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# QUEEN STREET

## ESSENTIAL VEHICLES AREA EVALUATION

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1	Correction of background information (infringements) and alteration to recommendation 4.	Sienna MacArthur-Beadle	06/10/2022

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# 1. BACKGROUND

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In July 2022, Auckland Transport and Auckland Council introduced an Essential Vehicle Area (EVA) on Queen Street between Wakefield Street and Wellesley Street. The EVA has been established as part of operationalising the Auckland City Centre Master Plan which seeks to shift the city centre from a place people 'go through' to a place that people 'go to'.

The EVA means that the section of Queen Street between the Civic Theatre on Wellesley Street and the Town Hall at the intersection of Wakefield Street is closed to private vehicles, taxis, and car share and rideshare services. The EVA can only be used by buses, bikes, mopeds, motorbikes, emergency vehicles, and registered goods vehicles, vans, trucks, or utility vehicles. The EVA applies 24 hours a day, 7 days a week, with breaches liable for a \$150 infringement fee. From 12 September 2022 Auckland Transport started issuing fines, but only to those who had already received a warning notice. Warning notices are issued to anyone who drives through the area for the first time. Auckland Transport allows two weeks for the warning to be mailed out and received. If the same vehicle then drives through the area after this two-week period, they receive a fine.

The EVA became operational on 3 July 2022. Road layout and signage changes, including advanced warning signs, have been completed as well as public communications through relevant websites, posters in carparks, and direct communications to taxi and rideshare organisations. Some guidance on alternate routes if travelling by car through Queen Street has been provided. However, a more coordinated set of changes to better direct traffic away from Queen Street and around the city centre as envisaged by the A4E (Access for Everyone) strategy will be undertaken at later date.

Since the EVA has gone live there has been a high degree of non-compliance with the vehicle restrictions. Between the 'go live' date and approximately mid-September 2022, 51,000 infringements were recorded<sup>1</sup>.

Auckland Transport data does suggest that the number of violations is reducing over time (see Table 1). However, the number of first-time offenders after the infringement process began (see Table 2) is still notable.

*Table 1: EVA zone non-compliance statistics (source: Queen St TDM working group 20/9/22)*

Week	Number of Observations	Total Warning Letters
2	13,102	9,447
4	13,162	10,302
9	7,599	Stand down
10	2,476	Stand down

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<sup>1</sup> <https://www.driven.co.nz/news/auckland-transport-starts-issuing-150-tickets-on-section-of-queen-st/>

Table 2: EVA zone non-compliance statistics – live infringements (source: AT communication)

Week	Number of first-time violations (receiving warnings)	Number of repeat violations (receiving fines)	Total number of violations
1	402	151	553

Feedback to Auckland Transport also suggests that the road design around the EVA has not been consistently effective in alerting drivers not to enter the area. This could either be because the signage is not visually salient enough, or because the information on the signs is confusing. It is also possible that some drivers are unable to plan an alternate route ‘on the fly’ and therefore feel they have no choice but to drive through the EVA.

Before beginning to issue infringement fines for all road users violating the EVA (rather than issuing warnings for first time violators), Auckland Transport has commissioned a Human Factors (HF) Review of the EVA. This will provide assurance that drivers are being given the best possible opportunity to identify the EVA, understand what behaviours are required, and respond appropriately.

This report details the results of the review. Each approach to the EVA is reported separately. Recommendations are focused on enhancing the overall design of the EVA. Where recommendations are particularly relevant to an approach this is highlighted.

It should be noted that various changes have been made to the layout of the EVA since inception and further minor signage changes are planned. The review largely focused on the current installation. However, the reinstatement of the Queen St Northbound ADS sign was also considered.

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## 2. SCOPE & METHOD

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### 2.1 Scope

The HF review of the EVA involved three key steps:

- Developing a description of Queen Street EVA focused particularly on road design and signage.
- Observations of drivers at each EVA approach where non-permitted vehicles are present.
- Site evaluations of each EVA approach where non-permitted vehicles are present.

### 2.2 Method

#### Description of Queen Street EVA

EVA planning and design documents provided by Auckland Transport were reviewed to develop a description of the EVA intervention. Communications materials and any route guidance was also reviewed. A short description of the EVA is provided in the results section of this report.

#### Driver Behaviour Observations

Structured one-hour observations of the two approaches at the southern end of the EVA were undertaken to gather data on driver behaviour. Figure 1 shows where observers were stationed at each approach. Due to roadworks at the northern end of the EVA, systematic observation was not possible. Instead, multiple site visits informed general observations.

During structured observations the following information was recorded about passing vehicles (except buses):

- Vehicle type (e.g., car/van/ute/truck)
- Vehicle use (e.g., private/commercial/rideshare/taxi – if information was available)
- Lead/following vehicle (was vehicle travelling through first or following others)
- Traffic lights on approach (red/orange/green)
- Behavioural observations (description of driver behaviour on approach to intersection, during time at intersection and after travelling through, including manoeuvres such U-turns, or pausing in a lane)
- EVA use (did the driver enter the EVA)
- EVA avoidance (did the driver make evasive manoeuvres to avoid the EVA)

Data for vehicles observed at southern approaches and general observations completed at northern approaches are provided in Appendix A.

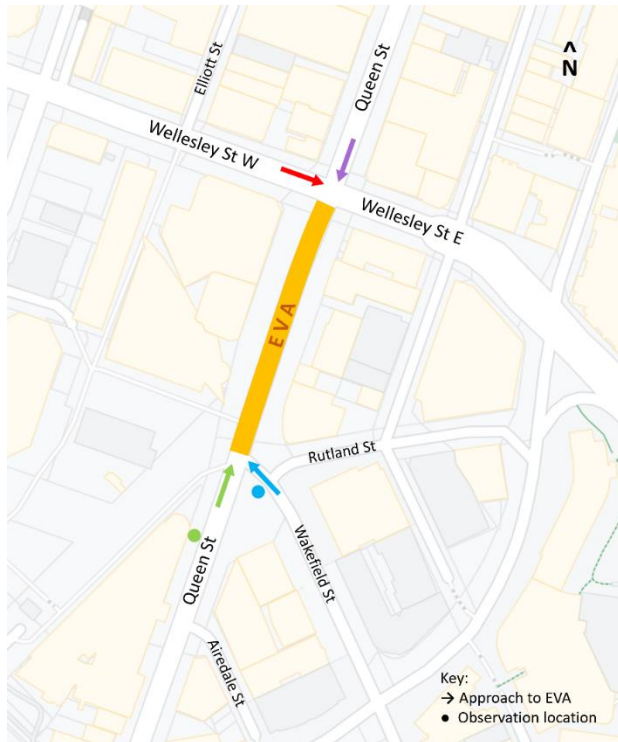


Figure 1: Map of the Queen St EVA and the Observer Entry Points

## Site Evaluations

Driving is a complex task. As drivers navigate the roadway, they gather and process sensory information and compare it to their existing driving knowledge to make safe choices. Safe and successful driving requires a well-designed road environment and a knowledgeable, alert driver. A good overview of driving from a psychological perspective is provided by the model in Figure 2 which was adapted from one developed by TNO Netherlands.

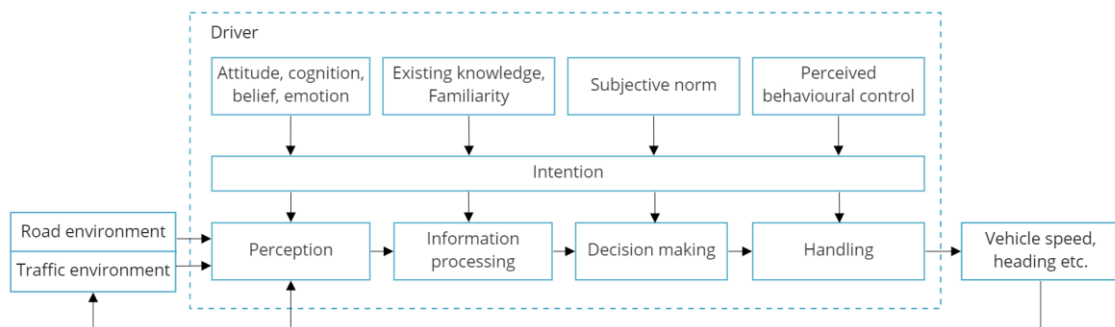


Figure 2: Model of Driver Behaviour (adapted from TNO)<sup>2</sup>

<sup>2</sup> [https://international.fhwa.dot.gov/humanfactors/chapter\\_seven.cfm](https://international.fhwa.dot.gov/humanfactors/chapter_seven.cfm)

One of the main areas of interest for road safety human factors is identifying and mitigating crash risks. Again, well established theoretical models provide a useful basis for identifying these risks. Generally, adverse events and crashes happen when multiple system factors/failures occur together (Reason, 1990<sup>3</sup>).

James Reason's Swiss Cheese model is a cornerstone of this understanding and shows how both unsafe acts (e.g., being distracted, or travelling too fast for conditions) and pre-cursors to unsafe acts (e.g., difficult road conditions, inexperience) can co-occur and result in crashes.

Human factors checklists provide a useful way of identifying risks/systems factors and associated mitigations. For the purposes of this assessment, a road safety human factors checklist was used that covered the following categories:

- General environment (context)
- Roadway design, signage, and markings
- Road users (demographic factors, behaviour, attitudes, mistakes/slips/violations)
- Environmental factors (weather, light levels etc.)

Under each category, human factors areas or issues that have been shown through research to affect safety were considered (e.g., environmental complexity, road signage and marking design, driver familiarity with the area). Areas where safety risks co-occurred was noted (e.g., visually complex background and small signage).

Assessments were made at each approach to the EVA where non-permitted vehicles were present. These involved site visits, photos of the site from different positions, and previously completed observations of driver behaviour. Two human factors specialists completed the assessment at each site. A further peer review process was used to test whether all potential issues had been identified.

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Reason, J. (1990). *Human Error*. Cambridge University Press.



## 3. EVALUATION FINDINGS

### 3.1 Description of Queen Street EVA

The extent of the Queen Street EVA (in yellow) is shown in Figure 3, as are the routes that non-permitted vehicles can take to travel around the EVA without receiving an infringement fine.

The area within the EVA is closed to private vehicles, taxis, and car share and rideshare services.



Figure 3: Queen Street EVA (figure supplied by Auckland Transport)

## Queen Street EVA Signage

Auckland Transport provided the team with EVA plans that included the signage provided in Figure 4.

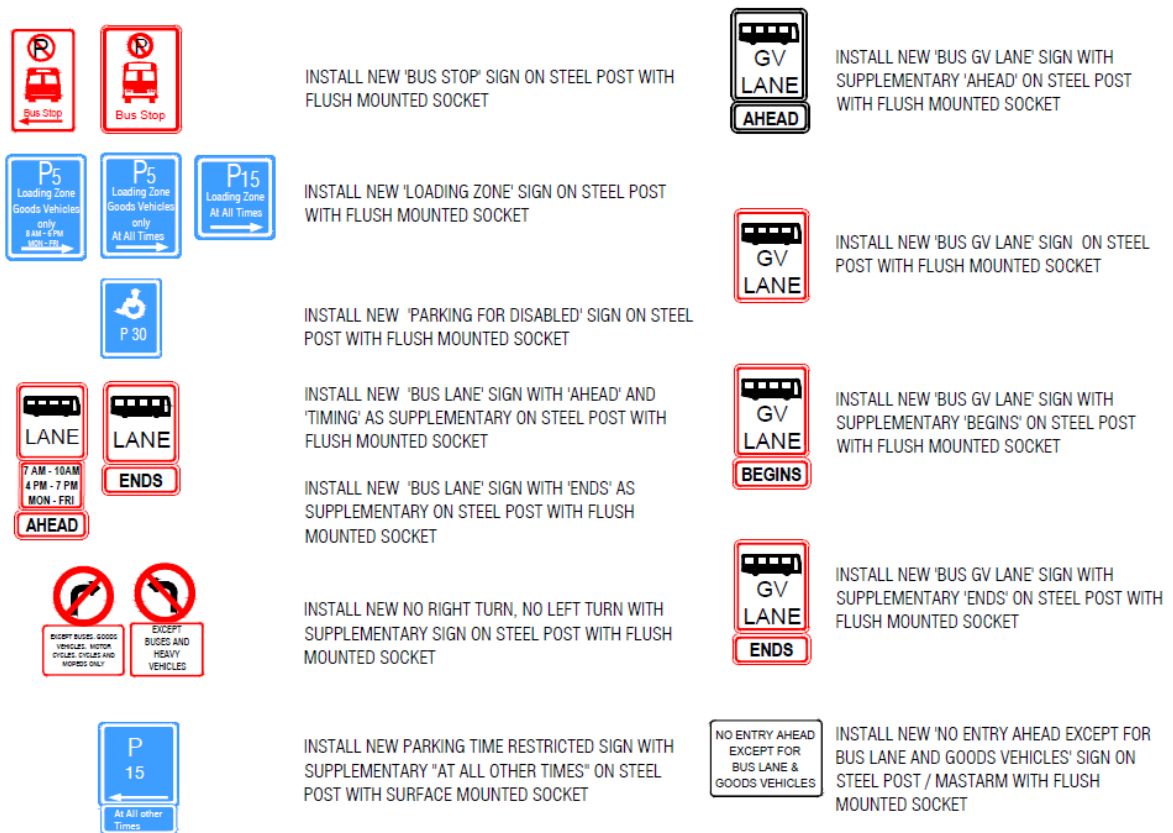


Figure 4: EVA signage provided by Auckland Transport (AT Traffic Signs and Roadmarkings Plan Sheet -2021-PTM-16\_G130

While it is not included in Figure 4, an advance direction stack (ADS) sign was also installed on Queen St between Karangahape Rd and Mayoral Drive. This sign, shown below, warns the road user that “local access only” is permitted further down Queen St.



Figure 5: Advance direction stack sign installed between Karangahape Rd and Mayoral Drive (image provided by AT)

During site observations temporary portable variable message signs (VMS) were also in place for both northbound and southbound traffic on Queen St. The VMS message for southbound road users is shown below.



### Queen Street EVA Communications

The following images show examples of Queen Street EVA communications materials. In addition to the materials identified, further signage and communications regarding the EVA are still underway.



Figure 6: Queen Street EVA communications

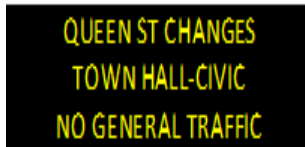
Motorway VMS gantry signs also presented the following messages before and after July 3<sup>rd</sup>.

Prior to Sunday 3<sup>rd</sup> July

Page 1



Page 2



From Sunday 3<sup>rd</sup> July onwards

Page 1

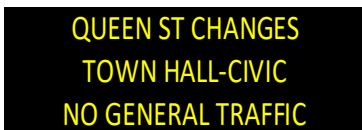


Figure 7: Queen Street EVA motorway VMS gantry signs

The Auckland Transport Betterway website was also updated to include a page dedicated to driving.<sup>4</sup> The EVA is explained, and supplementary information (e.g., parking, pick-up, and drop-off information) is provided.

Taxi companies and rideshare platforms were informed of the changes and were provided with a circulation map (Figure 8) showing various routes to access the areas of Queen St adjacent to the EVA.

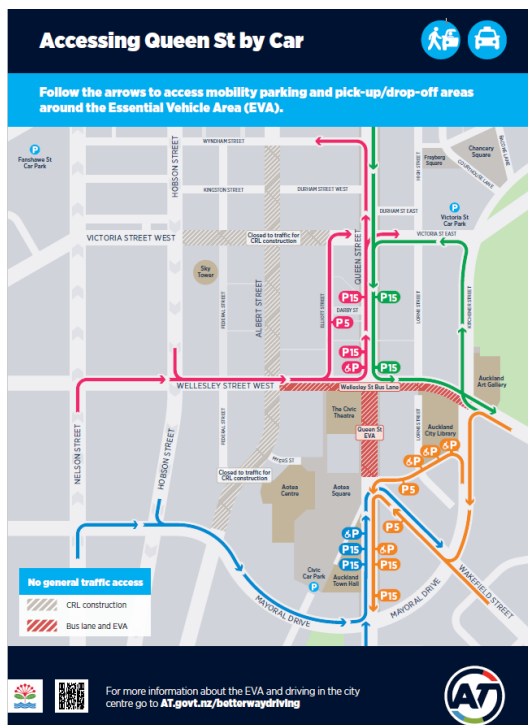


Figure 8: Taxi and rideshare Queen Street EVA communications

<sup>4</sup> Driving (at.govt.nz)

## 3.2 Wakefield Street EVA Approach



Figure 9: Wakefield St EVA approach

### Site Assessment

The general environment at the Wakefield St approach is characterised by several tall buildings. However, due to Aotea Square the visual scene is noticeably less cluttered than the approaches at the northern end of the EVA. There are also fewer commercial signs, no roadworks signs (which are currently present at the northern end) and more open sky.

Wakefield St is a feeder route to Queen St, so the traffic volumes are light, and speeds are low. There is only a single traffic lane. As such, drivers do not have to work to choose the correct lane or drive with consideration to drivers in other lanes of traffic travelling the same direction. There are other road users present, although not in large numbers during these observations.

The roadway design at Wakefield St is relatively straightforward. The single lanes in each direction are separated by a small traffic island. The Queen St approach has a left-hand curve at the point of the intersection and checkerboard-textured tiles, both of which provide further cues to slow down. There is a left turn arrow marked on the road.

There is a range of signage regarding the EVA and who is allowed to enter it at this approach. The signage is quite small and not very conspicuous. In this situation the signs seem sufficient (given behavioural observations). This is likely because there is less visual clutter in the scene, fewer road users, and the driving task is quite straightforward. Therefore, drivers can direct more of their attention to the signs. While some of the text might be difficult to read, the no right turn arrows probably compensate. The redundancy in signs provides multiple opportunities for drivers to acquire information about the EVA.

In terms of wayfinding, if drivers are aware of the EVA and what route they wish to take, they simply need to turn left at low speed. If they are not aware of the EVA, then they must read signage, turn left, and plan an alternate route. In some cases, being forced left is likely to send the drivers in the opposite direction to their intended route and may require reasonably significant replanning. To ensure safety, particularly of vulnerable road users, this should be done when pulled over as it would require significant attention.

## Driver Behaviour Observations

Over the course of one-hour, 48 vehicles were observed exiting Wakefield St (see full list in Appendix A). Because traffic was reasonably sporadic, most were lead vehicles and the drivers had to choose their route without reference to the behaviour of cars around them.

Only one non-permitted vehicle was observed entering the EVA.<sup>5</sup> This vehicle turned left from Wakefield St onto Queen St. It then performed a U-turn and proceeded through the EVA.

Behavioural observations suggest that the signage is sufficient to communicate to drivers that they must not turn right into the EVA. However, several drivers were observed approaching the intersection without indicating, pausing at the intersection for quite long periods, or inching slowly around the corner when turning left. A few other drivers performed quite complex manoeuvres, such as U-turns and pulling on to the pavement, that may have been related to trying to navigate the EVA.

## Conclusions

The review of Wakefield St indicates that given the general environment, traffic volume, and driving task, the signage for the EVA is probably sufficient even though in other circumstances it would likely be too small and inconspicuous to be reliably identified by drivers. The redundancy in signage is not adding too much visual clutter and does provide drivers with multiple opportunities to acquire information about the EVA.

Behavioural observations suggest that the signage and markings are sufficiently conspicuous, and that drivers are aware they should not turn right. The hesitating behaviour at the intersection may be because drivers are attempting to plan another route, having expected to be able to travel down Queen St.

In the case of this approach, improvements could be made by better communicating alternate routes to drivers (particularly providing information on which route to take to travel north).

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<sup>5</sup> Two tow trucks, one motorcycle and a truck did enter.

### 3.3 Queen Street (travelling north) EVA Approach



Figure 10: Queen Street northbound EVA approach

#### Site Assessment

The general environment at this approach is characterised by several tall buildings. However, they are distant as Aotea Square creates a break in the line of buildings. The visual scene is less cluttered than the approaches at the northern end of the EVA. There are noticeably fewer commercial signs and no roadworks signs.

Queen St is a main road and a main bus route, so the traffic volumes are generally heavy (moderate outside of peak hours). There are two traffic lanes in the northbound direction. As such, drivers must work to choose a correct lane, drive with consideration to drivers in other lanes of traffic travelling the same direction and avoid the bus lane. There are other road users present, particularly buses, though not in large numbers during the observations for this work. Overall, traffic speeds were relatively low during observations.

The roadway design at this approach is moderately complex. The entry into the intersection is two lanes: the left is a straight-only bus lane, the right lane is right turn only. A stretch of the left lane approximately 15m long is painted green and marked with the words, “BUS GV LANE”. Further back from the intersection the left lane is marked with a straight arrow, while the right lane is marked with a right arrow.

There is a range of signage indicating the EVA. These contain conflicting messages about who is allowed to enter it. On the left side of the roadway approximately 55m back from the intersection a signpost has four signs arranged vertically. The top says, “GV LANE”, with a pictogram of a bus, and below another says, “BEGINS”. Underneath these, a third says “BUS LANE”, with a pictogram of a bus, and below another says “ENDS”. Next to this sign the road is marked with the words, “BUS LANE BUS GV LANE”. These signs and the road marking (including the unpainted section of the bus lane) could erroneously indicate to drivers that the bus lane has ended and that usage restrictions of the lane no longer apply.

From this approach the signs seem insufficient (given behavioural observations). The text on the signs is quite complex, not necessarily comprehensible to all motorists in some cases, and the message does not seem consistent. In addition, the heavy thoroughfare of buses through this intersection could block the view of some signage for drivers.

In terms of route finding, the number of drivers using the bus lane to continue travelling along Queen St raises the possibility that they may be mentally committed to travelling straight (as opposed to drivers approaching on Wakefield St who are expecting to turn at the intersection).

They may also be taking their direction from other drivers in front of them as there are more following drivers on this approach.

The core driving task is more difficult at this site due to the multiple lanes, heavier traffic, and bus lanes. If drivers are aware of the EVA and what route they wish to take they simply need to turn right at low speed. If they are not aware of the EVA, then they must read signage, potentially change into the right lane, turn right, and plan a new route. If they are not familiar enough with the CBD this may involve erroneously pulling into Rutland St and then needing to turn around and exit onto Wakefield St, or it may involve pulling over to check directions. Because general driving is somewhat demanding here, the extra route planning/navigation work may simply not be possible for some drivers. The difficulties associated with erroneously turning into Rutland St may increase the stress and complexity of route planning, especially considering the other driving restrictions in the CBD.

### Driver Behaviour Observations

Over the course of one-hour, 74 vehicles were observed driving northbound on Queen St (see full list in Appendix A). Because of the traffic light cycle at this intersection, the vehicles tended to clump into groups. Vehicles following behind were able to choose their route with reference to the behaviour of cars around them.

Behavioural observations suggest that the signage is insufficient in communicating to drivers that they must not proceed straight into the EVA. Fourteen non-permitted vehicles were observed entering the EVA.<sup>6</sup> Of these 14 vehicles, six were observed following another road user into the EVA. On one occasion four cars approached a red light in the right lane. The first car changed into the left (bus) lane at the light and came to a stop. The car behind copied the lead car and pulled to a stop mostly in the bus lane. The third car then followed suit, pulling slightly into the bus lane. The fourth car then also copied, pulling slightly to the left. The light then turned green and all four cars drove into the EVA.

Several drivers were observed approaching the intersection without indicating, pausing at the intersection for quite long periods, or inching slowly around the corner when turning right. A few other drivers performed quite complex manoeuvres, such as U-turns, that may have been related to trying to navigate away from the EVA. In one such instance a driver approached in the right lane without indicating. They proceeded straight through from the right lane (on a green light with a red arrow) to the threshold of the EVA. They noticed the EVA and quickly performed a U-turn in the middle of the intersection to avoid entering it. They then turned left into Rutland St. These manoeuvres are quite dangerous and put other road users at risk (particularly vulnerable road users) as the behaviour of the vehicles is quite unpredictable.

Several drivers were also observed turning right into Wakefield St and then into Rutland St (probably attempting to continue in a somewhat northbound direction). Upon realising that there is no thoroughfare through Rutland St, they turned around and exited Rutland St by turning left onto Wakefield St. There is no signage at the entry to Rutland St to indicate that there is no exit/no throughfare.

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<sup>6</sup> Three unpermitted and five other permitted vehicles also entered the EVA.



## Conclusions

The review of Queen St northbound indicates that given the general environment, traffic volume, and driving task, the signage for the EVA seems insufficient and confusing in some cases. This may be because it is too small and inconspicuous to be reliably identified by drivers in some circumstances. Or it may be because the driving workload means that some drivers are simply unable to allocate attention to processing the signs.

The hesitating behaviour at the intersection also suggests drivers are attempting to plan another route, having expected to be able to travel down Queen Street. Therefore, in the case of this entry point, improvements could be made by better communicating alternate routes to drivers, particularly to inform them of the no thoroughfare through Rutland St.

Finally, the issues of drivers following each other into the EVA in error is difficult to resolve. Hopefully the addition of additional signage and route planning information will help drivers be less reliant on following other vehicles.

## 3.4 Queen Street (travelling south) EVA Approach<sup>7</sup>



Figure 11: Queen Street southbound EVA approach

### Site Assessment

The general environment at this approach is characterised by many tall buildings, most with awnings. The visual scene is noticeably more cluttered than the approaches at the southern end of the EVA. There are many commercial signs including those on the Civic Theatre. During observations there were also very heavy roadworks with associated signage, and many road cones.

Queen St is a main road and a main bus route, so the traffic volumes are generally heavy (moderate outside of peak hours). The roadworks have narrowed the street to only one southbound lane. As such, drivers do not have to work to choose a correct lane or drive with consideration to drivers in other lanes of traffic travelling the same direction. However, they do have to navigate the roadworks. There are other road users present, particularly buses, and at peak hours there are many pedestrians, cyclists, and scooter users.

The roadway design at Queen St is yet to be finalised. There is a range of signage indicating the EVA and who is allowed to enter it. This signage is quite small and not very conspicuous. In

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<sup>7</sup> Note, taking comprehensive photographs of a southbound driver's point of view were not possible due to roadworks at this site.

this situation, the signs seem insufficient (given behavioural observations). This is because the heavy thoroughfare of buses through this intersection may block the view of some signage, the visual clutter from the surroundings and the roadworks makes the signs inconspicuous, and the complex driving environment requires a lot of attention. Additional signage indicating the Wellesley Street W bus lane is present and is also relatively inconspicuous. Given behavioural observations these signs also seem insufficient.

The core driving task is complex at this site. If drivers are aware of the EVA and what route they wish to take the EVA does not add any additional workload. However, if they are not aware of the EVA, then they must read signage, deduce that they can only turn left, and plan a new route. This may involve pulling over if they are not familiar enough with the CBD and it is difficult to find somewhere to do this. Because the high workload associated with simply driving in the area, the extra route planning work may not be possible for many drivers, especially given the number of restrictions in the CBD and the complexity of identifying a viable new route. Due to this, drivers may be relying on other drivers in front of them or feeling like they do not have sufficient time/confidence to quickly plan another route and thus simply driving through the EVA.

### Driver Behaviour Observations

Due to roadworks at the intersection of Wellesley and Queen streets, systematic observation could not be undertaken. Multiple site visits to the intersection totalling approximately 2.5 hours were instead used to develop general observations (see Appendix A).

Commonly observed behaviours included vehicles approaching the intersection very hesitantly—one driver was even seen stopping to talk to a road worker. Some drivers seemed to realise that the EVA was ahead but could not confidently select another route in time and, therefore, proceeded straight into the EVA (sometimes very hesitantly).

Many drivers were observed turning right into the Wellesley St W bus lane as they were aware of the EVA, but not the Wellesley St W restrictions (or perhaps were aware of the cameras and automatic infringements in the EVA and the absence of a bus lane camera on Wellesley St W).

Prior to Queen St being narrowed to one southbound lane, drivers were seen stopping at the intersection in the right lane before noticing the EVA, starting to indicate left, and turning left into Wellesley St E from the right lane.

Other drivers were seen turning left into Wellesley St E before performing a U-turn through the gap in the median traffic island and proceeding back through the intersection and onto Wellesley St W.

### Conclusions

The review of Queen St EVA southbound approach indicates that given the general environment, traffic volume, and driving task, the signage for the EVA seems insufficient. It is too small and inconspicuous to be reliably identified by drivers given the background clutter—which is made worse by the complex roadworks currently in progress at the intersection. This is evidenced by the number of drivers who proceeded into the EVA without hesitation or turned up Wellesley St W.

Wayfinding is also an issue at this site, evidenced by the hesitating behaviour at the intersection when drivers were attempting to plan another route, having expected to be able to travel up Queen St. The hesitations, abrupt turns (sometimes from the wrong lane), and unpredictable manoeuvres like U-turns are dangerous to other road users. Improvements in communicating alternate routes are required.

### 3.5 Wellesley Street West EVA Approach

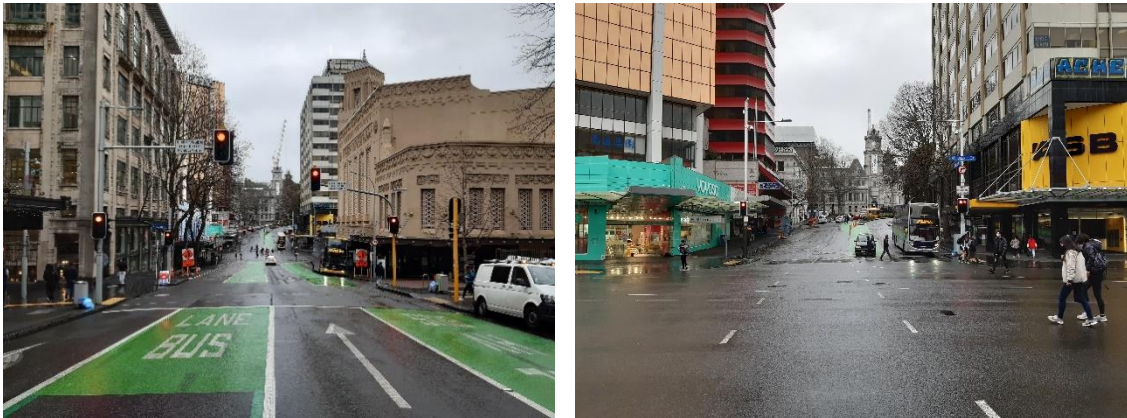


Figure 12: Wellesley Street West EVA approach

#### Site Assessment

The general environment at this approach is characterised by many tall buildings, most with awnings. The visual scene is noticeably more cluttered than the entry points at the southern end of the EVA. There are many commercial signs including those on the Civic Theatre.

There are other road users present, particularly buses, and the area is becoming increasingly pedestrianised. During observations there were many road users on the footpath waiting for busses. Monitoring these road users adds to the complexity of the driving task.

Wellesley St W is a main road and a main bus route, so the traffic volumes are generally heavy (moderate outside of peak hours). There are three traffic lanes including one bus lane and several sets of traffic lights. Drivers must work to choose a correct lane and drive with consideration to drivers in other lanes of traffic travelling the same direction. The intersection which includes the right turn to the EVA has a left lane which is left turn only, a middle lane is a straight-only bus lane, and a right lane which is both straight ahead and right-turning. A large stretch of the left lane also doubles as a bus stop. The left lane is marked with a left arrow, the centre lane is painted green and marked with the words, "BUS LANE", and the right lane is marked with a heavily worn hybrid straight and right arrow. The complex road environment requires a lot of attention.

There is a range of signage indicating the EVA and who is allowed to enter it. Some signage pre-warns drivers from as far back as the intersection between Wellesley St W and Elliott St. However, this signage and the signage at the Queen St intersection is quite small and not very conspicuous. In this situation, the signs seem insufficient (given behavioural observations). Some of the signage is out of the driver's eyeline, it is small and difficult to spot against the clutter, the text is difficult to read, and signage can be obscured by busses and other large vehicles.

The core driving task is very complex at this site. If drivers are aware of the EVA and what route they wish to take they simply need to turn left or proceed straight at low speed which does not add much workload. If they are not aware of the EVA, then they must read the signage, deduce that they can only turn left or proceed straight, and plan a new route while negotiating the complex roadway with a range of restrictions (such as bus lanes). This may involve pulling over if they are not familiar enough with the CBD, although there are limited opportunities to pull over in Wellesley St E (especially for traffic travelling in the right lane who would need to change lanes before pulling over). Although the core driving task is complex, the hybrid straight and right-turning lane allows for people to change their route and proceed straight ahead without changing lanes if they are aware they can do this. This is likely to be possible for most drivers.

### Driver Behaviour Observations

Due to roadworks at the intersection of Wellesley and Queen streets, systematic observation was unable to be undertaken. Multiple site visits to the intersection totalling approximately 2.5 hours enabled general observations to be made (see full list in Appendix A).

Some drivers were observed waiting at a red light in the right lane (indicating right to turn into the EVA) before noticing the signage and driving straight through the intersection (into Wellesley St E). Although some then made U-turns and travelled back along Wellesley St W. Others were observed stopped at a red light for quite some time before turning into the EVA with no indication that they had noticed the signage. On one occasion a vehicle in the right turning lane seemed to notice the EVA and hesitated at the green light. A bus behind began honking and the driver turned right into the EVA, seeming to know that the area was restricted but not having the ability to change route and avoid it.

### Conclusions

The review of Wellesley St W eastbound indicates that given the general environment, traffic volume, and driving task, the signage for the EVA seems insufficient. At this site, more than others, the signage was difficult to spot against the visual clutter. In addition, drivers working hard to negotiate the complex environment are unlikely to be generally scanning for additional information.

Behavioural observations also suggest that the signage and markings are not sufficiently conspicuous, and that several drivers are not aware that they should not turn right at the intersection.

It appeared that once drivers were aware of the EVA, they were able to re-plan relatively easily to proceed straight.

## 3.6 Cross EVA Findings

Road environment design can greatly influence road users' experiences of an area. Good road environment design makes the roadway easy to understand and use and supports safe and predictable behaviour of road users.

This review suggests that the road design at the approaches into the EVA has not been successful in preventing unpermitted entry to the area—as indicated by the various observations of EVA violations and the data collected by Auckland Transport. Although the precise error types are not always possible to determine, our observations suggest that genuine driver mistakes, through inadequate or confusing information is the main mechanism by which drivers are choosing to enter the EVA area or alternatively change direction suddenly. The main reasons for this appear to be that the signage is not sufficiently conspicuous, does not convey clear information about the EVA to road users, and that alternate route planning is difficult at some sites due to the general complexity of the driving task.

The core issues differ slightly by site. At the northern end of Queen St, the lack of conspicuous signage (including some out of the line of sight) suggests some drivers simply do not see the signs and fail to notice the EVA against the general clutter. It is also likely that additional complexities related to navigating roadworks at the northern end of the EVA have contributed to the general lack of awareness and high rate of violations from drivers.

For road users northbound on Queen St (at the southern end of the EVA), the site is less visually complex, and the roadway is also. Signage appears to reliably alert drivers emerging from Wakefield St and usually alert drivers travelling north on Queen St. Although the language on some signs is unclear. For example, on the block between Karangahape Rd and Mayoral Dr, the signage southbound says, "local access only", and conflicts with the terminology used on all other signage warning of the EVA. However, the primary issue at this site appears to be route planning. The signage does not give those without prior knowledge of the EVA adequate time to safely plan a new route and avoid the area. Also, the routes drivers need to take to avoid the EVA are not particularly intuitive, potentially leaving drivers feeling they are travelling back the way they came.

At both ends of the EVA the delayed perception and comprehension of the signage by some road users and attempts to identify alternate routes under pressure have resulted in unsafe and unpredictable behaviours from many of the observed vehicles (including U-turns in the middle of intersections and through gaps traffic islands). This is dangerous to other road users.

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## 4. RECOMMENDATIONS FOR EVA

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The following recommendations are intended to improve the design of the EVA from a driver's perspective. They range from helping drivers plan their routes in advance, to ongoing monitoring of driver behaviour at the EVA. The recommendations have been broken into five areas:

- Route planning
- Roadway and signage design
- Tactical decision-making/real-time wayfinding
- Issuing infringement fines
- Tracking behaviour

### 1. Route Planning

#### **Recommendation 1.1: Provide better route planning guidance**

The route planning information identified during this review merely listed alternative roads that could be used. To be useful to drivers, particularly those unfamiliar with the area, the information would need to suggest specific routes for navigating around the EVA if travelling north or south.

Ongoing monitoring of driver understanding of alternate routes should be undertaken so that communications and route planning guidance can be targeted to areas of need.

### 2. Roadway and signage design

#### **Recommendation 2.1: Develop EVA gateway signage**

#### **Recommendation 2.2: Improve conspicuity and legibility of all EVA signage**

#### **Recommendation 2.3: Use consistent terminology to communicate to drivers**

The EVA is a new concept for New Zealand. Its unfamiliarity to drivers means that an extra education effort is needed. A consistent change in behaviour is unlikely to be realised without ongoing investment in communications and roadway design. This appears to be borne out by the data collected on the EVA to date which has shown many violations.

At a concept level, we recommend developing gateway signage and road markings that connect the EVA more closely to the broader story of the City Centre Masterplan and the vision for the Waihorotiu/Queen Street Valley, communicating the 'why' of the intervention. We recommend making a feature of the EVA by making the 'gateway' visually eye-catching and including signs explaining the EVA (perhaps with a QR code for easy access to more detailed information and links to trip-planning guides). This should include large, uniquely coloured signs with matching pavement marking. Advanced signage should match the colours used and, if possible, a consistent and recognisable logo or brand should be used.

Figure 13 on the following page shows an example of the gateway concept used for the London Congestion Zone. This example doesn't contain all the elements suggested above but does provide an idea of what a gateway may look like.



Figure 13: London Congestion Charging Zone.<sup>8</sup>

In terms of general signage related to the EVA, the review showed that although there seemed to be some effective and clear advanced signage, much of the EVA signage was small, difficult to spot against the background and difficult to read. This was particularly problematic at the northern end of the EVA, and not helped by current roadworks.

Overall, the signs need to be more conspicuous. It was noted during the review that the blue ADS sign stood out well against the visual background as it is not a common colour at the site. Using this colour and increasing sign size as well as better placement may help drivers notice the signs. Where possible signs should be placed where drivers typically scan rather than high up or a long way off the roadway. However, given the complexity of the site, this may not always be possible.

To embed recognition and understanding the signage must have consistency in language, symbols, and colours to ensure that it is predictable to road users. Over time, this reduces the amount of attention road users need to pay to the signs as they learn to identify them with a quick glance. As a result, they can pay attention to safety critical things such as monitoring for pedestrians and cyclists.

Upon review of various materials provided, and multiple site visits to the EVA, it was evident that a variety of terminology has been used across the EVA and that it is assumed that the public is familiar with all of them. Signage refers to the area being a 'bus lane', 'GV lane', 'bus GV lane' and 'local access only'. This variation could cause confusion for some road users, especially when the wording on signs conflicts with the wording of road markings. A review of existing signage and terminology may be needed to ensure that the existing EVA signage is not unnecessarily confusing.

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<sup>8</sup> <http://forums.pepipoo.com/lofiversion/index.php/t116534.html>

### 3. Tactical decision-making and real-time wayfinding

#### Recommendation 3.1: Support real-time wayfinding

Route planning once drivers find themselves at the EVA is quite complex in some directions (see Figure 15). For this reason, real-time route planning could significantly reduce risks to the driver and other road users.

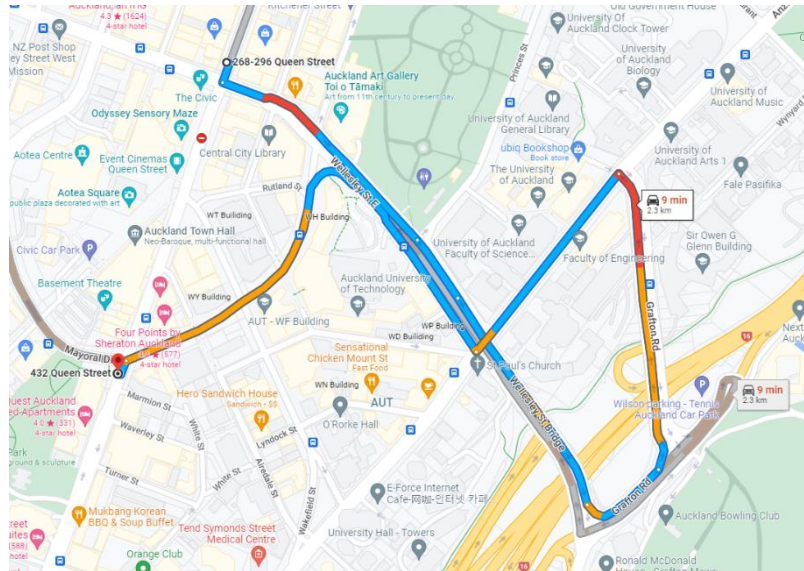


Figure 14: Example of route finding around Queen Street EVA from southbound on Queen Street (directions sourced from google maps 2022)

While it is very difficult to provide wayfinding/route planning information to drivers in real-time once they find themselves confronted with the EVA, it may be possible to identify specific sites where many drivers are having difficulty and install route-finding, informational signage.

If possible, these sites should include pull-over areas so that drivers can safely pull off to read sign. Including a QR code on the sign for drivers to scan from the car would provide them with information to use as they navigate the alternate route.

Areas around the EVA where behaviour observations suggest route finding guidance may be useful are:

- Drivers southbound on Queen St (many drivers observed starting to turn left onto Wellesley St E, proceeding up it, performing a U-turn, and then turning left onto Mayoral Dr (eastbound Wellesley St E drivers are not permitted to turn right onto Mayoral Dr).
- Drivers travelling northbound on Queen Street (a significant number of drivers were seen turning into Rutland Street and then turning around to exit it again. Clear signage indicating the no exit/thoroughfare is highly recommended for the Wakefield Street Rutland Street intersection).



## 4. Issuing infringement fines

### Recommendation 4.1: Delay issuing infringement fines

In hindsight, it may have been better to ensure that the EVA was not introduced while extensive roadworks were still being undertaken in the area (particularly at the intersection of Queen and Wellesley streets). The complexity and clutter generated by the roadworks has greatly hindered people's ability to recognise and avoid the EVA. The soft launch of infringement fines (following warning notices) does well to allow for first-time errors. However, if the number of repeat offenders continues to remain high, it is recommended that infringement fines are not issued until roadworks are complete.

## 5. Tracking behaviour

### Recommendation 5.1: Monitor driver behaviour

In addition to monitoring people's understanding of the EVA, we recommend tracking driver compliance. High levels of non-compliance persisting over time suggest that the scheme is fundamentally not user-friendly to drivers and further remediation is needed. Alternatively, drivers may eventually habituate to the scheme when experience or word of enforcement spreads even with sub-standard signage. However, this would seem unfair for new drivers who are unfamiliar with the area, and background information, advanced signage and threshold signage should do at least a reasonable job of alerting new drivers to a non-access area.

Monitoring should include tracking driver awareness of the EVA, understanding of the rules relating to it, behaviour when navigating it and knowledge of alternate routes is recommended so that the most appropriate communications can be planned.

## APPENDIX A. DRIVER BEHAVIOUR OBSERVATIONS

Observations were only recorded for all vehicles except buses. Utes are recorded separately from cars as there appears to be a loophole that allows them to enter the EVA as the rules stand.

Location observed: Wakefield St North-Westbound      Date: 21/09/2022      Time: 10:15-11:15 AM						
Vehicle Type	Leader/follower	Use (if possible)	Lights on approach	Behavioural Observations	Used EVA	Performed manoeuvre to avoid
Car	Leader	Private	Red	Had approached the lights and stopped approximately 5 metres back. The driver from the car behind got out of their vehicle and told the driver to pull forward further. The light was not activated until they pulled forward. Indicated left. Turned left (southbound on Queen St).	No	No
Car	Follower	Private	Red	Indicated left on approach. Stopped and got out to speak to the driver of the vehicle in front. Turned left (southbound on Queen St).	No	No
Car	Follower	Private	Red	Indicated left on approach. Turned left (southbound on Queen St).	No	No
Car	Follower	Private	Red	Indicated left on approach. Turned left (southbound on Queen St).	No	No
Tow truck	Leader	Commercial	Red	Did not indicate. Turned right (northbound on Queen St).	Yes	No
Van	Follower	Commercial	Red	Indicated left on approach. Turned left (southbound on Queen St).	No	No
Car	Leader	Private	Red	Indicated left on approach. Turned left (southbound on Queen St). Drove very slowly around the corner. Hesitated, potentially to read the 'no right turn' sign across the intersection.	No	No
People mover	Leader	Private	Red	Indicated left on approach. Turned left (southbound on Queen St).	No	No
Car	Leader	Private	Red	Indicated left on approach. Turned left (southbound on Queen St). Hesitated, potentially to read the 'no right turn' sign across the intersection.	No	No

Car	Leader	Private	Red	Did not indicate on approach. Turned on left indicator after sitting at the lights for a few seconds. Inched forward when another direction had a green light. Turned left (southbound on Queen St).	No	No
Car	Leader	Private	Red	Approached quite slowly as a pedestrian jaywalked in front of them. Started indicating left once they stopped. Inched towards the line. Turned left (southbound on Queen St).	No	No
Car	Leader	Private	Red	Did not indicate on approach. Stopped at light. Indicated right, then switched to indicating left. Turned left (southbound on Queen St).	No	No
Car	Leader	Private	Green	Indicated left on approach. Light turned green just as they approached. Turned left (southbound on Queen St). Pulled into a mobility park on the left just after the traffic lights, then immediately pulled back into traffic to continue southbound. Potentially considered stopping to check directions/alternate routes.	No	No
Car	Leader	Private	Red	Indicated left on approach. Turned left (southbound on Queen St). Turned the corner at a moderate speed, seemed to glance across the intersection at the 'no right turn' sign.	No	No
Car	Leader	Private	Orange	Did not indicate on approach. Turned left (southbound on Queen St) on an orange light.	No	No
Car	Leader	Private	Red	Did not indicate on approach. Indicated left as they stopped at the light. Waited at the green light for a pedestrian who jaywalked in front of them. Turned left (southbound on Queen St) quite slowly. Looked around at the pedestrians waiting at the intersection.	No	No
Car	Leader	Commercial	Red	Had driven south-eastbound up Wakefield St. Performed a U-turn and approached the intersection without indicating. Indicated left after waiting at the lights for a few seconds. Turned left (southbound on Queen St).	No	No
Tow truck	Follower	Commercial	Red	Did not indicate on approach. Turned right (northbound on Queen St).	Yes	No
Car	Follower	Private	Red	Indicated left on approach. Turned left (southbound on Queen St).	No	No

Truck	Leader	Commercial	Red	Turned left out of Rutland St and drove south-eastbound up Wakefield St. Performed a U-turn and approached the intersection without indicating. Indicated right. Turned right (northbound on Queen St).	Yes	No
Ute	Leader	Private	Green	Slowly approached without indicating and missed the green light. Driver was potentially looking at a phone while driving. Indicated left after being stopped at the lights for around 5 seconds. Turned left (southbound on Queen St).	No	No
Car	Leader	Private	Red	Honked horn on approach. Did not indicate on approach. Turned left (southbound on Queen St) quite slowly. Seemed to glance across the intersection at the 'no right turn' sign. Pulled into the mobility parking on the left on Queen St. One passenger got out and walked around on the footpath for a few minutes. Seemingly unbelted children in the back. Pulled out in front of traffic to do a U-turn and stopped at the lights. Drove slowly through the intersection and into the EVA (northbound on Queen St).	Yes	No
Car	Leader	Rideshare	Red	Stopped about 15m back from the intersection. Put hazard lights on and let out two passengers. Turned off hazard lights and drifted forward a few metres. U-turned to drive south-eastbound up Wakefield St and avoid the traffic lights.	No	Yes
Car	Leader	Rideshare	Red	Indicated left on approach. Turned left (southbound on Queen St).	No	No
Ute	Leader	Private	Red	Indicated left on approach. Turned left (southbound on Queen St).	No	No
Car	Leader	Private	Red	Indicated left on approach. Turned left (southbound on Queen St).	No	No
Car	Leader	Rideshare	Red	Stopped about 30m back from the intersection. Let out one passenger. U-turned to drive south-eastbound up Wakefield St and avoid the traffic lights.	No	Yes
Motorcycle	Leader	Private	Red	Did not indicate on approach. Turned right (northbound on Queen St).	Yes	No
Car	Leader	Private	Red	Did not indicate on approach. Inched forward when pedestrians had a green light. Started indicating right when the light turned green. Drove into the intersection and did a U-turn around the island to turn into Rutland St (eastbound). Turned around and approached the Rutland St intersection again. Turned left out of Rutland St and drove south-eastbound up Wakefield St.	No	Yes
Ute	Leader	Commercial	Red	Indicated left on approach. Turned left (southbound on Queen St).	No	No

Car	Follower	Private	Red	Did not indicate on approach. Indicated left once the light turned green. Turned left (southbound on Queen St) late on an orange light.	No	No
Car	Follower	Private	Red	Indicated left on approach. Turned left (southbound on Queen St) on a red light.	No	No
Car	Leader	Private	Red	Indicated left on approach. Turned left (southbound on Queen St).	No	No
Truck	Follower	Commercial	Green	Indicated left on approach. Turned left (southbound on Queen St).	No	No
Car	Leader	Private	Red	Indicated left on approach. Turned left (southbound on Queen St).	No	No
Car	Follower	Private	Red	Turned left out of Rutland St. Immediately performed a U-turn around the traffic island and stopped at the lights. Did not indicate. Turned left (southbound on Queen St). Pulled into the mobility parking on the left on Queen St.	No	No
Car	Leader	Private	Green	Indicated left on approach. Light turned green just as they approached. Turned left (southbound on Queen St).	No	No
Car	Leader	Private	Red	Indicated left on approach. Turned left (southbound on Queen St).	No	No
Campervan	Leader	Commercial	Red	Did not indicate on approach. Turned left (southbound on Queen St) quite slowly.	No	No
Car	Leader	Private	Red	Did not indicate on approach. Inched forwards at the red light. Obviously confused as they did not move forward on the green light. Began moving forward on the orange light. Turned left (southbound on Queen St).	No	No
Car	Leader	Private	Red	Indicated left on approach. Started to turn left. Completely stopped in the middle of the intersection for a few seconds. Continued southbound on Queen St.	No	No
Car	Follower	Private	Red	Drove on the wrong side of the road to turn right into Rutland St. Turned around and approached the Rutland St intersection again. Turned left out of Rutland St and drove south-eastbound up Wakefield St.	No	Yes
Tow truck	Leader	Commercial	Red	Did not indicate on approach. Turned left (southbound on Queen St).	No	No

Truck	Leader	Commercial	Red	Drove on the wrong side of the road to turn right into Rutland St. Parked on the left.	No	No
Car	Leader	Private	Red	Indicated left on approach. Turned left (southbound on Queen St).	No	No
Car	Follower	Private	Red	Indicated left on approach. Turned left (southbound on Queen St).	No	No
Truck	Follower	Commercial	Red	Indicated left on approach. Made a tight left turn on a red light and mounted the footpath to park in the middle of the paved pedestrian area.	No	No
Truck	Leader	Commercial	Red	Turned left out of Rutland St. Immediately performed a U-turn around the traffic island and stopped at the lights. Indicated right. Turned right (northbound on Queen St).	Yes	No
<b>Location observed: Queen St Northbound      Date: 22/09/2022      Time: 10:25-11:25 AM</b>						
<b>Vehicle Type</b>	<b>Leader/follower</b>	<b>Use (if possible)</b>	<b>Lights on approach</b>	<b>Behavioural Observations</b>	<b>Used EVA</b>	<b>Performed manoeuvre to avoid EVA</b>
Car	Leader	Private	Red	Approached in right lane without indicating. Hesitated in the middle of the intersection to decide which right turn to take. Turned into Rutland St. Turned around and approached the Rutland St intersection again. Turned left out of Rutland St and drove south-eastbound up Wakefield St.	No	No
Ute	Leader	Commercial	Red	Approached in right lane indicating right. Turned right into Rutland St.	No	No
Ute	Leader	Private	Red	Approached in right lane. Changed into left (bus) lane without indicating. Hesitated when the light turned green (could have been due to distraction or being unsure). Drove straight ahead into the EVA.	Yes	No
Car	Follower	Private	Green	Approached in left (bus) lane. Drove straight ahead into the EVA.	Yes	No
Truck	Leader	Commercial	-	Approached and did a U-turn at the Airedale St intersection. Continued Southbound up Queen St.	No	Yes
Forklift	Leader	Commercial	Red	Approached in right lane indicating right. Crossed over centre lane to partially enter left (bus) lane. Proceeded straight through the EVA.	Yes	No

People mover	Follower	Private	Green	Approached in right lane without indicating. Turned right into Rutland St. Turned around and approached the Rutland St intersection again indicating left. Had right-of-way but stopped at the intersection for upwards of 10 seconds. Eventually turned left out of Rutland St and drove south-eastbound up Wakefield St.	No	No
Car	Leader	Private	Red	Approached in right lane without indicating. Driver leaned forward to look at signage. Started indicating right once stopped. Turned right into Rutland St.	No	No
Car	Follower	Private	Red	Approached in right lane without indicating. Turned right into Wakefield St.	No	No
Car	Leader	Private	Red	Approached in right lane and started indicating left. Turned off left indicator and turned on right indicator. Turned right into Rutland St.	No	No
Truck	Follower	Commercial	Red	Approached in right lane without indicating. Turned right into Rutland St.	No	No
Van	Follower	Private	Red	Approached in right lane without indicating. Proceeded straight through on an orange light into the EVA.	Yes	No
Car	Leader	Private	Red	Approached in right lane indicating right. Turned right into Wakefield St.	No	No
People mover	Follower	Private	Red	Approached in right lane. Began indicating right after stopping behind the indicating car in front. Turned right into Wakefield St.	No	No
Car	Follower	Private	Red	Approached in right lane. Began moving into the left (bus) lane without indicating. Turned right on a red light into Wakefield St.	No	No
Car	Follower	Private	Red	Approached in right lane. Turned right on a red light. Hesitated in the intersection for a few seconds before deciding to turn into Rutland St.	No	No
Car	Leader	Private	Red	Approached in right lane indicating right. Turned right very slowly. Braked in the middle of the intersection. Turned right into Wakefield St.	No	No
Car	Follower	Private	Red	Approached in right lane indicating right. Turned right into Rutland St.	No	No
Car	Follower	Private	Red	Approached in right lane without indicating. Turned right on a late orange into Wakefield St.	No	No

Truck	Leader	Commercial	Red	Approached in right lane indicating right. Waited at the green light for an oncoming (southbound) truck running a red light. Turned right into Rutland St and pulled over on the left to make a delivery (hazard lights on).	No	No
Car	Leader	Private	Red	Approached in right lane indicating right. Turned right into Wakefield St.	No	No
Van	Follower	Private	-	Approached in right lane. Turned right into Airedale St. Turned around and approached the Airedale St intersection again. Turned left out of Airedale St and drove southbound up Queen St.	No	No
People mover	Follower	Private	Red	Approached in right lane without indicating. Began indicating after stopping behind the indicating car in front. Hesitated at the green light and then turned right into Rutland St.	No	No
Car	Leader	Private	Red	Slowly approached in right lane without indicating. Began indicating right once stopped. Turned right into Wakefield St.	No	No
Car	Follower	Private	Red	Slowly approached in right lane without indicating. Began indicating after the car in front began indicating. Turned right into Wakefield St.	No	No
Car	Leader	Police	Red	Approached in right lane without indicating. Began indicating when the light turned green. Turned right into Rutland St. Turned around and approached the Rutland St intersection again. Turned left out of Rutland St and drove south-eastbound up Wakefield St.	No	No
Car	Follower	Private	Red	Approached in right lane without indicating. Slowly pulled up to the red light behind the police car. Inched forward on the green arrow but did not proceed through before it turned red. Came to a stop just over the line. Turned right indicator on and then off. Waited for the next green arrow and turned right into Wakefield St.	No	No
Car	Leader	Private	Red	Approached in right lane without indicating. Driver looked confused and gestured to the passenger about the lanes ahead. Turned on right indicator once stopped. Turned right into Wakefield St.	No	No
Car	Leader	Private	Red	Approached in right lane without indicating. Turned on right indicator once stopped. Inched forward on the red light. Hesitated on the far side of the intersection and turned into Rutland St. Turned around and approached the	No	No



				Rutland St intersection again. Turned left out of Rutland St and drove south-eastbound up Wakefield St.		
Car	Leader	Private	Red	Approached in right lane without indicating. Turned on right indicator once stopped. Hesitated on the far side of the intersection and turned right into Rutland St. Pulled over on the left to park.	No	No
Truck	Leader	Commercial	-	Approached and did a U-turn at the Airedale St intersection. Continued Southbound up Queen St.	No	Yes
Van	Leader	Private	Red	Approached in right lane indicating right. Turned right into Wakefield St.	No	No
Car	Follower	Private	Red	Approached in right lane without indicating. Hesitated on the far side of the intersection and turned right into Wakefield St.	No	No
Car	Follower	Private	Red	Approached in right lane without indicating. Proceeded straight through from the right lane (on a green light with a red arrow) into the EVA.	Yes	No
Car	Follower	Private	Red	Approached in right lane without indicating. Proceeded straight through from the right lane (on a green light with a red arrow) to the exact threshold of the EVA. Quickly performed a U-turn to avoid entering the EVA. Turned left into Rutland St.	No	Yes
Van	Leader	Commercial	Red	Approached in right lane without indicating. Changed into the left (bus) lane without indicating. Proceeded straight through into the EVA. Braked slightly at the threshold.	No	No
Car	Leader	Private	Red	Approached from the Mayoral Dr intersection in the left (bus) lane. Changed into the right lane. Changed back into the left (bus) lane at the intersection. Waited for the green light. Proceeded straight through into the EVA.	Yes	No
Car	Follower	Private	Red	Approached from the Mayoral Dr intersection in the left (bus) lane. Changed into the right lane. Indicated left and followed the car in front to change into the left (bus) lane. Stopped mostly in the bus lane. Waited for the green light. Proceeded straight through into the EVA.	Yes	No
Car	Follower	Private	Red	Approached from the Mayoral Dr intersection in the left (bus) lane. Changed into the right lane. Followed the car in front to change into the left (bus) lane.	Yes	No

				Stopped half in the bus lane. Waited for the green light. Proceeded straight through into the EVA.		
Car	Follower	Private	Red	Approached from the Mayoral Dr intersection in the left (bus) lane. Changed into the right lane. Indicated left and copied the car in front to angle towards the left (bus) lane. Waited for the green light. Proceeded straight through into the EVA.	Yes	No
Motorcycle	Follower	Food delivery	Red	Approached in the right lane. Turned right into Rutland St.	No	No
Ute	Leader	Private	Red	Approached in the right lane. Changed into the left (bus) lane. Turned on hazard lights in the middle of the intersection. Proceeded straight through into the EVA.	Yes	No
Car	Follower	Private	Red	Approached in the right lane. Changed into the left (bus) lane. Indicated right in the middle of the intersection. Proceeded straight through into the EVA.	Yes	No
Car	Leader	Private	Red	Approached in the right lane indicating right. Slowly turned right into Wakefield St.	No	No
Car	Follower	Private	Red	Approached in the right lane without indicating. Hesitated on the far side of the intersection and turned right into Wakefield St.	No	No
Car	Leader	Rideshare	Red	Approached in the right lane without indicating. Drifted slightly into the left (bus) lane and then returned to the right lane. Stopped at the light. Reversed a few metres back from the line. Performed a U-turn then immediately pulled over the left to drop off two passengers in a mobility park. Continued southbound up Queen St.	No	Yes
Car	Leader	Private	Red	Approached in right lane. Performed a three-point-turn manoeuvre at the Airedale St intersection and continued southbound up Queen St.	No	Yes
Car	Leader	Private	Red	Approached in the right lane without indicating. Very slowly pulled up to the light. Very slowly turned right into Rutland St. Turned around and approached the Rutland St intersection again. Turned left out of Rutland St and drove south-eastbound up Wakefield St.	No	No

Car	Leader	Private	Red	Approached in the right lane. Indicated left to change into the left (bus) lane. Hesitated on the green light. Proceeded straight through into the EVA.	Yes	No
Van	Follower	Commercial	Red	Approached in the right lane. Indicated left to change into the left (bus) lane. Proceeded straight through into the EVA.	Yes	No
Truck	Follower	Auckland Council	Red	Approached in the right lane. Indicated left to change into the left (bus) lane. Proceeded straight through into the EVA.	Yes	No
Flatbed truck	Follower	Commercial	Green	Approached in the right lane. Indicated left but stayed in the right lane. Stopped on the red arrow and started indicating right. Turned right into Wakefield.	No	No
Car	Leader	Private	Red	Approached straddling both lanes. Changed into the right lane. Turned right into Wakefield St.	No	No
Car	Follower	Private	Red	Approached in the right lane without indicating. Pointed their wheels towards the left (bus) lane and then shifted them back. Turned right and hesitated on the far side of the intersection. Settled on proceeding up Wakefield St.	No	No
Car	Follower	Private	Red	Approached in the right lane without indicating. Started indicating right. Turned on a late orange into Rutland St.	No	No
Car	Leader	Private	Red	Approached in the right lane indicating right. Turned right into Rutland.	No	No
Car	Follower	Private	Red	Approached in the right lane without indicating. Turned right into Rutland.	No	No
Van	Leader	Commercial	Red	Approached in the right lane without indicating. Turned right into Wakefield.	No	No
Car	Follower	Private	Red	Approached in the right lane without indicating. Turned right on a late orange light and drove slowly up Wakefield.	No	No
Car	Follower	Private	Red	Approached in the right lane indicating right. Turned right on a red light into Wakefield St.	No	No
Motorcycle	Leader	Private	Red	Approached in the right lane without indicating. Proceeded straight through into the EVA.	Yes	No
Car	Leader	Private	Red	Approached in the right lane. Indicated left and changed into the left (bus) lane. Proceeded straight through into the EVA.	Yes	No

Truck	Follower	Commercial	Red	Approached in the right lane. Indicated left and changed into the left (bus) lane. Proceeded straight through into the EVA.	Yes	No
Ute	Follower	Private	Red	Approached in the left (bus) lane. Proceeded straight through into the EVA.	Yes	No
Car	Leader	Private	Red	Approached in the right lane without indicating. Turned right into Wakefield St.	No	No
Motorcycle	Follower	Food delivery	Red	Approached in the right lane without indicating. Turned right into Rutland St.	No	No
Car	Follower	Private	Red	Approached in the right lane without indicating. Turned right into Rutland St.	No	No
Car	Follower	Private	Red	Approached in the right lane without indicating. Proceeded straight into the EVA from the right lane. Merged in between two buses travelling northbound from the left (bus) lane.	Yes	No
Van	Leader	Private	Red	Approached very slowly in the right lane without indicating. Changed into the left (bus) lane. Proceeded straight through into the EVA.	Yes	No
Car	Follower	Private	Red	Approached in the right lane without indicating. Changed into the left (bus) lane. Proceeded straight through into the EVA.	Yes	No
Truck	Leader	Commercial	Red	Pulled out from a taxi stand on the left. Changed into right lane indicating right. Turned right into Wakefield St.	No	No
People mover	Follower	Private	Red	Approached in the right lane without indicating. Changed into the left (bus) lane. Proceeded straight through into the EVA behind a bus.	Yes	No
Van	Leader	Commercial	Red	Approached in the right lane without indicating. Changed into the left (bus) lane. Proceeded straight through into the EVA behind a bus.	No	No
Car	Leader	Private	Red	Approached in the right lane without indicating. Indicated right as the light turned green and turned right into Wakefield St.	No	No
<b>Location observed: Queen St Southbound      Date: 14,21,22,23/09/2022</b>						
<b>Behaviour Type</b>		<b>Behavioural Observation</b>				
Avoiding the EVA		<ul style="list-style-type: none"> <li>Road users were observed trying to determine where to turn to avoid the EVA. They could be seen leaning forward in their seat to read the signage and could be seen gesturing to passengers. One road user stopped and held up traffic to talk to a construction worker.</li> </ul>				

	<ul style="list-style-type: none"> <li>• When two southbound lanes were in place people could be seen abruptly turning left onto Wellesley St E from the right lane.</li> <li>• Road users were often seen changing which way they indicated after sitting at the red light for a short while.</li> </ul>
EVA use (presumed violations)	<ul style="list-style-type: none"> <li>• When the first vehicle avoided the EVA it often cued others behind to do the same. Conversely, when one vehicle proceeded through the EVA a run of other vehicles was often observed following—perhaps without realising, or perhaps assuming that the driver in front of them knew something they did not.</li> <li>• Some road users seemed to recognise that they should not use the EVA ahead but had not been able to plan an alternate route, and thus committed to (hesitantly) driving through the EVA.</li> </ul>
Wellesley St W bus lane violation	<ul style="list-style-type: none"> <li>• Some road users were observed approaching the intersection presumably intending to drive straight. Upon noticing the EVA ahead, they changed their planned route and began indicating right. They did not observe or disregarded the ‘no right turn’ sign and bus lane signage. The road users then turned right into Wellesley St W.</li> <li>• Some road users were observed turning left onto Wellesley St E, performed a U-turn through gap in a traffic island (a courtesy pedestrian crossing) and proceeding back through the intersection westbound on Wellesley St W (using the bus lane).</li> </ul>
<b>Location observed: Wellesley St W Eastbound      Date: 14,21,22,23/09/2022</b>	
<b>Behaviour Type</b>	<b>Behavioural Observation</b>
Avoiding the EVA	<ul style="list-style-type: none"> <li>• Some road users were observed indicating right in the right turning lane. Upon recognising the EVA, they were able to continue straight onto Wellesley St E (without needing to change lanes).</li> </ul>
EVA use (presumed violations)	<ul style="list-style-type: none"> <li>• Several vehicles were noted turning right out of Wellesley St W, having sat in queue of traffic for some time, and therefore having had a long time to see the signs.</li> <li>• One vehicle was observed sitting stationary in the right turning lane while on a green light, before being honked at by a bus behind them and then turning right into the EVA.</li> </ul>