Auckland Rapid Transit Study

Unlocking the potential of the Auckland's rapid transit network

Delivering a better world

AECOM

DRAFT

Auckland Transit Station Study

Client: Auckland Transport
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1.0	23-Sep-2022	Draft report for technical working group review	Werner Pretorius Principal Transport Planner	

Auckland Rapid Transit Study

Main Report

Delivering a better world

Auckland Rapid Transit Study

Contents

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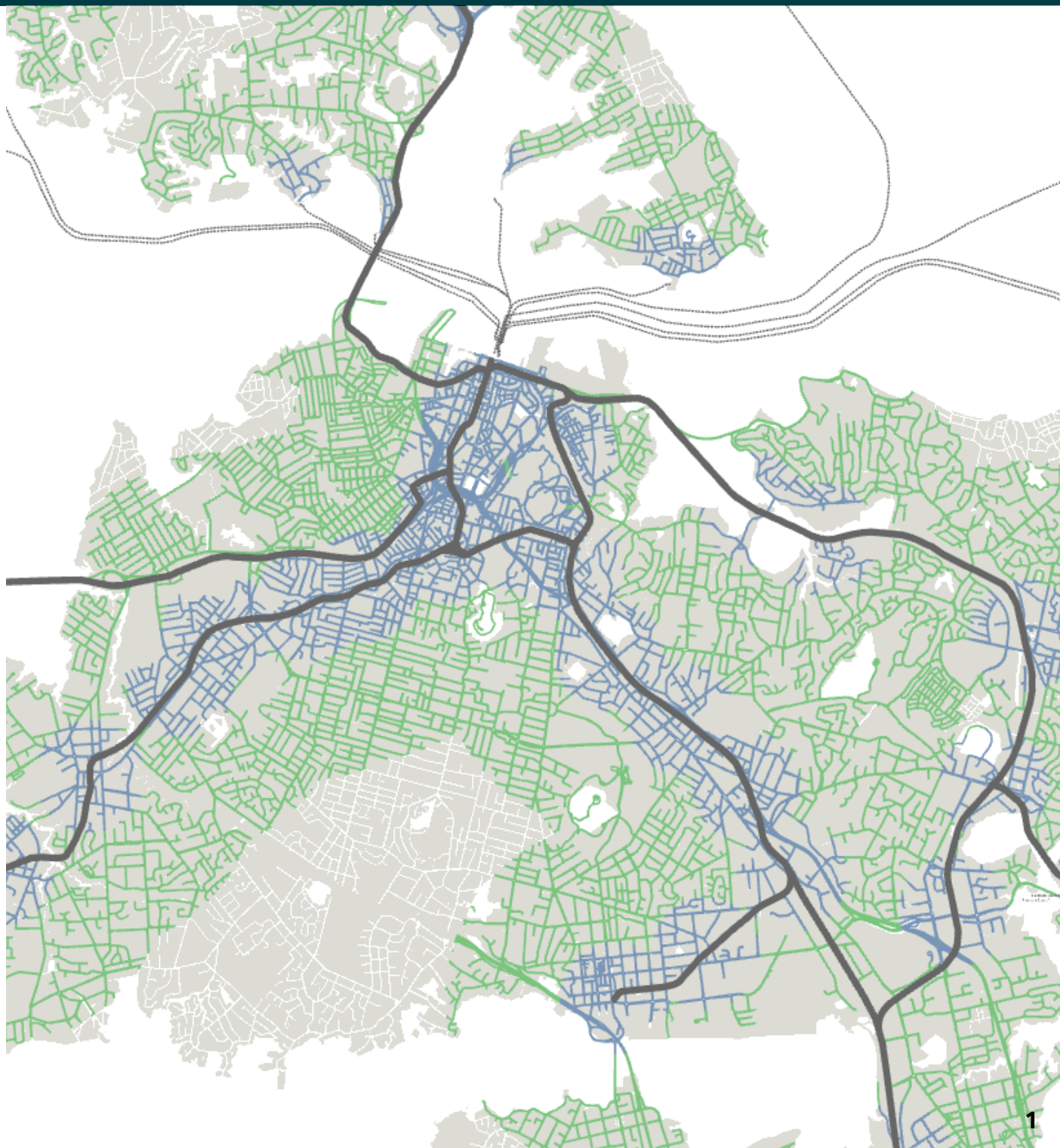


Executive Summary

Our city is growing, with an extra 700,000 people by 2050. This growth presents challenges, but also an opportunity to shape a better city. Making the most of these opportunities will require an interwoven land use and transport strategy. Getting this in place is a key challenge for planners and policy makers in Auckland. But with an aligned set of policies, goals and direction we can achieve a more liveable city for everyone.

This report represents the second phase of a study into Auckland's rapid transit system. The first phase of this study was a high-level analysis of existing transport access and land use around Auckland's rapid transit stations. This second phase further refines the analysis tools, incorporates future stations and provides high level guidance on opportunities to integrate transport, land use and customer experience. The high-level guidance offered in this report can guide the next steps to creating thriving communities around rapid transit stations.

Context

For Auckland to thrive in the future, we must reframe our approach to growth, investment and integrated delivery. Recent policy has begun to use the term 'well-functioning urban environments'. This term calls for growth that is for the benefit of all people in an equitable and climate-friendly manner. The most obvious place to achieve this kind of growth is around transit stations. This is particularly important near public transport nodes, since it offers opportunities to address these various transport, housing and climate issues simultaneously. The goal is to have a compact city that is easy to move around by walking and cycling, with strong access to public transport.

The challenge is 'well-functioning urban environments' do not just happen organically. They requires cross-sector collaboration to break down complex silos. This study is a direct response to this requirement. A tool has been developed that captures the key actors and factors involved in creating well-functioning urban environments around stations. It captures and measures levels of transport access, land use development and customer experience around stations. The tool then establishes how far the area around the station must further develop to be highly liveable and accessible.

To achieve multiple policy goals, the transport planning horizon should extend beyond the rapid transit station itself. These stations are the key anchors for enabling thriving neighbourhoods. The existing and future rapid transit network is a city shaping instrument to make Auckland a better place for everyone.

The intent of this study

This study is intended to inform and influence the development of multiple plans and strategies, including:

- National Policy Statement on Urban Development (NPS-UD)
- The Government Policy Statement for Transport (GPS)
- The National Emissions Reduction Plan
- Auckland Transport Emissions Reduction Plan (TERP)
- The Auckland Regional Land Transport Plan (RLTP)
- The Auckland Regional Public Transport Plan (RPTP)
- The Auckland Rapid Transit Plan (ARTP)

The declaration of a climate emergency at a national level is also pertinent. The outputs of this study could be used to inform any transport or land use plan, policy, strategy, or process. More information on this can be found here.

What this study covers

This study establishes a framework of best practice to better understand and improve the performance of rapid transit stations. This framework is data-driven, with data and evidence coming together to provide insights that encompass a variety of the aspects of what makes great transit stations. With this evidence each station has had its current and future performance for transport access and land use development measured. A total of 81 existing and future stations have been measured. This includes all existing rail, busway and ferry stations, as well as future stations on the Airport to Botany Line, Eastern Busway, stations in the Southern Growth Area, the City Rail Link Stations, new bus interchanges along the north-western motorway and new stations at Rosedale and Whangaparāoa.

This report shows:

1. How access to transit can be improved and various ways
2. The short, medium, and long term steps we need to take to enable well-functioning urban environments around rapid transit stations.
3. The planning and infrastructure needed to support our growth, climate, transport and urban development aspirations.
4. A tool for various public and private stakeholders that can break down the silos required for achieving common goals and making decisions together.

2.6m

Tāmaki Makaurau is expected to grow to 2.6mil people by 2050, which means we need to plan for a much higher population.

64%

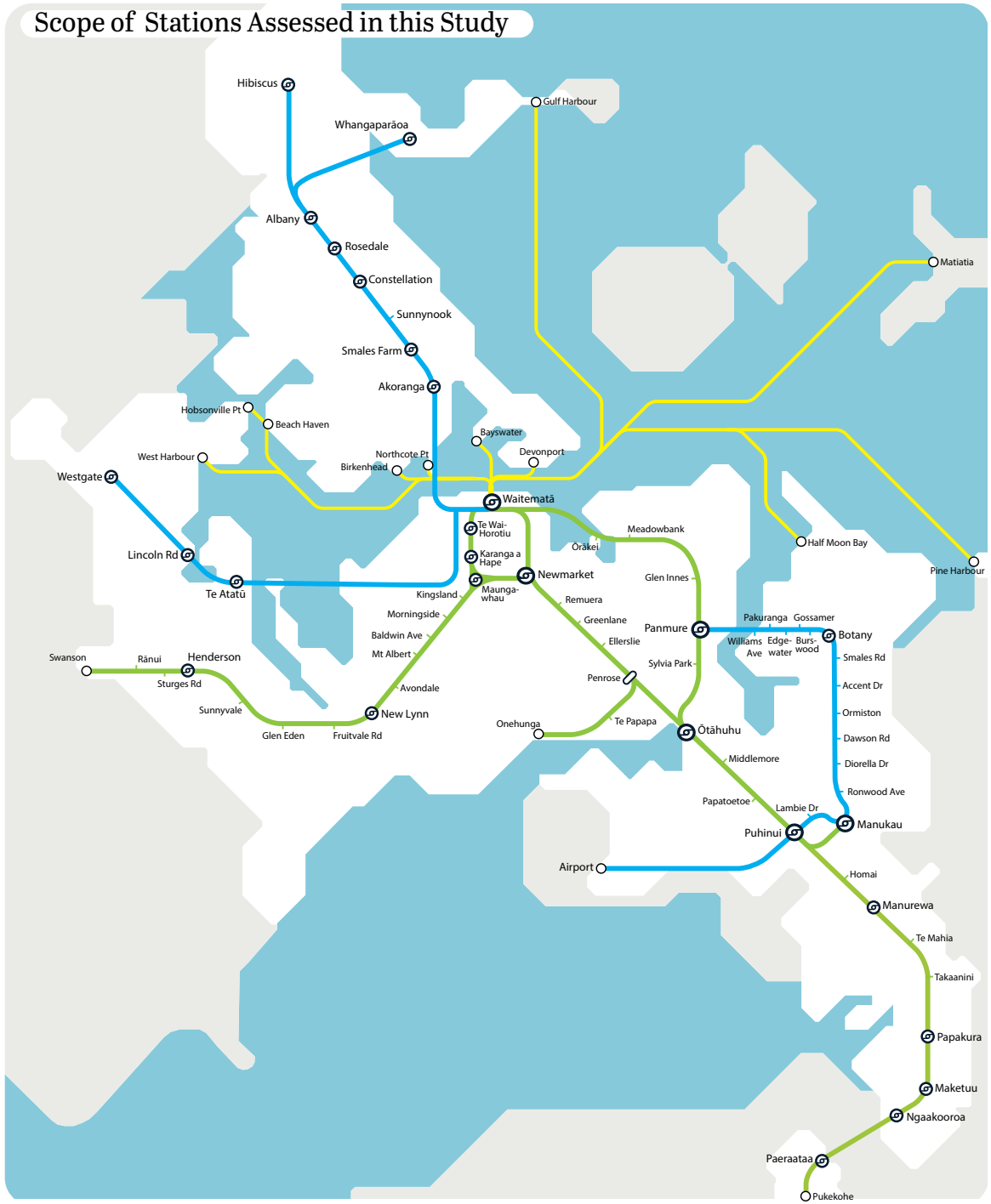
The Transport Emissions Reduction Plan's (TERP) target for reducing transport emissions by 2030. This work will help inform the mode shift investment required for reaching this goal.

45 12 24

The total (81) number of transit stations (59 existing and 22 future) that have been assessed as part of this study.

1m+

Based on recent zoning changes, the maximum additional population growth that can be accommodated within the station catchments across the existing and committed rapid transit network.



Improving the Customer Journey

Cycling and Micro-mobility: The findings suggest that all stations perform poorly for cycling access and safety. There are significant opportunities to improve this across the whole network. This has been identified as the area where the most investment is required to achieve our desired outcomes.

Walking: The findings suggest that a few stations perform well but most stations will require a lot more work to unlock their potential. The less-strategic stations are performing worst for walking access and safety, with only some of the city centre and metropolitan centre stations performing moderately.

Public Transport: Over the next decade there will be improvements to the public transport network, with the likes of the city rail link and better feeder bus frequency coming online. However, there is still significant room for improvement. Investment should continue to improve rapid and frequent networks. There should be a strong focus on improving the transfer experience, with recent investment such as Puhinui Station providing a great example to follow.

Car Access: Many stations perform well for car access. This is often coming at the detriment of walking, cycling and public transport access. There needs to be better alignment with a station access hierarchy where walking, cycling and public transport (in that order) receive the highest priority with car access receiving the lowest priority. There are also opportunities to price parking around stations and better utilise existing public and private land currently used for parking.

Wayfinding: At most stations, wayfinding is very poor, with major opportunity for improvement.

End to end customer experience: Investment in first and last leg connections has received little attention in the past. As growth continues around stations is it important to have a stronger emphasis on these trips, as the train, bus or ferry is only one part of a journey. There needs to be well-considered planning and investment processes that capture and improve the end-to-end customer experience.

Station Experience: Investment in first and last leg connections has received little attention in the past. As growth continues around stations is it important to have a stronger emphasis on these trips, as the train, bus or ferry is only one part of a journey. There needs to be well-considered planning and investment processes that capture and improve the end-to-end customer experience.

Growth and renewal around stations

Density: Most stations have a very low density in comparison to the potential future density. For land use, this is where the most effort is required. Increasing density around rapid transit stations is where we can make the most progress on our housing, transport and climate goals.

Proximity and Diversity: As growth happens around stations it is important to focus the intensity of different uses in proximity to stations. There also needs to be a diverse range of land uses and activities around stations to meet everyone's needs. This can be done by enabling high-density mixed-use development around stations through tools such as zoning,. and having public and private sector entities invest in services that are easily accessible via rapid transit stations.

Public and private stakeholder interactions

Public Landholdings: Publicly owned land presents a great opportunity to develop land around rapid transit stations. This is an opportunity to accelerate transport and urban planning strategies. The use of government land can also show examples of good outcomes to encourage private sector development in a certain direction.

Plan together: Public and private sector agencies across the transport and land use spectrum must work together. There needs to be agreed outcomes for station precincts, then the development of plans to implement them. This requires a good governance arrangement and robust planning pathways to deliver successful outcomes.

Neighbourhood and station master-planning: The most practical way to achieve and coordinate outcomes is through masterplans for station precincts. The City Centre masterplan offers a glimpse of the kind of work that should be undertaken in station precincts across the city. While this study does not go into depth on how to do this, it provides some of the tool that are necessary, and this can be seen as a next step following on from this study. There is a need for plans that bring together first and final leg strategies as well as investment programmes for station catchments.

High-Level Findings

Key Findings Breakdown *(Click titles below for more information)*

Metric	Committed Investment	Typology	Deficiency
Walking	51	88	37
Cycling	15	88	73
Public Transport	34	57	23
Car	34	25	-9
Proximity	50	62	12
Density	12	54	43
Diversity	27	48	22
Station Experience	50	78	27

Staged Interventions

Short-Term | **Medium-Term** | **Long-Term**

- Improve Active Mode Access + Safety
- Increase Walkable Catchment
- Fully built-out active mode network

- Improve Transfer Experience
- Improve end to end transfer experience
- Improve RTN and Feeder Bus Frequency
- Frequent bus routes in all possible directions from station
- Dedicated interchange facility where strategic intent requires

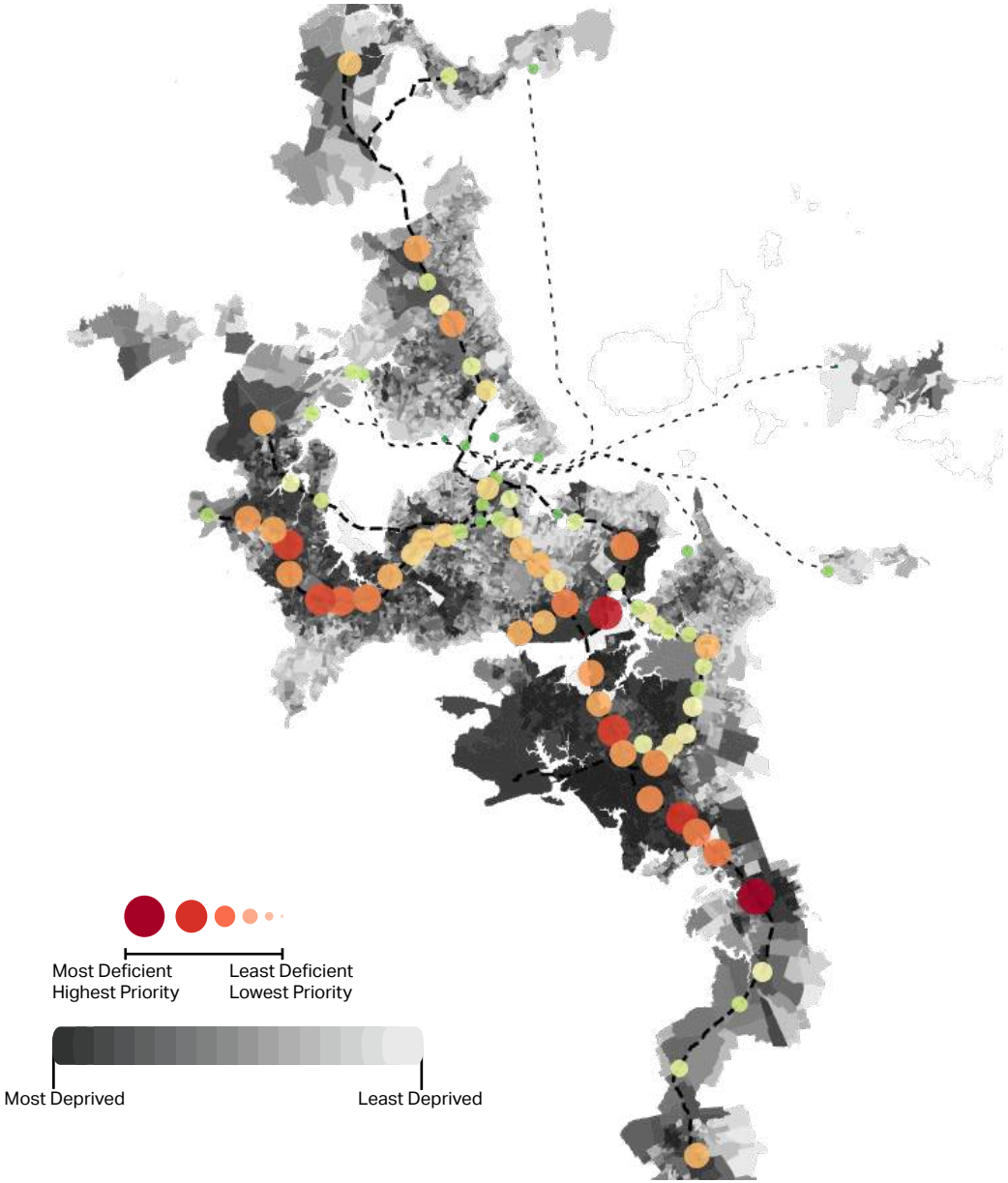
- Implement Parking Management
- Reallocation of road space to PT and active modes
- Redevelopment of surface level car parking into high density development

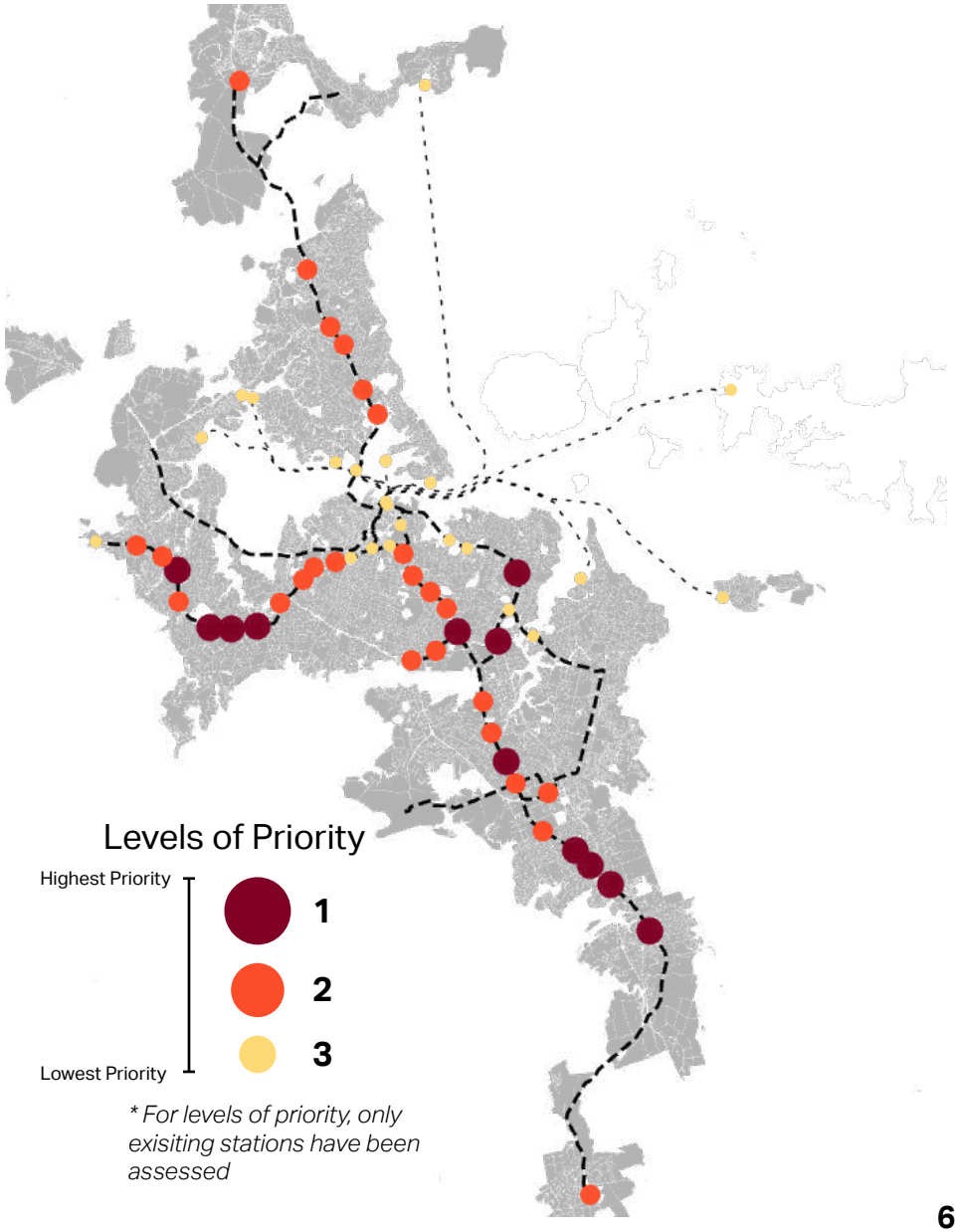
- Enable Greater Density
- Better utilise land around stations
- Develop long-term masterplans for station catchment
- Implement long term plan and redevelopment of publicly owned land

- Improve Wayfinding
- Fully optimise the station experience
- Fully build out station based on strategic requirement

Investment Prioritisation

The key findings from this study identify which stations are more deficient than the others. The cumulative deficiency shown on the left combines the insights for walking, cycling, public transport, recent up zoning and public transport imbalance. The map on the right translates to cumulative deficiency into three levels of priority (1 being highest priority and 3 being lowest) which can be used to show areas where investment is most needed.



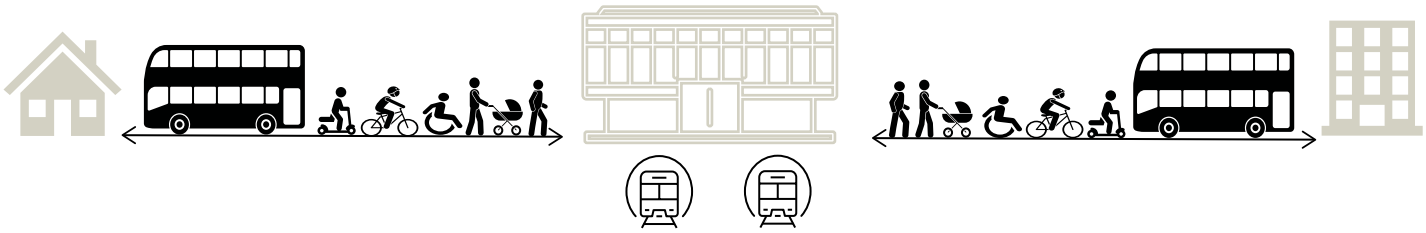


** For levels of priority, only exisiting stations have been assessed*

01

The Customer Journey

The Customer Journey



First Leg | **Main Leg** | **Final Leg**

Customer Journey

The customer journey is understood to be the entire journey from origin to destination. It consists of multiple legs to get customers from where they are to where they want to be. Customers use several modes of transport to complete a journey.

Auckland Transport provides the main service by ferry, bus or rail that connects customers from one neighbourhood to the next. For the first and final leg of the journey customers might walk, drive, ride a bicycle, scoot, bus, take a train, or in many cases combine several modes to complete that part of the journey. For access, egress and transfers at the station, users must compete many parts of the journey on their own.

Another way to think about the customer journey is to recognise that it is more than just movement. It also combines interactions with people and places offering different experiences throughout the journey.

When unpacking the customer journey, there are different experiences throughout the journey which can be summarised as follows:

1. The **station experience** incorporates access, transfers, waiting, egress, and various components of customer experience.

2. The **catchment experience** travelling to and from the station (first and final leg)

3. The **network experience** provides the ability to go places and do things, connecting customers from one neighbourhood to the next.

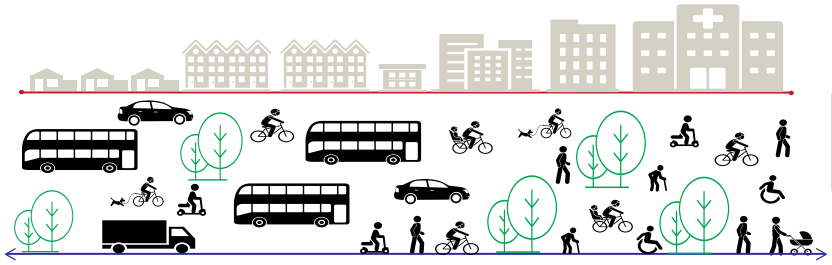
Understanding the Customer Journey

This diagram demonstrates the many moving components of the end-to-end customer journey. Transit-oriented journeys consist of much more than the transit itself. The first and last leg is often overlooked but is the most important part of the journey. People will struggle to access transit if there are no quality transit and active mobility solutions within the station catchment.

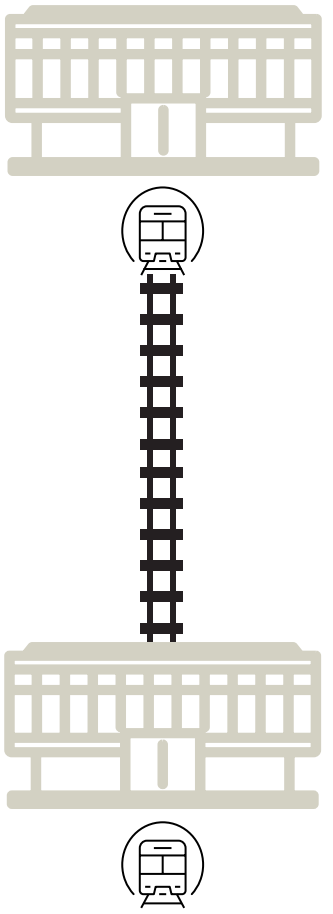
Customer needs and forms of access can vary from user to user. This means that it is important to cater for a wide range of needs and abilities. This diagram is a demonstration of this, where people access the transit station in various ways. It is important that all the elements from origin to destination are functioning in a holistic and integrated way.

Middlemore Station

Catchment Experience



Station Experience



Station Experience

Te Wai Horotiu Station

Catchment Experience

The Network Experience

The Station

The station experience is central to the customer experience and improving the overall journey. A station is more than just a platform, tracks and timetables. It is a key anchor to enabling thriving and sustainable neighbourhoods. They are also gateways to the wider network of opportunities to live, work, learn and play. Stations and their precincts thus provide the space for businesses and public services, while also providing access to, from and between transport modes.

There are different types of stations that can serve different strategic functions. The type, design and scale of a station should strongly relate to the context of its surroundings. In higher density areas such as city centres and metropolitan centres we should expect the highest standard of station experience, with high amenity, safety and access elements. Across all stations we should expect a high standard of Universal Design, no matter the station's strategic importance.

Stations provide the main leg of the customer journey. In order to be effective, there should be a seamless transition between the first and last legs of the customer journey. This means having universal walking access, bike and micro-mobility storage facility, a well-designed bus interchange facility and plenty of car drop off and pick up points.

** For more information on the below classifications, refer to* *page 39*

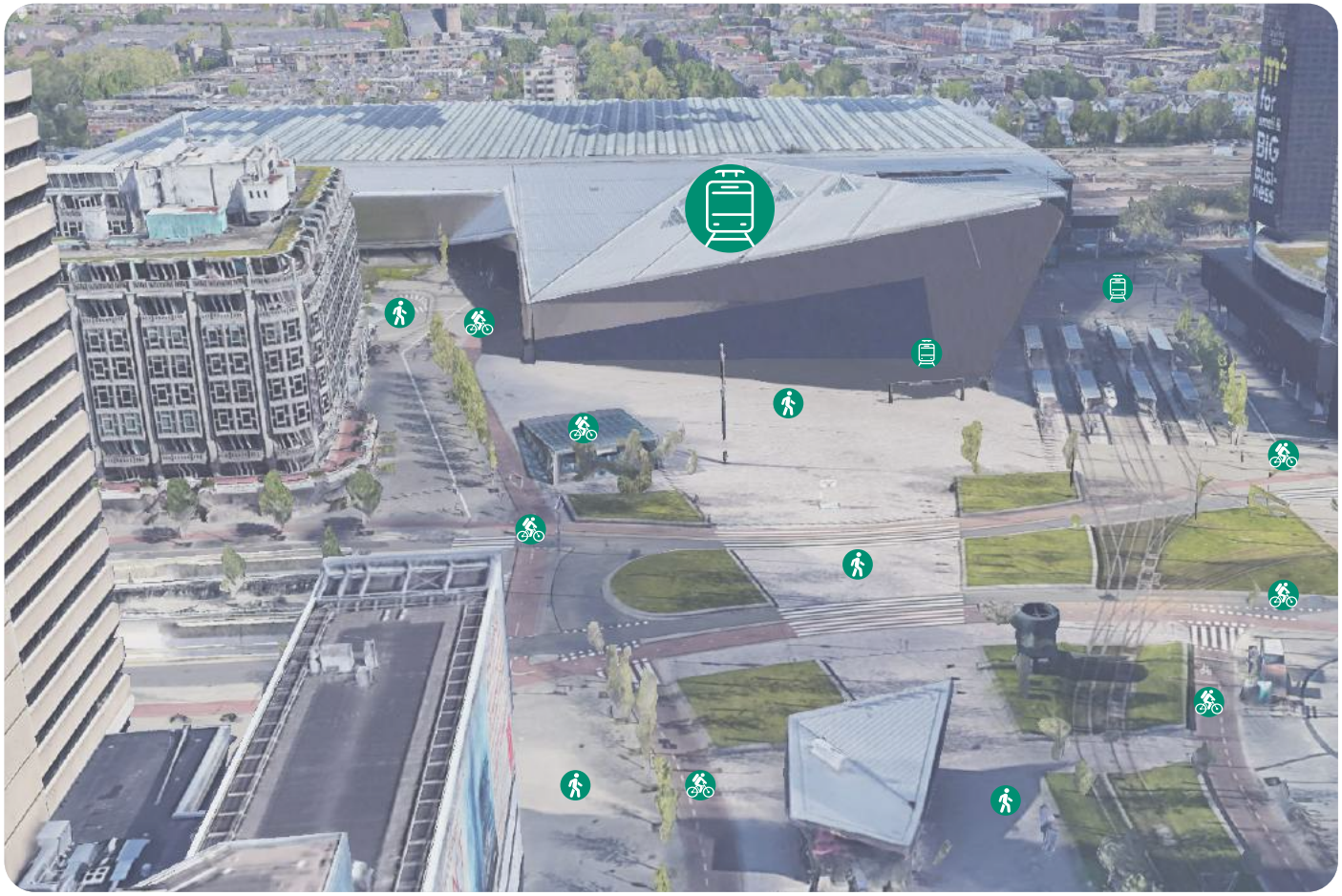


Image Source: Google Earth

City Centre

Metropolitan

Town Centre

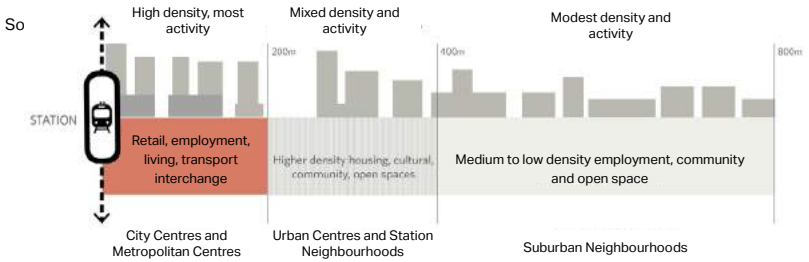
Suburban/Single-use

Transfer

Coastline

Images Source: Auckland Transport

The Catchment



The figure above captures the key elements of the land use and transport access hierarchy. It demonstrates the various strategic functions of catchments. The stations serve as the anchor of the catchment. This enables a higher intensity and proximity of land uses. Active modes should always be prioritised within the station precinct. A catchment should be people and micro mobility friendly, providing access to all the key services and amenities within a catchment.

The Catchment

The catchment experience is central to the customer experience and improving the customer journey. It combines interactions with people, places and movement offering different experiences. The catchment surrounding the stations should have all the things people need. So, it is important that our planning and investment approach recognises that the station and the catchment are deeply connected. All the elements of a station and its catchment directly or indirectly impact one another.

From a policy perspective, the walkable catchment plays an important role in achieving a 'well-functioning urban environment'. This interaction is witnessed through the recent zoning changes where a building height limit of at least six stories is required within the walkable catchment of a rapid transit station. As a result of this, station catchments can unlock enormous potential for good growth. The network of streets and how modes along them are prioritised is key to shaping a sustainable urban environment.

Integration

A thriving and sustainable city considers strongly the responsiveness of land use to transport access. This means that the level of density correlates with the level of sustainable transport access. Within the station catchment active modes (walking, cycling and micro-mobility) receive the highest movement priority. Nearest to the station we should also be maximising land use diversity and density.

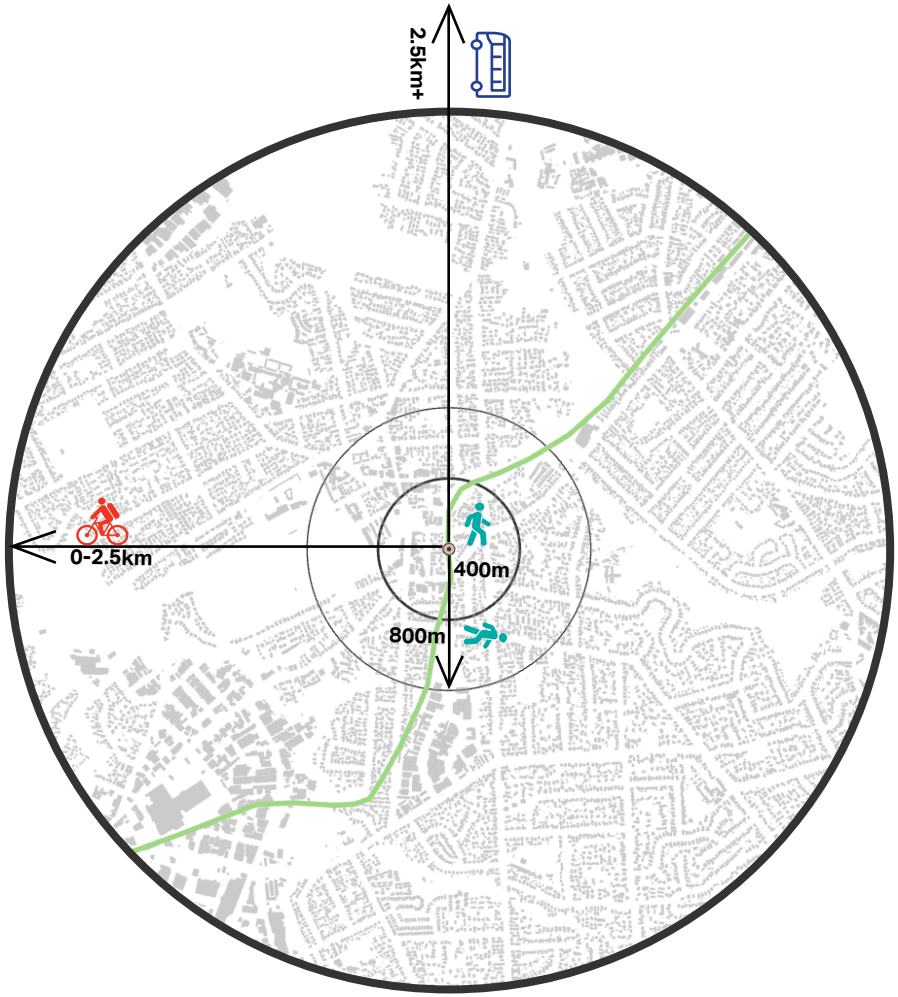
Typology

The zoning in the station catchment provides clarity of its strategic intent within the urban region. Therefore, not every station catchment is the same. Each catchment has its own identity, character, and neighbourhood function. From the network perspective, each catchment plays a role in offering different strategic functions to live, learn, work and play.

Station catchments based around transfer stations, such as Puhinui, will have lower level of density and diversity, but have higher level of public transport access.

All stations should prioritise access for active modes, irrespective of typology. These space-efficient modes cost less to deliver, achieve better urban integration and deliver the best climate outcomes.

The Catchment and the Network



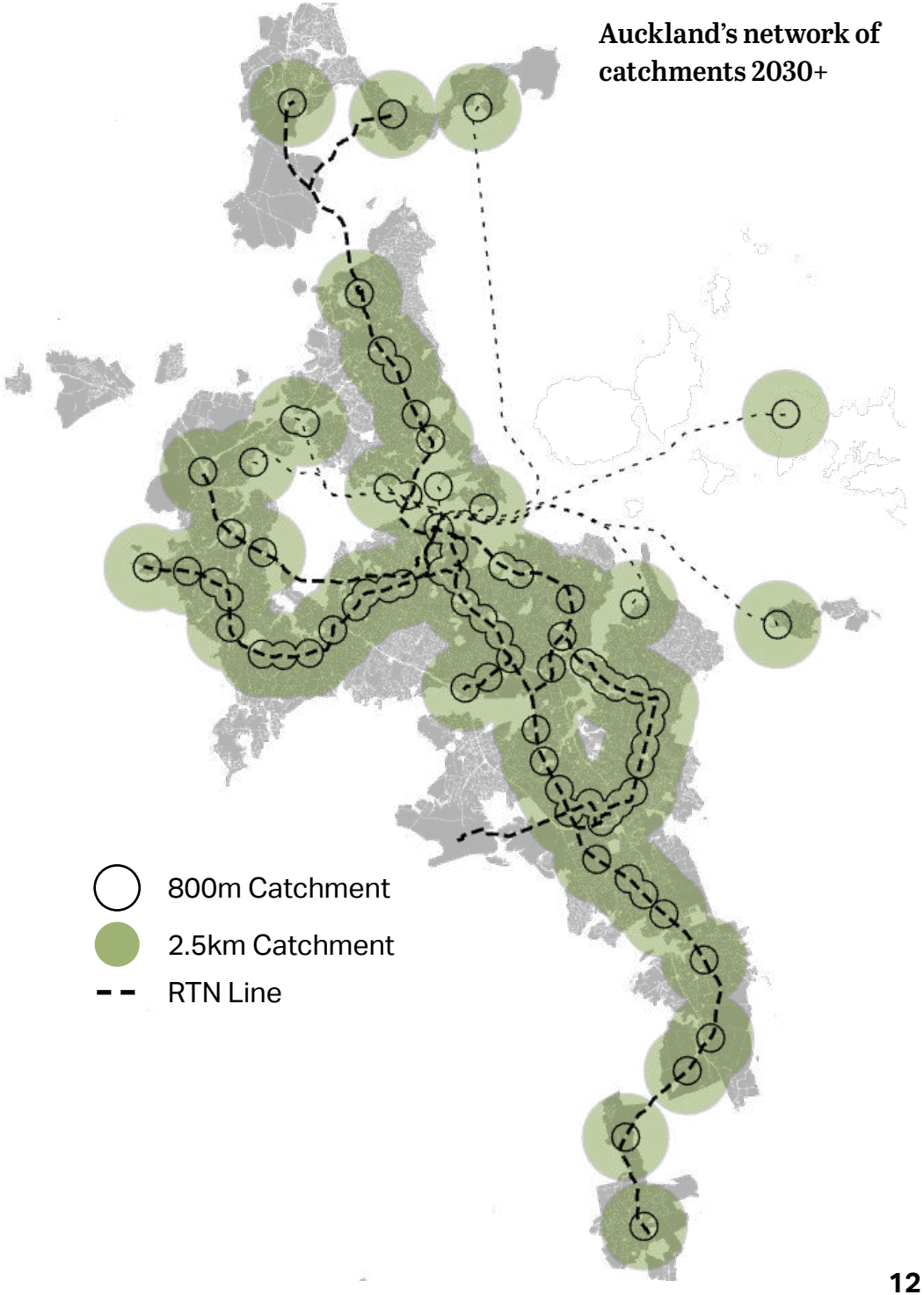
Beyond 800m to 5km people will use local bus to access the station

From 0-2.5km people will cycle to access the station

People tend to walk 800m, but will sometimes walk further to access the station

The station itself needs to be highly accessible and visible to access

Auckland's network of catchments 2030+



The Network of Catchment Types

An integrated transport and land use planning approach considers access to an entire region. This is provided through a network of Rapid Transit routes and catchments. The variety of catchment types ensures the network provides access to range of housing, education, employment and recreational needs.

The vision is for a network of catchments where residents live, learn, work and play in compact station precincts that are well connected by rapid transit and active modes of transport.

The network experience provides the ability to go places and do things. Connecting customers from one neighbourhood to many others. Improving this experience is the highest-level element of the customer experience.

To improve this, we need to improve the 'network reachability'. Network reachability is the cumulative places or destinations that can be reached within a certain time. To improve this, we can either expand the network to reach more places or by putting useful destinations within the reachable station catchments.

02

The Case Studies

Well-functioning stations, catchments, and networks

At the station level

Source: Auckland Transport

Puhinui Station - Tāmaki Makaurau

At the smallest scale, well-functioning growth begins at the station. This provides connectivity between the network and the station precinct. The station should serve as the neighbourhood's anchor and gateway. To achieve this well-functioning growth, all other elements within the neighbourhood should seek to orient towards the station.

An example of this in action is the newly built Puhinui Station in Tāmaki Makaurau. The primary role of the station is to facilitate transfers between the Southern rail line, the Eastern Rail Line and the Airport Link. The presence of a well-designed station unlocks the entire Puhinui catchment for sustainable growth; enabling and encouraging this growth is key to realising the station's potential and the next step to realising a myriad of policy ambitions.

At the catchment level

Source: Hobonsville Point Land Company

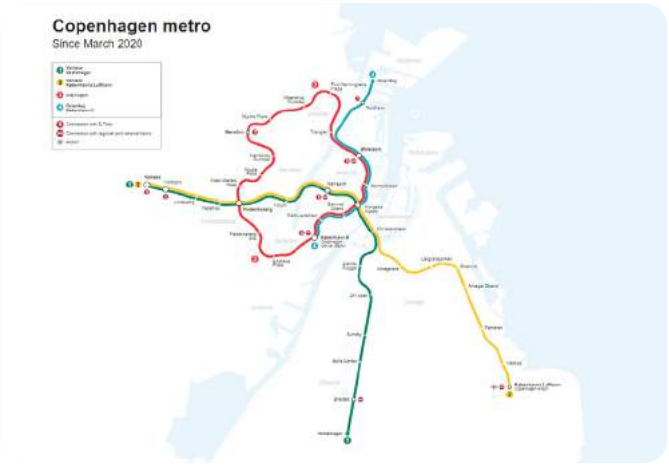
Hobsonville Point - Tāmaki Makaurau

The catchment level stems from the anchor provided by a well-designed station. Within this catchment there are a wide range of elements. When these elements are brought together, we create thriving and happy communities.

At this level, the greatest complexity can be found. This is where we need to use tools that help break down silos between stakeholders, such as the one this study provides. In Auckland there are certain communities that align closely with the built-form elements we might expect from a well-functioning urban environment. One such community is Hobsonville Point.

This community exemplifies the critical elements of built form that should be integrated into station precincts. There is a mix of housing types in a compact urban form. There is access to local amenities such as shops, schools and employment. Although Hobsonville Point is a step in the right direction, the car has still been given the highest modal priority. With more priority towards active modes and the built form exemplified in Hobsonville, we can start to envision what a compact community my look like.

At the network/regional level



Source: Copenhagen Metro

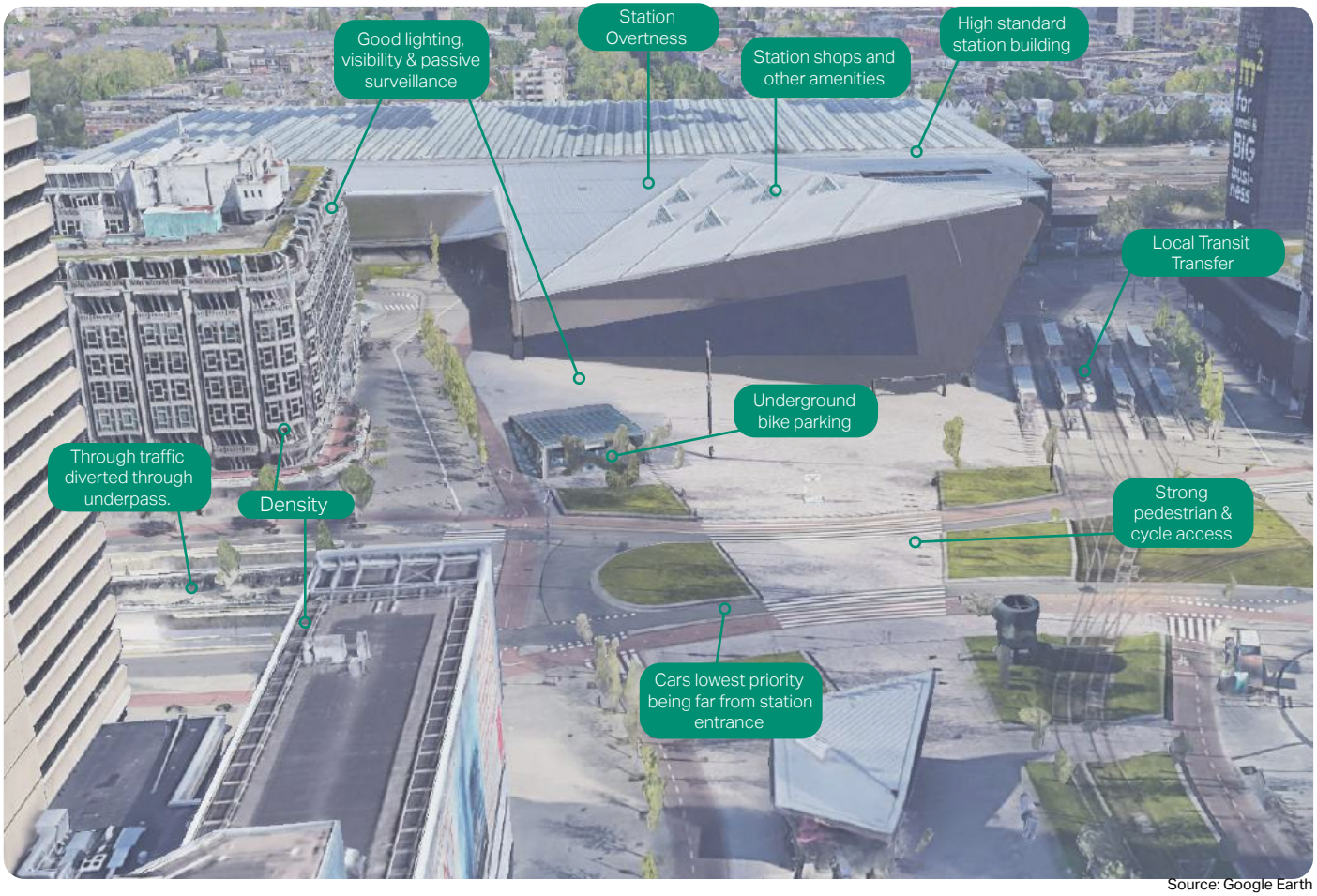
The Copenhagen Metro - Denmark

At the highest level, an efficient, accessible, and well-designed rapid transit system is key. This rapid transit system enables connectivity between various station precincts at the regional level. Through heavy investment and good decision making at the highest levels of power, Auckland can have a well-functioning rapid transit system. An international example that Auckland can look towards is that of the Copenhagen Metro.

This metro is a useful case study for Auckland, with construction of the metro beginning in the 1990's. Similar to Auckland, a rapid transit system was designed and built within a well-established city. The metro is expected to handle a ridership of 600,000 trips per day by 2030, in a city region of just 2.1 million people.

The network can do this because it has been designed in a way that provides strong access to employment, housing and education across the city. The metro stations are well designed and are anchors for the wider neighbourhood. The station integrated with walking, cycling and local public transport networks. The Copenhagen Metro sets a great example for Auckland to follow as our rapid transit network develops.

The Station



Source: Google Earth

Rotterdam Centraal Case Study

This station sets the benchmark for station experience. It incorporates all the elements that we should expect to see in stations that support our most strategically important catchments. There is seamless connection with a myriad of other transit options. Ample bike parking is provided in an underground storage facility. Passive surveillance is provided through buildings that overlook the station. The station is also very overt, making it obvious from its surroundings. The case study provides an example of one of the best station experiences globally.

Location

Rotterdam, Netherlands

Construction

2004 - 2014

Lead Agencies

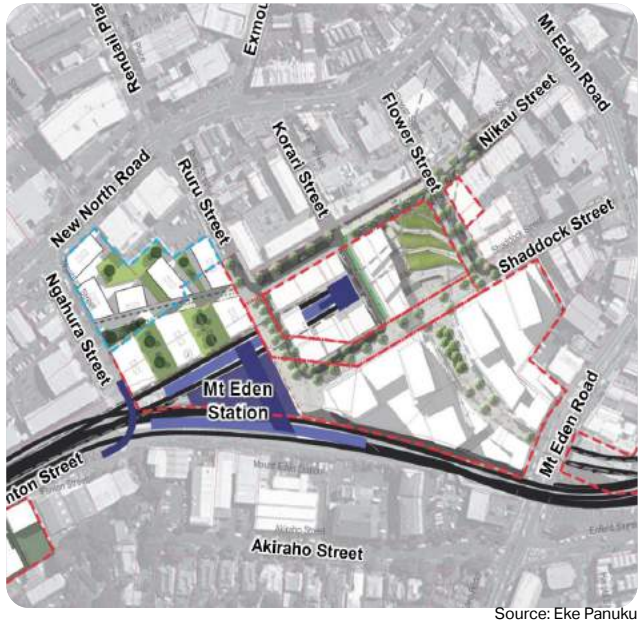
ProRail, Nederlandse Spoorwegen, and the Municipality of Rotterdam.

Key Points

- A total reconstruction of the station and its surrounds began in 2004 in order to keep up with the stations growth.
- 5,190 secure bicycle parks, including an underground facility,
- Serves local, regional and international connections.

The Catchment

Source: Eke Panuku



Source: Eke Panuku

Maungawhau Station - Tāmaki Makaurau Auckland

Kāinga Ora, Eke Panuku, Auckland Council, and City Rail Link Ltd are collaborating to develop a transit-oriented community above the new Maungawhau Station.

Project Aspirations

To be an exemplar of net zero carbon development that is climate resilient. Integrate mātauranga (traditional knowledge) and Māori identity. Provide health, affordable and accessible homes. Create precincts that are accessible for all and encourage the use of public transport. Provide public space and learning/development opportunities. Create enduring investment for the community.

Why it matters

This project is an example of better utilisation of publicly owned land around a rapid transit station. Once the City Rail Link is complete there will be 24 trains per hours passing through at peak times. There is potential for 1,100 new homes and 2,300 future residents. It will also deliver active mobility benefits with a finer grain street pattern. There will also be an increase in public amenity and spaces. This demonstrates the vast potential of cross-sector collaboration to delver thriving communities around stations.

Location

Tāmaki Makaurau

Construction

2016 - 2024+

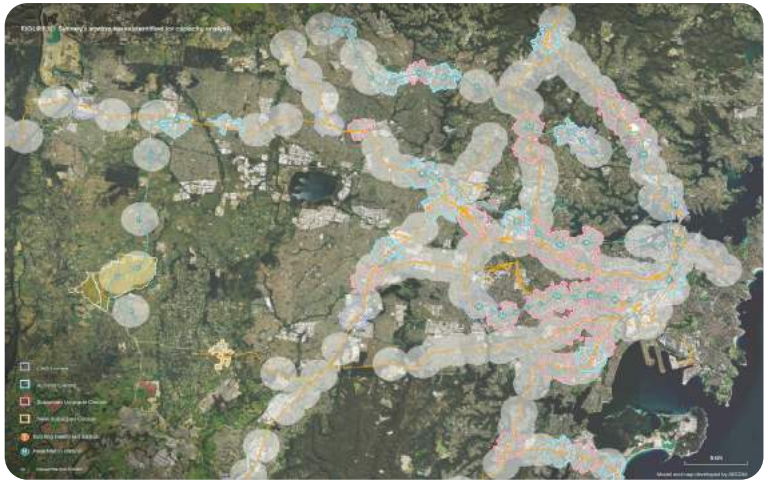
Lead Agencies

Kāinga Ora, City Rail Link Ltd, Auckland Council and Eke Panuku

Key Points

- Mixed use development on land that was aquired as part of the CRL construction
- The development includes a mix of high density housing, offices, shops, restaurants and public spaces.

The Network of Catchments



Rethinking Station Precincts - Sydney

"How to create great precincts around rail stations, and why this matters for Sydney"

Project summary

Project Summary

This is a report that brought together the disciplines of urban planning, architecture, urban design, economics, land development, and transportation. The study had two key objectives;

1. Allowing more of Sydney's growth in walking distance of rail and metro stations.
2. Ensuring growth is high quality, supports community life and helps make areas more liveable.

It offers a vision of advanced thinking for the areas around stations. While the project was in the context of Sydney, there are many elements that are applicable to Auckland. The report outlines specific steps for achieving thriving and sustainable communities around stations. You can see the report in full here.

Key Project Outcomes

The Sydney precinct plan offers us a glimpse of what Auckland also has the potential to achieve. The plan provides a strong point of reference for many of the next steps we may wish to take after this study.

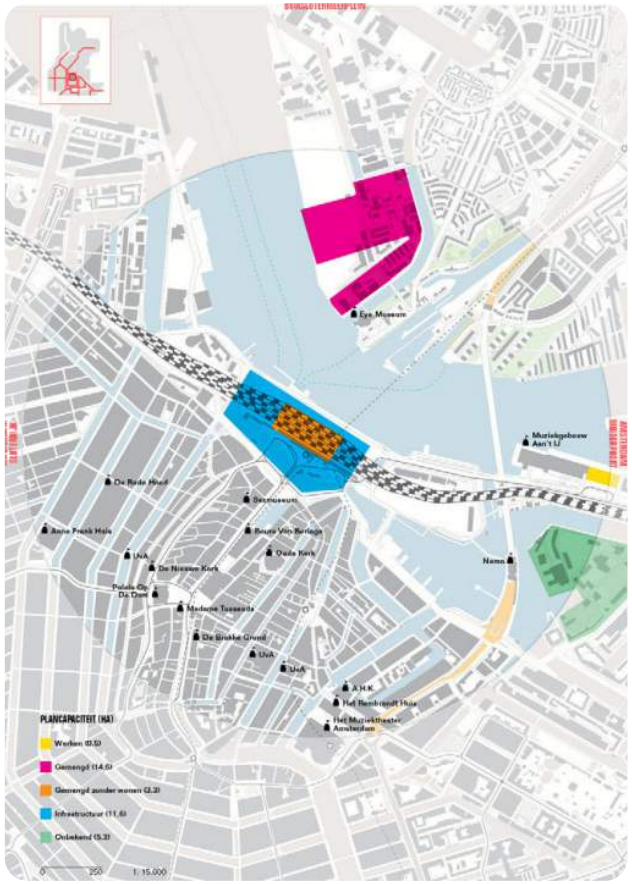
The plan introduces design and delivery principles that will ensure there is growth around stations in a manner this is liveable and sustainable. It demonstrates the potential for stations to be an anchor for positive urban growth.

This report also gives a strong explanation of the further steps that are required to make a precinct plan reality. It establishes the appropriate governance and planning pathways.

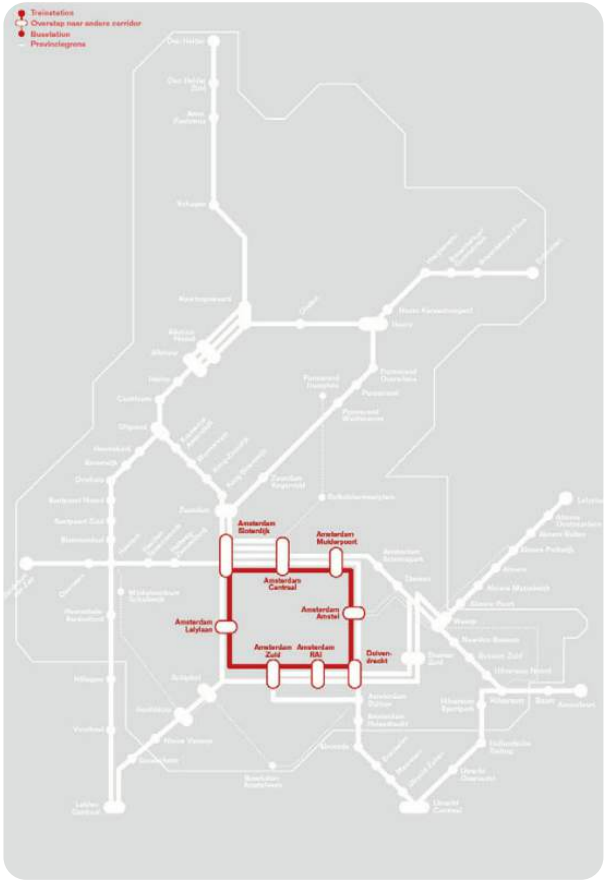
The report also provides detail on how to coordinate different agencies responsible for delivering infrastructure and land development. There is detail about how to deliver these at differing scales.

The Regional Network of Catchments

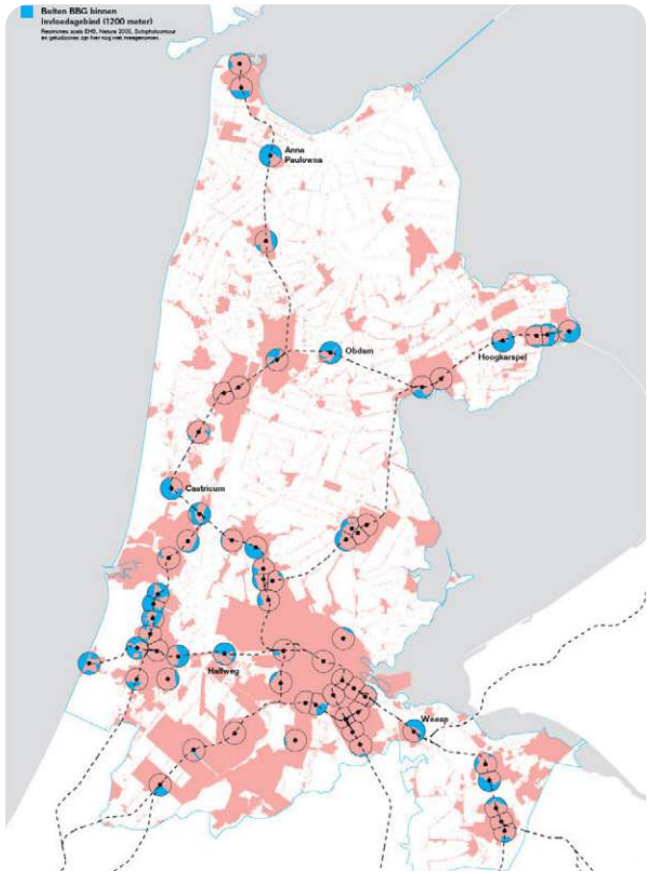
The Local View



The Corridor View



The Strategic View



Source: MAAK PLAATS!

North Holland - Netherlands

The transit network and the network of catchments in the North Holland region of the Netherlands is a useful example. It provides an example of a regional network that we can emulate in Auckland or even the upper North Island. The development and growth patterns strongly align with the principles for growth we are striving for in Auckland.

The figures above demonstrate the strong integration of thinking at the catchment level, the corridor level and the regional level. They have been sought from the Dutch Study 'Maak Plaats', which was part of the inspiration of this study. The Maak Plaats study identified transit corridors where a network of different types of catchments would be located. Within these corridors a person's employment, housing and recreational needs can all be met, within proximity to transit.

03

The Opportunties for Tāmaki Makaurau

Auckland's Changing Growth and Policy Context

Our city is growing, with an extra 700,000 people by 2050. This growth presents both opportunities and challenges. Given the intensification policies around transit there is the potential for a paradigm shift in Auckland. This shift can unlock a new planning and investment era, where height and density of our city can reflect a high level of transport access.

There is now a focus being placed on compact growth as opposed to sprawling growth. In addition, there is increasing urgency for urban growth and transport investment to contribute more to addressing issues of climate change, housing, health, among other societal problems. The most obvious place to start with this kind of growth is around our existing and future rapid transit stations. We can have a much better utilisation of the land around it for housing, employment, education and recreation.

To succeed in realising the untapped potential of Auckland's rapid transit network we must transform stations into destinations. Our planning horizon should also extend beyond just these stations. A station is more than just a platform, tracks and timetables. The station is the anchor for a community and can be a city shaping instrument.

The challenge is that the growth described in this study does not happen organically. It is realised through continuous outcome-based planning and cross sector collaboration. Using the tools and findings of this study we can begin to meet these challenges and unlock the potential that Tāmaki Makaurau holds.

Population growth poses a challenge for Auckland, but also an opportunity to develop a new direction for the city that benefits everyone. Too often, our historic transport investment has sought to solve a transport-specific problem. There has been fragmented integration with surrounding communities. These communities have had their potential held back with restrictive zoning and planning rules in places where there is a high level of transport accessibility.

This has contributed to making growth easier in areas that are less accessible and less sustainable. This has also led a decline in investment in public transport and active travel options. The maps shown on the next page are a snapshot of how these decisions have shaped Auckland as we know it today.

Recently Auckland reached a policy and growth tipping point. We have realised that for Auckland to thrive in the future we urgently need to overhaul our approach to growth and investment. Enabling more Aucklanders to have access to quality public transport and better travel options. This will enable them to go places and do things without being reliant on a car.

There has been a focus (in policy and plans) to enable 'well-functioning urban environments' surrounding key public hubs. This focus is intended to help address the challenges in climate, congestion and housing that Auckland will face in the coming decades.

New Zealand has declared a climate emergency. The priorities outlined in the Auckland Plan, climate commission report, Government Policy Statements and various council policies clearly outlines the urgency for mode shift and compact cities.

From an urban development policy context there has been a significant shift towards intensification with recent zoning changes and the removal of minimum parking requirements. Over time these changes will unlock a significant amount of growth, and a great deal of this growth will happen around rapid transit stations across the region. Cross sector collaboration is key to ensure this growth is positive and benefits all Aucklanders.

A story of growth for Tāmaki Makaurau

700,000
extra people by 2050

313,000 new
homes by 2050

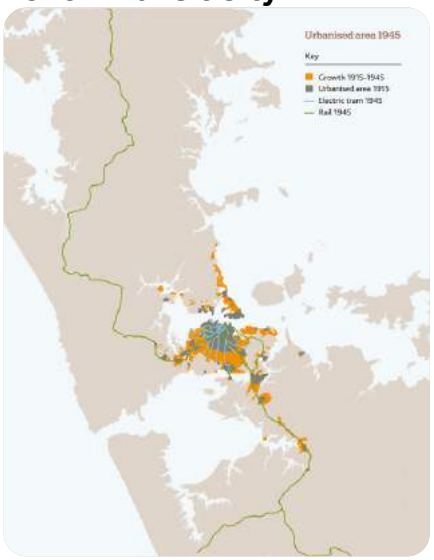
40% of New Zealand's GDP

Net-Zero
carbon emissions by 2050

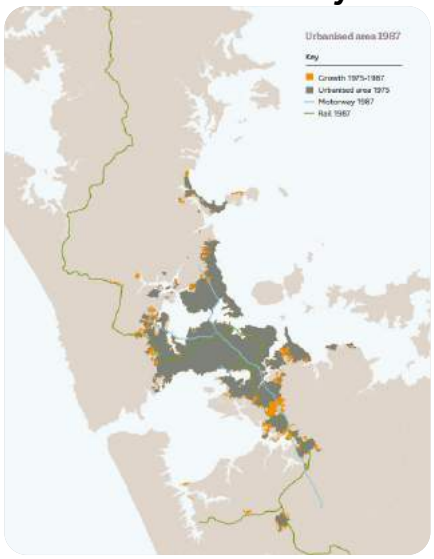
A history of transport and land-use in Tāmaki Makaurau

1915 - Compact City

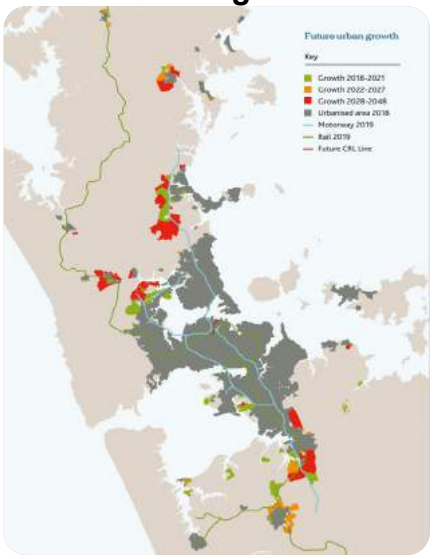
1945 - Transit City



1987 - Car Centric City



2018 - A Turning Point?



Hoffman, L., (2019). A brief history of Auckland's urban form. Auckland Council.

Mapping the opportunities for an integrated approach to growth

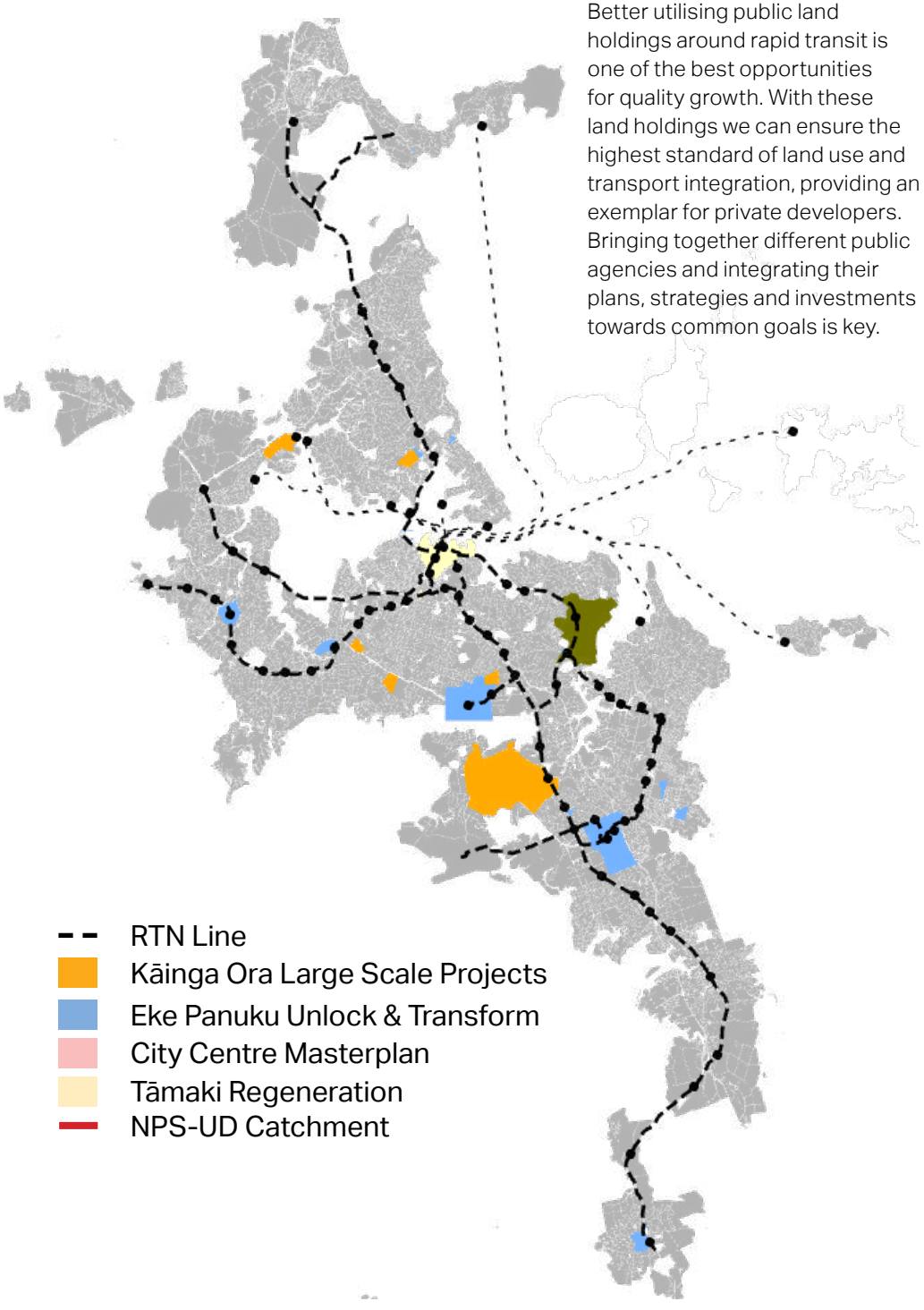
Kāinga Ora Large Scale Development - Northcote

Eke Panuku Unlock and Transform - Henderson

Auckland Council - City Centre Masterplan

Tāmaki Regeneration Company - Tāmaki

Better utilising public land holdings around rapid transit is one of the best opportunities for quality growth. With these land holdings we can ensure the highest standard of land use and transport integration, providing an exemplar for private developers. Bringing together different public agencies and integrating their plans, strategies and investments towards common goals is key.



To achieve multiple goals we need to reframe our understanding of the stations, the catchment, and the network.

- Housing Choice & Affordability
- Better Employment Opportunities
- Strong Access & Mobility
- Sustainability & Low Carbon
- Healthy & Active Populations
- Safer & Cohesive Communities

Creating well-functioning urban environments

A well-functioning urban environment is a complete system. There is no one element that creates it; to successfully create a well-functioning urban environment all aspects across all disciplines are needed . This report seeks to bring together many of these elements in one place, with visualisations to provide insights at a glance. A hallmark of well-functioning urban environments is compact and mixed-use development that is highly accessible and connected. When this statement is unpacked there are clear and specific elements that are required, such as:

1. A strong balance (include hyperlink to balance page) between transport accessibility and land use development.
2. A diverse range of land uses, with higher densities in proximity to a rapid transit station.
3. Prioritisation of active mobility (walking, cycling, and micromobility) access over other options.
4. Fast and reliable local public transport options to and from the station.
5. Deprioritisation of the use of private vehicles, as they are the least efficient mode of transport in a compact urban environment.
6. A safe and accessible experience for the user.

There is strong potential for achieving these things over the next few decades. We need to take an integrated approach through the station, the catchment and the network. This is all coming at a critical time for the city. Over the next 30 years a high growth scenario means we could have an extra million people call Tāmaki Makaurau home.

04

Strategic Context

Strategic Alignment

Rapid transit is a critical part of AT's public transport network. In the future, patronage on the network is expected to have substantial growth. Rapid services carried 30 million people in a year ending February 2020 (pre-pandemic). Rapid transit is a direct part of AT's statement of intent targets. Rapid transit also has an indirect effect on several other targets. The Regional Land Transport Plan emphasises the importance of first/last leg connections to stations. This study aims to inform this plan and provide information on areas of improvement. This study is intended to inform and influence the development and implementation of multiple strategies, policies and plans:

- The National Policy Statement on Urban Development
- The Government Policy Statement for Land Transport
- The National Emissions Reduction Plan
- The Auckland Regional Land Transport Plan
- The Auckland Regional Public Transport Plan
- The Auckland Transport Emissions Reduction Plan
- The Declaration of a Climate Emergency

The outputs of this study can be used to inform any future transport or land use plan, policy or strategy.

Why is this important now?
New Zealand has declared a Climate Emergency, as well as releasing multiple climate and emissions reduction plans. Plans from both central government and council clearly outline the urgency for mode-shift and intensification.

The recent intergovernmental panel on climate change has stressed the urgency for large emissions reductions over the next few decades to keep warming below 2 degrees. It highlights how the reduction of transport emissions plays a key role in this. This study can directly inform the ways we design and plan our cities for low carbon ways of living.

National Policy Statement for Urban Development (NPS-UD)
This policy sets the national direction for urban development in New Zealand. It requires local authorities to enable sufficient development to accommodate growth around rapid transit. Within a walkable catchment of rapid transit there is requirement for high limits now less than 6 stories. This study can directly inform which stations are more suited to this policy and which will require much more investment to enable this kind of growth.

Medium Density Residential Standards (MDRS)
This policy change makes it easier for intensification to occur right across the city. In all Auckland urban areas there is no longer the need to obtain resource consent for building three homes up to three stories in height on a single property. This policy in addition to the national policy statement will enable a much more compact urban form right across the city. This work will directly inform the implementation of the policy as the stations cyclable catchment will be mostly affected.

Transport Emissions Reduction Pathway (TERP)
This policy sets the direction for lowering Auckland's transport emissions. The goal is to reduce these emissions by 64% by 2030. This gives effect to Auckland's climate plan. Transport accounts for over 40% of Auckland's transport emissions, with 86% coming from road transport. To achieve this emissions reduction, the policy seeks to see a significant mode shift. This mode shift is towards active mobility and public transport accounting for 62% of all trips by 2030. This study can directly inform the investment that is required for such a significant mode shift. We can seek to guide this investment to be in line with the modal hierarchy and create thriving communities around transit.

Government Policy Statement for Transport (GPS)
This policy sets the national direction for transport in New Zealand. The strategic priorities set out include better travel options, climate change, and safety. The policy has a general focus on improving the public transport system and providing for active modes. This study can aid the implementation of the strategic outcomes at the local level. This study can assist the particular focus on active mobility and direct investment to the highest areas of priority.

Auckland Regional Land Transport Plan (RLTP)
This policy sets the investment direction for Auckland Transport over the next decade. It also influences the development of AT's many sub-strategies. The most recent version of this plan identifies climate change, safety, access and travel choices as its key priorities. Improving public transport and active mobility is identified as key to addressing these priorities. This work can inform future editions of this plan and direct transport investment to where it is needed most.

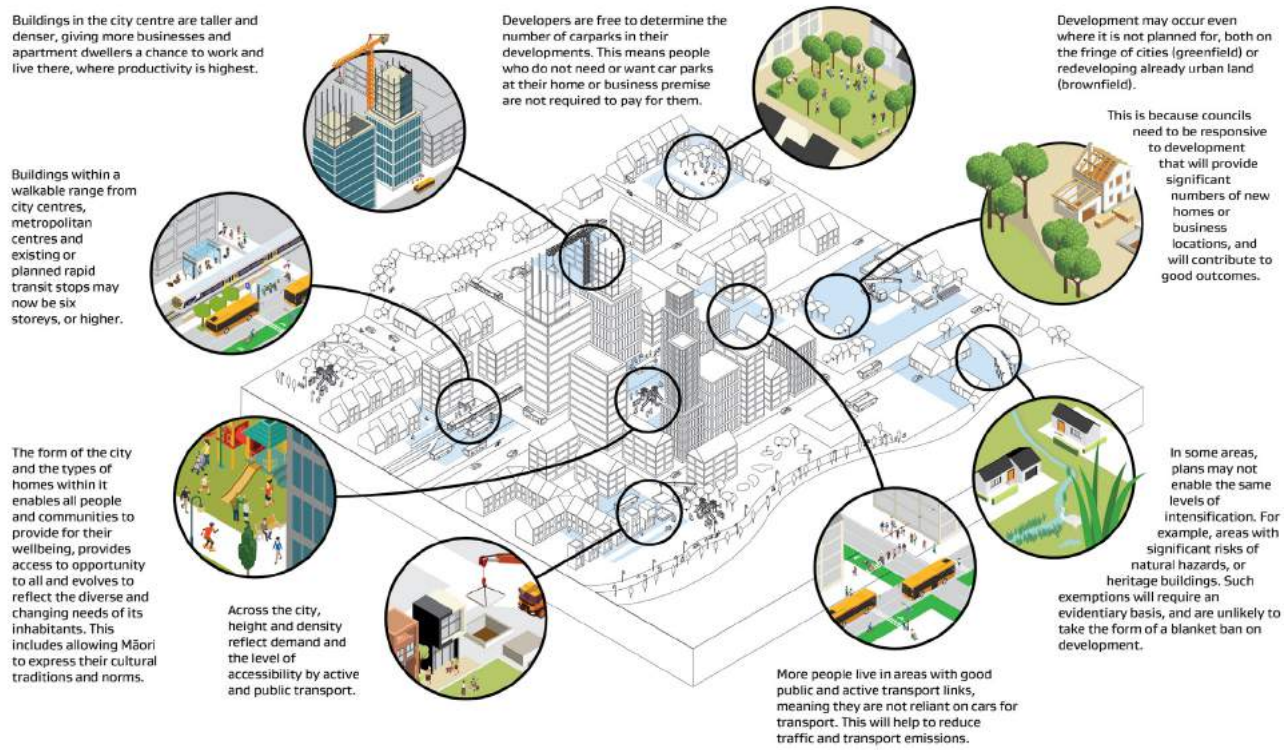
Auckland Rapid Transit Plan (ARTP)
This plan is currently being developed through a partnership of AT, Auckland Council and Waka Kotahi. It will provide a detailed plan for the development of Auckland's rapid transit system over the next 30 years. This work will inform this plan and ensure there is strong access to all future and existing stations. This will ensure we can get the most out of all the investments that are made.

Regional Public Transport Plan (RPTP)

The current RPTP was approved by the AT Board in 2019. The plan describes the public transport network that Auckland Transport proposes for the region, identifies the services that are integral to that network over a 10-year period, and sets out the policies and procedures that apply to those services. There is a strong opportunity for the next RPTP to be influenced by this study. A lot of investment has gone into the PT network, but to get the most out of that network a significant investment in first and last leg transport needs to be made. This study can guide how and where the investments need to be made. This can become a significant part of the next RPTP.

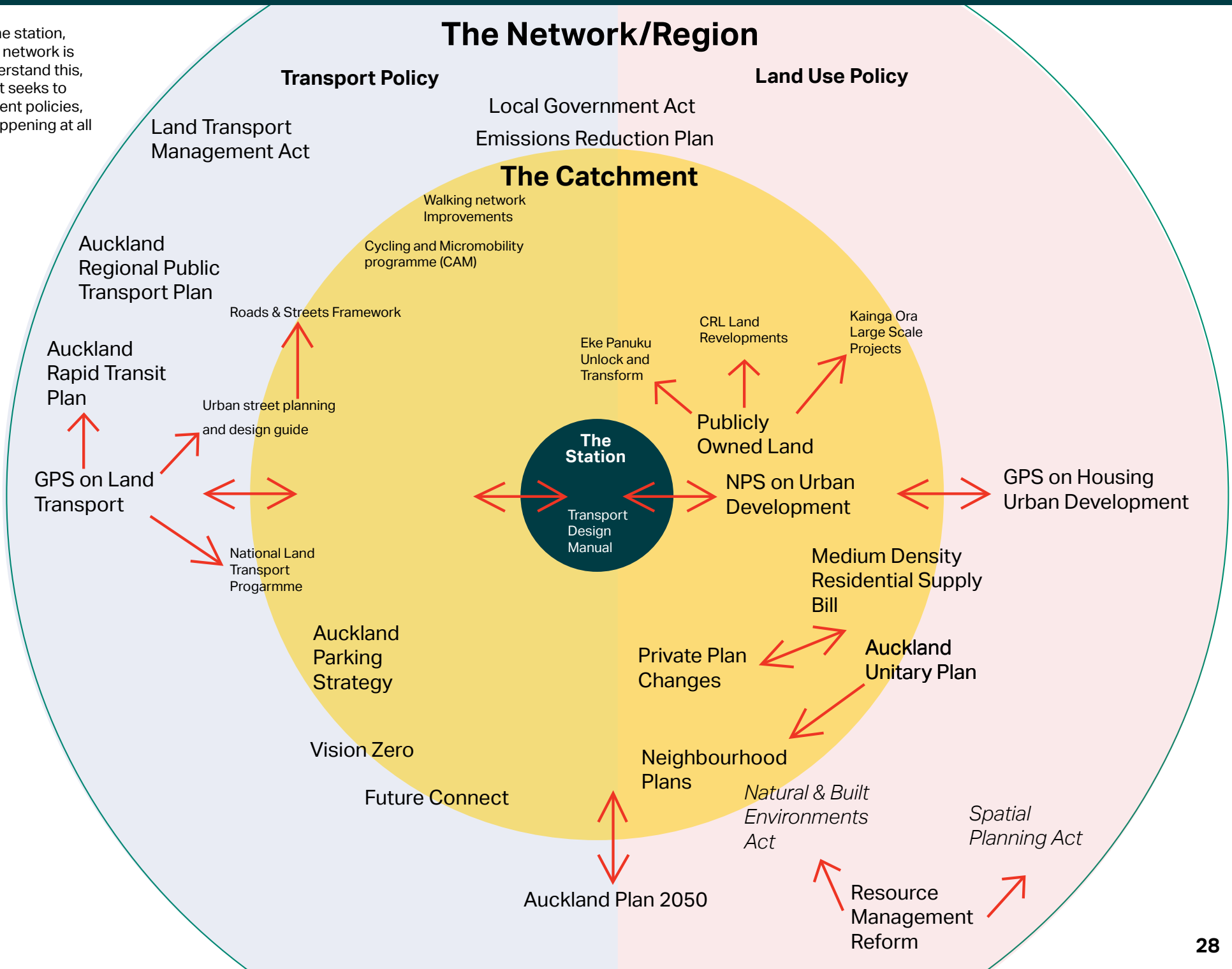
Imagining an Integrated Strategy...

The NPSUD is a strong first step towards an integrated strategy, but in order to truley realise the ambition of a well-functioning urban environment there needs to be an approach that goes beyond land use zoning.



Source: MHUD

The Policy context of the station, the catchment, and the network is complex. To better understand this, the diagram on the right seeks to visualise all these different policies, strategies and plans happening at all levels.



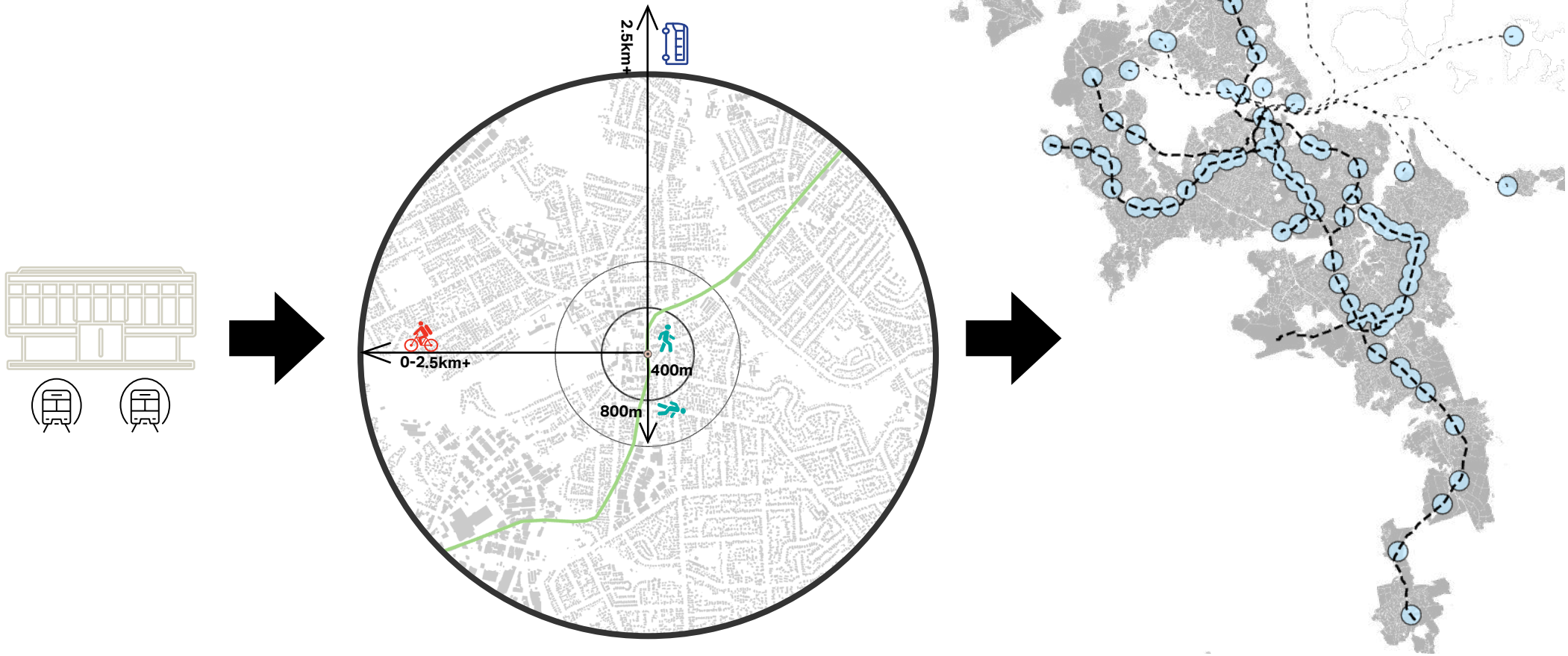
05

The Butterfly Mechanics

Developing an integrated assessment tool

To respond to the many challenges and opportunities in Auckland a tool has been developed. This is a decision support tool to capture the key actors and factors involved in improving the customer journey, the station experience and the surrounding catchments.

The tool sets out a framework to measure key aspects of a station and the catchment surrounding it. This framework is data-driven, with data and evidence coming together to measure the current and future performance of each station. It captures the key components involved in creating well-functioning urban environments around stations. It can also help to streamline cross-sector planning and decision making.



This tool draws on international best practice. It is based on the Dutch Butterfly model. This model integrates transport and land use decision making to create thriving communities around stations. It brings together a wide range of transport, planning, land use and customer experience disciplines and highlights the corresponding factors that influence a stations performance.

The model presents the findings in a way that makes it intuitive for a range of political, planning and investment disciplines. This is key to making sure that the tool is useful to many people in many fields of work that influence how successful our rapid transit network is.

The decision support tool provides opportunities to:

- Fill the gap in information about how to foster thriving communities around stations
- Achieve government policy goals/ambitions
- Direct investment around stations and their catchments
- Provide a clear and consistent framework that limits subjectivity
- Address the overarching need to better integrate land use and transport investment
- Reduce the risk of poor outcomes going unnoticed
- Improve conversations between various stakeholders, both public and private
- Identify current and future network deficiencies that can be improved

To develop an integrated decision support tool this study:

1. Established best practices principles and outcomes for the station, catchment and network.
2. Established metrics to measure the outcomes in a clear and consistent way.
3. Measured the existing conditions for transport, land use and station experience.
4. Identified future opportunities to create thriving communities.
5. Identified next steps to enable a pipeline of works.

1 Establish Principles and Outcomes

The first step is to establish a clear set of guidelines and principles for what we want to achieve. This includes clear goals for the performance of a station and the surrounding catchment. Then determine how these can measured and improves, and identify which stakeholders are responsible for improving each of the outcomes.

2 Establish Metrics to Measure Outcomes

The metrics were adapted from an existing Dutch model for a New Zealand context. This allows for an assessment that is suited for an Auckland context. The adapted metrics allow for an intuitive interpretation of dozens of data sources that are weighted and brought together to demonstrate areas for investment to achieve thriving communities around stations.

3 Measure the Existing Conditions

Using the adapted metrics, an assessment of the existing conditions is undertaken. This encompasses all the different metrics. These metrics have numerous sub-categories that add up to 100. Each station is categorised into a typology based on its strategic intent. Within the typologies an aspirational score is given for each metric. This provides insight into how a station is functioning in relation to its strategic intent.

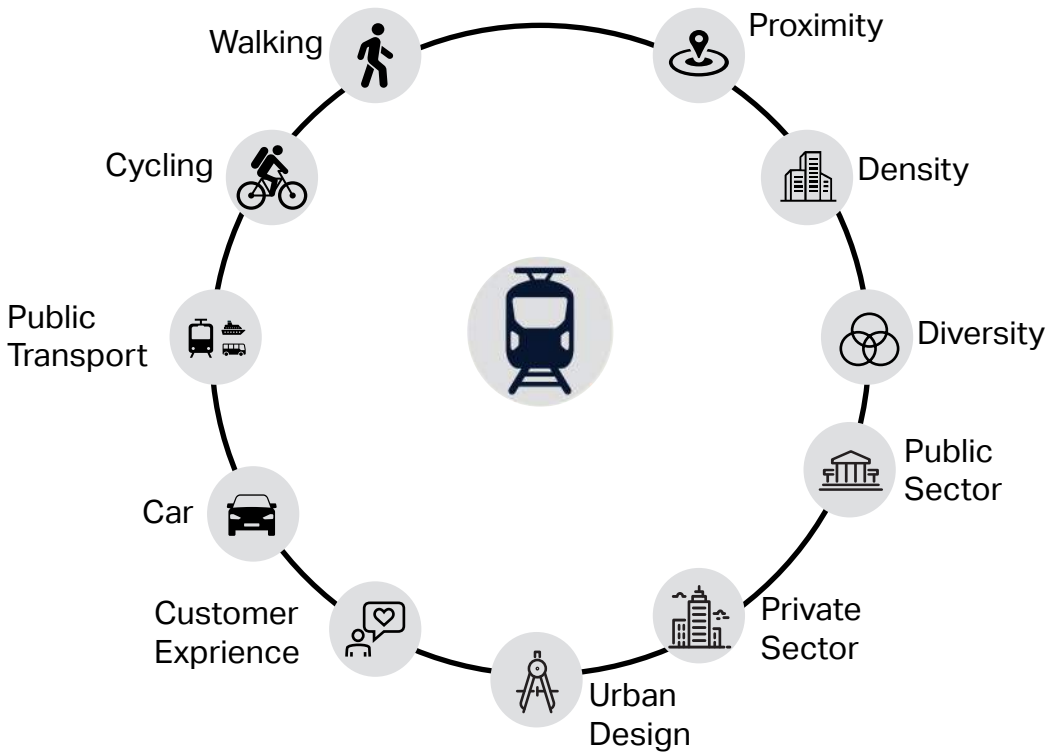
4 Provide Insights using the Butterfly Tool

The Butterfly Model provides an integrated overview of the many functions to go into thriving communities around transit. The modal, as the name suggests, is a visualisation in the shape of a butterfly. Each wedge of the model on the transport side and opposite land use side seek to balance one another out. With the model we can also input different scenarios and investments to gain insight into how they may affect the metrics.

5 Commit to improving the baseline

The final step is to take the model's insights and a develop thriving communities. This is done through a pipeline of work and investment that aligns the stations and its catchment with its strategic intent.

1 Establish Principles and Outcomes



We started by establishing clear guidelines and principles for each aspect of a station and its catchment's performance. We then outlined how these could be measured and improved, and identified which stakeholders are responsible for improving each of the outcomes.

This included transport, land use, stakeholders and design interactions. We developed several design principles that align strongly with government and council policy direction. The key aim of this process was to better understand the relationship between the transport network (node and movement) and land use (surrounding place). This included their functions in the public realm, their strategic intent in the network and how to shape transport and land use interventions. Putting this all together is key to creating thriving communities around transit.

Integrated Outcomes

Walk
Design street networks that improve walking

Outcome A: The pedestrian real is safe and accessible to all.

Outcome B: The station's walkable catchment is maximised.

Outcome C: The street networks are equitable and inclusive.

Outcome D: The wayfinding by people walking is easy and intuitive.

Outcome E: High-quality transit is accessible by people walking.

Cycle
Design street networks that improve cycling and micromobility

Outcome A: The cycling network is safe, direct and complete.

Outcome B: The cycing network is connected to communities.

Outcome C: Cycling parking and storage is ample and secure.

Outcome D: The micromobility and biking wayfinding is easy and intuitive

Public Transport
Improve access to public transport nodes

Outcome A: The rapid transit network is frequent, reliable and connected.

Outcome B: The local services are fequent, connected and integrated.

Outcome C: The transfer experience from connecting services is easy and intuitive.

Outcome D: Nodes are connected with intercity travel.

Car
Increase mobility by managing parking and road use

Outcome A: Minimise land occupied for parking in high quality transit areas.

Outcome B: Improve parking management

Outcome C: Prioritise consitency with mode hierarchy

Proximity
Enable growth close to transit

Outcome A: High-density development is prioritised close to transit nodes.

Density
Optimise density and match transport capacity

Outcome A: High density residential and jobs are located within the stations walkable catchment.

Outcome B: The density matches transport capacity to enable well functioning urban enviornments.

Diversity
Optimise land use and improve diversity

Outcome A: The zoning and land use that promotes diverse functions.

Outcome B: Opportunities and services are within a short walking distance of where people live, work and public space is activated.

Station Experience
Improve the station experience for everyone

Outcome A: The station experience is safe, accessible and comfortable for all users.

Outcome B: The wayfinding inside and adjacent to the station is easy and intuitive for all users.

2 Establish Metrics to Measure Outcomes

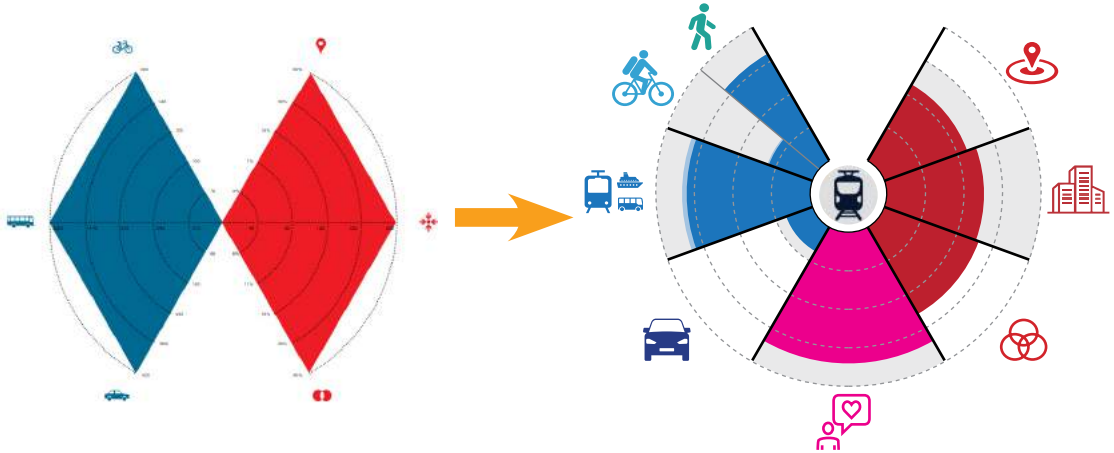
MAAK PLAATS!

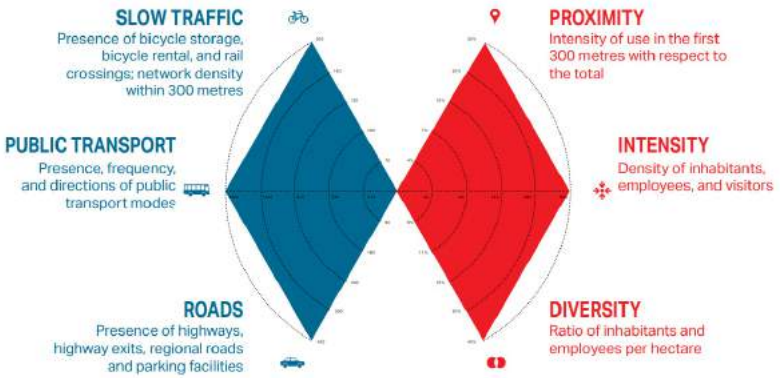
Maak Plaats! (Dutch for Make space/place) and the butterfly model were the inspiration for this study. The Dutch model has been adapted for an Auckland context. Maak Plaats draws from key principles to measure how well a station functions. This functioning is measured in the present and for the potential future. The key principles that align with this adapted version include:

- Service frequency increase and spatial development are mutually reinforcing.
- Realise at least 50% of new development within catchment areas of rapid transit stations.
- Prioritise existing land use development within the urban growth boundaries and within the catchment areas of stations.
- Align urban growth plans with the ambition of thriving communities around transit.

These principles align closely with recent policy changes and the strategic intent of a myriad of government policy.

The model then aims to synthesise and present this information in an intuitive format. This format may appear simple but still contains as much data as possible and is highly informative. All parts of the diagram relate to the functioning of a station, the catchment and the wider network. A key principle within the diagram is the balance between the public transport levels and the intensity of land uses.





Contextualising the metrics

While the principles of good transit and urban design apply everywhere, a direct translation of the Dutch model into a New Zealand context would be problematic. There are several key areas where the Dutch model would not work. The Netherlands has a well-developed walking and cycling network, with the primary areas of improvement shifting to bike parking. In response the New Zealand model integrated much deeper and more advanced measurements. This included integrating deficiencies in the walking network that have been identified in Future Connect by AT.

Another shift was the splitting of active modes into two; walking and cycling and micro-mobility. Best practice active transport planning recognises the clear differences in needs for both forms of travel. There is a strong discrepancy between existing walking and cycling infrastructure that we wanted to capture.

3 Measure Existing Conditions

Walking

This measures how accessible a station is on foot. To increase this score:

- Improve footpath width and quality.
- Increase the walking network and density.
- Improve crossing safety across the catchment.
- Improve the general walking safety across the catchment.
- Improve walking wayfinding.

Cycling

This measures how accessible the station is for people cycling or using micro-mobility. To increase this score:

- Increase the amount of safe cycleways in the catchment.
- Increase cycle and micro-mobility parks.
- Improve hired micro-mobility options.
- Improve general cycling safety.

Public Transport

This measures how accessible a station is via public transport. To increase this score:

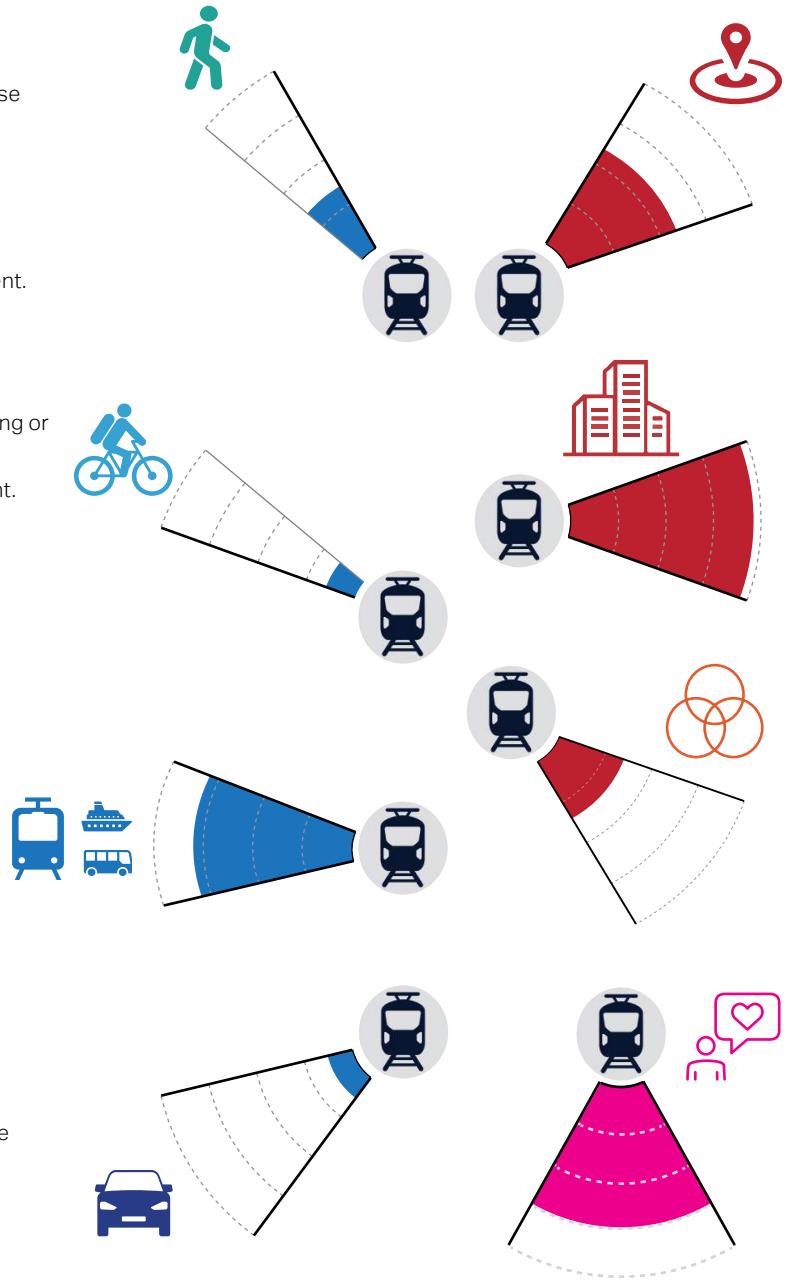
- Increase the number of directions reachable by public transport from the station.
- Increase the frequency or operating hours of any service.
- Decrease travel time between stations.
- Improve the transfer experience between rapid transit and local services.
- Provide intercity bus and train services.

Car

This measures how accessible a station is by car. To increase this score:

- Increase the number of park and ride spaces.
- Increase the unmanaged on street parking.
- Increase private parking spaces available.
- Increase motorway and arterial road connections to the station.

The Butterfly Wedges



Proximity

This measures the proportion of uses within 400m of the station as a proportion of total uses in 800m. Put another way, this measures how station oriented the land use is. To improve this, a higher density of development needs to be enabled in proximity to the station.

Density

This measures the total number of uses (residential, commercial and education) within the catchment. This is expressed through density per square kilometre. To improve this, higher densities of development need to be enabled in each mesh block within the station catchment.

Diversity

This measures how well mixed the uses within the catchment are. There are two measures; the mix between jobs, population, and education at a mesh block level, and the number of points of interest within the station catchment. The first is done by taking the number of jobs and education against the number of residents at a mesh block level. This allows us to take an average of jobs and education/residents mix in all mesh blocks within the catchment. To improve this, a mix of uses needs to be enabled and encouraged within each mesh block in the catchment. The second is done by measuring the number of points of interest relative to other stations on the network.

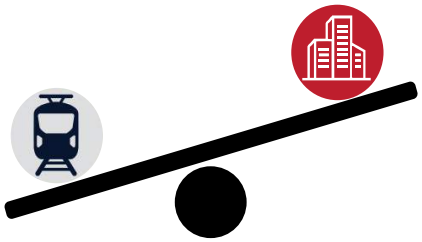
Station Experience

This measures the overall station experience for a range of different customers. Toincrease this score:

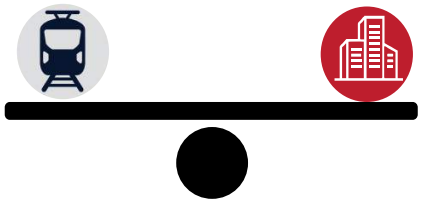
- Improve safety, accessibility, amenities and wayfinding.
- Improve micromobility access.
- Improve overall ease of use.

Seeking Balance

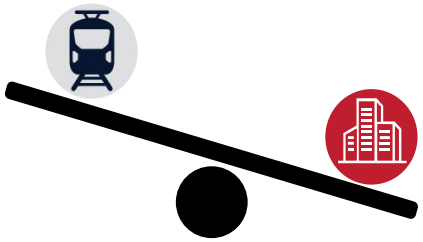
A key principle of the model is to establish a balance between public transport and density in the butterfly. This is a basic and early indicator of a station and the ingredients to help the surrounding community thrive. Seek balance to ensure that height and density reflects the level of public transport access or to identify opportunities where transport and land use are better balanced.



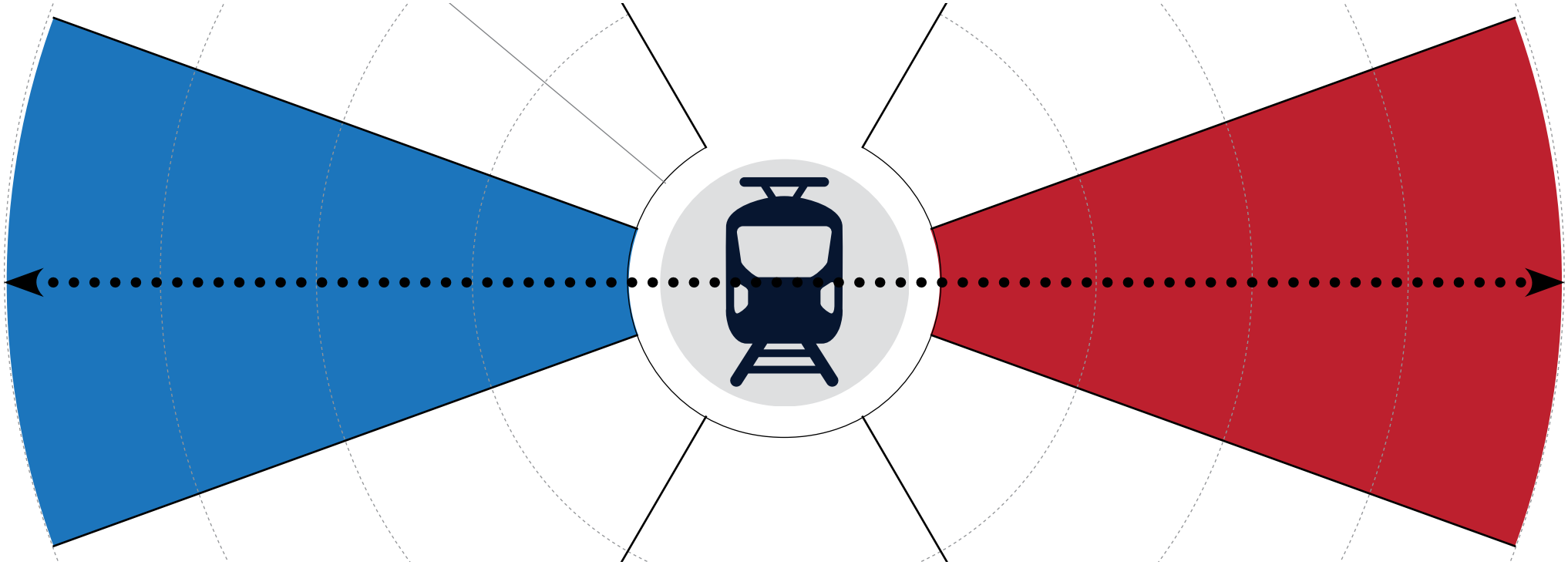
Large investment into public transport made, but is not being utilised due to low levels of density. Opportunity to increase the density to match levels of public transport access.



Levels of density are matched with the levels of public transport access. This is the most desirable outcome. Enables a well functioning enviornment and delivers upon multiple policy outcomes

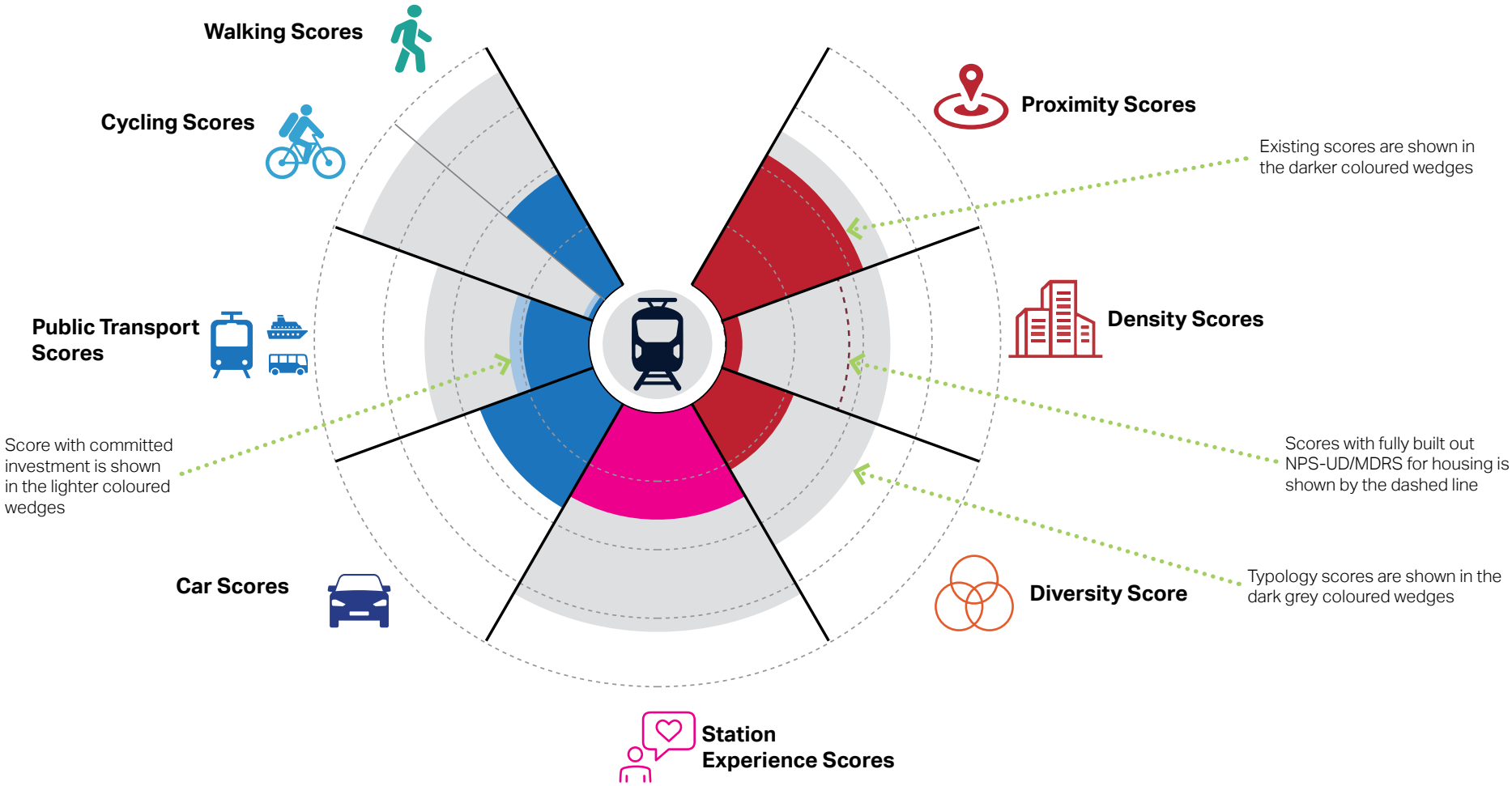


There is a very high level of density but a low level of public transport access. This is the most negative outcome and there needs to be significant public transport investment to support density



The Metrics

Each segment of the tool summarises an important part of a well functioning station; increasing any metric will increase how accessible the station is by one way or another. This section will summarise how the score for each wedge could be increased. It is important to note that this does not mean that a score neccessarily should be increased; this happens within the typology, where the vision for each station stype provides the future directon for investment. However in most cases (perhaps with the exception of the car wedge) increasing the size of any wedge is a good thing that will improve the performance of a station and its catchment.



4 Provide Insights Using the Butterfly Tool

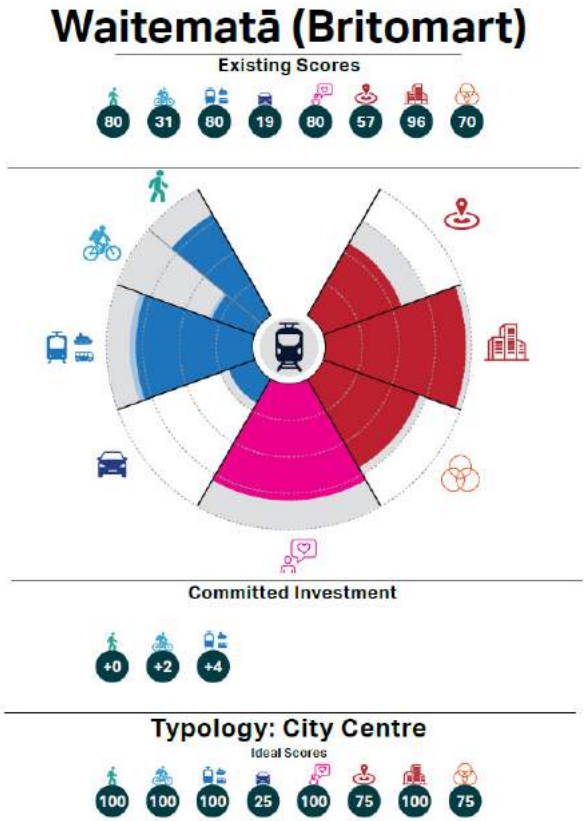
The basic idea of the model is that each metric summarises the elements that go into a station and the community surrounding it. Increasing any metric will increase how accessible the station is one way or another. Each station is given a typology to identify its future ideal state. This is linked closely with the strategic intent of the station. This then guides investment decisions and areas of priority.

Given the policy context, increasing and diversifying land use, as well as improving active mobility access is the key priority for all stations.

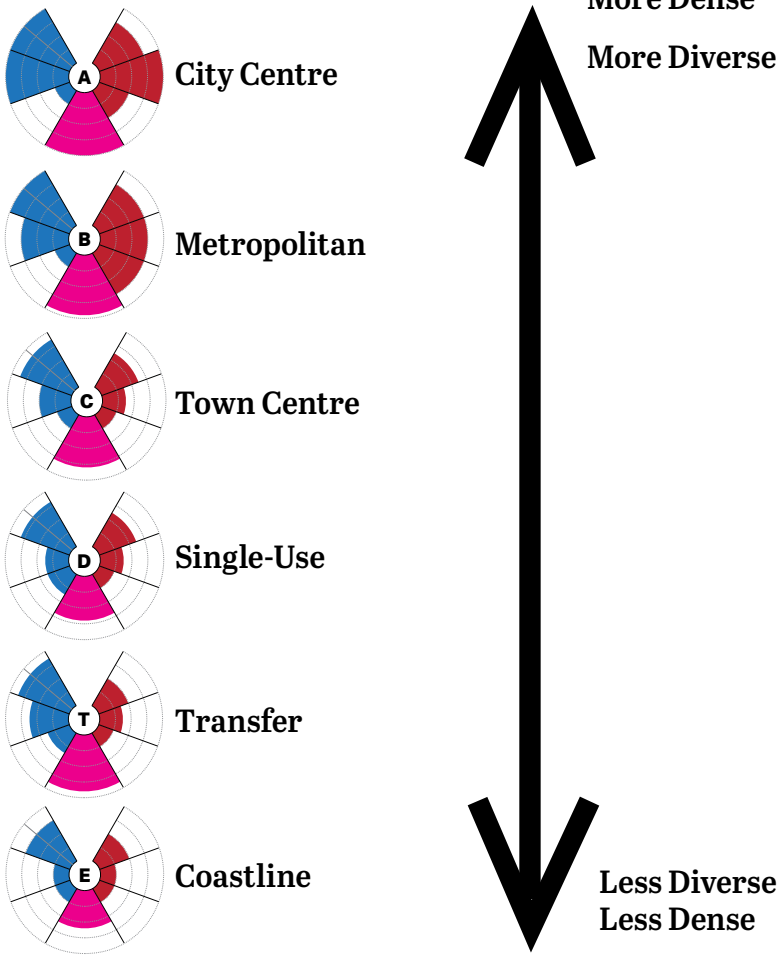
It also presents the findings in manner that is intuitive for a range of planners, investors and decision makers. This helps these different groups to align their goals and identify the biggest gaps for investment.

From a process perspective, the tool simplifies the decision making into a few steps:

- It sources data about the key principles and policy outcomes for the station and the surrounding catchment.
- This data is then translated into a geospatial format. This is useful for range of disciplines to easily visualise the insights.
- These insights are then used to measure the current performance of the various sub-metrics for each station. This establishes a baseline for each station.
- All these insights and measurements are then visualised in the butterfly diagram, where each wedge shows the individual outcomes for an integrated transport and land use approach.
- This then makes it easy to identify opportunities and deficiencies. Decision makers and planners can then have much more confidence in the decisions they are making and take the steps towards thriving communities around transit.

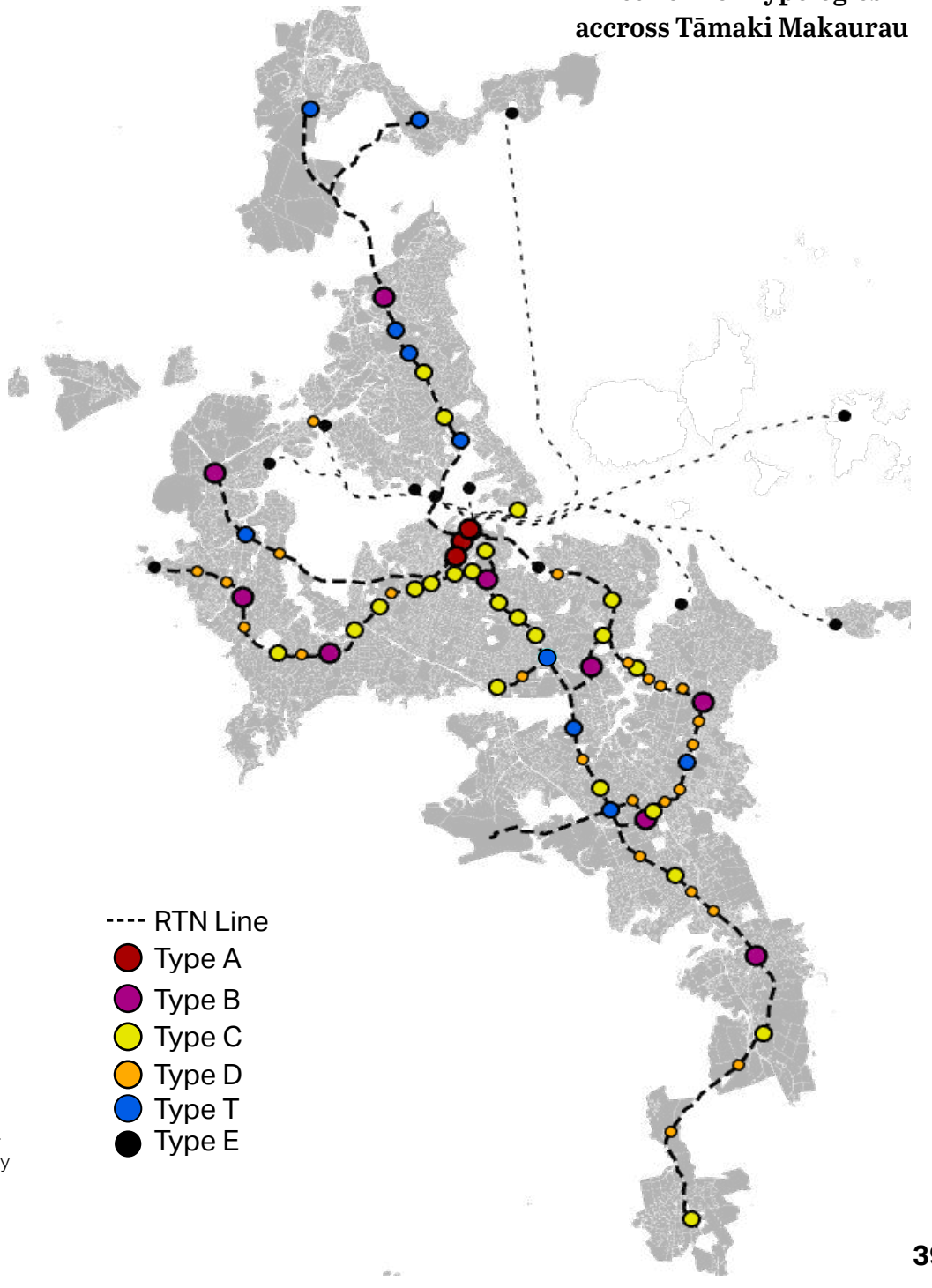


5 Station Typologies



The final step in this process is committing to improving the baseline conditions at each station. To achieve this a typology has been assigned to each station. These typologies outline the ideal future scenario for each station. The typologies seek to align with the station's strategic intent. Comparing these ideal future states against current performance can highlight the gap between where the station currently scores and where it should be in the future. It will give planners and decision makers the ability to prioritise investment to the greatest areas of need and identify the aspects of a station that most need improving to achieve thriving and sustainable communities around transit.

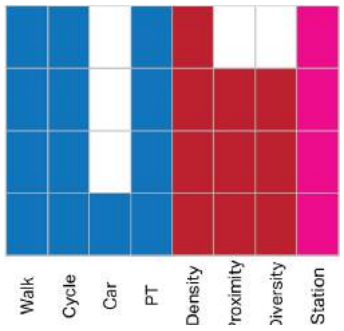
A Network of Typologies accross Tāmaki Makaurau



(A) City Centre

Land Use

Scores



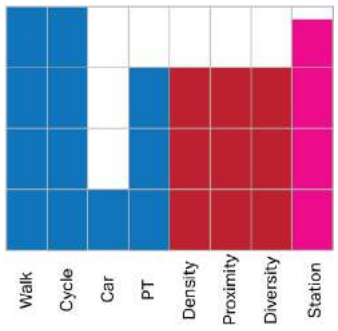
Station Experience

- Highest density
- Very high proximity
- Highest PT access
- Highest walking and cycling access
- Limited car access
- Best station experience

(B) Metropolitan

Land Use

Scores



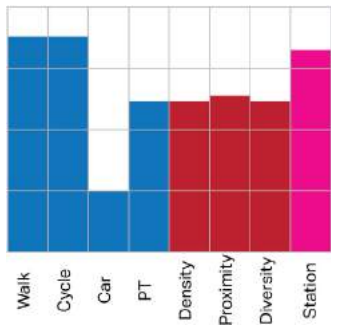
Station Experience

- Very high density
- High PT access
- Highest diversity
- High walking and cycling access
- Limited car access
- Strong station experience

(C) Town Centre

Land Use

Scores

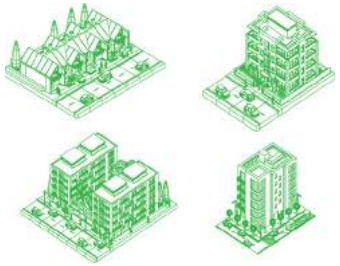


Station Experience

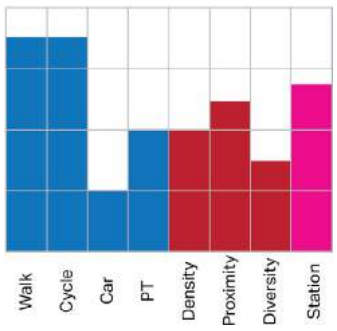
- Medium Density
- High Diversity
- High proximity
- High walking and cycling access
- Limited car access
- High station experience

(D) Single-Use

Land Use



Scores



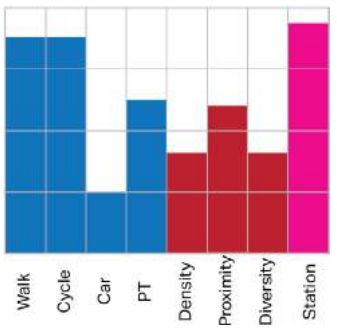
Station Experience

- Medium density
- Very low diversity
- high walking and cycling access
- Medium PT access
- Some car access
- Safe and accessible station

(T) Transfer

Land Use

Scores

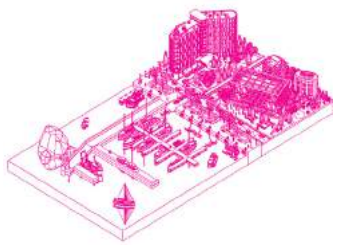


Station Experience

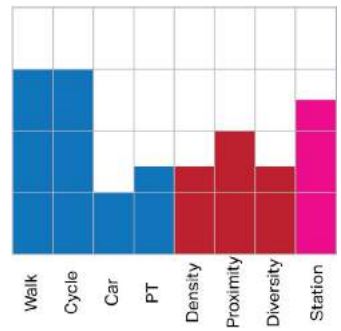
- Primarily single use
- Medium density but high PT access
- High walking and cyling access
- Some car access
- Best station experience

(E) Coastline

Land Use



Scores



Station Experience

- Primarily single use
- Lowest density
- Lowest diversity
- Medium walking and cycling access
- Some car access
- Good station experience

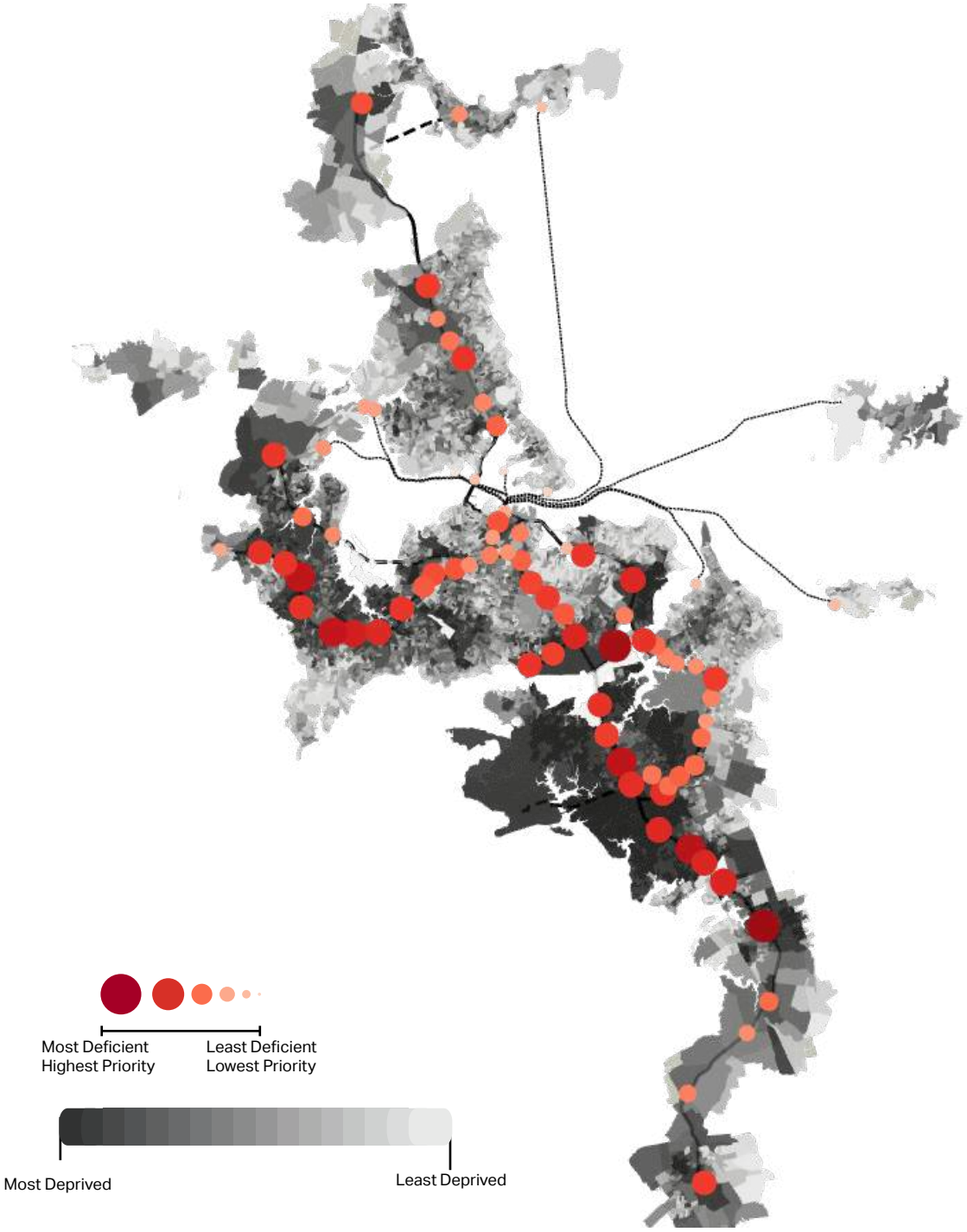
06

The Key Findings

Summary of key deficiencies

Key Findings Breakdown

Metric	Committed Investment	Typology	Deficiency
Walking	51	88	37
Cycling	15	88	73
Public Transport	34	57	23
Car	34	25	-9
Proximity	50	62	12
Density	12	54	43
Diversity	27	48	22
Station Experience	50	78	27

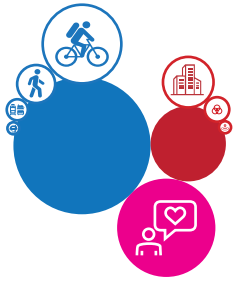


Breakdown of Key Findings by Typology

Type A

Type B

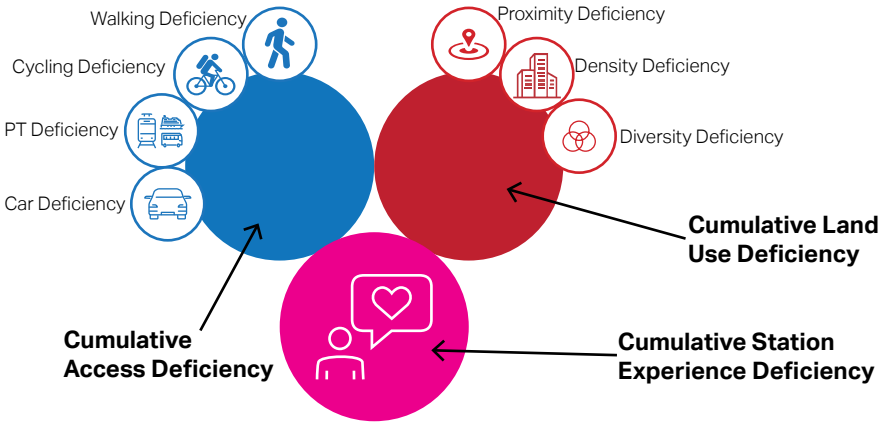
Type C



Type D

Type T

Type E



Explainer

The diagrams above demonstrate the levels of deficiency by typology, where "deficiency" is defined as the difference between a station's score after the current round of investment and the station's ideal future score. They demonstrate the cumulative deficiency for station access, catchment land use and station experience. The smaller bubbles to the side of larger bubbles show the levels of deficiency for each metric, i.e., how much of that deficiency is being made up by each metric.

The key to left explains how to understand each bubble in a visual way. These are useful for demonstrating the levels of investment that will be required within each station typology to create thriving communities around transit.

Key findings caveats, explanations and limitations

Future Stations

The assessment of future stations included:

- Airport to Botany Rapid Transit.
- The Eastern Busway.
- New Southern Growth Area Stations.
- New bus interchanges along the North-Western Motorway at Te Atatu, Westgate and Lincoln Rd.
- The new Northern Busway Station at Rosedale.
- A new station at Whangaparāoa as part of PenLink.
-

This study does not include the three A2B stations at the Airport, The Quad and Manukau. It also does not include any expected rapid transit in the Northern and North-West growth areas. Light Rail is also excluded from this study.

TheNPS-UD zoning changes currently only include existing stations and will be updated closer to implementation.

Future stations do not include on-street parking measures, as there was no data available to support this.

Scores with committed investment

The first maps show what the scores are for each station on the network with 'committed investment.' This refers to the calculated scores once committed investment is completed. These projects are added to the existing scores to create an 'investment' score.

For example, the New Lynn to Avondale pathway was only completed during the second phase of the study. This means that due to its completion the walking scores and cycling scores will be lifted due to the added benefit of the pathway.

Typology Scores

The second maps show what the scores for each station are based on their **typology**. These scores refer to the ideal future scenario for the station in each metric. This provides a comparison between where the station currently sits and where it ideally should be.

Key findings as an investment tool

The key findings identify which stations should receive priority or have the highest opportunity. The cumulative deficiencies shown on the previous page combine insights from all the various metrics as well as measuring the future capacity from recent zoning changes. The map on the next page translates these cumulative deficiencies into three levels of priority (1 being highest priority and 3 being lowest priority). There can help guide the prioritisation of investment.

Although we would note that this ranking should not be relied upon blindly. There is a myriad of factors that influence investment priorities. This is one method of prioritisation based on the factors measured in this study, and this prioritisation can be adjusted and reinterpreted depending on the reader's needs.

This study has sought a high-level overview of the investment required to achieve thriving communities around transit stations. Although to truly unlock the potential of the rapid transit network a pipeline of work and investment is required. Far more work and understanding is required to decide exactly what is required. But this tool sits at the beginning of a process that helps planners and decision makers break out of their silos. It allows them to understand differing priorities and align towards common goals.

The potential is just over the horizon; Auckland can be a place where people live, work, learn and play in thriving communities that are supported by transit.

Walking Findings

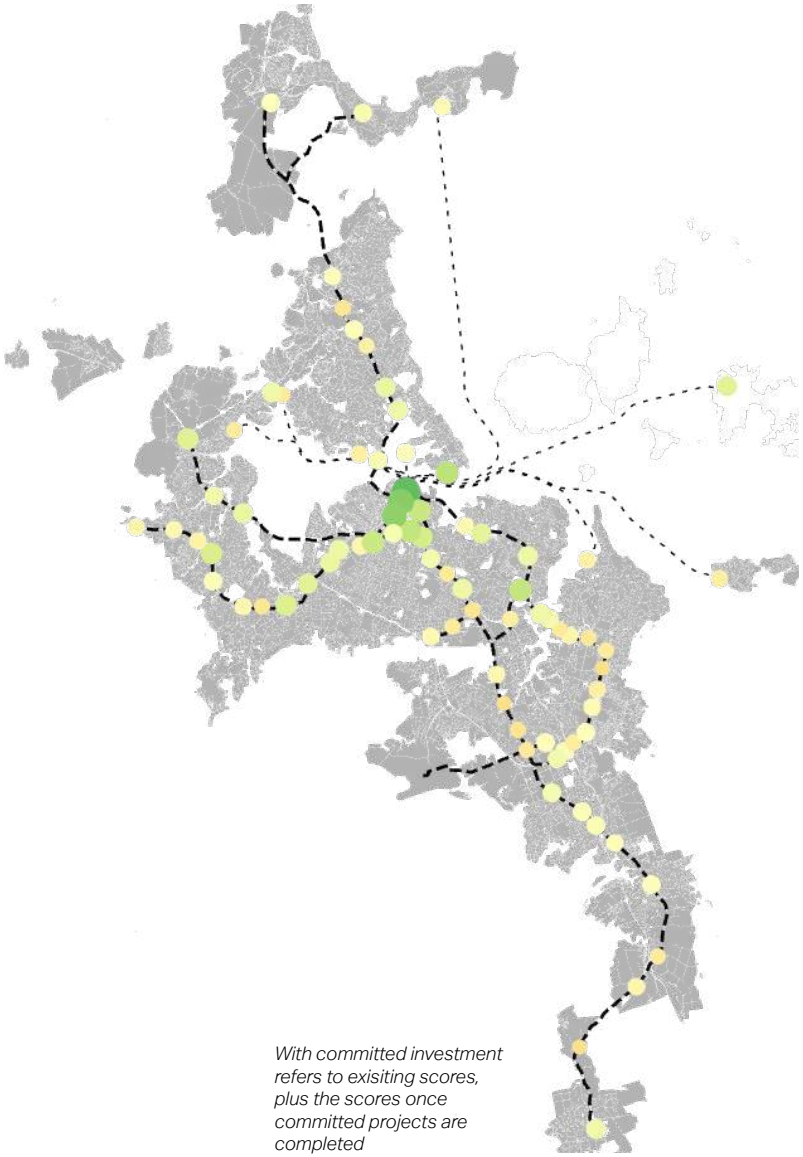
Every station should score very high for walking. Currently, there are very few stations that receive a score that is close to their respective typology.

The exceptions are limited to the three City Centre stations of Wāitemata, Te Wai Horotiu, and Karanga a Hape. There is a leaning towards moderate walking scores in stations with established town centres. This is likely due to the existence of an older and more connected pedestrian network as well as recent enhancements such as Town Centre upgrades. Many of the single use/suburban stations score very poorly for walking.

What the high-level findings indicate is that walking access in many of the well-established centres can be improved significantly. When it comes to other lower-tier stations there are significant amounts of work required to improve walking access to stations.

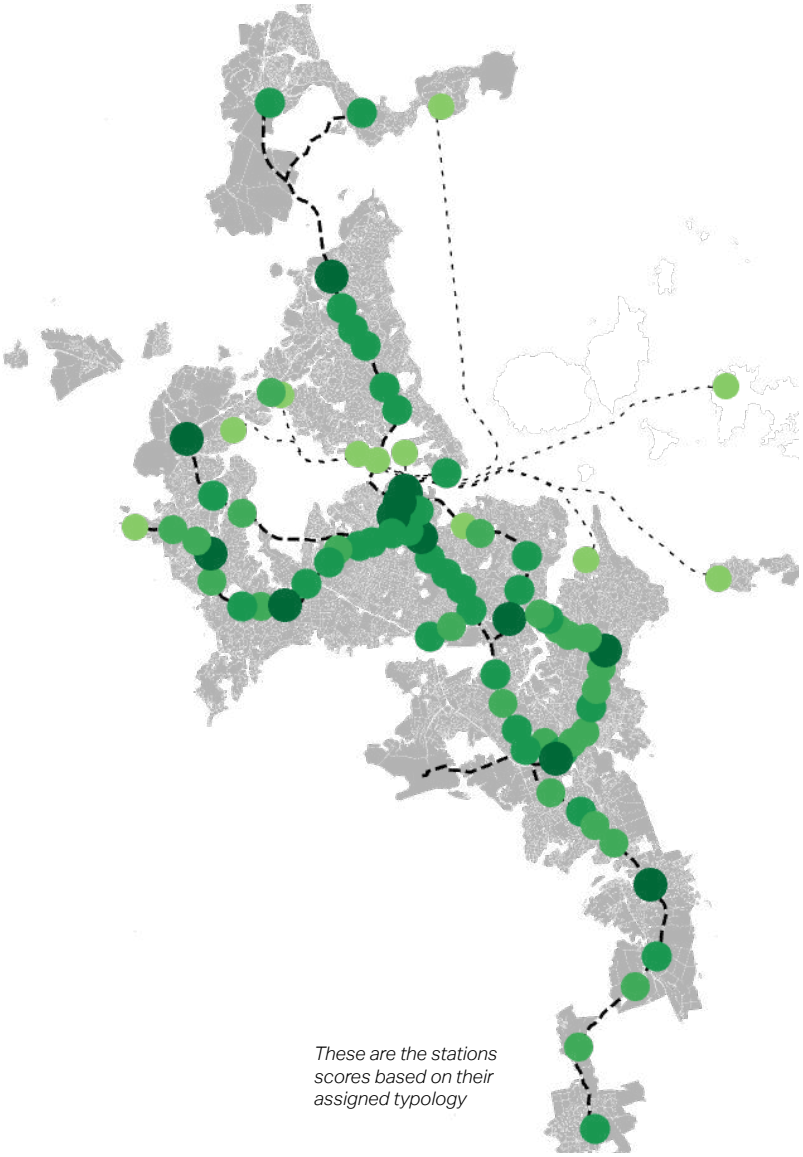
100 0 Rating Scale

Scores with committed Investment



With committed investment refers to exisiting scores, plus the scores once committed projects are completed

Scores based on typology



These are the stations scores based on their assigned typology

Cycling Findings

Every station should score very high for cycling access. What is evident from the highlevel findings is that almost all stations perform poorly for cycling access, safety and end facilities.

Even in the highest scoring stations in the City Centre, the score is far from adequate. There are severe deficiencies across the network, that require large-scale interventions to be addressed.

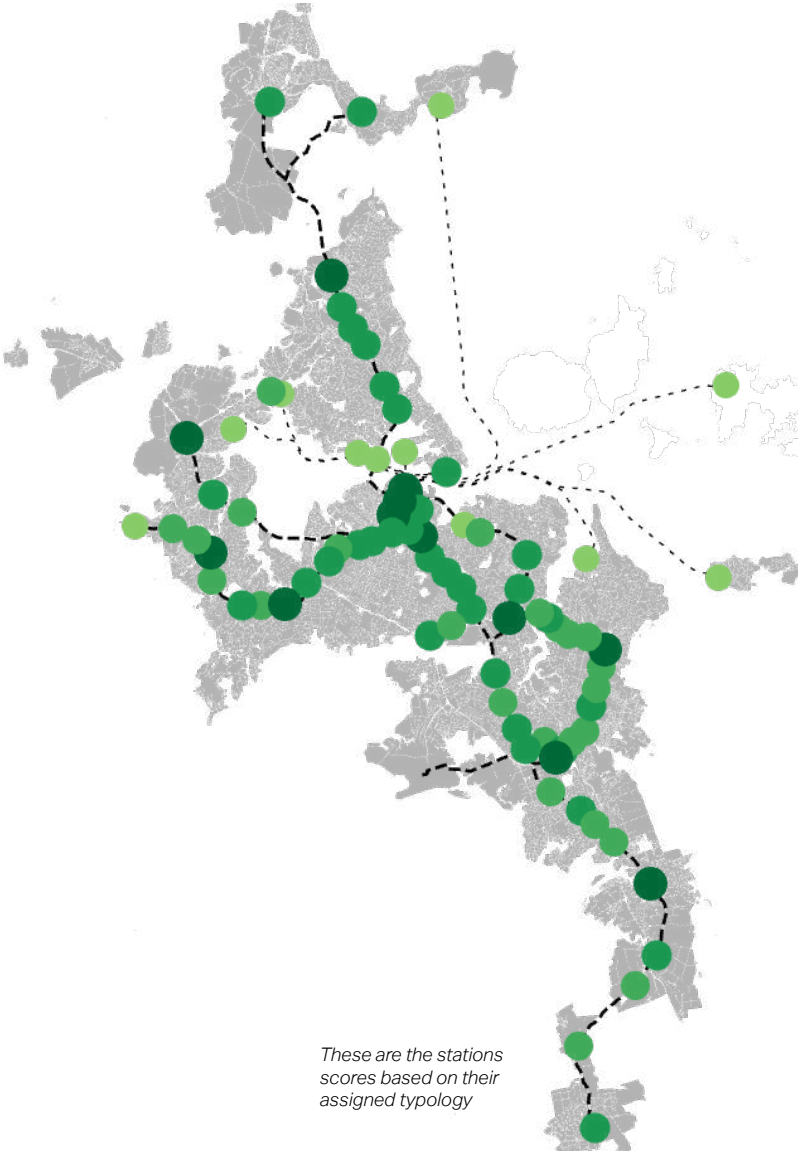
Cycling access represents perhaps the most significant opportunity to improve access to Auckland's rapid transit stations. It also has significant potential to increase patronage, reach more people and help achieve various policy goals.

100 0 Rating Scale

Scores with committed Investment

With committed investment refers to exisiting scores, plus the scores once committed projects are completed

Scores based on typology

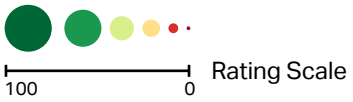


These are the stations scores based on their assigned typology

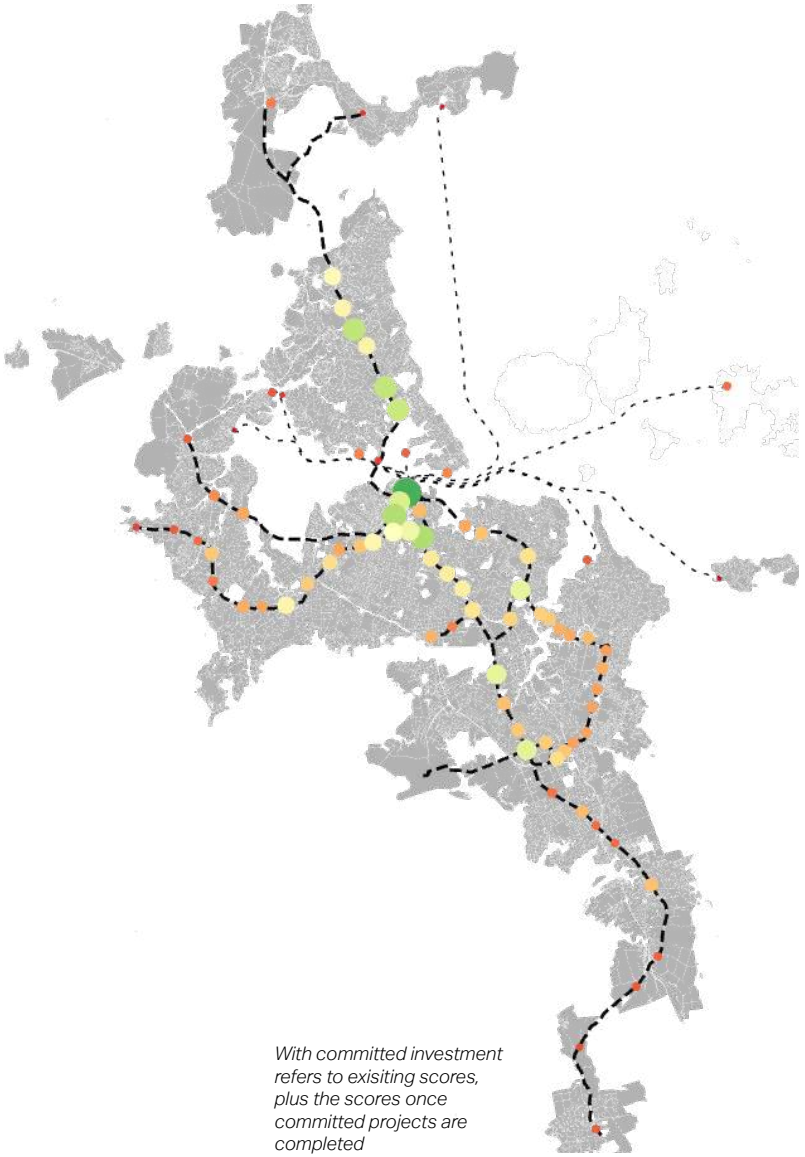
Public Transport Findings

As the study focused on rapid transit, having strong levels of public transport access is a key component. While the current scores are not shown here, there is a significant uplift across the network for public transport scores. This is due to current projects underway, that upon completion will vastly improve public transport access in Auckland.

Even with these improvements, there is still significant potential for enhancing public transport access. Over time we should continue to improve service frequency for rapid transit and local services and significantly improve the transfer experience at stations.

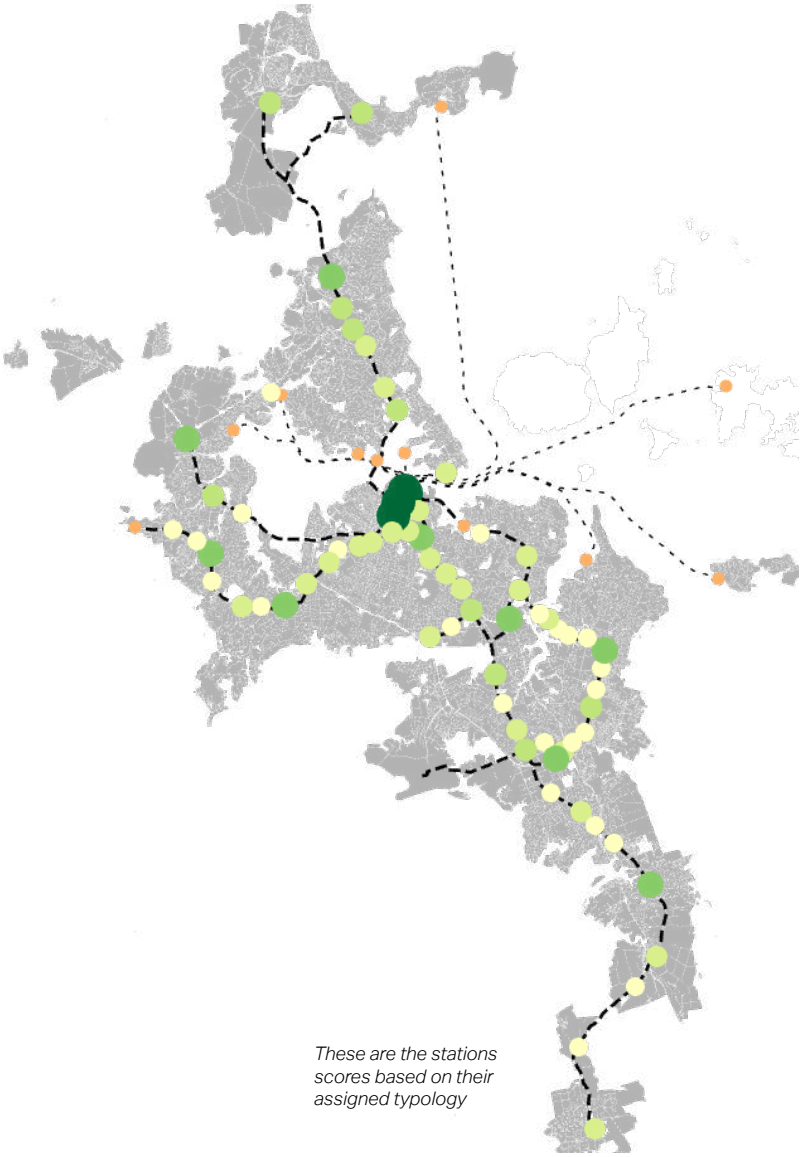


Scores with committed Investment



With committed investment refers to exisiting scores, plus the scores once committed projects are completed

Scores based on typology



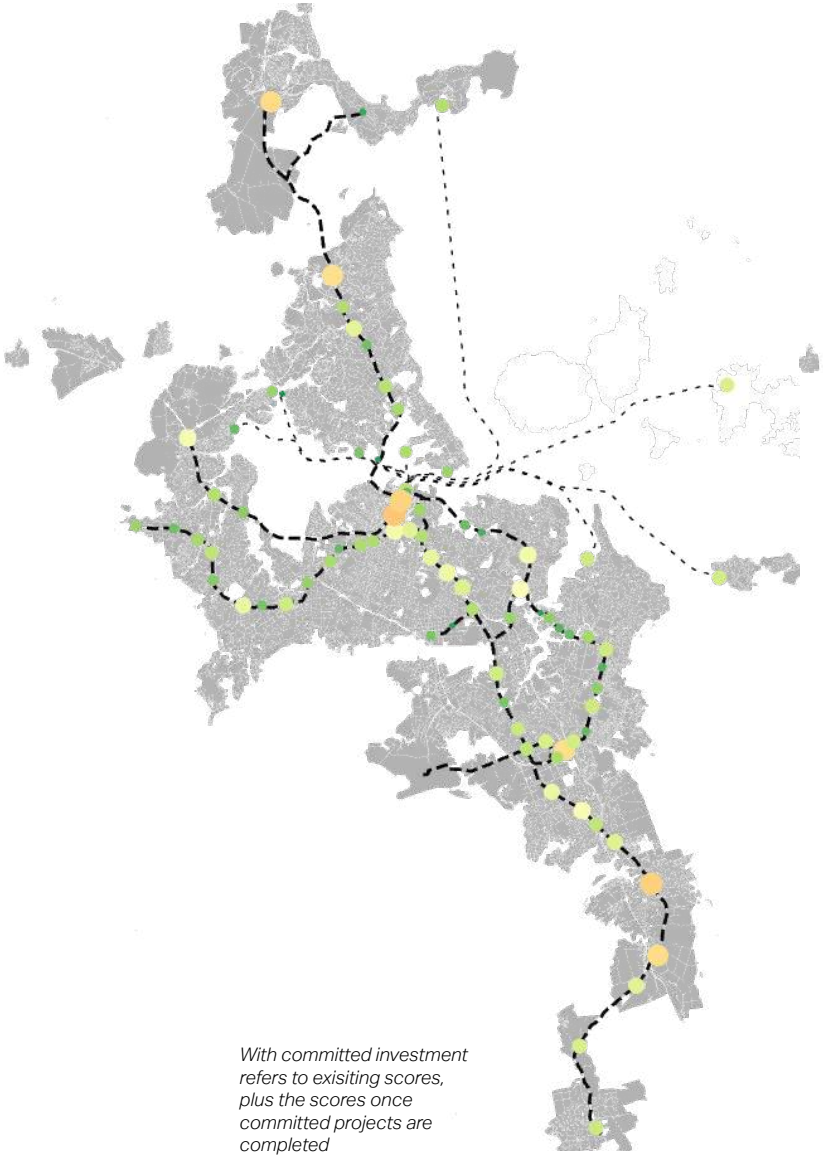
These are the stations scores based on their assigned typology

Car Findings

Many of the stations have high car access scores. This often provides much better access than for walking, cycling and public transport. Based on the station access hierarchy, the car should represent the lowest form of access priority for rapid transit catchments.

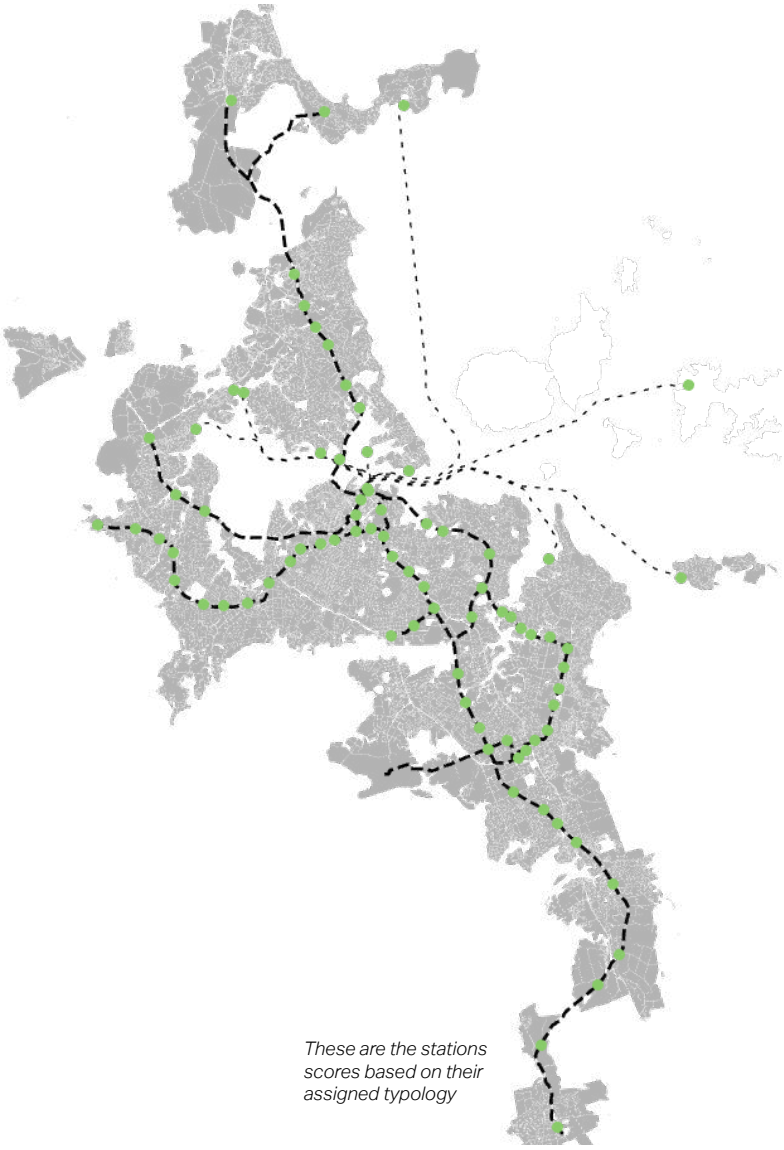
There are significant opportunities to offer better travel choices for customers. This can be achieved by introducing better parking management and the reallocation of road space. Road space priority should be given to active mobility and public transport above car access.

Scores with committed Investment



With committed investment refers to exisiting scores, plus the scores once committed projects are completed

Scores based on typology

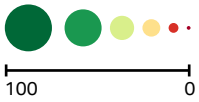


These are the stations scores based on their assigned typology

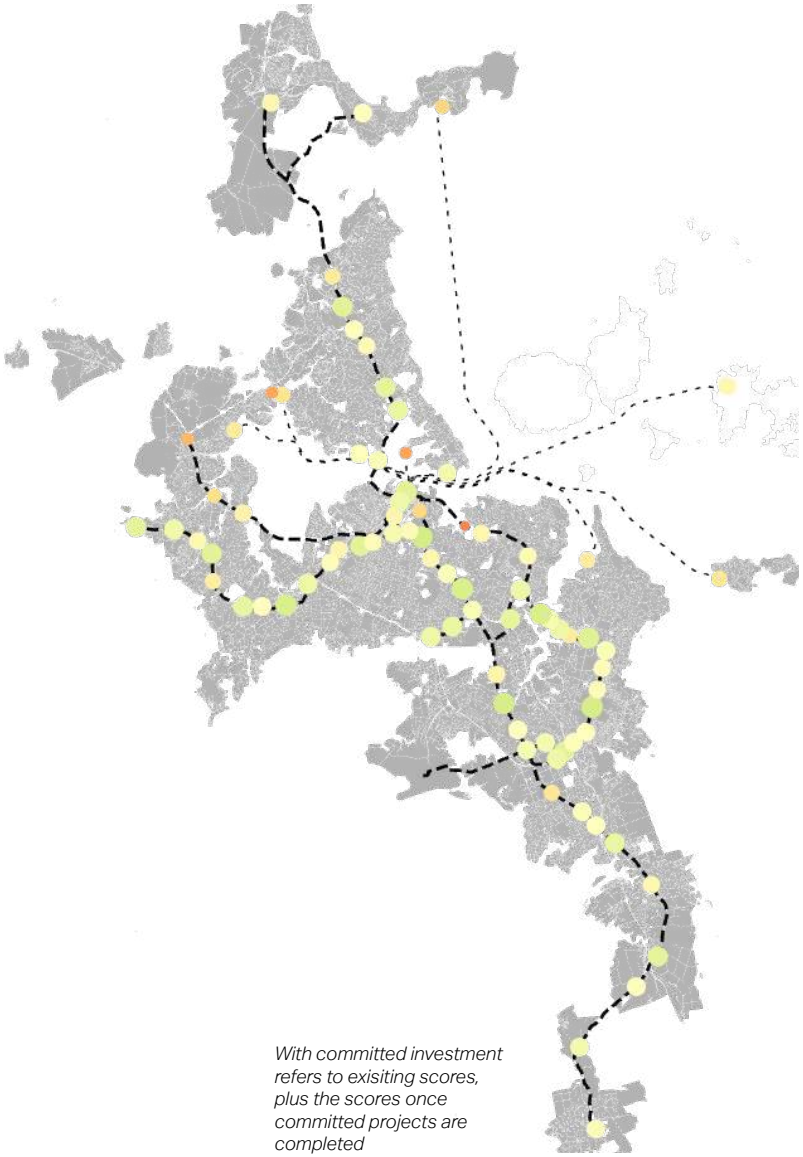
Proximity Findings

Proximity scores across the network indicate that densities tend to be approximately even. However, this is likely due to there being a low level of station-oriented development and there being low levels of density.

As density increases over time with more growth and renewal, we need to ensure that higher densities and a mix of uses are enabled closer to stations. This will ensure that as density increases the levels of land use proximity can also increase.

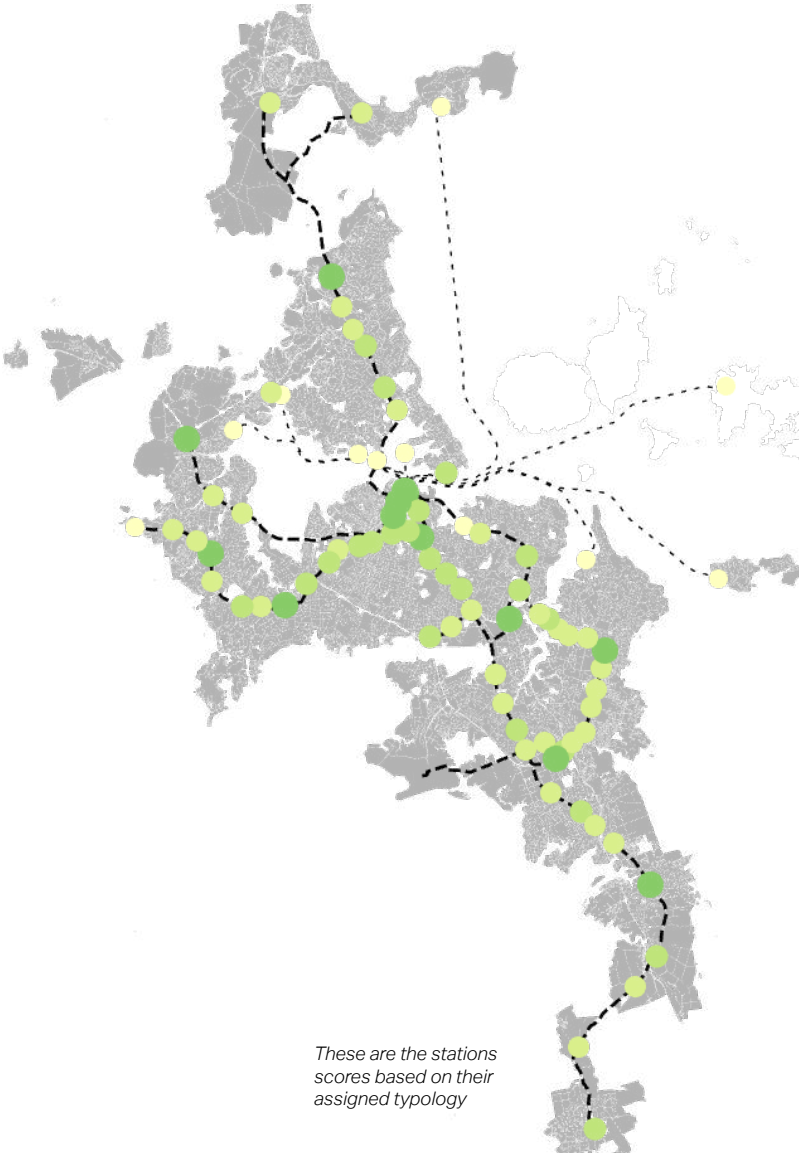


Existing Proximity Scores



With committed investment refers to exisiting scores, plus the scores once committed projects are completed

Scores based on typology

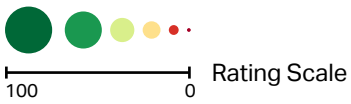


These are the stations scores based on their assigned typology

Density Findings

Most stations score very poorly for density. This highlights the significant opportunity there is to lift density around stations. This can be achieved through enabling greater height and density to reflect the levels of transport access.

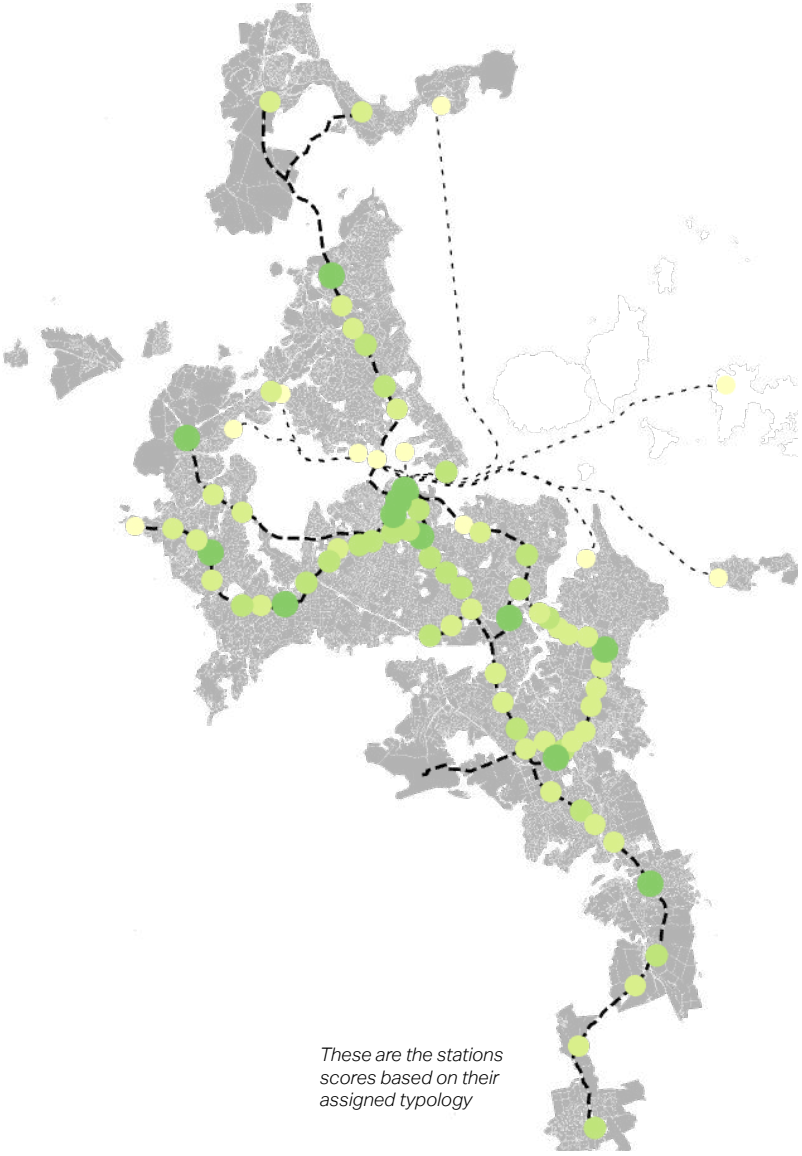
In Auckland, density is low at almost every station, with the City Centre stations being the only exception. No stations fall within the approximate densities that the NPS-UD might allow and across the network, levels of public transport indicate that even at current service levels, higher density could provide significant benefits.



Existing Density Scores

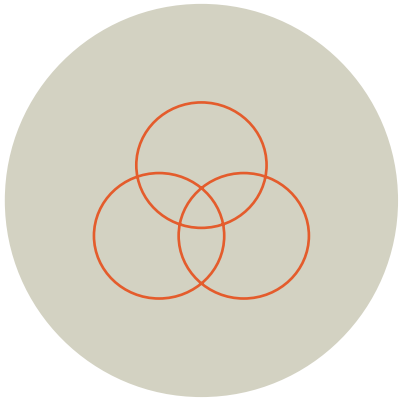
With committed investment refers to exisiting scores, plus the scores once committed projects are completed

Scores based on typology



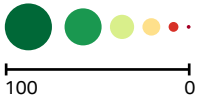
These are the stations scores based on their assigned typology

Diversity Findings

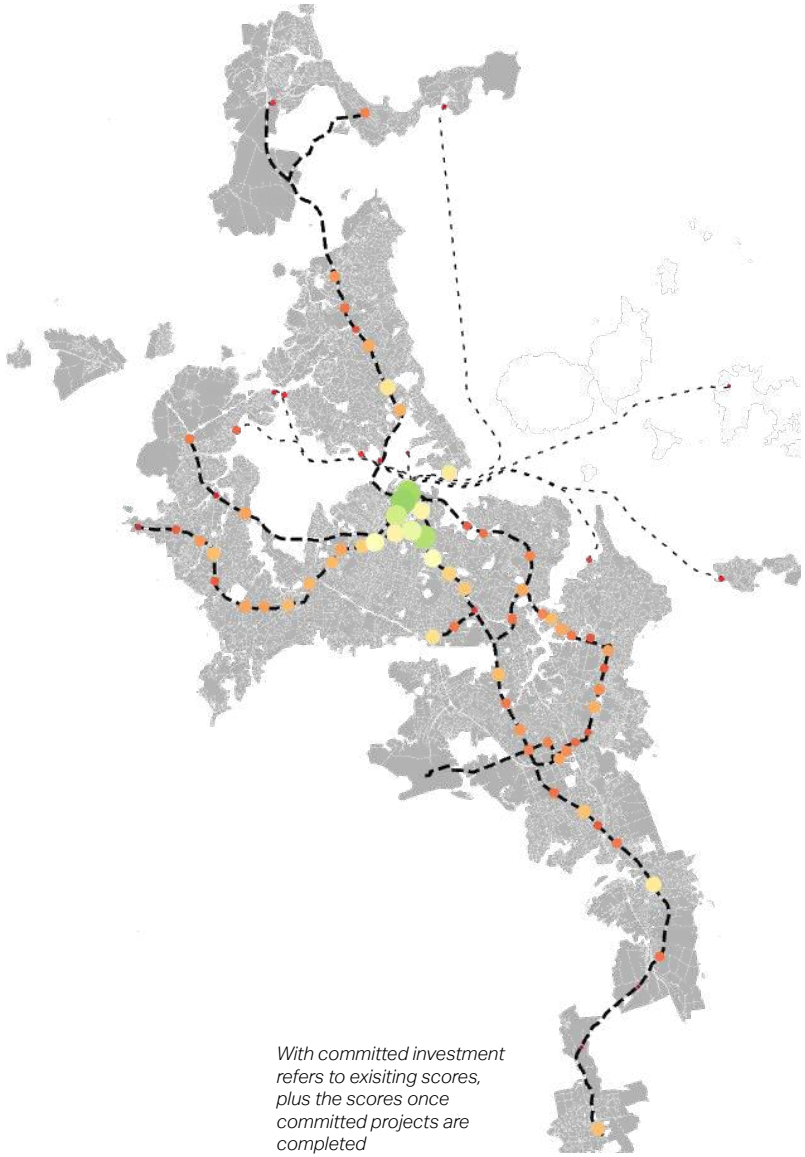


Having a higher land use diversity has many benefits. This includes reducing the overall need to travel, supporting higher levels of density, and making travel patterns less peak-heavy. Most stations score at a medium level. This indicates the potential for improvement.

There is a very strong linkage between the levels of diversity and levels of density. Overtime we can expect that for many stations their levels of density will also increase. Therefore, the most important way to increase the levels of diversity it to enable high density mixed-use development. This is one of the more critical elements to creating thriving communities around stations.

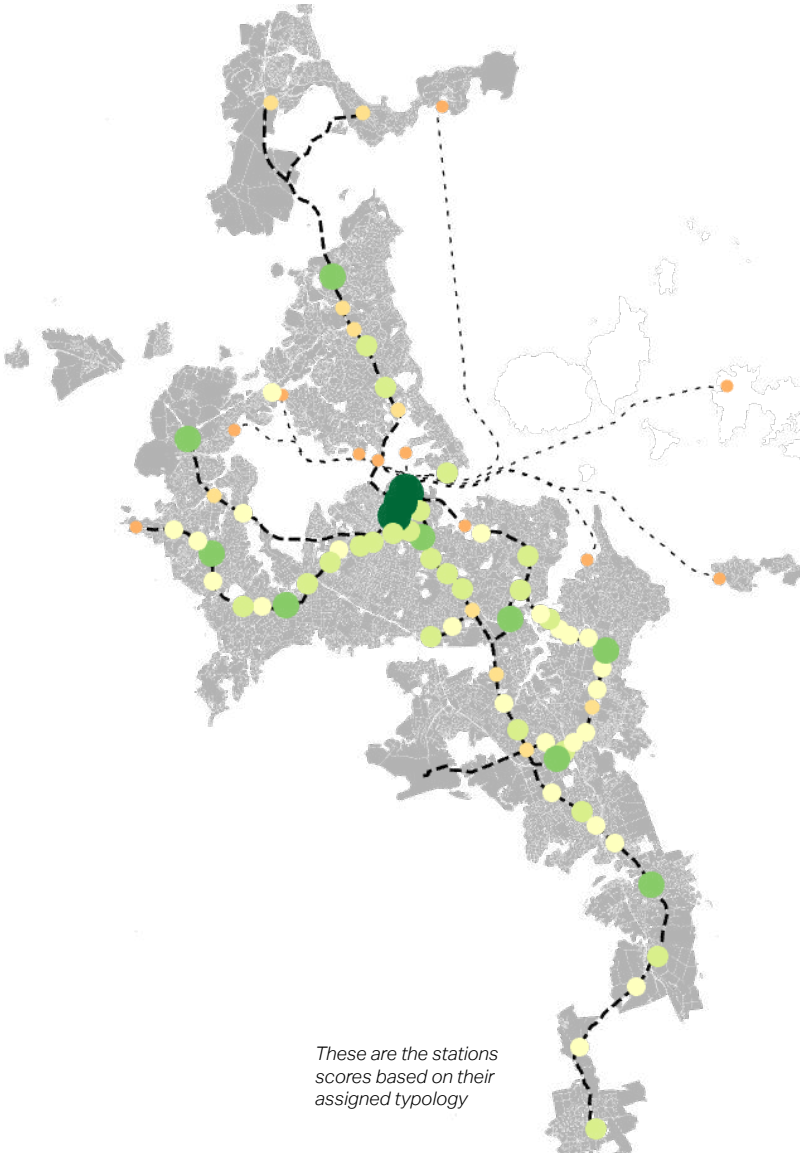


Existing Diversity Scores



With committed investment refers to exisiting scores, plus the scores once committed projects are completed

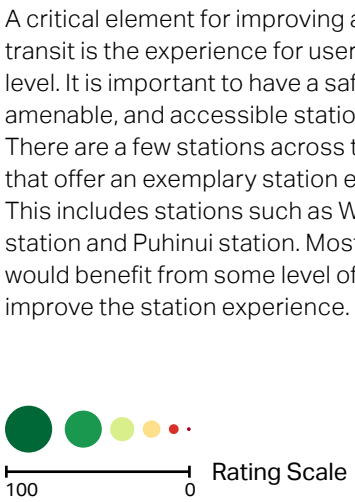
Scores based on typology



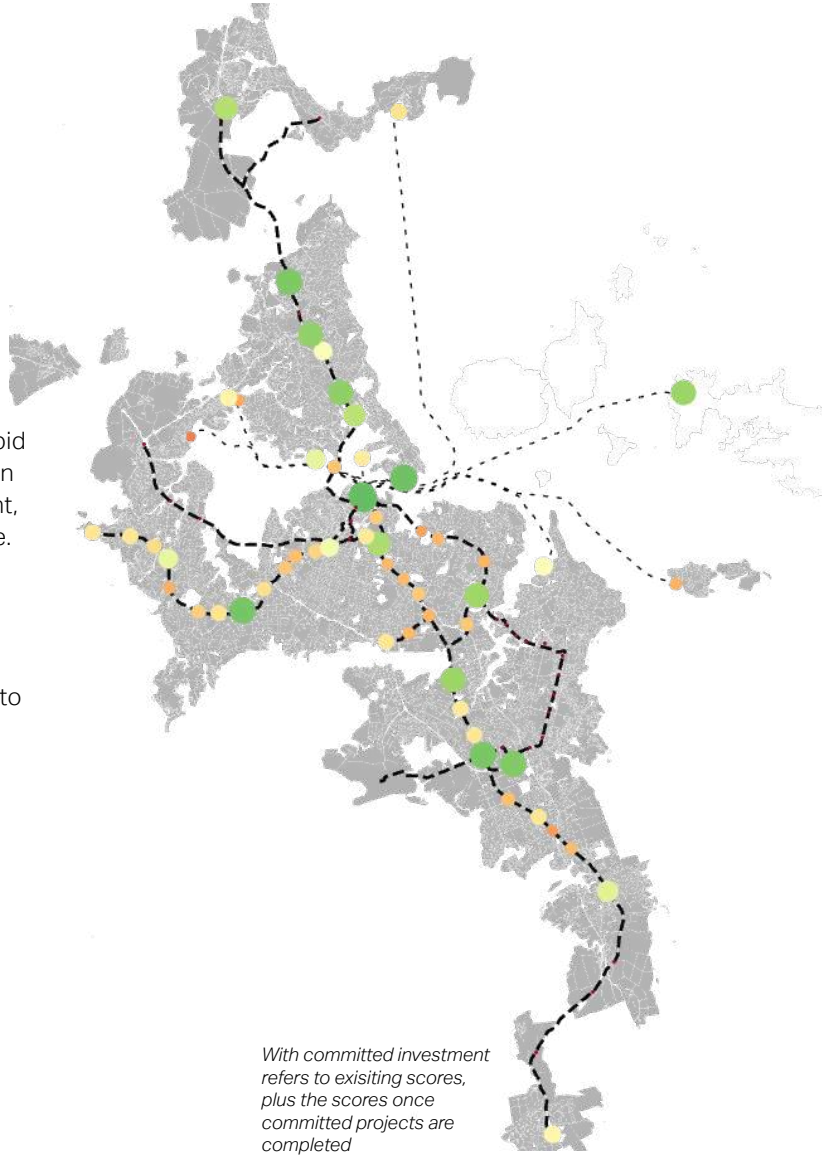
These are the stations scores based on their assigned typology

Station Experience Findings

A critical element for improving access to rapid transit is the experience for user at the station level. It is important to have a safe, convenient, amenable, and accessible station experience. There are a few stations across the network that offer an exemplary station experience. This includes stations such as Waitematā station and Puhinui station. Most stations would benefit from some level of investment to improve the station experience.

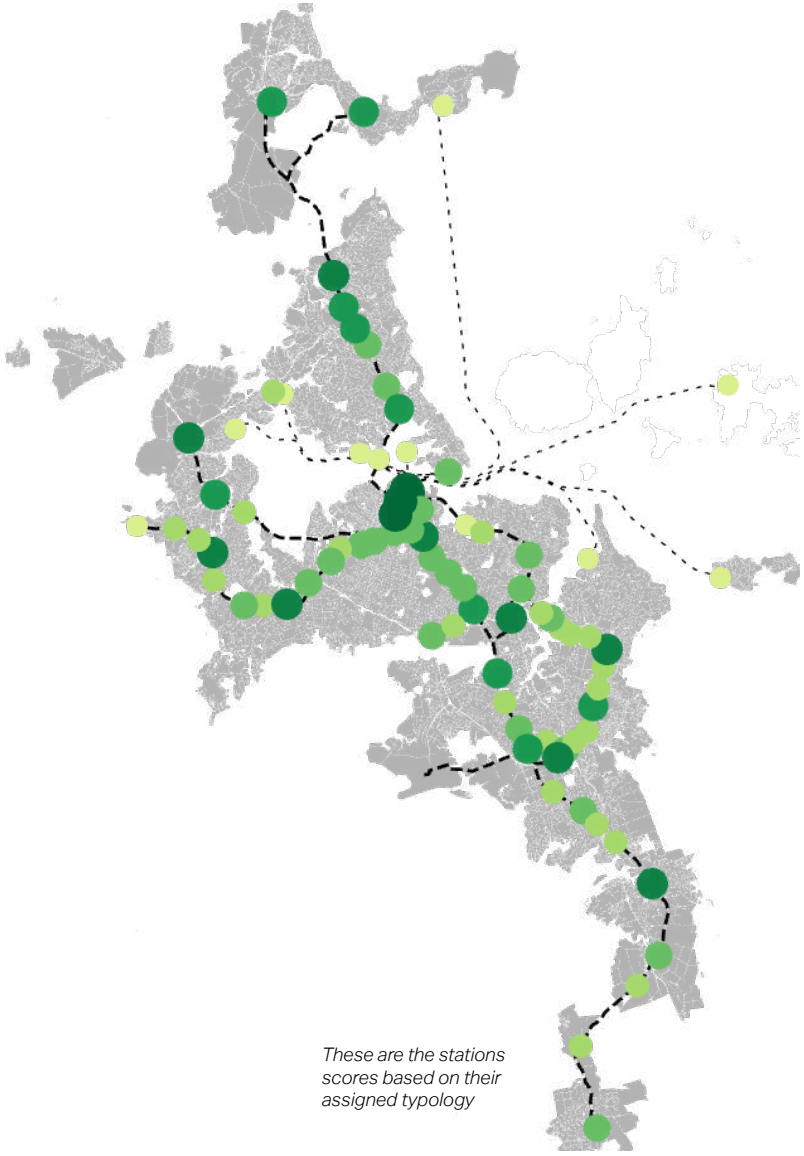


Existing Station Experience Score



With committed investment refers to exisiting scores, plus the scores once committed projects are completed

Scores based on typology



These are the stations scores based on their assigned typology

Development Potential Insights

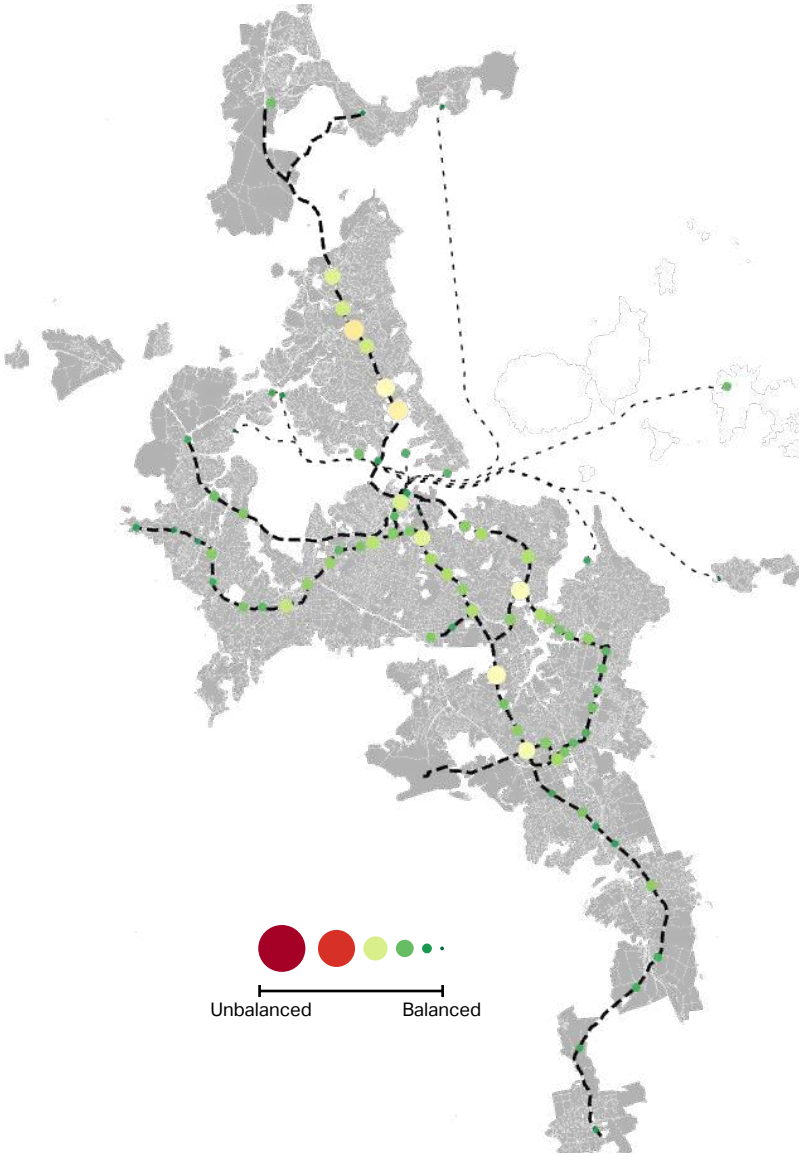
One of the key measures of the butterfly model is the balance between different metrics. This balance is important so that density is matched with transport access. Without this balance it is difficult to have thriving communities and ensure the best use of costly investments.

Across the network, the Northern Busway stations have the greatest imbalance in the network with significantly higher public transport scores than density scores. This means that along the Northern Busway there is significant development capacity.

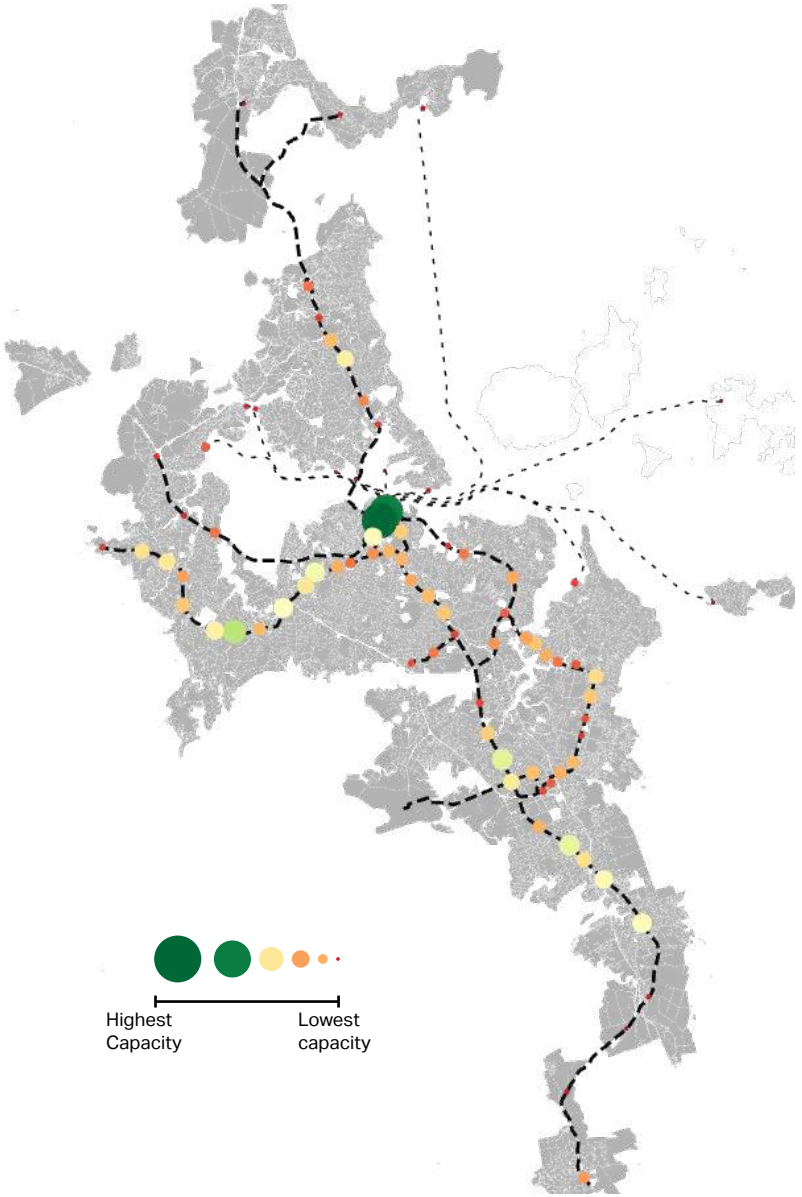
There is also significant development potential in metropolitan centres across Auckland. The ferry terminals appear to be more balanced. However, this is largely due to both public transport scores and density levels being very low.

While this study presents the shortcomings of many stations across Auckland, it also represents opportunity. The opportunity for planning and investment is to shape the city in a very positive way and accelerate good growth. The map on the right is the difference between the current land use and the potential maximum land use enabled by the NPS-UD. The NPS-UD zoning changes currently only include existing stations and will be updated closer to implementation.

Imbalance between PT access and Density



Density Scores with NPS-UD + MDRS Added Development



The Next Steps...

This study and the butterfly tool sit at the beginning of a long journey. This journey is one towards thriving communities around stations. As has been outlined previously, some of the key outcomes of this study is to provide information that informs:

- Policy
- Business cases
- Funding directions for various organisations

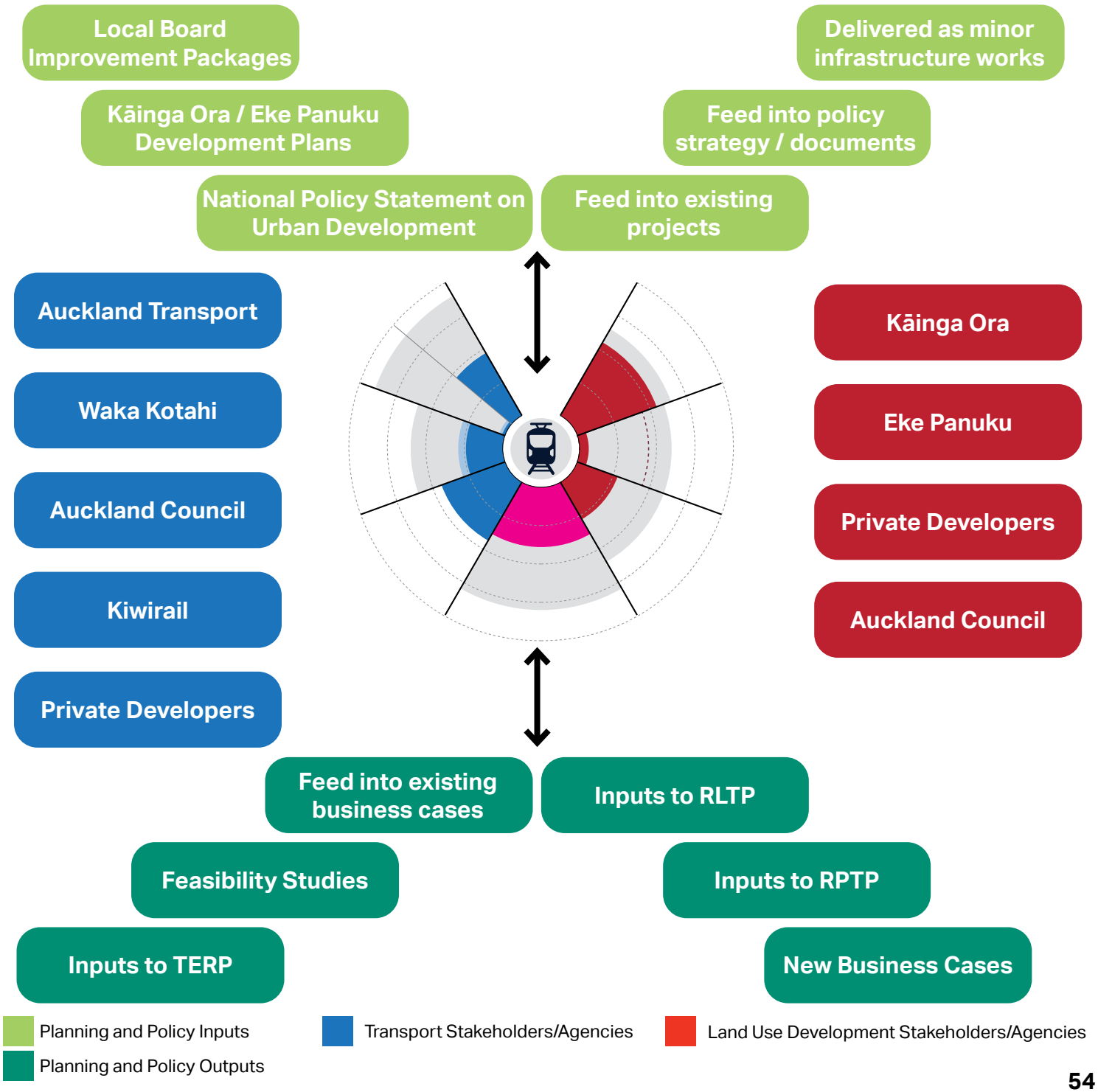
The diagram on the right demonstrates how this outcome functions in terms of the butterfly tool. This tool allows public and private sector stakeholders to collaborate. It breaks down silos and allows different stakeholders to visualise common goals.

Currently there are various organisations that have different roles and functions in the context of this study. Using the butterfly outputs these various agencies can begin to see the bigger picture. This allows them to understand where to target an integrated land use and transport strategy.

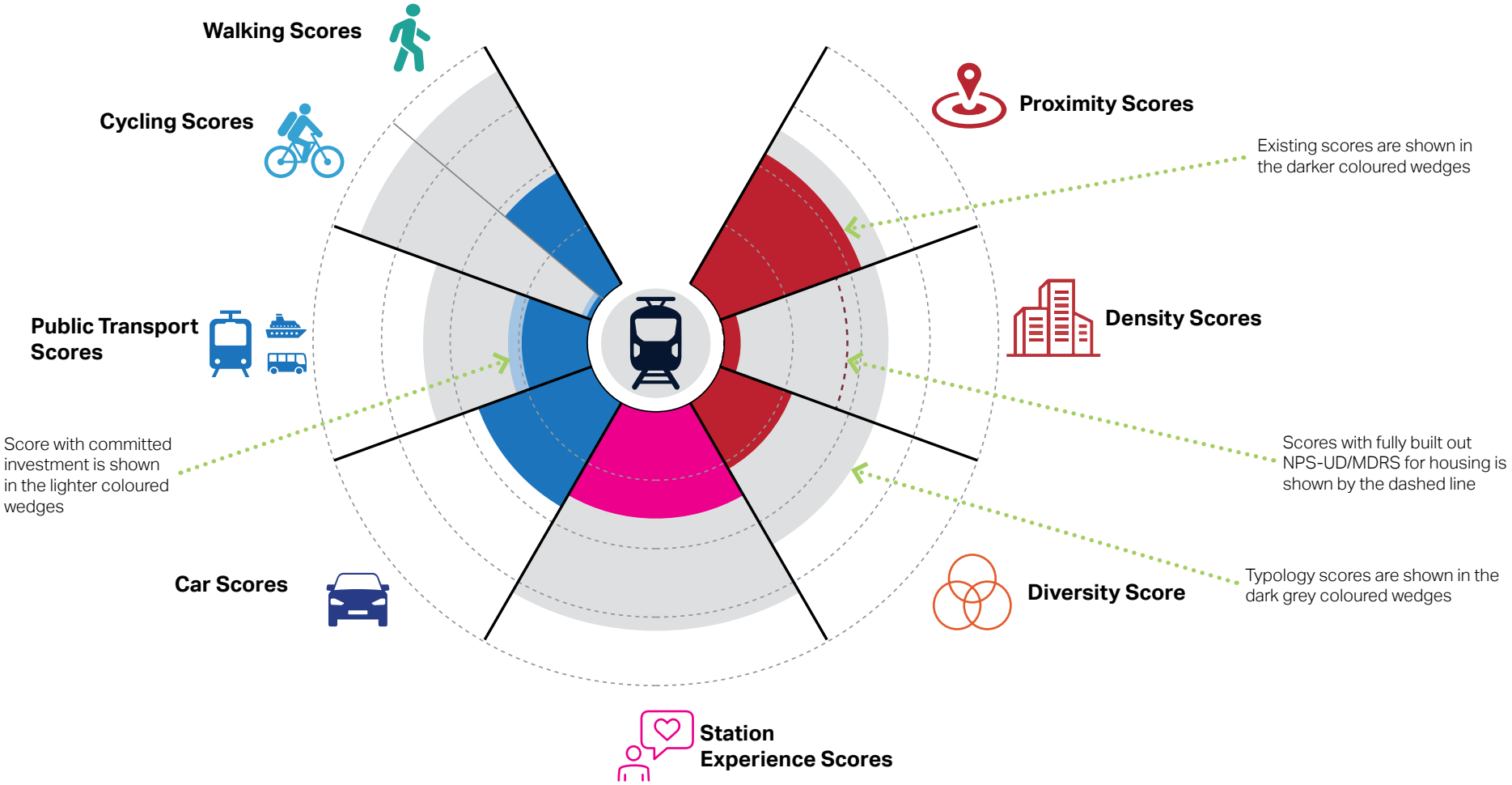
For example:
AT can provide funding to improve the various transport metrics of the butterfly, but they have a limited influence when it comes to land use development. In contrast, Kāinga Ora can have an influence on delivering land use improvements but has a limited influence when it comes to transport strategy.

With the use of the butterfly tool, these two agencies can begin to foster better collaboration. Where Kāinga Ora is delivering greater density, AT can ensure that strong levels of transport access are being provided. Where there has been increased investment into transport access, Kāinga Ora can know to increase their development density in those areas.

This is an example of the one of the many ways the butterfly tool can feed into an integrated process. It can ensure that there is alignment of objectives and investment. The next steps to follow from this project should be a pipeline of transport and land use investment that is aligned to common goals, and ultimately delivers well-functioning urban environments around stations.



The Butterfly Diagram Explained



Type				
A	Downtown	Karanga ā Hape	Te Wai Horotiu	Waitematā

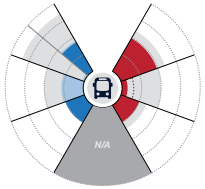
Type									
B	Albany	Botany	Henderson	Manukau	New Lynn	Newmarket	Papakura	Sylvia Park	Westgate

Type									
C	Avondale	Devonport	Ellerslie	Glen Eden	Glen Innes	Grafton	Greenlane	Kingsland	Manurewa
	Maungawhau	Maketuu	Morningside	Mt Albert	Onehunga	Panmure	Pakuranga	Papatoetoe	Parnell
	Pukekohe	Remuera	Ronwood Ave	Smales Farm	Sunnynook				

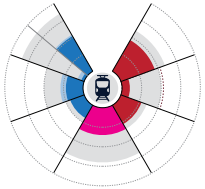
Type

D

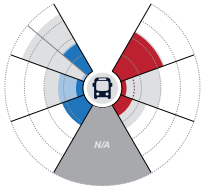
Accent Dr



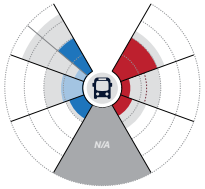
Baldwin Ave



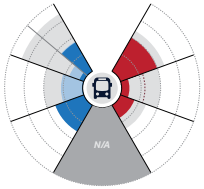
Burswood



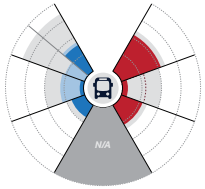
Dawson Rd



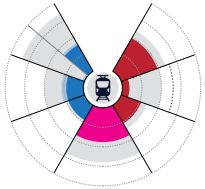
Diorella Dr



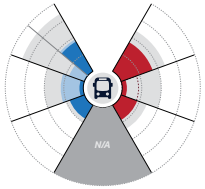
Edgewater



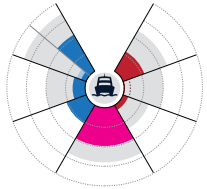
Fruitvale Rd



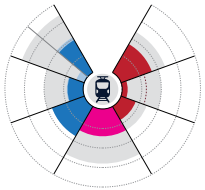
Gossamer



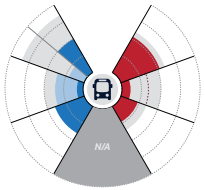
Hobsonville Pt



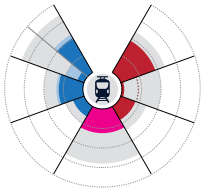
Homai



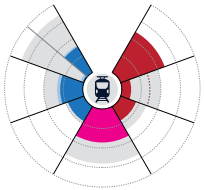
Lambie Dr



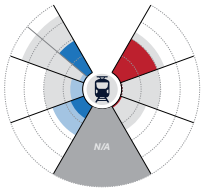
Meadowbank



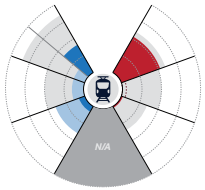
Middlemore



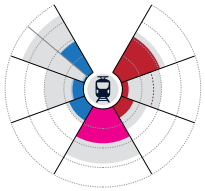
Ngaakooroa



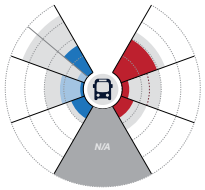
Paeraataa



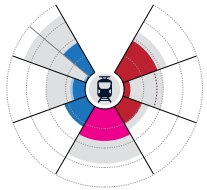
Rānui



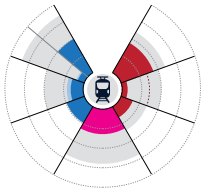
Smales Rd



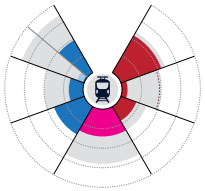
Sturges Rd



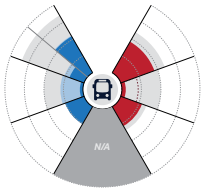
Sunnyvale



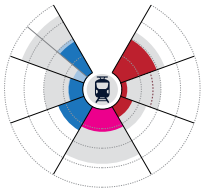
Takaanini



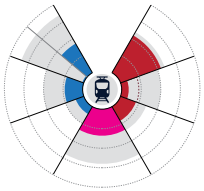
Te Atatu



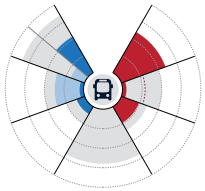
Te Mahia



Te Papapa



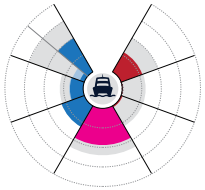
Williams Ave



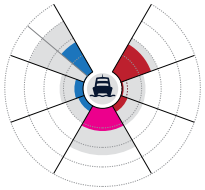
Type

E

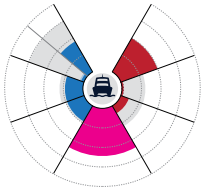
Bayswater



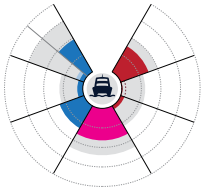
Beach Haven



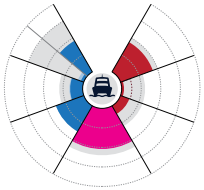
Birkenhead



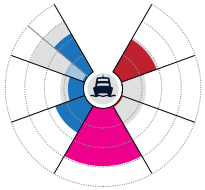
Gulf Harbour



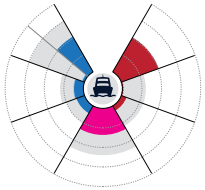
Half Moon Bay



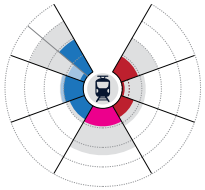
Matiatia



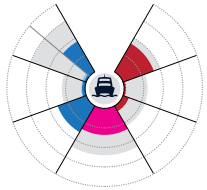
Northcote



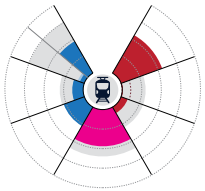
Orākei



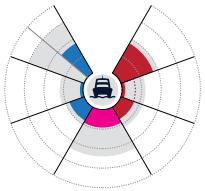
Pine Harbour

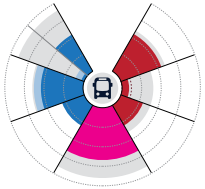
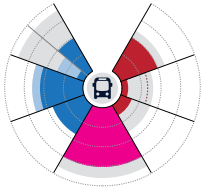
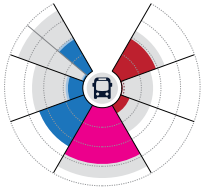
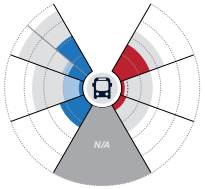
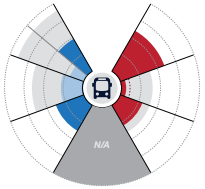
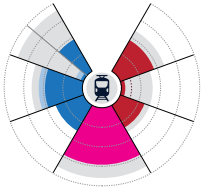
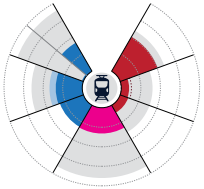
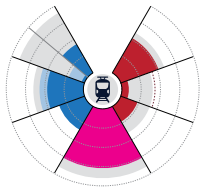
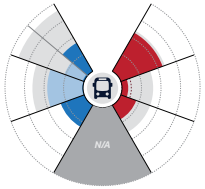
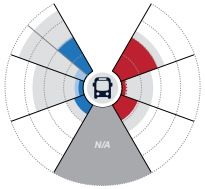


Swanson

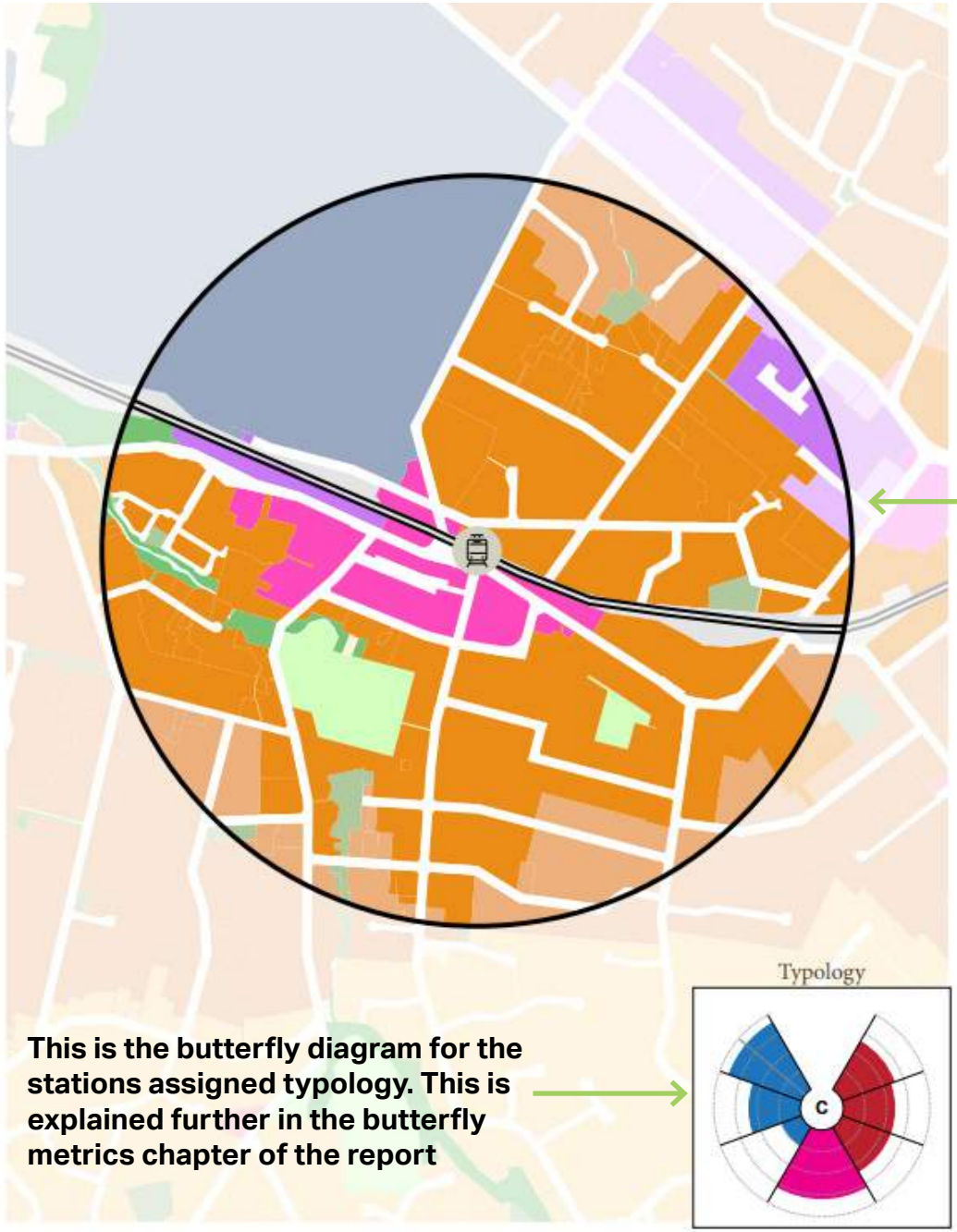


West Harbour



Type	Akoranga	Constellation	Hibiscus Coast	Lincoln Rd	Ormiston	Ōtāhuhu	Penrose	Puhinui	Rosedale	Whangaparāoa
T										

Outputs Explainer (Page 1)



This is the butterfly diagram for the stations assigned typology. This is explained further in the butterfly metrics chapter of the report

A Unitary Plan Map showing the current zoning for the station surrounds. The transparent area is within the 800m catchment and the translucent area is outside the 800m catchment

Existing Scores

47	2	24	45	39	56	7	29

Scores out of 100

These are the numercial values of the existing scores for each metric that are shown in the darker coloured wedges of the butterfly diagram

These are the numerical values demonstrating the scores based on future invesment that are shown in the lighter coloured wedges of the butterfly diagram

Committed Investment

+0	+3	+6

These are the numerical values of the different metrics based on the stations typology, that is shown in the dark grey coloured wedge of the butterfly diagram

Town Centre

90	90	60	25	80	65	60	60

Scores out of 100

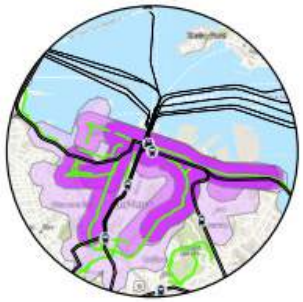
Unitary Plan Zones

Outputs Explainer (Page 2)

WALK

- Actual Walkable Catchment
- Deficient Footpath Width
- Pedestrian Severance
- Deficient PedestrianCrossing
- Rapid Transit Line

CYCLE



- Future Connect Cyclable Catchment
- Existing Cyclable Catchment
- Safe Cycling Route
- Rapid Transit Line

PUBLIC TRANSPORT

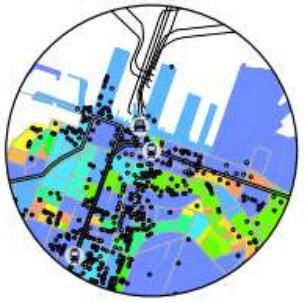
- Rapid Transit Line
- Frequent Bus Network
- Non-Frequent Bus Network
- Bus Stops

CAR

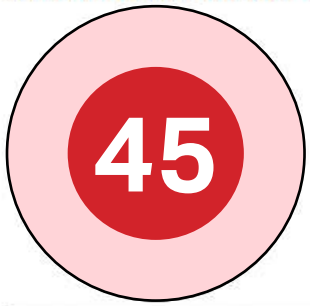
- Private Parking Area
- Managed On-street Parking
- Un-managed on-street parking
- Primary Arterial Road
- Secondary Arterial Road
- Park and Ride Area
- Motorway
- Drop-off Parking Space
- Loading Zone
- Mobility Parking Space

PROXIMITY + DENSITY

DIVERSITY



STATION EXPERIENCE



- Typology Station Exprience Score
- Existing Station Exprience Score

EXISTING ZONING (AUP 2016)

FUTURE ZONING (NPSUD 2021)