Auckland Transport & Auckland Council

Time of Use Charging programme

Summary report: initial findings & emerging policy direction

June 2025

NOTE: THIS REPORT PRESENTS INTERIM OPTION ASSESSMENT RESULTS AND POLICY FINDINGS. THESE ARE NOT FINAL. THE ASSESSMENT OF SCHEME OPTIONS AND POLICY POSITIONS IS ONGOING AND WILL RESULT IN AMENDMENTS GOING FORWARD.

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Executive summary

Auckland is a city in demand. It is a powerhouse of the New Zealand economy with a great climate and natural environment. The city's population has grown rapidly over recent decades and is forecast to continue to grow. This growth offers the potential benefits of scale, with more skills, cultural diversity, and improved productivity. Growth also presents challenges, and foremost amongst these is the increased demand on a road network that is already suffering from congestion.

Time of use charging (ToUC) is a tool to manage demand for vehicle travel on the road network targeting congested conditions. Since 2006, studies have shown the potential for time of use charging to reduce congestion in Auckland. Overseas, a range of cities have implemented successful schemes that receive support from their citizens.

Our work has considered a range of options for a future ToUC scheme in Auckland. This work demonstrates that there are a range of potential options that will reduce congestion and provide significant time savings to Aucklanders.

However, the potential of ToUC is not straightforward to realise. The conditions for a successful scheme are not necessarily present across Auckland's entire road network. At the same time, international experience shows that more cities have failed to implement charging schemes than have succeeded, demonstrating the challenge of introducing a new charge on something that has previously been free. These abandoned proposals provide key lessons for Auckland in developing a successful scheme.

Auckland Council and Auckland Transport, supported by consultants, undertook significant work on time of use charging options for Auckland over 2024. The intent of that work was to inform the Auckland Council Group submission on ToUC legislation[1] and to narrow the range of potential scheme options. This paper is intended to provide a 'point in time' overview of the technical work that has been undertaken, and the policy thinking that informed our approach to the submission, with a focus on drawing out the key emerging insights.

Building on the Ministry of Transport's "The Congestion Question" (TCQ) study, this paper describes the network impacts of three broad ToUC scheme categories: City Centre Cordon, Strategic Corridors – Inner Isthmus and Highly Congested Locations. These three categories cover 11 individual sub-options. This paper also outlines the necessary policy and operational settings for a scheme and summarises the international experience for key elements of scheme design. Further information on our study is covered in the supporting technical material.

This study has been guided by Auckland Council's agreed objective for a time of use charging scheme in Auckland – to reduce congestion and improve network productivity. However, given the wider impacts created by introducing a ToUC scheme, our work also took the approach that any scheme also needs to be effective, simple, feasible and fair.

We have drawn a range of preliminary insights from this interim work that will inform further assessment.

- **TOUC schemes can provide significant time savings benefits:** Virtually all schemes deliver significant congestion reduction and time savings benefits at the regional level. Scheme sub-options delivered an average forecast saving of around 13,900 hours per day for the combined morning and afternoon peak periods, with the largest savings occurring around the charge area. Identified savings for specific charged routes range from 1.7 minutes to 11.8 minutes. As a

[1] Agenda of Transport, Resilience and Infrastructure Committee - Thursday, 3 April 2025

comparator, the 27-kilometre Transmission Gully motorway was estimated to save 10 minutes for a typical peak period trip from Kāpiti to Wellington.

- **The larger scale schemes have the highest congestion benefits but are more complex and appear less efficient:** The very largest schemes, in terms of vehicles charged, generally provide the largest overall congestion benefits but appeared to provide smaller time savings per vehicle charged. Given their scale, they create greater impacts on the network, people, businesses and social licence, making them more complex.
- **The medium scale schemes that include motorways provide good congestion benefits but create some network and public acceptability challenges:** These schemes deliver good congestion benefits relative to the number of vehicles charged. However, public transport alternatives are less viable for complex motorway trips, and the diversion impacts need to be further assessed to see if they can be mitigated.
- **The smaller scale schemes focused on the city centre and fringe have lower total congestion benefits but appear the most efficient:** These schemes deliver smaller absolute congestion benefits but tend to provide slightly higher travel time savings per vehicle charged. These schemes are likely to be the least complex and benefit from availability of good public transport alternatives, but the potential economic and other impacts on the city centre and fringe remain to be fully assessed.
- **Results are location specific:** Network impacts from a scheme depend on a combination of factors including the availability of alternative modes, ease of diverting to avoid the charge, the severity of congestion and scale of demand on that part of a network. The best results do not necessarily come from charging the highest volume congested locations.
- **A ToUC is more than a charging location:** Although the charging location is key, successful schemes overseas use complementary measures, such as additional public transport services, to enhance benefits. They also use mitigations, such as exemptions for some vulnerable users, to minimise negative impacts. A successful scheme will be a package of elements. Our work to date has not included modelling of a full scheme package with complementary measures and mitigations.
- **Diversion:** Significant traffic diversion can result from a charge. This may increase congestion in some localised areas, even as overall regional congestion decreases. Charging an area that cannot be avoided has the smallest diversion impact. Charging both the motorways and local roads in the same area is likely to be necessary to minimise diversion impacts.
- **Public transport:** Mode shift to public transport is more limited for schemes that charge outside the city centre. This reflects more complex trip patterns and less competitive public transport alternatives, especially for options that include motorways. Meanwhile, community feedback and stakeholders emphasised the importance of having viable public transport services available as an alternative to paying the charge.
- **Pricing:** The charge should ideally be set at the minimum level to achieve the congestion reduction goals. The same charge will result in different impacts, in terms of demand reduction and time savings, depending on the conditions of a particular location.
- **Revenue allocation:** Schemes perceived as revenue raising have failed to win public support overseas. Revenue should be focused on enhancing the benefits and minimising any negative impacts of a scheme.

- **Public acceptability:** Complementary measures, mitigations and revenue allocation have been critical to the success of international schemes as they help build public acceptability. This is consistent with feedback we received from stakeholders and the community.
- **Technology:** National consistency has merit, but solutions should be assessed on a regional level to better respond to the local context and ensure value for money.
- **Optimisation will be needed:** Preferred schemes will likely require optimisation of their charging price across the time of day to reflect localised conditions. Charged prices may need to be higher or lower than the figure assumed in this initial work and could impact the relative performance of schemes.

While there is clear potential for congestion benefits, there are trade-offs to be made in balancing these benefits against the wider impacts of a charge on the network, people and businesses. These insights will guide further work on ToUC in Auckland, which is needed before a preferred scheme can be identified. Beyond immediate scheme design, our work points to the need for a flexible legislative framework that can accommodate different policy settings and is responsive to local conditions.

Glossary

ANPR	Automatic number plate recognition
AT	Auckland Transport
CCO	Council-Controlled Organisation
Houkura	Houkura Independent Māori Statutory Board
VKT	Vehicle kilometres travelled
LGACA	Local Government (Auckland Council) Act 2009
LTMA	Land Transport Management Act 2003
NZTA	Waka Kotahi New Zealand Transport Agency
TCQ	The Congestion Question (2020)
TIC	Auckland Council Transport and Infrastructure Committee
ToUC	Time of use charging
TRIC	Auckland Council Transport, Resilience, and Infrastructure Committee

1. Introduction

Congestion is holding Auckland back. It is a persistent problem, even with the large investments in public transport and roading capacity over recent decades. Demand management through ToUC is a tool that can be used to tackle congestion, with the potential to make Auckland more accessible and productive.

This report presents interim findings of the work of the AT and Auckland Council ToUC Programme, supported by an EY and Arup consultant team. This programme was established following direction from the council's Transport and Infrastructure Committee (TIC) in November 2023.

The ToUC Programme assessed options for a potential ToUC scheme in Auckland and considered the wider policy and operational settings required to implement a successful scheme in Auckland. It builds upon work done over recent years, particularly TCQ by the Ministry of Transport in 2020, and aligns with strategic direction from both central government and Auckland Council.

This work provided the evidence to inform the Auckland Council Group submission on draft ToUC legislation and advances the Group's understanding of the opportunities and challenges that a ToUC can bring to Auckland.

This paper is intended to provide a broad summary of the technical work undertaken to date and the policy thinking that informed our response to the draft ToUC legislation. With substantial work still to be undertaken, this paper focuses on emerging insights rather than specific scheme assessment.

Consequently, we have summarised and simplified the reporting of the 11 individual sub-options that were assessed as part of this study into the three broad option categories they fell within: City Centre Cordon; Strategic Corridors, Inner Isthmus; and, Highly Congested Locations. Detailed descriptions, maps and technical assessment of the 11 individual sub-options can be found in section four of the 'Options Assessment and Policy Framework Report'[2].

Further work is needed to optimise the schemes to their localised conditions and assess the wider impacts of a charge, which will likely change the results reported here.

[2] EY and Arup, 2024, Options Assessment and Policy Framework Report

2. The congestion problem in Auckland

Auckland is one of Australasia's most congested cities. Rapid population growth and constrained geography have seen congestion increase - even as major improvements have been made to Auckland's roading and public transport networks.

Ongoing population growth is forecast to be accompanied by more vehicle trips and slower vehicle speeds. For example, between 2016 and 2051, average vehicle speeds are projected to decline by 6 per cent in the morning peak, 7 per cent in the interpeak and 14 per cent in the afternoon peak. Between 2031 and 2051, the proportion of travel undertaken in severe congestion is expected to increase by 20 per cent during the morning and evening peaks[3].

Auckland's demand for transport is driven by economic and population growth, a high reliance on private vehicles, and dispersed economic hubs. Public transport serves the city centre and inner isthmus well, however other parts of the city have less frequent public transport services. This leaves many trips without competitive options apart from driving a car.

The cost of Auckland's congestion is estimated to be $2.6 billion a year in 2026[4], even with the City Rail Link in place. The impacts of congestion include:

- Less time available to work, learn, exercise, relax or spend with friends or family. For example, by 2026 Aucklanders are expected to spend an average of 17 hours per person stuck in traffic each year[5] costing $1.9 billion in time delays.
- Increased costs for businesses through delays, scheduling complications, additional fuel, and maintenance expenses.
- Extra fuel use and wear and tear on vehicles costing an estimated $120 million in operating costs per year[6].
- Reduced benefits of agglomeration such as knowledge sharing, increased competition, and efficient supply chains.
- More traffic delays for bus passengers.
- Increased nitrous oxide, particulate, and carbon emissions, harming human health and the climate.

[3] EY and Arup, 2024, Draft Strategic Case
[4] EY and Arup, 2024, Auckland's Cost of Congestion
[5] 2023 New Zealand Census Projections
[6] HAPINZ 3.0, Health and air pollution in New Zealand 2016, 2022

3. Time of use charging as part of the solution

In response to the challenges from congestion, Auckland Council is considering a ToUC on parts of Auckland's road network to relieve congestion. This approach has been applied successfully by a range of cities around the world and is being considered by more.

In its recent study on infrastructure pricing, the Infrastructure Commission found that pricing should send signals to users about when, where, and how they should use energy, water, transport and telecom networks to maximise their overall benefits. For example, the electricity sector manages peak demand on its network and has, for some time, used peak demand pricing as a tool.

The study noted that transport providers could improve how they use pricing to optimise their networks.[7] ToUC is one way to achieve this, as it will help Auckland make better use of existing assets, as noted by ATAP in 2016[8].

What is time of use charging?

ToUC is a form of congestion charging. Time of Use Charging targets times of high demand, requiring those that use the roads to pay a charge, encouraging people to travel at different times, or by different modes or not at all.

This uses public roads more productively and efficiently - contributing to reduced congestion at peak times.

Some cities around the world have successfully rolled out ToUC. A successful scheme in Auckland needs to have Auckland's issues in mind, informed by the people who experience congestion daily.

It is widely recognised that ToUC in any form is not a 'silver bullet' to addressing all congestion issues but rather a tool in a broader toolbox of measures to enable effective, efficient, and sustainable movement throughout Auckland.

The idea of a ToUC scheme for Auckland is not new. The idea was considered in detail in the 2006 Auckland Road Pricing Evaluation Study. The options and impacts have since been further developed and examined, most recently and extensively between 2017 and 2020 in 'The Congestion Question' (TCQ), as well as the 2021 Select Committee inquiry into congestion pricing in Auckland.

Observed evidence from cities which have introduced congestion charging, as well as studies of road pricing in Auckland and modelling for this project, all confirm that congestion pricing can be effective at managing demand and achieving congestion reduction benefits.

Congestion pricing does impose a financial cost on some travellers and is explicitly intended to change the travel patterns of others. New charges are often unpopular at first. A lack of public acceptance is a common factor that has halted implementation of congestion pricing proposals overseas. It is therefore important that a potential scheme generates clear benefits for those in the charge area, including for the motorists who pay.

There is an opportunity to deliver better outcomes for Auckland by combining the infrastructure investment programme (supply side intervention) with ToUC (demand management). Careful scheme design and testing will be needed to help reduce negative impacts on the network and any undesirable socio-economic impacts. This project presents an opportunity to reduce the economic and social costs of congestion borne by Aucklanders and realise more of the benefits of our growing city.

[7] The Infrastructure Commission, 2024, Network infrastructure pricing study
[8] Auckland Transport, 2016, Auckland Transport Alignment Project – Final Report

4. Mandate for the time of use charging programme

In November 2023, AT and Auckland Council were requested by the Auckland Council Transport and Infrastructure Committee to establish a ToUC programme. The programme was tasked to report back on progress on the planning and design of ToUC including the benefits and disbenefits on communities and wider issues of equity.[9]

Both the Government's and Auckland Council's core strategy and policy documents, including the Government Policy Statement on land transport 2024 and the Auckland Plan 2050, provide a clear and consistent direction on the important role that ToUC is expected to play in improving the performance of Auckland's transport network. The Government has committed to delivering legislation to enable ToUC in 2025 and working with Auckland Council to deliver a ToUC scheme in Auckland.

5. The AT and Auckland Council ToUC programme

The programme investigated the following aspects of a ToUC:

- Scheme options
- Policy settings that support a scheme – complementary measures, mitigations, pricing and revenue
- Technology requirements.

The programme undertook targeted engagement with stakeholders and the community, through two citizen's panels. The programme used TCQ as its basis and built upon it in the following ways:

- Updated the inputs and assumptions used in the transport modelling to reflect planned network improvements/interventions.
- Drew on international evidence and experience to learn from successful and unsuccessful schemes overseas.
- Tested the potential for trial schemes.
- Drew on the policy framework of fairness, simplicity, effectiveness, and feasibility to guide our assessment and understand trade-offs between different options.
- Use Agent Based Modelling (ABM) to assess the social and local economy benefits and disbenefits of a scheme.

[9] Minutes of Transport & Infrastructure Committee - Thursday, 16 November 2023

6. Policy framework

6.1. Policy framework

The primary objective for the current ToUC programme was endorsed by Auckland Council's Transport and Infrastructure Committee in June 2024:

To *manage travel demand to achieve an improvement in road network performance by:*

- *reducing congestion*
- *increasing throughput of people and goods*
- *improving reliability of the road network.*[10]

Supporting this primary objective is a wider policy framework developed by the ToUC programme. It includes policy principles along with the secondary outcomes that are expected to occur as the result of a scheme.

While the core objective of the scheme is to reduce congestion (be **effective**), the policy principles recognise that there are wider implications that occur when implementing a ToUC which need to be understood when implementing a successful scheme. The policy principles used in our study recognise that the introduction of a new charge has the potential to create **fairness** issues; the public should be able to understand the scheme (be **simple**); and a scheme should be easy to implement (be **feasible**).

The policy framework was informed by TCQ, international insights and current strategic direction from central and local government. It has formed the basis of the assessment in this study. *See appendix 1 for more information*.

Table 1: The policy framework

Primary Objective	The central goal that drives what we're trying to achieve	To manage travel demand to achieve an improvement in road network performance by: • Reducing congestion • Increasing throughput of people and goods • Improving reliability of the road network
Core Policy Principles	The critical success factors which will be fundamental to scheme design	1. **Effective**: Improve network performance. 2. **Fair**: Minimise and mitigate adverse social impacts and ensure benefits and costs are fairly distributed across users. 3. **Simple**: Be understandable and avoid complexity. 4. **Feasible:** Be practical, acceptable, and affordable.
Supporting Policy Principles	These will guide the development of the scheme design	1. Be flexible in time, location, and pricing to achieve target congestion levels. 2. Target travel in congested conditions. 3. Target locations and routes where users have viable alternatives and discourage lower value discretionary trips. 4. Vary for different vehicle types according to the contribution they make to congestion. 5. Improves accessibility for most people and most businesses. 6. Be technologically achievable, adaptable, cost effective, and efficient. 7. Avoid mitigations that undermine the efficacy of the scheme. 8. Support ability to spatially extend and modify the scheme. 9. Avoids unwanted consequences, e.g. significant fiscal costs for vulnerable communities, diversions, community severance.
Secondary Outcomes	There are not objectives being sought and do not shape scheme design but are expected to occur as a result of time of use charging. They will be tracked and measured.	1. Share of travel by public transport, walking, and cycling 2. Carbon emissions reduction 3. Net revenue 4. Improved air and water quality
Assessment Criteria	Provides a framework to consistently assess potions, aligned to the intent of the policy framework	

[10] Transport and Infrastructure Committee 6 June 2024 Meeting Minutes, Auckland Council

6.2. A time of use charging scheme is made up of a package of policies and solutions

A time of use charging scheme is more than just an access charge applied to a part of the transport network at certain times of the day. Looking across international schemes, it is clear that a ToUC scheme is a combination of elements that work together to maximise benefits and mitigate impacts. The key components of a scheme are:

1. **Charging location:** The choice of a charging location has a critical role in achieving the scheme objective of reducing congestion. It determines which parts of the region will be impacted, who will be charged, the types of trips that will be charged, and the scale of the impact.
2. **Charging tariff:** The tariff is a fundamental part of a scheme which alters travel patterns when traffic levels are high. How a tariff is applied is made up of different components – time of day, day of week, direction of travel and vehicle used.
3. **Complementary measures:** Refers to a wide range of possible interventions that may address impacts arising from a charging scheme or enhance its benefits. For example, additional public transport capacity to cater for travellers who switch to bus, train, or ferry.
4. **Mitigations:** Measures such as discounts, exemptions or charge credits which are typically deployed to support road users that are most negatively affected by the charge. Examples of potential target user groups include emergency services, the disabled population, and public buses.

A key insight from the AT and Auckland Council ToUC Programme so far is that, while these scheme elements work in concert, there is a hierarchy to them that supports maximising benefits and minimising impacts. The charging location and the tariff have the greatest impact on reducing congestion and mitigating disbenefits. For instance, a charging location that impacts fewer trips from low-income neighbourhoods will likely pose fewer fairness challenges than a location in a low-income outer suburban area with limited public transport services.

Residual impacts and further benefit enhancements are then addressed by complementary measures, with selective use of mitigations being the last resort to address these.

7. Scheme options

The scheme options considered in this study included three different scheme typologies:

- **Cordon Charge**: charges are payable when crossing a 'boundary' surrounding a defined geographical area. Cordon schemes typically apply to geographic areas which are home to certain attractors, for example a city centre area.
- **Area Charge:** all trips into, out of, through, or within the charged area incur the charge.
- **Link Charge:** Charges are payable for use of specific roads or road links on the road network (typically arterials or motorways) rather than extended areas.

The options themselves were based on TCQ's final option recommendation of a City Centre Cordon followed by the phased introduction of charges on strategic corridors. An additional option category was included in this study to consider existing Highly Congested Locations on the arterial and motorway networks. Analysis was undertaken to define this additional category of Highly Congested Locations to determine where pricing signals would be most appropriate. The criteria used to identify these locations included analysing traffic volumes, congestion levels, travel patterns (origin-destination assessment) and the availability of public transport alternatives. This analysis produced a category of scheme options which were taken through the assessment process.

Map 1: Indicative map of geographic areas covered by each option category

Based on the approach above, three option categories were considered in this study:

1. **City Centre Cordon (Green)**: Includes three sub-options which focus on Auckland's city centre and fringe. The scheme design charges vehicles to enter and exit the city centre area in the congested direction during peak periods.
2. **Strategic corridors – Inner Isthmus (Yellow)**: Includes three sub-options which focus on the Auckland inner isthmus. Includes area and cordon charge options.
3. **Highly Congested Locations (Purple)**: Includes five sub-options which focus on congested locations across the roading network. Some sub-options focus on the motorway network, others on arterial roads, and trips are generally charged in both directions. Includes extensive corridor charges and more targeted point charges.

These three categories therefore cover 11 sub-options, which included a range of scheme sizes, road types, and scheme types. For the purposes of this summary, we consolidated the results from these 11 sub-options into their three respective option categories. Detailed descriptions, maps and technical assessment of these sub-options can be found in section 4 of the 'Options Assessment and Policy Framework Report'[11].

[11] EY and Arup, 2024, Options Assessment and Policy Framework Report.

8. Evidence base – optioneering

This section outlines the impact of the broad categories of ToUC options considered in this work. It describes the changes in broad travel patterns arising from each option before considering congestion reduction and travel speed improvement benefits. Implications for fairness, simplicity, and feasibility are also outlined. It ends with emerging conclusions rather than recommendations, as more detailed assessment of the options remains to be completed.

8.1. Options assessment

8.1.1. Summary

The options were modelled and analysed using Auckland Forecasting Centre's (AFC's) Macro Strategic Model (MSM) to understand complex issues around traffic diversion, time-shifting, modal shift, as well as the impact these schemes could have on overall levels of congestion. The New Zealand Agent Based Model (ABM), co-developed by the Ministry of Transport and Arup, was used to understand social and economic impacts of the options.

Charges were applied during the AM and PM peak periods[12]. A flat nominal $3 charge[13], as assumed in TCQ, was applied in each option and each charging location. This approach sought to provide a basis for an initial shortlisting of options, whilst also learning about key charging characteristics using a consistent price. This means that the sub-options were not fully optimised for their locations and time of charging, so further performance improvements are likely to be achievable in forthcoming work. All schemes were modelled in 2026 with the City Rail Link assumed to be in place and operational.

The modelling results were assessed through a multi-criteria assessment framework, informed by the Policy Framework. We then compared the performance of the option categories and developed a range of emerging conclusions to be taken forward into the next stage of detailed assessment. See *appendix 2 – Method* for more information.

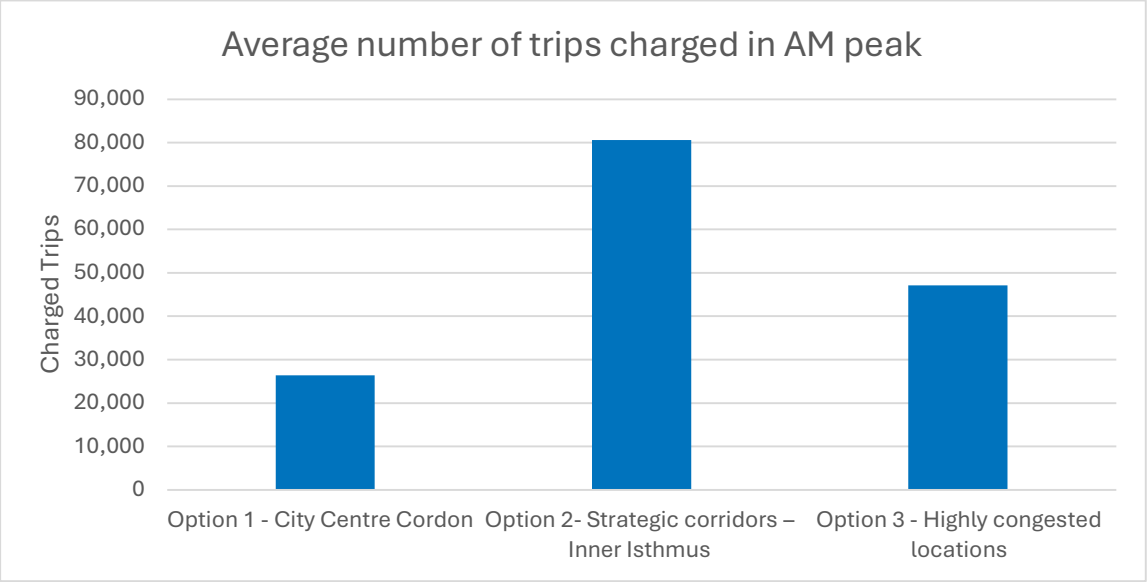
8.1.2. How many trips are charged?

The number of vehicle trips charged is a key indicator of the relative 'scale' of the scheme and the likely impact of a scheme option on Aucklanders. The number of vehicles charged is determined by the number of road links charged in each scheme along with the peak period traffic volume on those links.

- Across the sub-options we modelled, between 1 and 18 per cent of all morning peak period vehicle trips across the region were charged – with the wide range reflecting the breadth of options included in the assessment.
- The City Centre Cordon category charges an average of 26,000 trips, or 4 per cent of trips in the AM peak.
- The Strategic Corridors, Inner Isthmus area category charges an average of 80,000 trips, or 13 per cent of trips in the AM peak, reflecting the large number of medium volume routes charged within this category.

[12] The AM peak period runs from 7am-9am. The PM peak period runs from 4pm to 6pm.
[13] Note that the $3 is a nominal value within the MSM system and does not represent the 'real world' value.

- The Highly Congested Locations category charges an average of 47,000 trips, which is 8 per cent of trips in the AM peak. However, this varied between 2,000 trips for a link charge focused on central isthmus arterials and between 47,000 and 100,000 trips for motorway network options. The large number of trips charged for the motorway options reflects the high traffic volumes on the motorway network.



8.1.3. How do travel patterns change?

The application of a ToUC increases the fiscal costs of making a trip through the charged location during congested periods. Motorists can respond by re-timing their trip (shifting the trip to a time of day when the charge did not apply), changing transport mode (e.g. using public transport), re-routing their journey (e.g. diverting around the charged location), re-locating (i.e. changing their trip destination), trip-chaining (combining several activities into one trip) or not travelling at all[14]. The overall effect is generally to reduce vehicle volume at the charged location, as well as parts of the network approaching or departing from the location (although volumes may increase elsewhere).

Table 2: Overview of travel pattern changes across ToUC option categories

	Measure	Option 1 – City Centre Cordon	Option 2 – Strategic Corridors, Inner Isthmus	Option 3 – Highly Congested Locations
AM Peak	Vehicles that pay a charge (% of total regional trips)	18,980 to 30,651 (3% to 5%)	47,286 to 105,578 (8% to 18%)	2,190 to 100,024 (1% to 17%)
	Change in vehicle trips across region (%)	-3,631 to -6,215 (-1%)	-9,250 to -17,835 (-2 to -3%)	-3,271 to -8,166 (-1%)
	Public transport patronage change across region (%)	+2,351 to +3,082 (+2.2% to +2.9%)	+4,099 to +6,484 (+3.8% to +6.1%)	+577 to +2,954 (+0.5% to +2.8%)

[14] Due to modelling limitations, trip suppression and trip chaining were not considered in our study.

AM peak trip reduction

Around 610,000 vehicle trips are forecast for the two-hour morning peak in 2026.

- The options reduced regional vehicle trips by between 3,498 and 17,835 trips (less than 1 per cent to around 3 per cent of AM peak vehicle trips), recalling that between 1-18 per cent of vehicle trips were charged. (See table above).
- Critically, the schemes charging the highest number of vehicles did not always result in the largest reduction in overall peak-period demand.
- The cordon and area schemes focused on the city centre and inner isthmus had a similar ratio of peak period vehicle trip-reduction to number of vehicles charged.
- The Highly Congested Locations options typically saw relatively little peak period vehicle trip reduction for the number of vehicles charged.

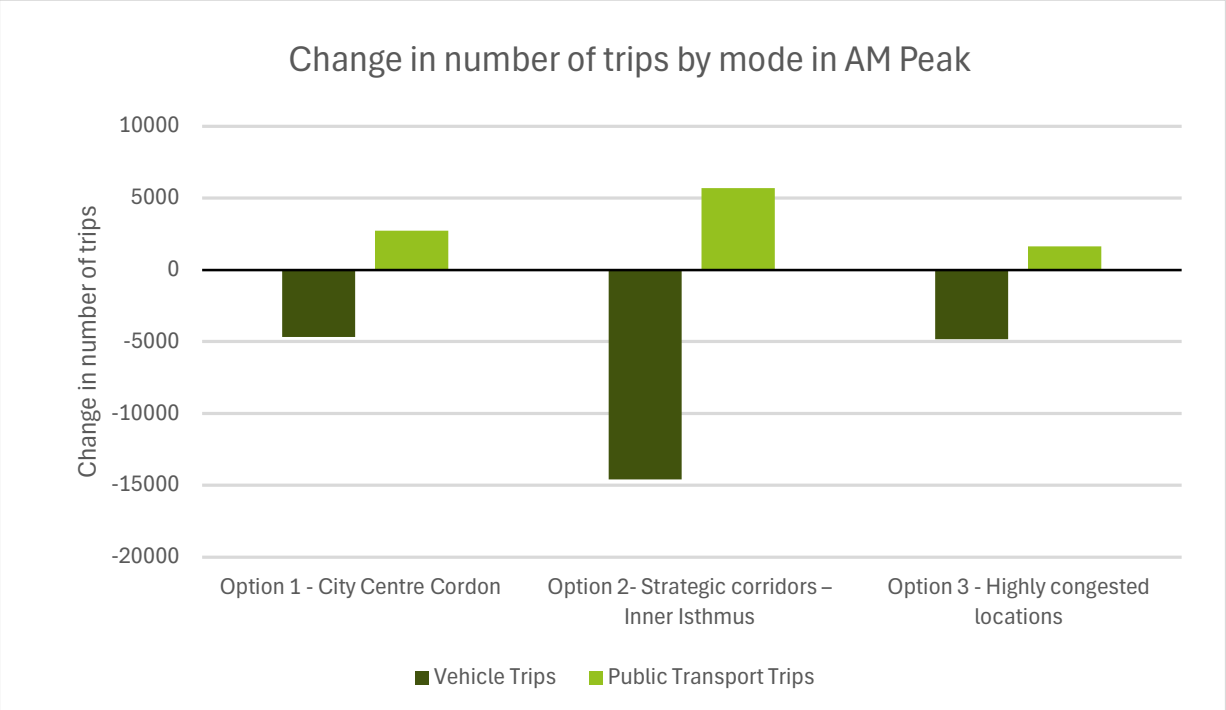
Change in mode

Mode shift to public transport is a desirable response to the introduction of a ToUC.

- Increases in morning peak public transport boardings ranged from 577 to 6,484, or a 0.5 per cent to 6.1 per cent increase in modelled patronage.
- The highest increases in public transport patronage relative to number of vehicle trips charged occurred for the City Centre Cordon options where the public transport network can best provide an attractive alternative to car travel.

If public transport alternatives are good, mode shift from car to public transport supports the decongestion benefits of a ToUC.

- Charging motorway locations away from the city centre tended to see a relatively small shift to public transport for the number of trips charged.



Re-route

All options produced some degree of re-routing, or 'diversion,' as a proportion of vehicle trips changed their route to avoid the charge.

Map 2: Shows diversion onto the uncharged arterial network and local roads when all motorways are charged. Light blue indicates reduced traffic volumes, and orange increased traffic volumes. The line weight indicates magnitude of change.

- The City Centre Cordon category saw a redistribution of trips around the boundary of the cordon, including on the inner motorway network. In some cases, this contributed to increased motorway congestion in the morning peak period.
- Charges that are more easily avoided (e.g. a point charge on the motorway) saw significant diversion onto alternative arterial routes to avoid the charge. This diversion is a combination of drivers staying on the local road network longer – e.g. going to the next on-ramp – to avoid the charge as much as drivers exiting and re-entering the motorway to avoid the charged location.
- Charging highly congested motorway sections with local road alternatives can cause significant traffic diversion and congestion. For instance, a point charge on SH1 in the North Shore was modelled to reduce traffic by 41 per cent but increased nearby arterial traffic by 23 per cent.
- Some vehicle trips will increase the distance and time spent travelling as they re-route to avoid a charge.
- When there is a charge on the motorway, diversion and congestion occurs on the local road network and vice versa.

Traffic that changes its route to avoid a charge can lead to new localised congestion, with the potential to create delays on bus routes.

8.1.4. Benefits

Three main metrics have been used to assess the benefits of the scheme options. These are: congestion reductions, vehicle speed improvements, and overall time savings. Changes in these metrics are not always consistent, so the three need to be considered together.

Congestion reduction

Across all the options investigated there was an overall regional congestion-reduction[15] benefit, when measured across both the morning and afternoon peak periods. In 2026, with no charge applied, 24.8% of vehicle kilometres travelled are forecast to be in congested conditions during the morning peak, and 29.6% in the afternoon peak. Results for the options categories are as follows:

- **City centre:** the distance travelled in congested conditions decreased by an average of 20,500 kilometres, or 0.8 per cent, during the morning peak and by 125,682 kilometres, or 5.9 per cent, in the afternoon peak.
- **Strategic Corridors, Inner Isthmus:** the distance travelled in congested conditions decreased by an average of 46,537 kilometres, or 1.9 per cent, during the morning peak and by 152,869 kilometres, or 6.8 per cent, in the afternoon peak.
- **Highly Congested Locations:** the distance travelled in congested conditions decreased by an average of 106,045 kilometres, or 6.1 per cent, during the morning peak and by 234,494 kilometres, or 11.4 per cent, in the afternoon peak.
- However, within these averages, some Highly Congested Locations sub-options slightly increased the amount of travel in congested conditions. This mostly occurred during the morning peak period when the diversion of traffic from the motorway system triggered congestion on high-volume links already approaching the congestion threshold.
- Despite these increases in congestion, all sub-options still delivered overall improvements in network speed and travel time savings.

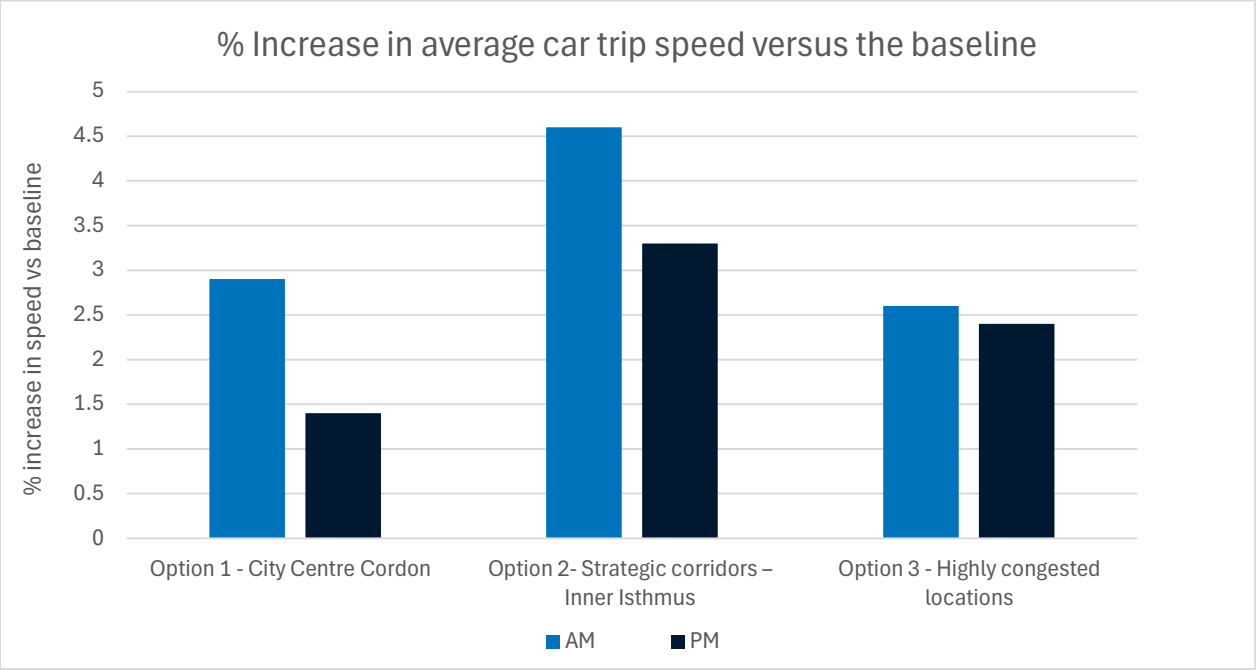
Vehicle speed

Along with changes in congestion, improvements in vehicle speed provide a key metric[16] for considering the impact of the scheme categories on vehicle travel.

- Across the scheme options, average AM peak regional speed improvements ranged from nothing to a 5.7 per cent improvement in average vehicle speed. Within this, the option categories saw average improvements as follows:
    - **City centre:** 2.9 per cent in the AM, 1.4 per cent in the PM
    - **Strategic Corridors, Inner Isthmus:** 4.7 per cent in the AM, 3.4 per cent in the PM
    - **Highly Congested Locations**: 2.6 per cent in the AM, 2.2 per cent in the PM

[15] Congestion is defined at Level of Service E and F. This represents travel times under a 'maximum sustainable flow' state of the network.

[16] Note that, in the context of a ToUC scheme, changes in speed will not result in 'induced demand' for additional vehicle trips as these are suppressed by the charge. There may, however, be increases in vehicle distance travelled due to traffic diversion or changes in the relative attractiveness of different locations.



- While speed increases in the order of 1 per cent to 5 per cent seem modest at first, it is worth recalling that these figures are averaged across the 610,000 AM peak period vehicle trips and the 652,000 PM peak period vehicle trips and disguise significant localised improvements in the charging area (discussed below).
- As a comparison to these speed improvements, travel speeds are forecast to decrease across the region between 2016 to 2051 by 6% in the morning peak and 14% in the afternoon peak *(see section 2)*.

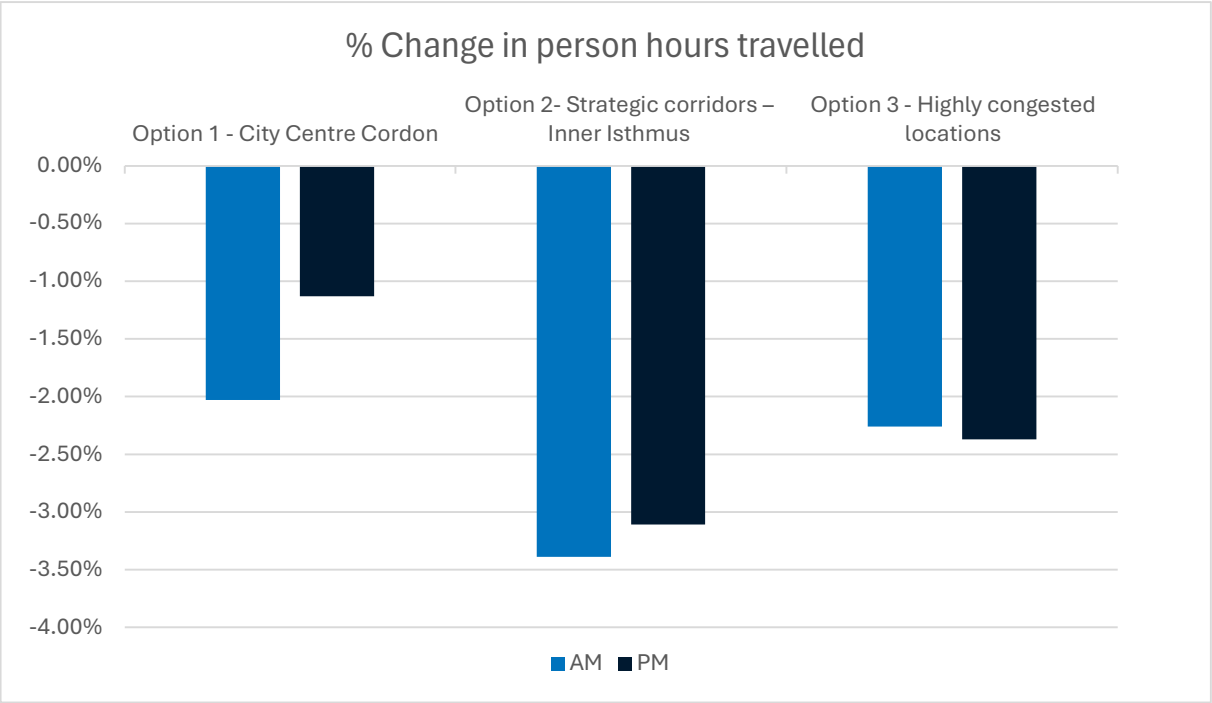
Overall person travel time reductions

The overall person[17] travel time reduction figure captures the net effect of the charging options on total region-wide person travel time during the peak periods. This includes the reductions in travel time experienced by people in vehicles and on public transport, the impact of retiming trips outside of the peak period and the increase in total public transport travel time arising from the trips that transfer from vehicles. Changes in the average trip length, which may reflect a change in route or destination, can also be an important factor.

- Total travel time changes for a typical morning peak period across all sub-options range between 607 hours and 13,266 hours (or 0.2 per cent and 4.3 per cent) and an increase of 446 hours to a reduction of 12,963 hours for the afternoon peak (a 0.2 per cent increase to a 4.7 per cent reduction). Averages for the scheme categories for the typical peak periods are as follows:
    - **City centre:** morning peak travel reduced by 6,295 hours or 2.0 per cent reduction and an afternoon peak reduction of 3,151 hours or 1.1 per cent.
    - **Strategic Corridors, Inner Isthmus:** morning peak travel reduced by 10,487 person hours or 3.4 per cent and afternoon peak reduced by 8,623 hours or 3.1 per cent.
    - **Highly Congested Locations:** morning peak travel reduced by 6,983 person hours or a 2.3 per cent and afternoon peak reduced by 6,555 hours or 2.4 per cent.

[17] Note that, in this case, person trips includes the passengers in vehicles along with public transport trips.

- The Strategic Corridors - Inner Isthmus category delivers the biggest total travel time reduction , likely as a result of its overall scale. However, the City Centre category performs well for its relative size.



- We have calculated the reduction in regional peak person-hours travelled per vehicle charged as a rough indicator of the time reduction relative to the scale of the scheme[18]. This is intended to compare between schemes, rather than reflect the impact of an individual scheme. Note that while TOUC schemes provide significant time savings to the vehicle charged, they also provide small savings to a large number of trips that do not pay the charge. Consequently, the reduction in travel time captured in this metric reflects all the changes across the network and will generally exceed the average saving to those vehicles paying the charge[19]. Average results per category are set out in Table 3.

Table 3: Average regional peak period time reduction per vehicle charged

Number of minutes saved (network wide) per vehicle charged	Option 1 – City Centre Cordon	Option 2 – Strategic Corridors, Inner Isthmus	Option 3 – Highly Congested Locations
AM	14.5	8.4	10.6
PM	6.9	6.5	4.6[20]
AM+PM	10.7	7.5	7.5

[18] This excludes cost variables, plus social and economic impacts.
[19] The figure is further exaggerated because the person hours metric includes vehicle passengers, not just vehicle trips.
[20] Note that the removal of the poorest performing sub-option in this category improves the average to 7.2 minutes

- On this metric, the City Centre category significantly outperforms the other categories. However, this reflects an average across sub-options. The figures are closer when considering the best performing sub-option in the other option categories.
- Overall, the percentage reduction in total travel time is less than the percentage increase in travel speed. More work is needed to understand this, but it is expected to reflect the additional travel time associated with those trips that shift from vehicle to public transport.

Localised impacts

To understand more localised congestion impacts, our study looked at congestion and time savings effects on roads in the immediate vicinity to a scheme as well as time savings for a series of generic trips in each of the charge categories.

Table 4: Example changes in vehicle trip times from charging options

Example vehicle trip	Time savings (minutes)			% Change in trip time		
	Option 1	Option 2	Option 3	Option 1	Option 2	Option 3
Airport to City Centre	-3.6	-2.6	-1.7	-9%	-7%	-4.7%
Silverdale to City Centre	-6.1	-7.5	-11.8	-10%	-12%	-23%
Westgate to City Centre	-6.9	-1.7	-5.6	-14%	-3%	-12%
Manukau to City Centre	-4	-2.2	-7.5	-9%	-5%	-19%
Howick to City Centre	-4.6	-4.2	-5.6	-8%	-7%	-10%
Mt Roskill to City Centre	-2	-4	0	-12%	-16%	0%
St Johns to St Lukes*	-0.5	-1	-1	-2%	-3%	-3%
Waterview to Manukau*	+0.6	+4	+2.7	2%	1%	8.7%

**These trips would not be expected to pay a charge.*

Localised time savings varied between options and routes, even with a consistent charge being applied in all options.

- Trips through charged links or areas generally receive significant savings. Trips just outside the charged area will also typically receive small savings, as in the example of the St Johns to St Lukes trip in the Table. However, some trips will also see increases in trip time due to diversion, as in the example of Waterview to Manukau.

All options have the potential to reduce regional congestion. Congestion relief is greater in the area around the charge.

- As a guide, the 27-kilometre Transmission Gully motorway, with an estimated cost of $1.25 billion was estimated to save 10 minutes from Kapiti to Wellington during the peak[21], while the five-kilometre Waterview connection motorway, with an estimated cost of $1.4 billion, was expected to save 15 minutes for a typical city centre to airport trip[22]. While expected time savings from the charging options are not of the same scale as these projects, the savings are likely to be spread more widely around the network.

8.1.5. Other impacts

Initial assessment has been undertaken on the impacts of a charge on people, the local economy, and the feasibility and simplicity of a ToUC. Further modelling and assessment will be required to fully understand and explain the impacts of a charge.

a. Impacts on people

Global benchmarking, MSM and agent-based modelling provided insights into how different groups would be affected by a charge, and the potential fairness implications of different schemes.

- Larger scale scheme options impact a greater number and broader cross-section of the community (including a greater number of lower-income people).
- Smaller scheme options have fewer impacts which might require mitigation.
- Highly congested location options that include motorways pick up trips from a wider area than the City Centre category. The motorway options charge a higher number of low-income people from across the city.
- Options which impact a greater number of geographically dispersed lower-income travellers will be harder to mitigate through improved public transport and are likely to impact perceived fairness of a scheme.
- In response to a charge, younger and older people are less likely to shift modes to public transport.
- The lowest proportion of Māori are charged under the City Centre option category. However, it is important that further analysis be carried out to better understand the impact on Māori.
- The proportion of charged trips by gender is similar across all options.
- Rat-running and diversionary traffic has the potential to create negative safety, and amenity impacts on residents.

It is likely to be more straightforward to mitigate the impacts for low-income groups under the city centre focused options.

b. Impacts on the local economy

Different schemes capture different trip types. Large scale schemes capture a wider range of trips, including more shopping trips, whereas city centre focused schemes capture more commuting and business trips.

[21] Other savings were 15 minutes from Kapiti to the Hutt Valley and 7 minutes from Porirua to the Hutt Valley https://www.nzta.govt.nz/projects/wellington-northern-corridor/transmission-gully-motorway/
[22] https://www.nzta.govt.nz/assets/projects/waterviewconnection/docs/info-sheet-waterview-connection-motorway.pdf

- In general, larger schemes impact the greatest number of businesses, including nationally significant goods and logistics routes.
- A significant majority of trips being charged in all scenarios are commuting, business or freight trips. This is particularly true for the City Centre Cordon category where these trip types are approximately 70 per cent of all charged trips.
- Many more shopping trips are charged under the Highly Congested Locations options than the City Centre options.
- Some options may create distortions within local economies – with potential hyper-local impacts as customers may switch from one small business to another because of the location of the charge.
- There are significant potential journey time benefits under all schemes for business trips. These benefits are greater for schemes that capture a large extent of the motorway network.
- There is a potential minor reduction in business trips into key destinations. However, this needs further analysis, particularly when considering the City Centre options.
- Freight journeys are faster under all options except one highly congestion location sub-option, where significant diversionary impacts are observed.

8.1.6. Simplicity

This assessment considered the complexity of scheme boundaries, the tariff, likely trip frequency across charge areas and how these factors influence public understanding and user experience of a scheme.

- Schemes that covered one road type or a well-defined geographical area were considered simpler to understand.
- Schemes that charge areas or roads which are not aligned with an established boundary or congestion hot spot were assessed as being more complex. It would be a challenge to articulate a clear rationale for why certain roads had been selected for a charge.

8.1.7. Feasibility – practicality, public acceptability and affordability

This assessment drew on stakeholder feedback, global benchmarking of scheme implementation and operation, and a high-level consideration of costs. The costs were considered at a very high level (capital costs, revenue, operations and maintenance) and enable comparison across the options, not a baseline cost.

- All options assessed would be technically and financially feasible over time, however complexity and cost increase as scheme scale increases.
- Options with greater amounts of physical infrastructure are costlier to implement, and less flexible, especially the option 2 category.
- Options which impact more people and are further from the city centre trigger concerns around access to good public transport alternatives
- Early feedback from Local Boards highlighted key concerns around equity, safety, and access to public transport. Options which impact more people, have a disproportionate impact on lower-income groups, create significant diversionary impacts, or are hard to complement through public transport are likely to create a greater challenging in gaining public acceptability.

- Articulating a clear rationale for who is impacted, and why, is critical for securing public acceptability.

8.1.8. Insights

Our assessment identified aspects of scheme design that may or may not work in Auckland. We gained insights into the trade-offs and further work that needs to be considered in progressing ToUC in Auckland.

During our study, some options were deprioritised from further assessment as the number of challenges they presented were considered impractical to mitigate. For example, options with significant diversion issues, and those likely to have social licence and fairness challenges.

a. All options reduce congestion and improve travel times

Virtually all options provided reduced overall congestion and improved travel times, with an average saving of 11,000 hours per day across Auckland. These improvements are strategically significant and comparable to the impact of very large roading or public transport projects.

b. Results are location specific

Reductions in regional vehicle demand were not determined by the scale of the option (number of vehicles charged) alone. Other variables - such as the availability of public transport alternatives, the ease of diverting around the charged location and the change in overall travel costs - also have an important impact.

For example, options in the Highly Congested Locations category which charged large numbers of vehicles saw relatively little peak period vehicle trip reduction and a relatively minor shift to public transport, especially when compared to smaller scale options. However, they still achieved significant time savings – likely from re-routing or diversion rather than re-timing or mode change.

The congestion reduction benefits also varied by location, suggesting that different charge levels will be needed if the goal is to achieve consistent traffic reduction across the network. This could however reduce the simplicity of a scheme.

Overall, changes in speed and travel time will reflect a complex interplay between the routes where vehicle trip reduction is occurring, the initial volumes and level of congestion on those routes and the diversion impacts onto other parts of the network or other modes. There does not appear to be a strong alignment between the average change in congestion and the average improvement in travel speed.

c. Scale and complexity

Notwithstanding the above, greater decongestion benefits generally require larger schemes, both geographically and in the number of trips charged. This results in greater impacts on people, businesses, and social licence.

With more people affected by a charge, larger schemes are likely to require more complementary measures such as improved public transport and mitigations which is likely to raise complexity and fairness issues. This was a factor in deprioritising the biggest schemes that charged a significant numbers of trips.

d. Smaller scale schemes

Smaller scale city centre-focused schemes deliver smaller absolute congestion benefits but tend to be more efficient with slightly higher travel time savings per vehicle charged. This likely reflects better public transport alternatives. The economic impact of city centre focused schemes needs further assessment.

e. Public transport

Limited mode shift to public transport occurs when charging outside the city centre. This reflects more complex trip patterns and less competitive public transport alternatives in these areas.

Having viable public transport alternatives to paying for the charge was a common piece of feedback from stakeholders and the community.

f. Diversion

Impacts of diversion were common across most options. Diversion does create new areas of congestion or worsens existing congestion. However, results show that virtually all options still delivered material speed improvements and time savings. Further work is needed to assess opportunities to minimise diversion when optimising options.

Key insights about diversion are:

- An integrated approach, charging both the state highway and local road networks, is likely to reduce diversion
- A charge area which cannot be avoided (e.g. a City Centre Cordon or a point charge at geographic pinch points) reduces diversion
- Traffic diverting from motorways onto local roads could increase localised congestion and have negative impacts on safety, amenity and public transportation reliability. But traffic diverting from local roads onto motorways can impact substantial trip volumes.

g. Start small?

There is a potential case for starting off with a small scheme first to prove the concept of a time of use charge. This would potentially build public support for expanding the scheme once the benefits become evident.

8.1.9. Stakeholder views

Stakeholders discussed how options design could mitigate against the negative impacts of a scheme. There were varying views on the optimal size for a ToUC scheme for Auckland.

a. Local boards

- A clear plan needs to be in place to ensure that traffic is not diverted off state highways and arterials impacting residential roads, and roads around schools, which could impact on traffic flow and community safety.
- A scheme needs to take into consideration those communities who have little or no transport choices.
- A scheme should only start in areas of Auckland where transport options are more readily available, with a phased roll out into other areas in conjunction with increased public transport options to enable a smoother transition.

b. Mana whenua

- Scheme must be designed so it does not shift traffic onto local roads, especially quiet streets.
- Highlighted the over-representation of Māori in road-related DSIs.

c. Stakeholder reference group

- A scheme needs to impact different competitor business districts equally. For example, equal impact on both Newmarket and Sylvia Park, rather than one benefitting from a scheme over the other.
- Balance is needed to ensure the city centre remains an attractive, vibrant economic hub.
- Keen to understand the impacts on the freight industry who travel across the day.

d. Citizens panel

- The initial size/boundary of the scheme should be big enough to make a network-wide impact but avoid being too complex.

9. Evidence base – wider policy and technology

This section presents the evidence base across the following workstreams:

- Mitigation measures
- Complementary measures
- Pricing and revenue policy
- Technology

Each workstream includes what we observed, the insights we gained, stakeholder views and recommended settings for a successful scheme in Auckland (Section 10). *See appendix 2 for the assessment method of these policy areas*.

Further work is required on the wider policy and technology workstreams, to reflect the specific characteristics of a charging area.

9.1. Mitigations measures

9.1.1. Summary

Mitigation measures are targeted interventions designed to alleviate the financial or negative social impacts of ToUC on specific user groups. The charging location and tariff are strong levers that can be used to minimise undesirable social impacts of a scheme. However, with the introduction of a new charge, residual impacts are likely to remain, and mitigations are a tool that can be used to address these.

All international schemes reviewed exempt emergency vehicles from ToUC and provide further mitigations to other road users of varying extents.

Mitigations are an important part of the social licence of a scheme. However, too many mitigation measures can reduce the benefits of the scheme and raise issues of fairness, for example determining which user groups it applies to, and can create administrative complexity and costs.

Careful assessment is necessary to ensure that any mitigation measures implemented do not undermine the objectives of the scheme. This assessment should be consistent with a scheme's overarching policy intent. Ideally the government should use the welfare tools at their disposal to mitigate impacts on vulnerable communities. If impacts remain, then keeping the number and extent of mitigations minimal is necessary to meet the policy framework of effective, fair, simple and feasible.

9.1.2. Findings

International schemes use a range of different mitigation approaches to support various user groups. S*ee Appendix 5 for detailed on mitigation measures in overseas schemes*. Examples of common approaches to mitigation used internationally are as follows:

Table 5: Summary of mitigation and exemptions policies internationally

London *(many exemptions)*	**Exempt:** Emergency vehicles, buses, motorcycles, mopeds, taxis, nationally significant vehicles. Some exemptions for disabled people.
	Not exempt: Low-income people.
Stockholm	**Exempt:** Emergency vehicles, buses, motorcycles, mopeds, some specific through traffic with no alternate route. Freight is exempt during off peak hours.
	Not exempt: Disabled people, residents, or low-income people.
Singapore *(fewer exemptions)*	**Exempt:** Emergency vehicles. Freight is exempt under specific conditions.
	Not exempt: Buses, disabled people, motorcycles/mopeds, residents, or low-income people.

The combination of mitigation measures used by each scheme reflects its strategic objectives and specific localised economic, environmental, regulatory, and social circumstances.

Over time, overseas ToUC schemes have often changed their approach to mitigation measures. This reflects changes in user travel patterns, and changes in the scheme's operational design or strategic objectives. For example, Singapore narrowed its approach to exemptions when shifting from an area licensing scheme to an electronic road pricing scheme in the 1990s. Since 2025, the London Congestion Cordon Zone no longer has exemptions for electric vehicles.

Mitigations can create a high administrative burden and reduce the effectiveness of a scheme. In the case of London, there are over twenty mitigation measures that need to be administered and enforced. It also means that 30-40 per cent of all vehicles entering the Congestion Cordon Zone receive a discount, exemption, or rebate. This would have put upward pressure on the charge for the remaining traffic and reduce the overall effectiveness of the scheme.

The feasibility of implementing exemptions must be considered. Our study showed that exemptions need to target user groups that can reasonably and reliably be linked to vehicle licence plates. Mitigations linked to the user of a vehicle (e.g. a low-income person) rather than the vehicle itself (an ambulance) are less straightforward to implement and more likely to lead to fraud.

Some targeted mitigations may be warranted but must be carefully considered to balance scheme effectiveness, fairness, simplicity and feasibility.

Initial desktop assessment using the Auckland ToUC policy framework, suggests mitigations be provided in in limited circumstances, linked explicitly to local scheme needs and local scheme design, to address public concerns about significant cost or fairness issues for vulnerable groups. This must not materially reduce the effectiveness of the scheme. Our study showed that there may be a case for mitigations in Auckland for emergency vehicles, some disabled user groups, and subsidised bus services. This needs to be further explored as part of next steps of detailed options assessment and public engagement.

9.1.3. Stakeholder views

There was support from stakeholders to provide mitigations to vulnerable road users or at least to explore the need and benefits for providing these, particularly for disabled people and those least able to pay.

- **Local boards:** Support discounts, exemptions, and/or rebates for specific vulnerable user groups such as low-income families, and people with disabilities who cannot use public transport.
- **Mana whenua:** Support further work to consider potential financial impacts that may limit access to sites of significance.
- **Citizens panel:** Any mitigation measures should be applied on a very limited basis, e.g. socioeconomically disadvantaged people and/or mobility challenged people. Where possible this support should be administered through other appropriate agencies such as the Ministry of Social Development and the welfare system.
- **Stakeholder reference panel:** Had mixed views on mitigation measures; they noted the need to consider disabled people who cannot use public transport.

9.2. Complementary measures

9.2.1. Summary

Complementary measures are used to both address any impacts that arise from the introduction of a charge (e.g. traffic calming measures to mitigate rat-running) and enhance the benefits of a scheme (e.g. providing increased public transport capacity).

Complementary measures are used in all international schemes. They demonstrate how the revenue raised is reinvested into the local transport network and are an important part of achieving social licence.

A broad range of complementary measures are used overseas, reflecting local objectives and what is needed to achieve public acceptability for a scheme.

Our assessment indicates that a hierarchy of complementary measures would be required to support a scheme in Auckland. When the options assessment is further refined, more detailed work on suitable complementary measures to support schemes can be completed.

9.2.2. Findings

Overseas jurisdictions use several different complementary measures to support their ToUC schemes. These include the enhancement of public transport services and active mode networks, the construction of additional park and ride facilities, changes to road space prioritisation, and network optimisation. *See Appendix 4 for further details of complementary measures used by overseas schemes.*

Some complementary measures are critical for day one to support forecasted mode shift. For example, prior to the rollout of their ToUC scheme, London invested in 300 new buses, along with new bus routes, and increased frequencies, while Stockholm invested in 200 additional buses, 16 new bus lines, and expanded existing services.

Overseas schemes show that complementary measures are in place at the launch of a scheme and evolve over time. Since the introduction of the Congestion Cordon Zone, London has invested in

temporary and permanent reprioritisation of road space through pedestrianisation and restricted vehicle access at specific times of the day. In Milan, removing carparks has created more space for mobility services to provide users with hubs to access electric scooters, bikes, and cars.

This study did a desk-based assessment of complementary measures in place overseas. The assessment looked at the impacts of the different option categories to understand what complementary measures would be necessary and beneficial in Auckland. The complementary measures considered were:

- Public transport
- Network optimisation
- Road space prioritisation
- Kerb zone management
- Active transport
- Park and ride
- Parking management

Having complementary measures aligned to existing transport strategy ensures that a ToUC supports and is well integrated into the wider transport network.

Our study determined that there is a hierarchy of complementary measures. First order 'essential' complementary measures are those interventions that are needed on day one of any scheme. These measures are needed to accommodate or mitigate the impact of changes in travel behaviour resulting from the scheme – such as an increase in patronage on specific bus routes that require more capacity. They are an integral part of the scheme and should be regarded as a core cost, and hence a first call on scheme revenue.

Meanwhile, 'enhancing' complementary measures, improve the benefits of a scheme and build social licence for the scheme, but are not essential to the smooth running of a scheme. This could include public transport that provides new travel choices to those affected by a charge and enhances congestion reduction benefits.

The type of complementary measures that could be rolled out in Auckland is largely dependent on the specifics of the final scheme. Our option assessment has shown that for Auckland:

- City Centre Cordon scheme options are easier to complement with improved public transport alternatives, as those affected by the charge are traveling to/from a single destination.
- Motorway/arterial options are more challenging to complement with competitive public transport alternatives, as trips affected by the charge are more dispersed and complex.
- The use of road space prioritisation can help to address localised effects such as rat running through suburban streets.
- Network optimisation can enhance benefits for all options. For example, rolling out the Auckland Network Optimisation Programme, on a quicker delivery timetable, could have a significant impact across all scheme options, without needing to make large-scale investment into new transport infrastructure.

It will be harder to provide public transport improvements as a complementary measure for schemes covering large areas and motorways.

9.2.3. Stakeholder views

Overall, stakeholders support rolling out complementary measures, particularly public transport, to provide accessible and reliable alternative transport options to paying the charge.

- **Local boards:** Support greater investment into public transport to improve journey times, reliability, and affordability as well as further investment into active modes for improved connectivity. They also support prioritising network optimisation projects and improved connections between local areas.
- **Mana whenua:** Support investment into active modes and improvements to existing transport infrastructure before implementing the scheme.
- **Citizens panel:** Investment into improving the transport system is critical for scheme social licence. The Panel emphasised the need for investment into improving public transport services.
- **Stakeholder reference panel:** Need for reasonable travel alternatives to be available and improve equity of access to public transport.

9.3. Pricing and revenue policy

9.3.1. Summary

Pricing and revenue are critical components of scheme design.

ToUC schemes reduce congestion by pricing the use of roads encouraging travellers to change modes, routes, destinations and times. The tariff of a ToUC scheme is made up of different factors - time of day, day of week, direction of travel and the type of vehicle used. Most international schemes charge variable rates across much of the day, not just at peak hours – reducing traffic at busier times and avoiding pushing congestion into the shoulder periods.

How revenue is allocated is critical to building the social licence of a scheme. Our study shows that all essential costs of a scheme should be paid for by scheme revenue, before the balance of revenue is calculated. The balance of revenue should then be allocated to projects and services that enhance the scheme by benefitting those impacted by the charge.

9.3.2. Findings

- International schemes take different approaches to pricing, reflecting the local context and objectives:
    - London has an area charge and has a flat rate of £15 (NZ$34) for day. This has increased from £5 (NZ$11) in 2003. Price increases for entering the Congestion Cordon Zone occurred in 2005, 2011, 2014 and 2020. The level of pricing is reflective of the scheme' objectives to reduce congestion and invest in public transport and active modes as well as the large number of users who receive discounts or exemptions.
    - Singapore is a point charge and has a highly variable pricing schedule across the day for different routes. Singapore reviews the pricing regime every 3 months to ensure the variable prices are meeting the strategic objectives of the scheme.
    - Stockholm is a cordon charge that has 11 different prices by time of day. These range between 15 SEK (NZ$2.35) to 35 SEK (NZ$5.50).

- Modelling shows that in Auckland, the change in travel patterns from the same charge varies from place to place. Consequently, achieving the same congestion reduction result across different parts of the network is likely to require different prices.
- Keeping the tariff to a minimal level is consistent with the approach that a ToUC scheme in Auckland is about improving network productivity, not about raising additional revenue. International experience shows that any revenue that is raised from a scheme is used to fund:
    - Administrative/capital/operational costs of their schemes first (e.g. back-office support)
    - Complementary measures (e.g. public transport, network optimisation)
    - Mitigation measures (discounts, exemptions, and rebates).
    - Other transport projects within the area to further the scheme objectives.

A ToUC scheme in Auckland is about improving network productivity. Its purpose is not to raise revenue.

- It is critical to get the pricing and revenue settings correct to maintain public support for a ToUC scheme. Internationally, schemes have failed or faltered after they were perceived to be unfair or revenue raising, for example the case of the scrapped scheme in Cambridge, UK[23].

9.3.3. Stakeholder views

Overall, stakeholders support a fair and minimal tariff that would deliver the objectives of the scheme. Widespread feedback that any revenue from ToUC should be reinvested into public and local transport improvements.

- **Local boards:** Support the tariff being fair and minimal with a simple pricing structure. Transparency is needed on how the revenue is spent, with a focus needed on public transport improvements.
- **Mana whenua:** The tariff needs to be fair and minimal to support congestion reduction. The tariff should minimise community severance and enable Māori to access sites of significance. It is important that the scheme is not seen to be a revenue gathering tool.
- **Citizens panel:** The tariff needs to be fair, minimal, and simple to support congestion reduction, avoiding "mission creep" e.g. use tariffs to raise revenue. Revenue should be managed and administered by Auckland local government and ring-fenced for Auckland, to improve accessible transport options, including public transport.
- **Stakeholder reference panel:** Alignment between central and local government on pricing policy/objectives and how revenue is spent is essential.

9.4. Technology

9.4.1. Summary

A technology solution for a ToUC scheme is made up of four components. AT studied each component to progress towards preferred solutions for each:

[23] Time of Use series | WSP

- **Roadside assets:** The infrastructure required on the road network to detect, identify, classify, and enforce vehicles traveling in the charging scheme area.
- **Vehicle identification:** Visual sensing devices such as CCTVs or cameras to obtain the vehicle number plates, using systems such as Automatic Number Plate Recognition (ANPR).
- **Back-office system (BOS):** The system to make a tariff policy operable by managing transaction and image processing, the charge rating, exemptions, action list processing.
- **User account management:** The presentation of user data is the place where customers can easily interact with their charge account via their smartphone, computer, or call centre.

9.4.2. Method

Third party due diligence was completed on AT's existing technologies to determine their suitability to perform the functions of a ToUC scheme. Our study drew upon a technical trial conducted in 2022. The purpose of this trial was to evaluate whether an appropriate supplier and AT Park could manage a ToUC by incorporating an additional Area ID within AT Park to function as the charge cordon. AT's technology team also met with global counterparts to understand technical considerations of a ToUC scheme implementation.

9.4.3. Findings

Through AT's 2022 trial, we learnt that the use of gantries is the preferred installation method to optimise number plate recognition and enable easy maintenance.

Through our research internationally we heard that a secondary analytics engine, a software tool that helps process and analyse large data sets, has been adopted by schemes overseas. This improves the automation rates of Optical Character Recognition (OCR) of number plates read to minimise the level of manual image review. AT note that there are software solutions available on the New Zealand market which may be suitable for Auckland.

Four options were considered for the ownership and operation of the technology solution, including the BOS and user account management. Two focused on an Auckland solution and two on a national solution. Two options were identified as preferable: depending on national legislation:

- **Option 1 - Legislation allows model to be owned/operated by Auckland:** AT would install, own, and maintain roadside assets and use an appropriate supplier for Vehicle Identification. AT would go to market for the BOS and User Account Management components. AT are highly experienced with installing and maintaining roadside assets. There are appropriate suppliers with proven capability in ANPR technology in New Zealand. More research will be needed into the market offering for a BOS. Consideration would be needed for future integration into a national platform.
- **Option 2 - Legislation requires the scheme to be owned/operated by central government:** The scheme would be fully implemented and operated by NZTA, including all roadside assets. This option would incur no future costs to integrate to a national platform. It is assumed that the BOS provider procured by NZTA would have proven ToUC experience expediting implementation in Auckland and would provide reliable support. It may require a longer implementation period, due to the requirement to consult with all regions.

These options will need to be reconsidered in light of final legislation.

10. Summary of key settings

The key settings seem as needed for a successful ToUC in Auckland are summarised below. We will need to revisit these settings once the legislation has been finalised.

10.1. Charging location

a. A successful ToUC in Auckland is likely to be made up of the following network characteristics:
   - Targets/impacts an area that has congestion.
   - Is an area that is difficult to avoid.
   - Has good public transport alternatives for those that would otherwise pay the charge.

10.2. Pricing

a. Specific price will need to reflect different factors - time of day, day of week, direction of travel, vehicle used and location.

b. The approach to pricing requires flexibility to reflect dynamic travel patterns and the local context.

10.3. Mitigation measures

c. In the first instance, the government should ideally use the welfare tools at their disposal to mitigate impacts on vulnerable communities. However, it will be prudent for ToUC legislation to provide for mitigations in limited circumstances, to address public concerns about significant cost or fairness issues for vulnerable groups.

d. Mitigations, if used, need to be tailored to specific local circumstances and should be able to evolve over time. Legislation should provide flexibility for a locally responsive approach aligned to the local policy framework, rather than prescribing a national approach.

e. To manage the issues that come with mitigations, any mitigation should be subject to assessment against the scheme policy framework: effectiveness, fairness, simplicity and feasibility.

f. To preserve scheme effectiveness, if mitigations are used, the number of exempted user groups will need to remain small.

g. Initial assessment suggests there may be a case for mitigations in Auckland for emergency vehicles, some disabled user groups, and subsidised bus services.

10.4. Complementary measures

a. Complementary measures are a necessary component of an Auckland ToUC scheme. They will benefit communities, and they are critical in securing social licence for a scheme.

b. Complementary measures should align with Auckland's existing strategic direction for transport.

c. There are two types of complementary measures:
   - essential complementary measures address the impacts of the scheme (e.g. sufficient public transport services to provide for mode shift or, reduce diversion impacts). These are integral to a scheme and are a core scheme cost.
   - enhancing complementary measures reduce congestion or deliver benefits for those impacted by a charge.

10.5. Revenue

a. The primary objective of ToUC is to improve network performance, rather than raise additional funds from road users. A tariff or "price" should be set at the minimum level needed to achieve the network performance objectives.
b. Revenue from a scheme should pay for all essentials scheme costs first. Scheme costs include establishment, administrative and capital costs and essential complementary measures.
c. To support the best overall scheme outcome, the balance of revenue should be allocated to projects and services that enhance the scheme by benefitting those impacted by the charge and, are consistent with regional plans.

10.6. Technology

a. Legislation and/or national frameworks should define which components within the technical platform are to be nationally mandated (components being road assets, vehicle trip detection, back-office system, and customer portal).
b. The customer portal component should be a single solution at a national level encompassing all regional ToUC schemes and other road tolling schemes. This will improve customer convenience and uptake of the solution.
c. Where components are nationally mandated, value for money must be prioritised for the benefit of shareholders and the public (e.g. robust procurement processes).
    - Components should be designed for easy upgrade as new technology evolves.
    - A ToUC platform (e.g. software maintenance and customer service, required to run the platform on an ongoing basis) must be run as efficiently as possible.
d. Other components (i.e. roadside assets, vehicle trip detection, back-office system) should be assessed on a regional basis. Local schemes should be given the flexibility to adopt the most appropriate solution for other components that meet their requirements (e.g. ability to meet timelines). This will allow competition between technology providers and reduce monopoly risks.

10.7. Comms & engagement

a. Consistent and sustained communications and engagement are recommended through the development/design phase to achieve social licence, and public acceptance of ToUC.
b. Engagement activities should be undertaken by the local authority on behalf of the design partnership.
c. In addition to statutory consultation obligations outlined in legislation, the design partnership will also consider obligations and expectations from local government elected members related to engagement.

11. Further work

Our assessment shows that there is potential for a successful scheme in Auckland, although challenges remain that will need to be addressed. Managing a network that is already under significant pressure during peak periods remains difficult, and time of use charging alone will not solve all congestion issues.

This study is not a comprehensive evaluation of what a successful ToUC scheme in Auckland would look like. It has identified key areas that require further investigation, including:

- Work on optimal pricing levels to achieve the desired network performance level.
- For motorway-based schemes, a comprehensive review of diversionary impacts to understand the degree to which they could be mitigated and the resulting impact on the options' effectiveness.
- For central city-based options, a deeper understanding of the effects of a scheme on the city centre and its local economic "competitor areas" and the influence that time and price level of a charge has on discretionary trips.
- Work on how additional complementary public transport services could achieve more mode shift, especially outside the city centre.

In addition, optimised options will require detailed mana whenua, social and local economic impact assessments.

The various policy areas will be further developed once legislation for ToUC in New Zealand is known, and with a clearer understanding of a preferred charging area.

NOTE: THIS REPORT PRESENTS INTERIM OPTION ASSESSMENT RESULTS AND POLICY FINDINGS. THESE ARE NOT FINAL. THE ASSESSMENT OF SCHEME OPTIONS AND POLICY POSITIONS IS ONGOING AND WILL RESULT IN AMENDMENTS GOING FORWARD.

Appendix 1: Assessment framework

The assessment framework sits under the policy framework. It was used principally in the optioneering process to understand the benefits, impacts and challenges associated with each option and remains consistent across all stages of the optioneering process. The content of the framework was largely sourced from TCQ.

As there will be increasing levels of analysis and a more detailed understanding of impacts in later stages of the optioneering process, the specific measures used to evaluate criteria in the framework are expected to evolve, while continuing to be used to evaluate a consistent set of criteria and objectives.

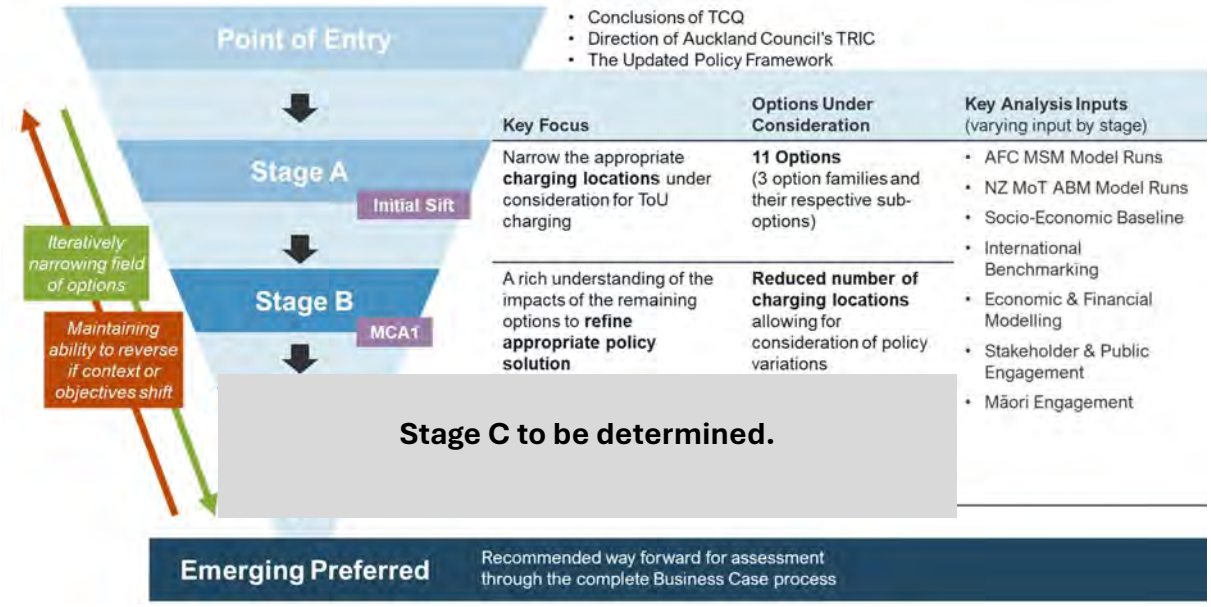
The ToUC options assessment framework is shown below, and includes direct references back to the primary objective, secondary outcomes, and core principles established in the AT ToUC policy framework.

Primary Objective (1)	Core Principles (4)	Assessment Areas (10)	Criteria (26)	Metrics
To **manage travel demand to achieve an improvement in road network performance** by: • reducing congestion • increasing throughput of people and goods • improving reliability of the road network.	**Effective**	Network Assessment (Local and City-wide)	Congestion & Reliability Accessibility & Productivity Through-put	Appropriate metrics to be defined for each stage of assessment including a mix of: • Quantitative, • Qualitative and, • Monetised.
	Fair	Social & Distributional Assessment	Equity Distribution of Impacts Mana Whenua Assessment Safety	
		Local Economy Assessment	Local Economy Performance & Prosperity	
	Simple	User Experience & Understanding Assessment	Public Interpretability & Understanding User Experience	
	Feasible	Practicality Assessment	Flexibility Privacy Enforcement Deliverability	
		Social License Risk Assessment	Stakeholder Perspectives Public Perspectives Political Perspectives	
		Affordability Assessment	Capital Costs Lifecycle Costs & Revenue	
Secondary Outcomes These are not objectives being sought and do not shape scheme design but are expected to occur as a result of time of use charging. They will be tracked and measured.		Environmental Assessment	Greenhouse Gas Emissions Local Pollution (e.g. air & water)	
		Sustainable Travel Assessment	Public Transport Usage Active Travel Usage Available Revenue for Investment	
		Wider Economic Impacts	Agglomeration Move to more productive jobs	

Appendix 2: Method

Optioneering

To advance the ToUC programme towards implementation, a three-stage optioneering process was established. This process guided the development and assessment of options from the point of entry through to a focused shortlist and emerging preferred option that will be subject to a complete business case analysis. The three-stage optioneering approach is summarised below.



The approach allows for increasing levels of analysis on a narrowing field of options, with early sifting stages to ensure that modelling analysis and effort is focused on pursuing, interrogating, and understanding options that are most likely to be viable. It is also inherent to the options process that while options may be deprioritised, it remains possible to restore options.

The three option categories were taken through Stage A and partially through Stage B. This included network assessment, social assessment, local economy assessment, stakeholder engagements and analysis against international evidence. This allowed the implications and trade-offs between a wide range of strategic options to be considered. Advancing from stage A to stage B, we reduced the number of options under assessment. Options excluded were selected on the basis that they presented fundamental problems or "red flags."

The option categories were modelled and analysed using Auckland Forecasting Centre's (AFC's) Macro Strategic Model (MSM) to understand complex issues around traffic diversion, time-shifting, modal shift, as well as the impact these schemes could have on overall levels of congestion. The modelling input assumptions included the following:

- Morning peak charge: 7am – 9am. Afternoon peak charge: 4pm-6pm
- Charge price: $3.10
- Transport network projected out to 2026, includes a completed CRL
- Public transport running as 'uncrowded', i.e. no capacity constraints on public transport

We used an Agent-Based Model (ABM) for Auckland to derive more detailed insights into potential impacts on people across diverse demographic segments. Further work will be required to complete

the remaining areas of assessment for all options, to enable progression towards Stage C and subsequently the identification of an emerging preferred option.

Wider Policy - *Complementary measures, mitigations, pricing and revenue policy*

We followed a four-step qualitative method to assess complementary measures, mitigations, pricing and revenue policy and establish the wider policy direction for Auckland. The below is an overview of the method:

Step 1: TCQ	Review of TCQ as the Point of Entry.
Step 2: Global Scan	Scan ToUC schemes to understand what has been deployed globally
Step 3: What does this mean for Auckland?	Review of local strategic direction and context, using global benchmarking findings as precedent. Assess emerging policy direction against the policy framework and the charging location options.
Step 4: Emerging findings and considerations	Indicative desktop assessment of potential benefits and disbenefits within an Auckland context in line with policy framework, drawing on options assessment.

Stakeholder Engagement

As a new concept with multiple public implications, it is imperative to engage partners, key stakeholders and the broader public on the rationale and merits of implementing a scheme. Throughout 2024, AT and Auckland Council have undertaken early engagement with partners, stakeholders and public to understand viewpoints and help inform policy and scheme options design.

The programme team has met with more than 40 stakeholder groups including representation from business, advocacy, and community. The team also engaged with iwi and 21 Local Boards.

Stakeholder conversations have been structurally consistent, educating on the congestion issue, explaining how ToUC could serve as a tool to address the issue, and discussing the programme objectives to shape a scheme that is effective, fair, simple and feasible.

Engagement has been carried out through stakeholder briefings, establishing a project reference group, as well as utilising Local Board workshops, AT stakeholder forums and operational hui. Two bespoke Community Panels facilitated by the University of Auckland were convened representing a cross-section of Auckland residents.

Appendix 3: Stakeholder summary

Appendix 4: International examples of complementary measures

Global Snapshot of Complementary Measures

Snapshot of complementary measures deployed in international jurisdictions which have considered or implemented Congestion Charging schemes.

	Singapore[1] *	London, United Kingdom[2, 3, 4]	Stockholm, Sweden[5]	New York, USA (postponed indefinitely)[6]	Milan, Italy[7]	Bergen, Norway[8]
Public Transport	Enhancement of existing bus routes (capacity and frequency).	Enhancement of existing and introduction of new bus routes.	Enhancement of existing and introduction of new bus routes.	Proposed increased bus services and improvements to subway stations.	Enhancement of existing and introduction of new routes (bus and metro).	Enhancement of existing public transport services and introduction of new modes including Light Rail).
Active Transport		Invested in walking and cycling to enable mode shift away from cars.	Investment in walking and cycling infrastructure include new cycle lanes and pedestrianisation.	Proposed investment in cycling infrastructure.	Improved walking and cycling infrastructure and	Improved walking and cycling infrastructure.
Park and Ride	15,000 park and ride spaces introduced outside the charged area.		2,800 park and ride spaces introduced outside the charged area.	Proposed suburban park and ride facilities.		Free shuttle bus from Park and Ride facility to city centre ran from 2003-2011 (deemed not financially viable).
On-street Parking Management	Doubled parking fees within the charge area.	Residential parking permits standard across London – managed at a Borough level – including within charged area and around much of the boundary. Funds were made available to support implementation of additional on-street controls to plug 'gaps'.	Paid residential and business parking permits within the charged area and paid on-street short stay parking.	Considered residential parking permits in and around the proposed charge area.		
Road Space Prioritisation	Silver Zones to calm traffic in residential areas including chicanes, extended crossing times for pedestrians etc.	Introduction of Low Traffic Neighbourhoods to reduce car traffic within residential areas.			Introduced pedestrian only areas, new traffic signals, footpath widening etc…	
Network Optimisation	Established HOV+4 lanes. Reduced speed limits within Silver Zones. Bus prioritisation.	Introduced 20mph (30km/hr) speed limits on all roads within the Congestion Charging Zone in 2020. Traffic signal timings on key strategic freight corridors to improve journey times where appropriate. Real Time Optimisation of traffic signals and bus prioritisation.			Introduction of Zone 30 areas (30km/hr zones).	
Kerb Zone Management		Flexible street spaces (including Better Streets) and changes to freight / delivery access over time.			Investment in BikeMi (bike sharing scheme) and 'All you can share' shared mobility scheme' based around fixed stations / hubs.	
Reduced or Free Public Transport				Proposed year-long pilot of reduced fares for some commuter rail trips.		

Day one	Over time

*When considering Singapore, it is important to note that the cost of car ownership, set through the purchase of a Certificate of Entitlement, is approximately $187,000 NZ annually which serves as a key anti-congestion measure[9]. As a result, there are just under 1 million private cars on the road in Singapore, which has a population of around 5.5 million.

[1] https://www.nzta.govt.nz/assets/planning/process/trial-ip-toolkit/docs/road-pricing.pdf
[2] https://content.tfl.gov.uk/annual-report-and-statement-of-accounts-2022-23-acc.pdf
[3] https://content.tfl.gov.uk/freight-servicing-action-plan.pdf
[4] https://content.tfl.gov.uk/better-streets-delivered-2.pdf
[5] https://www.parkingreformatlas.org/parking-reform-cases-1/pricey-residential-permit-parking-in-stockholm
[6] https://www.cbsnews.com/newyork/news/nyc-congestion-pricing-lirr-metro-north-discounts/
[7] Milan's Area C reduces traffic pollution and transforms the city center - C40 Cities
[8] https://www.researchgate.net/publication/372502129_Transforming_a_cordon_toll_ring_to_congestion_charging_scheme_The_impacts_in_the_case_of_Bergen_two_years_on/fulltext/64bdf3e68de7ed28babcf246/Transforming-a-cordon-toll-ring-to-congestion-charging-schem
[9] https://www.bbc.com/news/business-67014420

Appendix 5: International examples of mitigations

International identification of user groups and deployment of mitigation mechanisms

International precedent

Overseas congestion charging schemes provide precedent and insight into the identification of user groups and the mitigatory response adopted. Table 2 summarises user groups eligible for mitigation measures and how the mitigation mechanism is deployed to guide ToU mitigation considerations. What is clear is that every time of use charging scheme around the world uses mitigation measures and in almost all instances targets multiple user groups, with approaches to mitigation measures changing over time.

Key:	Exemption applies	Exemption has previously applied	Discount applies	Rebate applies	Account credit applies (Non-withdrawable)	Mitigation measure does not apply

Table 2: Global scan

User group	Singapore	London	Stockholm	New York[2]	Milan	Seoul
Emergency service vehicles	Exempt – automatically applied at point of charge using registration	Exempt – automatically applied at point of charge using vehicle registration number	Exempt – appears to be automatically applied at point of charge using registration number	Exempt – as defined by New York State Vehicle and Traffic Law are exempt because they are essential for public safety and emergency response.	Exempt – must complete formal request within given time frame	Exempt – automatically applied at point of charge using registration[3]
Buses[4]	Exempt under ALS[5] - eligible user did not need to purchase license otherwise required by the ALS	Exempt - organisation to register for an exemption Discount – for vehicles with 9+ seats	Exempt – appears to be automatically applied at point of charge using registration number	Exempt – School buses contracted with the NYC Department of Education, commuter vans licensed with the NYC Taxi and Limousine Commission, and buses providing scheduled commuter services open to the public		Exempt – automatically applied at point of charge using registration
Motorcycles (and mopeds)	Exempt under ALS - eligible user did not need to purchase license otherwise required by the ALS	Exempt - automatically applied at point of charge using registration	Exempt – appears to be automatically applied at point of charge using registration number		Exempt – road users on mopeds do not require a ticket to enter the area	Exempt – automatically applied at point of charge using registration
Freight	Exempt under specific conditions each requiring self-identification via registration – including peak hours, special permits, green vehicles and specific routes	Discount - eligible vehicles apply for discount online, based on emissions and size	Exempt during off-peak hours - registration required		Exempt - only applies to low-emission vehicles, users must self-identify by registering	Exempt during off-peak hours - automatically applied at point of charge using registration
Taxis and Private Hire Vehicles (PHV)	Exempt under ALS - eligible user did not need to purchase license otherwise required by the ALS	Exempt – automatically applied while actively licensed with London Taxi and Private Hire	Exempt in trial – not explicitly stated, likely automatically applied using registration number		Exempt – vehicle owner must self-identify by registering license plate in database	Exempt – only if designated as wheelchair-accessible vehicles
Disabled people		Some exempt – automatically applied if exempt from vehicle tax and under a 'disabled' taxation class Others discounted - eligible to receive 100% discount upon provision of documentation confirming mobility impairment to TfL		Exempt – Individuals with disabilities or health conditions that prevent them from using transit can apply for the Individual Disability Exemption Plan (IDEP)	Exempt – disability pass holder must register their license plate in the electronic detection system (restricted to a single car)	Exempt - must register exemption Exempt – must register for exemption
Nationally significant vehicles[6]		Exempt – organisation must register for an exemption	Exempt – not explicitly stated, likely that organisation must register for an exemption	Exempt – Publicly owned vehicles specifically designed to perform public works other than general transportation, and directly engaged in a core agency purpose, are exempt to ensure that essential government service		Exempt – must register for exemption
Electric Vehicles (EVs) or alternative-fuel cars		Discount – eligible user applies for discount online	Exempt in trial – not explicitly stated, likely automatically applied using registration number		Exempt – road users with vehicles meeting emissions criteria do not require a ticket to enter the area	Discount – eligible user applies for discount online

[2] Noting the implementation of mechanisms are TBC where it is unclear how the mechanism will be implemented following pending approvals
[3] Journal of the Eastern Asia Society for Transportation Studies, Vol.11, 2015 (jst.go.jp)
[4] There is no universal definition of a 'bus'. In some instances, a vehicle with more than nine passenger seats is a demarcation point, and in others there has been a more qualitative description based on trip purpose. Where this is available, this has been stated within the table.
[5] ALS indicates exemptions under the Area Licensing Scheme in operation between 1975 to 1998.
[6] For example: the Coastguard, Port Authorities, armed forces, diplomats

User group	Singapore	London	Stockholm	New York[2]	Milan	Seoul
Special trip purpose (i.e., users travelling to/from hospital)		Rebates - eligible users travelling to/from hospital to apply to registered trust or hospital tasked with reimbursement			Exempt –vehicle owner travelling to/from hospital must complete formal request	Exempt – vehicle owner travelling to/from hospital must formally request exemption
Residents living within congestion zone		Discount – eligible user applies for discount online			Non-withdrawable account credit – residents self-identify using proof of address, receive 50 free entries annually Discount – available once account credits are exhausted, a discount applies	Discount – eligible user applies for discount online
Certain operational vehicles[7]		Exempt - organisation to register for an exemption				Exempt – automatically applied at point of charge using registration[8]
Through traffic		Exempt in original CCZ – all vehicles travelling through routes (primarily defined by the Western boundary) were exempt from the charge.	Exemption – vehicles travelling from or to an isolated island (Lidingö) are exempt, providing vehicles pass two defined control points within a span of 30 minutes			
Roadside recovery vehicles		Discount – eligible user applies for discount online, relying on vehicle registration details				Exempt – must register for exemption
Low-income vehicle owners				Discount – Those enrolled in the Low-Income Discount Plan (LIDP) receive a 50% discount after the first 10 trips in a calendar month.		Discount – eligible user must self-identify, evidencing income tax and be enrolled in government assistance programme

[7] For example: Street cleaning and waste collection vehicles
[8] Journal of the Eastern Asia Society for Transportation Studies, Vol 11, 2015 (jst.go.jp)