

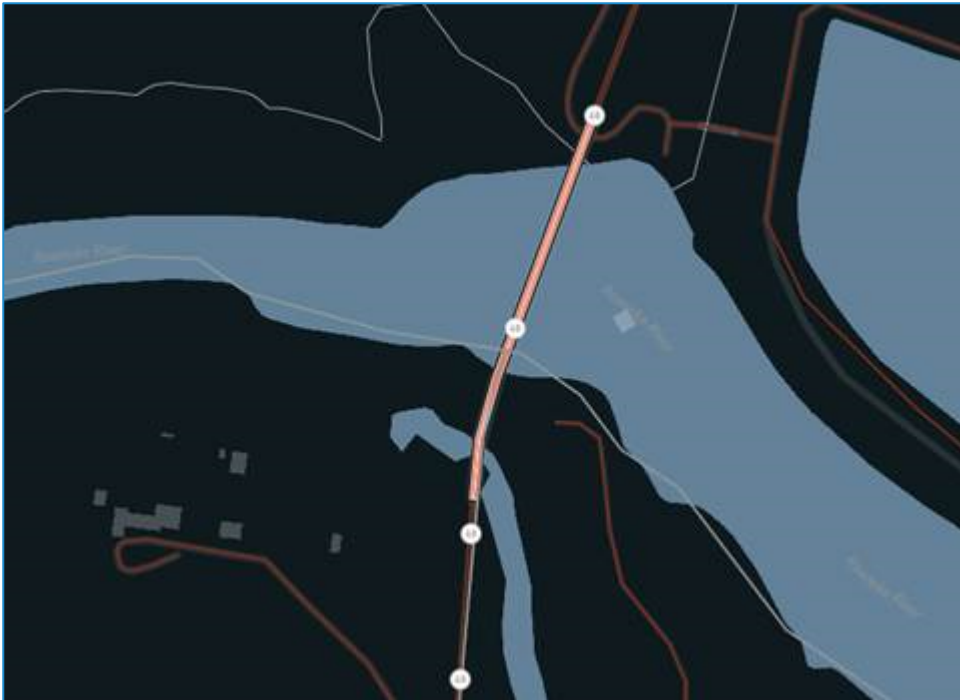


## Technical Memorandum

To: Patricia Macchi, STV  
From: Trent Moody, STV  
Date: 07/18/2022  
CC:  
2022 BIP ***Replacing Aging and Poor Infrastructure to Drive Sustainability (RAPIDS)***  
Grant  
Subject: BR-021 Replica Data for Trip Purpose

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TripFirst step was to select the network link representative of the existing bridge rather than selecting a group of TAZs or Tracts to produce the trip metrics.

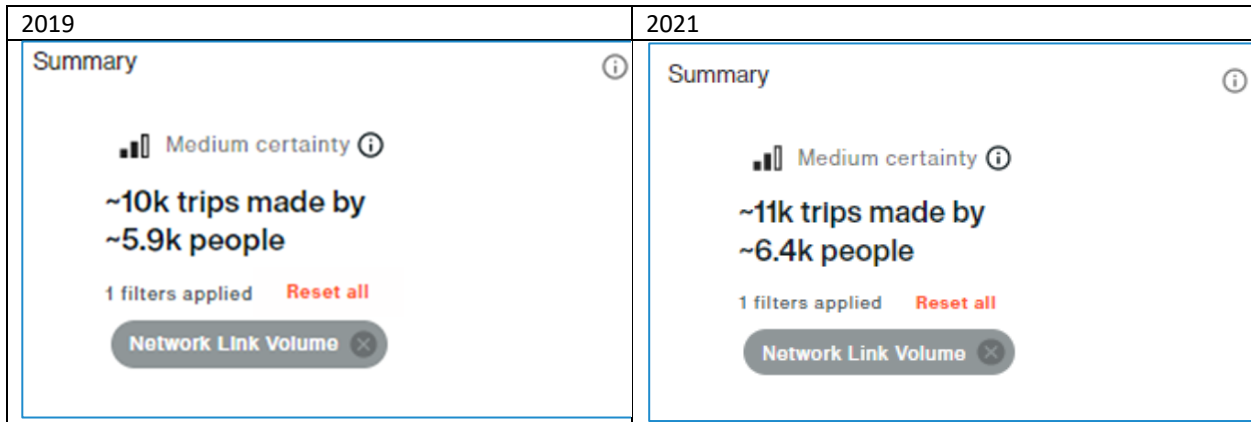


With the link selected, the first piece of information provided was a summary of the number of trips that are generated for this area.



This data is representative of:

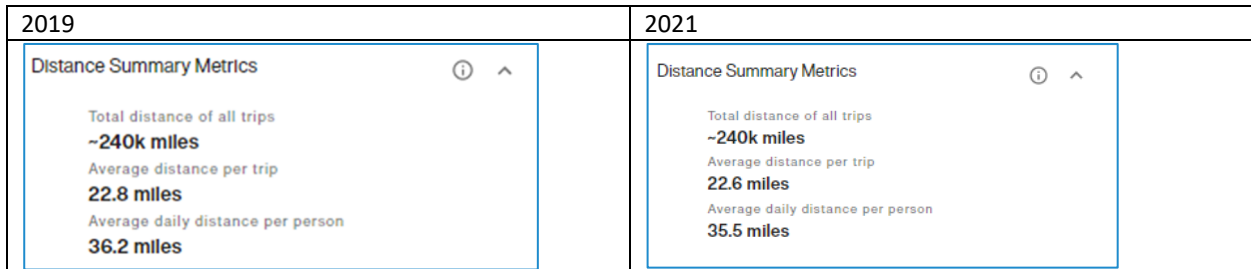
- a 2019 midweek data set produced  $\approx$  10,000 trips by  $\approx$  5,900 people.
- a 2021 midweek data set produced  $\approx$  11,000 trips by  $\approx$  6,400 people.



To better understand the primary mode of each of these trips, the following table was produced:

TripMode	2019		2021	
	Count	Percentage	Count	Percentage
Private auto	7477	71.43%	7970	74.03%
Auto passenger	2135	20.40%	2191	20.35%
Commercial vehicle (freight)	555	5.30%	472	4.38%
Biking	91	0.87%	88	0.82%
Walking	47	0.45%	33	0.31%
Taxi/TNC	162	1.55%	12	0.11%
Other	0	0.00%	0	0.00%
Public transit	0	0.00%	0	0.00%
<b>TOTAL</b>	<b>10467</b>	<b>100%</b>	<b>10766</b>	<b>100%</b>

Another interesting metric is that the average distance for trips that travel across this segment is 22.6 miles. Further breakdown of trip distance and durations are also included in a table below.





TripDuration	2019		2021	
	Count	Percentage	Count	Percentage
20-40min	2721	26.00%	2953	27.43%
10-20min	2971	28.38%	2891	26.85%
5-10min	1835	17.53%	1999	18.57%
40-80min	1457	13.92%	1261	11.71%
Over 80min	1063	10.16%	1030	9.57%
Under 5min	420	4.01%	632	5.87%

TripDistance	2019		2021	
	Count	Percentage	Count	Percentage
4-8mi	2844	27.17%	2806	26.06%
16-32mi	2391	22.84%	2552	23.70%
8-16mi	1829	17.47%	1769	16.43%
2-4mi	1351	12.91%	1591	14.78%
Over 64mi	930	8.89%	993	9.22%
32-64mi	972	9.29%	880	8.17%
1-2mi	145	1.39%	163	1.51%
0.5-1mi	5	0.05%	12	0.11%
Under 0.5mi	0	0.00%	0	0.00%

The main question revolves around Trip Purpose. Below is a table that summarizes the trip purpose. Table below is broken by purpose out directionally

TripPurpose	2019			
	Northbound		Southbound	
	Count	Percentage	Count	Percentage
Other	134	2.53%	104	2.01%
Home	2252	42.58%	1170	22.60%
Work	510	9.64%	855	16.51%
School	220	4.16%	124	2.39%
Eat	303	5.73%	342	6.60%
Shop	526	9.95%	787	15.20%
Social	695	13.14%	870	16.80%
Recreation	28	0.53%	54	1.04%
Errands	290	5.48%	567	10.95%
Pass-through traffic	0	0.00%	0	0.00%
Lodging (hotels etc.)	65	1.23%	15	0.29%
Region departure (airport etc.)	1	0.02%	0	0.00%
Commercial (freight)	265	5.01%	290	5.60%
Total	5289	100%	5178	100%



2021				
TripPurpose	Northbound		Southbound	
	Count	Percentage	Count	Percentage
Other	43	1%	63	1%
Home	2244	41%	1319	25%
Work	379	7%	735	14%
School	176	3%	134	3%
Eat	447	8%	563	11%
Shop	952	18%	1163	22%
Social	579	11%	595	11%
Recreation	67	1%	196	4%
Errands	242	4%	360	7%
Pass-through traffic	0	0%	1	0%
Lodging (hotels etc.)	35	1%	1	0%
Region departure (airport etc.)	0	0%	0	0%
Commercial (freight)	259	5%	213	4%
Total	5423	1	5343	1.02

The things noticed in this table is that a larger proportion of Home trips are travelling northbound, while the majority of other purposes (work, eat, shop, etc.) are skewed to southbound. This appears to make sense as there is more non-residential development south of the bridge in Roanoke Rapids as compared to the Gaston area.

Definitions of these purposes are next for further description.



## Trip Purpose

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The Trip Purpose module shows the number of trips for each purpose. The trip purpose is determined by the destination type of the trip. For example: If a person is traveling to work, the purpose of the trip is 'Work'. If a person is traveling to a restaurant, the purpose is 'Eat'.

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Errands includes trips to hairdressers, auto shops, banks, and a variety of other locations.

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Recreation includes trips to recreational destinations such as parks and swimming pools. Replica does not include looping trips without a destination, such as walking the dog, or jogging.

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Commercial refers to trips by medium and heavy trucks for deliveries and other commercial purposes.

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Lodging refers to trips by visitors to overnight accommodation such as a hotel.

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Region departure refers to trips by visitors to a "port-of-exit", such as an airport, or major train station.

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Pass-through traffic refers to trips made by non-residents that start and end outside the region. These trips can include short stopovers within the region.

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Select a purpose to filter the Replica Activity Table to include only trips for that purpose.

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How the data is generated

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Trips are generated using our modeling tools. We use de-identified mobile phone location data and other data sources to create behavioral models of how people move. We then apply these models to a synthetic population. Movements are calibrated against observed, ground-truth data.