Approach to Sustainability

Developing the Baseline for Emissions Modelling

7 August 2019

TE TUPU NGĀTAHI
Supporting Growth

Purpose and Process

Purpose

- To confirm the recommended approach to emissions modelling for the SGA programme, including defining the Baseline Scenario

Process

- SGA consideration of issues and options
- Liaison with AT and NZTA sustainability teams (6/8/19)
- Recommended Approach

General Approach to Emissions Modelling

- Use the VEPM model to estimate emissions rates (kg/VKT by vehicle speed) for current and future years (noting rates are forecast to reduce based on current and assumed future vehicle fleet changes)
- Apply VEPM rates to transportation models (VKT by link speed) to estimate emissions per peak period, aggregated to average day
- Model emissions generation only, not dispersion
- Assess the impact of the transport intervention by comparing Scenarios:
  - Existing: Current situation for reference (2016 or 2018 model)
  - Baseline: A future without the recommended intervention
  - Option: A future the proposed transport intervention
- Assess future via short, medium and long term forecasts: 2028, 2038, 2048 forecast years
- Sensitivity test long-term results with shorter-term rates, to separately identify the impact of the assumed future fleet changes

Required Inputs to Transport Model Scenarios

- Key inputs to the scenarios are:
  - Land use/demographic inputs for each forecast year
  - Future transport system assumptions
  - Economic/policy assumptions (e.g. fuel price, public transport fares, Travel Demand Management (TDM) policy impacts on travel etc)

- Impact of the Transport Interventions:
  - Directly influences travel choices and patterns (e.g. VKT)
  - Directly influences network performance (e.g. speed)
  - Directly or indirectly can influence land use patterns (through enabling capacity or system performance)
  - Unlikely to influence economic/policy inputs at SGA project or programme level

Issues and Context

- The greenfield **growth has been signaled** in the AUP, and the form defined in some locations through Structure Plans
- Decisions on releasing growth sit with **Auckland Council**, informed by transportation needs or impacts
- SGAs role to **protect** corridors that allow **future** implementation of the identified preferred transport system
- SGA approach therefore to get **best outcomes** for the planned growth, not to assess the value of the growth itself
- The transport networks are being design for long-term with **both planned greenfield and brownfield growth** assumed
- Land use and transport planning is being progressed in an integrated way for the desired, integrated outcomes (i.e. non-desired networks or land use are not being actively designed as a ‘counter-factual’)
- ‘Baselines’ have been defined for SGA as including full planned growth for:
  - economic evaluation
  - The ‘existing environment’ definition for option assessment and AEE

Measures for Scenario Comparison

Regional or area totals

✓More useful to understand net impact on emissions

❖not useful to compare between options with different levels of growth

Per-Capita Values

✓Can compare between scenarios with different levels of growth

❖sub-area comparators can be biased by location in regard to local vs through traffic

➢**Both measures have strengths and weaknesses**

➢**Use both as appropriate**

Options for Baseline Transport inputs

The Option scenario will include the recommended transport system, however there are options for treatment of the Baseline comparator:

1. Use a **future Do Minimum** network for the Baseline. As per BCR and AEE assessments, this would typical comprise the existing network plus only committed projects

2. Use an **Alternative** future network. This could be developed around 'previous' policy settings/standards or 'traditional' network (e.g. dominated by roads for personal car travel)

3. Use the **existing** scenario (e.g. a 2016 model (or 2018 if available)

Assessment of Baseline Transport Options

Option 1 (Do Minimum)

- ✓ Easy to define
- ✓ Spatially comparable to the fully-developed 'Recommended Option' scenario
- ✓ Consistent with EEM and AEE approaches, but
- ❖ May not fully demonstrate the value of the recommended networks, relative to 'traditional' approaches
- ❖ Somewhat artificial/unrealistic situation with full growth development on a Do Minimum network

Option 2 (Alternative Network)

- ✓ Could better demonstrate the value of the recommended network, relative to a 'traditional' approach
- ✓ Spatially comparable to the fully-developed 'Recommended Option' scenario, but:
- ❖ Hard to define and requires additional design and assessment of an alternative network
- ❖ Arbitrary and contrary to current objectives, policies, expectations, standards
- ❖ Outcomes will be sensitive to the design of the alternative network

Option 3: Existing situation

- ✓ Easy to measure, high level of certainty and not sensitive to assumptions :
- ❖ Not comparable with future vehicle fleet (although this could be addressed by using future fleet assumptions on current-day transport network)
- ❖ Existing developed areas may not be spatially comparable with growth areas

- ➢ **All options have strengths and weaknesses**
- ➢ **Option 2 not preferred as requires additional analysis for limited value**
- ➢ **Recommend use mainly Option 1 but with Option 3 used for reference**

Options for Land Use inputs to Scenarios

1. Use a **common** regional population total for both Baseline and Option scenarios that includes all planned growth. Sensitivity testing of alternative location/density can be included

2. Use **variable** land use inputs with full planned growth for the Option scenario but constrained growth for the Baseline

Assessment of Baseline Land Use Options

Option 1 (Common Land Use)

- Can directly compare outcomes
- Evaluates transport intervention, not growth
- Evaluation is contained within Auckland Region
- Is consistent with EEM and AEE approaches, but
- Assumes growth is immutable, which may not reflect enabling/influencing role of transport on growth

Option 2 (Variable Land Use Inputs)

- Makes direct comparison of outputs very difficult (emissions would be compared per capita rather than in absolute terms
- Assumes any constrained growth occurs ‘elsewhere’ in NZ or globally, beyond scope of the evaluation
- Could effectively include impacts of growth, rather than the transport intervention
- Ability to predict the required alternative and constrained baseline land use growth is weak

- **Recommend Option 1 (Common Land Use) for the Modelling Baseline**
- **Sensitivity test alternative land use scenarios that retain same regional growth but alternative forms of employment location and housing density**

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