

Replica Fall 2025 Trip-Purpose and Origin-Destination Analysis Technical Memorandum

To: US Department of Transportation, Federal Highway Administration
From: Oklahoma Department of Transportation
Re: Replica Fall 2025 Trip-Purpose and Origin-Destination Analysis Technical Memorandum to Support the Response to the FY25 Bridge Investment Program (BIP) I-40 and SH-100 Bridge Replacement Bundle at Webbers Falls Project

Introduction

Replica is an activity-based model that simulates activities and movements of residents, visitors, and commercial vehicles in a region on a typical day of a given season.¹ To obtain trip volumes and trip patterns for the I-40 and SH-100 bridges at Webbers Falls, the network links for both directions of travel on each bridge were selected, as shown in Figures. Replica classifies person and commercial vehicle trips by trip purpose. These trip purpose definitions are provided in Table 1 and are used throughout the trip purpose and person-miles analyses that follow.

Table 1: Replica Trip Purpose Definition

Trip Purpose	Definition
Other	Trips to destinations or activities not classified under another trip purpose.
Home	Trips to resident's home
Work	Trips to resident's place of work
School	Trip to resident's place of school
Eat	Trips to a restaurant
Shop	Trips to a shopping destination such as a mall
Social	Trips to visit friends or family, or to attend social, community, or religious activities.
Recreation	Trips to recreational destinations such as parks and swimming pools. This does not include looping trips without a destination, such as walking the dog, or jogging.
Errands	Trips to hairdressers, auto shops, banks, and variety of other locations
Pass-through traffic	Trips made by non-residents that start and end outside the region

¹ <https://replicahq.com/>

Trip Purpose	Definition
Lodging (hotels etc.)	Trips by visitors to overnight accommodations such as a hotel
Region departure (airport etc.)	Trips by visitors to a 'port-of-exit', such as an airport, or major train destination
Commercial (freight)	Trips by medium and heavy trucks for deliveries and other commercial purposes

Figure 1 and

Figure 2. Selecting the network links in the model identifies trips that have crossed each bridge, regardless of origin and destination.

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Figure 1: SH-100 Bridge: Network links selected in Replica.

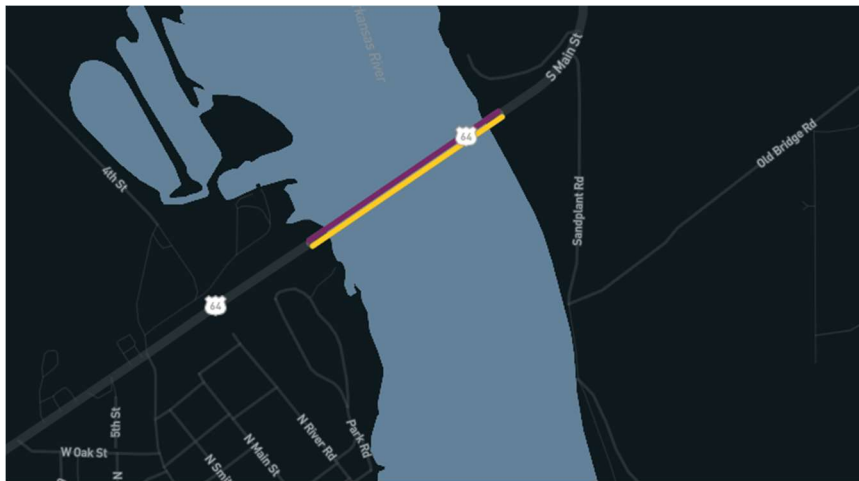
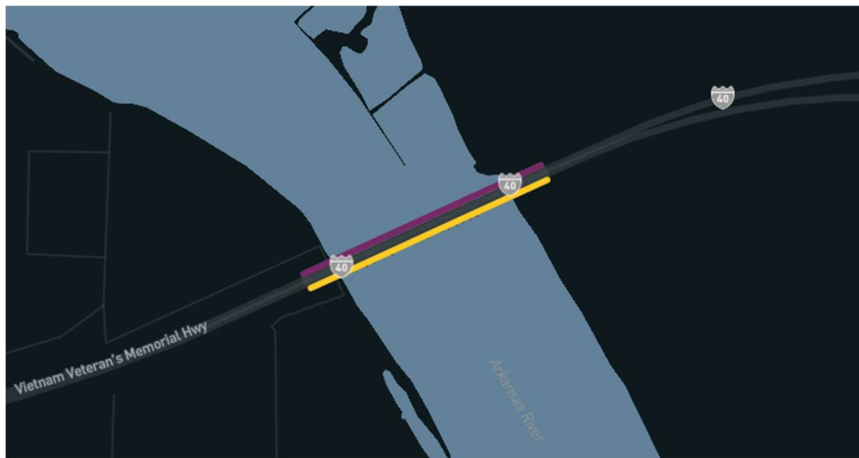


Figure 2: I-40 Bridge: Network links selected in Replica.



Trip Statistics

Trip data was collected from Replica for the above network links using the Weekday, Fall 2025 dataset. The data represents person trips for a typical weekday (data is collected on Thursday) for travel across both the I-40 and SH-100 bridges. Vehicle trips are the sum of private auto (or driver) and commercial vehicle trips while people trips include all modes, including auto passengers.

On a typical weekday, the I-40 bridge carries an estimated 22,080 vehicle trips and 30,820 people trips, and the SH-100 bridge carries an estimated 2,976 vehicle trips and 3,805 people trips. Table 2 summarizes these findings.

Table 2: Trip Summary, Typical Weekday (Fall 2025)

Trip Type	SH-100 Bridge	I-40 Bridge	Total
Vehicle trips	2,976	22,080	25,056
People trips	3,805	30,820	34,625

Table 3 shows the share of trip purpose for each bridge. Private auto trips account for the largest share of trips on both bridges (76.1% on SH-100 and 50.6% on I-40). Commercial vehicle (freight) trips account for 21.0% of people trips on the I-40 bridge (29.3% of vehicle trips), compared with 2.0% of people trips on the SH-100 bridge (2.5% of vehicle trips). Biking, walking, and taxi/TNC trips were recorded only on the SH-100 bridge (30 trips combined). No public transit or other trips were recorded on the SH-100 bridge. Additionally, taxi/TNC, public transit, and other trips were not reported in the I-40 data extracted.

Table 3: Trip Purpose

Trip Mode	SH-100 Bridge		I-40 Bridge		Combined	
	Count	Share	Count	Share	Count	Share
Private auto	2,894	76.1%	15,600	50.6%	18,494	53.4%
Auto passenger	806	21.2%	8,740	28.4%	9,546	27.6%
Commercial vehicle (freight)	75	2.0%	6,480	21.0%	6,555	18.9%
Biking	15	0.4%	0	0.0%	15	<0.1%
Walking	8	0.2%	0	0.0%	8	<0.1%
Taxi/TNC	7	0.2%	–	–	7	<0.1%
Other	0	0.0%	–	–	0	0.0%
Public transit	0	0.0%	–	–	0	0.0%
Total	3,805	100.0%	30,820	100.0%	34,625	100.0%

Table 4 shows the distribution of trip duration for trips crossing each bridge. On the SH-100 bridge, the largest share of trips take 20 to 40 minutes (39.7%), followed by trips of 40 to 80 minutes (23.2%) and 10 to 20 minutes (18.3%). Trips longer than 40 minutes account for 32.4%. On the I-40 bridge, trips are substantially longer with 70.3% of trips taking more than 80 minutes and 22.3% taking 40 to 80 minutes, with trips shorter than 20 minutes accounting for only 0.6% of total trips.

Table 4: Trip Duration

Trip Duration	SH-100 Bridge		I-40 Bridge		Combined	
	Count	Share	Count	Share	Count	Share
Under 5 min	120	3.2%	4	<0.1%	124	0.4%
5-10 min	248	6.5%	17	<0.1%	265	0.8%
10-20 min	696	18.3%	165	0.5%	861	2.5%
20-40 min	1,509	39.7%	2,070	6.7%	3,579	10.3%
40-80 min	883	23.2%	6,884	22.3%	7,767	22.4%
Over 80 min	349	9.2%	21,661	70.3%	22,010	63.6%
Total	3,805	100.0%	30,801	100.0%	34,606	100.0%

Table 5 shows the distribution of trip distance for trips crossing each bridge. On the SH-100 bridge, the most common trip length is 16 to 32 miles (30.1%), followed by 32 to 64 miles (23.0%) and 8 to 16 miles (19.0%). Trips of 16 miles or longer account for 67.7% of SH-100 bridge trips, and no trips shorter than 1 mile were recorded. On the I-40 bridge, 83.3% of trips are longer than 64 miles, with an additional 13.8% trips ranging from 32 to 64 miles. Trips shorter than 16 miles account for 0.3% of I-40 bridge trips.

Table 5: Trip Distance

Trip Distance	SH-100 Bridge		I-40 Bridge		Combined	
	Count	Share	Count	Share	Count	Share
Under 0.5 mi	0	0.0%	0	0.0%	0	0.0%
0.5-1 mi	0	0.0%	0	0.0%	0	0.0%
1-2 mi	36	0.9%	1	<0.1%	37	0.1%
2-4 mi	130	3.4%	2	<0.1%	132	0.4%
4-8 mi	339	8.9%	8	<0.1%	347	1.0%
8-16 mi	723	19.0%	68	0.2%	791	2.3%
16-32 mi	1,144	30.1%	814	2.6%	1,958	5.7%
32-64 mi	875	23.0%	4,255	13.8%	5,130	14.8%
Over 64 mi	558	14.7%	25,653	83.3%	26,211	75.7%

Trip Distance	SH-100 Bridge		I-40 Bridge		Combined	
	Count	Share	Count	Share	Count	Share
TOTAL	3,805	100.0%	30,801	100.0%	34,606	100.0%

Table 6 summarizes the trip purpose for all trips crossing each bridge. Home trips are the largest category on both bridges (38.5% on SH-100 and 26.1% on I-40). On the SH-100 bridge, home trips are followed by work (13.7%), social (11.6%), and shop (10.5%) trips. On the I-40 bridge, home trips are followed by commercial (freight) (21.1%), work (11.4%), and shop (10.8%) trips.

Origin-destination data from Replica further indicates that the majority of SH-100 bridge trips travel between Muskogee County, while the I-40 bridge accounts for longer trips distributed across other origin-destination pairs, consistent with the longer trip distances shown in Table 5.

Table 6: Trip Purpose by Bridge

Trip Purpose	SH-100 Bridge		I-40 Bridge		Combined	
	Count	Share	Count	Share	Count	Share
Other	48	1.3%	684	2.2%	732	2.1%
Home	1,464	38.5%	8,010	26.1%	9,474	27.4%
Work	521	13.7%	3,510	11.4%	4,031	11.7%
School	194	5.1%	390	1.3%	584	1.7%
Eat	343	9.0%	2,010	6.5%	2,353	6.8%
Shop	400	10.5%	3,310	10.8%	3,710	10.7%
Social	442	11.6%	1,400	4.6%	1,842	5.3%
Recreation	154	4.0%	1,200	3.9%	1,354	3.9%
Errands	132	3.5%	1,600	5.2%	1,732	5.0%
Pass-through traffic	0	0.0%	194	0.6%	194	0.6%
Lodging (hotels etc.)	24	0.6%	628	2.0%	652	1.9%
Region departure (airport etc.)	8	0.2%	1,310	4.3%	1,318	3.8%
Commercial (freight)	75	2.0%	6,480	21.1%	6,555	19.0%
Total	3,805	100.0%	30,726	100.0%	34,531	100.0%

Table 7 summarizes the average trip distance and share of person-miles traveled by trip purpose for each bridge. Average trip distance reflects the full length of each trip, not only the portion on the bridge. Trips crossing the SH-100 bridge have an average trip distance of 38.1 miles. Weighted by trip count, trips crossing the I-40 bridge average approximately 151 miles. On the SH-100 bridge, average trip distances range from 27.6 miles for school trips to 84.3 miles for region departure trips. On the I-40 bridge, average trip distances exceed 100 miles for every trip purpose, ranging from 115 miles for region departure trips to 174 miles for recreation trips.

Table 7: Average Trip Distance by Trip Purpose

Trip Purpose	SH-100 Bridge		I-40 Bridge		Combined	
	Avg. Miles	Share of Person-Miles	Avg. Miles	Share of Person-Miles	Avg. Miles	Share of Person-Miles
Other	64.8	2.1%	172	2.5%	165	2.5%
Home	38.3	38.7%	148	25.5%	131	25.9%
Work	39.2	14.1%	147	11.1%	133	11.2%
School	27.6	3.7%	129	1.1%	95	1.2%
Eat	34.4	8.1%	170	7.4%	150	7.4%
Shop	40.2	11.1%	164	11.7%	151	11.7%
Social	35.4	10.8%	163	4.9%	132	5.1%
Recreation	39.7	4.2%	174	4.5%	159	4.5%
Errands	43.9	4.0%	171	5.9%	161	5.8%
Pass-through traffic	–	–	122	0.5%	122	0.5%
Lodging (hotels etc.)	53.6	0.9%	128	1.7%	125	1.7%
Region departure (airport etc.)	84.3	0.5%	115	3.2%	115	3.2%
Commercial (freight)	35.3	1.8%	143	19.9%	142	19.4%
Total	38.1	100.0%	151	100.0%	139	100.0%