Overview New Zealand Rail Network, Auckland / Wellington Networks and National Passenger Vision 30 November 2023

Heriot-Edievale Limited

Michael van Drogenbroek

Photo Source: KiwiRail

New Zealand Geographic Overview





- New Zealand South-West Pacific Nation
- Population >5 Million
- Official Languages: Te Reo, NZ Sign, English most widely spoken
- Largest City Auckland 1.7 Million
- Capital City Wellington, Largest City Auckland
- Two Main Islands North and South
- Constitutional Monarchy British King Head of State
- Land Area 268,021 square km
- Temperate Climate
- Landscape varied from Plains to Alpine
- Closest Neighbour Australia

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Brief Historical Overview New Zealand Rail Network

- Rail publicly developed and owned by New Zealand Central Government from inception in 1860's right through to 1993 (Provincial Governments did develop some rail before 1873) – various structures in that time with major reforms from the 1980's (Department, Statutory Boards/Corporation Company)
- Initially various track gauges across New Zealand (Broad, Standard and Cape) but from late 1870's all converted to Cape Gauge (1067mm)
- Rail fully privatised as vertically integrated operation from 1993 to 2003 various owners and publicly listed for time on NASDAQ and NZX exchanges
- Government bought track in 2003 and above rail privately run separately 2003 to 2008 Toll NZ private rail operator, Ontrack Infrastructure owner and access provider. Significant capital reinvestment in Rail since 2003.
- Auckland Above Rail Metro franchised in 2004 to Connex/Veolia/Transdev with CAF from 2014 transitioned to Comfort Delgro / UGL from early 2022
- Kiwi Rail formed 2008 vertically re-integrated above and below rail operations back to Central Government ownership (apart from Metro Operations)
- Wellington Above Rail Metro franchised to Transdev / Hyundai Rotem 2016 extended late 2023
- Massive Rail capital invested in upgraded infrastructure and rolling stock has gained even more momentum since about 2010 – Many Billions over 10 years.

New Zealand Railways Characteristics

- Cape Gauge (1067mm) Network with quite tight gauge and kinematic envelopes. About 3700km operating of which 1500km passenger (additional 400 km mothballed) – mostly diesel
- NIMT electrified 1980's Palmerston North to Hamilton (25Kv), Auckland Metro (25 kV AC) in 2010's and Wellington Metro (1500-1600 V Dc) network beginning mid 1930's.
- Quite a lot recent reinvestment to rehabilitate / replace assets ongoing especially in Auckland
- Axle load is generally 18 tonne (some 20 tonne) some lines are less at 16 tonne
- Interisland rail capable ferries operate between North and South Island with two new large rail capable ferries on order for 2025 delivery
- Top rated speed for pax is 110 kph for NIMT although much of network is rated lower at 100 kph or less at 90kph, 80kph or even less on some regional lines.
- Predominately freight network outside of Auckland and Wellington Metros with limited inter-regional passenger trains and some long-distance Scenic Trains operating. Freight is Bulk (Coal, Forestry, Milk etc), Intermodal Import/Export containers (Dairy, Meat, General etc), Domestic Intermodal logistics distribution (JIT), Manufactured product (Such as steel etc)

New Zealand Railways Organisations

Main Government Agencies / Organisations

- KiwiRail State Owned Enterprise Access Provider, Network Owner / Developer as well as Rail operator of Freight services, Long Distance/Inter-Regional passenger – Vertically Integrated Railway
- New Zealand Transport Agency (NZTA) Waka Kotahi Funding / Regulator / Multi Modal Transport Agency Planning note separately City Rail Link (CRL Ltd) are delivering CRL in Auckland
- Ministry of Transport (MoT) Central Government Transport policy and advice across transport
- Auckland Transport (AT) Client / Planner for Auckland Metro Rail Passenger
- Greater Wellington Regional Council Client / Planner for Wellington Metro Rail Passenger
- Waikato Regional Council Client / Planner for Waikato Regional Rail Passenger
- Other Regional Councils Potential Clients for Regional Rail Passenger

Operators / Major Participants

- KiwiRail National Rail freight operator and Long Distance / Regional Passenger and Interisland Ferry Operator Vertically Integrated Railway Operator
- Transdev Wellington Operator Wellington Metro Rail since 2016
- Auckland One Rail (ComfortDelGro / UGL JV) Operator Auckland Metro Rail since 2022
- CAF Rolling stock maintainer Auckland Metro Rail to 2024
- Hyundai Rotem Rolling stock maintainer Wellington Metro Rail
- City Rail Link (CRL Ltd) delivering CRL project in Auckland
- Auckland Light Rail Delivery agency will likely be morphed to new PT network delivery entity with new Government
- Various Heritage Rail Operators e.g. Dunedin Railways, GVR, Steam Inc

Politics – Central Government – Bi Partisan Support For Rail – Different Flavours On Priorities and How To Develop It

- Rail Investment In Metros has broad Bi–Partisan support at National level between National (new Right leaning Government) and Labour (previous Left leaning Government) - each have different flavours of approach – Labour has national network focus
- National / ACT / NZ First Coalition Against Light Rail & favour optimising Heavy Rail Metro and other Public Transport such as:
 - Investigate four main lines in Auckland South instead of three as per Labour and Auckland Level Crossing removals
 - New Auckland Rapid Transit Network to North-West (Which mode Bus or Rail not decided and to be tested)
 - Rapid Transit Network Busways to North, East and South-West instead of Light Rail / Light Metro Rail
 - Potential further electrification extension Pukekohe to Pokeno Investigation
 - Examine Auckland Heavy Rail Cross City Avondale Southdown development tied to future Northland Port developments
- Labour /Greens Māori Coalition Was In favour of:
 - Totally New Auckland Wide Light Rail/Light Metro system
 - Slower build of Auckland Metro Heavy Rail third and fourth mains and Auckland Level Crossing removals
 - Faster delivery of new inter-regional Heavy Rail services eg Te Huia to Hamilton and other areas not currently served
 - Look into potential further afield rail electrification extension Pukekohe to Hamilton and Tauranga (ECMT)
 - Was more aligned to Auckland Transport program as at 2023
- Both consider Rail to Auckland North Shore longer term as part of 2nd Harbour crossing with National likely preferring Heavy Rail option and Labour Light Rail/Metro option
- Both parties almost fully aligned on investment on Wellington Metro / Wellington Regional Passenger Rail (New Hybrid trains)
- Both aligned generally on options to development Northland Regional Heavy Freight Rail to Marsden Point Port
- Coalition Parties of the right of National, ACT and NZ First sworn in as New Government on 27 November 2023 after General Election in October 2023

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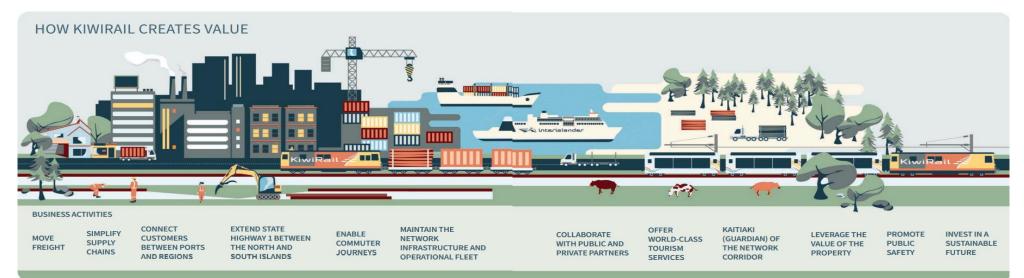
KiwiRail #

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KiwiRail's Place and The Passenger Context

Source 2022 and 2023 Kiwi Rail Annual Report







As New Zealand's national rail organisation KiwiRail is a fully above and below rail integrated operation

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Kiwi Rail Business - Overview

Source 2023 Kiwi Rail Annual Report

Stronger Connections Better New ZealandWe are a transport services and infrastructure business moving people and freight by rail and sea, and the steward of the national rail network				Connect Build Grow			
Capital	Реор	le and Safety	Customer	Partnerships	Environment	Assets	Commercial
Vision	ZERO INJURIES EVERYDAY	TALENT & PERFORMANCE-LED CULTURE	SERVICE EXCELLENCE & RELIABILITY	ENDURING & EFFECTIVE RELATIONSHIPS	SUSTAINABILITY LEADERSHIP	RESILIENT & RELIABLE NETWORK & SMART ASSETS	PROFITABLE ABOV RAIL BUSINESS
	Our people return home safe and healthy everyday	Our people are engaged, empowered, skilled and supported to perform	We are a trusted service provider, consistently delivering operational service reliability and innovative freight and passenger solutions for customers	We partner effectively and respectfully with our stakeholders and we are a valued and trusted part of communities wherever we operate	transport and support	We are the custodian of a reliable, resilient and safe rail and shipping network for the benefit of all NZ	We are an efficient, profilable and sustainable business
Objectives	Build a culture where everyone believes all injuries are preventable and delivers on our Care and Protect value to show trust and care for our people	Inspiring leadership across a one KiwiRail culture that values, engages, empowers and champions our people ensuring that our values, behaviour and culture are consistently, genuinely lived across our One KiwiRail enterprise	Clear service offerings and market leading solutions that will add value for our customers	Develop enduring relationships with Mana Whenua	Decarbonise through modal freight shift, and reduced carbon intensity of rail and maritime operations and facilities	Deliver capital programmes to scope, time and budget	Achieve Above Rail sustainability
	A focus on visible leadership, critical risks/controls, front line engagement and standard ways of working	Talent succession pathways and capability development	Asset Management capability, systems, processes with standardised fleet configuration, technical asset standards / assurance performance reporting to meet customer service promise	Partner with metro and regional authorities to enable reliable services for commuters, and support achievement of local mode shift targets	Some series of the series of t	Successfully transition new major assets into service for customers	Improve Above Rail operating ratio (total cost/total revenue)
	Sustainable healthy workplace with a genuine wellbeing focus for our people and contractors	Levels of work with clear roles, responsibilities, accountabilities, to deliver standard ways of working	Right skills, right training, right capabilities - critical skills pipeline and resourcing in place to support service excellence and reliability	Support regions through our tourism experiences	 Invest in science-based targets for scope 1, 2, 3, emissions and waste reduction targets 	Leverage technology and connected systems to build accessible, transparent end-to-end processes and standards and deliver seamless real time data insights	Simple, efficient and right sized structures processes and ways of working
	Reduce environmental exposure and enhance Zero Harm environment	Celebrate people from all backgrounds, ensuring a diverse, inclusive and supportive environment built on KiwiRail values		Partner with unions for High Performance High Engagement	Deliver our Rautaki Whakauka Sustainability Strategy		
Measures	TRIFR High potential near- misses	Employee Net Promoter Score Women in the workforce Under 30s in the workforce	On Time Performance Freight Net Tonne Kilometres carried Metro network reliability Interislander reliability	Under development	Truck journeys avoided Rail freight carbon intensity	Critical asset project milestones met Track Quality Index Temporary speed reductions Network condition Asset availability	Revenue Operating surplus Operating margin

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New Zealand Passenger Rail Network Today

Passenger Rail services operate on about 1500 route Km of KiwiRail's 3,700 route Km operating network as follows:

- Auckland Metro Passenger Network (25 kV AC)
- Wellington Metro Passenger Network (1500-1600 V Dc)
- Wairarapa Services (Masterton Wellington)
- Capital Connection (Palmerston North Wellington)
- Te Huia (Hamilton Auckland)
- Northern Explorer (Auckland Wellington)
- Interisland Rail RoRo Ferries (Wellington Picton)
- Coastal Pacific (Picton Christchurch)
- Tranz Alpine (Christchurch Greymouth)
- Dunedin Railway Services access KiwiRail Network
- Heritage mainline operators access KiwiRail Network



Source 2023 Kiwi Rail Annual Report

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Kiwi Rail Business - Overview -

Source 2023 Kiwi Rail Annual Report

Freight

Moves around 18 million tonnes of freight each year



Sustainability

Reduces heavy vehicle impact by more than 1 million truck journeys per year.

Every tonne of freight carried by rail delivers a 70% emissions saving over road



Great Journeys New Zealand

Offers tourism experiences connecting Auckland, Wellington and Christchurch with regional New Zealand



Freight services

Operates 40,400 mainline freight departures each year 240 locomotives and shunts

Track IIIIIIIIIII

Operates and maintains 3700km of track, including six million sleepers, of which 56% are concrete



Carries 36% of the New Zealand freight task that is deemed to be available to rail



Commuters

Operates Te Huia and Capital Connection, and manages the metro networks supporting more than 22 million metro commuter trips each year



Our team 4900 employees

19% women

18% under 30 years old



Property

Manages a portfolio worth \$4.3 billion with more than 18,000 hectares of land leased from NZRC

Owns more than 900 buildings

Manages 10,000+ leases, licences and grants





Connecting more than 300 customers' freight supply chains



Interislander

Operates three ships making 3300 sailings per year, providing around 600,000 passenger trips



Exports and imports

Transports around 19% of New Zealand exports and imports



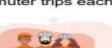
Value

The total value of rail to New Zealand's economy is approximately \$1.7-\$2.1 billion every year¹



Infrastructure

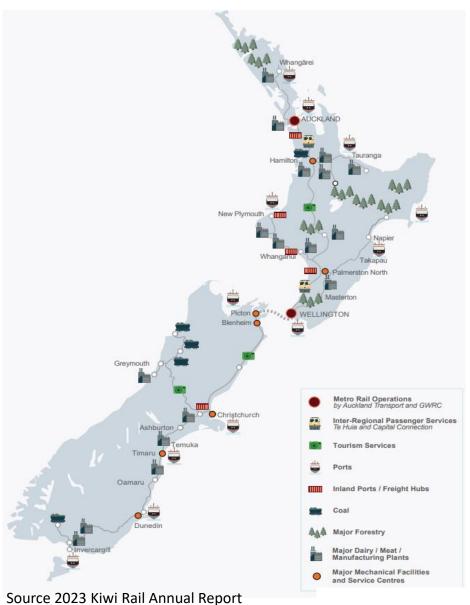
3106 signals 1447 public level crossings 106 tunnels 1367 bridges



New Zealand Freight Rail Network Today

Freight Rail services operate on KiwiRail's 3,700 route Km operating network as follows:

- Forestry
- Import / Export containers
- Dairy produce
- Meat
- Steel
- Coal
- Manufacturing
- Inland Port Hubs
- Domestic Distribution Freight
- Rail RoRo Ferries (Wellington Picton)



The 2020's – Today – NZ Passenger Rail



Auckland Metro – Auckland One Rail



Wellington Metro – Transdev



Great Journeys of New Zealand - KR



Inter-Regional Passenger Rail - KR

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Waikato Regional Rail – Te Huia Hamilton - Auckland



- Te Huia inter regional rail service between Hamilton and Auckland from April 2021 with 2 return services Mon Fri and 1 return Sat
- Locomotive hauled push/pull refurbished ex BR cars used (3 train sets) but new Tri or Bi Mode trains being considered post 2028
- Improved performance to date post Covid restrictions and long journey times due to Auckland Metro congestion stops at Puhinui for transfer to Airport by express bus with terminal station at The Strand, Central Auckland
- Service enhancement from February 2024 (Thurs, Fri. Sat) on services strengths e.g. Interpeak services train paths available
- Longer term needs network capacity enhancement like third and fourth main, additional platforms at Puhinui to speed up service enable more services and possible extension of services to South (Wellington) / East of Hamilton (Tauranga)
- Fast Rail business case with options of Standard gauge alignment (250 kph) unlikely, Cape gauge tilt trains favoured (160kph) preliminary business case has been developed and firmer business case under consideration by Ministry of Transport

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Options not discussed in 2015 Auckland Rail Plan but now very real and has major implications for Auckland rail network

KiwiRail Interisland Rail / Road RoRo Ferries

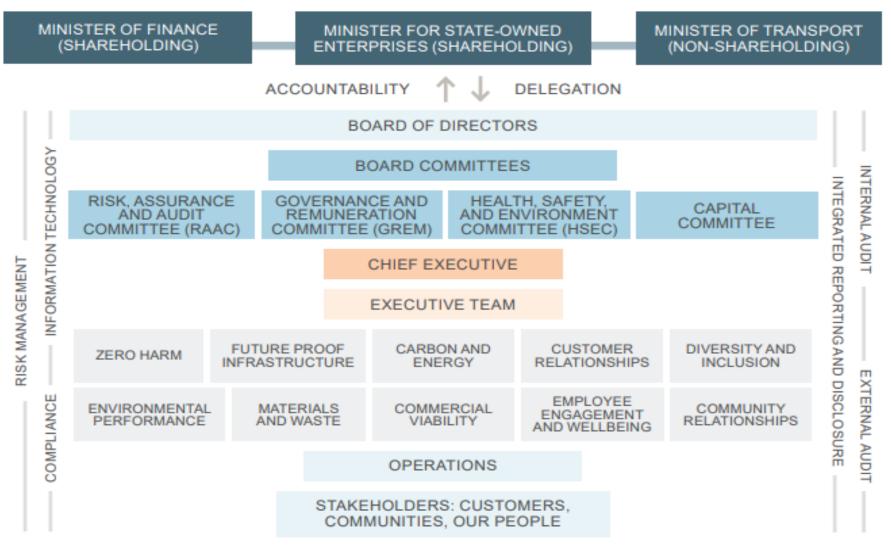


- Interisland RoRo Rail Ferries join the North and South Island rail networks together used for rail, road and passengers
- Part of national rail and road networks
- Terminals in Wellington (North Island) and Picton (South Island)
- Started 1962 before that each island had separate networks
- Three main ships
- Two New Ships on Order for delivery 2025 with new terminals in both Wellington and Picton Project IREX
- Approximate 3 hour journey time one way across Cook Strait

Kiwi Rail Governance Overview

Source 2023 Kiwi Rail Annual Report

Accountability





DX class

Subclasses: DXB, DXC, DXR Number range: 5016-5520 (DX), 8007, 8022 (DXR) Entered service: 1972 Power output: 2,050kW (standard), 2,460kW (uprated, some members), 2,349kW (DXR) Tractive effort: 259kN

Introduced due to the need for a more powerful locomotive on the North Island Main Trunk. DX 5362 was rebuilt as DXR 8007 in 1993, followed by DX 5235 into DXR 8022 in 2005. All DX locomotives now exist as DXB, DXC or DXR class locomotives. The DXB class is fitted with heavier drawgear, uprated engines, new cabs and BrightStar, while the DXC class additionally has lower air intakes for use in the Otira Tunnel.

Tip: The DX class is much longer than the DC class, and the front hood is shorter as well.



DF class (1979)

Subclasses: DFT, DFB Number range: 6006-6317 (DF), 7008-7348 (DFT) Entered service: 1979 (as DF class), 1992 (as DFT class) Power output: 1,230kW (DF), 1,800kW (DFT) Tractive effort: 198kN

The DF class was built as a modern version of the DC class, sharing the same prime mover, but with a Co-Co wheel arrangement, enabling the class to make greater use of its power. In 1992, DF 6260 was turbocharged and altered, and re-entered service as DFT 7008, with the other 29 locomotives following later. DFB class locomotives are a standard DFT fitted with the BrightStar wheel slip control system and a fire suppression system for passenger service.

Tip: Note the upper headlights. The DF class's lights are one over another, while on the DBR, DC and DX they are horizontal. Also, all DFTs and DFBs have a small chute behind the cab on the left (assistant's) side of the locomotive.

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DH class

Number range: 2816-2868 Entered service: 1978 Power output: 672kW Tractive effort: 146kN

Originally an order for Philippine National Railways, they were purchased by the NZR as a heavy shunter for Auckland port work. They are still used in Auckland and Tauranga for heavy shunting, now fitted with multipleunit capability.



DL class

Number range: 9008-9688 Entered service: 2010 Power output: 2,700kW

Purchased by KiwiRail and first delivered in 2010, these were the first brand new locomotives to be introduced since the DF class over 30 years previously. Currently the most powerful and common diesel locomotive in New Zealand, the class sees service in the North Island on heavy freight trains. 63 locomotives are currently in service.

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DC class

Subclasses: DCP Number range: 4006-4876, 4916-4951 (Hutt-built) Entered service: 1978 (as DC class) Power output: 1,062kW (645C), 1,230kW (645E) Tractive effort: 140kN

Rebuilt from the D^A class between 1978 and 1983, the class is still in use today on freight services. Out of the original 85 locomotives built, only a handful remain in service as the class is slowly being phased out. The DCP class originally denoted locomotives owned by Tranz Scenic 2001 Limited, but now denotes those locomotives fitted with bogie strops to prevent the bogies separating in a derailment.

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Source: https://nzrailphotos.co.nz/locomotives

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DSC class

Number range: 2000-2759 Entered service: 1958 Power output: 315kW Tractive effort: 46kN

Purchased as a heavy shunter to replace smaller D^S and D^{SA} class shunting locomotives and smaller steam locomotives. A second version was built by NZR powered by two Leyland diesel engines instead of the Rolls-Royce engines. Only NZR-built locomotives remain in service.



DSG class

Number range: 3005-3304 Entered service: 1981 Power output: 700kW Tractive effort: 130kN

The DSG class forms the basis of KiwiRail's heavy shunting and yard work.

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Diesel Multiple Units



ADL class

Trailer classification: ADC Number range: 801–810 (ADL), 851–860 (ADC) Entered service: 1982 (Perth), 1993 (Auckland) Power output: 2x 205kW, one engine per bogie per motor carriage

Purchased along with the ADK class in 1993, intended to revive the Auckland rail network. The two classes were successful, and contributed to a rise in patronage from their introduction. The class was refurbished in 2002 in the new MAXX livery. The class currently runs services between Papakura and Pukekohe, and are expected to be withdrawn once electrification is complete.

Electric Locomotives



EF class

Number range: 30007-30249 Entered service: 1988 Power output: 3,000kW

Currently the most powerful locomotive in New Zealand and the only electric locomotive in operation. The class was introduced for the North Island Main Trunk electrification in 1988, and most still run today.

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KiwiRail EMU's Motive Power Fleet

Electric Multiple Units



AM class

Trailer classification: AMT Number range: 103-714, 810-973 (all carriages) Entered service: 2014 Power output: 1,520kW (per unit)

Auckland's first class of EMU. Carriages are classified AMP for the motor car with pantograph, AMT for the centre trailer car, and AMA for the motor car without pantograph. Also referred to as "AM" for the unit as a whole.



FP class ("Matangi")

Trailer classification: FT Number range: 4103-4610, 5010-5396 (FP, FT) Entered service: 2010 Power output: 680kW

Named "Matangi". Operates in the electrified area of the Wellington suburban network. Introduced to replace the D^M and EM classes.

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An artist's impression of the new locomotive. Photo credit: Supplied

KiwiRail has signed a contract with Swiss rail manufacturer Stadler Rail Valencia for 57 new mainline locomotives worth about \$403 million.

The new locomotives will mainly be used in the South Island servicing both freight and passenger rail. They'll replace the existing aging South island fleet which has an average age of 47 years.

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National Network Projects Outside Metros

- Main North Line rebuild after Kaikoura Earthquake 2016 large substantive rebuild of structures and formation including numerous tunnels after near 8 magnitude earthquake
- Northland rail rebuild rebuild of rail line from Auckland to Whangarei, including many structures and tunnel work, to higher standard of line, hi-cube clearance. Also reopen line north of Kauri to Otiria in far north for intermodal freight and logging traffic. Much damage sustained Cyclone Gabriel 2023 – being repaired
- Hillside Railway mechanical workshops rebuild in Dunedin for assembling, manufacturing and maintenance of rolling stock close to completion
- Waltham Mechanical hub in Christchurch for South Island mechanical maintenance close to completion
- Napier to Wairoa line rebuild and reopen in in 2018 for logging traffic but severe damage by Cyclone Gabriel 2023
- Develop new regional freight and servicing hub for Lower North Island at Palmerston North near Bunnythorpe
- New Freight Inland container logistics hubs e.g. Ruakura super hub near Hamilton opened 2023
- Numerous national network rehabilitation works e.g. Kaimai tunnel works, bridge replacements
- Potential Electrification Extensions from Auckland Metro network to Hamilton and Tauranga on East Coast



Cyclone Gabrielle Hawkes Bay and Northland February 2023



Slips in the Esk River Valley

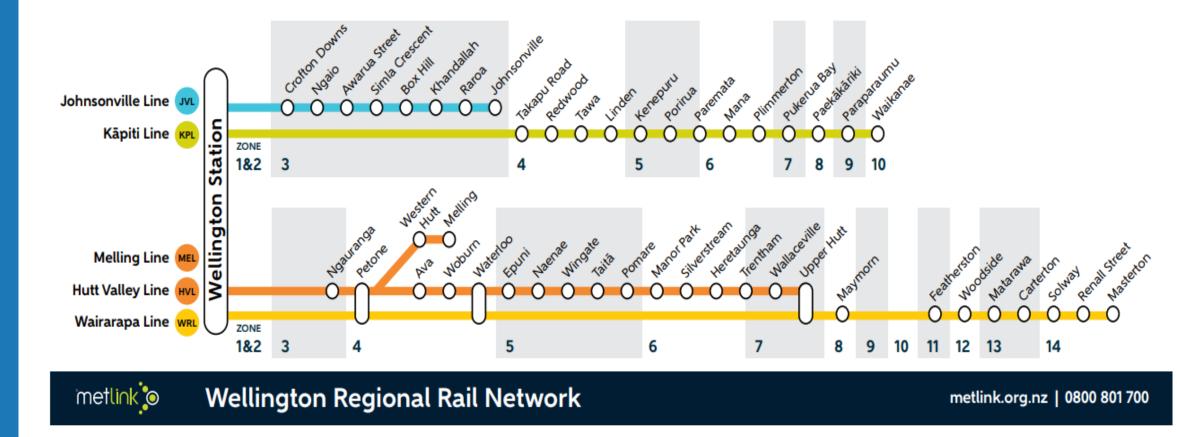


Wellington Rail Network Current Statistics At A Glance

- Four Main Rail Lines totalling 160 route kilometres (88 km of which is double track)
 - Kapiti Line Wellington Waikanae Electric EMU
 - Hut Valley Line Wellington Upper Hutt including Melling spur Electric EMU
 - Johnsonville Wellington Johnsonville Electric EMU
 - Wairarapa Line Wellington Masterton Diesel Loco hauled carriages
- A total of 83 2 Car EMU's Rotem Mitsui run from 2 car consist to 8 car consist
- Electrified at 1600 V Dc on all lines except Upper Hutt Masterton
- A total of 30 refurbished carriages ex BR Mk2 and 3 DFT locos run Wellington Masterton services
- A total 49 Metro Rail Stations, 48 of which owned and managed by GWRC
- About 13 Millions passenger journeys per annum pre Covid
- A total normally of about 2,200 train services per week
- Run by Transdev Wellington with Rotem Mitsui rolling stock maintainer
- Kiwi Rail own and manage track maintenance and access
- Train Control from Wellington New dedicated national Train Control Centre Upper Hutt Silverstream
- Main Maintenance Depot at Wellington Central
- Interfaces to Capital Connection regional train ex Palmerston North, Northern Explorer long distance train to Auckland and Freight Services to North and to South Island by Interisland Rail capable Ferry
- Wellington Metro Upgrade Project for delivery completion 2026

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Wellington Rapid Transit Rail – 160 kilometre network



Wellington Rail Network Upgrades Underway

Network-wide projects to improve your rail services

- Renewing signals power supply: By 2020
- Renewing traction power overhead line systems (including masts and wires): By 2021
- More traction sub-stations to strengthen Matangi train power supplies: By 2021
- Renewing track at the end of its lifespan: By 2026

Improving infrastructure to allow more frequent train services

Kapiti Line: By 2026

- Converting Plimmerton to a terminus station
- Renewing tracks and upgrading drainage in Tawa tunnels
- Renewing sleepers within the Paekakariki tunnels
- •Renewing signals power supply DONE

Johnsonville Line: By 2022 •Renewing traction power

- overhead line systems
- Renewing sleepers within all seven tunnels
- Slope stability improvement Ngaio Gorge

Wairarapa Line: By 2026

Renewing tracks:

- Remutuka tunnels
- Along 60 km between Upper Hutt and Masterton
- Renewing three bridges
- •Renewing signalling between Upper Hutt and Featherston

Hutt Valley Line: By 2021

- Renewing traction power overhead line systems
- Renewing signals power supply

Melling Line: By 2021

 Renewing traction power overhead line systems

Wellington Railway Station: By 2020

- Improving Station approaches to increase capacity
- Renewing traction power overhead line systems

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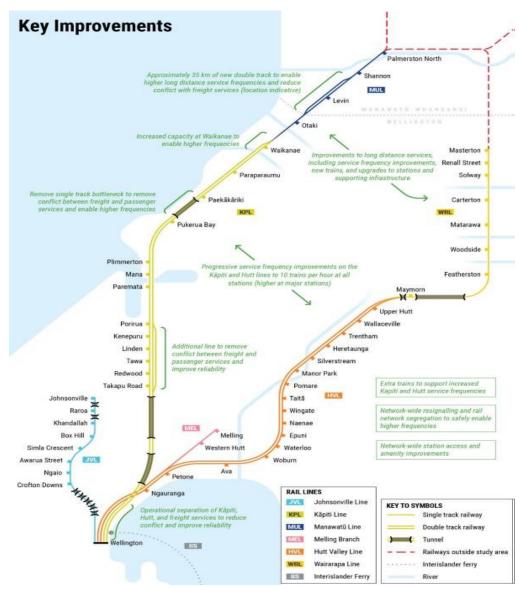
Wellington Rail Network Upgrades – Current Major Projects

- Wellington Railway Station throat changes to rail infrastructure at Wellington Railway Station will allow for more frequent and ultimately longer trains, more often including signal renewals, complete replacement of signal equipment at Wellington Railway Station and the station approaches.
- Plans for ETCS Level 2 signaling upgrade over next decade across the Metro network
- Kapiti line improvements including resilience works station re-development at Plimmerton including turnback – general upgrades
- Johnsonville Line resilience upgrades
- Hutt Valley Line track duplication completed between Trentham and Upper Hutt and further resilience changes
- Wairarapa line significant and overdue upgrade not seen in a generation. Includes improvement to resilience, which will improve reliability, punctuality, and ultimately journey time on the line. Increasing future passenger and freight services by improving network capacity and safety, through the addition of new signaling between Featherston and Masterton, and additional passing loops to enable more trains to run on the line at the same time.

Wellington Rail Program Business Case 2022

Key features of the plan include:

- Improvements to all aspects of station amenity across the network
- Progressive service frequency improvements
- Supporting electric multiple unit (EMU) fleet expansion to enable the higher frequencies
- Network resilience and operational flexibility upgrades
- Wellington throat capacity improvements, fourth main
- Full duplication between Pukerua Bay and Paekakariki (North-South Junction),
- Duplicated approach to the Waikanae Station
- Network resignalling ETCS Level 2
- Traction power upgrades,
- Rail network segregation at all places where reasonably practicable,
- Continuous improvement of systems, processes, and capability, including improved asset management



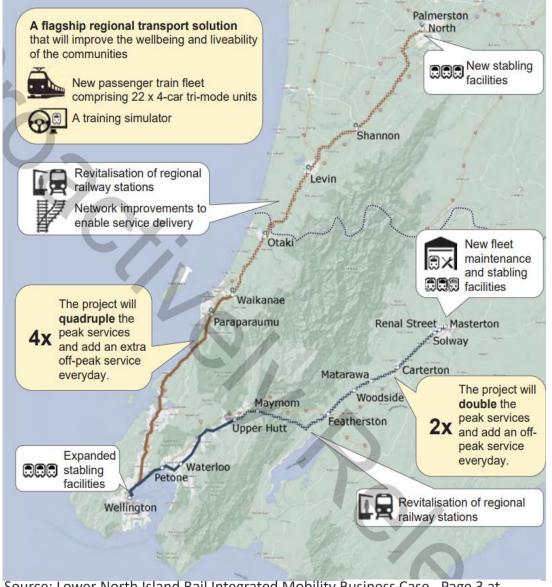
Source: Wellington Rail Programme Business Case – Wellington Strategic Rail Plan

Heriot-Edievale.com

Lower North Island Rail Integrated Mobility - Regional Trains

Key features of the preferred solution include:

- Using existing overhead lines plus battery technology, topped up by an onboard lowemission generator outside of stations and tunnels.
- The tri-mode is a solution that is highly reliable and provides dependable connectivity.
- It maximises the regeneration of braking energy to achieve minimal emissions and does not require long and expensive electrification works.
- The new trains will provide amenities and services tailored to customers' needs, and lift NZ regional passenger rolling stock to international safety standards.
- Business Case approved, procurement underway with supply contracts expected to be let in 2024
- Options for other New Zealand regional routes eg Hamilton – Auckland route



Source: Lower North Island Rail Integrated Mobility Business Case , Page 3 at www.jheriot-Edievale.com

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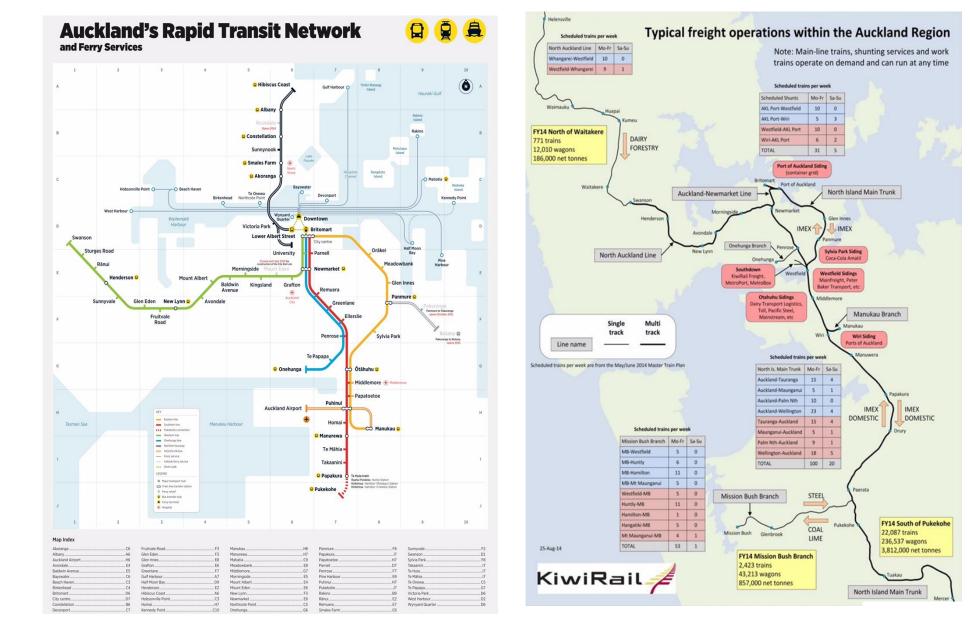


Auckland Rail Network Current Statistics At A Glance

- Four Main Rail Lines totalling 96 route kilometres mostly double track
 - Eastern Line Britomart Manukau
 - Southern Line Britomart Papakura Pukekohe
 - Western Line Britomart via Newmarket to Swanson
 - Onehunga Line Britomart to Onehunga via Newmarket
- A total of 72 3 Car EMU's CAF run either in 3 car consist or 6 car consist
- Electrified at 25 kV AC since 2015 on all lines except Papakura Pukekohe portion of Southern line which is currently being electrified
- 10 2 car DMU railcars ex Perth ran shuttle Papakura to Pukekohe suspended
- A total 43 Metro Rail Stations owned and managed by Auckland Transport
- About 22 Millions passenger journeys per annum adjusted for Covid
- A total normally of 3,736 train services per week
- Run by Auckland One Rail CAF doing rolling stock maintenance transitioning
- Kiwi Rail own and manage track maintenance and access
- Train Control from Wellington but moving to Auckland and new location Wellington region Upper Hutt Silverstream
- Maintenance Depot at Wiri
- Interfaces to Te Huia regional train ex Hamilton, Northern Explorer long distance passenger train to Wellington and Freight Services to North and South of city
- City Rail Link and associated projects such as Third Main under construction for delivery late 2025 / Early 2026

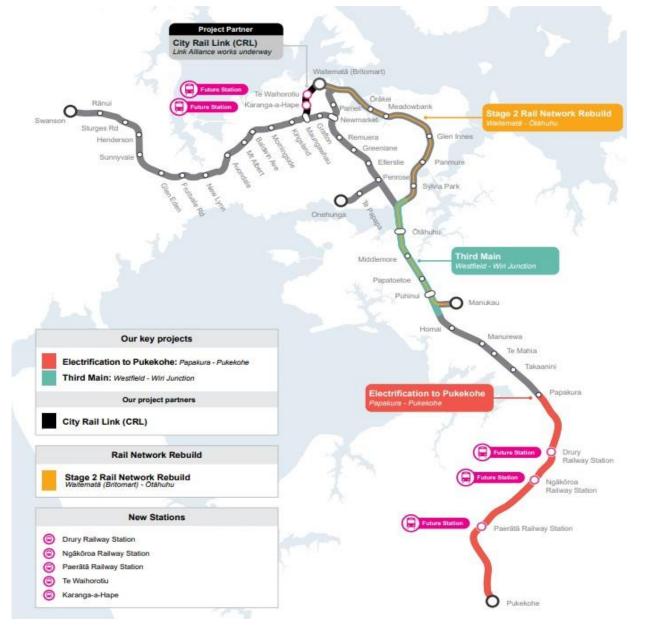
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Current Auckland Rapid Transit / Freight Rail Networks



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Auckland Network Rail Major Projects Underway 2023-2026



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Sequencing Change - Rail Development Plan Changes Since 2015

There have been changes since the 2015 Plan and as part of the 2023 Auckland Rail Programme Business Case developed. Some projects have been brought forward, some new added, some deferred slightly, some cancelled (for now anyway) and others in potential strategy needing future consideration

Brought Forward:

- Pukekohe Electrification for Auckland Metro Rail brought forward in delivery now for completion late 2024 was after 2026

 avoided interim DMU works etc
- Sarawia Level Crossing closed at Newmarket
- Deferred renewals all brought forward aggressively under Transitional Rail due to major Rolling Contact Fatigue (RCF) issues in 2020/21 and major network foundation issues post 2022 as part of Auckland Rail Network Rebuild (RNGIM)
- Otahuhu Third Platform commissioned and operating 2021

New Added:

- Additional three Metro stations south of Papakura as part of electrification extension to Pukekohe Drury East, Drury West and Paerata – major Park n Rides
- Nine Car trains now on agenda CRL stations all modified to be 9 car compliant and plans being developed for certain key stations to be modified (Platform & signal modification etc) for 9 cars use not considered before
- Regional Passenger Rail Hamilton to Auckland (Te Huia) has already started and Fast Regional Rail under active consideration – was not even on agenda before
- Northland Rail upgraded for freight meaning more freight over time –was not considered before and thoughts were this
 route may even be mothballed or closed
- All Major Level Crossings to removed especially Western and Southern Line major Program

Sequencing Changes Rail Development Plans Since 2015 Continued

Timing Changed to Later Or Deferred:

- City Rail Link (CRL) under delivery now opens circa 2025/26 not 2023 as before
- Third Main on NIMT Wiri- Sylvia Park and Auckland Port interchanges under delivery opens 2025 around CRL time

Cancelled (For now anyway)

 Auckland Heavy Rail to the Airport via Onehunga Line and substantial line upgrade for line too – substituted Light Rail/Metro link to Airport from Auckland Central as part of that network now also cancelled as at November 2023

Others In Longer Term Strategic Thinking – Including Auckland Rail Program Business Case

- Avondale Southdown Freight Line to enable more freight trains to run on North Auckland Line especially if more Intermodal freight moves from Northland to Auckland. This line would most likely be used for Metro passenger too.
- North-Western Freight Terminal as link to Marsden Point Port in Northland developed links to Auckland Ports strategy. Northland Rail upgrading underway
- Extension of Auckland Metro south, including electrification, of Pukekohe towards Mercer with stations at Tuakau,
 Pokeno and even Mercer with Park and ride facilities to support this
- Four mains progressively to be delivered from Westfield junction to Pukekohe for express passenger running, regional passenger rail and increased freight capacity from Southern Auckland and Northern Waikato
- New Stabling and Maintenance facilities for trains across network
- Enhanced station amenities from rail stations in Auckland region
- Heavy Rail to North Shore option not rued out could be Light Rail/Metro though. Under consideration

Auckland Rail Programme Business Case – 30 Year Plan

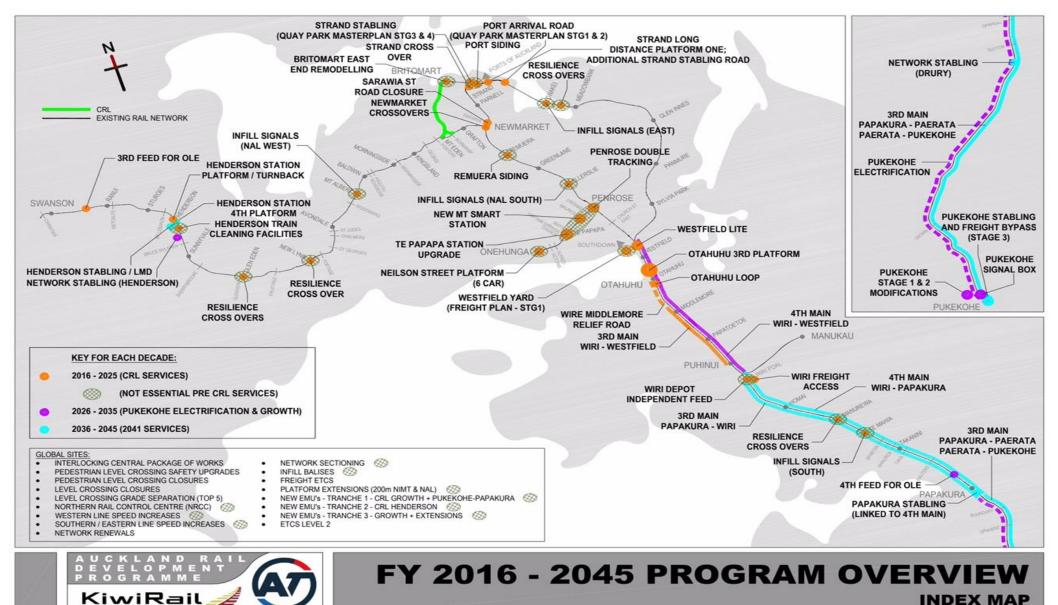
6 key infrastructure investment focus areas

Maintenance & renewals	Level Crossing removal	Signalling & Power	Network upgrade forecast
Step change in maintenance & enewals levels and elivery methods and o improve reliability nd reduce disruption from track works	Closure or grade separation of all level crossings	Upgrade signalling for capacity Upgrade power supplier for greater passenger frequency & electrified freight	Wynyard Waitematâ Te Waihorotiu Karanga-a-hape Maungawhau Kingsland Kingsland
Fleet, Depots & Stabling	Additional Track	Station Upgrades	Swanson Penrose . Henderson Avondale Onehunga
lew and replacement trains, depots & tabling to meet future demand	38km 4-tracks: Westfield Junction to Pukekohe New Avondale to Southdown - Crosstown corridor enabling port options and freeing the inner isthmus for	Upgrades and improvements to stations to improve access and amenity to cope with growth	New Lynn Mångere

Pukekohe



Auckland Transport Rail Metro Program Overview To 2045

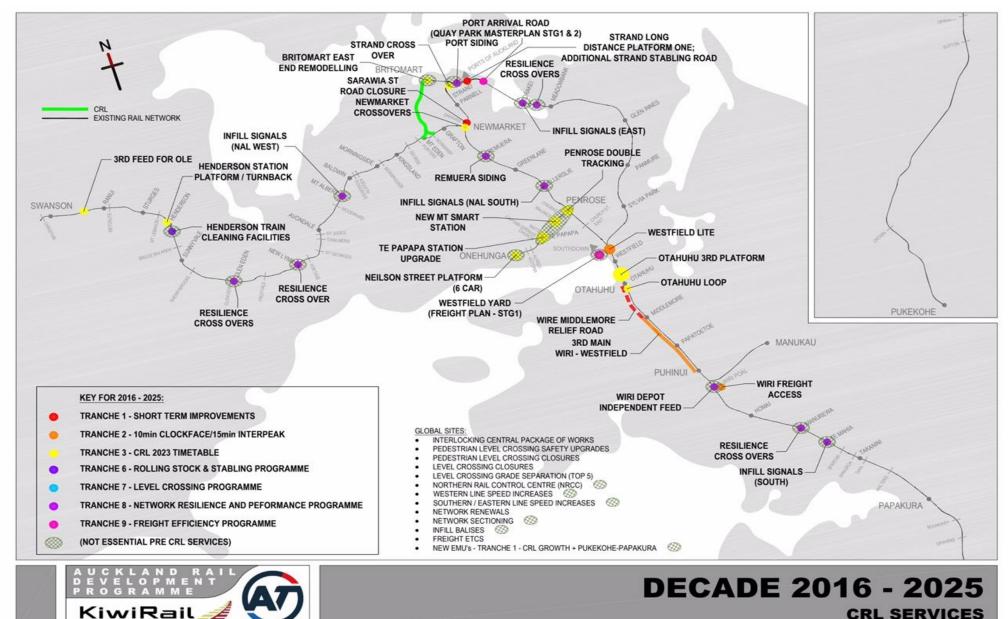


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INDEX MAP

Auckland Transport Rail Metro Program To 2025 For CRL

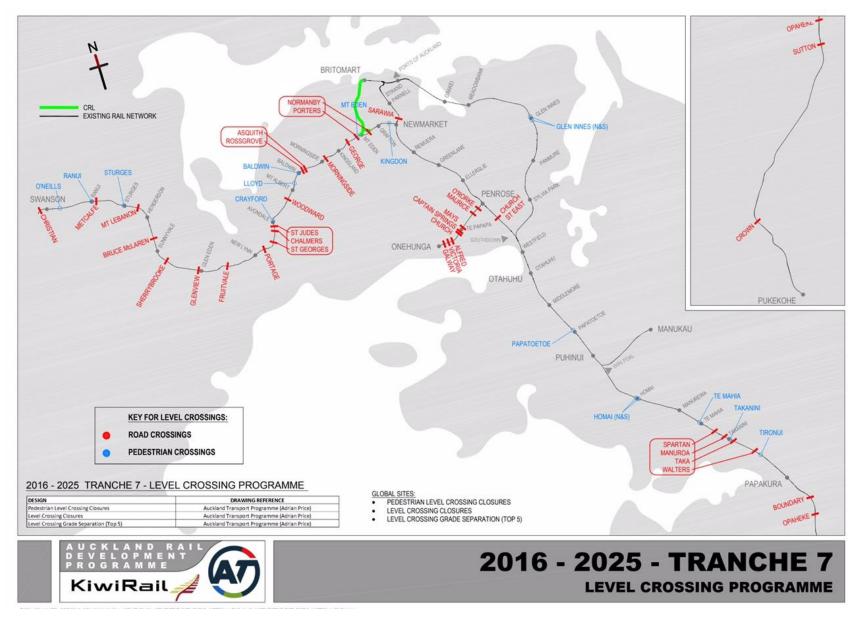


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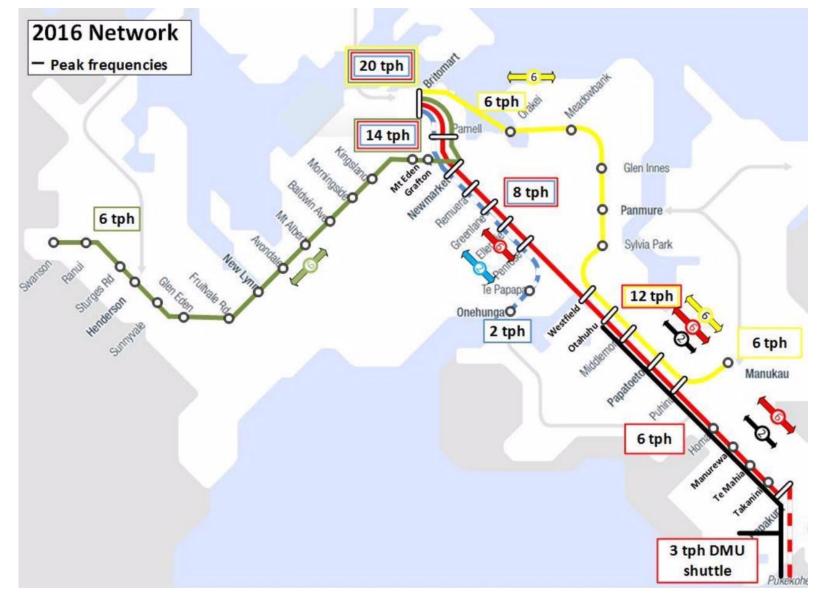
CRL SERVICES

Auckland Transport Rail Program – Level Crossing Removals



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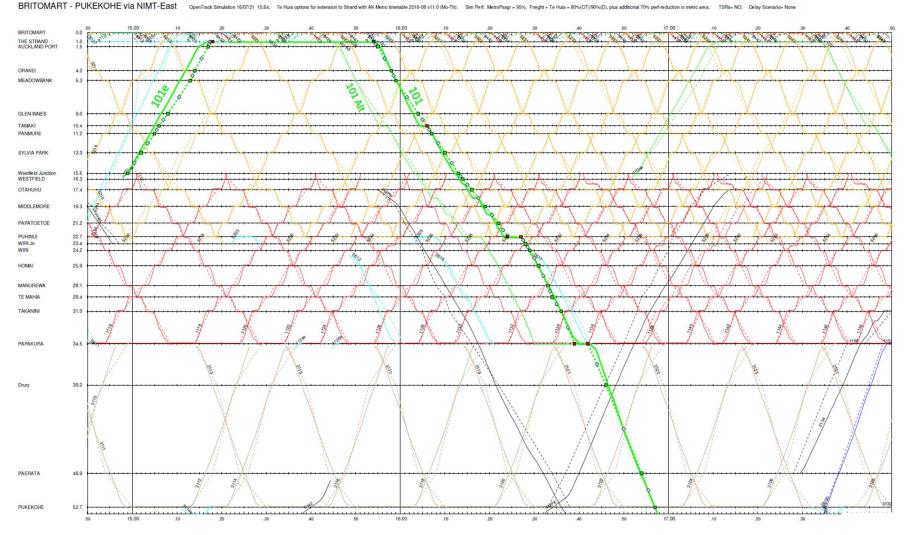
Auckland Rail Network Current Capacity Overview Per Peak Hour (Largely as is in 2023)



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Rail Network Current Capacity Example – Auckland PM Peak Congestion – (Along Waterfront / Southern Lines)

Shows how regional train weaves its way through non clockface timetables in PM peak hour



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Auckland Transport (AT) - Overview

Source 2020 AT Annual Report

Who we are and what we do

AT is a Council Controlled Organistation (CCO) of Auckland Council. It was established in 2010 to contribute to an efficient, effective and safe Auckland land transport system.





We lead the Auckland Forecasting Centre planning

networks in greenfields areas with Waka Kotahi NZ

Panuku Development Auckland, and others.

Transport Agency, and brownfield areas with Kainga Ora,

Our call centres respond to more than 600,000 transport related phone calls and our on-site customer service centres provide face-to-face support to more than 1.5m customer interactions per year.

AT is the regional guardian of \$21.1b publicly-owned assets.

We provide walking and cycling infrastructure and travel demand activities to encourage more people to walk or ride bikes.





We manage the transportrelated impacts of hundreds of special events each year.



we work with Waka Kotahi to manage both the local, as well as the State Highway and motorway network

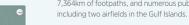
from Taupō to Cape Reinga - 15,000km of road network. AT manages and runs the region's transport

At the Auckland Transport Operations Centre (ATOC)

network (excluding state highways) on behalf of Auckland ratepayers and taxpayers for the benefit of 1.7m residents.







(A7)

We design, build, manage and promote most of Auckland's public transport infrastructure. This includes services. systems, facilities, customer apps and the region's integrated passenger

transport ticketing system, AT HOP.



We enable utility companies, construction companies and others to safely access the road corridor to undertake construction, service assets and undertake work associated with their business needs.



Our day-to-day activities keep Auckland's transport systems moving. We plan and fund public transport, promote travel choices and operate the local roading network.

We partner with Kiwi Rail, Transdev and contracted bus and ferry companies to deliver rail, bus and ferry services.





We operate compliance services on the roading network.

We deliver local board and Auckland Council projects and programmes, and work collaboratively with other CCOs as part of the Council group to deliver integrated solutions across Auckland.



We manage assets such as wharves, moorings and navigation aids to deliver a safe marine environment through our Harbourmaster function.

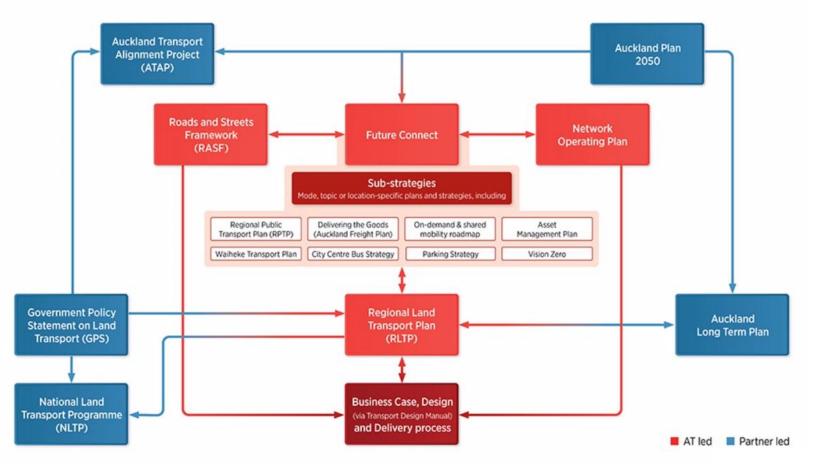
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Auckland Transport Strategic Plan Framework

Source 2020 AT Annual Report

The Auckland Transport Strategic Planning Architecture

The Auckland Transport Strategic Planning architecture



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Auckland Regional Public Transport Plan - Overview

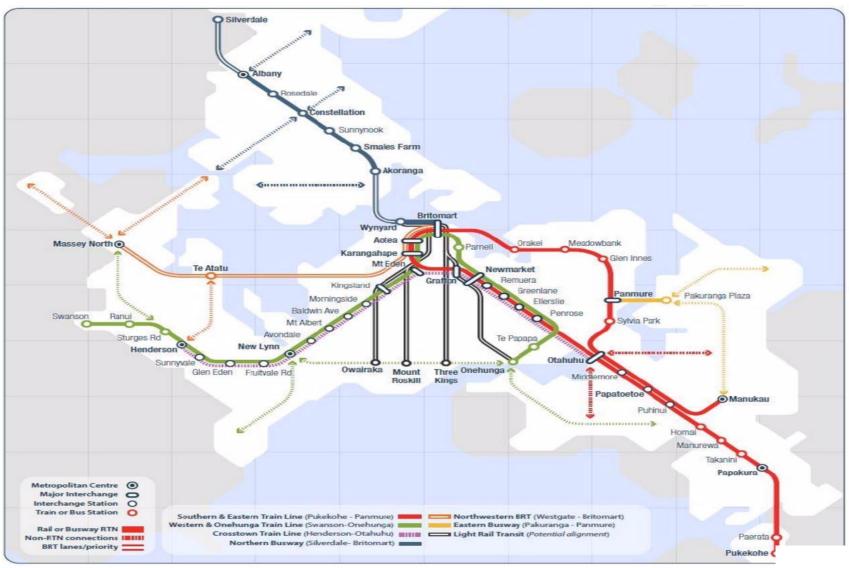
Source 2020 AT Annual Report

HOW DOES THE RPTP FIT IN WITH OTHER PLANS?

The RPTP complements The RPTP focuses on the planned public transport services and policies that guide the planning and operation of AT's network. and follows on from other plans, including the recently completed Regional Land **Regional Public** Transport Plan. It is consistent Transport Plan with the new Government describes the services Policy Statement on Land Transport (2018) and the that are integral to Auckland Plan 2050, as well Auckland's public as AT's Statement of Intent Auckland Plan transport network (2018-21). Auckland Long **AT's Statement** for a 10-year period Term Plan of Intent and is reviewed Auckland Transport Auckland every three years. Reprint as at 1 October 2018 Alignment Project 60% OF PEOPLE WHO MADE SUBMISSIONS TO OUR RECENT **REGIONAL LAND TRANSPORT** PLAN SAID IT IS IMPORTANT TO Land Transport Management Act 2003 Public Act 2003 No 115 Date of animal 12 Normather 2003 INVEST IN PUBLIC TRANSPORT. 100 mand when Land Transport **Auckland Transport Regional Land Transport Plan** Management Act **Alignment Project** sets out the programme of transport improvements for Auckland for a 10-year period. TRANSPORT PLAN 2018-2028 National Land Government **Policy Statement Transport Programme**

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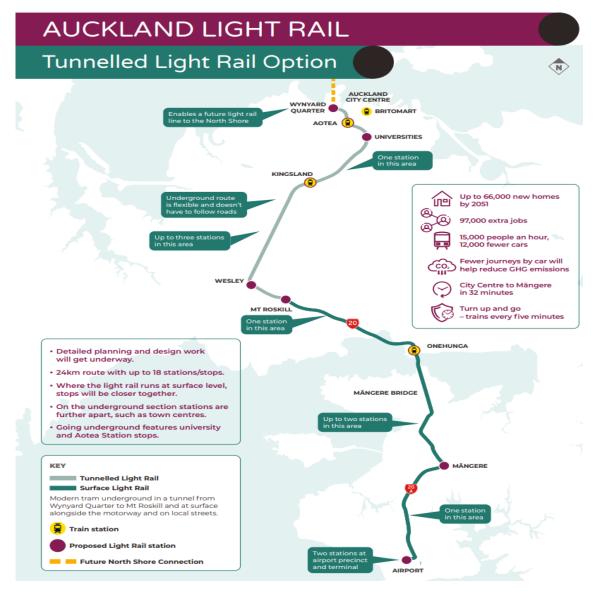
Auckland Transport Developing Rapid Transit Network (RTN) Overview - Heavy Rail, Busway and Potential Light Rail/Metro



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Auckland Light Rail – Proposed – Now On Hold With Stop Work

- Major new independent rail network for Auckland was proposed
- First stage of three new lines at least
- NZ\$15 Billion Project
- Tunneled option hybrid of Light Metro and Light Rail
- Due for construction to start late 2024
- First line to Auckland International Airport
- Ultimately to cross to North Shore and to North-West
- Staged network delivery and expansion over time
- Change in Government in November
 2023 has seen this project put on hold
 with a stop work issued other options
 to be considered



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NZ-National Passenger Rail Vision

Photo Source: https://teague.com/work/future-rail

Why A National Vision For Passenger Rail?

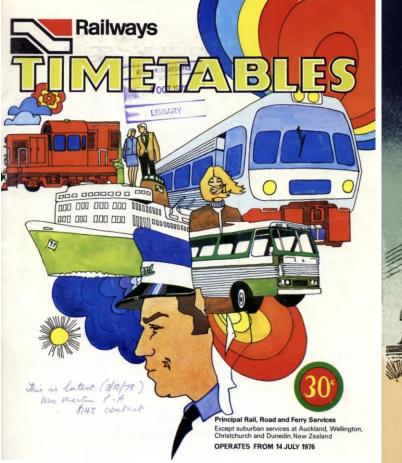
Can we change from just Metro rail to national focus ecompassing the Heartland?

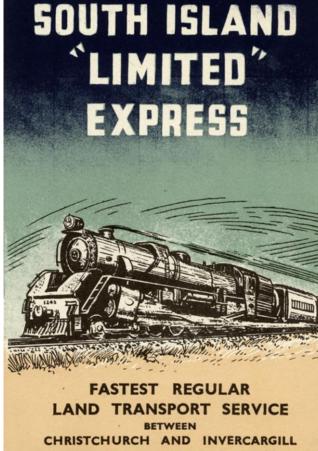
What sort of country do we want NZ to be? - Patriotic national pride as one joined up nation at stake

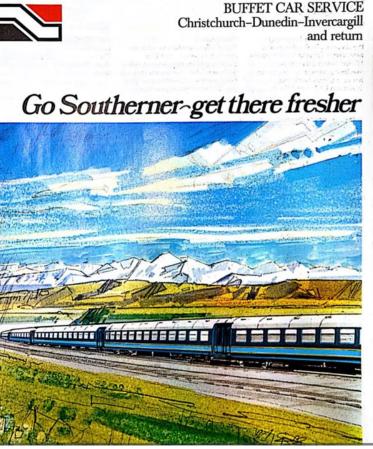
Quality Rail Networks gives perception of a united nation

A Choice - Shape next Centuries development – and community National nonpartisan consensus critical for sutainability

Past Moves To Modern Integrated Networks

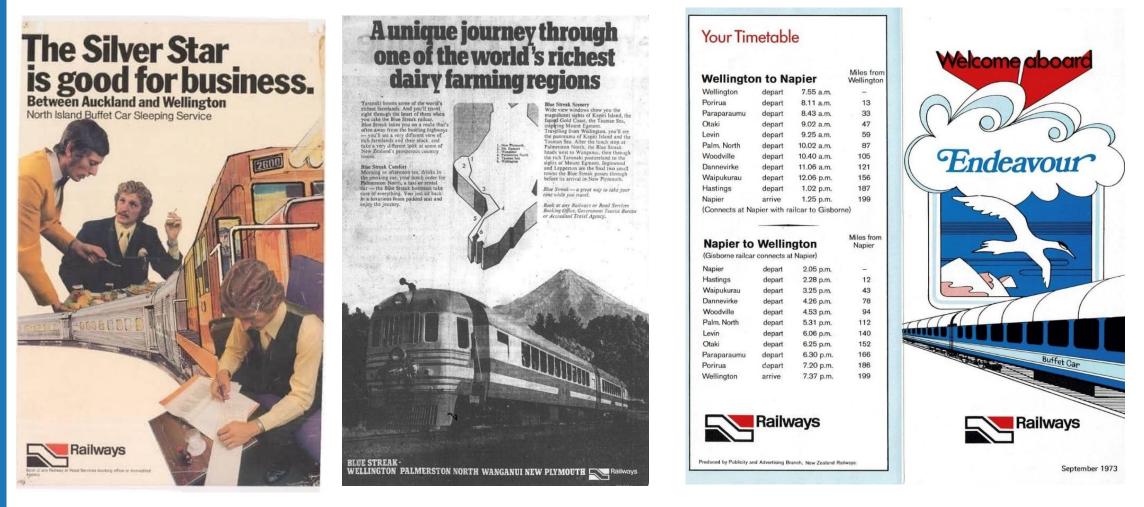






Past optimism, modernity and move towards national multi-modal integrated network by 1970's - Over time confidence was lost

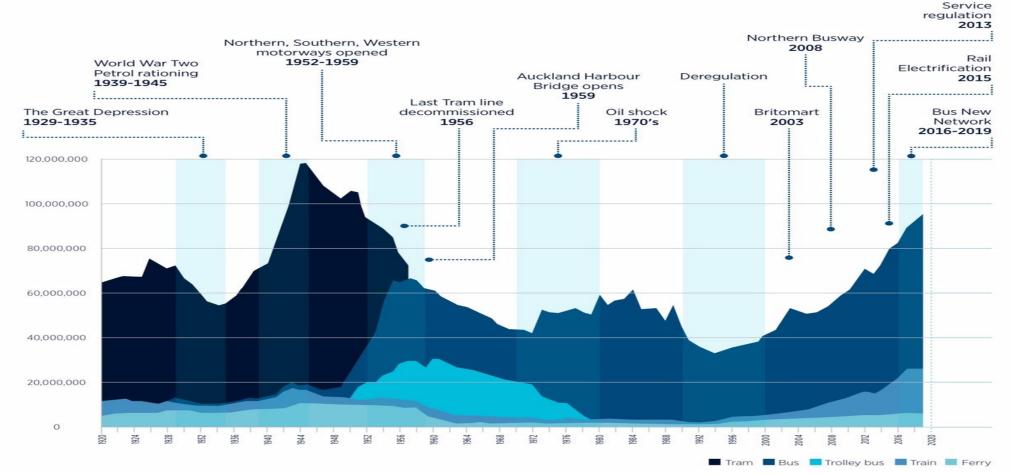
Flashback - Mid 1970's - The Top Notch Premier Trains



The North Island followed with its own prestige passenger trains slightly later in the decade with the likes of the Silver Star sleeper train, The Blue Streak Railcar and The Endeavour – all were gone by 2001

Public Transport (PT) Use Trends New Zealand – Auckland

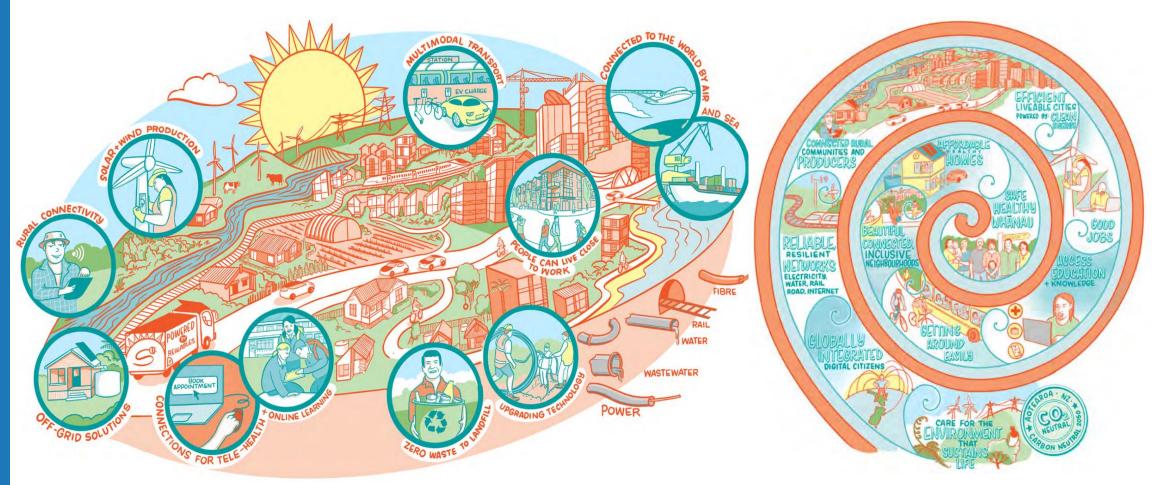




A systematic policy move away from PT towards private based mobility (motorcars) saw PT use decline significantly as shown. Auckland has more than triple the population today than in the 1940's but way less PT trips. For regional rail this is even more pronounced as policies until recently have effectively discouraged PT use over the last 70 years.

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Why? Infrastructure NZ Sustainability Framework



Source of diagrams: Rautaki Hanganga o Aotearoa New Zealand Infrastructure Strategy pages 6, 7 & 28 - Te Waihanga New Zealand Infrastructure Commission Infrastructure New Zealand rural connectivity and multimodal transport key elements for a sustainable and resilient

Where Inter-Regional Passenger Rail?



Identifying where rail has strategic edge



Potential journey time advantage due to superior rail alignments eg tunnelling



Analysing transport demand - current, latent



Spatial planning to ensure growth strategies are integrated with transport



Access to affordable housing



Mana whenua and our Tamariki to have stronger voice

Vision – Priority - Upper North Island: Golden Triangle – Auckland – Hamilton - Tauranga

- High quality, fast frequent rail Auckland Hamilton -Tauranga up to 160kph Tri-Mode rolling stock – 50% of

NZs population in broader area



Current Status & Interventions : *Te Huia* Hamilton to Auckland Loco hauled rolling stock – top 100 kph. Infrequent service and no service to Tauranga.



Timing: Developing now through to Tauranga by early 2030's possible



Source of train diagram below - Submission to Parliamentary Transport and Infrastructure Select Committee Inquiry Into the future of inter-regional passenger rail in New Zealand - Ruapehu District Council, Horizons Regional Council and Greater



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NIRP / Te Huia proposed underfloor layout: 25kV AC equipment in gold, Batteries in green, CI engine/genset in black

Vision – Priority - Lower North Island:

Wellington - Masterton & Wellington - Palm Nth - Whanganui

- Fast frequent pass rail connections Wellington –
- Palmerston North and Masterton 120-130kph speed using Tri-Mode rolling stock. Whanganui?
- Current Status / Interventions: Capital Connection and Wairarapa Connection – 100 kph. New Rolling stock -
 - Lower North Island Rail Integrated Mobility (LNIRIM) project underway.

Timing: Late 2020's delivery underway – Funded

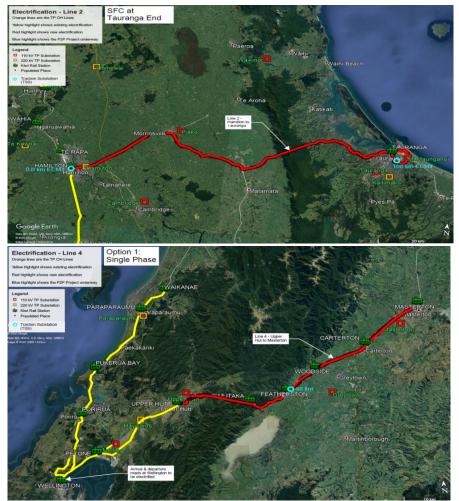




Underfloor layout proposed in LNIRIM DBC: 1.6kV DC equipment in blue, Batteries in green, CI engine/genset in black

Key Enabling Investment - Electrifications





Electrification: 1st Pukekohe – Hamilton 2nd Hamilton – Tauranga 3rd Palmerston

North – Waikanae and 4th Upper Hutt - Masterton

Map Source: Beca Electrification study 2020

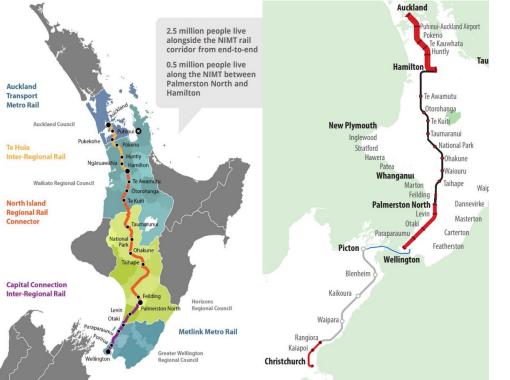
Vision – Priority – National Network Connector: Auckland - Wellington - Picton - Christchurch (Connecting Nation)

Integrator Auckland to Wellington -

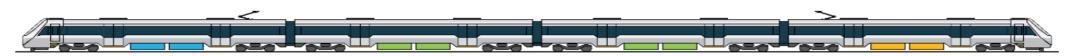
- daytime & overnight train, and
- Wellington Christchurch via Interisland connection.
 - **Current Status & Interventions:** Northern Explorer & Coastal Pacific service seasonal & infrequent.



Timing: New trains for NI and utilizing current Coastal Pacific fleet better – New ferries 2025/26.



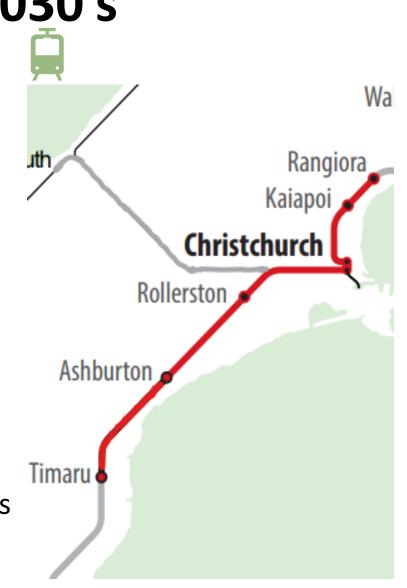
Source of train diagram above: Submission to Parliamentary Transport and Infrastructure Select Committee Inquiry Into the future of inter-regional passenger rail in New Zealand - Ruapehu District Council, Horizons Regional Council and Greater Wellington



INTEGRATOR MODE: Due to advancing battery technology, this rolling stock underfloor layout, will become viable regarding range resilience, at the time of procurement and/or future fleet upgrade: 1.6kV DC equipment in blue, 25kV AC equipment in gold, Batteries in green

Vision – Priority late 2020's - 2030's Central South Island

- Rangiora Christchurch Ashburton Timaru 160 kph fast rail (<90 mins) – with initial bus onward connection to Dunedin
- Ō
- **Current Status & Interventions:** No service exists, leverage off North Island investment – Infrastructure and alignment ideally suited for upgrades to higher speeds trains
- Ð
- **Timing:** Initial rolling stock cascade down from older Te Huia / Capital Connection from late 2020's awaiting new rolling stock



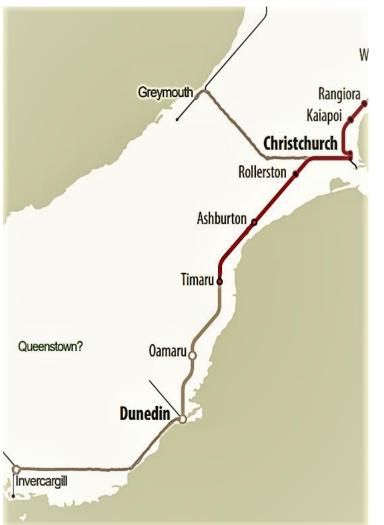
Map Source: Adapted and modified from Green Party Intercity Rail proposal from 2020 Election proposal

Vision – Following Priority 2030 - 2040 Lower South Island

- Timaru Dunedin Invercargill, Suburban
- Christchurch, Dunedin Railways Commuter Mosgiel, Taieri Gorge leverage
- Ē
- **Current Status & Interventions:** No service exists, leverage mid South Island investments – New crossing loops, signaling to add network capacity



Timing: Northern Explorer type service possible Christchurch - Dunedin - Invercargill (leverage tourism) early 2030's – new carriages



Vision – Following Priorities 2030 - 2050 Other Extensions and Developments 💂 🙋 📮

- Redefined Tourism Services: Tranz Alpine and National Tour Train (all pax lines e.g. SIMT/Dunedin) / Charter Services Commercial operation
- **Ongoing Network Expansion:** Napier, New Plymouth and Northland. Reopen Rotorua? Gisborne? Queenstown via Kingston?? and new local regional local networks such as : Waikato Local, BoP Local to Whakatane, Hawkes Bay Local Ongoing support for heritage networks as required



Progressive Delivery from the 2030's as rail capability develops across New Zealand and financing capability allows in New Zealand. Utilise strategy to cascade rolling stock

Vision – Completed National Network By 2040's



A quality high frequent core network of fast (Red) trains supplemented by electrified NI regional connectors (solid Black). Complimented by longer distance trains (Grey) spanning the entire nation progressively by 2040's

New Emerging Rolling Stock – Bi/Tri-Mode

(VLine (Victoria) VLocity, Etihad Rail, DB/Siemens and Wink/Stadler)



Potential inter-regional rail rolling stock adapting fast. From all diesel units like, the VLocity used in Vic. Aus. to Bi/Tri Mode Units (TMU). Power from overhead or battery charged either from CI engine or Overhead.

Summary of Vision and Outcomes

- Staged Rail over 20+ years Golden Triangle and Lower North Island first, then national connectors / South Island - "Connecting Communities"
- National Public Transport Integrated Planning with Strong Regional input for local and national outcomes supported by robust research and analysis
- ➢ Rails key advantages leveraged, customer centric approach innovation
- >Non-partisan support for stakeholders for funding and delivery required
- Funding: Land Value Capture, TOD's, NZLTF, fuel / gen tax, rates, GST allocation, inward investment, community, pop funding base, car release
- > Delivery models incl. Franchising, Concession, Development Co-operative
- >Integrated networks Public bus improvements for many routes
- ➢ Rail skills enhancement development pipeline of industry capability

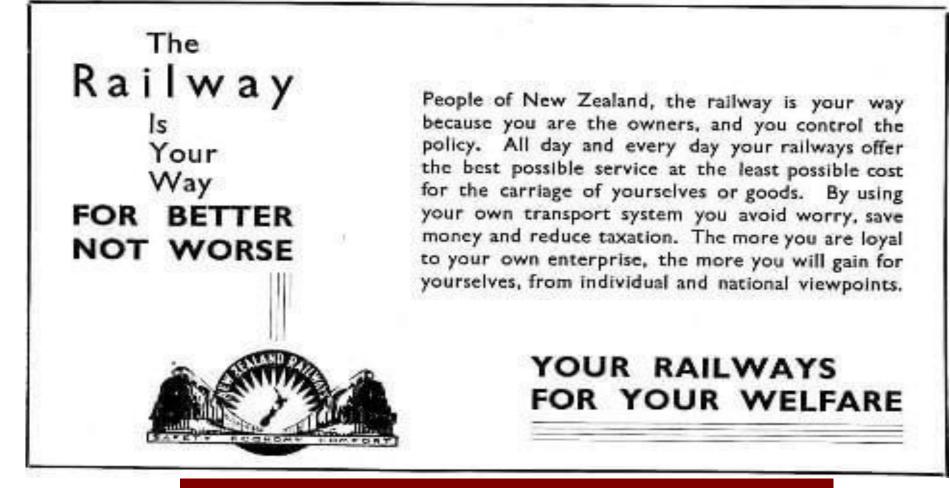
Thoughtful Quote

"There is more to be done than to make figures to show whether the railways are paying or not. You have to take into account consideration the areas to be tapped and the development of the country through which the railway passes ... instead of that, people bought and sold land and they got rich: and it was almost painted on the clouds the railways were not paying"

Michael Joseph Savage – Evening Post 10 June 1938, 10.



Epilogue - NZ Railways Is Our Railway!



Let's Do This New Zealand!

Heriot-Edievale.com Fast Tracking To Our Future

Michael van Drogenbroek www.heriot-edievale.com

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Photo Source: Michael van Drogenbroek