Waitematā Bridge

Additional harbour crossing proposal

MRCagney presentation

September 2024

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Issues crossing the harbour

1. **Poor resilience:** All cross-harbour land transport is on a single bridge, in a single set of mixed lanes for all traffic, with public transport in the same lanes, and no mode alternatives.

2. **Road design delays freight and creates traffic conflicts.** Current bridge combines regional state highway traffic flows with commuter traffic to the city centre and local traffic to Ponsonby-Herne Bay. This creates lane and merge inefficiencies, weaving, interrupted flow, and capacity constraints.

3. **Reduced counterpeak traffic capacity causes congestion for freight and regional traffic:** The movable barrier system prioritises capacity in the commuter peak direction, at the expense of the state highway in the counterpeak direction.

4. **There are no rapid transit lanes across the harbour.** Currently busway buses join general traffic queues via the harbour bridge and get caught in the same congestion and disruptions.

5. **There are no walking or cycling lanes across the harbour.** Walking from the North Shore to the city is effectively impossible, and cycling requires major detouring to infrequent ferries.

Opportunities crossing the harbour

The network of motorway lanes and ramps either side of the harbour bridge already accommodates up to twelve lanes of capacity north and south of the harbour at Onewa and Victoria Park (five traffic lanes plus bus lane each way).

However…the bridge itself has only **eight lanes** (five in the peak direction, and three counterpeak).

- There is the equivalent of up to four lanes of motorway capacity, unbalanced and unused at peak times, on the existing state highway network either side of the existing crossing.

Twelve lanes north

Twelve lanes south

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Potential solutions to the problems

Proposed solution is to add missing modes, balance lanes and increase capacity:

- Add additional motorway lanes parallel to the harbour bridge, to align the cross-harbour lane capacity with the maximum capacity of the approaches either side.
- Increase separation between the flows of state highway traffic using the regional motorway system, from the flow of commuter traffic accessing the city centre and inner suburbs.
- Add two lanes dedicated to carrying the northern busway, or other rapid transit, across the harbour from the upper North Shore.
- Add the missing cycleway and footpath capacity.
- Improve priority for buses accessing the city centre from the lower North Shore.

The proposal

Add a six-lane bridge across the harbour from old toll plaza to Pier Z

- Four motorway lanes connect to the Victoria Park Viaduct
- Two rapid transit lanes to Fanshawe Street
- Walking and cycling
- Water mains and electricity trunk cables

New bridge carries southbound motorway traffic, plus rapid transit and active modes in both directions

Existing bridge carries northbound motorway traffic, plus city traffic and buses in both directions

A variation of low-cost options and alterative bridge schemes, with a focus on maximising use of existing infrastructure and minimising capital works

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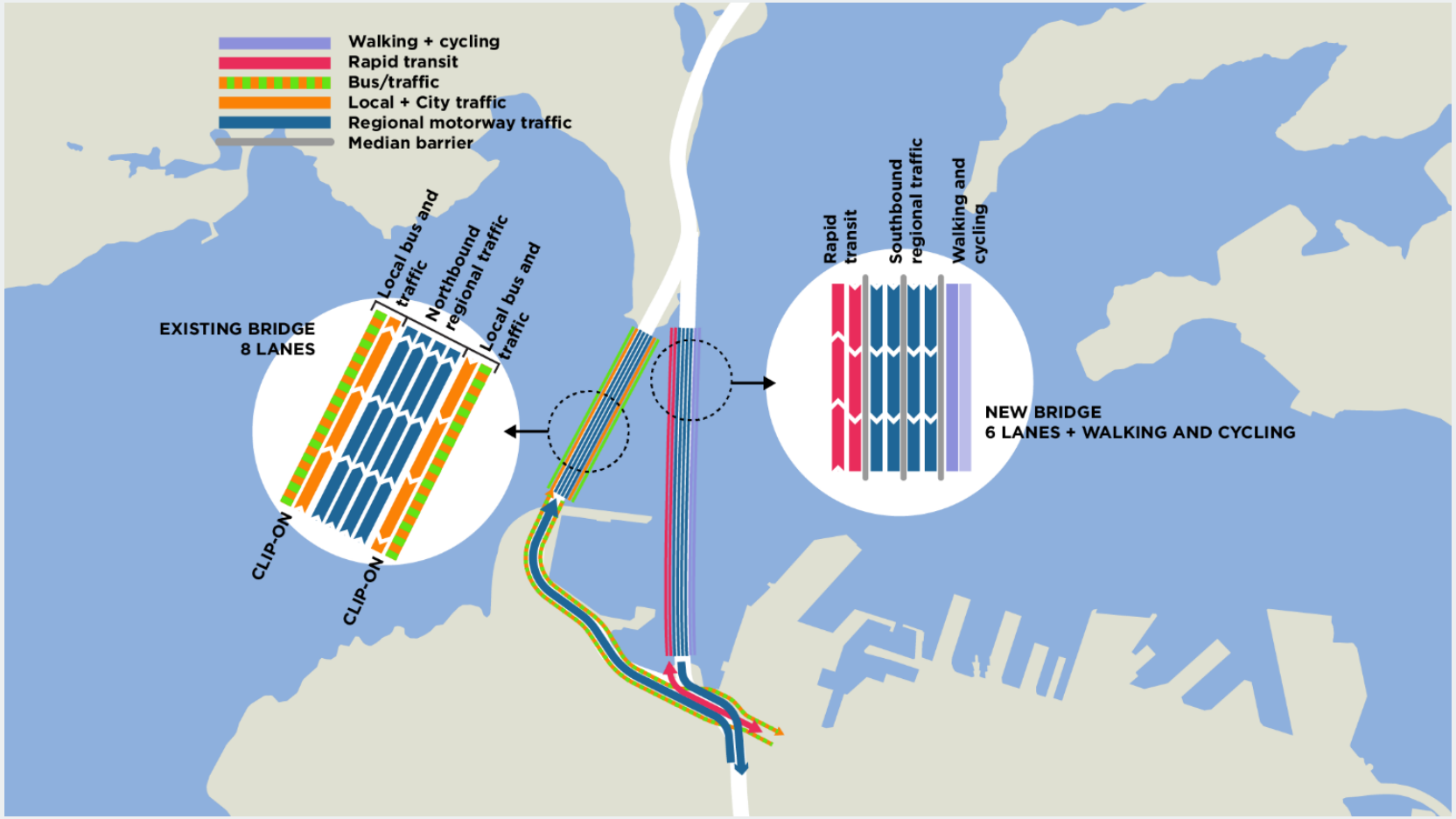
The proposal



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Network integration

North side

- Full width of existing carriageway from Akoranga to Onewa used for ten motorway lanes
- Extra two lanes for rapid transit on embankment/viaduct from Akoranga to Onewa
- Buses from Onewa Road via existing bridge, rapid transit via new bridge
- New Onewa station for bus-rapid transit connections
- Extra ramp to split Onewa on ramp traffic between bridges for city and motorway

South side

- Southbound motorway connects to existing Victora Park Viaduct
- Northbound motorway uses existing Victoria Park Tunnel (option for 4 x 3.1m lanes)
- Buses and city traffic use existing Fanshawe Street ramps
- Rapid transit ramps to Fanshawe Street median (option to transition to tunnel)

Capacity for vehicles and people

Existing harbour bridge:

5 + 3 mixed traffic lanes, for regional motorway and local/city commuter traffic, and buses.

- Capacity for 6,000 (counterpeak) to 9,000 (peak direction) private vehicles per hour each way,
- plus 7,500 bus passengers.

With additional bridge:

4 + 4 state highway lanes for regional motorway traffic, plus 2+2 general traffic lanes for local/city commuter traffic and buses, plus two dedicated rapid transit lanes (busway or rail), cycleway and walkway

- Capacity for 8,000 private vehicles per hour *both ways* on motorway,
- and another 3,000 vehicles *both ways* to and from city centre,
- plus 7,500 regular bus passengers,
- plus 9,000 passengers per hour each way on rapid transit,
- plus capacity for more than 5,000 cyclists and 5,000 walkers each way per hour.

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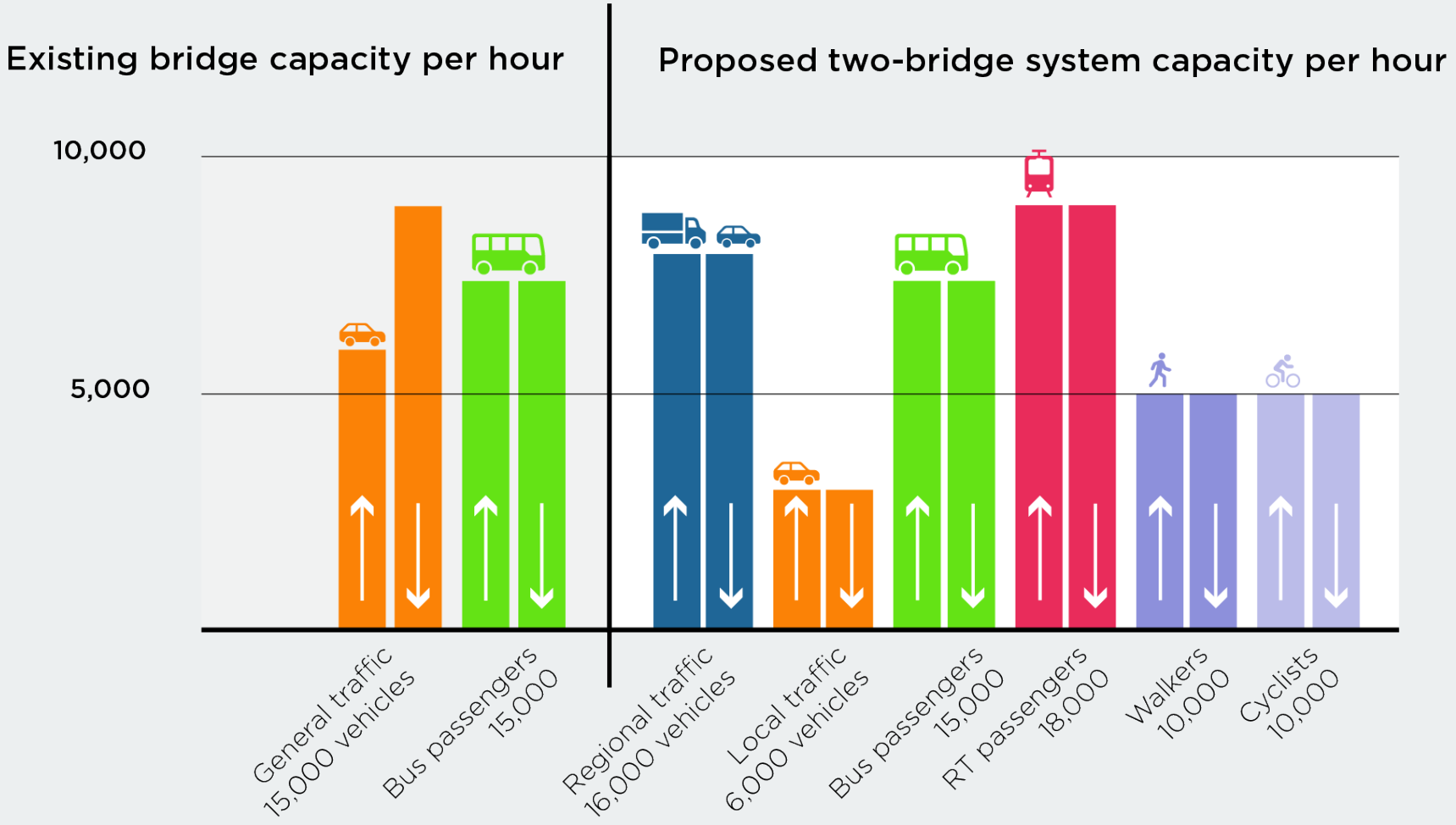
Capacity for vehicles and people



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Why a bridge?

A bridge is much better cost benefit than a tunnel:

- Easiest, fastest and least impact way to cross the harbour
- Several times cheaper than tunnelling to build, several times cheaper to operate
- Avoids need for extensive underground road interchanges, ramps, underground stations etc
- More resilient, fewer failure cases, fewer fire and life safety issues

A central bridge alignment is efficient because:

- Links two points with significant spare surface road and motorway network capacity at Onewa and Victoria Park
- Avoids need to widen St Marys Bay or Northcote Point further
- Adds rapid transit direct to city centre
- Adds walking and cycling on direct alignment
- Bridging over marina minimises impacts vs. widening into Westhaven Drive foreshore

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Capital works and costs

Bridge crossing

- 2,000m length multi-span bridge, e.g. cable stayed
- 500m northern approach viaduct and ramp to old toll plaza area
- 300m southern viaduct to tie-in to existing Victoria Park viaduct and ramp to Fanshawe Street

Northern approach works

- 1,500m embankment-breakwater to east of motorway for rapid transit lanes and shared path from Onewa interchange to Akoranga station
- Reconfiguration of existing carriageway width for ten motorway lanes
- Additional on-ramps at Onewa interchange to state highway
- Construction of Onewa bus-rapid transit interchange station

Southern approach works

- Direct tie-in to Victoria Park viaduct with no change southbound
- Potential to remark Victoria Park Tunnel as 4x3.1m lanes northbound

Cost

- very significantly reduced scope of works compared to recent harbour tunnel concepts (6km twin bore motorway tunnels, parallel rapid transit tunnels, underground interchanges etc
- Similar size projects domestically and internationally suggest a cost in the range of $5-6 billion for a second harbour bridge with approach works, and rapid transit extension to Akoranga.

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Outcomes

- Motorway lanes are balanced to the peak direction capacity available north and south of the harbour in both directions at all times.
- Freight and strategic transport operate independently of separate city access traffic and bus lanes
- Missing modes for rapid transit, cycling and walking are added across the harbour.
- Utilities over the new bridge (water and power) to take a large load off the existing bridge
- Deloading existing bridge would reduce maintenance, extend life, allow extra load for structural protection, wind barriers, suicide prevention screens.
- Resilient to wind and weather effects with modern bridge design
- Feasible cost and construction scope
- Earlier delivery, addressing issues sooner at a reasonable price

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Concept Renders

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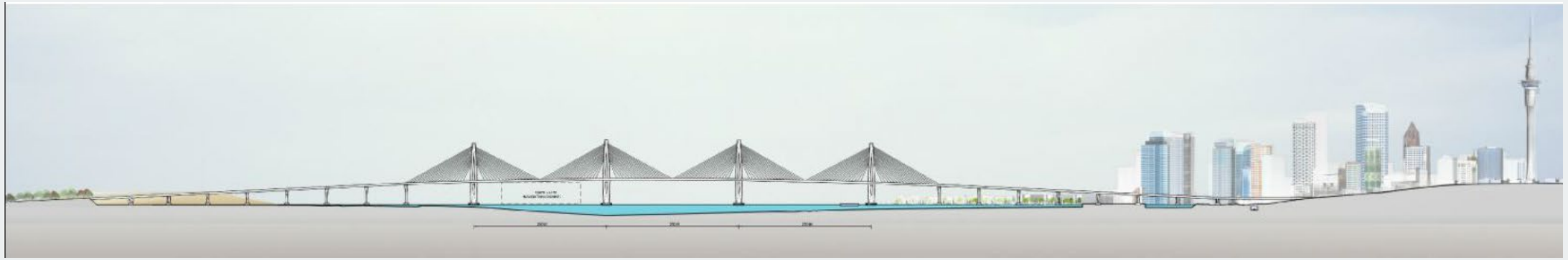
Previous NZTA bridge renders (2011)



Concept render developed by AWHC project team for 2011 study (motorway crossing only)

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Previous NZTA bridge renders (2011)

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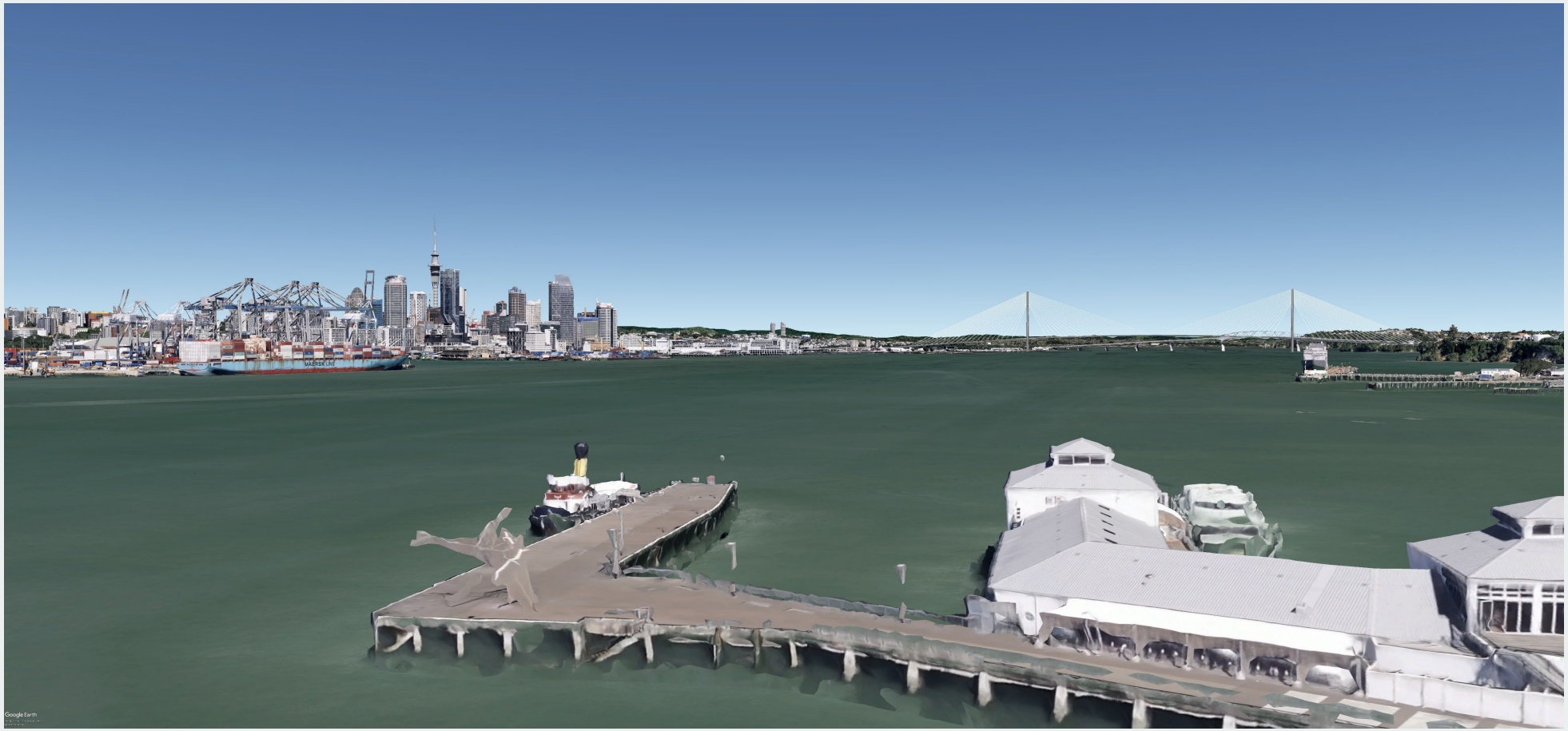
Potential two span multimodal bridge



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Potential two span multimodal bridge

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Multispan bridge in high wind zone

Pelješac Bridge, Croatia (https://www.plexiglas.de/en)

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Strategic concept and network plan

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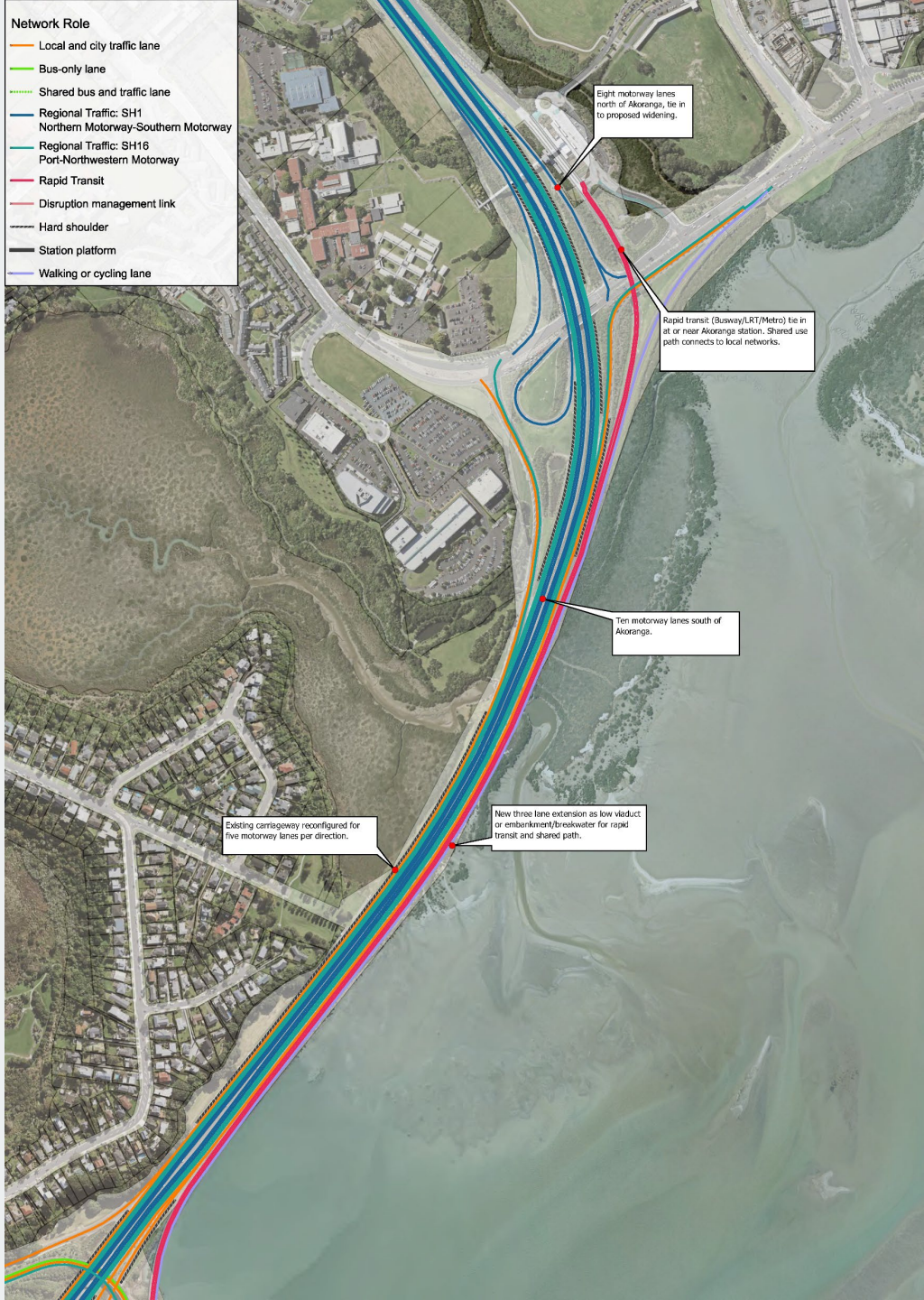
Northern approaches

- Rapid transit ties in at Akoranga (busway or light rail/metro)
- Existing carriageway carries ten lanes south of Akoranga
- New three lane embankment alongside for rapid transit lanes and shared path, acts as breakwater to protect motorway.



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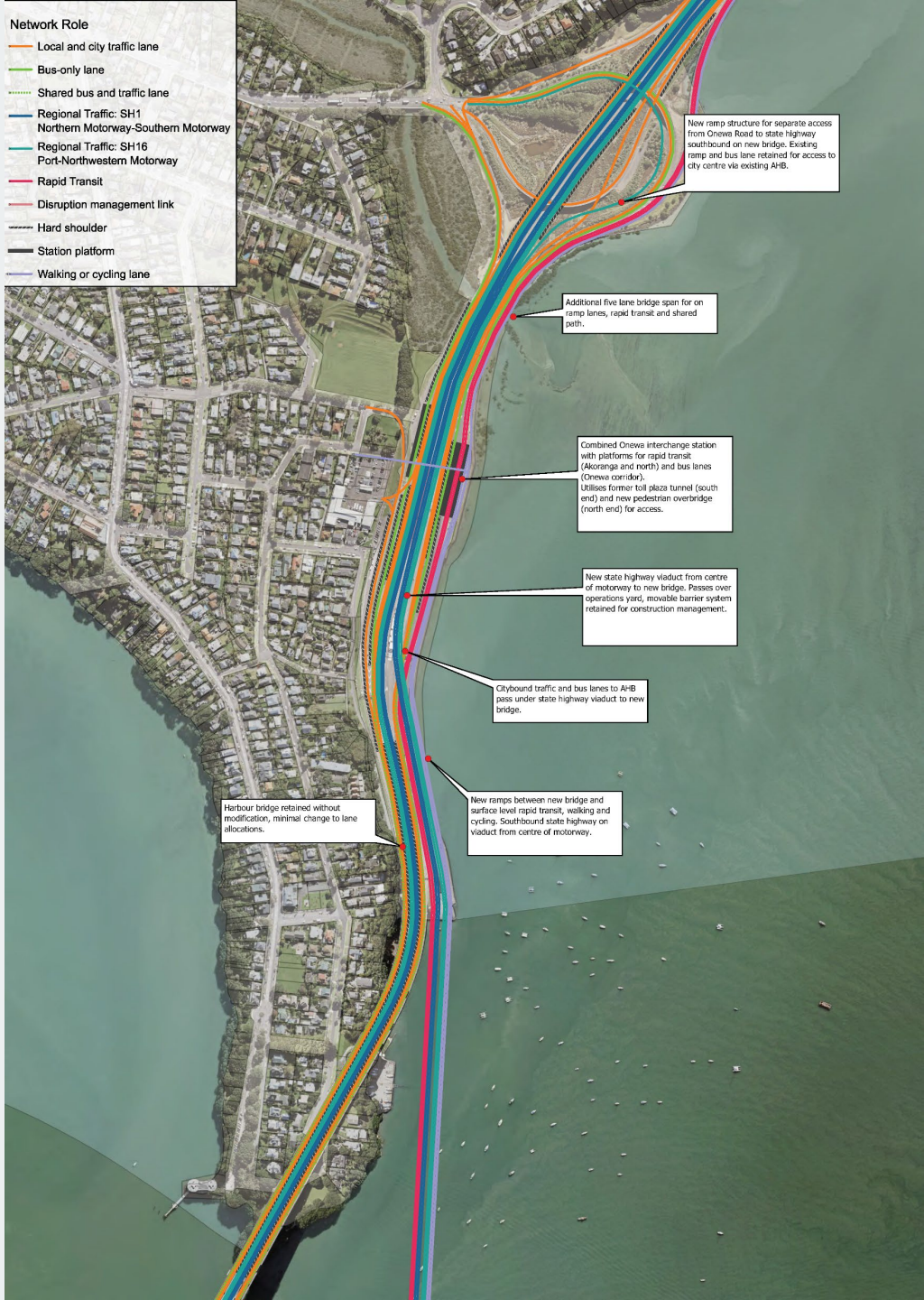
Onewa interchange

- New Te Onewa station for rapid transit and bus interchange
  - Onewa Road buses to current bridge
  - Rapid Transit to new bridge
- Viaduct from centre median to new bridge southbound
- Additional on ramp from Onewa to SH lanes



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Onewa Interchange and bridges (north)

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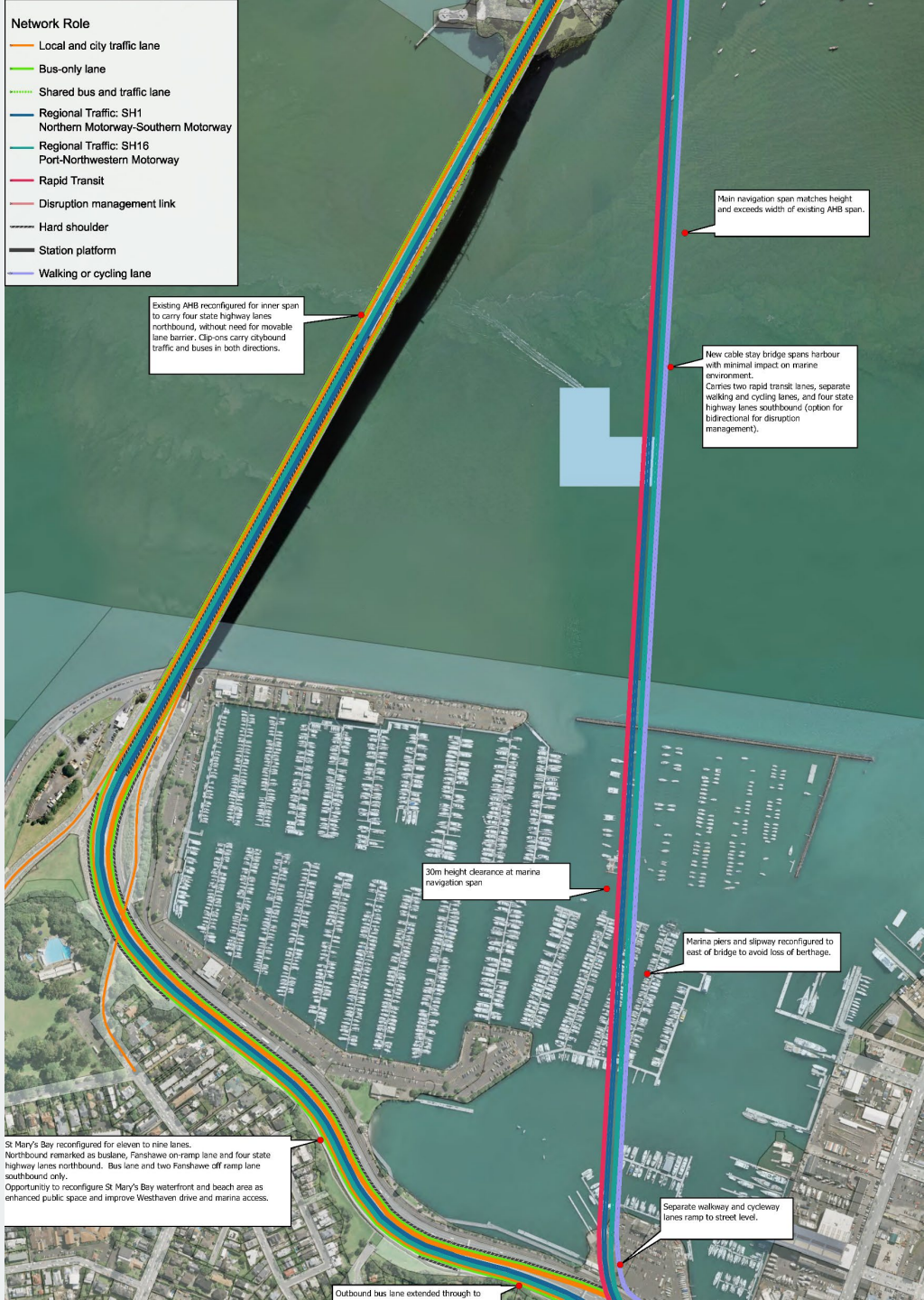
Harbour crossing

- New cable stay bridge with minimal impact
- Can operate bidirectional traffic for planned closures or emergencies
- Main navigation span same hight and broader than existing AHB clearance
- 30m height clearance over marina entrance
- St Mary's Bay has 2 to 3 fewer lanes: enables waterfront park etc



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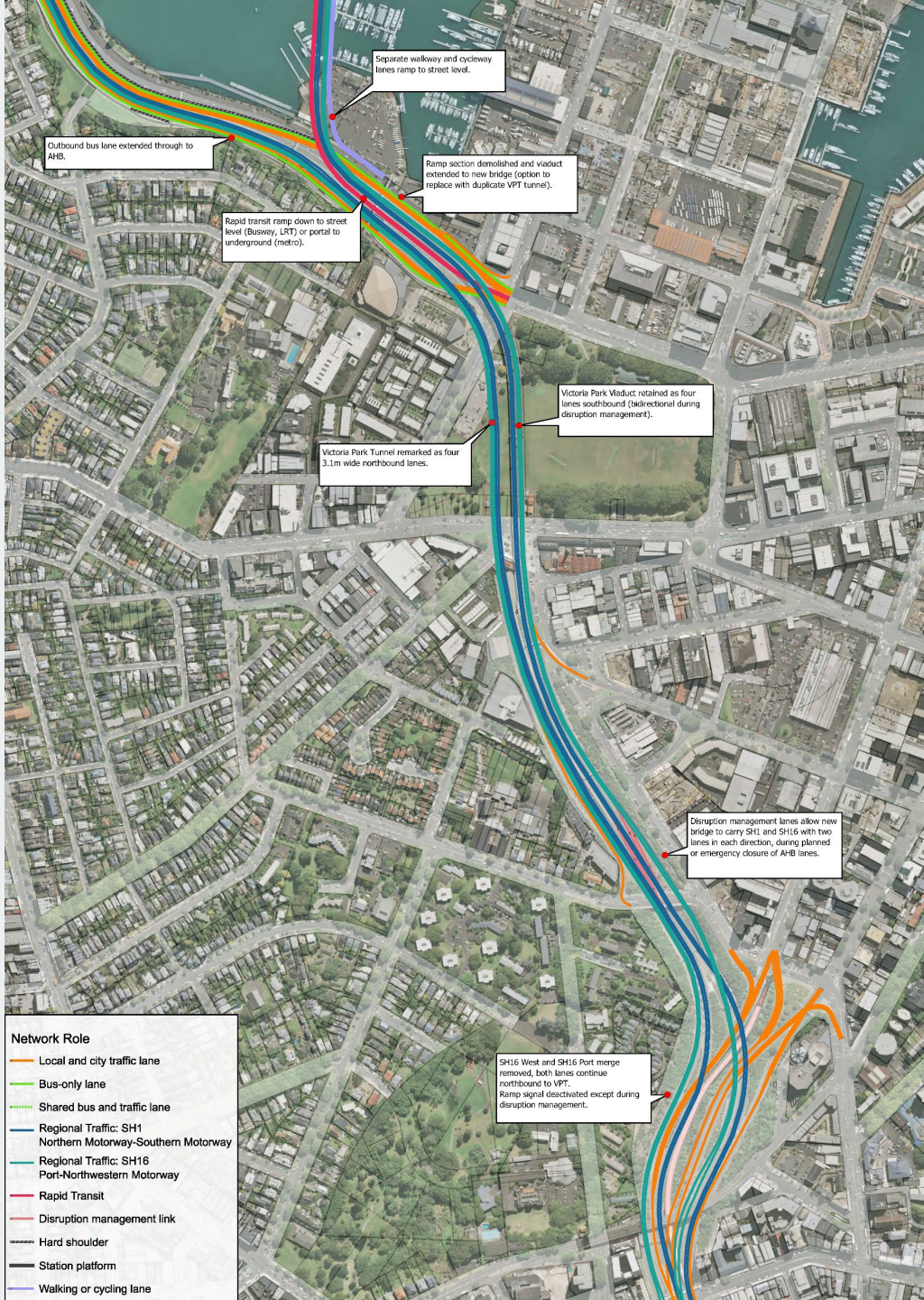
Southern approaches

- New bridge motorway lanes connect direct to Victoria Park flyover ‘bypass’, four lanes southbound
- Option to four-lane Vic Park Tunnel northbound and extend SH16 lanes to existing bridge
- Rapid transit ramps down to street (or tunnel portal)
- Fanshawe bus and traffic connections to existing bridge



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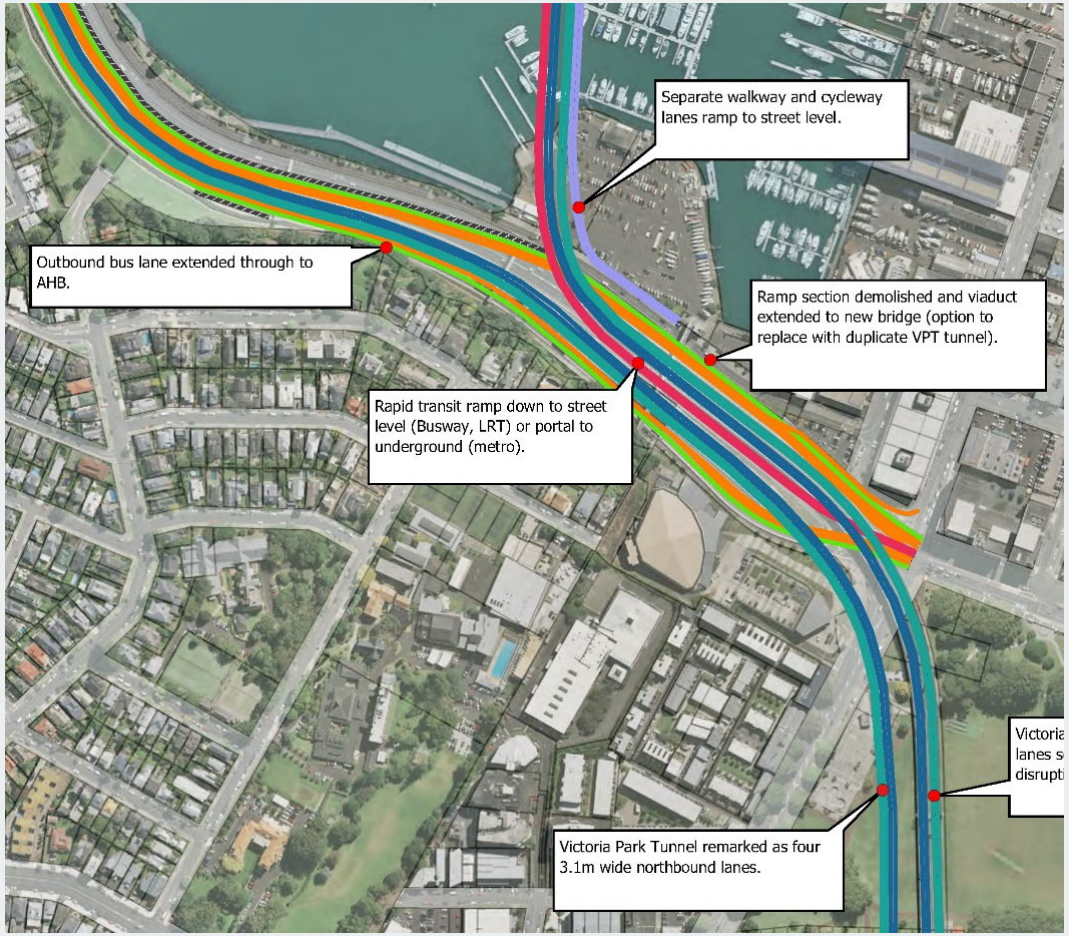
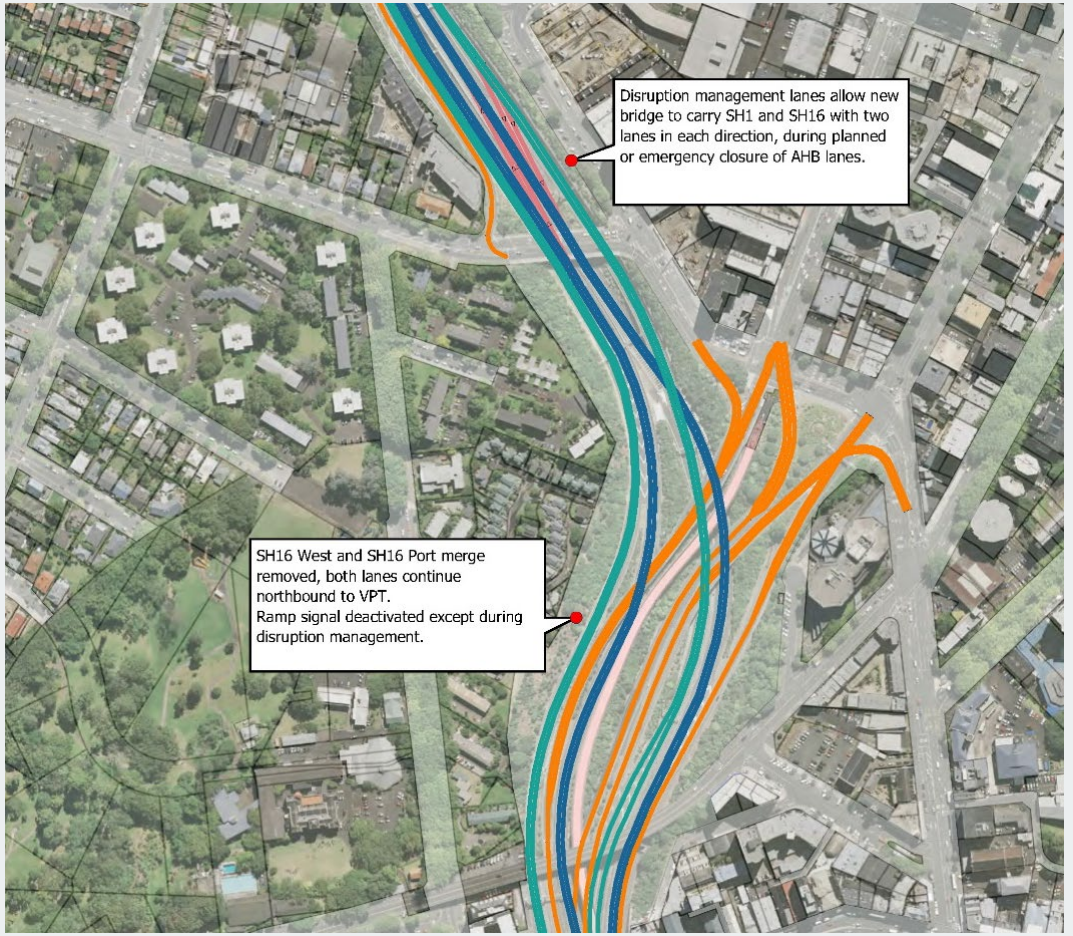
Southern approaches





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End
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