

## TRANSPORT FINDINGS

# Electric On Demand Transit Expands Network Coverage in Auckland

Benjamin Kaufman<sup>1</sup> , Ainsley Hughes<sup>2</sup> , Elena Pihera<sup>3</sup> , Srishti Lal<sup>4</sup> <sup>1</sup> Cities Research Institute, Griffith University, <sup>2</sup> School of Environment and Life Sciences, University of Newcastle, <sup>3</sup> Faculty of Science, Victoria University of Wellington, <sup>4</sup> Auckland Transport

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## Findings

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AT Local is an On Demand rideshare service operating in South Auckland, New Zealand. The service directly replaces the low patronage 371 fixed route bus and extends coverage to areas not previously served by public transport. This paper evaluates how AT Local is being used by customers located in two new catchment areas: an area in Conifer Grove and an Eastern Expansion area. Ridership analysis illustrates how AT has enabled new trip patterns. Trips from Conifer Grove are characterised by feeder service to the train network, while trips from the Eastern area fulfill feeder services while also facilitating various other trip patterns.

### 1. Questions

On demand rideshare services provide transit authorities with an innovative public transport (PT) mode that can address network gaps and meet diverse customer needs. Global deployments are increasingly using on demand to cover “performance gap(s) between individual transport (private car or taxi) and conventional line transport (buses), especially in low-density urban areas” (Giuffrida et al. 2021, 13) which often lie at the peripheries of urban centres. By using zonal service design, on demand allows for PT to be deployed in these low density, suburban areas to increase overall population served by high quality services (Kaufman 2020), as well as facilitating high quality feeder connections to other network modes (including major fixed route bus services and rail) (Enoch et al. 2004).

AT Local is an on demand rideshare service operating in South Auckland, New Zealand. The service covers a 13.5km<sup>2</sup> zone with 4 electric vehicles and trip booking and routing technology from Liftango (Auckland Transport 2022). The primary objective of AT Local was to directly replace the low patronage 371 fixed-route service and extend coverage to areas in South Auckland not previously served by public transport. The replacement of the diesel bus route with an electric on-demand service led to a reduction in carbon emissions produced by Auckland Transport. Each vehicle is wrapped with large AT Local branding and trip fares are consistent regardless of trip distances.

Given on demand services are a relatively new public transport mode, there has been little global research into how they are being used by communities. This paper uses spatial analysis techniques to examine AT Local’s movement patterns in newly serviced locations, demonstrating the value of servicing suburban areas with on demand transit.

The following research questions are examined:

- To what extent is AT Local being used by customers in new catchment areas?
- Did usage patterns vary based on geography?

## 2. Methods

We analysed all trips completed on the AT Local service from 23rd of July - 22nd of August, 2022, resulting in 6,045 trips completed, shown in [Figure 1](#). The Auckland Transport network was compiled using GTFS data, encompassing bus routes 33, 365, and 372. Each stop on these routes was allocated a 400m coverage buffer, used to demonstrate theoretical population access to the network (Horner and Murray 2004).

AT Local trip origins and destinations were compared to these bus stop buffers to determine which trips had segments outside of the fixed-route network catchment and were therefore new trips on the Auckland Transport network. Of the 6,045 trips in the period evaluated, 4,218 trips (69.8%) occurred outside of the fixed-route catchment. Of the remaining 1,827 trips, many would have required rider transfers or long waiting times to complete.

Routes 33 and 365 divided the AT Local zone into two sections, an eastern area and a Conifer Grove area in the west. AT Local trips were allocated to each of these areas depending on their origin and destination locations. Trips that had an origin and a destination in each area were allocated as cross-area trips and were counted in behaviours for both areas. Trips were allocated as follows:

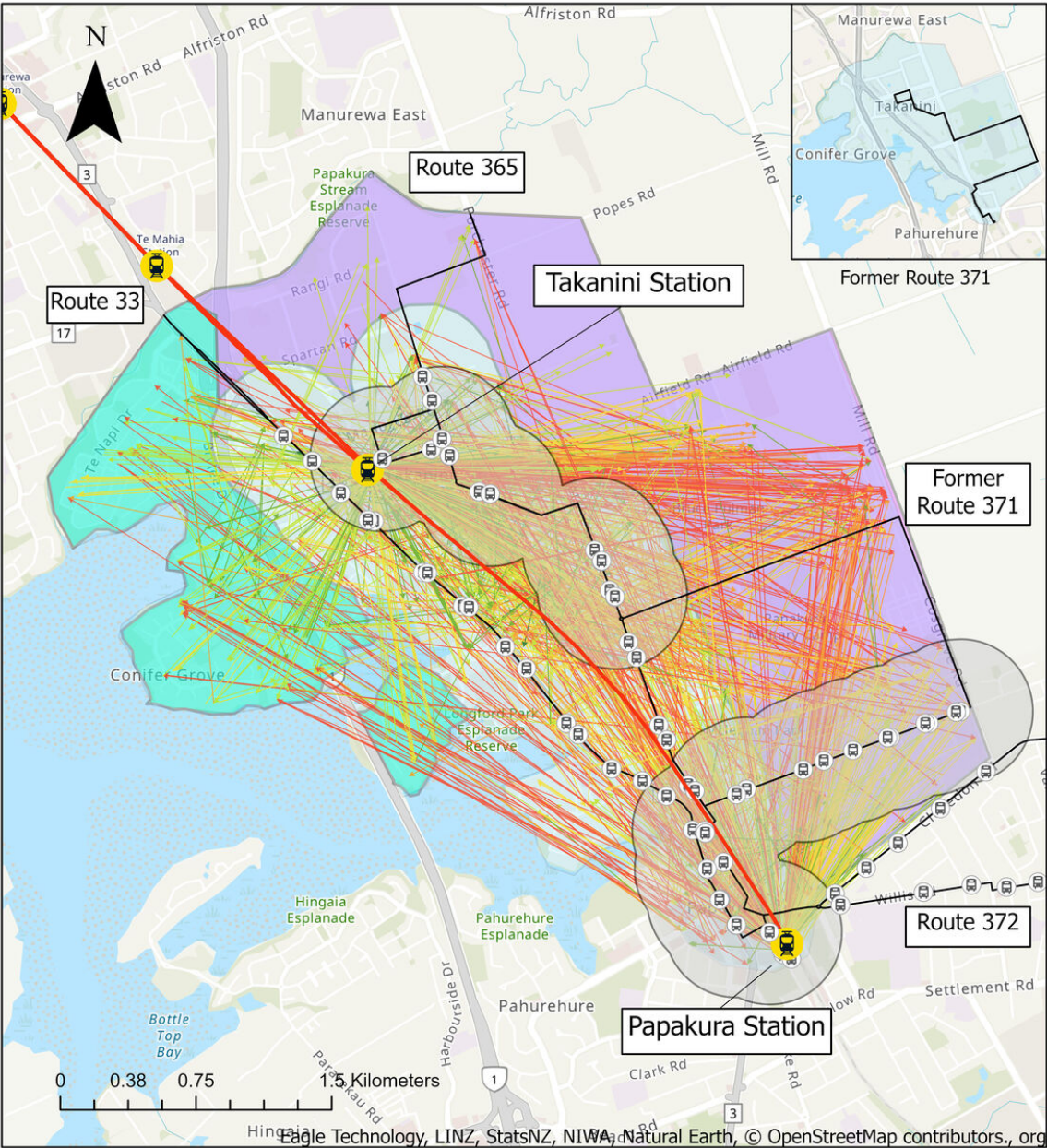
- Eastern area: 3,353 Trips (55.5% of total trips, [Figure 2](#))
- Conifer Grove area: 865 Trips (14.3% of total trips, [Figure 3](#))
- Cross-area: 125 Trips (2.1% of total trips)

## 3. Findings

The AT Local service has expanded transit network coverage in Papakura, New Zealand. The majority of ridership (69.8%) occurs outside of the fixed-route network, with demonstrable access and egress movement patterns to Papakura and Takanini Train Stations, as shown in [Figure 2](#) and [Figure 3](#). This service expands the coverage of the Auckland Transport network reducing the need for individuals in Papakura to own a car.

### *Eastern Area*

The eastern area covers 5.4km<sup>2</sup> and 6,183 people and produced the majority of new trips. Connection to the train route is common behaviour, resulting in 58.1% of all ridership going to or from the Takaanini and Papakura Train stations. Individually, they produced 1015 trips (30.3%) and 932 (27.8%) of trips, respectively. This demonstrates the capability for on demand services to operate as valuable feeder services in suburban settings. Trips from the eastern area tend to be longer than those in the Conifer Grove area due to the zonal

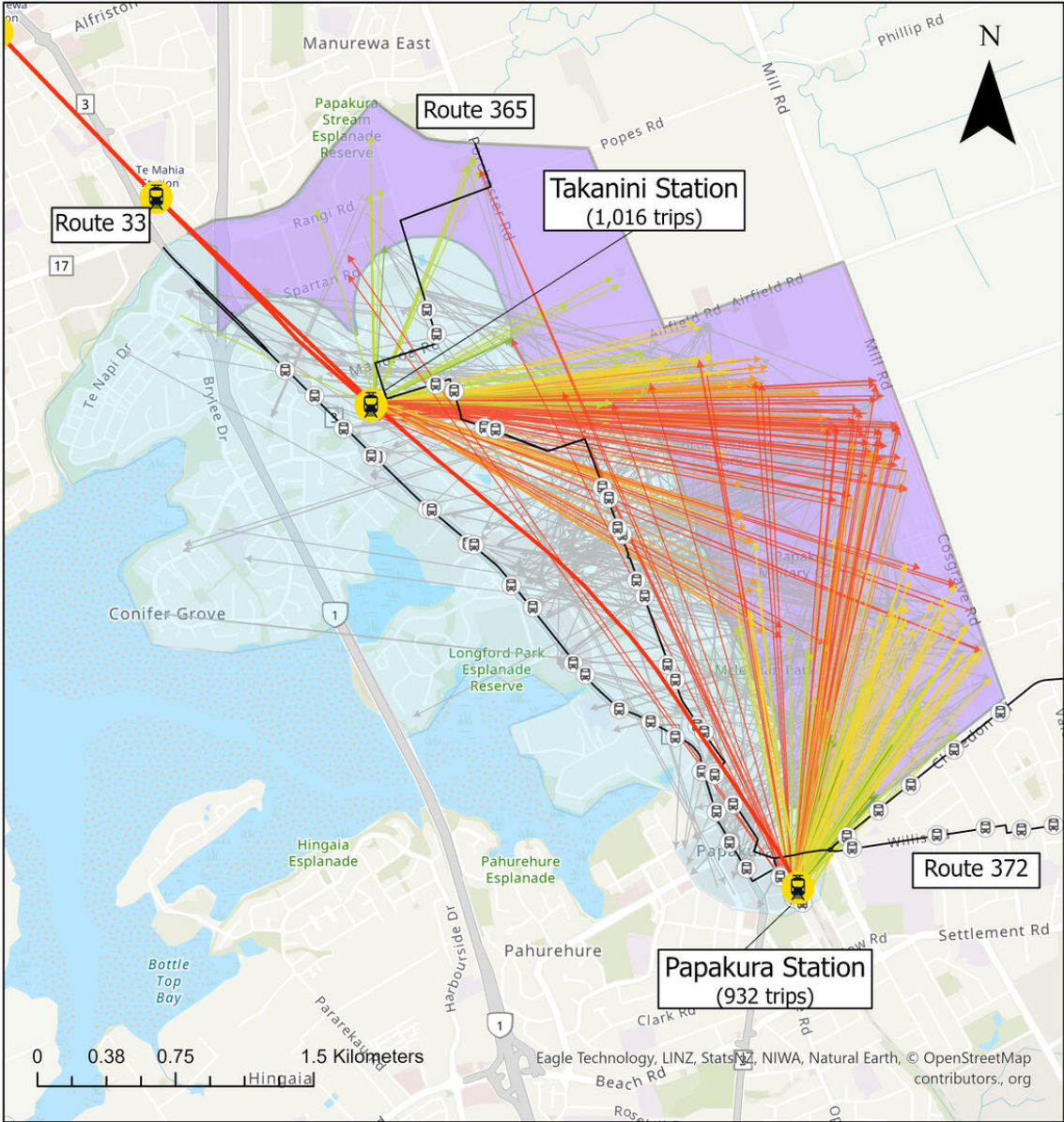


AT Local movements July 23 - August 22 2022



Figure 1. AT Local Trips from the 23rd of July - 22nd of August.





AT Local movements July 23 - August 22 2022

Legend

- Train Stations
- Bus Stop
- Southern Line
- Bus Routes
- Eastern Area
- AT Local Zone

- Eastern Area trips
- 0 - 2500+ m (3,353)
- Trips to stations
- 0 - 500 m (0)
  - 500 - 1000 m (92)
  - 1000 - 1500 m (381)
  - 1500 - 2000 m (508)
  - 2000 - 2500 m (347)
  - 2500+ m (620)

Figure 2. AT Local movements from July 23-August 22nd, 2022 in the Eastern area.

Trips to main train stations are colour-coded by distance with the remaining trips shown in grey.

design and proximity to key locations. This ability to travel further with a fixed fare may provide added incentive to residents in the eastern area, promoting greater usage.

### ***Conifer Grove Area***

The Conifer Grove area covers 2.1km<sup>2</sup> and 4,188 people. Delivering 865 trips, most (412 trips, 47.6%) went to Takaanini Station, while only 38 trips (4.4%) went to Papakura Station. This is most likely due to the proximity of Takaanini station to the area, providing a high quality feeder service to and from transportation to Auckland (which is located north of the zone).

According to Calabrò et al. (2022, 2) the use of on demand as a network feeder - as in the cases of Conifer Grove and the eastern area - “has the double advantage of serving the commuting demand of suburban areas and enhancing the ridership of PT”. These results demonstrate the ability for on demand services to provide high quality feeder connections to fixed-route services.

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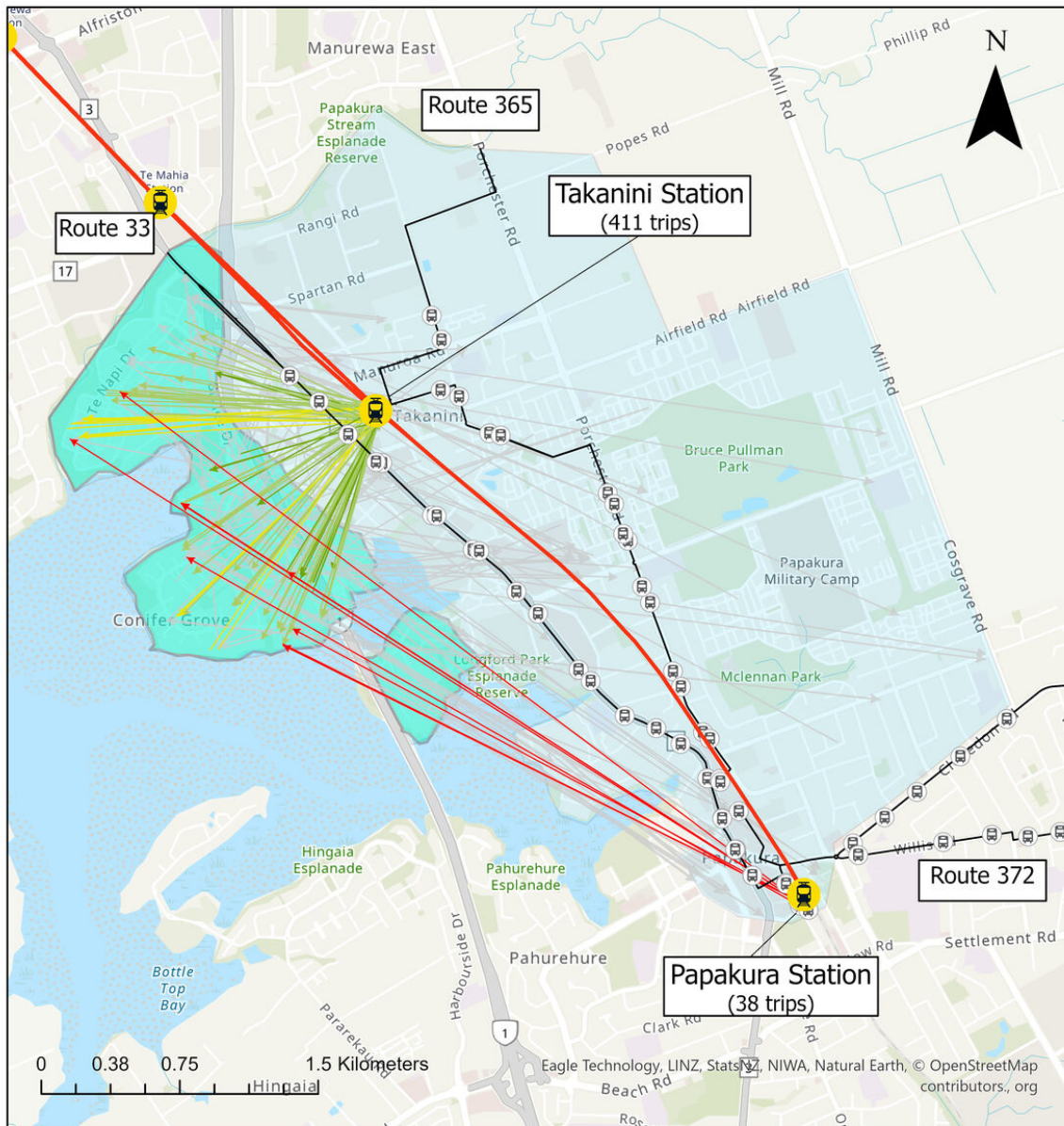
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



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## AT Local movements July 23 - August 22 2022

### Legend

-  Train Stations
-  Bus Stop
-  Southern Line
-  Bus Routes
-  Conifer Grove
-  AT Local Zone

### Conifer Grove trips

→ 0 - 2500+ m (865)

### Trips to stations

- 0 - 500 m (0)
- 500 - 1000 m (77)
- 1000 - 1500 m (296)
- 1500 - 2000 m (38)
- 2000 - 2500 m (0)
- 2500+ m (38)

Figure 3. AT Local movements from July 23-August 22nd, 2022 in the Conifer Grove area.

Trips to main train stations are colour-coded by distance with remaining trips shown in grey.



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