Chelmer to Indooroopilly River Crossing Strategic Modelling

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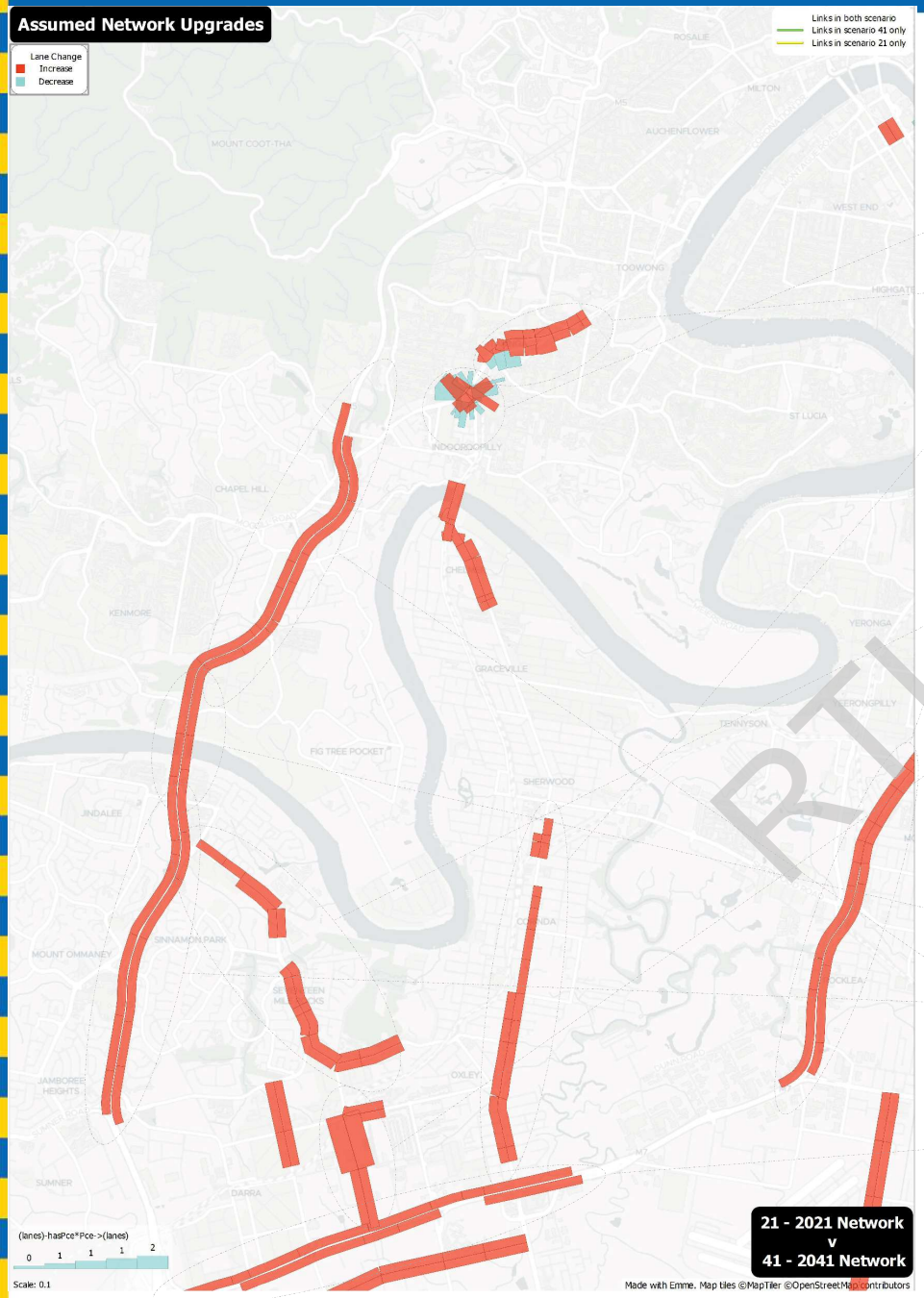
Strategic Modelling Context

- Due to time constraints existing models were used “as is”
- All results come from a forecast modelling year of 2041
- Being strategic in nature, there are limitations to the model, some of these are:
  - There is no intersection delay, only link delay
  - Despite having a given capacity, links can over congest if users are willing to pay the time penalty; this means that some links, for which alternatives are limited, will attract more traffic in the model than they could in real life
  - There are no limits on the capacity of public transport; this means that travellers can shift to transit even if the vehicle they board is over its real world capacity

Assumed Network Upgrades



The model used contains assumed network upgrades to 2041, key upgrades include:

- Indooroopilly roundabout upgrade
- Taringa Bypass
- Oxley Road (Ipswich Mwy to Sherwood Rd) - 4 lanes
- Ipswich Road Upgrades – upgrade to 6 lanes
- Seventeen Mile Rocks Rd (Goggs Rd to Pannard St) – upgrade to 4 lanes
- Pannard Street Extension - 4 lane extension includes rail crossing and connection to Englefield Road
- Centenary Bridge - Upgrade to 6 lanes
- Centenary Highway (Moggill Road to Sumners Road) - upgrade to 6 lanes
- Ipswich Motorway (Centenary Motorway to Oxley Road) - upgrade to 6 lanes

Scenarios Modelled

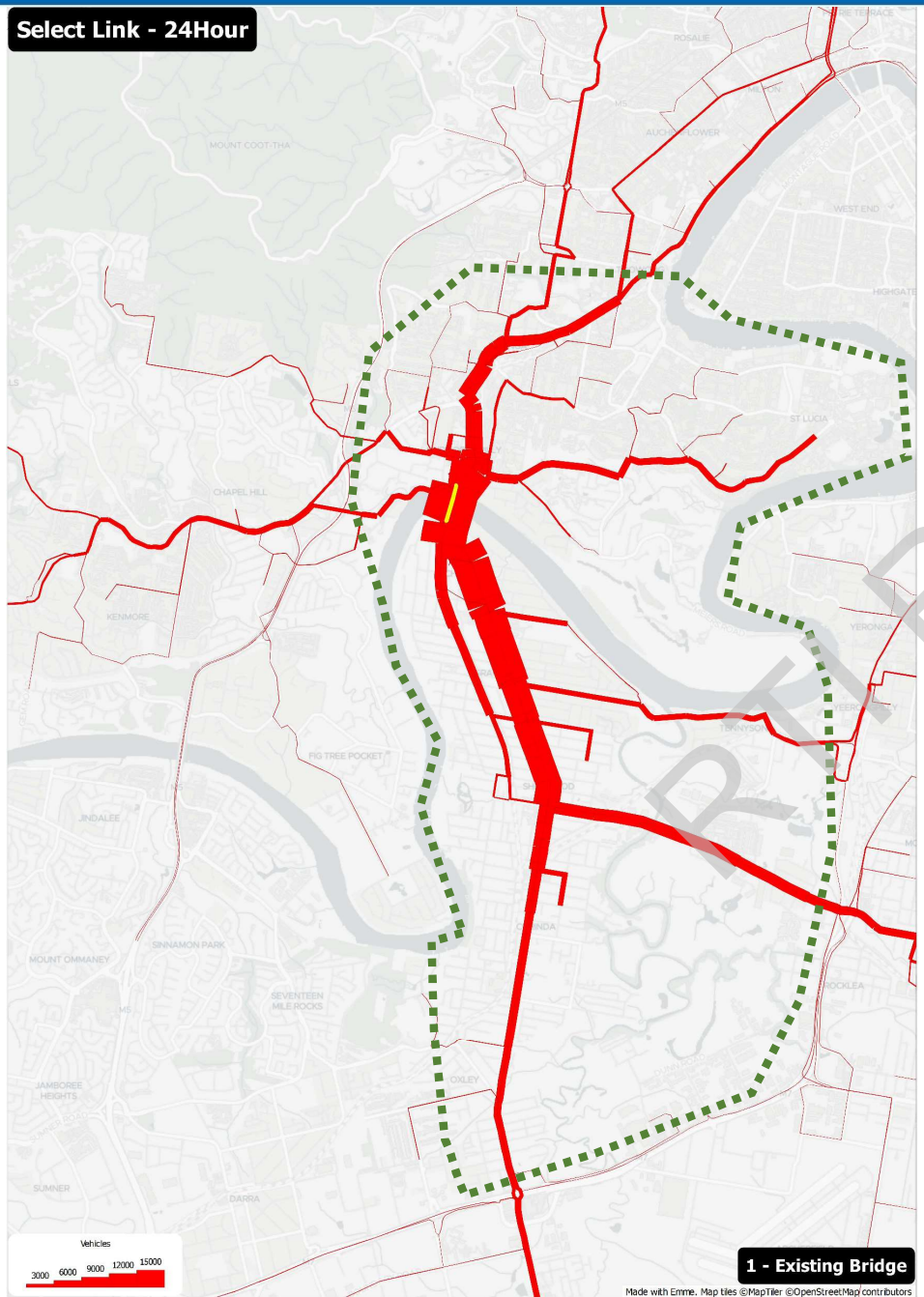
Base Scenarios

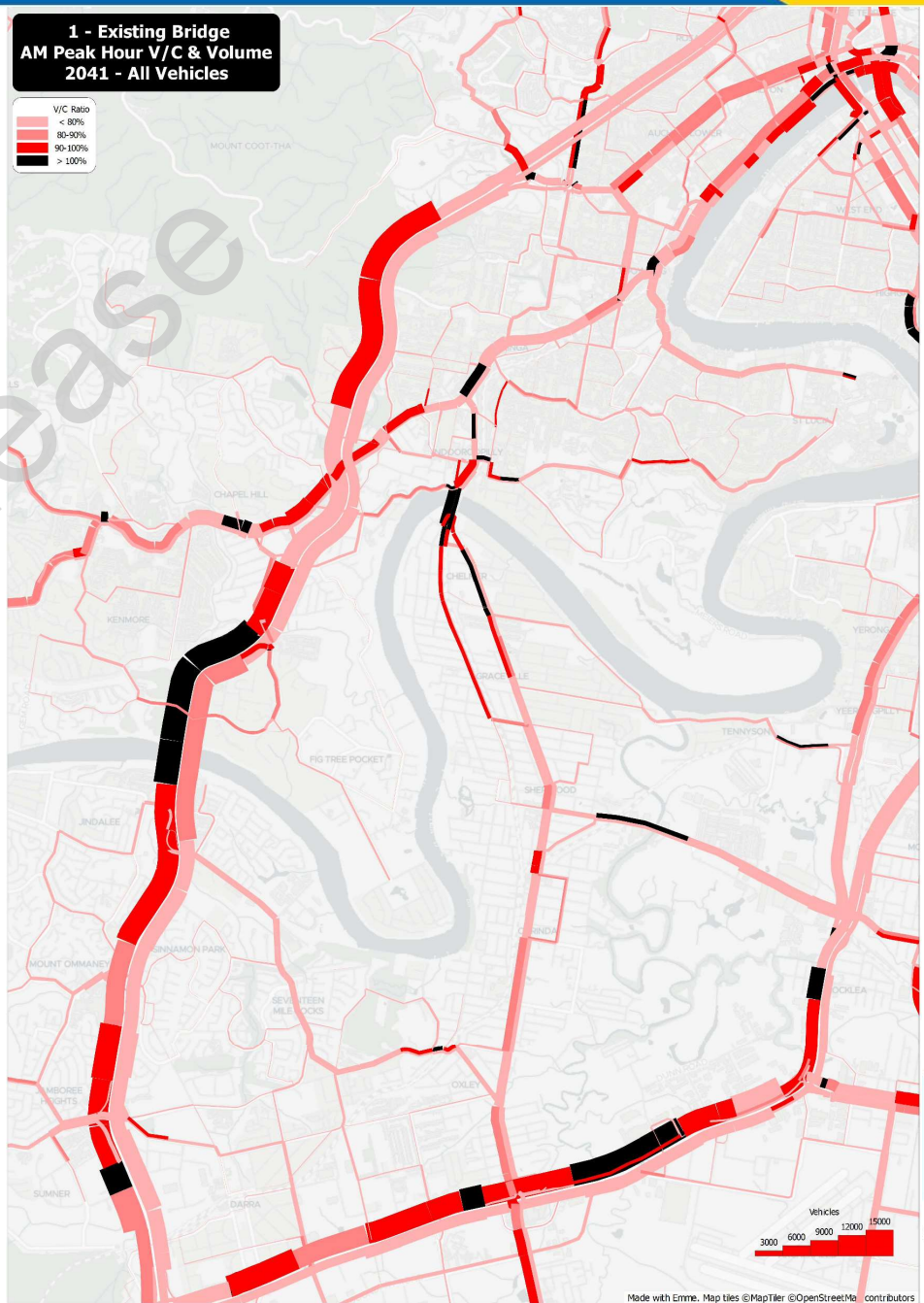
1. Existing Bridge
2. Bridge Duplication
3. Bridge Decommission

Sensitivity Scenarios

4. Bridge Duplication + No Centenary Highway Upgrades
   (Centenary Bridge upgrade assumed built as funding committed)
5. Bridge Duplication + No Ipswich Road Upgrades

1 - Existing Bridge





1 - Existing Bridge

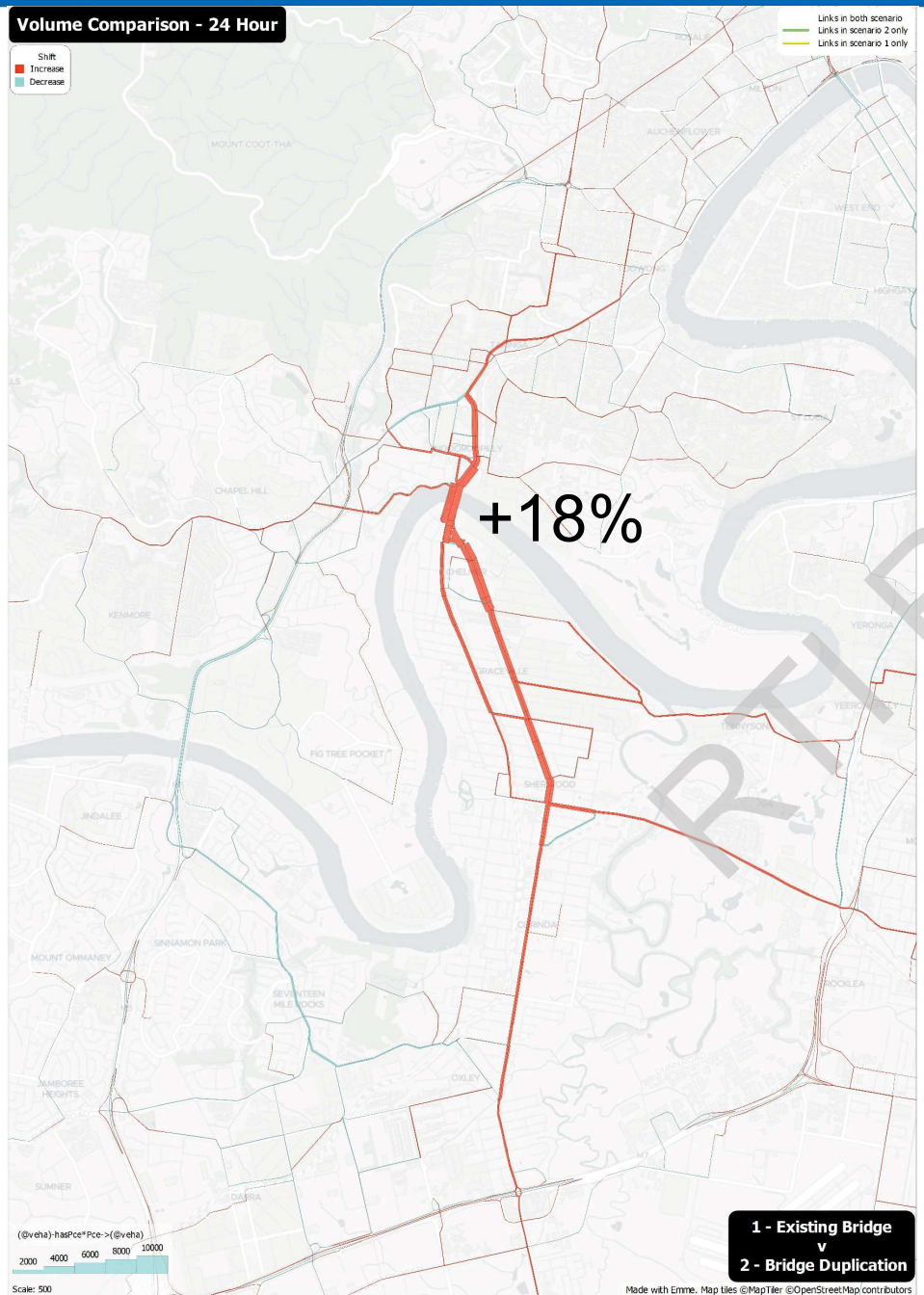
The select link plot shows where bridge users are travelling to / from, it can be seen that:

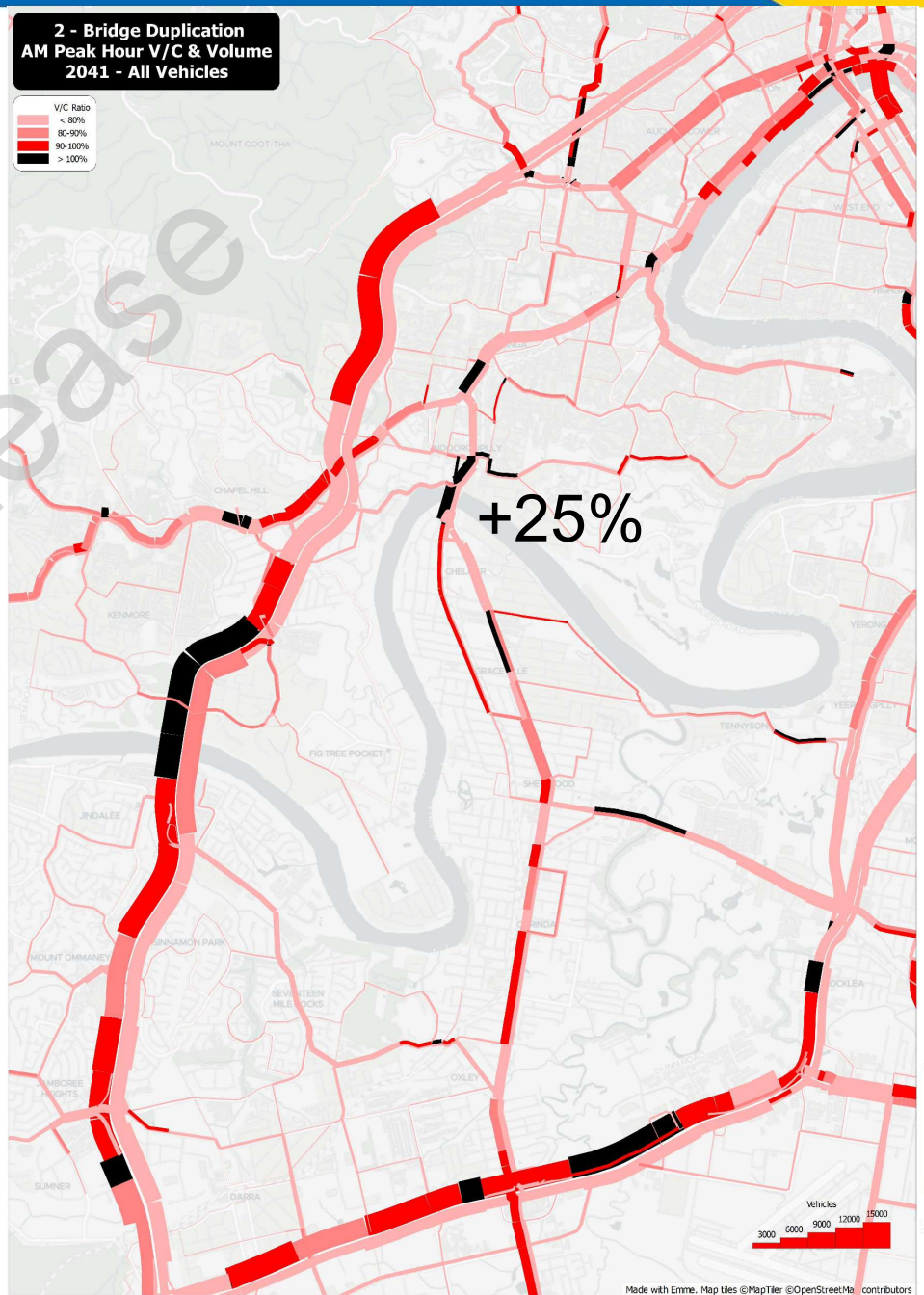
- The vast majority of use is for travel between the Chelmer / St Lucia peninsulars; highlighted by the green border area, outside of which volumes are much lower
- This suggests the bridge is used primarily for local travel and does not play a significant role in regional travel

By 2041, during the AM peak, it can be seen that:

- The bridge is heavily congested, with a V/C > 1 in each direction
- Even with the assumed upgrades, several parts of the network are approaching of exceeding capacity; they include:
  - most of the Centenary Highway – from Sumners Road to the Legacy Way portal
  - the Ipswich Motorway – from the Centenary Highway to Sherwood Road

2 - Bridge Duplication



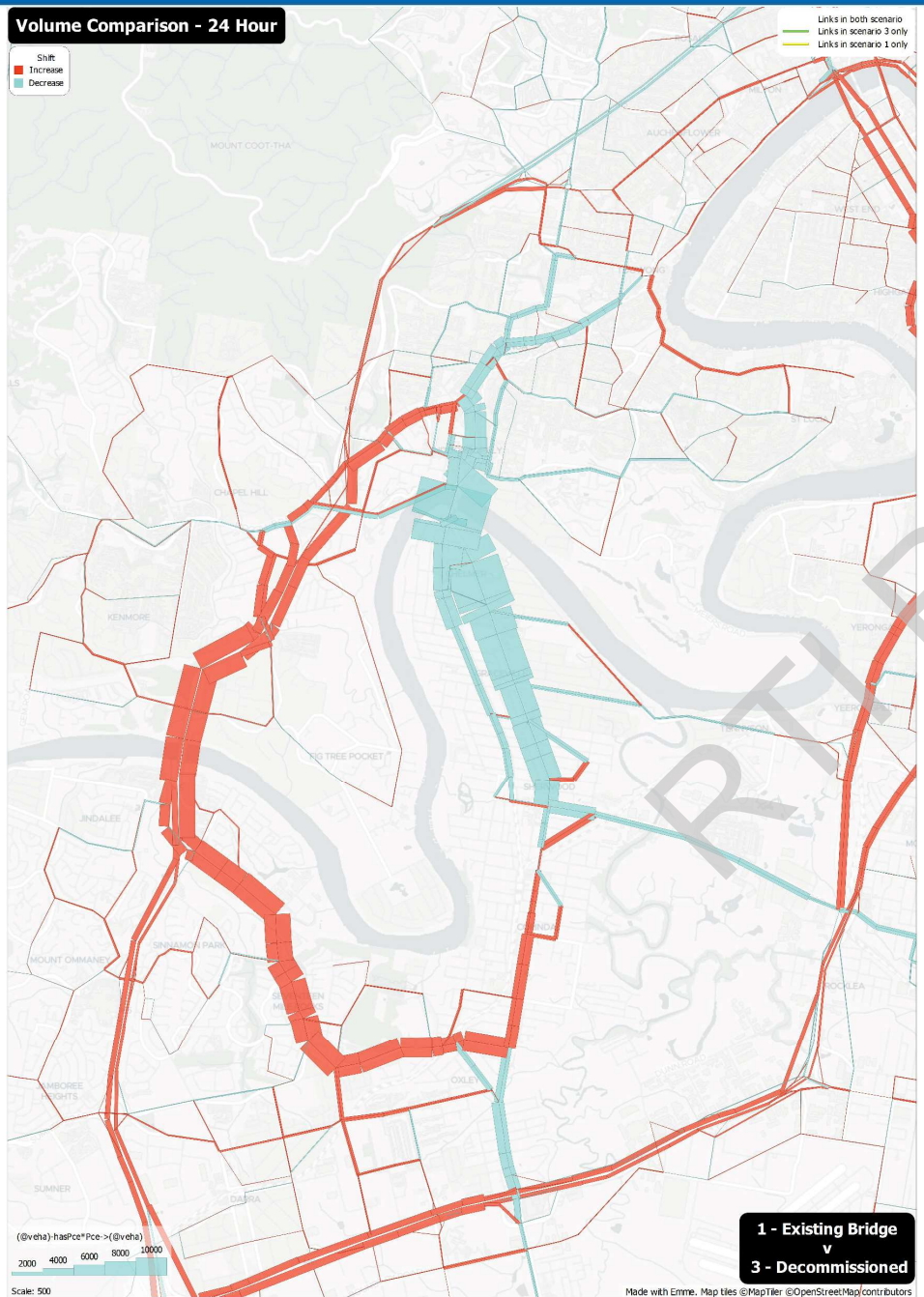


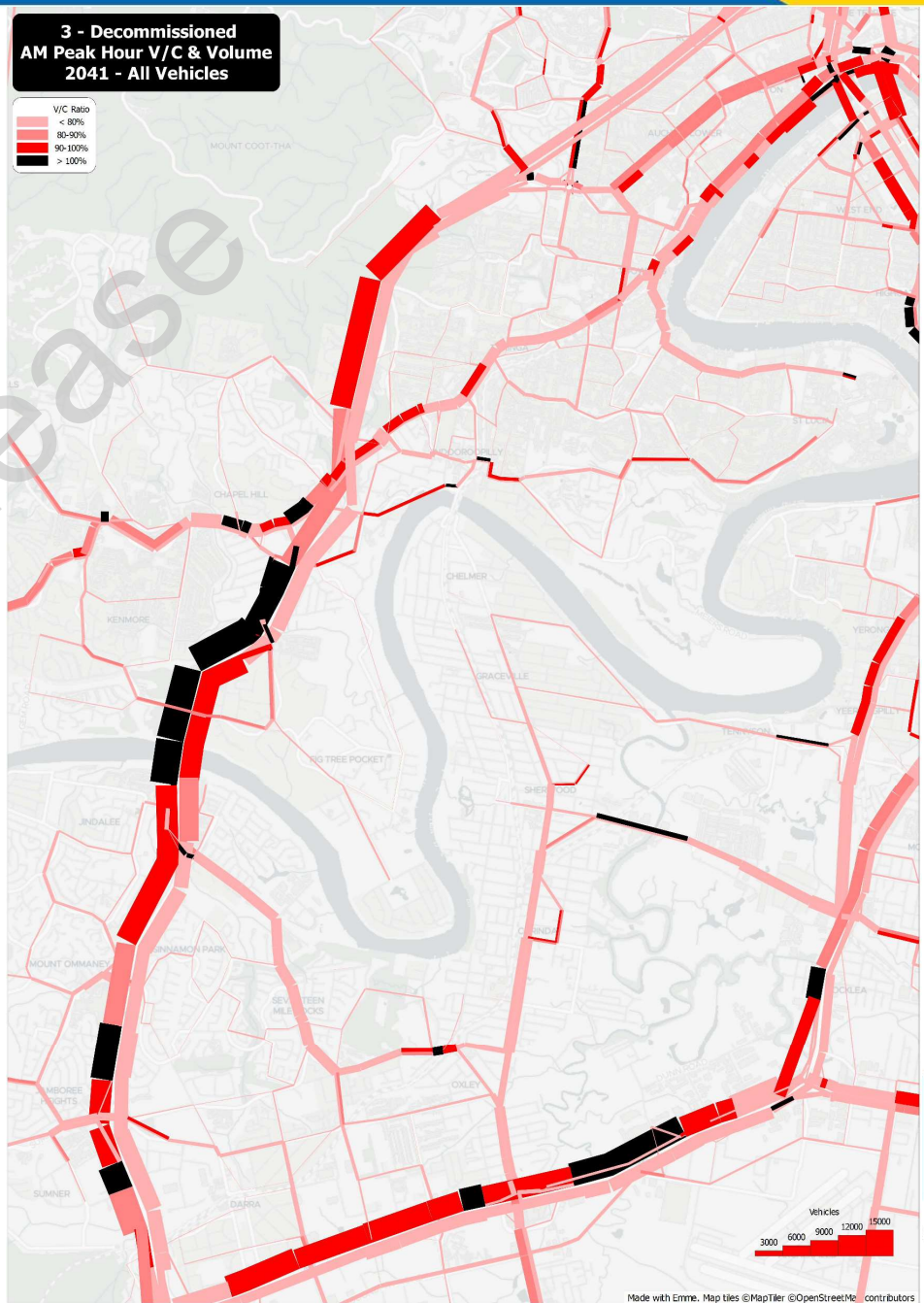
2 - Bridge Duplication

With the duplication of the Bridge:

- Daily volumes are forecast to increase by 18% compared to the existing case
  - The pattern of growth is similar to the existing use pattern, suggesting the role of the bridge has not changed
  - Only minor changes in volume are noticeable across the rest of the network
- AM peak hour traffic on the bridge is forecast to increase by 25% compared to the existing case
  - The inbound direction remains overcapacity, however outbound flow is under capacity
  - Inbound Coonan Street flow from the bridge to Westminster exceeds capacity
    Congestion increases on the southern sections of Oxley Road
  - Wider network congestion changes are negligible

3 - Bridge Decommissioned



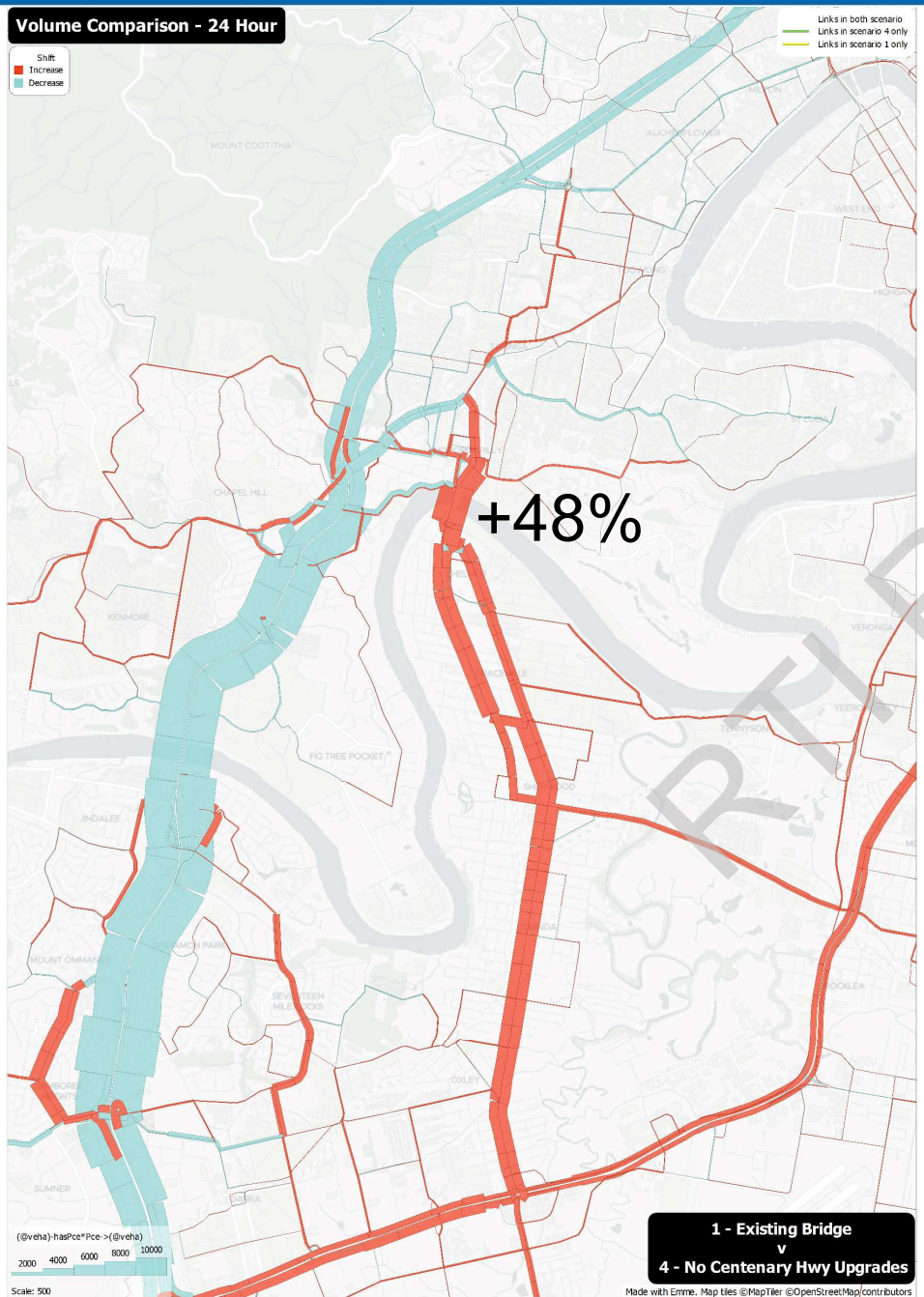


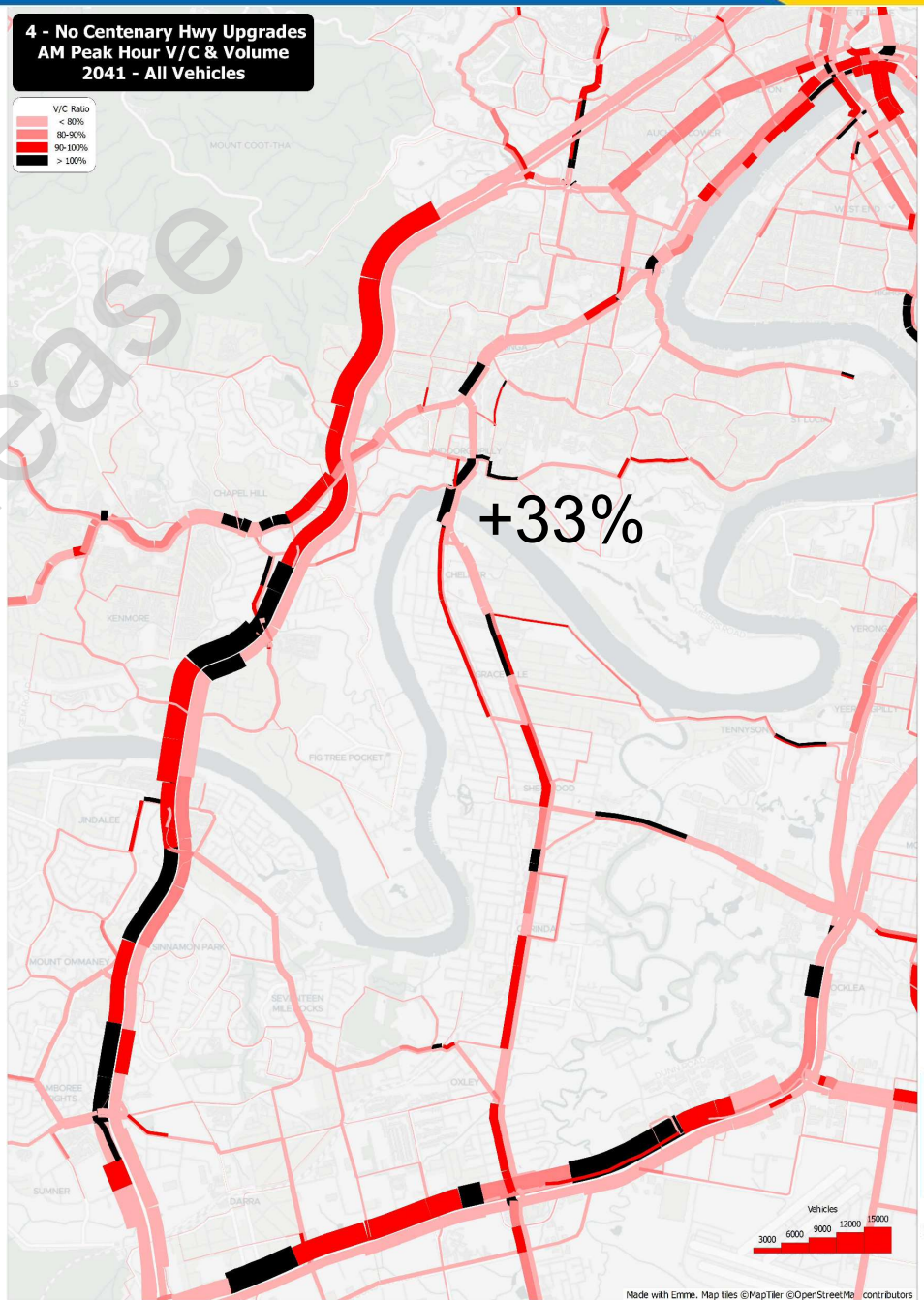
3 - Bridge Decommissioned

With the decommissioning of the Bridge:

- There is a significant re-distribution of traffic, corridors that experience large growth include:
  - Seventeen Mile Rocks Road
  - Centenary Highway
  - Moggill Road (Centenary Road to Coonan Street)
- The combination of these corridors best support the local trip function of the bridge.
- Corridors of lesser growth include:
  - Ipswich Motorway
  - Ipswich Road
  - Fairfield Road
- Moggill Road inbound volumes decrease from the intersection with Coonan Street.
- During the AM peak:
  - congestion levels on the Centenary Highway are forecast to increase, particularly north of the Seventeen Mile Rocks Road connection; there are also some southern sections which exceed capacity that weren't previously.
  - congestion levels drop significantly on Oxley Road.
  - congestion levels on Seventeen Mile Rocks Road are relatively unchanged even with the growth in traffic; likely due its assumed upgrade (2 lanes each way) being sufficient to handle the growth in traffic.

4 – No Centenary Motorway Upgrade



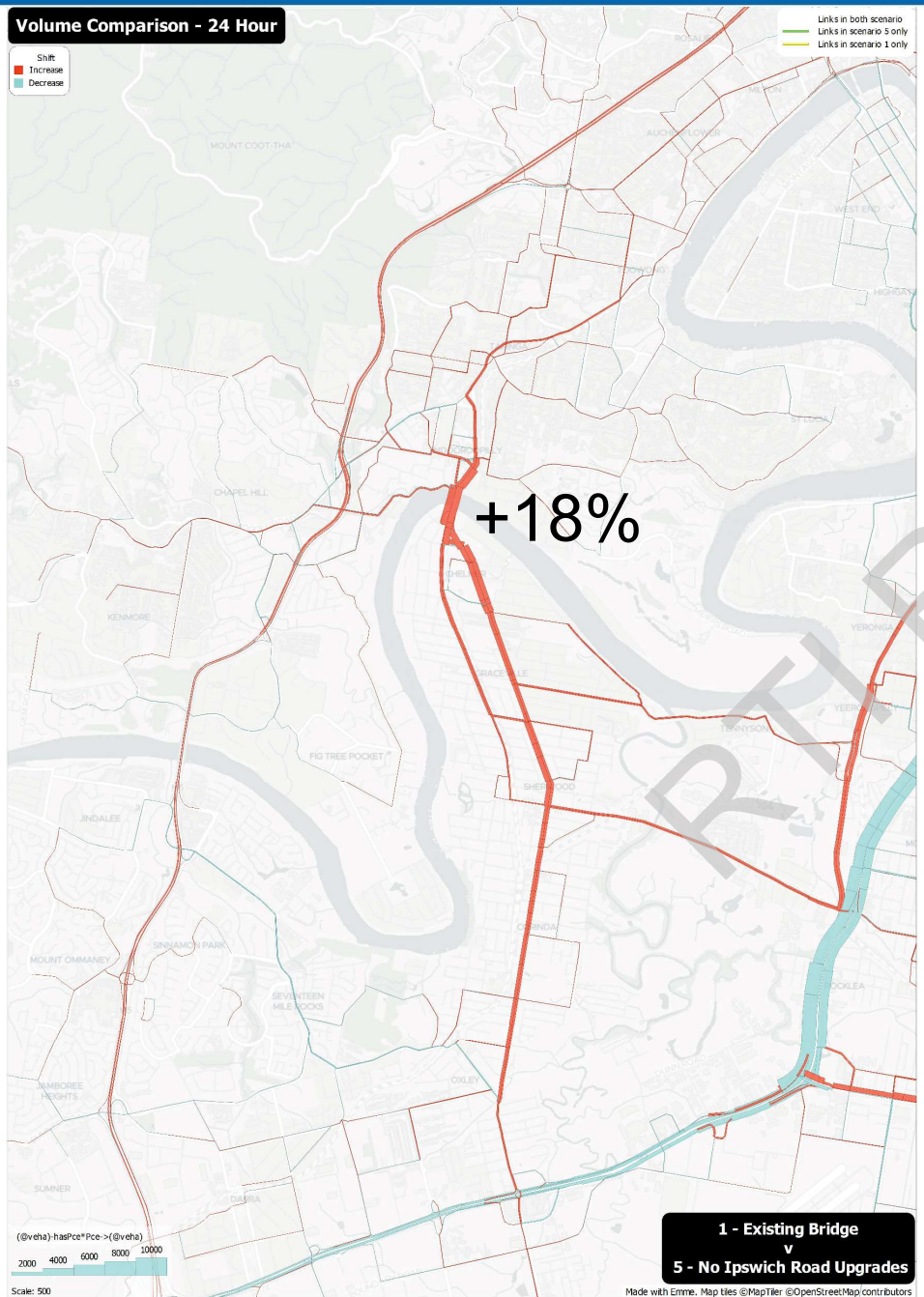


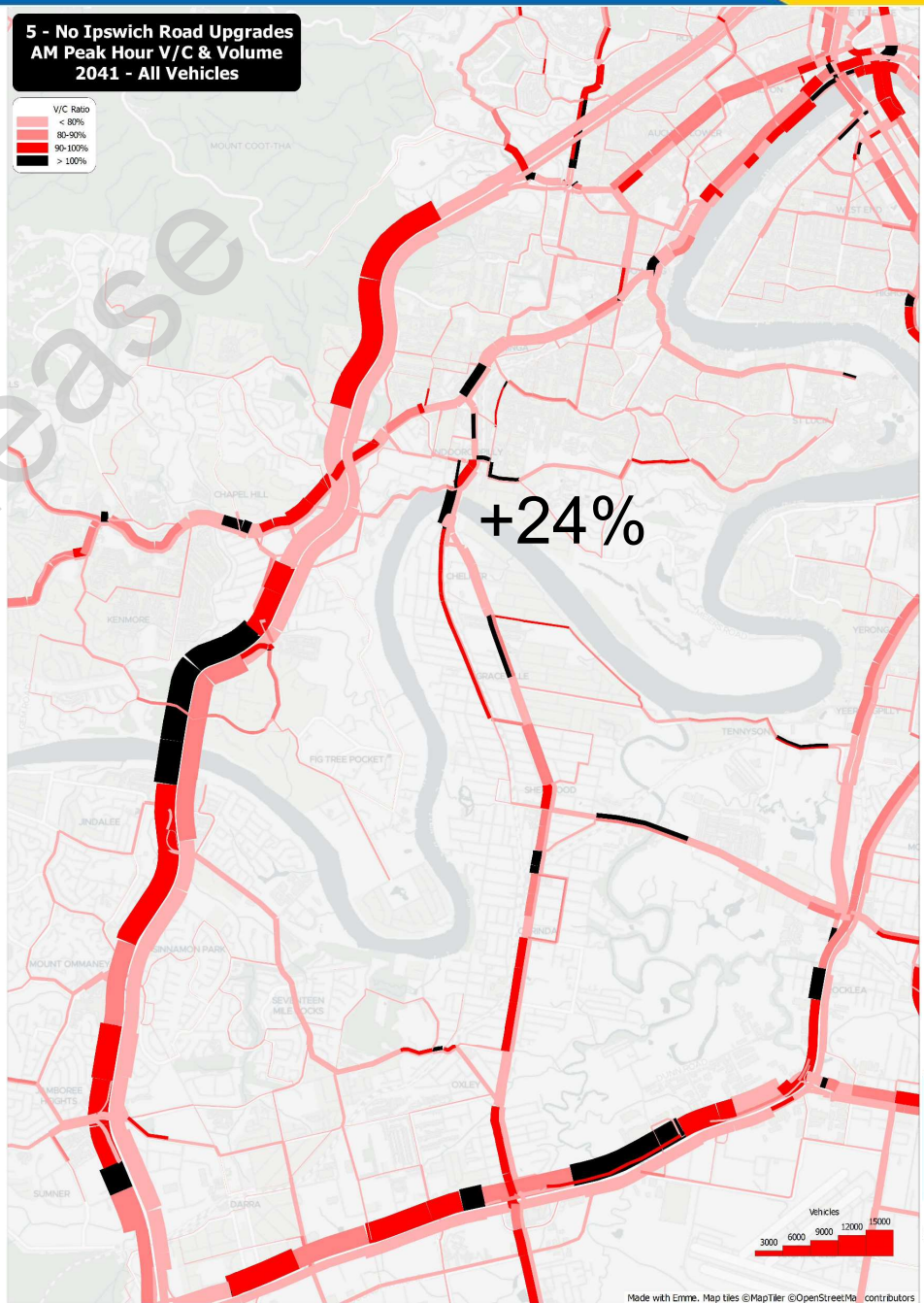
4 – No Centenary Motorway Upgrade

Were the Centenary Motorway upgrades not to go ahead:

- Daily volumes on the bridge are forecast to increase by 48% compared to the existing case.
- The pattern of growth is slightly different to the existing use pattern, with some growth coming from further west along the Ipswich Motorway, combining with trips from Darra, Oxley and south to Durack / Inala.
- While some growth does come from further west, its trip end remains close to the bridge on the northern side; the bridge is still not acting as a regional connector
- AM peak hour traffic on the bridge is forecast to increase by 33% compared to the existing case, with congestion increasing on:
  - the southern end of Oxley Road
  - the Ipswich Motorway
  - the Centenary Highway

5 – No Ipswich Road Upgrades





5 – No Ipswich Road Upgrades

If Ipswich Road upgrades do not go ahead:

- Daily volumes are forecast to increase by 18% and AM peak hour traffic on the bridge is forecast to increase by 24%.
- These values are extremely close to that of the bridge duplication alone, suggesting that the Ipswich Road upgrades have no or little impact on bridge volumes.

Bridge Volume

Scenario	1	2	3	4	5
AM Peak Hour Volume	3,560	4,460	-	4,750	4,430
Change from S1	-	+25% 900	-	+33% 1,190	+24% 870
Daily Volume	42,270	49,970	-	61,140	49,840
Change from S1	-	+18% 7,700	-	+48% 18,870	+18% 7,570

- Scenario 1 flows during the AM peak are higher than what is genuinely possible across the bridge, this suggests a couple of things:
  - For most bridge travel, there is no real alternative travel path; vehicles in the model are willing to pay the high time penalty (next slide) associated with its use.
  - The bridge is critical in providing a local connection across the river.
  - The growth resulting from the bridge duplication in Scenario 2 is potentially softened by the excessive volume of Scenario 1.
- The sensitivity scenarios show that only the upgrade of the Centenary Highway (4) has an impact on bridge flows compared to the duplication alone (2).

Bridge V/C and Travel Time

AM Peak Volume / Capacity Ratio by Direction

Scenario	1	2	3	4	5
Inbound	2.2	1.2	-	1.2	1.2
Outbound	1.1	0.6	-	0.7	0.6

AM Peak Bridge Crossing Time and Speed

Scenario	1	2	3	4	5
Inbound	5.7min 4km/h	2.9min 7km/h	-	3.3min 7km/h	2.8min 8km/h
Outbound	2.1min 11km/h	0.6min 37km/h	-	0.6min 37km/h	0.6 37km/h

- The V/C results of Scenario 1 show the inbound volume forecast for the bridge in the model is more than twice its capacity; people are willing to travel at 4km/h over the bridge rather than deviate as there is no alternative travel path.
  - This means that the benefits of bridge duplication and the disbenefits of bridge decommissioning are likely understated in this analysis.
- Even with the duplication, AM Peak inbound flows are still forecast to be over capacity, with a V/C ration of 1.2.

ATAP Values of Time

- The Australian Transport Assessment and Planning (ATAP) Guidelines outline best practice for transport planning and assessment in Australia; this includes appropriate values of time by purpose and vehicle type (ATAP, PV2 Road Parameter Values, Table 12)

Travel Purpose - Cars (all types)	Urban Occupancy rate (persons / veh)	Urban Value per occupant ($/person-hour)	Urban Value per vehicle ($/vehicle hour)	Assessment value per vehicle hour
Private	1.6	17.70	28.32	$36.13
Business	1.4	57.42	80.39	

- Values have been escalated to 2021 dollars using ABS 6302 – Average Weekly Earnings
- For the purposes of this strategic assessment, it will be assumed that:
  - all vehicles are cars and that daily trips are split 85% private, 15% business
  - the annual expansion factor for all vehicles is 340 (DTMR 2012 Classified Counts)

Network Vehicle Hours Travelled

Scenario	1	2	3	4	5
Daily VHT	2,223,580	2,223,380	2,246,740	2,234,570	2,225,040
Daily VHT change	-	-200	23,160	10,990	1,460
Daily VHT cost*	-	$-7,200	$836,800	$397,100	$52,800
Annual VHT cost*	-	$-2.4M	$284.5M	$135.0M	$18.0M

- The value of time determined from ATAP has been multiplied by the daily change in VHT to calculate benefits; a negative value of cost represents a benefit, a positive value a disbenefit.
- As discussed previously, the results have been skewed by too much traffic already using the bridge in Scenario 1. This is due to the mechanics of the strategic model and can only be overcome by alterations to the model or more refined modelling in a lower order modelling package such as Saturn.

* Costs are in 2041 dollars and have not been discounted

Summary

This strategic assessment has shown:

- The Walter Taylor Bridge plays a critical role in connecting local trips across the river; it plays no significant role in regional travel.
- For most trips that use it, there is no realistic alternative.
- Based on the volumes forecast, duplication is required by 2041, likely sooner based on the volumes forecast.
- The impact of decommissioning the bridge is substantial; estimated at over $280M annually (2041 dollars); note however with modelling refinements this will likely diminish.
- If the Centenary Motorway is not upgraded, some extra pressure is placed on the bridge.
- More detailed modelling is required to refine the accuracy of forecasting presented.