Modelling for High Productivity Vehicles in Metropolitan Areas

13 February 2018

Austroads

Today’s moderator

Eliz Esteban
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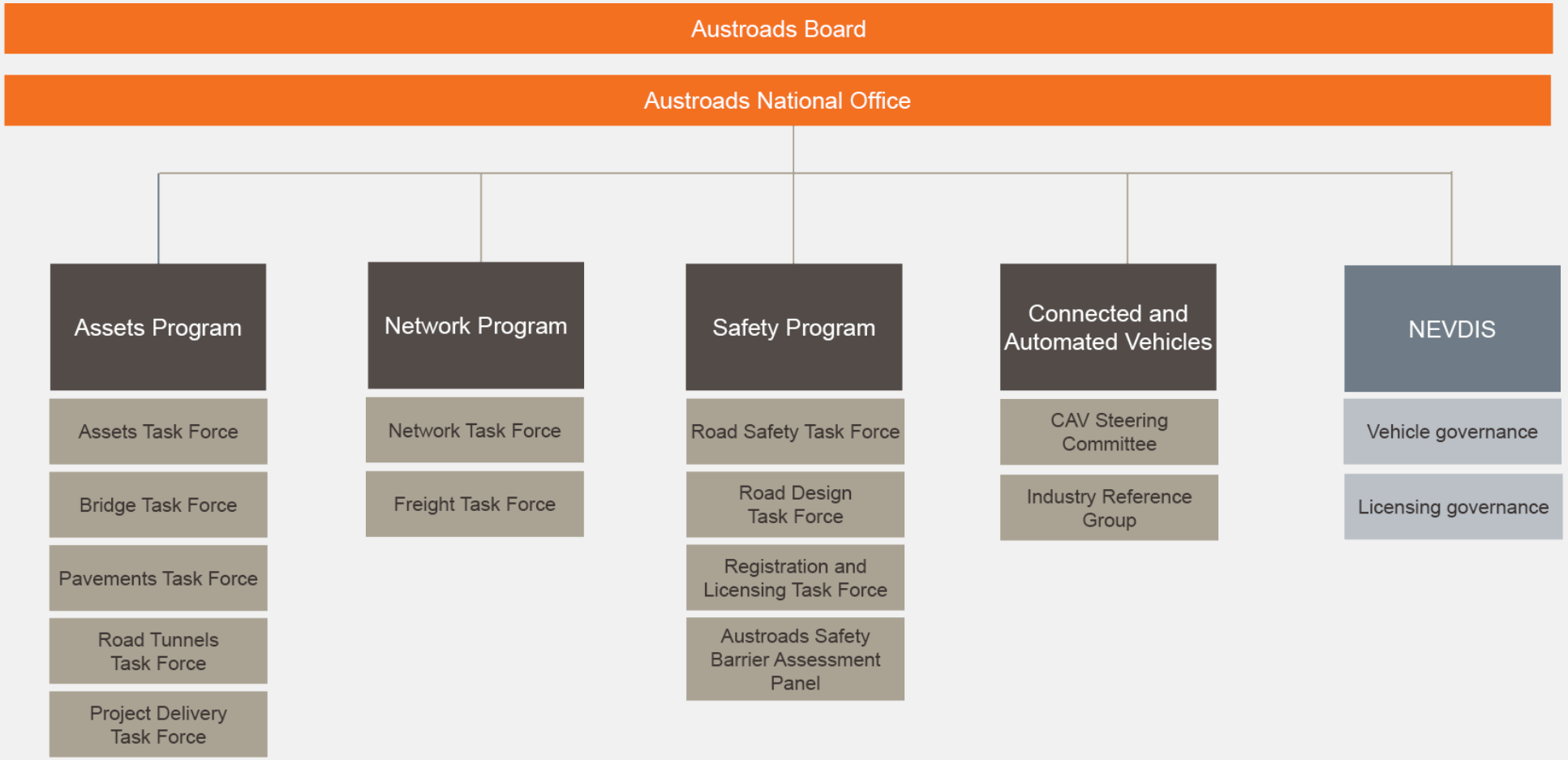
About Austroads

The peak organisation of Australasian road transport and traffic agencies

- Roads and Maritime Services New South Wales
- Roads Corporation Victoria
- Department of Transport and Main Roads Queensland
- Main Roads Western Australia
- Department of Planning, Transport and Infrastructure South Australia
- Department of State Growth Tasmania
- Department of Transport Northern Territory
- Transport Canberra and City Services Directorate, Australian Capital Territory
- The Department of Infrastructure, Regional Development and Cities
- Australian Local Government Association
- New Zealand Transport Agency

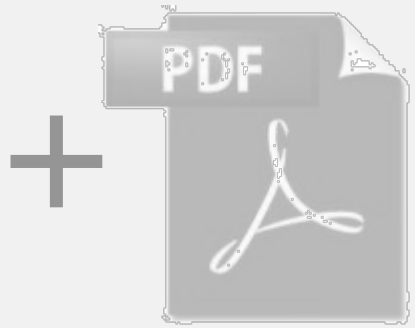
Our structure



Housekeeping

Presentation = 35 mins

Question time = 15 mins



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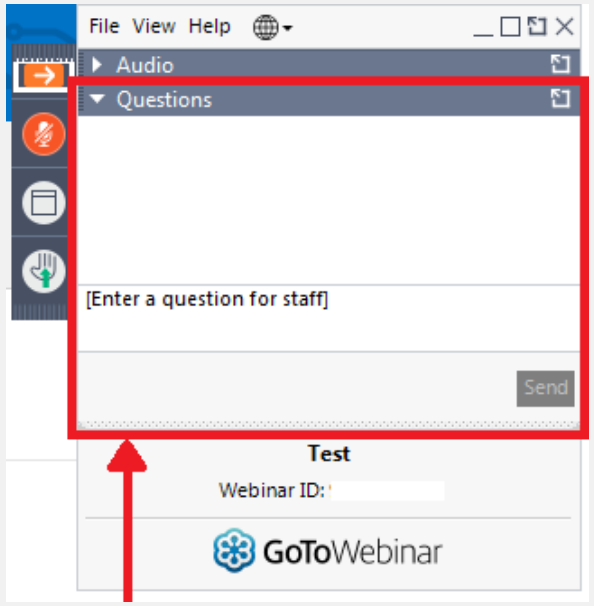
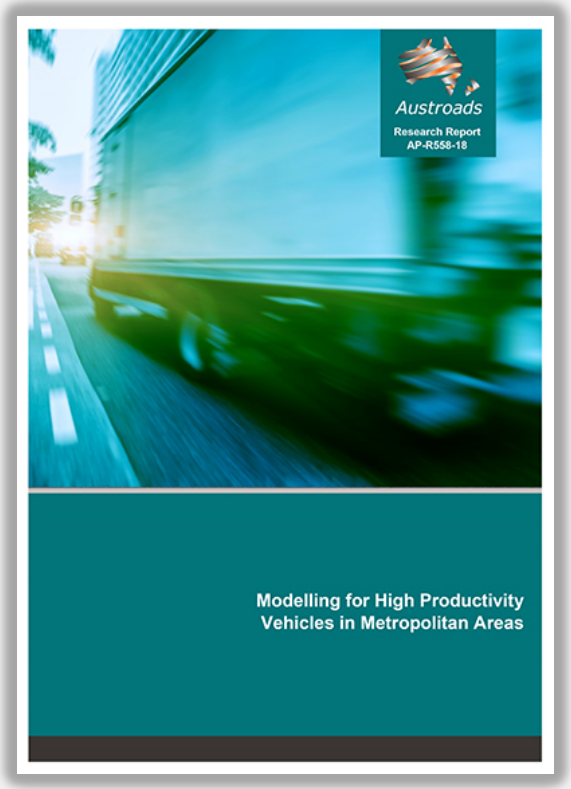
GoToWebinar



Please type your questions here

Let us know the slide number your question relates to

Austroads report



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https://www.onlinepublications.austroads.com.au/items/AP-R558-18

Today’s presenter

Dr Ian Espada

Team Leader, Network Operations

Congestion, Freight and Productivity

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Agenda

Topic	Presenter
Project Background and Introduction	Dr Ian Espada
Literature Review	
Stakeholder Consultation	
Modelling	
Conclusions	
Q&A	

Project Background and Introduction

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Introduction to team

Project Team

Austroads
Project Manager
Thang Nguyen

Project Leader, ARRB
Ian Espada

Team Member, ARRB
Kevin Wu

Team Member, ARRB
Andrej Bucko

Review Team

Austroads
Project Working Group

Stakeholders-
Road and Traffic
Authorities

Austroads Freight
Task Force

Austroads Board

The Project Team

Austroads

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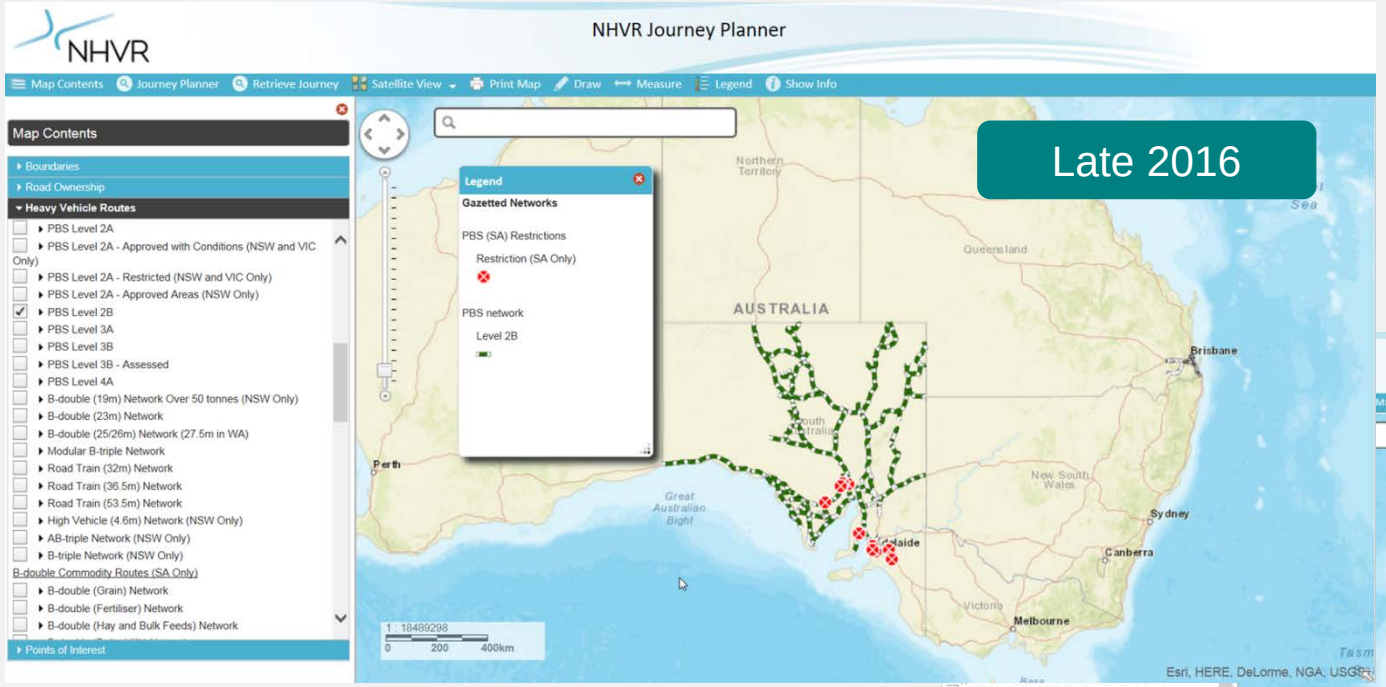
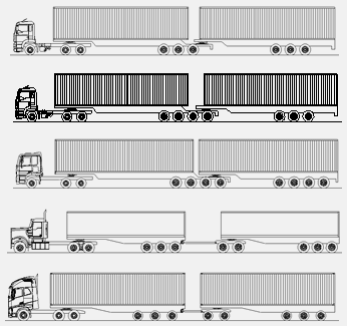
Project Working Group

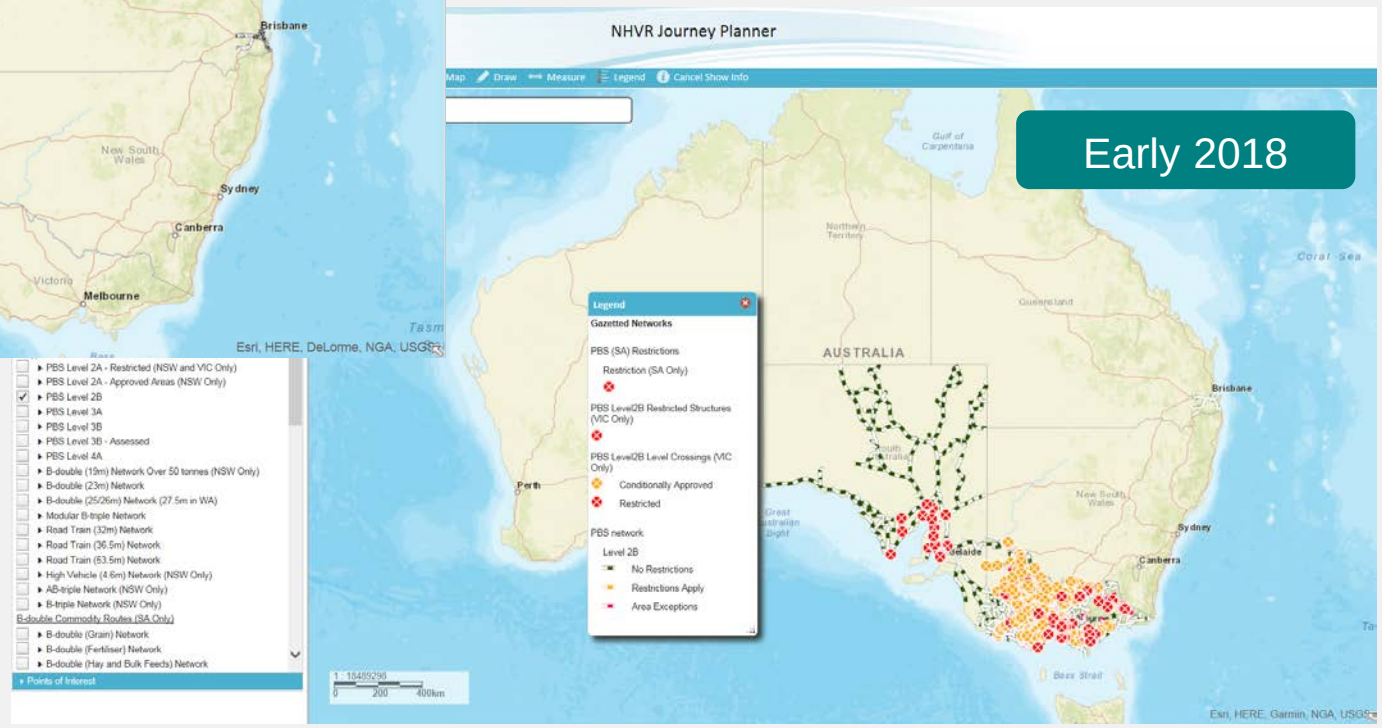
High productivity freight vehicle (HPFV) access in metropolitan areas



Late 2016



PBS 2B access



Early 2018

Research objective

See Section 1.1

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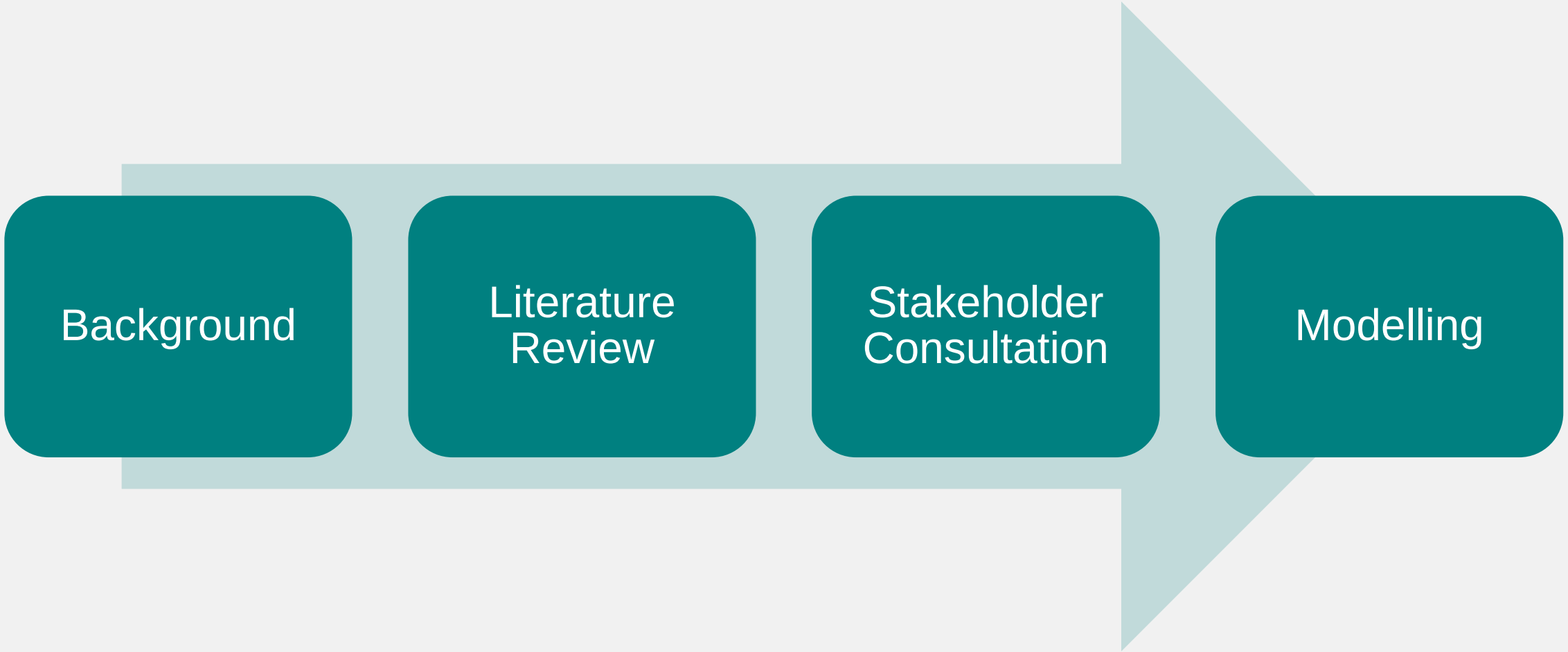
Performance Based Standard (PBS) 2B access → road operation

Project overview



Literature Review

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Delay and crashes

See Section 2

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Impact	Findings
Congestion delay	• Significant change in truck fleet mix • Reduction in truck trips • Congestion delay in saturated networks
Vehicle-to-vehicle crashes	• HPFV have lower historical crash rates • HPFV appear safer or just as safe
Crashes with vulnerable road users	• Trucks are overrepresented • No specific analysis on different truck types • Factors related to crash heightened with larger trucks

Environmental, amenity and cost

See Section 2

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Impact	Findings
Environment	• Reduction in emissions
Amenity	• Reduction in trucks could improve amenity • Impact of different truck types is not well understood
Transport cost	• Significant savings

Stakeholder Consultation

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Key considerations

See Section 3

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- Safety, amenity and community acceptance
- Congestion delay is a risk
  - but not considered critical
- Transport cost savings is primary driver
- Cost of infrastructure upgrade and maintenance
- Highly desirable to convert to PBS 2B
  - Line haul/truck routes with no constraints: >50% take-up rate
  - Otherwise: 15% to 50%

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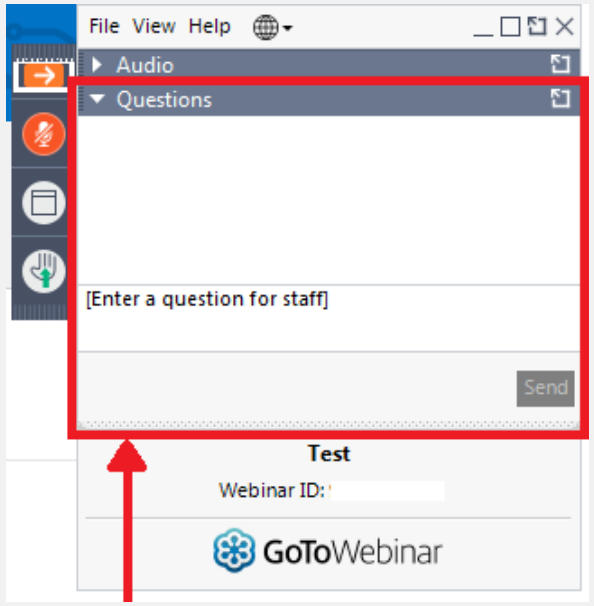

Please type your questions here

Let us know the slide number your question relates to


Modelling
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Modelling Framework

See Section 4

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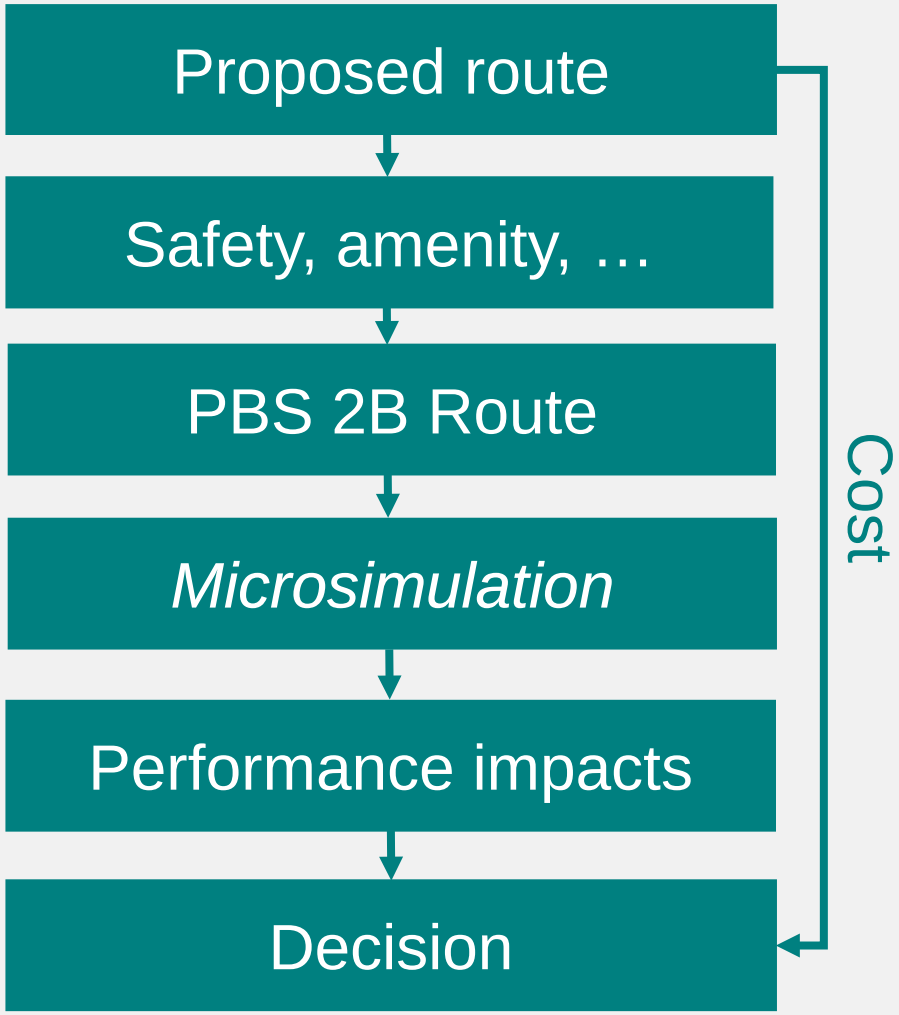

Parameters
Car to PBS 2B vehicles
Vehicle dimensions
Acceleration and deceleration • Load conditions • Driving mode • Grade
Vehicle power-to-weight ratio

PBS 2B Parameters

See Section 4

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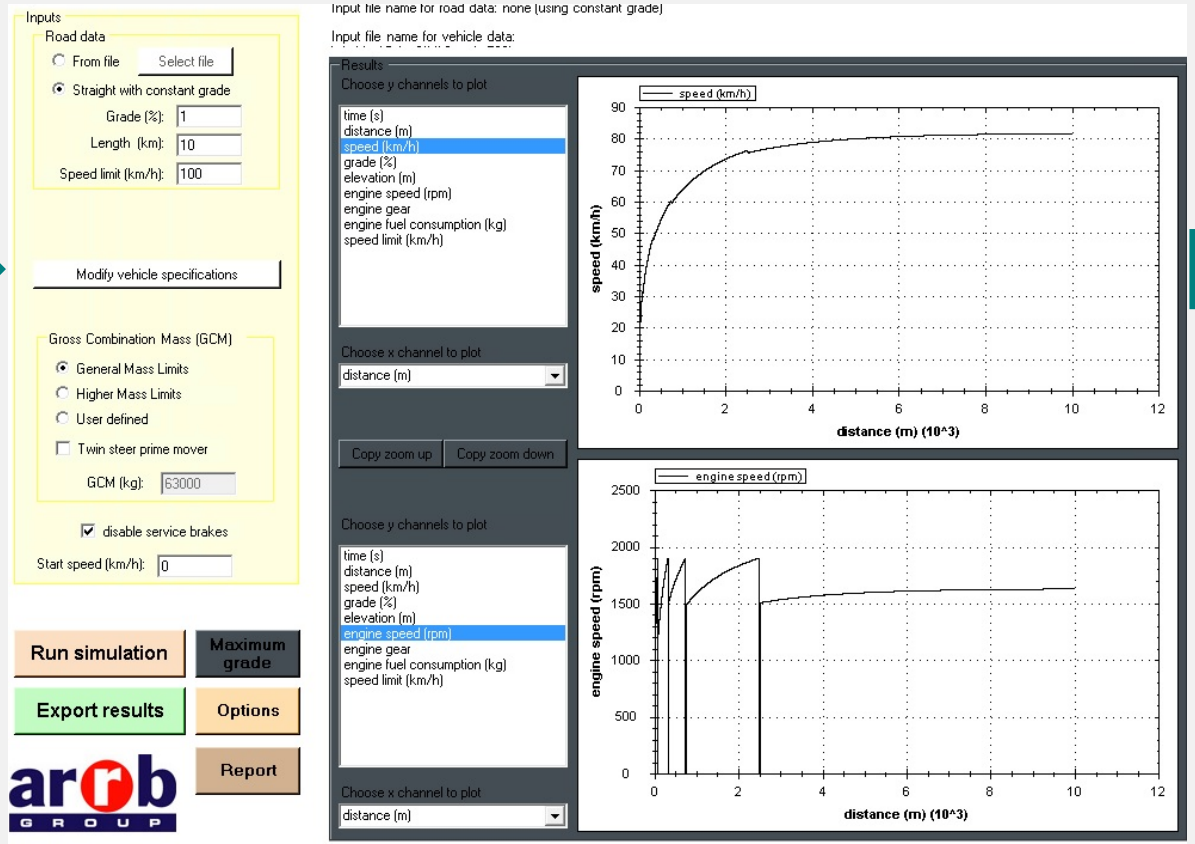
- Powertrain specs (past assessments)
- Mass
- Driving mode
- Grade

DriveSIM

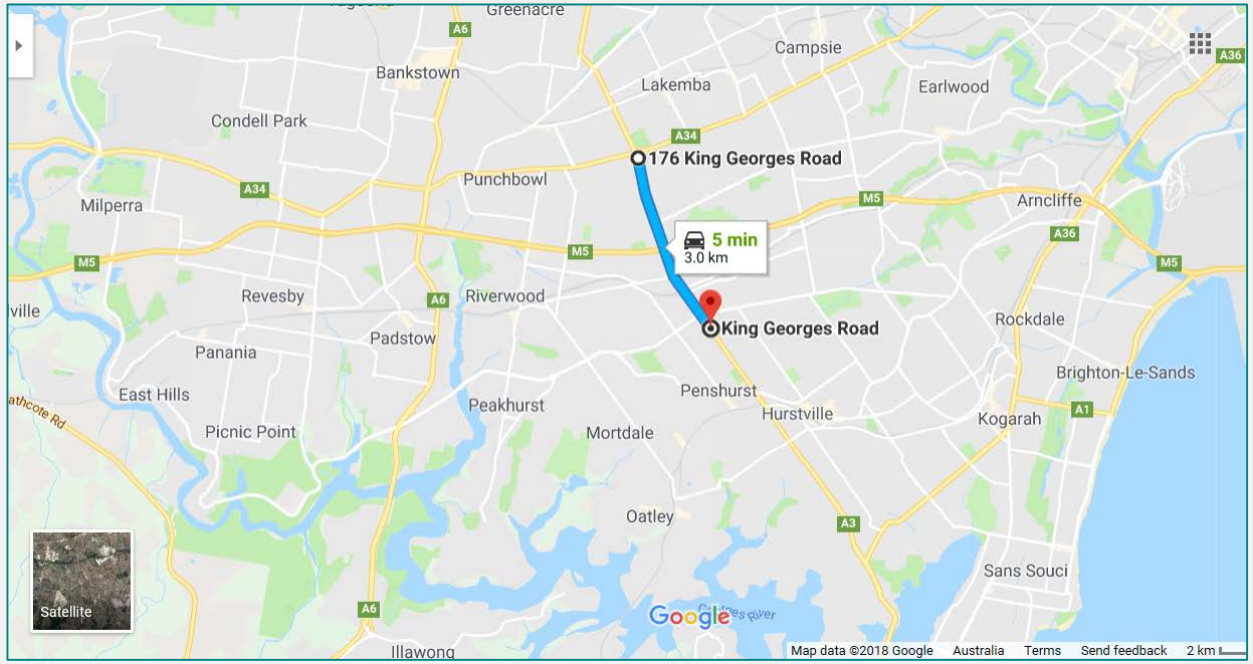


- Acceleration
- Speed limitations

King Georges Road

See Section 5

Austroads



Item	Actual	Hypothetical
Demand	Peak (2016 to 2036) Off-peak (2016)	Peak and off-peak (2016)
Mix	<1% Articulated trucks	<1% to 8% Articulated trucks
Network	As existing	As existing

King Georges Road

See Section 5

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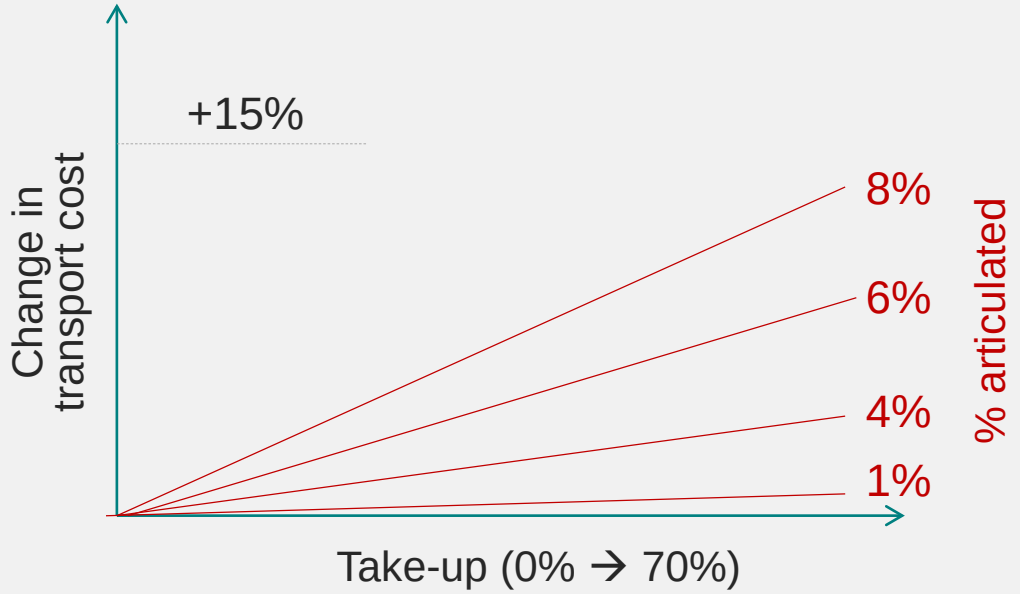
Off-peak

Peak



✓ Lower freight transport cost in both cases

King Georges Road

See Section 5

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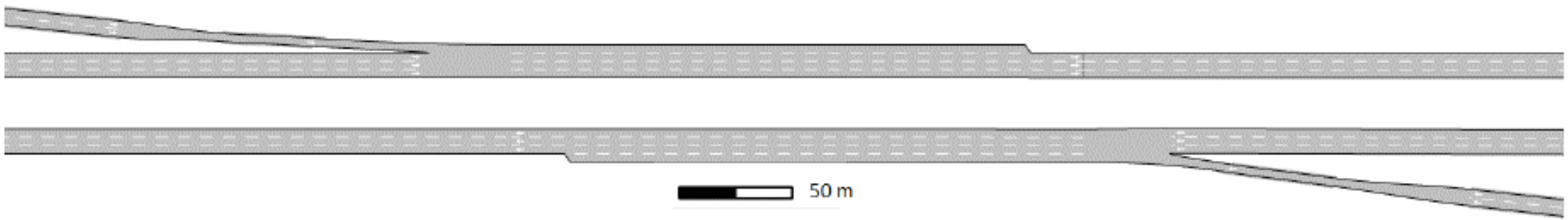
Access type	Vehicle type	Change in transport cost	
		<1% Articulated	8% Articulated
Off-peak only	All types	No change	No change
	Articulated	Benefit	Benefit
All-day	All types	No change	Dis-benefit
	Articulated	Benefit	Benefit

Motorway

See Section 5



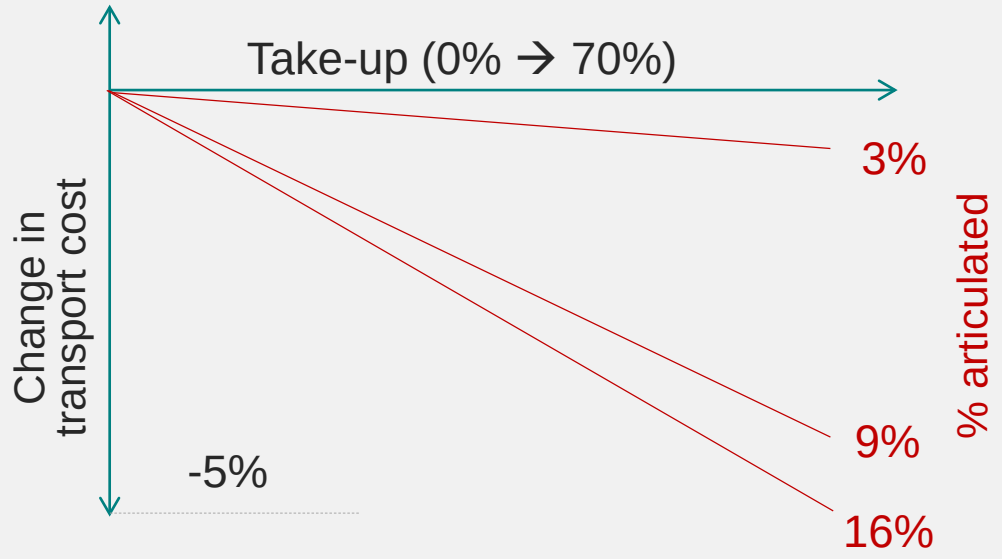
Item	Values
Demand	Off-peak → Peak
Mix	3% → 16% articulated
Network	On-ramp

Motorway

See Section 5

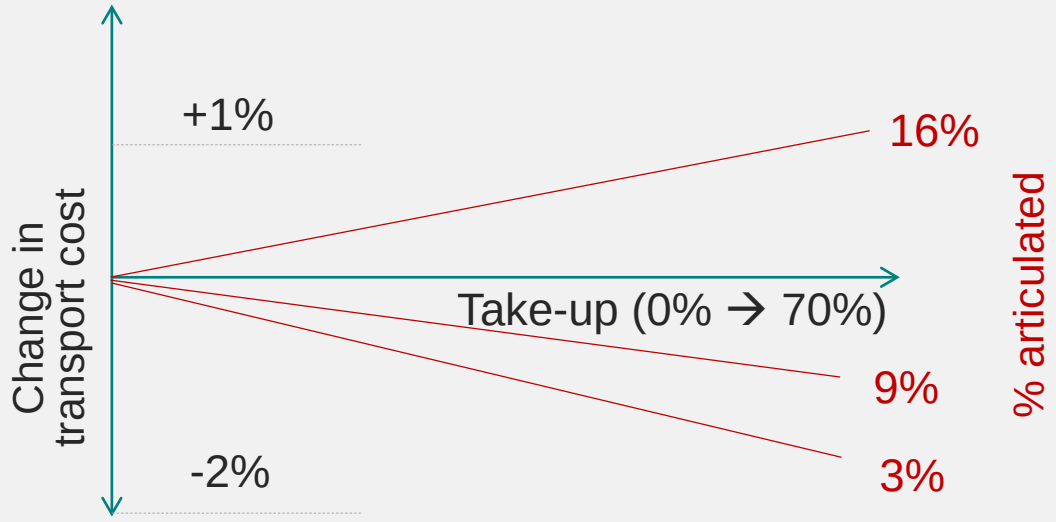
Austroads

Off-peak



- ✓ Neutral impact to delay
- ✓ Lower operation and emission cost

Peak



- ✓ Higher delays
- ✓ Lower operation cost

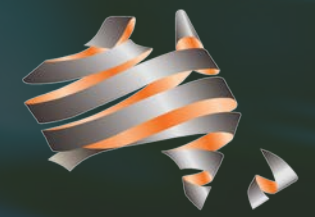
Motorway

See Section 5

Austroads

Access type	Vehicle type	Change in transport cost	
		<1% Articulated	8% Articulated
Off-peak only	All types	Benefit	Benefit
	Articulated	Benefit	Benefit
All-day	All types	Benefit	Benefit
	Articulated	Benefit	Benefit

Conclusions



Conclusions

See Section 6

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Issue	Findings
Congestion delay	Risk… if high truck shares and saturated in arterials Not a concern on… motorways, low truck shares, and under-saturated roads
Vehicle-to-vehicle crashes	Likely to be neutral or could potentially result in less crashes
Crashes with vulnerable road users	Risk… apply countermeasures
Environmental	Benefits expected

Conclusions

See Section 6

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Issue	Findings
Amenity	Possible benefits, but not well-understood
Modelling framework	Key assumptions were developed for accurate and consistent analysis
King Georges Road access	Recommend to apply… based on network performance impacts
Arterial road access	All-day access can be considered when under-saturated or low truck share Off-peak access only can be considered, otherwise
Motorway access	All-day can be generally considered

Questions?

Dr Ian Espada

Team Leader, Network Operations

Congestion, Freight and Productivity

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Upcoming Austroads webinars

Topic	Date
National Performance-based Asphalt Specification Framework	27 February
Pavement Design: Guide to Pavement Technology Parts 2 and 4C	9 March
Local Road Access for High Productivity Freight Vehicles	27 March

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Thank you for participating