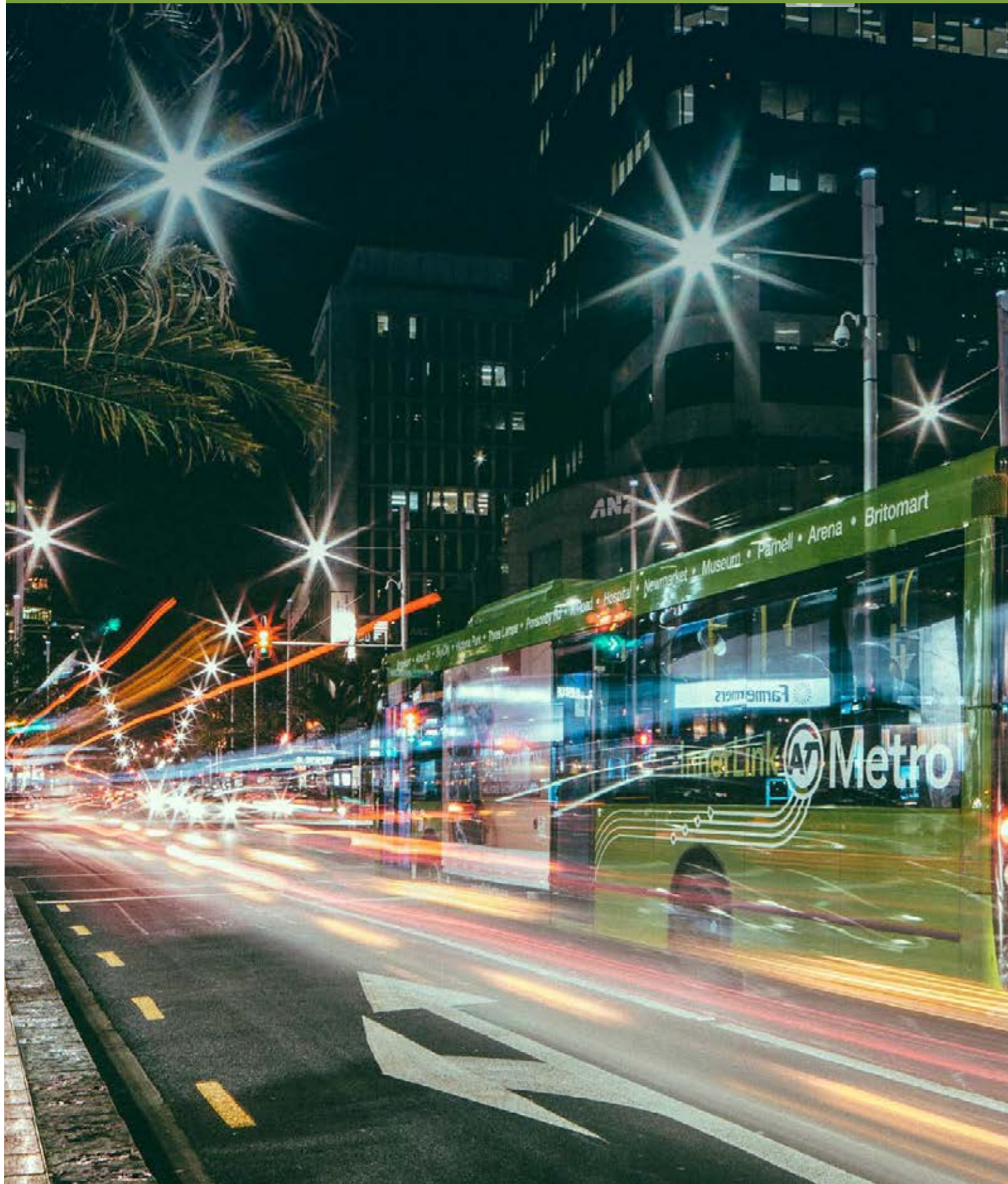


Principles



Auckland Network Operating Plan

# 4 Applying the Auckland Network Operating Plan



Comparing existing network performance to the ANOP guides decision makers towards network management and operation that will address deficiencies and move the network toward optimal strategic outcomes.

### The ANOP provides direction for:

- 1 Network performance monitoring
- 2 Network operation
- 3 Network Optimisation
- 4 Temporary Traffic Management Plans
- 5 Customer Understanding and Expectations
- 6 Project Impact Assessment



### 1 Network Performance Monitoring

AT Network Management produces monthly network performance reports for each of the different modes. These reports provide insights as to how well the network is performing for each mode and highlights where deficiencies currently exist. These metrics and insights are also used to support Future Connect Deficiencies and Opportunities, and available for reference and use across AT.



## 2 Network Operation

The ANOP provides the base reference for how the Auckland Transport Operations Centre (ATOC) operate the traffic signals network and directs decisions in routine optimisation and real-time operation.



## 4 Temporary Traffic Management Plans

Assessing the impacts of proposed temporary traffic management plans (TTMPs) relative to the ANOP, highlights potential modal impacts. This therefore indicates necessary remedial measures for each mode to ensure that the network operates at appropriate levels during roadworks.

This means for example that TTMPs need to consider how best to accommodate for cycling for works taking place on the strategic cycle network, or how to account for freight on the Freight Network. The same applies to buses, walking and therefore not just general traffic.



## 3 Network Optimisation

Network Optimisation is the programme of work seeking to make best use of the existing network. Network Optimisation is based on the following three principles:

### Network Management:

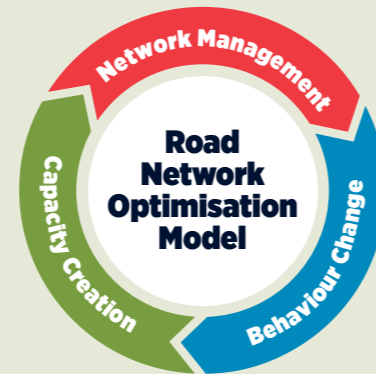
managing and operating the network in alignment with strategic intent and the ANOP.

### Capacity Creation:

enabling, promoting and increasing people and goods movement capacity (not necessarily vehicle movement capacity).

### Behavioural Change:

increasing people movement efficiencies and multi-modal user experience using the existing road space.



Buses on a key bus corridor were caught up in general congestion. Network Optimisation resulted in the introduction of the bus lane and missing pedestrian crossing facilities. This increased people movement capacity along the corridor and enabled improved walking opportunities across this busy street.

## 5 Customer Understanding and Expectations

Publication of the ANOP, together with the RASF and Future Connect, provides full transparency regarding AT's strategic intent. When customers ask questions, provide feedback or ask for changes, the ANOP can provide a reference for communicating AT's decision making and intended operation.



## 6 Project Impact Assessments for new projects and developments

Network Fit Assessments can be applied to determine how well works related to a proposed development aligns with the ANOP, or how effectively a proposed project contributes to reducing identified operational gaps and deficiencies being addressed.

Where there are multiple interventions available for different modes, the ANOP Assessment tool developed by AT, can assess the impact of each alternative on the current operating gap and therefore help in the selection of the most appropriate solution.







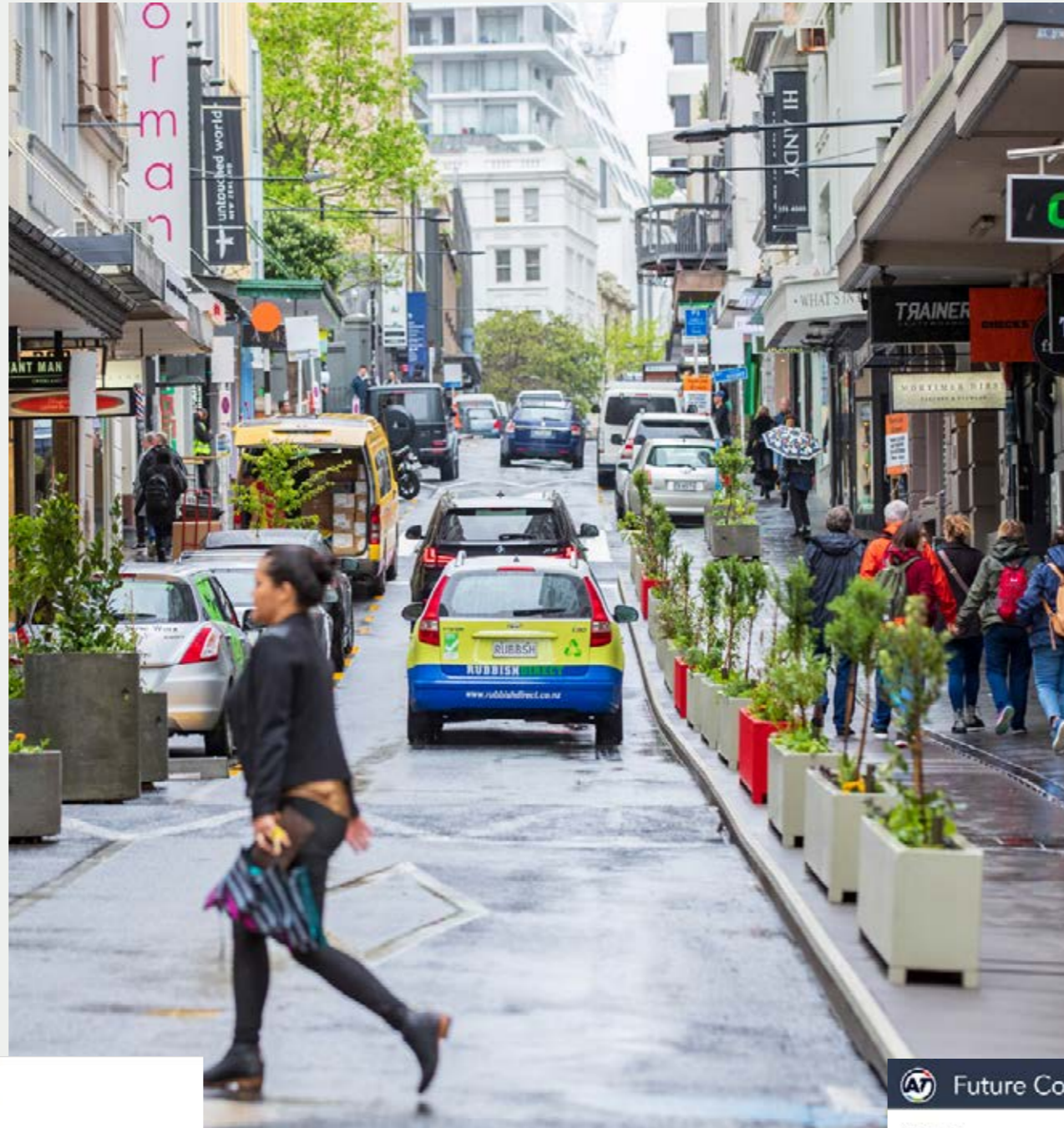
## Future Connect Viewer and ANOP Assessment tool for gap identification

The Future Connect Viewer provides an overview of network deficiencies across the network for both the Current and Future situation. The outputs inform network optimisation and larger scale interventions appropriate for RLTP funding.

In the same way, at the operational level, the ANOP Assessment tool is able to represent optimal outcomes of a location alongside the current operational performance, highlighting deficiencies by mode at the location.

As with the RASF, bar charts represent how each transport mode is operating compared to the aspirational or optimal targets set by the RASF. This comparison allows decisions to focus on interventions that would be most beneficial and which modes need the greater attention.

The tool can also be used to illustrate the expected benefits or affects of projects, interventions or roadworks. ANOP Assessments that result in Positive alignment with the ANOP confirms that the project aligns with Future Connect and RASF aspirations. In this way, day-to-day application of the ANOP enables the ongoing operationalization of strategic intent, which together with broader Regional Land Transport Plan interventions, results in improved safe, efficient and sustainable outcomes for customers and Auckland going forward.



## Access to the ANOP

The ANOP is represented by the 'Current' networks within the Future Connect Viewer. The Current user experience or LOS by mode are also represented within the Viewer.

Within AT, the ANOP is managed by AT Network Management, who also measure multi-modal operational performance on a monthly basis. This provides current and continual insight into the operational performance and therefore customer experience of the network.

The ANOP is updated as and when necessary to reflect changes to the current Future Connect Strategic Networks and the RASF, as well as changes to the physical network.

As the ANOP is an operational plan used to put strategy into effect, it is imperative that the ANOP remains well connected and aligned with Future Connect and the RASF, and that the ANOP is applied both consistently and across all network operation activities in Auckland.

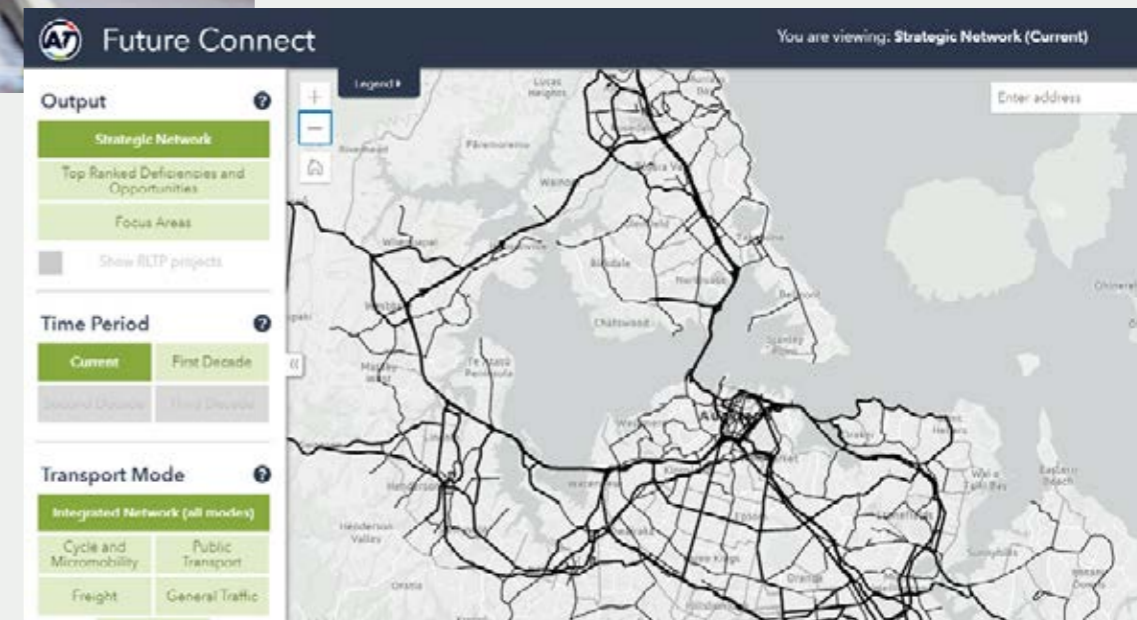
The ANOP 21-24 is expected to be updated in 2024 to incorporate any such changes, and to further document the agreed approach by Auckland Transport and Waka Kotahi to managing and optimising the strategic road network of the Auckland transport system.

The Auckland Network Operating Plan 21-24 (ANOP 21-24) document and AT's Application of the Auckland Network Operating Plan is publicly available through the [AT website www.at.govt.nz](http://www.at.govt.nz).

### Observed & Assessed Modal Levels of Service



The larger the gap between the Optimal performance and the current observed performance highlights a larger deficiency for that mode. An intervention is expected to address or at least reduce the deficiency.



**Fit Assessment Result** High likelihood of supporting the intent of the Auckland Network Operating Plan (ANOP) and Future Connect

## User experience



LOS	Pedestrians	
	Facility	Crossing delay
A	Crossing opportunity is within 50m* or shared space High quality pedestrian facilities with appropriate separation Friendly speed environment Free flowing for pedestrians No street obstacles	Average crossing delay less than 10s
B	Crossing opportunity is within 100m* Pedestrian facilities provided with appropriate separation Some street obstacles with minor conflicts for pedestrians	Average crossing delay less than 20s
C	Crossing opportunity is within 200m* Pedestrian facilities provided with appropriate separation Pedestrian speeds restricted	Average crossing delay less than 30s
D	Crossing opportunity is within 400m* Narrow sealed footpath Restricted movement for most pedestrians	Average crossing delay less than 45s
E	Crossing opportunity is within 800m* Formed footpath Footpath significantly restricted by street obstacles Restricted movement for pedestrians	Average crossing delay less than 60s
F	Crossing opportunity is more than 800m* No discernible footpaths OR Shuffling movement for pedestrians	Average crossing delay greater than 60s



LOS	Cycle	
	Facility	Crossing delay
A	Unobstructed off-road facility OR protected cycle path for use by cycles only AND Cyclist operating speeds are largely unhindered AND Minimal conflict with other modes at intersections	Average crossing delay less than 10s
B	Protected cycle path OR separated shared path OR shared path AND Cyclist operating speeds are largely unhindered AND Some conflict with other modes at intersections	Average crossing delay less than 20s
C	Protected cycle path OR separated shared path OR shared path OR shared spaces with low volume & low speed AND Cyclist operating speeds are somewhat impeded AND Some conflict with other modes at intersections	Average crossing delay less than 30s
D	Shared path OR traffic environment with low volume & low speed AND / OR Cyclist operating speeds are impeded AND Some conflicts with other modes en-route and at intersections	Average crossing delay less than 45s
E	On-road cycle lane OR shared traffic environment with medium volume & low speed OR low volume & medium speed (e.g. bus or transit lane) AND Cyclist operating speeds significantly impeded due to obstructions that require dismounting OR Conflict with other modes at intersections	Average crossing delay less than 60s
F	Shared traffic environment with high volumes AND high speeds	Average crossing delay greater than 60s

### A lower LOS should be considered with the following aspects:

- Poor actual safety record or perceived safety risks
- Poor alignment with the Transport Design Manual (TDM). Layout, widths and design not as per the TDM.
- Poor environment in relation to CPTED factors
- Poor quality crossing facilities (is it visible and legible to approaching drivers?)
- Where cycling on shared paths or footpaths result in poorer outcomes for pedestrians.

\* Distance to crossing opportunities should be halved in activity centres and outside schools

Footpaths should be as per TDM standards.

### A lower LOS rating is applicable where the following aspects might apply:

- Poor actual safety record or perceived safety risks
- Poor alignment with the Transport Design Manual (TDM). Layout, widths and design not as per the TDM.
- Poor route continuity, obvious indirectness of route or inclusion of steep grades
- Poor quality of the surface (if uneven or in disrepair)
- Poor environment in relation to CPTED factors
- High numbers of pedestrians on shared paths
- High volumes of traffic on any roundabouts along the route



LOS	Public Transport	
	Travel Speed OR Delay	Travel Time Reliability
A	Average Travel Speed greater than 90% of Posted Speed Limit OR No delay	85 <sup>th</sup> percentile journey time/ median journey time ≤ 1.1
B	Average Travel Speed greater than 70% of Posted Speed Limit OR Minimal delay	85 <sup>th</sup> percentile journey time/ median journey time ≤ 1.3
C	Average Travel Speed greater than 50% of Posted Speed Limit OR Some mid-block delay Stop at most intersections and clear next cycle No side friction	85 <sup>th</sup> percentile journey time/ median journey time ≤ 1.5
D	Average Travel Speed greater than 40% of Posted Speed Limit OR Some mid-block delay Stop at most intersections and mostly clear next cycle Noticeable side friction	85 <sup>th</sup> percentile journey time/ median journey time ≤ 1.7
E	Average Travel Speed greater than 30% of Posted Speed Limit OR Large mid-block delay Stop at each intersection and take ≥2 cycles to go through Significant side friction	85 <sup>th</sup> percentile journey time/ median journey time ≤ 2.0
F	Average Travel Speed less than 30% of Posted Speed Limit OR Significant mid-block delay Significant delay at intersection	85 <sup>th</sup> percentile journey time/ median journey time >2.0

Freight	
Travel Speed OR Delay	Travel Time Reliability
Average Travel Speed greater than 90% of Posted Speed Limit OR No delay	85 <sup>th</sup> percentile journey time/ median journey time ≤ 1.1
Average Travel Speed greater than 70% of Posted Speed Limit OR Minimal delay	85 <sup>th</sup> percentile journey time/ median journey time ≤ 1.3
Average Travel Speed greater than 50% of Posted Speed Limit OR Some mid-block delay Stop at most intersections and clear next cycle No side friction	85 <sup>th</sup> percentile journey time/ median journey time ≤ 1.5
Average Travel Speed greater than 40% of Posted Speed Limit OR Some mid-block delay Stop at most intersections and mostly clear next cycle Noticeable side friction	85 <sup>th</sup> percentile journey time/ median journey time ≤ 1.7
Average Travel Speed greater than 30% of Posted Speed Limit OR Large mid-block delay Stop at each intersection and take ≥2 cycles to go through Significant side friction	85 <sup>th</sup> percentile journey time/ median journey time ≤ 2.0
Average Travel Speed less than 30% of Posted Speed Limit OR Significant mid-block delay Significant delay at intersection	85 <sup>th</sup> percentile journey time/ median journey time >2.0



General Traffic	
Travel Speed OR Delay	Travel Time Reliability
Average Travel Speed greater than 90% of Posted Speed Limit OR No delay	85 <sup>th</sup> percentile journey time/ median journey time ≤ 1.1
Average Travel Speed greater than 70% of Posted Speed Limit OR Minimal delay	85 <sup>th</sup> percentile journey time/ median journey time ≤ 1.3
Average Travel Speed greater than 50% of Posted Speed Limit OR Some mid-block delay Stop at most intersections and clear next cycle No side friction	85 <sup>th</sup> percentile journey time/ median journey time ≤ 1.5
Average Travel Speed greater than 40% of Posted Speed Limit OR Some mid-block delay Stop at most intersections and mostly clear next cycle Noticeable side friction	85 <sup>th</sup> percentile journey time/ median journey time ≤ 1.7
Average Travel Speed greater than 30% of Posted Speed Limit OR Large mid-block delay Stop at each intersection and take ≥ 2 cycles to go through Significant side friction	85 <sup>th</sup> percentile journey time/ median journey time ≤ 2.0
Average Travel Speed less than 30% of Posted Speed Limit OR Significant mid-block delay Significant delay at intersection	85 <sup>th</sup> percentile journey time/ median journey time >2.0

- Delay can be used when no travel speed information is available OR to supplement assessment of travel speed
- Side friction: parking, bus stops, side roads, lack of enforcement
- Mid-block delay: pedestrian crossings
- LOS can also be influenced by Quality of Service and should be considered.
- Poor alignment with the Transport Design Manual (TDM).
- Layout, widths and design not as per the TDM.

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