Business Case Sustainability Story

Update

11 May 2020

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Supporting Growth

BC Process

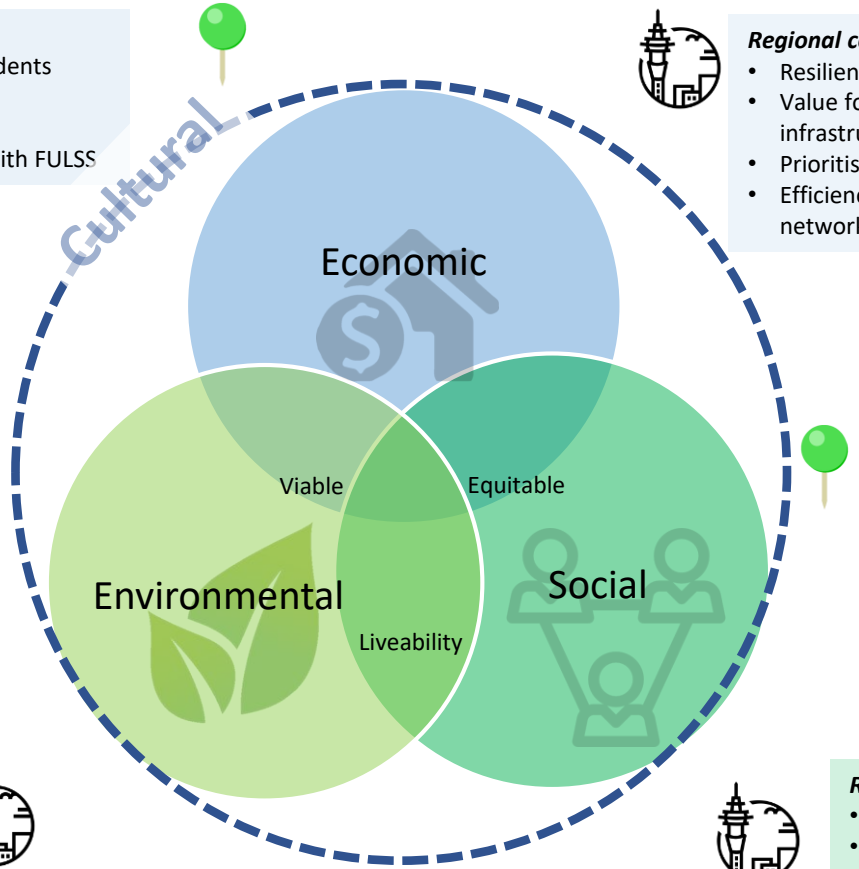
Process for each business case

1. Initial review
2. Involvement of sustainability expert in constraints mapping / optioneering / MCA
3. Capture opportunities
4. Sustainability section in DBC with ‘signposting’
5. Reporting on Outcomes at a broader level (including use of Emissions modelling)

Signposting in DBC document

Local considerations
- Access to jobs for residents
- Access for business
- Enabling growth area development in line with FULSS

Regional considerations
- Resilience of strategic transport corridors
- Value for money of transport infrastructure
- Prioritisation of projects
- Efficiency of the regional transport network



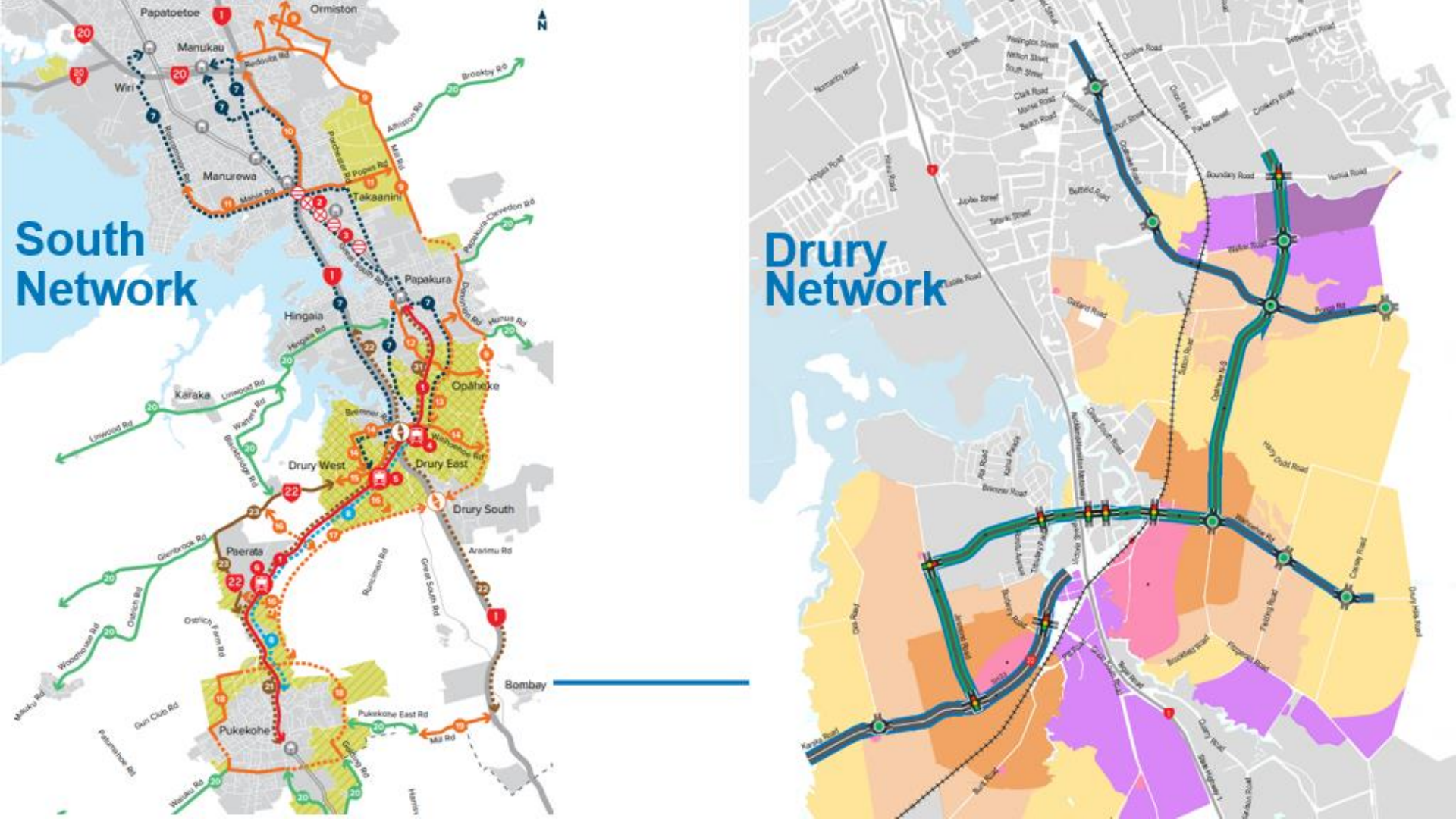
Local considerations
- Natural assets – Significant ecological area, Streams, rivers and waterways
- Stormwater effects and treatments
- Flooding impacts (local level)
- Mode share of growth areas

Local considerations
- Cost of travel for residents
- Transport choice available
- Safety of transport network
- Human Health and wellbeing
- Social cohesion
- Effects on surrounding land use
- Liveability of future growth areas

Regional considerations
- Reduction in VKT
- Reduction in CO2
- Impact on Coastal marine areas
- Flooding impacts

Regional considerations
- Mode share and travel behaviour
- Safety of transport network
- Access to social opportunities

An example – Drury Package Detailed Business Case


South Network
Drury Network
Papatoetoe
Ormiston
Manukau
Wiri
Manurewa
Takaanini
Papakura
Hingaia
Opaheke
Karaka
Drury West
Drury East
Drury South
Paerata
Pukekohe
Bombay
N

Drury package – Regional benefits

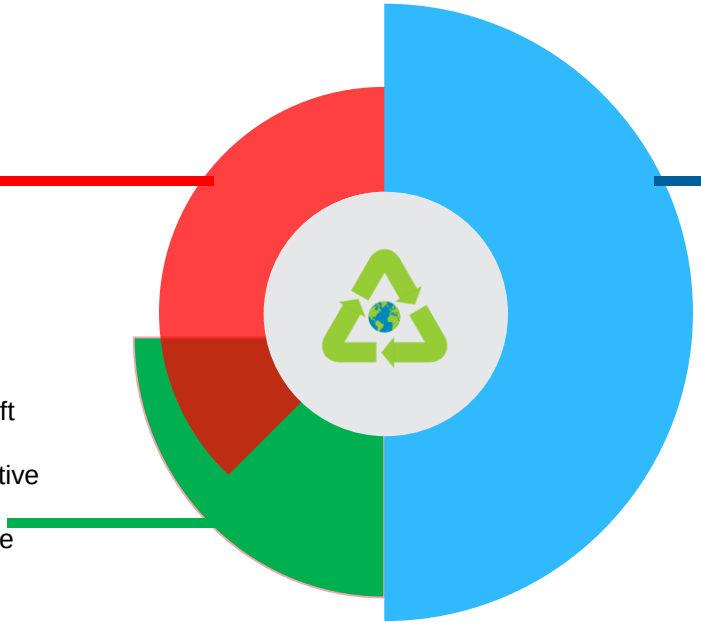
Social

- Options that integrate well with future land use and FUZ development have been selected.
- Opportunity to integrate with rail stations at Drury West and Drury Central providing transport choice and increasing mode share of growth areas.

Environmental

Reduced emissions as a result of mode shift by:

- Four-lane capacity prioritises PT and active modes enabling transport choice, accessibility and travel behaviour change within existing and new communities.
- In addition to population growth, the Structure Plan also enables employment growth in Drury and will reduce reliance on longer distance journeys to work



Economic

- Forms part of the FTN supporting access to jobs for residents and access for business.
- Provide direct connections for residents and businesses into the wider transport network.
- Opportunity to integrate with Papakura to Bombay project enabling growth area development.

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Drury Package – Local Environment Outcomes

Wetlands

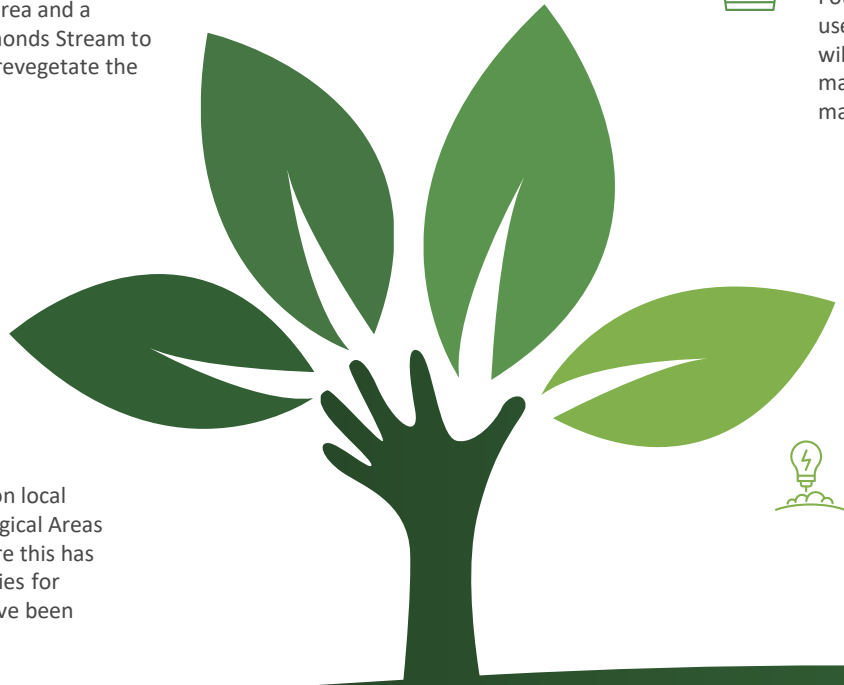
Opportunity for a centralised wetland in the Bremner/Waihoehoe Roads area and a 'floating' bridge at Ponga Symonds Stream to enhance the connection and revegetate the embankments.

Recycling materials

Four-laning presents a significant burden on resource use, as well as poor soils in the Opaheke area, that will require a focus on minimising excessive use of materials and identification of opportunities to reuse materials during the design phase.

Earthworks

Earthmoving quantities have been considered to seek a good cut/fill balance, significant gullies have been avoided



Riparian habitats

Opportunities to enhance riparian habitat and retain mature vegetation have also been identified, including preservation of mature trees that may support roosting 'Threatened' long-tailed bats.

Habitats

Wherever possible, impacts on local streams and Significant Ecological Areas have been avoided, and where this has not been possible opportunities for mitigation through design have been identified.

Climate change and flooding

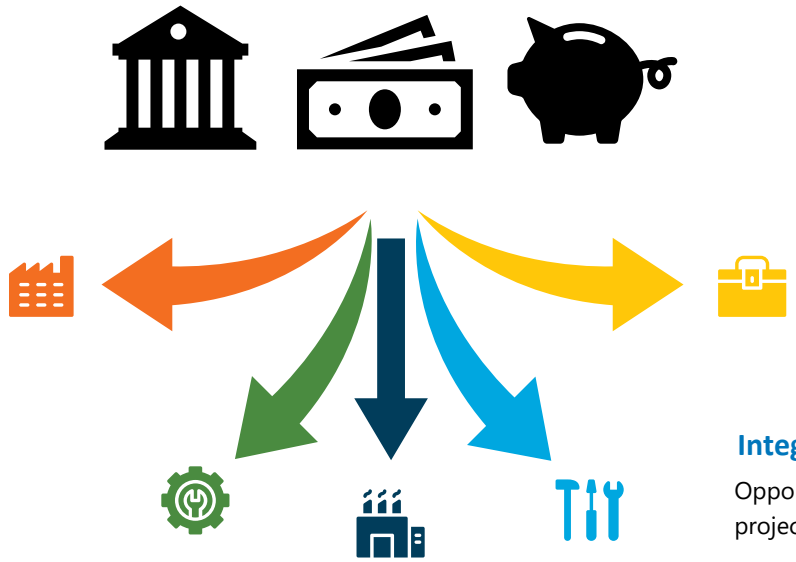
Options which impact the least on flood zones and Overland Flow Paths have been selected wherever possible, however some robust flood mitigation measures will need to be incorporated across the local roads network such as Bremner Road east.

Drury Package – Local Economic Outcomes

Transport Choice

Four-lane capacity prioritises PT and active modes enabling transport choice, accessibility and travel behaviour change within existing and new communities.

- Greater than 50% PT mode share for AM peak northbound trips in 2048+
- Ability to cater for buses every 4min along FTN corridors
- Additional 1,800 PT trips in the AM peak



Connection to the rail corridor

Opportunity to integrate with rail stations at Drury West and Drury Central providing transport choice and increasing mode share of growth areas.

- Enables access to the wider PT network
- 40% of rail patronage at Drury Central station estimated to be facilitated by the proposed upgrades

Access to jobs

Forms part of the FTN supporting access to jobs for residents and access for business

- 10% (107,400) of all jobs in Auckland accessible within 45min from Drury via PT
- 30% (313,000) of all jobs in Auckland accessible within 60min from Drury via PT
- 91,500 jobs accessible within 30min by car

Integrate with other projects

Opportunity to integrate with Papakura to Bombay project enabling growth area development.

Integration with development

Options that integrate well with future land use and FUZ development have been selected.

- Provision for 13km of new walking and cycling facilities
- Amenity of these corridors expected to improve by the FTN corridors. 10% reduction of daily traffic flows expected.

Connectivity

Provide direct connections for residents and businesses into the wider transport network.

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Drury Package – Local Social Outcomes

Links to Greenways

For the Bremner / Waihoehoe Rd sections there is the opportunity to link with the Local Board greenway route, providing another connection for communities.

Walking and cycling

All projects support safer walking and cycling through segregated routes.

Change in human health and emissions

Reduction in annual CO2 emissions by 1,270 tonnes, and reduction of annual fuel consumption by 575 tonnes when compared to the do-min

Sympathetic to community facilities

Wherever possible, options have been selected that have reduced impact on social facilities including local reserves and sports fields, as well as heritage sites.

Travel choice

Provides better choice for residents for short and longer trips, and encourages healthy and active lifestyles.

2,700 dwellings are expected to be within 800m walk catchment, and 43,000 dwellings within 3km cycling catchment

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General Approach to Emissions Modelling

- Use the VEPM model to estimate emissions rates (kg/km)
- Apply VEPM rates to transportation models to estimate emissions
- Assess the impact of the transport intervention by comparing Scenarios:
  - Existing: Current situation for context (2016 or 2018 model)
  - Baseline: A future without the recommended intervention
  - Option: A future the proposed transport intervention
- Sensitivity test long-term results with shorter-term rates, to separately identify the impact of the assumed future fleet changes

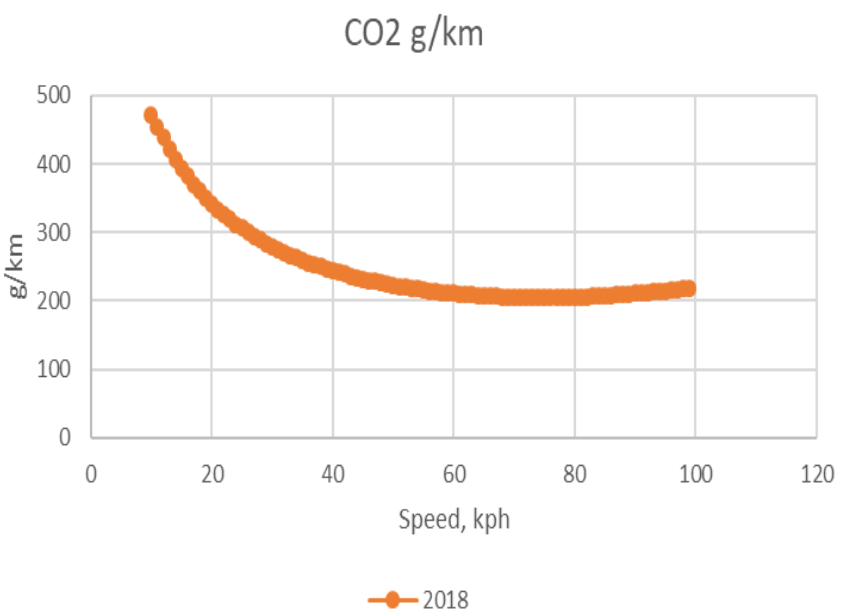
VEPM Vehicle Emissions Modelling

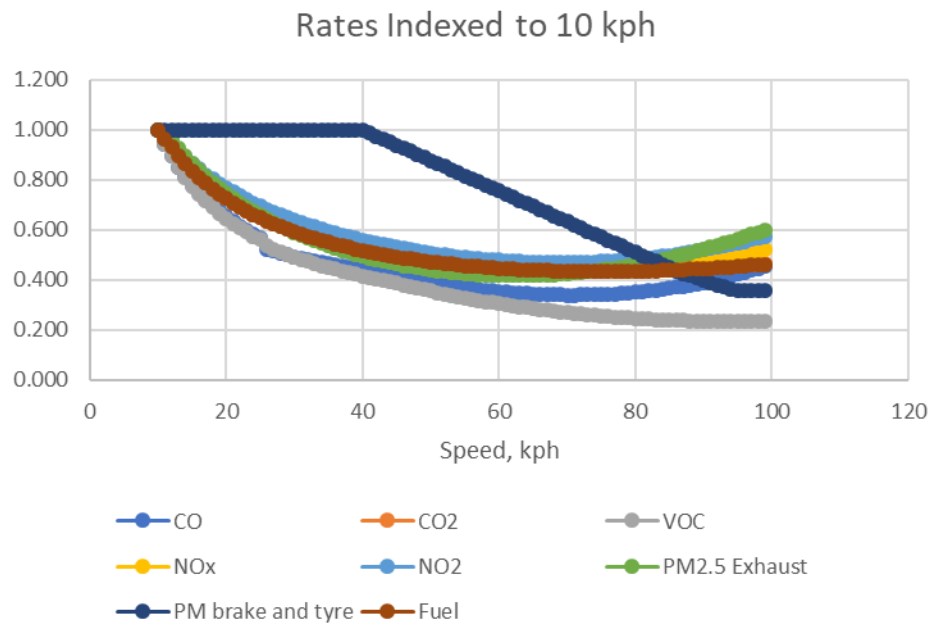
- Tail pipe emissions are a function of:
  - Amount of vehicle travel (**VKT**)
  - **Speed** of travel
  - Vehicle **fleet assumptions** (rates differ by forecast year)
- VEPM provides rates for average journey speeds
- Rates applied to each road in transport models scenarios
- Emissions include:
  - CO, CO_2, VOC, NOX, NO_2, PM, Fuel consumption

Limitations of VEPM:

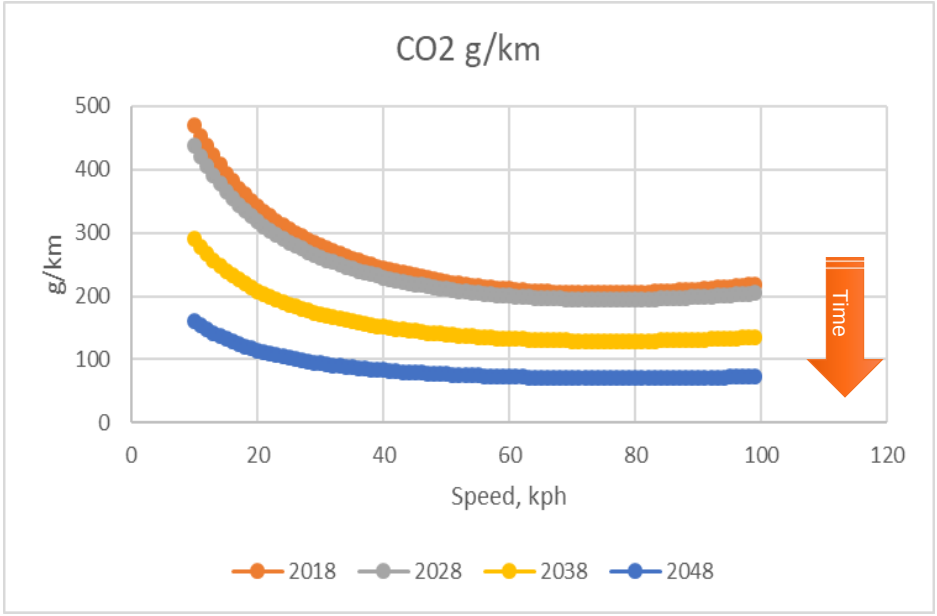
- The MoT fuel consumption factors are considered more accurate than VEPM but don't provide needed speed effect
- further planned updates to VEPM this year, including improving real world fuel consumption in VEPM

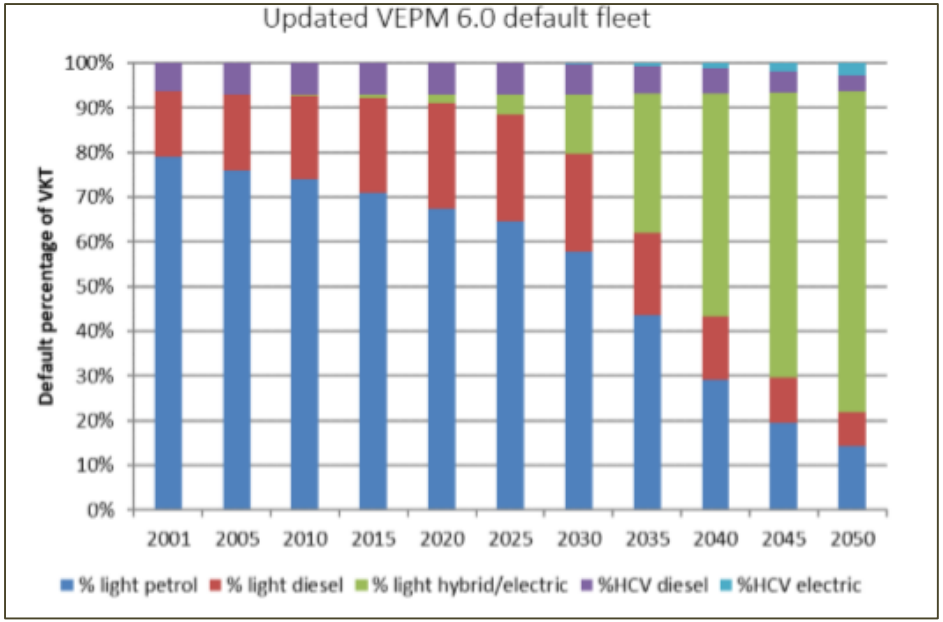
Impact of Speed





Impact of Fleet Assumptions





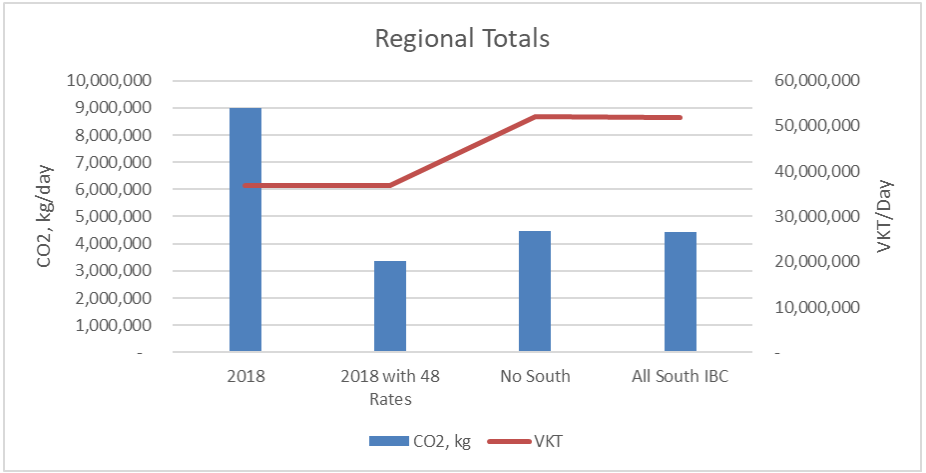
Impact of Interventions

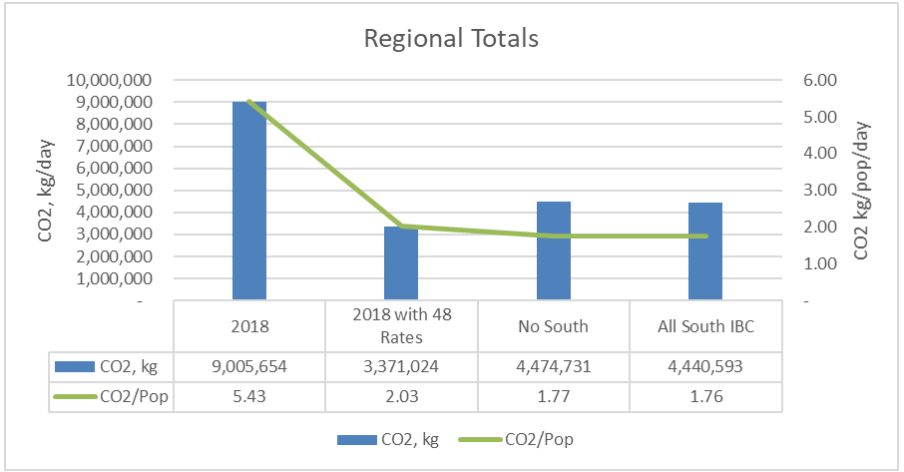
- Models predict VKT and speed, based on:
  - Land use inputs
  - Policy assumptions
  - Network and service inputs
- Proposed Interventions impact VKT via:
  - Mode shift (amount of travel by vehicle)
  - Change in destination (distance to destination)
  - Time of day (peak travel and speed)
  - Network performance (speed)
  - Choice of route (shorter or longer distance routes)

Suggested Baseline

- Use **total emissions** as key indicator to compare future scenarios but
  - also use **per-capita** values to benchmark against current day network and other areas (controlling for changes in fleet composition)
  - **Sensitivity test** with and without changes related to **future vehicle fleet** assumptions
- Assume **Common** land use for Baseline and Option scenarios, comprising:
  - Full development of Greenfield areas with total yield as per Council forecasts
  - Regional growth as per agreed Auckland Forecasting Centre forecasts
  - **Sensitivity test** with revised spatial allocations, retaining regional total:
    - Centralised employment (reduced in growth areas)
    - Dispersed density (rather than Structure Plan focus around stations)
- Use a '**Do Minimum**' transport network as the Baseline Network, comprising:
  - existing network
  - Plus committed projects in growth area
  - Plus 'ATAP3' assumptions outside growth areas
  - Assumed local and collector roads plus reduced speeds on rural roads in greenfield growth areas
- Use common 'ATAP3' economic and policy inputs to models
- Assess short, medium, longterm: 2028, 2038, 2048, 2048+ (note emissions targets set for 2030/2050)

Programme Outcomes (All South IBC Network)





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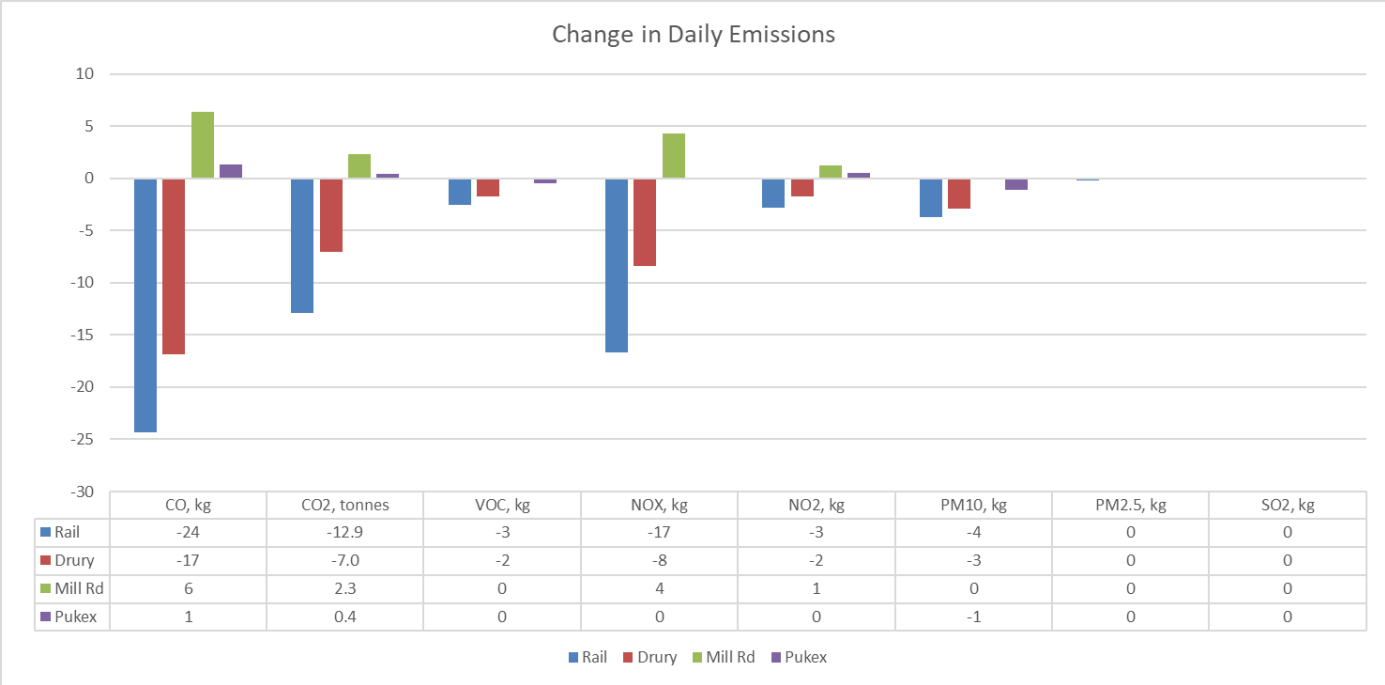
Note: Early illustrative results, to be updated for final business cases

Project Outcomes (Current Business Cases)



	CO, kg	CO2, tonnes	VOC, kg	NOX, kg	NO2, kg	PM10, kg	PM2.5, kg	SO2, kg
Rail	-24	-12.9	-3	-17	-3	-4	0	0
Drury	-17	-7.0	-2	-8	-2	-3	0	0
Mill Rd	6	2.3	0	4	1	0	0	0
Pukex	1	0.4	0	0	0	-1	0	0

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Note: Early illustrative results, to be updated for final business cases

Sensitivity test on fleet assumptions

2048 Analysis using 2048 Fleet				
Output	Units	Without Drury Package	With Drury Package	Change
CO Total	kg/year	2,355,803	2,351,443	- 4,360
CO2 Total	**Tonnes/year**	**1,457,600**	**1,455,900**	- 1,700
VOC Total	kg/year	181,452	181,022	- 429
NOX Total	kg/year	1,775,804	1,773,858	- 1,946
NO2 Total	kg/year	320,049	319,593	- 456
PM10E Total	kg/year	-	-	-
PM10BT Total	kg/year	283,361	282,575	- 786
PM2_5E Total	kg/year	22,638	22,631	- 7
PM2_5BT Total	kg/year	-	-	-
SO2 Total	kg/year	-	-	-
Fuel Total	l/year	599,911,421	599,140,638	- 770,783
VKT Total more than 8.5t	/year	1,270,954,428	1,270,910,409	- 44,019

Year 2048 Analysis using 2028 Evehicle Fleet				
Output	Units	Without Drury Package	With Drury Package	Change
CO Total	kg/year	15,813,053	15,782,797	- 30,257
CO2 Total	**Tonnes/year**	**3,972,709**	**3,965,806**	- 6,903
VOC Total	kg/year	1,299,128	1,295,703	- 3,425
NOX Total	kg/year	9,204,057	9,194,387	- 9,671
NO2 Total	kg/year	1,923,045	1,920,095	- 2,951
PM10E Total	kg/year	-	-	-
PM10BT Total	kg/year	307,048	306,280	- 768
PM2_5E Total	kg/year	236,894	236,779	- 115
PM2_5BT Total	kg/year	-	-	-
SO2 Total	kg/year	-	-	-
Fuel Total	l/year	1,623,781,413	1,620,841,995	- 2,939,418
VKT Total more than 8.5t	/year	1,270,954,428	1,270,910,409	- 44,019

Relevance for the AEE

- Guideline being developed for AEE based on work done as part of the BC
- Regional Benefits reported as part of section 1 of the AEE which covers Reasons for the Project
- Approach to design and alternatives assessment to explain consideration of sustainability
- Planner to analyse positive sustainability effects, drawing on specialist assessments and recommended mitigation e.g. riparian planting
- Further benefits and opportunities could be captured in conditions/management plans e.g. principles in ULDF and CMP.