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Marketing Research for the Quantifiable Benefits of Transit in New Jersey
Volume II: Final Report Technical Appendices

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Submitted by

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16. Abstract
New Jersey boasts an extensive system of public transportation that operates statewide, serving approximately two-thirds of the State's municipalities. The many benefits of public transportation have been widely discussed and analyzed in both academic literature and popular media. This research assembled data and information and estimated numerous quantifiable benefits of transit service to New Jersey residents, businesses, and communities. The research offers important insights, information and data regarding the benefits that NJ TRANSIT services provide to the State of New Jersey. The study proposes a series of storylines and delivers a series of infographics that can be used by NJ TRANSIT and other transportation stakeholders to implement a marketing campaign that communicates the benefits of public transportation to a range of audiences. This volume includes technical appendices only.

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APPENDIX A

Marketing Research for the Quantifiable Benefits of Transit in New Jersey

Phase 1, Task 1 Technical Memorandum

February 14, 2020

INTRODUCTION

Phase 1 of the *Marketing Research for the Quantifiable Benefits of Transit in New Jersey* study is focused on developing a rapid start-up "Did You Know?" or similar marketing campaign. The purpose of the campaign is to broaden awareness among various constituencies in New Jersey about the benefits of public transit services. As part of Task 1 of the study, the research team performed a series of quick turn-around, sketch-level benefit calculations for the following benefit measures:

- Reduction in vehicles, vehicle trips, vehicle miles traveled and associated Green House Gas (GHG) emissions;
- Reduction in vehicle traffic and congestion at trans-Hudson River crossings; and
- Jobs and overall economic activity generated from transit spending.

These calculations provide facts and information to be utilized in the Phase 1 marketing campaign. The following memorandum describes the calculation methodologies, data utilized and results of the Phase 1 benefit calculations. The benefit measures were selected for calculation based on past research conducted for NJ TRANSIT, the preliminary literature review conducted for the proposal and subsequent consultation with NJ TRANSIT staff.

REDUCTION IN VEHICLE TRIPS, VEHICLE MILES TRAVELED AND GREENHOUSE GAS EMISSIONS

NJ TRANSIT services accommodate millions of passenger trips each year. In the absence of NJ TRANSIT services, many New Jersey residents would need to travel by other means, including by private passenger vehicles. The first set of measures selected for estimation were additional private passenger vehicles, vehicle trips, vehicle miles traveled (VMT) and associated greenhouse gas (GHG) emissions that would be generated in New Jersey in the absence of NJ TRANSIT services (all modes).

Table 1 – Annual Unlinked passenger trips and passenger miles
by NJ TRANSIT services, 2017

Agency Name	Agency Status	Mode	Service	Unlinked passenger trips (UPT)	Passenger miles traveled (PMT)
New Jersey Transit Corporation	Active	CR	DO	88,578,277	2,077,067,508
New Jersey Transit Corporation	Active	DR	PT	1,610,072	9,898,392
New Jersey Transit Corporation	Active	LR	DO	5,531,921	12,379,497
New Jersey Transit Corporation	Active	LR	PT	15,476,385	60,426,164
New Jersey Transit Corporation	Active	MB	DO	143,878,120	1,113,473,813
New Jersey Transit Corporation	Active	MB	PT	10,574,069	42,682,026
New Jersey Transit Corporation	Active	VP	PT	727,002	27,415,332
New Jersey Transit Corporation	Active	YR	PT	2,713,160	39,719,834
			Total	**269,089,006**	**3,383,062,566**
			Avg. trip length (miles)		**12.57**

Source: National Transit Database

The relevant transit trip data source for this exercise is the National Transit Database (NTD), which includes the 2017 annual Unlinked Passenger Trips (UPT) and Passenger Miles Traveled (PMT). Table 1 shows that data. All analyses conducted for this exercise were done for aggregate UPT and PMT for NJ TRANSIT, but not for specific modes.

A source that provides data on VMT and person miles traveled (PRMT) is the National Transportation Statistics (NTS) by the Bureau of Transportation Statistics. The NTS provides national data on annual average VMT and PRMT for 2017. The NTS does not provide state-specific data. Examination of the VMT and PRMT data in the NTS revealed that the data presented in the national tables are from the 2017 National Household Travel Survey (NHTS).

NHTS raw data were analyzed to ensure that aggregated data match NTS national data tables. Once that was ensured, the analysis focused on the New Jersey sample of the NHTS data, consisting of 1,165 people representative of the state population. When weighted by the variable provided by the NHTS, the sample is representative of the state's total population of 8,953,794 (or 8.9 million). The summary data on PRMT and VMT from the NHTS for the US and NJ are provided in Table 2.

Table 2 – PRMT and VMT for USA and NJ from the 2017 NHTS

	United States	New Jersey
Annual Person Miles Traveled (PRMT)	3,968,056,772,972	138,202,609,857
Annual Person Trips (PRT)	371,151,971,524	11,288,982,646
Annual Vehicle Miles Traveled (VMT)	2,105,881,711,626	62,633,215,357
Annual Vehicle Trips (VT)	220,413,541,184	6,315,769,184
VMT/PRMT ratio	0.53	0.45
VT/PRT ratio	0.59	0.56

Source: National Household Travel Survey

Estimation of VMT

Two methods were used to estimate VMT.

Method 1

To convert NJ TRANSIT passenger miles data to VMT, two assumptions were made:

1) Passenger Miles Traveled (PMT) = Person Miles Traveled (PRMT)
2) PMT X (VMT/PRMT) = VMT

According to the first assumption, 10 people riding 20 miles by transit generates 200 passenger miles, which is also equal to 200 person miles. According to the second assumption, a given portion of the PRMT is VMT, whereas the remaining miles are generated by non-automobile modes. Table 2 shows that 45 percent of the NJ PRMT is VMT, whereas the remaining 55 percent is by other modes. For the US as a whole, 53 percent of the PRMT are VMT whereas the remaining 47 percent are by other modes. When the VMT/PRMT ratio of 45 percent is applied to the NJ TRANSIT' annual PSMT of 3,383,062,566 (3.38 billion miles), the resultant VMT would be 1,533,198,877 (1.53 billion miles).

Method 1: In the absence of NJ TRANSIT services, there would be an additional 1.53 billion annual VMT

Method 2

To convert the NJ TRANSIT passenger miles to VMT, this method makes the following assumptions:

1) Passenger Miles Traveled (PMT) = Person Miles Traveled (PRMT).
2) All people using NJ TRANSIT services will divert to cars, SUVs, vans, or light trucks.
3) Average vehicle occupancy for cars, SUVs, vans, and light trucks would apply to the diverted passengers.

According to NHTS, the average vehicle occupancy for all trips taken by cars, SUVs, vans, and light-duty trucks in the United States is 1.99 persons per vehicle. In New Jersey the average vehicle occupancy is 2.03 persons per vehicle. When the average vehicle occupancy rate of 2.03 is applied to NJ TRANST passenger miles shown in Table 1, total annual VMT generated would be 1,666,533,284, or 1.67 billion. This is greater than the estimate obtained from Method 1, but probably less realistic because there will be leakages to modes other than cars, vans, SUVs, and light trucks.

Method 2: In the absence of NJ TRANSIT services, there would be an additional 1.67 billion annual VMT

Estimation of Vehicle Trips and Additional Vehicles

Two methods were used to estimate the number of additional private passenger vehicle trips that would be taken in the absence of NJ TRANSIT services and the additional number of private vehicles needed to make those trips.

Method 1

To convert the NJ TRANSIT Unlinked Passenger Trips (UTP) to Vehicle Trips (VT), two assumptions were made:

1) Unlinked Passenger Trips (UTP) = Person Trips (PRT)
2) UTP X (VT/PRT) = VT

Table 1 shows that NJ TRANSIT's annual number of unlinked passenger trips (UPT) for 2017 was 269,089,006 (or 269.1 million). Table 2 shows the number of person trips and vehicle trips for the US and NJ from the NHTS. The bottom row of the table shows that the VT/PRT ratio for New Jersey is 0.56, indicating that 56 percent of all person trips are made by private passenger vehicles (i.e., cars, vans, SUVs, or light-duty trucks). By applying that rate to NJ TRANSIT's UPT, one can estimate annual vehicle trips to be 150,545,368 (or 150.5 million).

Method 1: In the absence of NJ TRANSIT services, there would be an additional 150.5 million annual vehicle trips

Table 3 shows the number of vehicles and number of vehicle trips in the United States and New Jersey from 2017 NHTS data. It shows that 1,102 trips are made by an average vehicle per year in New Jersey. While the estimate helps to validate that the data is reasonable, the Vehicles to Vehicle trips ratio is needed to estimate number of vehicles.

Table 3 – Number of vehicles and annual vehicle trips in USA and NJ, 2017

	United States	New Jersey
Annual Vehicle Trips (VT)	220,413,541,184	6,315,769,184
Total number of vehicles	222,578,947	5,730,982
Vehicle trips to vehicle ratio (VT/Vehicles)	990	1102
Vehicles to Vehicle trips ratio (Vehicles/VT)	0.001009824	0.000907408

By applying the vehicles to vehicle trip ratio (0.000907408) to the number of vehicle trips (150,545,368), one can estimate that the number of additional vehicles required to generate the vehicle trips would be 136,606. That is, almost 137,000 additional vehicles would operate year-round on New Jersey roadways in the absence of NJ TRANSIT services.

Method 1: In the absence of NJ TRANSIT services, there would be an additional 137,000 vehicles operating year-round on NJ roads

Method 2

To convert the NJ TRANSIT unlinked passenger trips (UPT) to vehicle trips, this method makes the following assumptions:

1) Unlinked Passenger Trips (UPT) = Person Trips (PT).
2) All people using NJ TRANSIT services will divert to cars, SUVs, vans, or light trucks.
3) Average vehicle occupancy for cars, SUVs, vans, and light trucks would apply to the diverted passengers.

When NJ TRANSIT' UPT of 269,089,006 (269.1 million) is divided by number of occupants per vehicle (2.03), the estimated number of vehicle trips (VT) is 132,556,161, or 132.6 million.

Method 2: In the absence of NJ TRANSIT services, there would be an additional 132.6 million annual vehicle trips

By applying the vehicles to vehicle trip ratio (0.000907408) to the estimated number of vehicle trips (132,556,161), one can estimate that the number of additional vehicles required to generate the vehicle trips would be 120,283.

Method 2: In the absence of NJ TRANSIT services, there would be an additional 120,000 vehicles operating year-round on NJ roads

Estimation of GHG from VMT

According to the Environmental Protection Agency (EPA), an average private passenger vehicle, driven an average of 11,507 miles per year, that has an average fuel efficiency of 22 miles per gallon (MPG), generates 4.71 metric tons of GHG annually (measured in CO_2E).[1] According to the NHTS data, an average vehicle in New Jersey is driven 10,929 miles per year, which is a close approximation of the figure used by the EPA. With the assumption that each private passenger vehicle generates 4.71 metric tons of GHG per year, the estimated 136,606 additional cars required (Method 1) in the absence of NJ TRANSIT services would generate 643,415 metric tons of GHG per year. That is 643,414,880 kg of GHG or 1,418,729,811 lbs. of GHG (i.e., 1.4 billion lbs.).

[1] https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references

Method 1: In the absence of NJ TRANSIT services, additional vehicles on the road will generate 1.4 billion lbs. of GHG annually

If one assumes 120,283 additional private passenger vehicles (by Method 2) instead of 136,606 vehicles, 566,531 metric tons of GHG would be generated. That is 566,530,921 kg of GHG or 1,249,200,680 lbs. of GHG per year (i.e., 1.2 billion lbs.).

Method 2: In the absence of NJ TRANSIT services, additional vehicles on the road will generate 1.2 billion lbs. of GHG annually

TRANS-HUDSON TRAFFIC REDUCTION

Hundreds of thousands of New Jersey commuters travel into and out of New York City each day. In the absence of public transit services, traffic and congestion at the Lincoln and Holland Tunnels and the George Washington Bridge (GWB) would be extreme. Traffic reduction and congestion relief at the trans-Hudson crossings were estimated to show the number of additional private passenger vehicles trips that would be generated if NJ TRANSIT service (commuter rail as well as buses operated and leased by NJ TRANSIT) did not exist. The analysis was conducted for New York-bound travel between 8 AM and 9 AM, 7 AM and 10 AM, and for the 24-hour period.

Base volume of people and vehicles crossing the Hudson from NJ to NY

Data from the New York Metropolitan Transportation Council's (NYMTC) Hub Bound Travel report 2017 [2] were used to support the analysis. The report includes only travel to the Manhattan Central Business District (aka NYC Hub), which includes all of Manhattan south of 60th Street. Because of its northern boundary, it does not include travel across the George Washington Bridge. Table 4 summarizes the number of people entering the NYC Hub from New Jersey between 8 AM and 9 AM, 7 AM and 10 AM, and a 24-hour period on a typical fall business day.

Table 4 – Number of people traveling from New Jersey to New York City, Average Weekday (2017)

	Between 8 AM and 9 AM			Between 7 AM and 10 AM			In a 24-Hour Period		
	Autos, taxis, vans, trucks	Bus	Rail	Autos, taxis, vans, trucks	Bus	Rail	Autos, taxis, vans, trucks	Bus	Rail
Lincoln Tunnel	4,071	33,949		12,307	89,827		64,164	202,951	
Holland Tunnel	3,071	2,700		9,208	6,505		50,844	16,386	

[2] https://www.nymtc.org/Data-and-Modeling/Transportation-Data-and-Statistics/Publications/Hub-Bound-Travel

Amtrak/NJ TRANSIT Tunnels			26,614			54,219			100,102

Source: NYMTC 2017 Hub Bound Report, Appendix tables 14-A, 14-B, and 14-C

Table 5 shows the number of vehicles (automobiles and trucks as well as buses) entering the NYC Hub from New Jersey on a typical fall business day. Because automobiles, on average, carry more than one person, the estimates of automobiles in Table 5 are smaller than number of people in Table 4. Data for the number of vehicles crossing the George Washington Bridge into the NYC Hub were provided by the Port Authority of New York and New Jersey.

Table 5 – Number of vehicles entering NYC from New Jersey on a typical fall business day

	Between 8 AM and 9 AM			Between 7 AM and 10 AM			In a 24-Hour Period		
	Autos, taxis, vans, trucks	Bus	Total	Autos, taxis, vans, trucks	Bus	Total	Autos, taxis, vans, trucks	Bus	Total
Lincoln Tunnel	2,974	871	3,845	9,239	2,394	11,633	47,525	7,342	54,867
Holland Tunnel	2,540	74	2,614	7,787	181	7,968	41,717	625	42,342
George Washington Bridge	7,875	107	7,982	22,587	257	22,844	139,456	1400	140,856
Total	13,389	1,052	14,441	39,613	2,832	42,445	228,698	9,367	238,065

Source: HT and LT from 2017 Hub Bound Report; GWB from Todd Goldman at PANY/NJ. (Note that Todd's data also include HT and LT volumes that exactly match the Hub Bound Report.)

Table 6 – Average Vehicle occupancy of private passenger vehicles and buses

	Between 8 AM and 9 AM		Between 7 AM and 10 AM		In a 24-Hour Period	
	Autos, taxis, vans, trucks	Bus	Autos, taxis, vans, trucks	Bus	Autos, taxis, vans, trucks	Bus
Lincoln Tunnel	1.37	38.98	1.33	37.52	1.35	27.64
Holland Tunnel	1.21	36.49	1.18	35.94	1.22	26.22
George Washington Bridge	1.37	38.98	1.33	37.52	1.35	27.64

Table 7– Adjusted number of people traveling from New Jersey to the NYC HUB

	Between 8 AM and 9 AM			Between 7 AM and 10 AM			In a 24-Hour Period		
	Autos, taxis, vans, trucks	NJT Bus*	NJT Rail	Autos, taxis, vans, trucks	NJT Bus*	NJT Rail	Autos, taxis, vans, trucks	NJT Bus*	NJT Rail
Lincoln Tunnel	4,071	24,487		12,307	50,101		64,164	95,054	
Holland Tunnel	3,071	1948		9,208	3,629		50,844	7,674	
George Washington Bridge	10,789	3,008		30,041	5,378		188,266	18,123	

Amtrak/NJ TRANSIT Tunnels			25,171			51,846			88,361
Total	17,931	29,443	25,171	51,556	59,108	51,846	303,274	120,851	88,361

Note: * includes passengers traveling via NJ TRANSIT buses and private carrier buses supported by NJ TRANSIT.

Table 6 shows the average vehicle occupancy for private passenger automobiles and buses. The estimates for Lincoln Tunnel and Holland Tunnel were obtained by dividing the number of people in Table 4 by the number of vehicles in Table 5. Because PANY/NJ provided only number of vehicles for George Washington Bridge and not the number of people, the research team assumed the same vehicle occupancy for the George Washington Bridge as the Lincoln Tunnel.

Table 7 shows adjusted estimates for the number of people traveling into the NYC Hub via various crossings. These estimates were derived by applying the Lincoln Tunnel vehicle occupancy rate to the number of vehicle crossings via the GWB, subtracting Amtrak riders from the Amtrak/NJ TRANSIT tunnels estimate shown in Table 4 and subtracting bus riders using services other than NJ TRANSIT buses and private carrier buses supported by NJ TRANSIT.

The NJ TRANSIT rail rider estimates were obtained from Section C of the Appendix III of the 2017 Hub Bound Report. NJ TRANSIT bus rider estimates were obtained from NJ TRANSIT's 2017 Bus Ridership and Fare Zone Profile and information provided by NJ TRANSIT staff. Ticket sales data contained in the Bus Ridership and Fare Zone profile report shows that a total of 88,646 riders bought tickets and traveled into NYC on an average weekday (24-hour period). An hourly breakdown of the ticket sales was not available. To obtain the NJ TRANSIT bus rider estimates for peak hour travel, the research team assumed a static ratio of NJ TRANSIT buses to all buses traveling in each period (i.e., 88,646 divided by 258,033, or 0.3435).

Data on commuter buses operated by private companies that lease buses from NJ TRANSIT was provided by NJ TRANSIT staff. These data were based on arrivals by time of day at the Port Authority Bus Terminal. The research team distributed the bus riders using private carrier buses supported by NJ TRANSIT to the three trans-Hudson crossings based on the distribution of NJ TRANSIT buses shown in Table 6. The estimated private carrier bus rider counts at the three crossings were added to the NJ TRANSIT bus rider counts and shown in the column labeled NJT Bus in Table 7.

Congestion and traffic reduction at trans-Hudson crossings

The first step in estimating the impact of NJ TRANSIT services on trans-Hudson traffic was to distribute the number of NJ TRANSIT rail riders shown in the bottom row of Table 7 to the three crossings. This was done by applying the percentages for autos, taxis, and vans in the same table. The distribution is shown in Table 8. The second step was to apply the average vehicle occupancy rates from Table 6 to the number of commuters presented in Table 8 to estimate the number of automobile trips generated from the three modes. The estimates are shown in Table 9. Note that the estimates for

"Original Autos" are the same as the autos, taxis, vans, and trucks presented in Table 5. Table 10 presents an estimate of total private passenger vehicle trips at each crossing when auto trips deviated from NJ TRANSIT rail and bus services are added to original auto trips. Table 11 shows the percent increase in traffic estimated at each crossing in the absence of NJ TRANSIT trans-Hudson commute modes.

Table 8 – NJ TRANIST rail riders distributed to the three crossings

	Between 8 AM and 9 AM			Between 7 AM and 10 AM			In a 24-Hour Period		
	Autos, taxis, vans, trucks	NJT Bus*	NJT Rail	Autos, taxis, vans, trucks	NJT Bus*	NJT Rail	Autos, taxis, vans, trucks	NJT Bus*	NJT Rail
Lincoln Tunnel	4,071	24,487	5,715	12,307	50,101	12,376	64,164	95,054	18,695
Holland Tunnel	3,071	1948	4,311	9,208	3,629	9,260	50,844	7,674	14,814
George Washington Bridge	10,789	3,008	15,145	30,041	5,378	30,210	188,266	18,123	54,852
Total	17,931	29,443	25,171	51,556	59,108	51,846	303,274	120,851	88,361

Note: * includes passengers traveling via NJ TRANSIT buses and private carrier buses supported by NJ TRANSIT.

Table 9 – Estimated Number of NYC-bound private passenger vehicle trips at trans-Hudson crossings if NJ TRANSIT rail and bus riders used cars instead

	Between 8 AM and 9 AM			Between 7 AM and 10 AM			In a 24-Hour Period		
	Original Autos	Autos from NJT Bus*	Autos from NJT Rail	Original Autos	Autos from NJT Bus*	Autos from NJT Rail	Original Autos	Autos from NJT Bus*	Autos from NJT Rail
Lincoln Tunnel	2,974	17,888	4,175	9,239	37,611	9,291	47,525	70,409	13,848
Holland Tunnel	2,540	1,612	3,566	7,787	3,069	7,831	41,717	6,292	12,142
George Washington Bridge	7,875	2,198	11,064	22,587	4,038	22,679	139,456	13,425	40,632
Total	13,389	21,698	18,805	39,613	44,718	39,801	228,698	90,126	66,622

Table 10 – Estimated total NYC-bound private passenger vehicle trips in the absence of NJ TRANSIT services

	Between 8 AM and 9 AM			Between 7 AM and 10 AM			In a 24-Hour Period		
	Original Autos	Deviated from transit	Total Autos	Original Autos	Deviated from transit	Total Autos	Original Autos	Deviated from transit	Total Autos
Lincoln Tunnel	2,974	22,063	25,037	9,239	46,902	56,141	47,525	84,257	131,782
Holland Tunnel	2,540	5,177	7,717	7,787	10,900	18,687	41,717	18,434	60,151

George Washington Bridge	7,875	13,262	21,137	22,587	26,717	49,304	139,456	54,057	193,513

Table 11 – Percent increase in inbound private passenger vehicle trips in the absence of NJ TRANSIT services

	Between 8 AM and 9 AM	Between 7 AM and 10 AM	In a 24-hour period
Lincoln Tunnel	742%	508%	177%
Holland Tunnel	204%	140%	44%
George Washington Bridge	168%	118%	39%

ECONOMIC IMPACTS OF TRANSIT SPENDING

It cost more than $2 billion annually to operate and maintain NJ TRANSIT's commuter rail, light rail, bus and paratransit services. This spending generates significant economic activity in the State. A sketch-level analysis was conducted to estimate the economic benefits provided by NJ TRANSIT's annual operating and capital expenditures in terms of jobs created and overall economic activity generated.

The most common method for estimating the economic impacts of transit spending is using an input-output model (I-O model). I-O models estimate the effects of an initial economic activity (e.g., operating a bus network or constructing a new bridge) on the regional economy. Although the initial activity may be undertaken by an agency, the output of the model is "economy-wide" for the region instead of being agency-specific. Some of the sophisticated computer models that perform I-O analysis are the (a) Economic Impact Analysis for Planning model (IMPLAN),[3] (b) Regional Economic Models, Inc. model (REMI),[4] (c) Regional Input-Output Modeling System (RIMS II),[5] and (d) the R/ECON™ Econometric Forecasting Model.[6] All of these models have to be customized to specific regions because, depending on the nature of the regional economy, the same amount of expenditure in different regions of the country generates different levels of impact.

The economic impact of capital and operating expenditures varies by industry type. If an industry imports a substantial share of initial inputs from other regions, the effect of the expenditures in that industry on the local economy would be lower than another industry that uses all inputs locally. Similarly, when the outputs are shared by outside regions, the impact of an expenditure on the local economy would be lower. Thus, "leakage"

[3] https://www.implan.com/
[4] http://ledsgp.org/resource/regional-economic-models-inc/?loclang=en_gb
[5] https://apps.bea.gov/regional/rims/
[6] http://recon.rutgers.edu/econometric-forecasting-model/

from the local economy to other regions reduces the impact of an expenditure on the local economy.

Overview of APTA Economic Impact Tool

For the sketch-level analysis conducted for this study, the research team used a web-based tool developed by the American Public Transit Association (APTA).[7] The APTA tool uses the IMPLAN model in the background and it is specifically designed to estimate impacts of transit investments using agency-specific expenditure and employment data from the National Transit Database (NTD).[8] The tool is accompanied by a user guide that indicates how specific data from the NTD (i.e., data cells from the Excel file) are to be input into the tool. Data from three NTD data tables are used in the tool–the employment table, the operating expenditure table, and the capital expenditure table.

The APTA toll generates four outputs: (a) employment (number of jobs created), (b) labor income ($), (c) value added ($), and (d) output ($). Employment refers to the number of jobs created for a full calendar year based on annual spending. Labor income refers to the total earnings by the generated jobs. Value added refers to gross output minus the intermediate inputs. It includes compensation of employees, taxes on production and imports, but excludes subsidies and gross operating surplus. Output is the sum of value added and intermediate inputs.

APTA Tool Data Inputs

The APTA tool contains two input tables or templates, one for operating budget and the other for capital budget. The operating budget template is shown in Table 12 and the capital budget template is shown in Table 13. The data shown in the two tables were extracted from the three detailed NTD tables mentioned previously. As shown in the tables, the data need to be entered in the tool separately for each transit mode instead of the aggregate for the agency as a whole. The data for the columns Bus, Light Rail, and Heavy Rail correspond to the NTD codes MB, LR, and CR, respectively. For the Paratransit column, the NTD code DR was used. For the “Other” mode column, data for NTD codes VP (Vanpool) and YR (Hybrid rail) were aggregated. Because no BRT or ferry service is provided by NJ TRANSIT, all cells in those two columns are empty.

Table 12 – Operating budget data entered to the APTA tool

Operating Budget Items	Bus	BRT	Light Rail	Heavy Rail	Para-transit	Ferry	Other	Total
Labor								
Number of staff on payroll	6,062	0.0	125	4,850	0.0	0.0	0.0	11,037
Fraction living in local area	0.95	0.0	0.95	0.95	0.95	0.0	0.95	0.95

[7] https://www.apta.com/research-technical-resources/my-economic-impact-tool/economic-impact-tool/
[8] https://www.transit.dot.gov/ntd/ntd-data

Operators' salaries and wages ($M)	182.7	0.0	2.2	135.9	0.0	0.0	0.0	320.8
Other salaries and wages ($M)	142.7	0.0	6.3	201.4	12.7	0.0	4.3	367.4
Fringe benefits ($M)	253.2	0.0	7.1	282.0	12.2	0.0	3.2	557.7
Purchased services								
Vehicle operations ($M)	29.6	0.0	34.9	0.0	41.2	0.0	15.4	121.0
Vehicle maintenance ($M)	9.0	0.0	11.6	0.0	12.5	0.0	5.1	38.1
Non-vehicle maintenance ($M)	3.4	0.0	4.6	0.0	4.7	0.0	2.0	14.7
General administration ($M)	2.9	0.0	7.0	0.0	4.1	0.0	2.9	16.9
Non-labor expenses								
Fuel and lubricants expenditure ($M)	30.4	0.0	0.0	22.0	0.0	0.0	0.0	52.4
Tires and Lubes ($M)	5.6	0.0	0.0	0.0	0.0	0.0	0.0	5.6
Other materials and supplies ($M)	78.1	0.0	8.7	79.3	1.8	0.0	0.9	168.8
Other administrative costs								
Utilities ($M)	15.2	0.0	6.1	62.9	1.3	0.0	0.5	86.0
Casualty and liability costs ($M)	31.6	0.0	1.0	24.7	6.2	0.0	2.3	65.8
Taxes ($M)	0.7	0.0	0.3	0.2	0.1	0.0	0.0	1.3
Services (Outside support, $M)	47.9	0.0	10.2	85.5	11.3	0.0	3.3	158.3
Other admin ($M)	35.1	0.0	0.9	77.4	2.4	0.0	0.9	116.7
Summary by Type								
Annual Operating budget ($M)	868.0	0.0	100.9	971.3	110.4	0.0	40.8	2,091

Source: National Transit Database, 2017

Data for all rows in the table pertain to the year 2017. The data were extracted directly from the NTD website because the tool's user manual refers to specific rows and columns of downloadable NTD data. The first row of Table 12 shows the number of full- and part-time employees. The data input in that row were extracted from the employment table of the NTD data. The cells in the second row, fraction of labor living in local area, were set to 0.95 to indicate that 95 percent of the agency's workers live within the region. This default setting was used because information on the share of NJ TRANSIT workers living within New Jersey could not be obtained. The data for the remainder of the inputs in Table 12 were extracted from the operating expenditure table of the NTD data. All data for capital expenditure in Table 13 were extracted from the capital expenditure table of the NTD data.

Table 13 – Capital budget data entered to the APTA tool

Capital Expenditure Items	Bus	BRT	Light Rail	Heavy Rail	Para-transit	Ferry	Other	Total
Construction								
Guideway ($M)	0.0	0.0	39.4	136.4	0.0	0.0	0.0	175.8
Passenger station (terminal) ($M)	0.3	0.0	4.7	19.0	0.0	0.0	0.0	24.1
Administrative buildings ($M)	0.0	0.0	0.0	2.9	0.0	0.0	0.0	2.9
Maintenance buildings ($M)	7.2	0.0	16.2	5.3	0.0	0.0	0.0	28.7
Vehicles								
Revenue vehicles ($M)	61.6	0.0	38.7	0.6	2.5	0.0	0.0	103.4

Service vehicles ($M)	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.9
Other equipment purchases								
Fare revenue collection equipment ($M)	0.5	0.0	10.2	0.0	0.0	0.0	0.0	10.7
Communication information equipment ($M)	5.8	0.0	1.0	109.9	0.0	0.0	0.0	116.7
Soft costs								
Design engineering ($M)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Legal ($M)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Public outreach and education ($M)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right of way								
Right of way acquisition ($M)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other ($M)	0.3	0.0	0.0	0.7	0.0	0.0	0.0	1.0
Fraction manufactured within region								
Revenue vehicles	---	---	---	---	---	---	---	---
Service vehicles	---	---	---	---	---	---	---	---
Fare revenue collection equipment	---	---	---	---	---	---	---	---
Communication information equipment	---	---	---	---	---	---	---	---
Summary by Type								
Annual Capital Projects ($M)	75.8	0.0	110.2	275.7	2.5	0.0	0.0	464.2
Annual Operating budget ($M)	868.0	0.0	100.9	971.3	110.4	0.0	40.8	2,091.4
Total								**2,555.7**

The total operating expenditure ($2.09 billion) and capital expenditure ($464.2 million) match the total operating expenditure and capital expenditure shown in the agency profile for NJ TRANSIT by the NTD. The data entered in the APTA tool were printed out and compared cell by cell with the data shown in Tables 12 and 13 to eliminate potential data-entry errors.

APTA Tool Economic Impact Estimates

In addition to the data inputs, the APTA tool requires users to select one or more region served by the transit agency. For this estimation, the state of New Jersey was selected. Although the tool allows users to select specific counties, because this effort is meant to estimate transit's impact on the state, all 21 counties of the state were included. Upon selection of the region, the tool loads information on regional economic characteristics to run the I-O model. The APTA tool generates five output files: (1) the economic impact summary, (2) jobs by sector from operating expenditure, (3) jobs by sector from capital expenditure, (4) jobs by occupation from operating expenditure, and (5) jobs by occupation from capital expenditure. The first of these, the economic impact summary, is presented in Table 3.

Table 14 – Summary of economic impacts

Impact Type	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct Effect	13,421	1345.74	1368.14	2324.00
Transit Operations & Maintenance	11,963	1245.90	1245.90	2091.60
Transit Capital Investment	1,458	99.84	122.24	232.40
Indirect (Supplier) Effect	7,879	466.52	600.08	1224.49
Induced (Income Re-spending) Effect	9,155	497.44	845.09	1368.95
Total Effect	30,456	2309.70	2813.31	4917.44

The first column of Table 14 shows the number of jobs generated by NJ TRANSIT's combined operating and capital expenditures. The bottom row shows that a total of 30,456 jobs were generated by the expenditures, of which 13,421 (44 percent) were direct, 7,879 (26 percent) were indirect, and 9,155 (30 percent) were induced. The second column of Table 14 shows the labor income (i.e., wages and salaries) generated by the expenditures. It shows that $2.31 billion were generated in total, of which 58 percent were direct, 20 percent were indirect, and 22 percent were induced. The third column shows that the total value added was $2.81 billion and the fourth column shows that the total output was $4.92 billion.

The major takeaway from the analysis is that in addition to NJ TRANSIT's 11,037 employees, the agency's 2017 expenditures generated 19,419 jobs elsewhere in the economy. Thus, every job at NJ TRANSIT is associated with 1.76 jobs elsewhere in the state. By dividing the total labor income by total jobs, one can obtain the average labor income associated with each job generated, $75,837. Considering that mean annual earning per worker in New Jersey is $56,970,[9] transit expenditures generate relatively high-paying jobs (33 percent higher than the state average).

[9] US Bureau of Labor Statistics. May 2017 State Occupational Employment and Wage Estimates New Jersey https://www.bls.gov/oes/2017/may/oes_nj.htm#00-0000

APPENDIX B

Marketing Research for the Quantifiable Benefits of Transit in New Jersey

Phase 1 Report

March 13, 2020

INTRODUCTION

Public transportation is a critical feature of metropolitan regions across the world. It enhances mobility for individuals, expands opportunities for businesses, and reduces vehicle miles traveled and related greenhouse gas emissions. According to the American Public Transportation Association, in 2017, Americans took 10.1 billion trips on public transportation. Since 1995, public transportation ridership nationally has increased by 30 percent, a growth rate higher than the 22 percent increase in U.S. population. Public transportation is a $68 billion industry that employs more than 420,000 people. (1)

New Jersey boasts an extensive system of public transportation that operates statewide. Networks and services include 12 commuter rail lines operated by NJ TRANSIT with stations in 116 municipalities, PATH which connects Newark, Harrison, Jersey City and Hoboken with New York City, the PATCO Speedline that connects Camden County with Philadelphia, PA, three NJ TRANSIT light rail systems (Hudson Bergen Light Rail, the River Line and the Newark City Light Rail) that serve 22 municipalities as well as a bus fleet of more than 3,000 vehicles operating on 252 bus routes serving 385 municipalities. Private ferries connecting New Jersey with New York City and buses, shuttles and paratransit services operated by New Jersey counties provide additional mobility for New Jersey residents. (2)

The many benefits of public transportation have been widely discussed and analyzed for the last two decades. This is true in both academic literature and popular media. Research and advocacy interest has been focused on understanding and communicating benefits related to sustainability and the environment, growth and economic impacts, accessibility and mobility, social equity and more recently emergency response and resilience and public health. The following sections present just a sampling of transit benefits discussed in the literature.

Growth and Economic Benefits

A 2009 Transit Cooperative Research Program (TCRP) Project examined the economic impacts of public transportation capital and operating investments separately and found that $1 billion dollars in average spending (capital and operating) on public

transportation generates 36,000 jobs, $3.6 billion in business sales, $1.8 billion in value-added Gross Domestic Product, $1.6 billion in labor income and approximately $490 million in tax revenues. [3] A 2014 study conducted by Economic Development Research Group, Inc. (EDRG) for the American Public Transportation Association drew similar conclusions. [4] Further research by Chatman et al (2012) for TCRP found that the presence of transit infrastructure can lead to large agglomeration benefits, measured by increases in employment density and regional population. [5]

Similar calculations have been made at the level of metropolitan region and county level. [6] [7] For example, a 2004 study measuring the impact of transit on the Montreal metro region in Quebec, Canada found that transit authorities supported 12,845 jobs, either directly or through suppliers, and contributed $300 million in annual revenues to the Quebec and Canada governments. [6] Studies pertaining to New Jersey have shown that transit users' expenditure alone contribute significantly to New Jersey's economy. [8] [9] For example, a study by members of this research team showed that recreational travelers from New Jersey and neighboring states who travel by the North Jersey Coast Line (NJCL) to visit tourist destinations along the New Jersey coast spend almost $15 million in the New Jersey shore communities on summer weekends. This spending generates $9 million in earnings, 225 annualized jobs, and $1 million in state taxes. [8] More importantly, at least 80 percent of these benefits are generated from transit users visiting from other states, especially New York.

Mobility and Accessibility Benefits

Public transportation increases accessibility and enhances mobility for those that use transit as well as those that don't. For more than a decade, studies conducted by the Texas Transportation Institute (TTI) have estimated the combined effects of roadway congestion in terms of yearly delay experienced by drivers stuck in traffic, "wasted" fuel per auto commuter, and the costs of congestion. In 2007, TTI estimated "that if public transportation service was discontinued nationwide and the riders traveled in private vehicles instead, urban areas would have suffered an additional 541 million hours of delay and consumed on the whole 340 million more gallons of fuel in 2005. The value of the delay and fuel that would be consumed if there were no public transportation service would be an additional $10.2 billion congestion cost, a 13 percent increase over current levels." [10]

In addition to relieving congestion, public transportation also provides important mobility and accessibility benefits, especially to low-income populations and people with disabilities. Research shows that low-income and minority populations are far more likely to use public transportation than others because a large proportion of them do not have cars available. [11] [12] Similarly, people with disabilities use public transit for a higher share of trips than people without disabilities. [13]

Sustainability and Environmental Benefits

Research has documented that public transportation has several environmental benefits, mostly related to reductions in vehicle miles traveled in private autos and light-duty trucks and related emissions reductions. For example, a study prepared by ICF International for the Transit Cooperative Research Program "found a significant correlation between transit availability and reduced automobile travel, independent of transit use. Transit reduces U.S. travel by an estimated 102.2 billion vehicle miles traveled (VMT) each year. This is equal to 3.4 percent of the annual VMT in the U.S. in 2007." [14] [15]

According to a study published by the Federal Transit Administration (FTA), "public transportation produces significantly lower greenhouse gas emissions (GHG) per passenger mile than private vehicles." FTA found that "heavy rail transit, such as subways, produce 76 percent less GHG emissions per passenger mile than an average single-occupancy vehicle (SOV). Light rail systems produce 62 percent less and bus transit produces 33 percent less." [16] A 2011 study in the Washington, DC. metropolitan region found that travel by Metro saved 40.5 million gallons of fuel annually and avoided 260 tons of volatile organic compounds (VOC), 22 tons of particulate matter (PM), and 0.5 million tons of carbon dioxide (CO2). Collectively, these emissions savings amounted to an estimated $9.5 million ($2010). [6]

A study conducted by members of the research team pertaining to NJ TRANSIT's Pascack Valley Line, found that deviation of potential automobile users to transit reduces GHG emissions by about one-third even after emissions from transit are accounted for. [17] Furthermore, transit helps to reduce traffic congestion on congested roadways. Another study conducted by the research team showed that the North Jersey Coast Line helps to reduce traffic at certain locations on the Garden State Parkway by seven to nine percent during weekend peak periods. [18] The same study also showed that the services provided by NJ TRANSIT helps to reduce traffic in downtown Newark by five to 15 percent during events at the Prudential Center.

Emergency Response and Resilience Benefits

While not often monetized, the important role that public transportation plays in emergency preparedness, response and recovery is well documented. Public transportation provides important capacity to evacuate people in harm's way as well as to transport emergency response personnel when disaster strikes. Examples in the U.S. and internationally are numerous, as are examples specific to New Jersey. The value of transit was demonstrated in the aftermath of the terrorist attacks of September 11, 2001 when NJ TRANSIT assets and private commuter ferries were used to shuttle evacuees out of lower Manhattan and to bring in supplies and support emergency operations at the World Trade Center site. The value of transit was also evident when NJ TRANSIT assets were used to evacuate thousands of low-income New Jersey residents from shore communities in advance of Tropical Storm Irene in 2011 and Hurricane Sandy in 2012.

Public Health and other Social Benefits

Public transportation can also generate a variety of public health and other social benefits. For example, people that use transit walk more, which can improve overall health and reduce body mass index. [19] Transit users also tend to walk more because they do so to access services in their neighborhoods and at their destinations. [20] One New Jersey-based analysis assessed the physical activity patterns of transit commuters living near three different suburban rail stations and found 78 percent of riders living near a station met physical activity recommendations–compared with 44 percent for the entire state. [21] Another study collected self-reported information and distributed pedometers to train and car commuters in northern New Jersey. The train commuters reported an average of 30 percent more steps and were four times more likely to walk 10,000 steps–the equivalent of meeting physical activity recommendations. [22]

Increased physical activity related to transit use has been shown to have measurable effect on upstream health outcomes such as lowered obesity rates. A 2008 study converted the additional minutes spent walking to transit into energy expenditure and reduction in obesity prevalence and, using this potential reduction, calculated the present value savings of $5500 per person. [23] In terms of other social benefits, transit use can reduce households' expenditure on transportation. Statistical models in a study by a research team member that used national Consumer Expenditure Survey data showed that the overall transportation cost of households containing transit users was lower than households that did not contain any transit user. [24]

PHASE 1 OVERVIEW

The literature scan presented above demonstrates that there is fertile ground to support sketch-level calculation of how much transit benefits New Jersey in a variety of ways. The objectives of this research study are to:

a) quantify the economic, mobility/accessibility, environmental and social benefits of public transportation to New Jersey;
b) understand better what benefits are potentially most important to transit riders, non-transit riders and other stakeholder groups;
c) determine how best to communicate the benefits of public transportation to these audiences; and
d) develop a marketing framework, communication plan and collateral materials to support a future transit benefits marketing campaign as part of NJ TRANSIT's on-going comprehensive communications activities.

Phase 1 of the study focused on producing "quick turn-around" benefit calculations; completing a series of focus groups to develop a foundational understanding of what benefit measures may resonate most with various constituent audiences; and developing recommendations regarding how NJ TRANSIT might launch a "Did you know?" marketing campaign to inform New Jersey residents, businesses, elected officials and others about the benefits NJ TRANSIT services provide to the State. The remainder of this report summarizes the results of Phase 1 work tasks.

PHASE 1 SKETCH-LEVEL TRANSIT BENEFIT CALCULATIONS

As part of Phase 1 of the study, the research team performed a series of "quick turn-around," sketch-level benefit calculations for nine economic, mobility and sustainability benefit measures. The measures were selected for calculation based on past research conducted for NJ TRANSIT, a preliminary literature review, and subsequent consultation with NJ TRANSIT staff. The benefit calculation methods and results are summarized below. More detail is provided in the Task 1 Technical Memorandum, attached as Appendix A1.

Growth and Economic Benefits

As noted in the Introduction, public transit provides a range of growth and economic benefits. These range from supporting land development and population growth to job creation and economic activity generated from transit agency spending. To estimate the impact of NJ TRANSIT spending on New Jersey's economy, the research team used a web-based economic modeling tool developed by the American Public Transit Association (APTA). [25]

The APTA economic impact calculator generates four primary measures of economic activity:

1. Employment;
2. Labor income;
3. Value added; and
4. Output.

The tool reports direct, indirect, and induced effects associated with operations and maintenance (O&M) and for capital spending. In addition, the tool also generates data that details the number of jobs generated by economic sector from capital, operations and maintenance spending and jobs by occupation. [26] Table 1 explains the four primary measures in more detail.

Table 15 – APTA Economic Impact Tool economic measures

Measure	Direct Effects	Indirect (Supplier) Effects	Induced Effects
Employment	Agency jobs (O&M) and jobs supported in construction, engineering, and related firms and manufacturing jobs for vehicle and equipment purchases, if applicable and sourced from the local economy (Capital)	Jobs supported in supplier firms attributable to "Outside of agency" purchases of goods and services produced "locally" from all rounds of business-to-business transactions	Jobs created as result of local income re-spending by agency personnel that reside "locally" (O&M) and personnel employed by firms associated with construction projects and vehicle and equipment purchases that also reside "locally"
Labor Income	Annual wages paid to agency employees (O&M) and annual wages paid to	Annual wages paid to workers in outside firms supported by the agency's	Annual wages paid to workers in outside firms

	workers in construction, engineering and related firms and manufacturing firms (Capital)	purchases of goods and services sourced locally	and businesses supported by income re-spending
Value Added	The contribution made to overall regional or state domestic product, (i.e., the difference between total revenue generated and the total cost of inputs, including the sum of labor, materials, and services purchased from other businesses within a reporting period. This includes the value of labor income for (O&M) and value of goods produced plus profits made by firms attributable to construction projects and vehicle and equipment purchases (Capital)	The contribution made to overall regional or state domestic product, including profit made by firms attributable to agency purchases of goods and services sourced locally	The contribution made to overall regional or state domestic product, including, profit made by firms and businesses for goods associated with all rounds of income re-spending
Output	Value of all goods and services produced	Value of goods and services produced	Value of goods and services produced

Source: APTA My Economic Impact Tool: How to Use It. Note: "Locally" refers workers that live in the State of New Jersey, jobs created in New Jersey, and spending that occurs in New Jersey.

The APTA economic impact calculator uses IMPLAN, an input-output model, running in the background. Input-output analysis is used to estimate the economy-wide effects of changes in economic activity. The APTA tool was specifically designed to estimate impacts of transit investments using agency-specific expenditure and employment data reported to the National Transit Database (NTD). Data from three NTD data tables are used as data inputs–the employment table, the operating expenditure table, and the capital expenditure table. For this project, the research team used 2017 NTD data, which is the most current complete data available.

The APTA tool economic modeling results are summarized in Table 2. In 2017, NJ TRANSIT invested $2,555.7 million in transit capital projects, operations and maintenance. This included $2,091.4 million for operations and maintenance and $464.2 million in capital projects. This level of expenditure generated an estimated 30,456 jobs in New Jersey, including 11,963 NJ TRANSIT employees, 1,458 jobs in construction and related firms associated with capital projects and 7,879 outside agency jobs associated with the agency's purchase of goods and services in New Jersey. Income re-spending by NJ TRANSIT employees and others whose jobs are supported by NJ TRANSIT investment created an estimated 9,155 jobs.

Table 16 – Summary of economic impacts

Impact Type	Employment	Labor Income ($M)	Value Added ($M)	Output ($M)
Direct Effect	13,421	1,345.74	1,368.14	2,324.00
Transit Operations & Maintenance	11,963	1,245.90	1,245.90	2,091.60
Transit Capital Investment	1,458	99.84	122.24	232.40
Indirect (Supplier) Effect	7,879	466.52	600.08	1,224.49
Induced (Income Re-spending) Effect	9,155	497.44	845.09	1,368.95
Total Effect	30,456	2,309.70	2,813.31	4,917.44

In 2017, labor income, including wages and fringe benefits, received by NJ TRANSIT employees, workers filling jobs supported by NJ TRANSIT investment, and employee re-spending totaled more than $2.3 billion. The value-added to the New Jersey economy from NJ TRANSIT investment totaled $2.8 billion. Overall, NJ TRANSIT investment resulted in $4.9 billion in economic output in the State in 2017.

Mobility and Accessibility Benefits

Hundreds of thousands of New Jersey commuters travel into and out of New York City each day. In the absence of public transit services, traffic and congestion at the Lincoln and Holland Tunnels and the George Washington Bridge would be extreme. Traffic reduction and congestion relief at the trans-Hudson crossings were estimated to show the number of additional private passenger vehicles trips that would be generated if NJ TRANSIT service (i.e., commuter rail, buses directly operated NJ TRANSIT, and NJ TRANSIT-owned buses operated by private carriers) did not exist. The analysis includes only travel to the Manhattan Central Business District (aka NYC Hub), which includes all of Manhattan south of the 60th Street.

Table 17 – Estimated number of people traveling from New Jersey to the NYC HUB

	Between 8 AM and 9 AM			Between 7 AM and 10 AM			In a 24-Hour Period		
	Autos, taxis, vans, trucks	NJT Bus*	NJT Rail	Autos, taxis, vans, trucks	NJT Bus*	NJT Rail	Autos, taxis, vans, trucks	NJT Bus*	NJT Rail
Lincoln Tunnel	4,071	24,487		12,307	50,101		64,164	95,054	
Holland Tunnel	3,071	1948		9,208	3,629		50,844	7,674	
George Washington Bridge	10,789	3,008		30,041	5,378		188,266	18,123	
Amtrak/NJ TRANSIT Tunnels			25,171			51,846			88,361
Total	17,931	29,443	25,171	51,556	59,108	51,846	303,274	120,851	88,361

Note: * includes passengers traveling via NJ TRANSIT buses and private carrier buses supported by NJ TRANSIT.

Table 18 – Estimated total NYC-bound private passenger vehicle trips in the absence of NJ TRANSIT services

	Between 8 AM and 9 AM			Between 7 AM and 10 AM			In a 24-Hour Period		
	Original Autos	Deviated from transit	Total Autos	Original Autos	Deviated from transit	Total Autos	Original Autos	Deviated from transit	Total Autos
Lincoln Tunnel	2,974	22,063	25,037	9,239	46,902	56,141	47,525	84,257	131,782
Holland Tunnel	2,540	5,177	7,717	7,787	10,900	18,687	41,717	18,434	60,151
George Washington Bridge	7,875	13,262	21,137	22,587	26,717	49,304	139,456	54,057	193,513

Table 19 – Percent increase in inbound private passenger vehicle trips in the absence of NJ TRANSIT services

	Between 8 AM and 9 AM	Between 7 AM and 10 AM	In a 24-hour period
Lincoln Tunnel	742%	508%	177%
Holland Tunnel	204%	140%	44%
George Washington Bridge	168%	118%	39%

As shown in Table 3, more than 200,000 people use NJ TRANSIT services to travel from New Jersey into Manhattan's central business district on an average weekday. More than half of those that use NJ TRANSIT services travel between 7 AM-10 AM, the morning peak commuting period. If NJ TRANSIT rail and bus services did not exist, an estimated additional 26,717 private passenger vehicles trips would be needed to accommodate commuters during 7 AM-10 AM (See Table 4). The addition of vehicles during this period would increase traffic at the Holland and Lincoln tunnels by 140 to more than 500 percent respectively. Traffic at the George Washington Bridge would more than double. Table 5 shows the percent increase in traffic estimated at each crossing in the absence of NJ TRANSIT trans-Hudson commute modes.

Sustainability and Environment Benefits

The sustainability and environmental benefits of public transit service can be measured in a variety of ways. One way is to consider how people would have to travel if public transit did not exist and how impactful that travel would be. NJ TRANSIT services accommodate nearly 270 million passenger trips each year. In the absence of NJ TRANSIT services, many New Jersey residents would need to travel by private passenger vehicle. Private passenger vehicle travel increases the number of vehicle miles traveled each year which increases greenhouse gas emissions. As such it can be argued that NJ TRANSIT services provide sustainability and environmental benefits by reducing the number of private passenger vehicles on the road, which in turn reduces VMT and GHG emissions.

The research team used NJ TRANSIT ridership statistics reported to the NTD and data from the National Household Travel Survey (NHTS) to estimate the number of additional private passenger vehicles that would be required to accommodate trip-making absent NJ TRANSIT services. Data from the Bureau of Transportation Statistics was used to estimate the annual VMT that would result from more private passenger vehicles being used to travel. Finally, multipliers made available from the Environmental Protection Agency were then used to estimate additional GHG emissions generated from the additional VMT. The results of these calculations are presented in Table 6.

Table 20 – Estimated sustainability and environmental impacts if NJ TRANSIT services did not exist

Impact Measure	**Estimate**
Number of additional private passenger vehicles operating year-round on New Jersey roadways	120,000 to 137,000
Additional private passenger vehicle trips annually	133 to 151 million
Increase in annual VMT	1.53 to 1.67 billion
Increase in annual GHG emissions	1.2 to 1.4 billion pounds

PHASE 1 FOCUS GROUP SUMMARY

The Phase 1 focus groups conducted for this study included four sessions convened between November 2019 and January 2020 (See Table 7). The purpose of the sessions was to gain insights and obtain feedback from New Jersey residents, elected officials, and business owners on how public transit impacts them personally, the State of New Jersey, their constituents (elected officials), and/or their employees and customers (business owners). Focus group discussions also sought to capture information about which benefits associated with public transit are most important to various stakeholders, as well as strategies to communicate and market the benefits of public transit.

The focus group discussions were moderated by Jon Carnegie, the principal investigator for the study. Mr. Carnegie was assisted by Kevin Narvaez (Envision Consultants) and Andrea Lubin (RU-VTC). A topic guide approved by the Rutgers University Institutional Review Board (IRB), which is part of the University's Human Subjects Protection Program (HSPP), was used by the moderators at all sessions. In addition, each participant was given an IRB approved consent form to read and sign. Each session lasted approximately two-hours and all sessions were audio-recorded. A copy of the focus group topic guide and a summary of discussions from each focus group are included as part of the Task 2 Technical memorandum attached to this report as Appendix A2. A total of 48 individuals participated in the four sessions.

Table 21 – Focus group dates and locations

Date	Participant Group	Location
11/21/19	Non-NJ TRANSIT customers	Bloustein School of Planning and Public Policy, New Brunswick, NJ
11/25/19	NJ TRANSIT customers	NJ TRANSIT Headquarters, Newark, NJ
01/16/20	NJ elected officials	Bloustein School of Planning and Public Policy, New Brunswick, NJ
01/29/20	NJ business owners	Bloustein School of Planning and Public Policy, New Brunswick, NJ

The following is a summary of the key findings and common themes gleaned from the focus groups discussions.

Familiarity with NJ TRANSIT Services

- Across all groups, there was an overall high degree of awareness regarding the availability of NJ TRANSIT services.
    - Many participants reported being very familiar with and regularly using one or more services, including a number that reported either currently or formerly using NJ TRANSIT services to commute back and forth to work or school.
    - Access Link was the least known service.
    - There was a general misperception that most of NJ TRANSIT's customers are rail riders, rather than bus riders.
- Perceptions of NJ TRANSIT services varied widely based on where participants lived and/or worked and their personal experiences.
    - Many existing NJ TRANSIT customers reported overall satisfaction with NJ TRANSIT services. Those that reported being satisfied appreciated service frequency and the convenience of available services where they live and/or work. Regular users acknowledged that services are generally reliable, and many reported being satisfied with the relative affordability of transit services compared to the other travel options available to them.
    - At the same time, unsatisfied customers and those that do not regularly use NJ TRANSIT services expressed a variety of common frustrations and complaints about NJ TRANSIT services.
        - *Non-NJ TRANSIT customers* explained that the main reasons why they do not use public transit is because transit is not "convenient,"

they find it “frustrating,” “it does not go where they need it to go,” they don’t like using it during “inclement weather,” and it is difficult to use “when you have to get kids to activities like sports.”

- A number of participants reported experiencing transit trips that took significantly longer than the same trip by car.

- Others expressed frustrations regarding what they described as poor customer communication regarding service disruptions.

- *NJ TRANSIT customers* complained about: bus and light-rail overcrowding; reliability issues, including train cancelations; poor customer service and rude train/bus operators; unclean stations, stops and terminals; and accessibility issues that included lack of elevators at rail stations and bus operator treatment of customers utilizing wheelchairs (e.g. failing to stop and pick-up customers using wheelchairs).

- *Elected officials* reported regularly hearing complaints about service reliability; poor communication and transparency about service delays; lack of adequate and reliable parking at rail stations; limited services statewide with infrequent service in many places; vehicle and station cleanliness; and high cost. Several observed that transit reliability complaints have increased over the past two years.

- *Business owners* noted that they often hear complaints from their employees and/or customers related to: the cost of taking NJ TRANSIT services; the fact that many areas have limited services; lack of frequent service; problems associated with service reliability; and lack of adequate parking at rail stations, especially for commuters.

Impact of public transit on New Jersey

- There was unanimous consensus at the elected official, business owner, and NJ TRANSIT customer sessions that, overall, NJ TRANSIT services are beneficial to New Jersey residents, businesses and communities. Most non-NJ TRANSIT customer participants also agreed that services are beneficial.

- Participants at each of the four sessions were able to self-identify multiple benefits of transit. Most commonly these were associated with the economic, mobility, accessibility, sustainability and environmental benefits. None were able to cite any specific statistics, just a general sense and belief that transit provides benefits. Specific benefit measures identified by participants were as follows:

    - ***Growth and Economic Benefits***

- Transit creates jobs.
- Transit helps people “get to work.”
  - Access to transit enables many New Jersey residents to reside in the suburbs while still accessing diverse job opportunities in the New York City area, which increases their salaries.
- The availability of public transit helps New Jersey to attract businesses, contributing to economic growth.
- Transit increases sales revenue for local businesses located near transit.
  - Transit increases “foot traffic” which stimulates businesses.
- Transit increases property value and allows growth around transit stations/stops.
  - However, some noted that increased property value was not necessarily a positive measure as that could contribute to increased taxes and rents, and may contribute to pricing individuals out of their respective neighborhood.

- ***Mobility and Accessibility Benefits***
  - Transit reduces traffic congestion.
    - Some disagreed, noting that they doubted or could not relate to the idea that transit impacted congestion significantly anywhere except when traveling into New York City.
  - Transit offers a convenient travel option that provides connectivity to destinations customers seek to access.
    - As one noted, “It gives you the opportunity to plan so you can find the most effective way of approaching each day.”
    - Others noted that NJ TRANSIT reduced fare affords enhanced mobility for older adults and persons with disabilities. One also stated that NJ TRANSIT offers safe mobility, due to the presence of fellow travelers and NJ TRANSIT vehicle operators.
  - Transit provides mobility options for those that cannot or choose not to drive.

        - Transit benefits disadvantaged populations including people with disabilities, older adults, and low-income populations enabling them to access needed destinations, including medical trips and employment, as well as contributing to decreased isolation.

        - However, non-NJ TRANSIT customers were not very interested in hearing basic facts/statistics/figures about how transit expands mobility and accessibility.

    - Commuting by transit saves time.

        - Although, some noted that this might vary significantly depending on the market. For example, it can save time commuting into New York City, but the same is not true in the suburbs or along busy local bus routes.

- ***Sustainability and Environmental Benefits***

    - Transit helps to reduce vehicle emissions and dependence on gasoline.

        - One participant suggested the following as a winning message: "X people can be moved on public transit for the equivalent of a gallon of gas."

        - Transit has a smaller "carbon footprint."

- ***Public Health and other Social Benefits***

    - Transit reduces air and noise pollution.

        - Decreased pollution benefits everyone, including persons suffering from respiratory illnesses.

    - Transit is safer than driving.

        - Transit reduces auto travel, which they described as a dangerous travel mode.

    - Reliable transportation helps address community health disparities and positively influence health outcomes.

    - Transit use increases people's level of physical activity.

    - Transit use reduces stress compared to driving thus contributing to positive mental health.

        - Commuting by transit “frees up your time” so you can do other things while traveling…read a book, look at social media, get some work done or just rest!

        - Transit offers an overall relaxing, easy commute.

    - Transit can contribute to personal independence and affords opportunities for social interactions

    - Public transit can contribute to a “sense of community” or belonging.

    - Transit can save you money if you don’t need to own a car.

        - Transit is a more cost-efficient travel option compared to driving in many scenarios.

        - Not all agreed with these statements, noting that this very much depended on individual circumstances.

- Participants from both the business owner and elected official sessions also self-identified benefits associated public health and more generally with overall quality of life.

    - Participants at both the NJ TRANSIT customer and non-NJ TRANSIT customer focus groups uniformly disagreed that transit offers public health benefits. Most expressed health concerns, such as being exposed to germs/illness from fellow passengers, as opposed to health benefits.

    - This contrasted with the perceptions of business owners and elected officials, who expressed a belief that transit provided public health benefits that derive from increased physical activity among transit customers.

- No participant in any of the four sessions self-identified transit benefits related to emergency response and community resilience.

    - Participants were prompted with examples such as NJ TRANSIT services aiding with emergency evacuations during Tropical Storm Irene and Super storm Sandy, as well as providing transportation in the aftermath of the September 11, 2001 terror attacks. Several participants expressed interest in these examples but indicated they did not find this benefit particularly compelling. Others voiced support for promoting these benefits more widely. As one NJ TRANSIT customer opined, increasing public awareness for these kinds of services will help demonstrate how NJ TRANSIT “supports communities.”

- While no single benefit or benefit category emerged as most compelling, economic, environmental and mobility/accessibility benefits garnered the most attention and discussion.

    - It was also noted that the appeal of various benefits will vary depending on the audience. For example, environmental benefits might appeal more to younger persons while older adults might be more interested in personal economic benefits and accessibility benefits.

Communication Methods

All participants indicated they would be receptive to hearing messages related to the benefits of public transit. Overall, approximately 12 methods for communicating the benefits of public transit were suggested by one or more participants from the four focus group sessions. The most frequently suggested methods were social media, television, and radio. Other commonly cited suggestions included hyperlocal media, online news outlets, and municipal websites and social media feeds. While non-transit customers and business owners were supportive of employing billboard ads, elected officials and transit customer participants were not.

Many participants of both the business owner and NJ TRANSIT customer focus group sessions noted that regardless of the marketing, a diversity of ads and materials communicating the benefits of transit should be developed and targeted to different markets. For example, a message could be targeted to older adults and persons with disabilities, while another could be targeted to younger persons.

Non-NJ TRANSIT customers

Television and radio ads were mentioned, as were billboard advertisements. Regarding the latter, it was suggested that LED and traditional billboard advertising be placed along populated roadways, boardwalks local street fairs, environmental events, and other recreational spaces. Non-transit participants did not support the use of social media to communicate transit benefits. Several did recommend utilizing hyperlocal media, including online local news services such as the TAPinto network and Patch and someone also suggested sharing short videos that highlight a “personal story” demonstrating the positive impacts of transit.

NJ TRANSIT customers

Most suggested utilizing social media platforms, television (News 12) and radio ads, hyper local online news outlets, and statewide online news outlets such as nj.com. Several individuals suggested marketing the benefits of transit at local community events but recommended that NJ TRANSIT should determine a “fun” way to engage attendees, such as offering giveaways of inexpensive “swag.” Several also recommended sharing the benefits via NJ TRANSIT public information events, such as Access Link forums. NJ TRANSIT customers were not supportive of utilizing billboards to advertise transit benefits.

Elected officials

Most participants suggested utilizing social media platforms, with one participant specifically recommending the video-sharing social networking service TikTok. Several shared that Facebook is used by a primarily older cohort compared to other social media platforms. The NJ.gov Twitter feed was cited by several as a good model. Hyper local online news services such as the TAPinto network and Patch were suggested. One participant recommended using press releases in traditional newspapers. Several elected officials recommended using municipal newsletters as well as sharing marketing materials with municipal communication departments to assist with message dissemination.

Business owners

Billboard ads placed on station platforms, along roadways, and in/near tunnel entrances into NYC. Television ads on News 12, municipal government channels, and PBS were recommended, as were radio ads on 101.5 and WFMU stations. Advertising on online news outlets including nj.com, njbiz.com, and roi-nj.com were suggested, as was leveraging local chambers of commerce. Many mentioned social media, but their support for this medium was not as strongly expressed as by the elected official and transit customer participants. One business participant also suggested marketing transit benefits via bus wrap advertisements.

Potential Storylines and Graphics

At each focus group session, participants were shown a series of 12 example infographics communicating the benefits of transit. Participants were asked to make observations and provide feedback on the information being communicated and the style and design of the graphics. The facilitator it made clear that the information in the graphics was not specific to New Jersey. Overall, participants responded positively to graphics that:

- Clearly and simply communicated the core message;
- Were uncomplicated; and
- Used bold colors to communicate core messaging and statistics, especially when combined with softer color schemes in the overall design.

Participants did not like graphics that presented a multitude of statistics, which they found confusing. This sentiment was especially true if the statistics presented were difficult to visualize and/or provided little or no context. Participants from the elected official session expressed skepticism about the statistics presented in many of the graphics.

Overall, there were two storylines that resonated positively across all four sessions. These were:

- ***Storyline 6: "1 bus can replace a minimum of 30 cars"*** (Figure 6) – Participants appreciated the overall simplicity of the message and pleasing color scheme; and

- ***Storyline 12: "The role of transportation in promoting physical activity"*** (Figure 12) – Participants found the linear, easy-to-follow story map presentation, clear messaging, and the pleasing color scheme and icons.

Participants also provided positive feedback about Storyline 4 and 9. They liked the overall message, graphic design, colors, and several of the facts presented in Storyline 4. They liked the clear messaging related to commuting costs by mode and the graphic design in Storyline 9. More specific commentary on each of the 12 storyline graphics is presented below.

Storyline 1: "Choosing METRO maximizes the roads we have"

Figure 1 presented a simple fact about transit ridership and noted that transit carries more people in the same amount of space which provides congestion relief and saves time. The consensus across all four focus groups was that the graphic was "too busy;" "too complicated;" and that the message should be made "simpler." Participants also remarked that the storyline heading should be made more prominent.

Storyline 2: "Make life simple and green with public transportation"

Figure 2 presented information on ridership proportions by mode and several statistics related to transit benefits. The overriding feedback from participants from all sessions, except the business owner group, was that this

Figure 1. "Choosing METRO maximizes the roads we have"

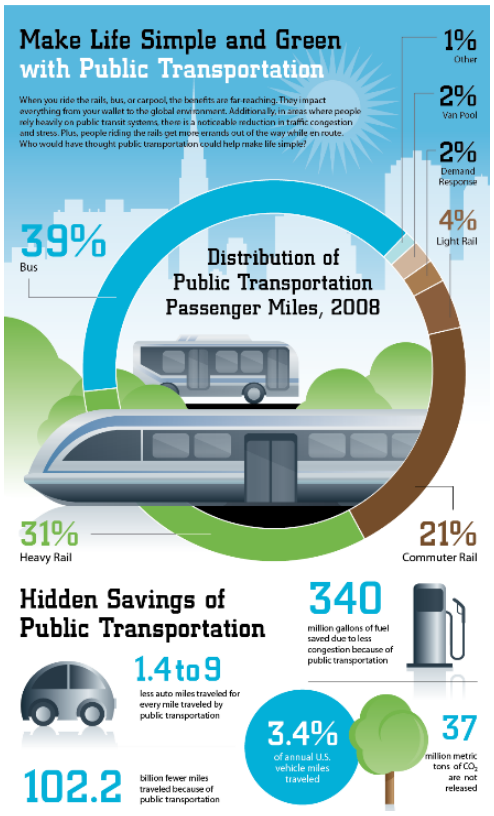

Figure 2. "Make life simple and green with public transportation"

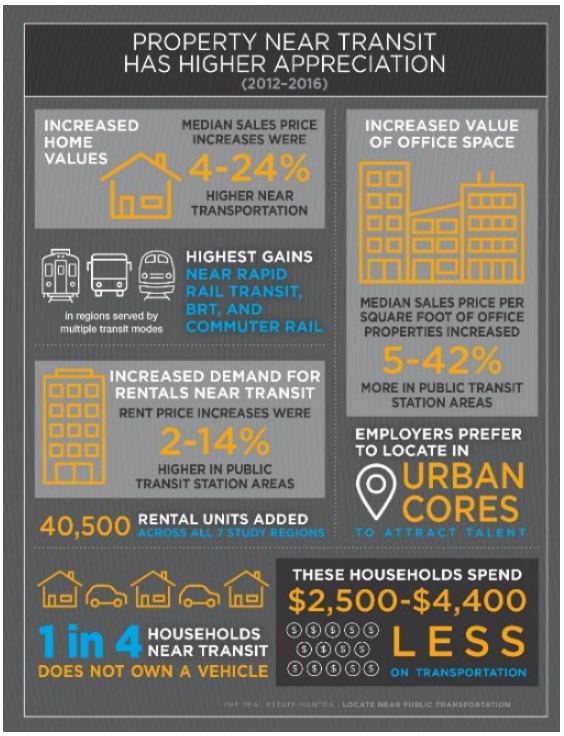

Figure 3. “Property near transit has higher appreciation”

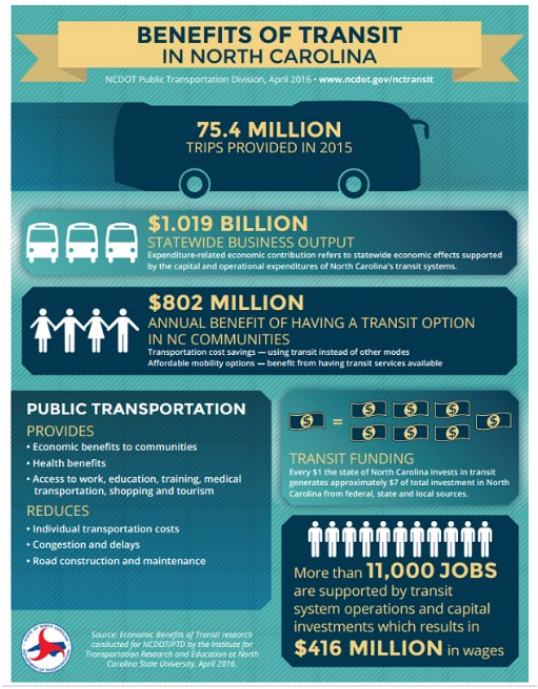

Figure 4. “Benefits of transit in North Carolina”

storyline was also “too busy” and was “statistical overkill.” One participant remarked that the viewer has “to do a lot of work to figure out this image.” Several from the elected official focus group session added that the information communicated in the bottom portion of the storyline under the heading “Hidden Savings of Public Transportation” was confusing and unclear. In contrast, several from the business owner session liked this storyline because it was “colorful” and “organized.” However, most business owner participants did acknowledge that they missed the main message that public transportation is easy and green.

Storyline 3: “Property near transit has higher appreciation”

Figure 3 presents multiple facts about a single topic related to the economic benefits of transit. The consensus across all four sessions was that this message and graphic were “too busy” and “not for the general public.” Several participants commented that the statistics “only matters if you own property.” Participants were confused about what audience the graphic was geared toward, assuming it was probably best suited for real estate professionals and developers. Several in the business owner session also remarked that the graphic was too dark.

Storyline 4: “Benefits of transit in North Carolina”

Figure 4 presents a simple fact about transit ridership and a range of benefits associated with the availability of transit services. Some were presented as simple assertions with no data and others were presented as facts backed up by statistics. Some participants from the NJ TRANSIT customer session opined that the facts were “not that interesting” and that people would have a hard time understanding the “large

statistics." However, participants from the other three sessions expressed varying degrees of support for this storyline. Most positive comments focused on the feeling that "There's a flow to it;" and viewers "can actually read it in an order." Others noted that "you can visualize it [the information presented]." In terms of design, several indicated they liked the use of the color blue throughout the graphic and that the spacing in between the message blocks made it easier to read. Also, when Mr. Carnegie read aloud some of the messaging in the storyline, such as "Every $1 the state of North Carolina invests in transit generates approximately $7 of total investment in North Carolina from federal, state and local sources," participants in the business owner and non-transit customer sessions suggested that this type of information and messaging should be prepared for New Jersey. However, several participants from the elected official focus group felt that the average person may be confused by some of the statistics.

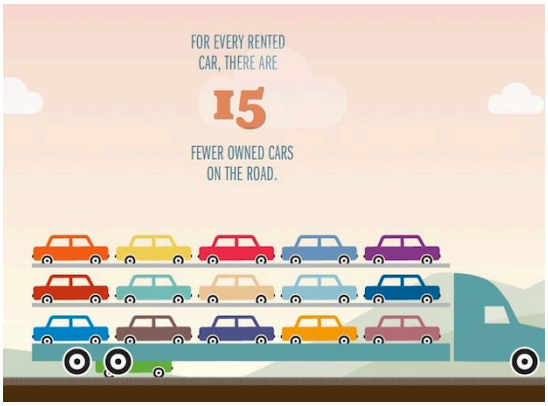

Figure 5. "For every rented car, there are 15 fewer owned cars on the road"

Figure 6. "1 bus can replace a minimum of 30 cars"

Storyline 5: "For every rented car, there are 15 fewer owned cars on the road"
Figure 5 communicates a single, simple fact. Participants from the non-transit customer and business owner sessions liked the clear and simple message being presented. Some noted in the business owner session that the simple, light background helps the viewer to focus. The main issue presented by elected official and NJ TRANSIT customer participants was that they did not fully understand or relate to the message being communicated about rental cars and the relationship to car ownership.

Storyline 6: "1 bus can replace a minimum of 30 cars"
Figure 6 also communicates a single, simple fact. This graphic was one of the most popular across all four sessions. Positive remarks included: "this grabs you right away, you don't have to decipher anything;" "simple is good;" "not too many words;" "good graphics." Participants from all four sessions also remarked that they liked the green/grey color scheme and light-colored background. The only negative remarks were expressed by several participants in the elected officials focus group. These individuals questioned the meaning and validity of the message being presented.

Storyline 7: "Public transportation is ten times safer than travel by car"
Figure 7 is a third example that communicates a single, simple fact. While several participants in the non-transit customer focus group liked the simplicity of this message/graphic, most participants in the other three sessions did not like the graphic, primarily due to the color scheme and graphic design. One participant suggested that the fonts, color scheme, and overall graphic design made the image "looks dated." Many participants disliked the use of the color red in the image. Comments included that "red seems alarmist;" "red is dangerous;" and "red is stressful." Several added that the graphic's darker red images also appeared "polluted" and "smoggy," which they disliked. At the same time several participants registered that this was probably the point of using the image and colors.

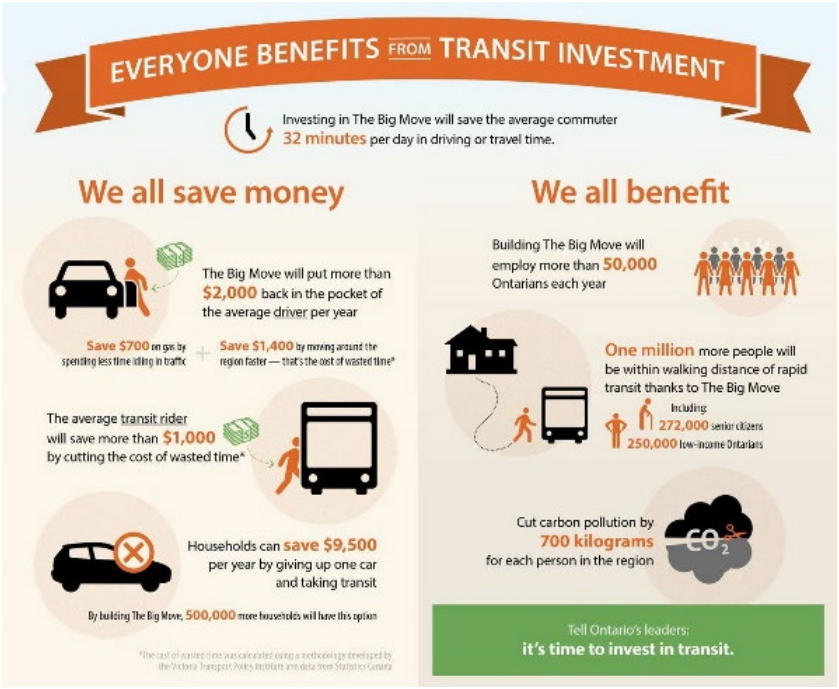

Figure 8. "Everyone benefits from transit investment"

Storyline 8: "Everyone benefits from transit investment"

Figure 8 describes transit benefits in the format of a personal appeal. Participants from the NJ TRANSIT customer group and elected official group expressed general support for this messaging and the style of the graphic. The graphic and messaging did not resonate well with the business owners nor most of the non-transit participants. Those that liked this storyline opined that its positive collective message, employing words like "we" and "everyone" to communicate the message was effective. However, both business owner participants and non-transit customers had difficulty comprehending the meaning of some of the environmental messages presented in the storyline. There was confusion regarding the example stating that this community's investment in transit will "cut carbon pollution by 700kg for each person in the region." Participants commented that they had no frame of reference for the kilogram measurement. Several in the business owner session responded affirmatively when Mr. Carnegie asked if it would be helpful if for example, a recognizable animal image was used (e.g. elephant) to provide that missing context.

Storyline 9: "Commuting costs comparison"

Figure 9 presents a comparison of commute costs by mode. The majority of those participating in the NJ TRANSIT customer, the non-transit customer and the business owners focus group sessions reacted positively to this graphic and its core message. Those that participated in the elected officials focus group were less positive. Those that liked the storyline cited reasons including the use of a graduated list of commuting cost differentials and what was described as a "clear" presentation of the mode rankings. One business owner offered, "It gets you to think about how you travel." Several other business owners remarked that they liked the colors and graphics used, indicating the storyline overall looks "happy."

Both NJ TRANSIT customer and non-transit customer participants recommended that the ranking be organized so that public transit – which has one of the lowest commuting costs compared to the other modes – is positioned near the top of the ranking instead of near the bottom. Mr. Carnegie asked all groups if they preferred presentation of cost savings by month or year, or both (as is shown in the storyline). Elected official and non-transit customers did not indicate a preference, whereas NJ TRANSIT customers noted they preferred seeing cost savings by month. One participant noted that the difference in scale between monthly and annual costs made it look like the monthly cost differential was less significant. Finally, several participants from both the elected official and business owner sessions questioned the calculations presented in the storyline, noting they were "too vague". A few participants in both sessions agreed it might be helpful if a QR code offering a link to more detailed information were included.

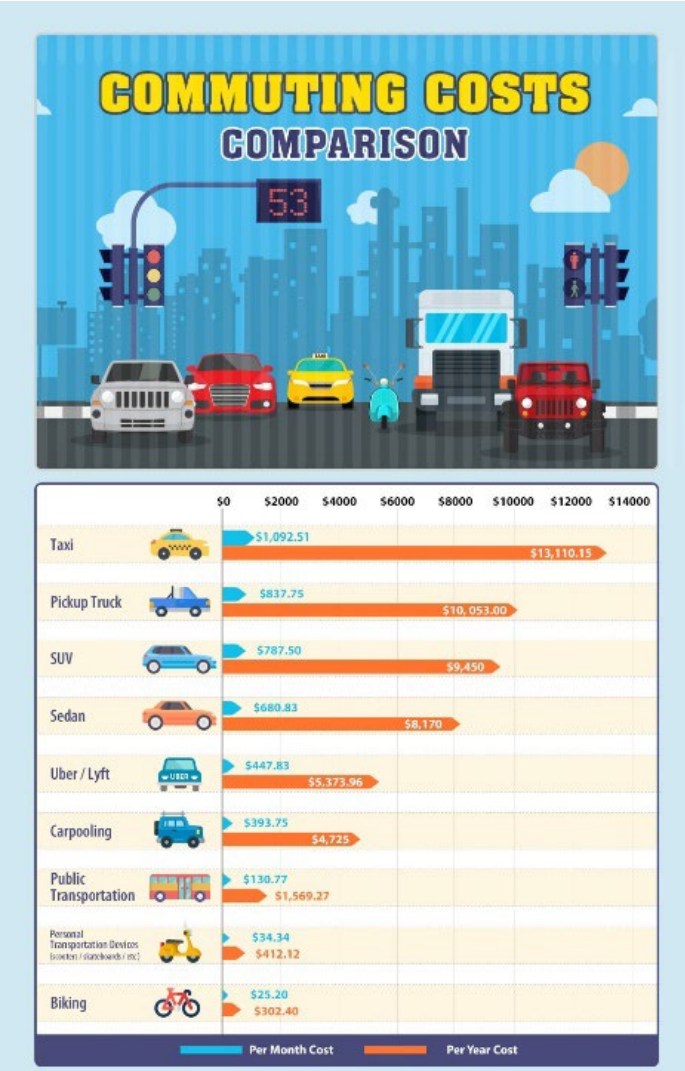

Figure 9. "Commuting costs comparison"

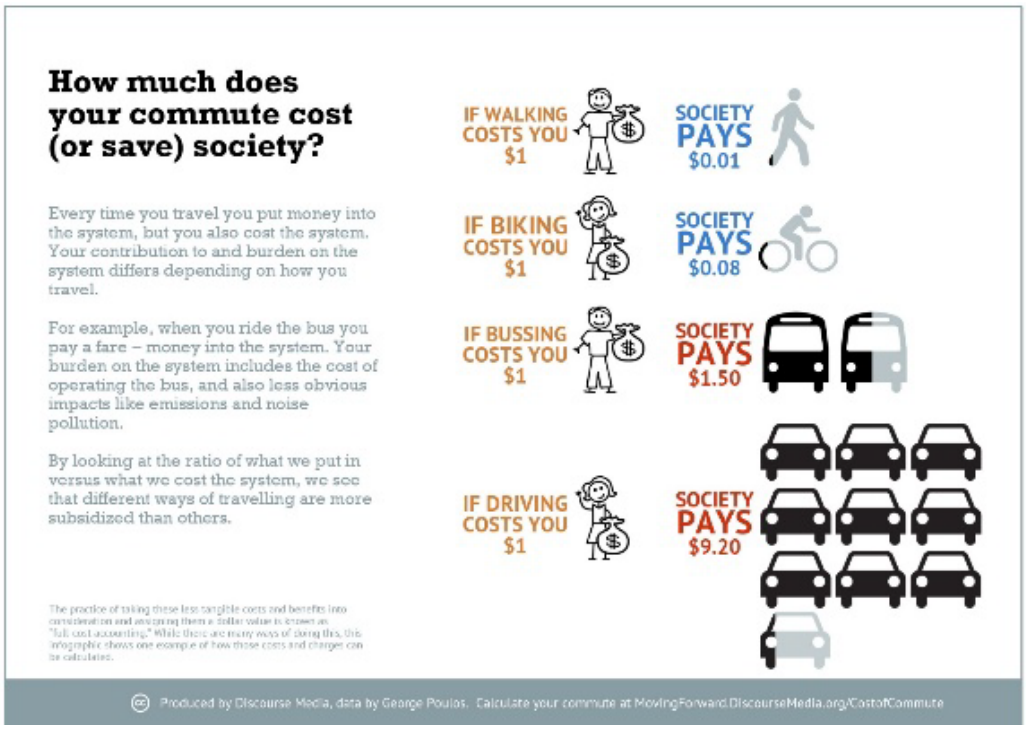

Figure 10. “How much does your commute cost (or save) society?”

Storyline 10: “How much does your commute cost (or save) society?”
Figure 10, which was described as an “explainer,” presents benefits along with a more significant amount of text that explains the message being shared. Overall, feedback on this storyline among participants was overwhelmingly negative, with comments focused on what was described as confusing messaging that was “too abstract;” “only an economist would care about this;” “too much;” and “game over.” The exception to these negative sentiments was voiced by a few business owners who indicated support for the messaging about the societal costs of various commuting modes.

Storyline 11: “Why you should get on board for public transportation”
Figure 11, which was described as a “story map,” presents a series of facts positioned on a graphic that includes an image of a local community streetscape with houses, storefronts, roads, etc. Business owners reacted positively to this graphic and messaging. They liked the messages used to communicate the benefits of transit, and the overall story map approach, which allows the viewer to progress through the graphic easily and employs “common structures” (e.g. houses, neighborhood setting) to tell the story. Participants from the other three focus groups were less positive. Non-transit customers were described the graphic as “too busy” and felt the images, which primarily present assertions, were not convincing. Participants in the elected official session found the graphic design similarly lacking, noting the font size used was too small and the circular text surrounding several of the storyline graphics was difficult to read.

Figure 11. “The role of transportation in promoting physical activity”

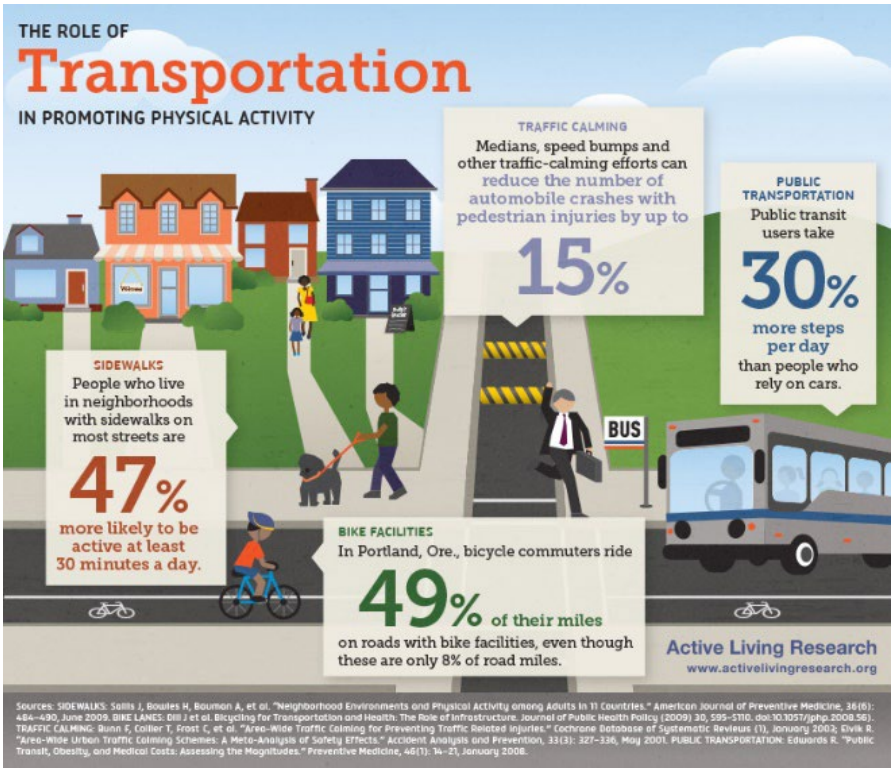

Figure 12. “Why you should get on board for public transportation”

Storyline 12: "The role of transportation in promoting physical activity"

Figure 12, which presented another example of a "story map," showed a series of facts positioned on a graphic that includes an image of a local community streetscape with houses, storefronts, roads, etc. This graphic and messaging generated the most positive response across all four groups of any of the graphics shown. Participants liked the bold color palette and icons used. Many stated their preference for this storyline compared to the one presented in the previous story map (Figure 11), noting that Figure 12 is "easier to read;" "it's more linear," "not as busy," and presents a "clearer message."

Closing Thoughts and Comments

When offered an opportunity to submit final thoughts and comments on notecards at the end of each session, participants shared the following observations and recommendations:

- The environmental, sustainability and "green" benefits of transit should be highlighted.
- Transit benefits as they relate to the individual (i.e. personal benefits), as well as to society and communities are important.
- NJ TRANSIT should market transit benefits to the entire New Jersey population, including segments that may be more difficult to reach such as bus customers; paratransit customers; non-English speakers; and persons not gainfully employed.
- Benefits should be communicated in a simple, clear, positive manner, imparting easy-to-understand information with simple graphics.
- NJ TRANSIT should partner with a range of stakeholder organizations such as bicycle advocates, New Jersey businesses, residents, and houses of worship to share the message of transit benefits.
- NJ TRANSIT should consider convening public forums to communicate the benefits of transit.

PROPOSED "DID YOU KNOW?" MARKETING STRATEGY

The research team recommends creating and implementing a preliminary 'Did You Know? campaign to share information and data about the benefits that NJ TRANSIT service provide residents and businesses in New Jersey. The preliminary campaign, which will be "rolled up" into a more comprehensive 'Benefits of Transit' campaign at the conclusion of the study, can be used to share statistics about the benefits of transit to New Jersey in a clearly understood manner, while also providing a steady flow of information that can help create a consistently positive public narrative about NJ TRANSIT.

For the purposes of this study, potential benefits associated with NJ TRANSIT services are being organized into five benefit categories as follows:

1. Growth and Economic Benefits;
2. Mobility and Accessibility Benefits;
3. Sustainability and the Environmental Benefits;
4. Emergency Response and Resilience Benefits; and
5. Public Health and other Social Benefits.

A set of nine transit benefit measures associated with NJ TRANSIT services were calculated as part of Task 1. These benefit statistics will provide a foundation for the proposed 'Did You Know?' campaign. The methods used to calculate the benefit statistics are presented in the Task 1 technical memorandum. The following sections lay out the components of the proposed Phase 1 'Did You Know?' marketing campaign recommended by the research team.

Branding and Consistency

Today, people are inundated with an incredible amount of information and advertising about a host of topics, products, issues etc. It is difficult to attract a viewer's attention unless it is deemed worthwhile for their attention. If a person is intrigued by a 'Did You Know?' factoid, message or infographic and find it useful, they will be drawn to a similar piece of information if it crosses their path in the future. To generate a connection with this campaign, a custom 'Did You Know?' logo should be included on all campaign materials to strengthen brand identity. The logo should be designed in a manner consistent with NJ TRANSIT's overall identity system. Figure 13 presents a draft set of 'Did You Know?' logos to consider. One of these or a similar logo should be selected and used consistently throughout the campaign.

Figure 13. Draft 'Did You know?' campaign logos

Communication Methods

Currently, NJ TRANSIT uses a variety of digital, mobile, print and other communication methods to share information with its customers and other constituencies. Table 8 presents the 12 methods for communicating the benefits of public transit that were suggested by one or more participants from the four focus group sessions convened as part of Task 2. The most frequently suggested methods included social media, television, and radio. Other commonly cited methods included hyperlocal media, billboards, online news outlets, and municipal resources.

Table 22 – Focus Group Suggestions for Communicating Benefits of Public Transit

NJ TRANSIT website and social media	Hyperlocal News Media
Traditional Newspapers	Television
Radio	Online News Outlets
Municipal Resources (websites, emails lists, newsletters)	Billboards
NJ TRANSIT Bus Wraps	Community Events held by others
Public Information sessions/events convened by NJ TRANSIT	Short Videos

The research team recommends organizing the preliminary 'Did You Know?' campaign around various components of NJ TRANSIT's owned media options, in particular the NJ TRANSIT website, social media posts, and in-vehicle and in-station print signage.

Proposed Transit Benefits Storylines and Messaging

It was clear from the Phase 1 Focus Groups that there was overwhelming agreement that NJ TRANSIT services provide benefits to New Jersey residents and businesses. Although, the focus group participants represent just a small sample of the State's population, the positive sentiment expressed at the focus group sessions suggests that individuals and stakeholders will be receptive to information and data that quantifies the benefits of transit in a substantive way. The thrust of the preliminary 'Did You Know?' campaign can therefore be on telling the story of transit benefits rather than obtaining buy-in to the fundamental idea that transit is beneficial. Using data derived from the Task 1 transit benefit calculations and insights gleaned from the focus groups, the research team developed seven storylines to include in the campaign. These storylines are presented in Figures 14-19.

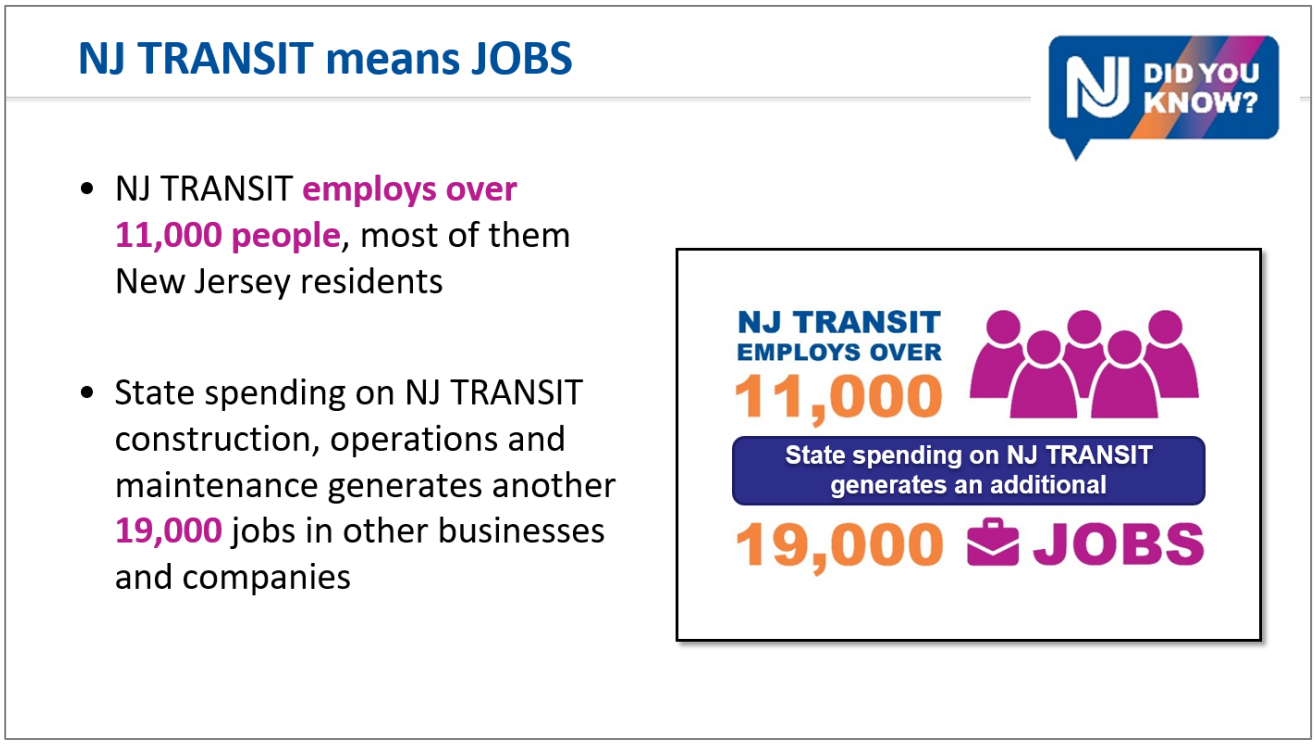

Figure 14. NJ TRANSIT means JOBS

NJ TRANSIT generates ECONOMIC ACTIVITY

- NJ TRANSIT spending generates **$5 billion in economic activity** each year
- Every **$1 invested by** NJ TRANSIT in public transportation generates **$2 in economic activity** in New Jersey

Figure 15. NJ TRANSIT generates ECONOMIC ACTIVITY

NJ TRANSIT reduces CONGESTION

- There are **140,000 fewer vehicles** on NJ Roads each year because people ride NJ TRANSIT instead of driving.
- NJ TRANSIT services eliminate **150 million vehicle trips** each year.
- **1.5 billion vehicle miles of travel saved** because people ride NJ TRANSIT.
  - That's enough miles to drive to the moon and back more than **3,100** times or from New York to Los Angeles **537,000** times.
- If NJ TRANSIT customers that travel into New York City for work each morning decided to drive instead, **traffic would increase by 500%** at the Lincoln Tunnel, **140%** at the Holland Tunnel and **120%** on the George Washington Bridge every weekday morning.

Figure 16. NJ TRANSIT reduces CONGESTION

NJ TRANSIT is good for the ENVIRONMENT

DID YOU KNOW?

- NJ TRANSIT services **eliminate 644,000 metric tons** of green house gas emissions every year.
- That is equivalent to **72 million fewer gallons** of gas consumed.
- It would require over **840,000 acres** of U.S. forests to absorb that much pollution. That's the equivalent of:
  - 1,000 central parks; or
  - The land area of Hudson, Union, Essex, Passaic, Bergen, Somerset, and Middlesex counties combined

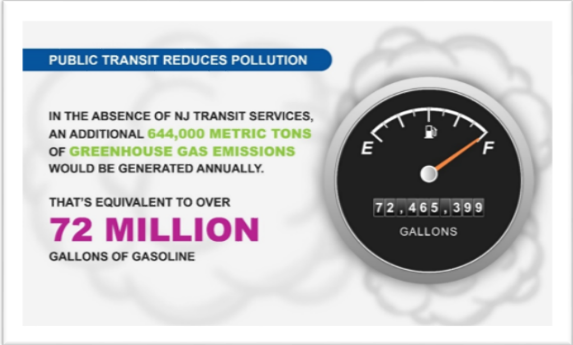

Figure 17. NJ TRANSIT is good for the Environment

NJ TRANSIT provides ACCESS TO OPPORTUNITY

DID YOU KNOW?

- NJ TRANSIT's system provides more than **944,000 trips** each weekday on 251 bus routes, three light rail lines, 12 commuter rail lines and through Access Link paratransit services.
- NJ TRANSIT has a service area of **5,325 square miles** with bus service to 386 NJ municipalities, rail service to 116 NJ municipalities and Light Rail service to 22 NJ municipalities.
  - NJ TRANSIT's service area is more than **17x the size of New York City** and **77x bigger than Washington DC.**
- NJ TRANSIT is the **third largest transit system in the country** with 165 rail stations, 62 light rail stations and more than 19,000 bus stops linking major points in New Jersey, New York and Philadelphia.

Figure 18. NJ TRANSIT provide ACCESS TO OPPORTUNITY

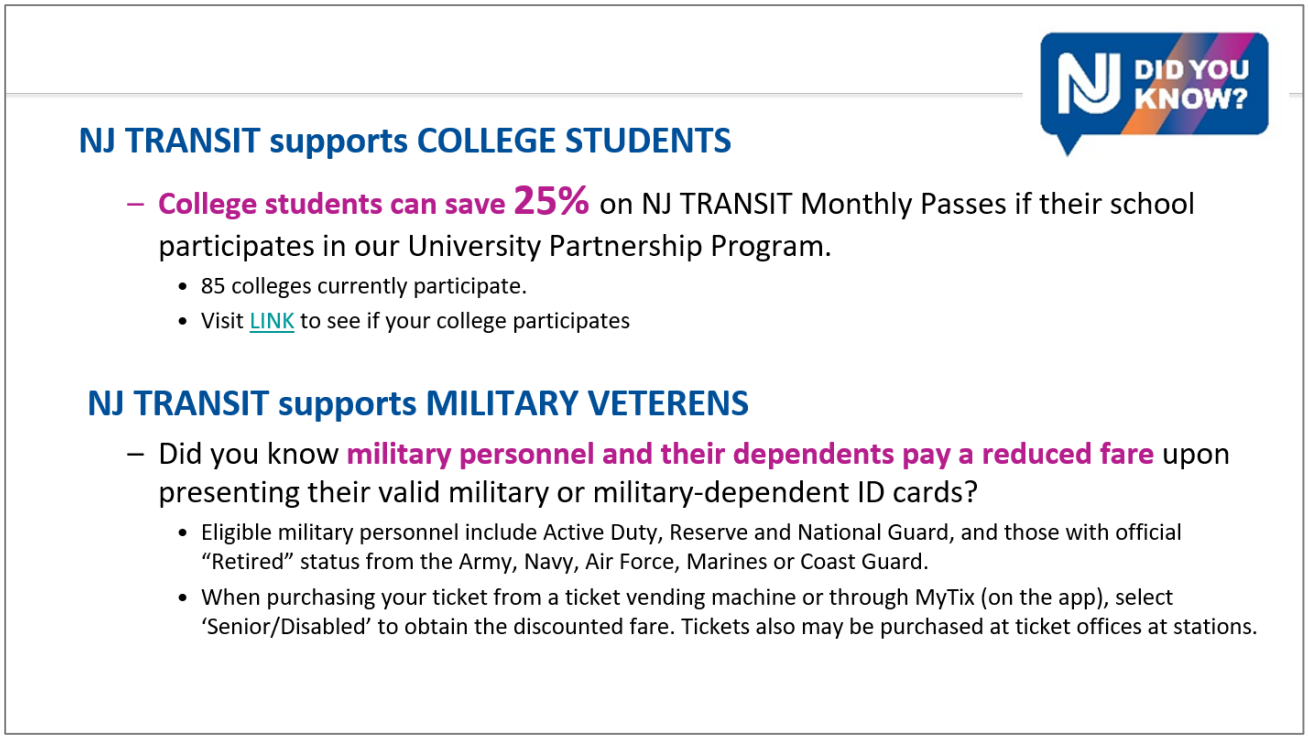

Figure 19. NJ TRANSIT supports COLLEGE STUDENTS and VETERANS

Recommended Collateral Materials

NJ TRANSIT already maintains a corporate website and mobile app, generates a regular stream of content via social media, and promotes its services via printed advertisements inside of their fleet of bus and rail vehicles, and throughout their stations and other outside venues. The proposed 'Did You Know?' campaign should be integrated into these existing activities as a new branded element of the agency's regular communications and marketing. The research team recommends the preliminary campaign consist of content suitable for a variety of mixed media sources (printed or digital), and the content be customized to appropriately match different audiences. Potential audiences for the 'Did You Know?' campaign include the general public (both transit and non-transit riders), businesses/employers, economic development and real estate professionals, local elected officials, and State legislators and their staff.

NJ TRANSIT should create a dedicated webpage for the campaign where infographics, other published materials and documentation regarding how the benefits were calculated can be reposed and accessed by the public. In addition, the storyline content presented above should be translated into a regular schedule of 'Did You Know?' facts disseminated regularly via all NJ TRANSIT social media channels (i.e., a new fact every month/week), or to coincide with a specific date of importance (i.e., Environmental fact on Earth Day) or both.

Other collateral materials should be developed as summary standalone materials. For the preliminary campaign the research team recommends a combination of infographics, briefing sheets and short videos.

Infographics

An infographic is the combination of information and a graphic. The reason for creating an infographic is to more effectively communicate data\information that may be difficult for others to understand, or something that the general person may not know. The infographic format has initially been determined the best method to communicate a number of the transit benefit transit benefit statistics into digestible facts that the general public can understand and appreciate. The development of a series of infographics will be the key component in its 'Did You know?' campaign, as they will provide NJ TRANSIT with a steady flow of information for them to distribute via the majority of their communication platforms.

There are numerous ways to design an infographic. As evident from the feedback during the four Focus Group meetings conducted as part of Task 2, infographic design is an important component of effective communication. Infographics are meant to simplify the data as much as possible in order to enhance communication. An infographic is not a list of questions; it is a visualization of the answers. The following preferences as expressed by focus group participants should guide infographic design.

- Use the infographics to communicate a clear and concise message with short and specific titles.
- Do not overcrowd the infographic with too much small-sized text.
- Use bold color when highlighting key messages and statistics.
- Avoid heavy use of the color red.
- Present information in an easy to follow manner, communicating facts that readers would not have difficulty visualizing and understanding.
- Provide a way for viewers to obtain more information about the statistics and how they were calculated through a QR code or link to more information.

Figure 20 shows two sample infographics developed by the research team to communicate the benefits of NJ TRANSIT services in terms of reducing vehicle miles traveled annually in New Jersey.

Briefing Sheets

Collateral communication materials will not be limited to infographics alone. There will likely be some content that needs more explanation. Too much information on an infographic is not advisable and can be overwhelming depending on the content. One-page handouts, brochures and briefing sheets are examples of compiling information in a format that audiences, such as elected officials may find useful.

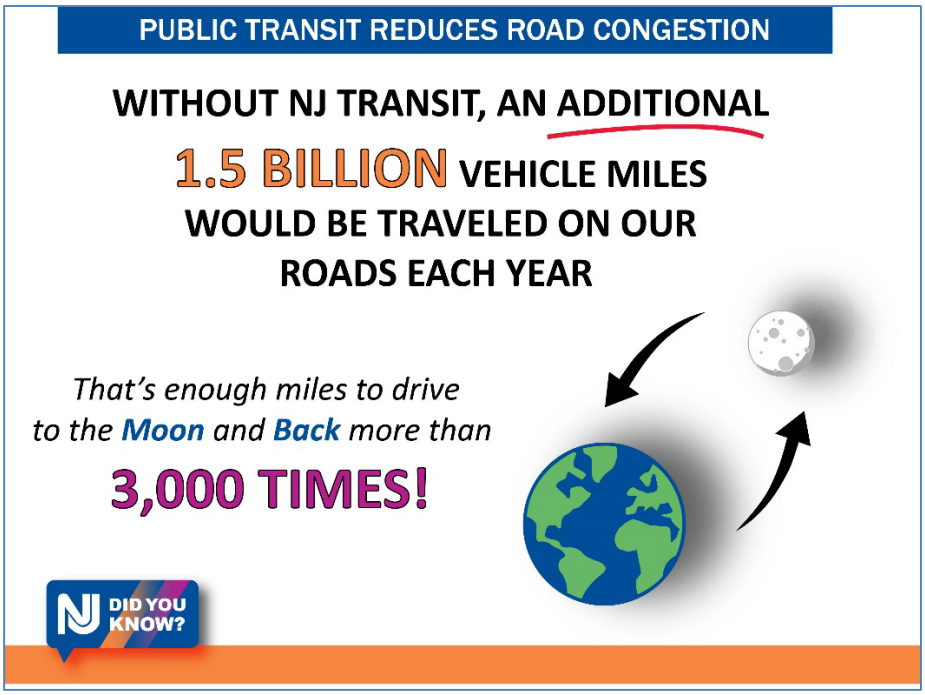

Figure 20. Example Infographics – VMT Reduction Benefits

Short Videos

Videos can be an effective means of communicating as part of awareness campaigns. In the context of the 'Did You Know?' campaign, videos could be used in at least two ways. One example, consistent with existing NJ TRANSIT efforts to connect with customers, would be for NJ TRANSIT's customer advocate, Stewart Mader, or another

NJ TRANSIT representative to conduct and record ‘person on the street’ interviews. The NJ TRANSIT spokesperson could present a ‘Did You Know?’ fact, record interviewee reactions, and have a short conversation about the fact. Another example might be to pair a fact with a personal story from someone that has benefitted from NJ TRANSIT services. These videos could be shared via social media and posted on a dedicated ‘Did You Know?’ webpage.

In addition, the following potential advertisement opportunities should be considered as part of the initial ‘Did You Know?’ marketing campaign roll-out.

Bus shelters, platforms and station buildings – Infographic ads on bus shelters, station platforms, station interiors, etc. drawing immediate attention from the public walking down the street, waiting for the bus or train, or driving by.

Audience: All (Transit and non-transit riders)

Bus wraps – Infographic ads covering the perimeter of the bus and capturing the attention of pedestrian, driver, and commuter traffic.

Audience: All (Transit and non-transit riders)

In-vehicle posters and cards – Infographic ads placed inside the bus and/or rail cars, communicating the message to riders.

Audience: Frequent and infrequent transit riders

Advertisements can be produced and displayed in the form of infographics. These advertisement options would also be applicable for additional marketing content developed as part of the more comprehensive transit benefits marketing strategy developed as part of Phase 3.

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APPENDIX C

Marketing Research for the Quantifiable Benefits of Transit in New Jersey

Phase 2 Report

September 8, 2021

INTRODUCTION

The objectives of this research are to a) quantify the economic, mobility/accessibility, environmental, and social benefits of public transportation to New Jersey; b) understand better what benefits are potentially most important to transit riders, non-transit riders, and other stakeholder groups; c) determine how best to communicate the benefits of public transportation to these audiences; and d) develop a marketing framework, communication plan, and collateral marketing materials to support a future transit benefits marketing campaign as part of NJ TRANSIT's comprehensive communications strategy.

Phase 1 of the study focused on producing "quick turn-around" benefit calculations, completing a series of focus groups to determine what benefit measures resonate most with various audiences, and developing recommendations regarding how NJ TRANSIT might launch a "Did You Know?" marketing campaign. The purpose of the campaign will be to inform New Jersey residents, businesses, elected officials, and others about the benefits NJ TRANSIT services provide to the State. As part of Phase 1, the research team performed benefit calculations for nine economic, mobility, and sustainability benefit measures. The research team selected measures based on past research conducted for NJ TRANSIT, a preliminary literature review, and subsequent consultation with NJ TRANSIT staff.

As part of Phase 2, the research team supplemented the benefit calculations performed in Phase 1 by expanding the information available to support the proposed "Did You Know" campaign. Phase 2 activities included:

- Reviewing additional literature on transit benefits and transit benefit marketing campaigns;
- Identifying a comprehensive set of "Did You Know" storylines, facts, and statistics to support a broad public and stakeholder information campaign; and
- Collecting the data and information necessary to populate the storylines with content; and
- Estimating benefits, where necessary, for the selected measures.

The Phase 2 literature review, which includes an annotated bibliography of reference documents, was prepared and submitted separately as the Task 5 Memorandum, dated September 8, 2020. The remainder of this document summarizes the data collection, reporting, and benefit calculation methodologies used to estimate benefits for those measures that required estimation.

PHASE 2 DATA COLLECTION, REPORTING, AND BENEFIT CALCULATIONS

Growth and Economic Benefits

The research team calculated the following growth and economic benefits of transit as part of Phase 1:

- Direct jobs generated from NJ TRANSIT payroll expenditures;
- Indirect jobs generated by transit investment and induced jobs generated from secondary effects of transit spending on administration, operations, maintenance, and capital construction projects; and
- Gross domestic product generated as a result of State spending on NJ TRANSIT;

Details regarding these benefit calculations are provided in the Phase 1 Report, dated March 13, 2020.

In addition to these three measures, as part of Phase 2, the research team investigated the following:

- The extent to which NJ TRANSIT services support growth and development;
- Impact of NJ TRANSIT services on property values and local tax revenues;
- How NJ TRANSIT connects residents and businesses to destinations within and outside of the New Jersey-New York metropolitan region;
- The scope and scale of areas served by NJ TRANSIT services; and
- How NJ TRANSIT services support tourism and tourism-related businesses.

The sections that follow summarize the results of these investigations.

<u>Supporting growth and development</u>

As noted in the literature review, land and infrastructure efficiency is a commonly identified benefit of transit. The availability of high-quality, frequent public transit service, especially rail transit, is frequently associated with encouraging or facilitating compact, concentrated development near transit stations. [1,2,3,4,5] This type of development pattern often referred to as transit-oriented development (TOD), is evident in transit communities throughout New Jersey. Perhaps the leading and most extensive example of TOD in New Jersey is along the Hudson-Bergen light rail (HBLR) line in Hudson County.

Table 1. Growth and development along the HBLR in Hudson County, NJ

	Year	0.5-mile network distance of HBLR stations	0.5-mile buffer of HBLR line	Hudson County
Population	2000	175,817	299,068	608,975
	2010	183,893	309,369	634,278
	2011	185,434	311,194	636,776
	2012	186,245	312,385	639,220
	2013	188,517	315,551	645,330
	2014	191,244	319,755	653,862
	2015	195,291	325,899	665,188
	2016	198,657	331,567	676,080
	2017	203,370	337,730	684,907
	2018	208,133	343,255	691,717
	2019	212,535	348,053	696,968
	2020	215,489	351,801	703,543
Housing units	2000	73,240	122,610	240,618
	2010	84,934	139,124	270,676
	2011	85,678	140,044	271,987
	2012	86,059	140,644	273,278
	2013	87,064	142,165	276,171
	2014	88,315	144,150	280,068
	2015	90,195	147,040	285,275
	2016	92,114	149,834	290,360
	2017	94,842	153,014	294,545
	2018	97,735	156,111	297,777
	2019	99,946	158,363	300,196
	2020	101,141	159,684	303,130
Area (sq mile)		7.96	15.81	52

Data Sources: ESRI Business Analyst demographics, American Community Survey. Note: Data for 2000 were calculated manually in ArcGIS Pro. Data for 2010-2020 were automatically calculated by ESRI ArcGIS Business Analyst extension.

Table 2 – Proportion of Hudson County, NJ growth occurring along HBLR line

	0.5-mile network distance of HBLR stations	0.5-mile buffer of HBLR line	Hudson County Total	% within 0.5-mile HBLR station	% within 0.5-mile HBLR line
Total population growth (2000-2020)	**39,672**	**52,733**	**94,568**	**42.0%**	**55.8%**
Population growth (2000 - 2010)	8,076	10,301	25,303	31.9%	40.7%
Population growth (2010 - 2020)	31,596	42,432	69,265	45.6%	61.3%
Total housing unit growth (2000-2020)	**27,901**	**56,313**	**92,032**	**30.3%**	**61.2%**
Housing unit growth (2000 - 2010)	11,694	35,753	59,578	19.6%	60.0%
Housing unit growth (2010 - 2020)	16,207	20,560	32,454	49.9%	63.4%

Data Sources: ESRI Business Analyst demographics, American Community Survey.
Note: Data for 2000 were calculated manually in ArcGIS Pro. Data for 2010-2020 were automatically calculated by ESRI ArcGIS Business Analyst extension.

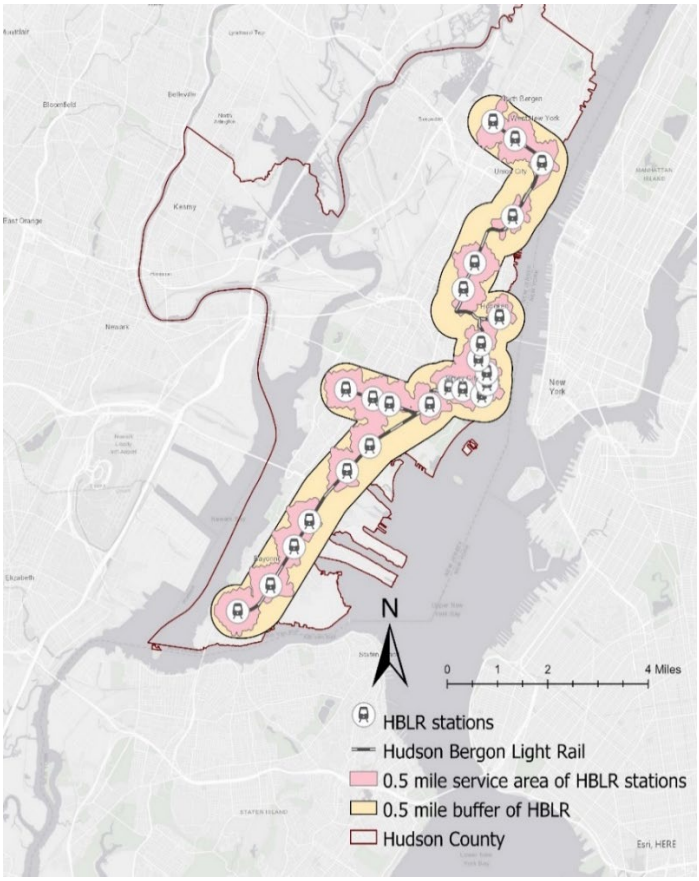

Figure 1. HBLR Study area analyzed

As shown in Tables 1 and 2, in the twenty years since the HBLR started operating, approximately 56 percent of population growth and more than 61 percent of housing unit growth in Hudson County occurred proximate to the HBLR, most within 0.5 miles of one of the HBLR stations. This housing and population concentration pattern close to NJ TRANSIT stations accelerated over the last decade.

Impact on property values

The literature on the benefits of transit also documents the positive effect that high-quality, frequent transit service has on property value in areas served by transit, especially near transit stations. [1,2,4,6,7] To estimate the effect of transit proximity on property values in New Jersey, the research team utilized GIS and statistical analysis software to analyze data from the NJGIN open data portal and data from the New Jersey Property Tax System/MOD-IV obtained from the New Jersey Division of Taxation. MOD-IV is "…the mechanism used to maintain and update all tax assessment records in the State of New Jersey." These data are compiled using the Tax Lists filed by municipal tax assessors with the County Boards of Taxation on or before January 10 of each year. These lists display "…all parcels of real property as delineated and identified on the municipality's official tax maps, as well as taxable values and descriptive data for each parcel." [8]

Data on three property classes were analyzed–Apartment, Commercial, and Residential. The analysis examined property value relative to proximity to NJ TRANSIT rail and light rail stations as follows:

- < 0.5-miles from NJ TRANSIT rail stations;
- 0.5 to 1.0-miles from a NJ TRANSIT rail station
- > 1.0-miles from a NJ TRANSIT rail station.

For the analysis of values by rail line, the > 1.0 miles from a NJ TRANSIT station study area was interpreted to include areas > 1.0-mile but less than 3.0-miles from a station. Parcels with a net taxable value of zero were removed from the dataset. As a result, data for 2,288,982 of New Jersey's 2,522,555 tax parcels were used for this analysis. To normalize the data for comparative purposes, equalized valuations were used. Property value per acre was calculated by dividing the property value identified in the MOD IV dataset by parcel area size. Average per acre property values by property class and proximity study area were then aggregated by municipality, county, and NJ TRANSIT rail line.

Table 3 presents the results of the analysis for NJ TRANSIT rail lines. Table 4 shows the analysis results for New Jersey counties, and Table 5 presents the analysis results for municipalities in Hudson County, New Jersey, as an example of municipal results. If there are no rail stations or properties for a particular property class within a given study area, the cell for that combination of conditions shows "N.A."

While patterns of property valuation differed by rail line, county, and municipality, overall, the analysis showed a significant value premium associated with properties located closer to NJ TRANSIT rail stations. The results were consistent for apartment, commercial and residential properties. The following list summarizes observations from a review of the data:

- In the aggregate, proximity to NJ TRANSIT rail stations positively impacts property values along all of NJ TRANSIT's rail and light rail lines.
    - The average per-acre value of apartment, commercial, and residential properties located within 0.5-miles of NJ TRANSIT rail stations statewide ranged from 1.6 times greater for apartment properties to 2.3 times greater for residential properties to 3.3 times greater for commercial properties. (see Table 4).
    - Statewide, average per-acre property values for apartment, commercial, and residential property combined were 2.4 times higher than the per-acre value of properties located further away (see Table 4).
- The lines associated with the greatest property value premium are the Northeast Corridor rail line and the North Jersey Coast line.
    - Per acre property values for apartments, commercial and residential properties located within 0.5-miles of rail stations are more than double the average per-acre value of properties located more distant from stations (see Table 3).
- The Newark Light Rail line shows the least benefit associated with proximity to rail stations (see Table 3).
- Proximity to commuter rail stations appears to have a greater impact than proximity to light rail stations (see Table 3).
- Proximity to rail stations has the greatest impact on the value of commercial properties within 0.5-miles of a station (see Table 3).
- In the aggregate, property value premiums are present in every New Jersey county served by rail line stations.
    - Except for apartment properties located within 0.5-miles of rail stations in Atlantic County, per acre property value premiums for all three classes of property range from 0.04 times greater for apartment properties in Bergen County to 5.68 times greater for commercial properties in Ocean County (see Table 4).
- As is evidenced by the data for municipalities in Hudson County, the relationship between property value and proximity to rail stations can vary

significantly by location and property class. In some municipalities, properties located near stations are valued higher and in others valued lower when compared to properties located more distance from rail stations. This variation occurs within all three property classes (see Table 5).

For more information on the methods used to conduct the property value analysis, see Appendix B1.

Rail Line	Average Per Acre Value - Apartment Properties				Value Ratio (<0.5 miles : Average)
	<0.5 mile	0.5-1.0 mile	>1.0-3.0 mile	Average	
Atlantic City Line	1,295,232	1,401,796	934,443	986,159	0.31
Bergen Couty Line	9,542,033	8,927,402	4,017,315	7,142,508	0.34
Hudson Bergen Light Rail	13,874,192	13,895,600	9,323,922	12,631,120	0.10
Main Line	9,761,350	9,342,009	3,998,996	7,155,393	0.36
Gladstone (Morris & Essex)	6,611,647	7,121,901	3,834,192	5,916,585	0.12
Morristown (Morris & Essex)	6,340,741	6,350,801	2,864,730	4,937,467	0.28
Montclair Boonton Line	6,985,274	7,473,929	2,740,139	5,078,248	0.38
Newark Light Rail	3,992,098	3,815,840	3,599,828	3,786,060	0.05
North East Corridor Line	8,029,581	6,169,353	1,849,876	3,048,620	1.63
North Jersey Coast Line	7,653,190	6,124,958	1,959,662	3,509,132	1.18
Pascack Valley Line	10,043,376	9,172,552	4,101,461	7,227,397	0.39
Raritan Valley Line	1,855,459	1,607,051	1,758,590	1,744,316	0.06
RiverLine	1,552,925	1,108,167	864,949	924,143	0.68
All Lines Combined	7,782,903	7,110,194	2,293,927	4,409,961	0.76
	Average Per Acre Value - Commercial Properties				
	<0.5 mile	0.5-1.0 mile	>1.0-3.0 mile	Average	
Atlantic City Line	1,196,143	944,516	518,322	591,038	1.02
Bergen Couty Line	6,536,320	4,760,866	2,273,757	3,343,861	0.95
Hudson Bergen Light Rail	10,038,342	8,129,908	2,729,214	5,499,269	0.83
Main Line	6,649,276	4,749,344	2,156,342	3,312,445	1.01
Gladstone (Morris & Essex)	5,166,679	4,592,530	1,142,994	2,120,744	1.44
Morristown (Morris & Essex)	4,480,497	4,077,624	1,076,702	1,772,760	1.53
Montclair Boonton Line	4,760,662	4,421,571	1,216,084	1,941,940	1.45
Newark Light Rail	3,060,190	3,081,435	2,005,132	2,496,314	0.23
North East Corridor Line	5,763,217	4,098,809	1,520,469	2,207,586	1.61
North Jersey Coast Line	5,388,566	3,515,938	1,281,496	2,086,697	1.58
Pascack Valley Line	5,960,997	5,288,678	2,039,710	3,187,498	0.87
Raritan Valley Line	1,838,101	1,195,966	810,737	903,302	1.03
RiverLine	1,005,617	778,779	437,820	507,420	0.98
All Lines Combined	5,113,047	4,039,184	1,284,451	2,090,736	1.45
	Average Per Acre Value - Residential Properties				
	<0.5 mile	0.5-1.0 mile	>1.0-3.0 mile	Average	
Atlantic City Line	1,183,704	1,091,321	559,259	632,716	0.87
Bergen Couty Line	5,445,616	3,875,270	1,870,521	2,588,902	1.10
Hudson Bergen Light Rail	11,535,496	11,073,006	6,421,858	9,540,612	0.21
Main Line	5,373,419	3,820,670	1,855,093	2,500,574	1.15
Gladstone (Morris & Essex)	4,290,412	3,236,665	1,381,353	1,980,561	1.17
Morristown (Morris & Essex)	4,392,265	3,393,158	1,329,407	1,900,236	1.31
Montclair Boonton Line	4,470,260	3,262,617	1,229,999	1,711,502	1.61
Newark Light Rail	2,715,729	2,611,472	2,670,935	2,659,917	0.02
North East Corridor Line	6,073,536	4,090,780	1,749,449	2,287,645	1.65
North Jersey Coast Line	5,004,756	3,742,860	1,739,722	2,311,890	1.16
Pascack Valley Line	5,457,658	4,069,612	2,151,638	2,849,963	0.91
Raritan Valley Line	1,473,179	1,285,629	893,819	943,578	0.56
RiverLine	1,225,609	1,060,449	858,211	913,948	0.34
All Lines Combined	4,792,398	3,478,942	1,446,925	2,016,053	1.38

Data Sources: N.J. Department of Treasury, Division of Taxation

County	Average Per Acre Value - Apartment Properties				Value Ratio (<0.5 miles : Average)
	<0.5 mile	0.5-1.0 mile	>1.0 mile	Average	
Atlantic	475,054	1,680,655	775,483	821,870	(0.42)
Bergen	4,481,550	3,845,524	4,415,474	4,289,430	0.04
Burlington	1,249,626	747,257	799,232	813,193	0.54
Camden	1,215,465	972,698	809,108	831,898	0.46
Cape May	NA	NA	2,959,188	2,959,188	N/A
Cumberland	NA	NA	513,210	513,210	N/A
Essex	4,005,972	3,541,675	2,902,566	3,328,101	0.20
Gloucester	NA	NA	638,048	638,048	N/A
Hudson	13,518,200	13,461,529	8,828,471	12,284,554	0.10
Hunterdon	921,406	466,110	839,827	773,386	0.19
Mercer	1,816,585	2,174,338	938,157	970,523	0.87
Middlesex	4,307,783	2,321,073	1,517,164	1,612,861	1.67
Monmouth	2,546,495	2,979,614	1,320,159	1,536,048	0.66
Morris	2,098,759	1,658,843	1,087,996	1,165,112	0.80
Ocean	1,334,995	1,297,745	588,936	593,656	1.25
Passaic	3,785,374	3,601,859	2,453,592	2,797,377	0.35
Salem	NA	NA	376,066	376,066	N/A
Somerset	2,638,612	2,123,684	1,930,549	1,971,195	0.34
Sussex	NA	458,230	449,206	449,360	N/A
Union	3,263,098	2,715,783	1,651,177	2,211,248	0.48
Warren	1,886,661	1,203,620	569,363	587,505	2.21
New Jersey	4,634,873	3,738,956	1,371,782	1,780,470	1.60
	Average Per Acre Value - Commercial Properties				
	<0.5 mile	0.5-1.0 mile	>1.0 mile	Average	
Atlantic	1,203,754	1,374,265	232,886	260,842	3.61
Bergen	3,211,926	3,056,490	1,832,394	2,085,637	0.54
Burlington	805,831	569,479	338,632	349,030	1.31
Camden	1,191,335	736,185	486,273	533,358	1.23
Cape May	NA	NA	437,758	437,758	N/A
Cumberland	NA	NA	179,017	179,017	N/A
Essex	3,275,866	2,663,418	1,317,489	1,667,395	0.96
Gloucester	NA	NA	291,360	291,360	N/A
Hudson	9,923,359	8,073,032	2,849,051	5,825,892	0.70
Hunterdon	567,975	423,226	302,464	309,200	0.84
Mercer	1,719,539	1,821,798	720,122	775,387	1.22
Middlesex	4,086,628	2,495,677	1,112,373	1,267,516	2.22
Monmouth	2,975,637	1,738,134	676,787	791,849	2.76
Morris	1,711,473	1,563,557	725,445	798,199	1.14
Ocean	3,366,129	2,829,200	481,114	503,869	5.68
Passaic	3,237,253	2,770,115	1,398,894	1,584,149	1.04
Salem	NA	NA	108,612	108,597	N/A
Somerset	1,865,756	1,398,496	651,192	709,704	1.63
Sussex	560,081	388,675	128,077	128,527	3.36
Union	3,263,517	2,156,199	1,377,376	1,769,622	0.84
Warren	1,306,564	997,182	231,677	247,822	4.27
New Jersey	3,309,309	2,442,754	612,707	763,707	3.33
	Average Per Acre Value - Residential Properties				
	<0.5 mile	0.5-1.0 mile	>1.0 mile	Average	N/A
Atlantic	659,017	670,270	292,766	300,747	1.19
Bergen	2,418,319	2,375,420	1,965,165	2,049,347	0.18
Burlington	1,178,012	913,016	488,842	508,034	1.32
Camden	1,468,543	1,288,015	617,778	679,593	1.16
Cape May	NA	NA	1,515,731	1,515,731	N/A
Cumberland	NA	NA	139,067	139,067	N/A
Essex	2,788,228	2,653,271	1,994,180	2,195,299	0.27
Gloucester	NA	NA	360,339	360,339	N/A
Hudson	11,444,670	10,599,675	5,433,194	8,786,269	0.30
Hunterdon	708,696	470,038	204,544	209,883	2.38
Mercer	1,329,646	1,498,655	812,638	832,524	0.60
Middlesex	2,271,968	2,181,094	1,496,198	1,546,975	0.47
Monmouth	3,079,946	2,851,566	924,350	1,062,371	1.90
Morris	1,538,227	1,561,435	629,194	697,592	1.21
Ocean	4,583,118	3,913,459	1,181,811	1,213,942	2.78
Passaic	2,353,808	2,331,958	1,089,535	1,188,551	0.98
Salem	NA	NA	136,871	136,871	N/A
Somerset	1,261,047	1,036,457	668,806	692,602	0.82
Sussex	925,719	677,092	186,843	187,667	3.93
Union	2,388,568	2,414,304	2,035,104	2,160,173	0.11
Warren	1,149,722	842,902	215,602	223,139	4.15
New Jersey	2,788,574	2,356,774	747,848	856,186	2.26

Data Sources: N.J. Department of Treasury, Division of Taxation

	Apartment				Value Ratio (<0.5 miles : Average)
Municipality	**<0.5 mile**	**0.5-1.0 mile**	**>1.0 mile**	**Average**	
Bayonne	6,973,553	6,770,560	1,685,078	6,444,000	0.08
East Newark Borough	NA	5,725,234	NA	5,725,234	N/A
Guttenberg	NA	NA	11,515,097	11,515,097	N/A
Harrison	5,703,766	7,210,613	8,171,681	6,951,716	(0.18)
Hoboken	30,468,109	31,766,674	NA	30,946,975	(0.02)
Jersey City	12,982,191	14,630,536	14,582,700	13,974,776	(0.07)
Kearny	NA	4,657,150	6,061,866	5,731,374	N/A
North Bergen Township	4,287,211	4,682,787	8,148,352	7,490,841	(0.43)
Secaucus	7,765,663	NA	4,902,175	5,715,756	0.36
Union City	9,065,888	11,170,646	10,486,208	10,455,774	(0.13)
Weehawken Township	12,733,345	13,964,619	NA	13,531,405	(0.06)
West New York	13,921,850	13,249,126	13,184,888	13,378,261	0.04
Hudson County	13,518,200	13,461,529	8,828,471	12,284,554	0.10
	Commercial				
	<0.5 mile	**0.5-1.0 mile**	**>1.0 mile**	**Average**	
Bayonne	5,907,983	6,163,872	1,498,629	5,541,336	0.07
East Newark Borough	244,280	4,087,060	NA	3,888,380	(0.94)
Guttenberg	NA	NA	9,146,457	9,146,457	N/A
Harrison	4,601,925	7,115,446	12,335,297	6,085,558	(0.24)
Hoboken	35,148,122	37,817,966	134,960	29,655,997	0.19
Jersey City	8,529,410	5,786,425	1,339,730	5,375,210	0.59
Kearny	NA	4,511,503	3,218,894	3,249,058	N/A
North Bergen Township	3,437,961	3,592,318	3,032,361	3,118,431	0.10
Secaucus	8,723,462	9,173,836	2,956,122	3,509,265	1.49
Union City	12,787,708	10,265,076	10,923,265	10,982,289	0.16
Weehawken Township	10,529,205	5,141,666	14,089,381	8,119,727	0.30
West New York	10,963,733	10,981,104	9,500,339	10,789,087	0.02
Hudson County	9,923,359	8,073,032	2,849,051	5,825,892	0.70
	Residential				
	<0.5 mile	**0.5-1.0 mile**	**>1.0 mile**	**Average**	
Bayonne	5,943,381	6,083,355	6,644,069	6,011,056	(0.01)
East Newark Borough	4,866,467	6,309,672	NA	6,302,759	(0.23)
Guttenberg	NA	NA	17,334,710	17,334,710	N/A
Harrison	7,374,414	5,886,774	8,383,764	6,220,881	0.19
Hoboken	104,607,283	86,851,286	NA	95,585,041	0.09
Jersey City	7,515,291	8,202,149	7,570,732	7,882,316	(0.05)
Kearny	NA	4,989,030	4,128,673	4,143,246	N/A
North Bergen Township	5,184,903	6,041,728	5,502,403	5,495,701	(0.06)
Secaucus	NA	NA	3,167,057	3,167,057	N/A
Union City	8,989,542	9,902,566	8,490,810	9,131,240	(0.02)
Weehawken Township	10,432,127	10,634,722	11,477,180	10,591,091	(0.02)
West New York	9,601,677	9,478,579	9,704,371	9,561,974	0.00
Hudson County	11,444,670	10,599,675	5,433,194	8,786,269	0.30

Data Sources: N.J. Department of Treasury, Division of Taxation

Impact on local tax revenue

In New Jersey, local property taxes support a range of local services, including public schools, emergency services, refuse collection, libraries, senior and youth services, infrastructure construction, operations and maintenance, and other facilities and services depending on the municipality. As noted in the previous section, proximity to NJ TRANSIT rail stations is associated with increased value for properties near transit in many places in New Jersey. To estimate the property tax benefit associated with increased value, the research team first calculated the difference in equalized value per acre for properties within 0.5-miles of a rail station compared to properties in the same class located within the municipality but greater than that 0.5-miles of a station. This difference was then multiplied by municipality-specific tax rates to estimate the net tax benefit realized by local governments annually based on the increased valuation of apartment, commercial, and residential properties in the municipality. Municipality-specific tax rates were obtained from the New Jersey Department of Treasury, Division of Taxation. Negative value differences were not subtracted from the benefit total.

Table 6 – Local tax benefit from increased property valuations proximate to NJ TRANSIT rail stations

County	Incremental tax benefit to municipalities for increased valuation near transit ($)			
	Apartment	Commercial	Residential	Total
Atlantic	12,648	2,491,990	2,691,550	5,196,188
Bergen	1,827,687	15,639,397	16,358,441	33,825,525
Burlington	736,000	2,953,903	8,555,686	12,245,588
Camden	60,640	6,347,859	3,196,800	9,605,299
Cape May	NA	NA	NA	NA
Cumberland	NA	NA	NA	NA
Essex	2,074,184	26,100,559	19,581,919	47,756,662
Gloucester	NA	NA	NA	NA
Hudson	1,216,676	27,806,383	10,575,087	39,598,146
Hunterdon	NA	450,271	3,159,787	3,610,057
Mercer	600,753	3,542,168	2,575,655	6,718,576
Middlesex	85,837	15,513,373	5,018,739	20,617,950
Monmouth	16,350	2,956,492	8,441,862	11,414,705
Morris	2,138	7,942,315	8,714,964	16,659,417
Ocean	NA	447,686	17,608	465,294
Passaic	450,973	4,920,106	2,741,585	8,112,664
Salem	NA	NA	NA	NA
Somerset	85,698	5,122,666	8,815,675	14,024,039
Sussex	NA	52,714	9,810	62,524
Union	34,758	24,911,108	3,612,356	28,558,222
Warren	2,000	397,895	730,431	1,130,326
New Jersey	**7,206,342**	**147,596,885**	**104,797,955**	**259,601,182**

Data Sources: NJ Department of Treasury, Division of Taxation

Note: See Appendix B1 a for more information on the data sources and methods used to derive these estimates

As shown in Table 6, New Jersey municipalities collect approximately $260 million in additional property tax revenue annually from properties located within 0.5-miles of NJ TRANSIT rail stations because property values near transit are higher than in areas further from transit. These additional property tax revenues support local services and contribute to community quality of life in the municipalities served by NJ TRANSIT rail stations.

Improved business access to consumer and labor markets

There are many ways to measure the potential benefits of transit to businesses and workers. One important measure is the extent to which public transit services provide businesses with access to consumer and labor markets. In many parts of New Jersey, public transit service is a conduit that connects businesses with customers and workers. To quantify these benefits of public transit in New Jersey, the research team used ESRI ArcGIS Business Analyst software to calculate the:

- Number of business establishments located close to NJ TRANSIT services;
- Business revenue/sales reported by these establishments;
- Number of jobs located close to NJ TRANSIT services; and
- Number of residents living close to NJ TRANSIT services.

For this analysis, “close to” transit was defined as within a 0.5-mile network distance of NJ TRANSIT rail and light rail stations and a 0.25-mile buffer of a NJ TRANSIT bus route. Table 7 shows the results of these analyses.

Table 7 – Businesses and workers served by NJ TRANSIT services

Performance Measure	Estimate
Business establishments located close to NJ TRANSIT services	203,882
- **Percent of total New Jersey businesses**	64.2%
Total Business revenue/sales reported by establishments located close to NJ TRANSIT services	$526,400,081
- **Proportion of all New Jersey business revenue/sales**	62.4%
Jobs located close to NJ TRANSIT services	2,682,365
- **Proportion of all New Jersey jobs**	64.8%
Households living close to NJ TRANSIT Services	1,767,291
- **Proportion of all New Jersey households**	53.4%
Residents living close to NJ TRANSIT Services	4,837,799
- **Proportion of all New Jersey residents**	53.2%

Data Source: ESRI Business Analyst

Connections to regional and national markets

In addition to providing New Jersey residents and businesses with improved access to customers and jobs inside the State, NJ TRANSIT services connect residents and businesses to regional and national markets and destinations such as employment

centers, government offices, healthcare facilities, and others. For example, NJ TRANSIT trains and buses travel into and out of New York City and Philadelphia and connect to Newark-Liberty International Airport. NJ TRANSIT train stations at Newark Penn Station, Metropark, New Brunswick, Princeton Junction, and Trenton Transit Center are all served by Amtrak with service between Boston, MA and Washington, DC., and connecting services to many other cities throughout the United States. To demonstrate these connections, the research team collected ridership and station boarding data to quantify the number of travelers making these connections each year. Table 8 summarizes a range of statistics related to business access to regional and national destinations and markets.

Table 8 – Ridership and utilization statistics for select NJ TRANSIT facilities and services

Performance Measure			Estimate
Travel into and out of New York City, NY [1]			
Annual NJT Interstate Bus Ridership			106,357,420
Annual NJT Interstate Rail Ridership			55,169,660
Total New York City Ridership (Bus + Rail)			161,527,080
Travel into and out of Philadelphia, PA			
Annual NJT Interstate Bus Ridership [2]			4,915,133
Annual NJT Interstate Rail Ridership [3]			338,544
Total Philadelphia Ridership (Bus + Rail)			5,253,677
Average Annual Newark Airport Station Boardings [4]			2,950,429
Annual Amtrak Ridership by Station [5]	**Riders On**	**Riders Off**	**Total**
Newark Penn Station	365,271	366,457	731,728
Newark Airport Station	93,308	71,431	164,739
Metropark	193,463	190,577	384,040
New Brunswick	1,498	2,808	4,306
Trenton Transit Center	216,462	218,375	434,837
Grand Total	870,002	849,648	1,719,650

Data Sources: NYMTC Hub-Bound Travel, Quick Reference Data (https://www.nymtc.org/Data-and-Modeling/Transportation-Data-and-Statistics/Publications/Hub-Bound-Travel), NJ TRANSIT, Amtrak
Notes: 1) Persons entering and leaving the NYC Hub on a Fall business day by mode and sector in 2019. Interstate Bus assumes all riders using NJ TRANSIT operated or supported bus services from New Jersey to NYC. Annual ridership estimates were derived by multiplying average Fall business day ridership by 260 business days per year. Estimates DO NOT include weekend ridership. 2) Annual interstate bus ridership estimates based on pre-Covid data provided by NJ TRANSIT for 2017-2019. 3) Annual rail ridership estimates based on pre-Covid data provided by NJ TRANSIT for the period 2016-208. The Atlantic City Line was out of service for part of 2018 and 2019 due to Positive Train Control equipment installation. 4) Average annual boardings at Newark Airport Station based on pre-Covid data provided by NJ TRANSIT for 2017-2019). 5) Annual Amtrak ridership based on pre-Covid data provided by Amtrak for March 2019 through February 2020.

Benefits to tourism and tourism-related businesses

There are many entertainment destinations, cultural attractions, performing arts venues, stadiums, arenas, historic sites, parks, beaches, and boardwalks throughout the region that are accessible by public transit. NJ TRANSIT bus and rail services support tourism and tourism-related businesses by connecting New Jersey residents and visitors to sites and venues within New Jersey and destinations in New York City and Philadelphia. NJ TRANSIT services also connect residents and visitors from adjacent states to New Jersey destinations.

A recent study conducted by researchers at Rutgers University estimated that more than 130,000 weekend riders use NJ TRANSIT's North Jersey Coast Line each summer to access destinations along the Jersey Shore for recreational purposes. Many of these riders reside in New York City. Using survey data, the researchers estimated that recreational transit riders spent an estimated $16 million over the course of 15 summer weekends on hotels, restaurants, bars, shopping, and amusement. (9) Further south in Atlantic City, casinos, restaurants, bars, shops, entertainment venues, and other businesses benefit from NJ TRANSIT access. More than 410,000 travelers get on and off trains at NJ TRANSIT's Atlantic City Convention Center station each year, many for recreational and leisure purposes.

It's not just the Jersey Shore that benefits from NJ TRANSIT services either. Many Newark visitors use NJ TRANSIT services to travel to the Performing Arts Center and Prudential Center for shows, concerts, hockey games, and other events. These customers spend money not just on transit but also at the venue and nearby businesses. For example, Rutgers researchers estimated that hockey fans that use NJ TRANSIT to get to games at the Prudential Center spend more than $7.5 million during one hockey season alone. Survey data also revealed that NJ TRANSIT customers traveling to just one concert at the Prudential Center spent an estimated $200,000. (9) Finally, every year more than 400,000 residents and visitors each use NJ TRANSIT rail services to access sporting and other events at the Meadowlands Sports and Entertainment District. NJ TRANSIT runs special train and service for large events in the Meadowlands. This special service reduces the demand for parking and helps to relieve congestion on surrounding roadways on event days. Table 9 summarizes these tourism and recreational transit use statistics.

Table 9 – Tourism and recreational transit use statistics

Performance Measure	Estimate
Weekend riders using NJ TRANSIT's North Jersey Coast line each summer to access destinations along the Jersey Shore	130,000
Dollars spent by weekend riders over one 15-week summer	$16,000,000
Annual riders using NJ TRANSIT Atlantic City Convention Center station	410,000+
Dollars spent by hockey fans using NJ TRANSIT to access games during one season at the Prudential Center in Newark	$7,500.000
Dollars spent by NJ TRANSIT riders attending one concert at the Prudential Center in Newark	$200,000
Number of riders using NJ TRANSIT rail and bus services to access games and events at the Meadowlands Sports and Entertainment District	400,000+

Data Sources: Pre-Covid ridership statistics provided by NJ TRANSIT. Tourism-related travel statistics were obtained from Deka, Devajyoti. (2014). Impact Analysis of Recreational Transit Services on Local Community Economic Development, Employment, and Spending. New Jersey Department of Transportation. Report No. FHWA-NJ-2014-017.

Environmental and Sustainability Benefits

As part of Phase 1 of this study, the research team estimated the benefits of NJ TRANSIT services in terms of congestion relief and other sustainability measures. Table 10 summarizes the results. Additional detail can be found in the Phase 1 report, dated March 13, 2020. (10)

Table 10 – Phase 1 congestion relief and sustainability benefit calculations

Performance Measure	Estimate
Number of additional private passenger vehicles operating year-round on New Jersey roadways without NJ TRANSIT services	+120,000 to 137,000
Additional private passenger vehicle trips annually without NJ TRANSIT services	+133 to 151 million
Increase in annual Vehicle Miles Traveled (VMT) without NJ TRANSIT services	+1.53 to 1.67 billion
Increase in annual carbon dioxide (CO_2) or Greenhouse Gas Emissions (GHG) emissions from increased VMT	+567 to 644,000 metric tons or +1.2 to 1.4 billion pounds
Increase in Vehicle Hours of Travel (VHT) from increased VMT [1]	+2.7 million
Percent increase in traffic at Hudson River crossings into/out of Manhattan, NY without NJ TRANSIT services	
- **Lincoln Tunnel**	+500%
- **Holland Tunnel**	+140%
- **George Washington Bridge.**	+120%

Source: Carnegie, Jon, Deva Deka, and Andrea Lubin. (2020). *Marketing research for the quantifiable benefits of transit in New Jersey, Phase 1 Report*. Notes: 1) VHT estimate provided by the North Jersey Transportation Planning Authority.

For Phase 2 of the study, the research team investigated several additional measures of potential environmental and sustainability benefits associated with NJ TRANSIT services. These included: GHG equivalencies such as gallons of fuel consumed, increase in pavement associated with the additional roadway miles and parking necessary to accommodate more vehicles operating in New Jersey, and pollution associated with an increase in pavement area. The sections that follow present the data and methodologies used to calculate these measures and associated results.

Greenhouse Gas Equivalencies

As noted in Phase 1 of the study and summarized in Table 10, the existence of NJ TRANSIT bus, rail, and Access Link services reduces the number of private vehicles operating on New Jersey Roadways, reduces VMT and VHT, and relieves congestion. Less VMT results in lower levels of GHG emissions. The research team used the United States Environmental Protection Agency (EPA) Greenhouse Gas Equivalencies Calculator to convert estimated GHG emissions to energy and environmental benefit equivalents. The calculator helps to translate emissions estimates into "everyday terms" that the general public understands. Complete documentation of the calculation methodologies used in the EPA's equivalency calculator can are on the EPA website.[10] Table 11 summarizes the equivalencies generated by the online tool for the emissions benefits estimated in Phase 1 of the study.

Table 11 – GHG benefits and equivalencies associated with NJ TRANSIT service

Performance Measure	Estimate	
	Low	High
GHG/CO_2 reduction associated with NJ TRANSIT ridership (metric tons)	-567,000	-644,000
Gallons of gasoline consumed	63,801,058	72,465,399
Tanker trucks worth of gasoline	7,506	8,525
Barrels of oil consumed	1,312,725	1,490,996
Acres of U.S. forest needed to sequester annual CO_2 emissions	694,676	789,014
Number of urban tree seedlings needed to be grown for ten years to sequester annual CO_2 emissions	9,375,465	10,648,676

Source: USEPA

To convert acres of forest needed to sequester annual CO_2 emissions to terms relatable to New Jersey residents, the research team performed additional calculations based on the geographic size of places familiar to residents. Table 12 shows the size of New

[10] https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

Jersey counties. An area of forest roughly the size of Bergen, Essex, Hudson, Middlesex, Passaic, and Somerset counties combined (768,460 acres) would be needed to sequester the annual CO2 emissions saved because NJ TRANSIT services exist. Analogously, an area the size of 936 Central Parks would be required. Central Park is 843 acres in size.

Table 12 – Geographic area of New Jersey counties

County	Square Miles	Acres
Atlantic	555.70	355,648
Bergen	**233.01**	**149,126**
Burlington	798.58	511,091
Camden	221.26	141,606
Cape May	251.42	160,909
Cumberland	483.70	309,568
Essex	**126.21**	**80,774**
Gloucester	322.00	206,080
Hudson	**46.19**	**29,562**
Hunterdon	427.82	273,805
Mercer	224.56	143,718
Middlesex	**308.91**	**197,702**
Monmouth	468.79	300,026
Morris	460.18	294,515
Ocean	628.78	402,419
Passaic	**184.59**	**118,138**
Salem	331.90	212,416
Somerset	**301.81**	**193,158**
Sussex	519.01	332,166
Union	102.85	65,824
Warren	356.92	228,429

Source: U.S. Census Bureau, data file from Geography Division based on the TIGER/Geographic Identification Code Scheme (TIGER/GICS). Note: Conversion from square miles to acres based on 640 Acres/square mile.

Pavement and pollution

Another negative environmental impact of increased automobile use is increased pavement area and non-point source (NPS) pollution caused by stormwater runoff from pavement. According to the EPA, “NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and ground waters.” [(11)] Roadways and parking lots contribute to urban stormwater runoff. Runoff often includes pollutants such as sediment (soil, sand, gravel, and stone); oil, grease, and other petroleum residues from motor vehicles and pavement sealants; heavy metals and toxic chemicals from motor vehicles; and road

salts. [11,12,13,14] Roadways and parking lots also absorb thermal energy from the sun. Retained energy contributes to hotter air and surface temperatures that can be 2-8 degrees warmer in urban areas due to stored heat. [12]

To quantify the potential pollution reduction benefits of NJ TRANSIT services, the research team estimated the additional parking area likely needed to accommodate new private passenger vehicles needed to transport NJ TRANSIT customers absent transit services. The pavement estimates were based on the average number of parking spaces needed to accommodate the vehicles multiplied by the average size of parking spaces in the United States. Because research on this topic varies, the research team produced a range of estimates based on available sources. [14,15]

As shown in Table 13, the average number of parking spaces required to accommodate private passenger vehicles in the United States ranges from 2.2 to 4 parking spaces per vehicle. Based on these multipliers, the research team estimated an additional 308,000 to 560,000 parking spaces would be required to accommodate the 140,000 new cars estimated necessary to meet the travel needs of New Jersey residents absent NJ TRANSIT services. This number of parking spaces translates to approximately 1,000 to 2,000 acres of additional parking in New Jersey.

Table 13 – Parking and pavement estimates

New vehicles required to accommodate travel absent NJ TRANSIT services	**140,000**	
	Parking and Pavement Estimates	
	Low Range	**High Range**
Average parking spaces per vehicle	2.2	4
Estimated parking spaces required	308,000	560,000
Average parking space size in the United States (sq. ft.)	154.8	154.8
Sq. ft. of parking required for additional vehicles	47,678,400	86,688,000
Square miles parking required	1.7	3.1
Acres of parking required	1,095	1,990

Source: Average parking space size from https://www.dimensions.com/element/parking-spaces

Note: Conversion based on 27,878,400 sq. ft./sq. mile and 43,560 sq. ft./acre.

As noted above, parking lots are a significant source of NPS water pollution. A review of academic and applied literature related to estimating the pollution impacts of parking lots identified a published peer-reviewed study that modeled the pollution impacts associated with approximately 1,400 acres of parking. This amount of parking is in the middle of the range estimated to be needed to accommodate an additional 140,000 vehicles in New Jersey. Davis et al. used the Long-Term Hydrologic Impact Assessment (L-THIA) model to estimate the pollution impacts of two scenarios: 1) land area occupied by parking lots, and 2) runoff of the same land area that was assigned ecosystem classes (e.g., wetlands, forests, agriculture, and grassland) in the proportion

existing in the non-urban parts of the study area. As shown in Table 14, the estimated pollution impacts of 1,397 acres of parking are significant.

Table 14 – Pollution from parking study results – Average annual runoff results

Indicator	Estimate
Acres of parking in the study area	1,397
Volume of runoff	
Acre-feet	1,900
Gallons	619,117,721
Oils and grease (pounds)	46,545
Heavy metals - Lead, Copper, Zinc, Cadmium, Chromium, Nickel (pounds)	1,187
Suspended solids (pounds)	287,030

Source: Davis, A.Y. et al. (2010) The environmental and economic costs of sprawling parking lots in the United States. Land Use Policy 27, 255-261

Mobility, Accessibility, and Social Benefits

As part of Phase 2, the research team collected and analyzed various data related to who uses NJ TRANSIT services and how NJ TRANSIT services impact the mobility, accessibility, and well-being of NJ TRANSIT customers and others. The following sections summarize these data and analyses.

Who uses NJ TRANSIT services?

One way to assess the impact and benefits of the NJ TRANSIT's services is to profile who uses the agency's services. NJ TRANSIT regularly surveys its customers to track utilization and better understand how satisfied customers are with the services they receive. The NJ TRANSIT Customer Satisfaction Survey collects data from Bus, Rail, Light Rail, and Access Link customers regarding their satisfaction with over 40 service attributes. The survey also gathers origin, destination, and demographic information about the customers participating in the survey. [16] Table 15 presents a demographic profile of NJ TRANSIT’s customer base.

Table 15 – Demographic characteristics of NJ TRANSIT customers

Characteristic	System	Bus	Rail	Light Rail	Access Link
Annual Household Income					
Lower income (<$35,000)	26.3%	37.4%	8.1%	20.1%	60.6%
Middle income ($35,000-$99,999)	32.7%	34.6%	27.8%	38.9%	30.6%
Higher income (>$100,000)	41.0%	28.1%	64.1%	41.1%	8.7%
Age					
Under 18 years	1.3%	1.9%	0.4%	1.8%	0.2%
18-34 years	33.5%	36.9%	29.4%	37.0%	23.7%
35-54 years	39.6%	39.6%	37.5%	39.2%	21.1%
55-64	17.5%	15.2%	21.3%	16.3%	24.1%
65 and over	7.8%	6.0%	11.5%	5.6%	30.6%
Gender					
Female	52.3%	56.7%	44.8%	53.1%	58.6%
Male	47.7%	43.3%	55.2%	46.9%	41.4%
Disability Status					
No	94.3%	94.6%	96.8%	94.4%	15.3%
Yes	5.7%	5.4%	3.2%	5.6%	84.7%
Race					
American Indian or Alaska Native	0.8%	1.1%	0.3%	0.9%	0.1%
Asian or Pacific Islander	12.0%	12.1%	12.5%	10.8%	3.3%
Black or African American	19.4%	26.2%	9.1%	15.5%	28.6%
Mixed Race	11.8%	14.6%	6.9%	14.0%	7.8%
Other Race	10.0%	1.6%	0.2%	0.1%	0.5%
White	55.0%	44.4%	71.0%	58.7%	59.8%
Hispanic Origin					
No	79.3%	73.8%	89.7%	71.3%	89.5%
Yes	20.7%	26.2%	10.3%	28.7%	10.5%

Source: NJ TRANSIT Customer Satisfaction Survey, Analysis of Fall 2019 survey data provided by Susan O'Donnell.

Household transportation expenditures

Research on the benefits of public transit has consistently found that households that use public transit spend less on transportation than households where no one uses public transit. The difference in household transportation expenditures results from households spending less on car ownership and operating costs. Studies consistently find that the costs of using transit are cheaper than alternatives such as owning and driving a car. [2,6,7,17,18,19,20]

The research team analyzed microdata from the U.S. Bureau of Labor Statistics Consumer Expenditure Survey (CES) to investigate whether public transit use in New

Jersey saves families' money. The CES collects data via interviews as well as travel diaries. The specific data files analyzed for this study are the family files, which are derived from interviews. These were used because the files contain household-level information. The research team combined data for 24 months to create a database suitable for this analysis. The data spans the period from the fourth quarter of 2017 through the third quarter of 2019. Table 16 shows the number of observations (households) found in the combined 24-month dataset.

Table 16 – Number of consumer units (i.e., households) in the CES data

Quarter	United States		New Jersey	
	Frequency	Percent	Frequency	Percent
2017_4	5,916	13.2	118	15.1
2018_1	5,899	13.1	124	15.9
2018_2	5,773	12.9	118	15.1
2018_3	5,571	12.4	119	15.2
2018_4	5,623	12.5	0	0.0
2019_1	5,493	12.2	110	14.1
2019_2	5,337	11.9	93	11.9
2019_3	5,248	11.7	100	12.8
Total (N)	44,860	100.0	782	100.0

Source: U.S. Bureau of Labor Statistics, Consumer Expenditure Survey

Readers should note that the CES includes a small sample size for any given quarter. In addition, because of the way the survey is conducted, certain quarters lack data for some states (e.g., New Jersey in 2018_4). For these reasons, BLS recommends using quarterly data for national and regional-level analysis. State-level analyses required data to be combined from multiple quarters to obtain a reasonable sample size. The combined dataset used here includes eight quarters of data for the United States and seven quarters for New Jersey because households in New Jersey were not included in the fourth quarter 2018 national sample.

CES data are primarily about household expenditures. They do not include variables on travel patterns or trips, just money spent on transportation. Consequently, to distinguish households whose members take public transit, it is necessary to examine whether they spent any money on public transport. Two variables show public transit expenditures: TRNTRPPQ and TRNOTHPQ. The first includes spending on all public transportation, including inter-regional trips by train, air, etc. The second includes only local public transport. The research team used the second variable to distinguish households that use public transit from those that do not. The variable on total transportation expenditure is TRANSPQ was also used. This variable includes all transportation expenditures, including private vehicle purchase (new and old), leasing, insurance, maintenance, gas, etc., and public transit expenditures.

The CES includes two household income variables. One for household income in the past 12 months before tax and the other for the past 12 months after tax. The research team used the variable on income before tax (FINCBTAX). It was necessary to categorize the respondents by income quintiles (i.e., five equal categories, each containing 20 percent of the households) to compare households' total transportation expenditure for those using transit and those not by income group. The research team estimated income cut-off points separately for the U.S. and New Jersey because New Jersey's mean income is substantially higher than the U.S. Table 17 shows the income cut-off points of the U.S. and New Jersey samples.

Table 17 – Income cut-off points for quintiles

Percentile	US cut-off income	NJ cut-off income
20%	$12,648	$23,976
40%	$33,020	$47,520
60%	$60,000	$85,162
80%	$106,600	$148,078

Table 18 shows the U.S. and New Jersey sample sizes by income quintile. To complete the analysis, the research team had to remove records that reported transportation expenditures for the quarter as $0. The elimination of households with $0 transportation expenditure reduced the size of the New Jersey sample from 782 to 745 (i.e., 527+218) observations.

Table 18 – Sample size (N) for the estimation of mean transportation expenditure

Annual income quintile	United States		New Jersey	
	No transit household	Transit household	No transit household	Transit household
Lowest 20%	5,418	1,185	92	40
20% to 40%	6,243	983	110	33
40% to 60%	6,659	912	115	39
60% to 80%	6,612	1,294	115	40
Highest 20%	5,943	1,843	95	66
Total	30,875	6,217	527	218

Source: U.S. Bureau of Labor Statistics, Consumer Expenditure Survey

Table 19 shows the mean quarterly transportation expenditure of transit and no transit households in the U.S. The table also shows the difference in mean transportation expenditure between transit and no transit households. The table shows that mean transportation expenditures for all but the highest income quintile are higher for

households where no one uses public transit. Lower-income households experience the most significant savings in quarterly transportation expenditures. For the lowest income quintile, mean transportation expenditure is almost 31% lower for households where at least one person uses public transit versus households where no one uses transit.

Table 19 – Mean quarterly transportation expenditure of transit and no transit households in the U.S.

Annual income quintile	No transit household	Transit household	Difference	
			Absolute	Percent
Lowest 20%	$1,321	$918	-$403	-30.5%
20% to 40%	$1,090	$789	-$302	-27.7%
40% to 60%	$1,512	$1,355	-$157	-10.4%
60% to 80%	$2,030	$1,888	-$143	-7.0%
Highest 20%	$2,954	$3,031	$76	2.6%

Source: U.S. Bureau of Labor Statistics, Consumer Expenditure Survey

Table 20 shows the mean quarterly transportation expenditure of transit and no transit households in New Jersey. The table shows that Low-and middle-income transit households spend less on transportation when compared to no transit households, a pattern similar to that observed at the national level. However, the distribution differs from the U.S. distribution in two ways: 1) the difference is more for middle-income households than lower-income households, and 2) transit households in the second-highest income quintile (60 to 80 percent) spend more on transportation than the highest quintile households. Importantly, these data show that low- and middle-income households in New Jersey where at least one person uses public transit spend 20 to 30 percent less on transportation than households where no one uses transit.

Table 20 – Mean quarterly transportation expenditure of transit and no transit households in New Jersey

Annual income quintile	No transit household	Transit household	Difference	
			Absolute	Percent
Lowest 20%	$1,053	$801	-$252	-23.9%
20% to 40%	$1,059	$786	-$273	-25.8%
40% to 60%	$2,072	$1,374	-$698	-33.7%
60% to 80%	$1,363	$2,464	$1,101	80.8%
Highest 20%	$1,819	$2,268	$450	24.7%

Source: U.S. Bureau of Labor Statistics, Consumer Expenditure Survey

In addition to examining variation in total transportation expenditures alone, the research team also considered variation in combined housing plus transportation (H+T) expenditures. The CES includes two variables on housing expenditure. HOUSPQ, which counts all expenses related to housing, including furniture, etc., and SHELTPQ, which counts only the costs for mortgage or rent, interest, building maintenance, home

insurance, etc. For this analysis, the research team used the latter variable to create a new H+T expenditure variable by adding SHELTPQ and TRANSPQ. Table 21 shows the H+T expenditure distribution for income quintiles for the U.S. The table shows that H+T expenditure is lower for transit households versus no transit households only in the lowest income quintile. Even in this case, the difference is slight. One explanation for this result is the spatial heterogeneity of U.S. households (i.e., the aggregation of urban, suburban, rural households living in places as diverse as New York City and rural Kansas). Households in rural areas spend a lot less on housing than households in urban areas.

Table 21 – Mean quarterly expenditure on combined housing and transportation (H+T) expenditures for transit and no transit households in the U.S.

Annual income quintile	No transit household	Transit household	Difference	
			Absolute	Percent
Lowest 20%	$2,916	$2,812	-$105	-3.7%
20% to 40%	$2,370	$2,504	$134	5.3%
40% to 60%	$3,040	$3,562	$521	14.6%
60% to 80%	$4,000	$4,662	$662	14.2%
Highest 20%	$6,000	$7,351	$1,351	18.4%

Source: U.S. Bureau of Labor Statistics, Consumer Expenditure Survey

Table 22 shows the H+T expenditures of New Jersey households. The table shows that transit-using households in the two lowest income quintiles spend less, whereas those in the two highest quintiles spend substantially more. An important observation from the New Jersey analysis is that low-income transit households pay nearly 40 percent less on H+T than no transit households.

Table 22 – Mean quarterly expenditure on combined housing and transportation (H+T) expenditures for transit and no transit households in New Jersey

Annual income quintile	Transit non-user household	Transit user household	Difference	
			Absolute	Percent
Lowest 20%	$4,115	$2,486	-$1,629	-39.6%
20% to 40%	$3,340	$3,081	-$259	-7.8%
40% to 60%	$4,438	$4,466	$28	0.6%
60% to 80%	$4,563	$6,230	$1,666	36.5%
Highest 20%	$6,615	$9,377	$2,761	41.7%

Source: U.S. Bureau of Labor Statistics, Consumer Expenditure Survey

Access to opportunity

The focus groups conducted as part of Phase 1 of this study showed that New Jersey residents, business owners, and elected officials all understand that NJ TRANSIT services provide significant accessibility benefits in places where NJ TRANSIT services are available. Focus group participants intuitively understood that NJ TRANSIT services

were essential for residents with no or limited access to private vehicles to meet their transportation needs. Participants also understood that transit could connect people to jobs, shopping, healthcare, recreation, and other essential destinations.

One way to quantify the benefits of NJ TRANSIT service is to report various system characteristics. For example, NJ TRANSIT's service area covers 5,325 square miles, an area 17 times larger than the size of all five boroughs of New York City combined. NJ TRANSIT services are available in more than two-thirds of New Jersey municipalities. There are more than 19,000 bus stops, 165 commuter rail stations, and 62 light rail stations in the State. NJ TRANSIT is the largest statewide transit system and the third largest transit system in the country, providing an average of more than 944,000 trips each weekday. See Table 23 for more details.

Table 23 – NJ TRANSIT system characteristics

Performance Measure	Estimate
NJ TRANSIT Service Area (square miles)	5,325
- **Proportion of New Jersey land area served**	72%
Average daily weekday trips	944,000
New Jersey municipalities served by local bus service	386
- **Number of bus routes**	251
- **Number of bus stops**	19,000
- **Proportion of municipalities serviced by local bus**	68%
New Jersey municipalities served by commuter rail service	116
- **Number of rail lines**	12
- **Number of rail stations**	165
New Jersey municipalities served by light rail services	22
- **Number of light rail lines**	3
- **Number of light rail stations**	62

Source: NJ TRANSIT data for 2019

Another way to quantify the benefits of NJ TRANSIT services is to estimate the potential accessibility the system provides by connecting residents to opportunities such as jobs, goods, needed services, and other destinations. In this regard, the research team used ESRI ArcGIS Business Analyst software to estimate the number of households and residents living close to NJ TRANSIT services. We derived separate estimates for low-income households, households with no access to a personal vehicle at home, and residents living close to high-frequency, direct service into New York City. We also estimated the number of jobs and businesses close to transit, including hospitals, health service businesses, and food stores.

Once again, “close to” transit was defined as within a 0.5-mile network distance of NJ TRANSIT rail and light rail stations and a 0.25-mile buffer of a NJ TRANSIT bus route. High-frequency bus routes were defined as 12-minute headways in urban counties and 22-minute headways in other counties. Table 24 reports the results of the analyses.

Table 24 – Potential origins and destinations located close to NJ TRANSIT services

Performance Measure	Estimate
Business establishments located close to NJ TRANSIT services	203,882
- **Proportion of total New Jersey businesses**	64%
- **Proportion of hospitals**	80%
- **Proportion of health service businesses**	65%
- **Proportion of food stores**	75%
Jobs located close to NJ TRANSIT services	2,682,365
- **Proportion of all New Jersey jobs**	65%
Households living close to NJ TRANSIT services	1,767,291
- **Proportion of all New Jersey households**	53%
- **Proportion of low-income households**	71%
- **Proportion of zero-vehicle households**	50%
Residents living close to NJ TRANSIT services	4,837,799
- **Proportion of New Jersey residents**	55%
Residents living close to high-frequency transit providing direct service into NYC	2,649,413
- **Proportion of New Jersey residents**	29%

Data Source: ESRI Business Analyst

Services for older adults and people with disabilities

According to NJ TRANSIT, 100 percent of the agency's bus fleet includes accessibility features such as lift-equipped and kneeling buses. In addition, all buses have public address systems, and the agency's bus operators must make bus stop announcements. Many NJ TRANSIT rail stations are accessible by elevator, ramp, mini high-level platform, or portable lift. (21) Older adults (62 years of age and older) and people with disabilities are eligible to use NJ TRANSIT's reduced fare program. The program provides a 50 percent discount on the regular fare. (22)

NJ TRANSIT also operates Access Link, which provides federally-required ADA complementary transit services for people with disabilities who cannot use local bus services. Qualified riders can use Access Link if their pick-up and drop-off points are within a 3/4 mile of an eligible bus route or light rail station. (23) Access link's fleet includes more than 400 vehicles operating throughout the State. In 2019, Access Link customers used the service to take nearly two million trips. (24)

Finally, NJ TRANSIT distributes approximately $20 million each year to New Jersey counties to support community transportation services for older adults and people with disabilities. County-operated community transportation fleets include nearly 1,000 vehicles statewide. Community transportation services operated by counties connect residents to medical appointments, jobs, recreation, school and training, shopping, friends and family, and other needed destinations. In 2019, New Jersey residents made

nearly three million trips using NJ TRANSIT-supported community transportation services operated by counties. The agency directs another $24 million in federal grant funds to local governments and not-for-profit organizations. These funds support local shuttle buses, transportation to day programs, nutrition programs, job access programs, travel instruction, etc. Funds also support vehicle purchases. [25]

Services for students, military personnel, and veterans with disabilities

NJ TRANSIT offers several programs that provide discounted fares for students traveling to college classes, parochial or public schools. The MyTix Student Pass program allows students attending a partner college or university, an accredited elementary or secondary school, or a post-secondary education program to purchase a reduced fare student pass. The pass provides a 25 percent discount on the standard fare. Students can also choose the FlexPass program, which provides a 20 percent discount for less frequent use. There are currently 62 partner colleges and universities participating in the program. [26]

Military personnel and their dependents may use the one-way reduced fare Senior/Disabled ticket upon presenting their valid military or military-dependent I.D. cards. The reduced fare program provides a discount of 50 percent off the regular fare. Active duty, reserve, National Guard, and those with official "Retired" status from the Army, Navy, Air Force, Marines, or Coast Guard qualify for the program. Veterans with service-connected disabilities may present a valid Veterans Affairs (V.A.) identification card that indicates "service-connected" to use the reduced fare ticket option. [27]

Safety Benefits associated with transit use

See Marketing Research for the Quantifiable Safety Benefits of Transit in New Jersey, Task 7 Technical Memorandum: Safety Benefits of NJ TRANSIT Services (dated April 1, 2021) prepared by Mohammad Jalayer, Ph.D. and Ahmed Sajid Hasan, Department of Civil and Environmental Engineering, Rowan University.

Health benefits associated with transit use

In addition to the mobility, accessibility, and social benefits described above, regular transit provides health benefits. Several empirical research studies have found people who use transit walk more. [28-32] Higher levels of physical activity can improve overall health and reduce obesity and body mass index. [28,29] Transit users also tend to walk more to access services in their neighborhoods and at their destinations. [31] One New Jersey-based analysis assessed the physical activity patterns of transit commuters living near three different suburban rail stations and found 78 percent of riders living near a station met physical activity recommendations–compared with 44 percent for the entire State. [30] Another study collected self-reported information and distributed pedometers to train and car commuters in northern New Jersey. The train commuters

reported an average of 30 percent more steps and were four times more likely to walk 10,000 steps–the equivalent of meeting physical activity recommendations. [32]

Increased physical activity related to transit use can have a measurable effect on upstream health outcomes such as lowered obesity rates. A 2008 study converted the additional minutes spent walking to transit into energy expenditure and reduction in obesity prevalence. Using this potential reduction, the researchers calculated the present value savings of $5500 per person. [29]

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APPENDIX C1 – EXPANDED SKETCH LEVEL ANALYSIS: IMPACT OF NJ TRANSIT ON PROPERTY VALUES

Prepared by: Haoyun Wang 2/25/2021

OBJECTIVE

This analysis aimed to estimate the impact of NJ TRANSIT services on property values in New Jersey.

DATA PREPARATION AND ANALYSIS METHODS

Data cleaning, analysis, and visualization were performed using ArcGIS Pro and RStudio software using MOD IV data and Geographic Information System (GIS) shapefile data.

Data acquisition

The research team obtained 2019 MOD IV data from the New Jersey Division of Taxation. MOD IV Historical Database (HDB) [11] was used. This database includes New Jersey real estate parcel data maintained by municipal tax assessors. The MOD IV dataset includes the following attributes which were used for the analysis: "gis_pin" (ID used for join tables), mod_iv_county_name, mod_iv_munis_name, property_class, calculated_acreage, and net_taxable_value. "Net_taxable_value" is the value of the land plus the improvement value minus limited exemptions. "Calculated_acreage" lists the size of the parcel in acres. The research team also obtained tables showing equalized property valuations from the New Jersey Division of Taxation.[12]

GIS shapefile data for NJ TRANSIT rail lines and rail stations, parcel shapefiles, and the jurisdiction boundaries were obtained from the New Jersey Geographic Information Network (NJGIN) Open Data portal.[13]

Data Management for quality control

The research team found that the MOD IV dataset included several problematic data records for the "calculated acreage" field as part of the analysis. These records referenced inaccurate data. These anomalies distorted analysis results. The research team calculated parcel areas in acres using the "calculate geometry" tool in ArcGIS Pro to address this issue. We then joined the MOD IV dataset and the parcel dataset exported from ArcGIS. If the ratio of area value provided by MOD IV dataset over area calculated by ArcGIS is less than two and more significant than 0.5 (meaning that these two are close), then the area value provided by MOD IV dataset ("calculated acreage") were used. For the records that violated these thresholds, the research team used ArcGIS to estimate the area value. This data cleaning protocol impacted 520,543 of the 2,522,555 parcel records for New Jersey, 20 percent of all parcel records in the dataset.

To normalize the data for comparative purposes, property value per acre was calculated by dividing the property value identified in the MOD IV dataset by parcel area. Boxplots were used to identify and remove outliers from the dataset using the Interquartile Range (IQR) method, a

[11] https://terrene.njaes.rutgers.edu/mod-iv/
[12] https://www.state.nj.us/treasury/taxation/lpt/lptvalue.shtml
[13] https://njogis-newjersey.opendata.arcgis.com/

standard method adopted by statisticians.[14] The interquartile range is the central 50 percent or the area between the 75th and the 25th percentile of a distribution. If a data point was above the 75th or below the 25th percentile by a factor of 1.5 times the IQR, it was defined as an outlier.[15]

Given the heterogeneity of municipalities and property classes, the research team removed outliers based on separate analyses for each property class (apartment, commercial, industrial, residential) in each municipality (see Figure 1 and Figure 2). The data were then recombined. The research team also removed parcel records where the net taxable value was zero. This protocol resulted in the removal of 9.2 percent of the parcel records in the dataset. The final dataset used for the analysis included 2,288,982 of the original 2,522,555 parcel records.

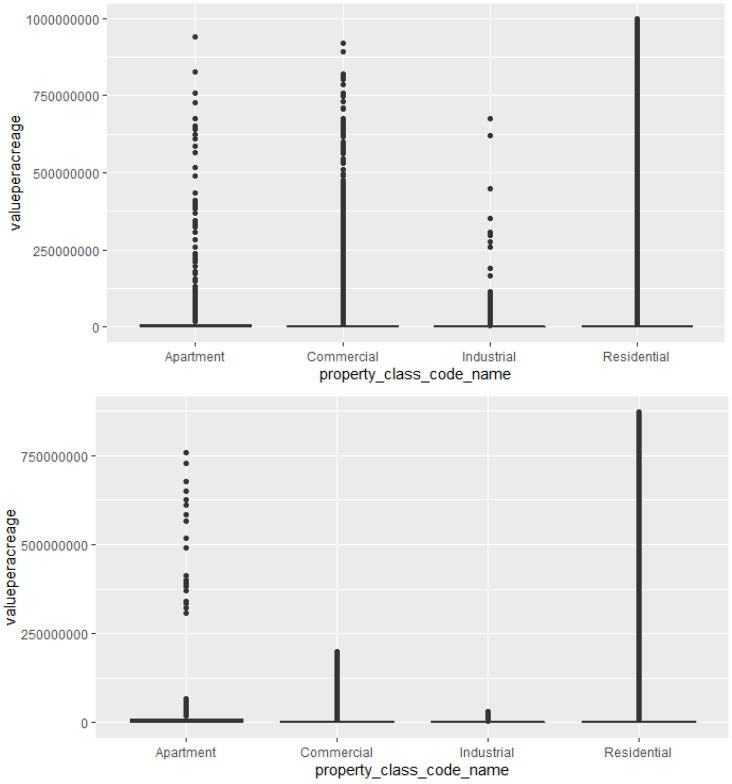


Figure C1-1. Before and after removing outlier parcel records

(Top: before; Bottom: after)

[14] https://www.r-bloggers.com/2020/01/how-to-remove-outliers-in-r/

[15] For example, if Q1= 25th percentile, Q3= 75th percentile. Then, IQR= Q3 – Q1. And an outlier would be a point below [Q1- (1.5)IQR] or above [Q3+(1.5)IQR].

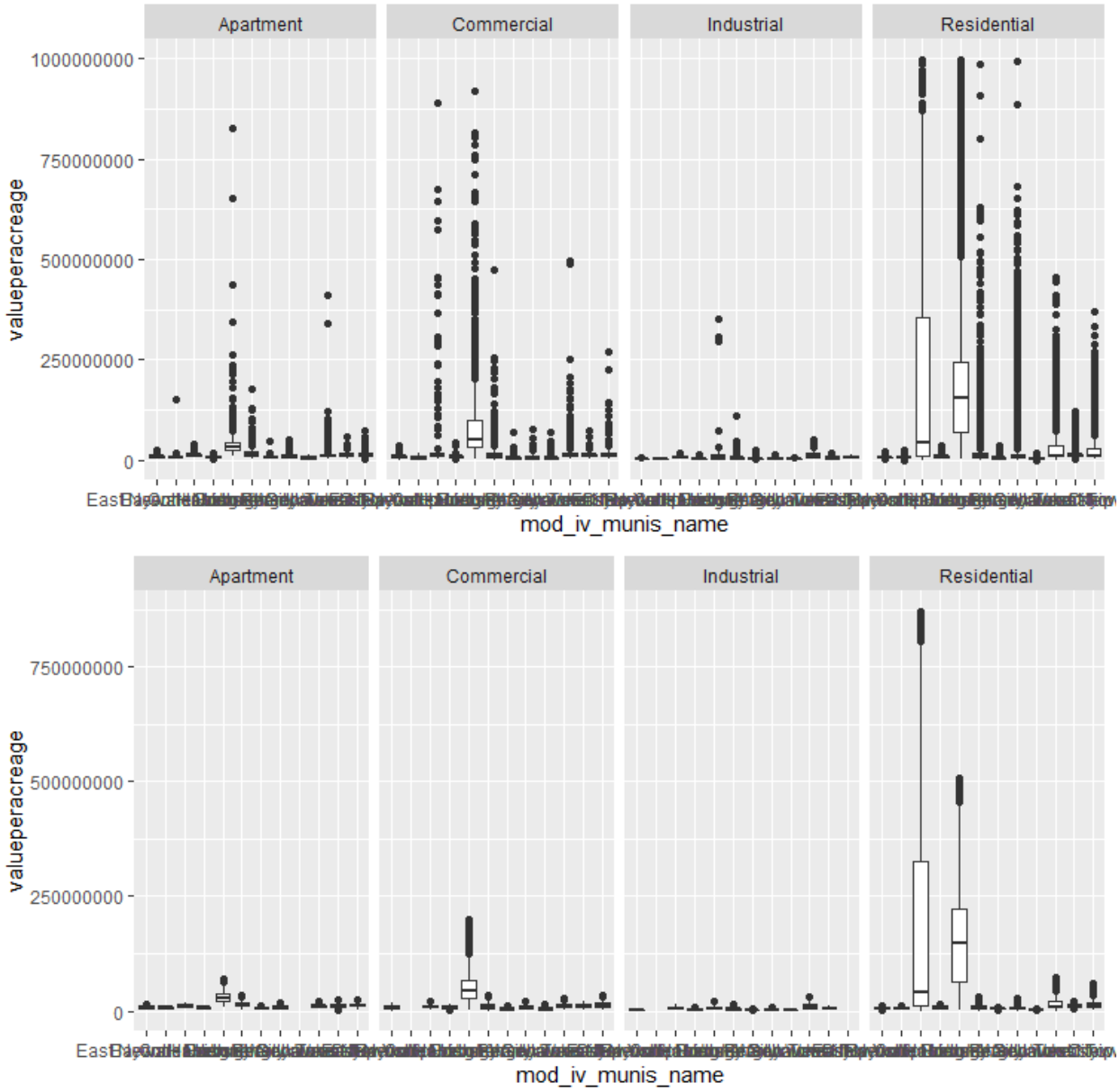


Figure C1-2. Before and after removing outliers parcel records in Hudson County

(Top: before; Bottom: after)

Property value estimation methodology – Municipalities and counties

average per acre property values for each property class were estimated for individual rail stations and then aggregated by municipality and county. Figure 3 depicts the estimation workflow. First, the research team created 0.5-mile and 1.0-mile network distance buffers for each rail station using the Network Analyst Extension in ArcGIS pro. Next, we converted parcel polygons to points using the centroid of each parcel to identify which parcels were located within

the network distance study areas. Once converted, the parcel points layer was overlaid with the network distance study area layer to identify parcels within the < 0.5-mile or 0.5-1 mile or > 1-mile service areas. The parcel data was then exported to a CSV file and joined with the cleaned MOD IV dataset for further analysis. Figure 4 shows example results for Atlantic County municipalities. If a municipality does not host a rail station, the cell for < 0.5-miles shows "N.A." Figure 5 presents the results of the analysis for New Jersey Counties that host a rail station. If there are no rail stations in the county, the cell corresponding with < 0.5-miles shows "N.A."

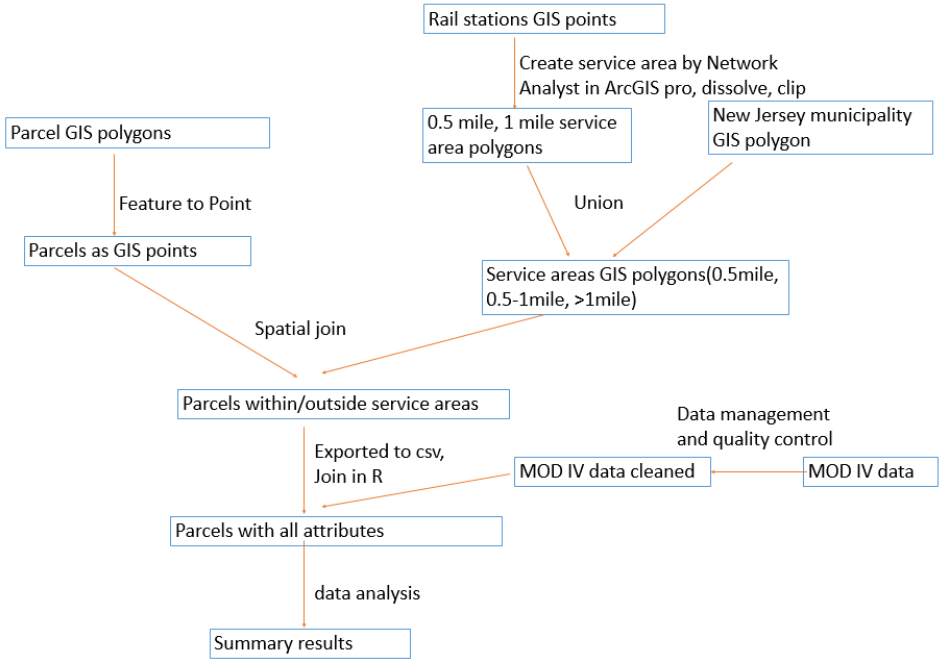


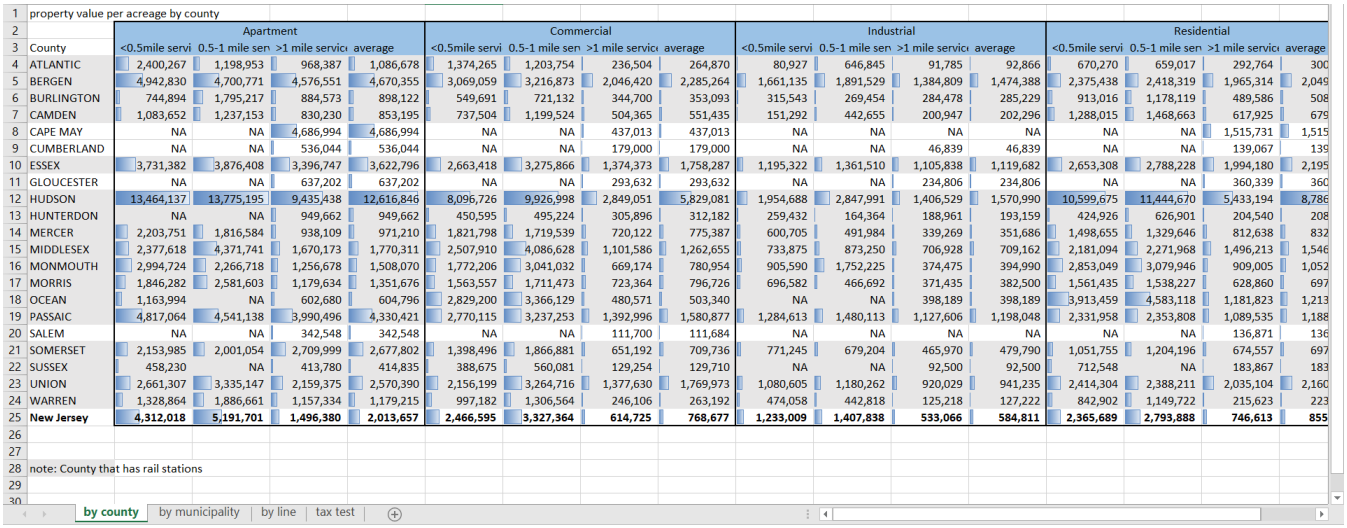
Figure C1-3. Workflow of estimation for county and municipality

property value per acreage for county & municipality note: grey row means this county/municipality has rail stations

	Apartment				Commercial				Industrial				Residential			
County/Municipality	<0.5mile ser	0.5-1 mile s	>1 mile serv	average	<0.5mile ser	0.5-1 mile s	>1 mile serv	average	<0.5mile ser	0.5-1 mile s	>1 mile serv	average	<0.5mile ser	0.5-1 mile ser	>1 mile serv	average
ATLANTIC	**2,400,267**	**1,198,953**	**968,387**	**1,086,678**	**1,374,265**	**1,203,754**	**236,504**	**264,870**	**80,927**	**646,845**	**91,785**	**92,866**	**670,270**	**659,017**	**292,764**	**300,746**
Absecon	NA	NA	NA	NA	472,556	899,889	137,284	208,245	NA	NA	NA	NA	646,455	466,825	556,120	579,364
Atlantic City	2,522,794	1,554,841	2,954,061	2,735,355	2,583,188	2,696,046	1,475,462	1,828,738	361,719	905,078	1,067,639	916,163	2,171,119	2,832,045	2,218,549	2,232,401
Brigantine	NA	NA	NA	NA	NA	NA	2,060,203	2,060,203	NA	NA	NA	NA	NA	NA	3,200,649	3,200,649
Buena Borough	NA	NA	482,244	482,244	NA	NA	134,481	134,481	NA	NA	NA	NA	NA	NA	178,390	178,390
Buena Vista Township	NA	NA	NA	NA	NA	NA	30,829	30,829	NA	NA	29,150	29,150	NA	NA	74,919	74,919
Corbin City	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	56,791	56,791
Egg Harbor City	NA	NA	NA	NA	230,656	634,737	166,146	335,551	74,453	176,487	86,388	86,877	488,516	628,359	208,061	404,844
Egg Harbor Township	NA	NA	537,791	537,791	NA	NA	172,509	172,509	NA	NA	355,657	355,657	NA	NA	295,889	295,889
Estell Manor	NA	NA	NA	NA	NA	NA	32,013	32,013	NA	NA	NA	NA	NA	NA	37,383	37,383
Folsom Borough	NA	NA	NA	NA	NA	NA	136,063	136,063	NA	NA	78,004	78,004	NA	NA	152,499	152,499
Galloway Township	NA	NA	NA	NA	NA	512,138	148,706	149,659	NA	NA	NA	NA	150,611	471,883	160,833	161,799
Hamilton Township	NA	NA	NA	NA	NA	NA	223,967	223,967	NA	NA	30,379	30,379	765,397	NA	111,175	111,195
Hammonton	750,389	754,434	386,310	417,909	462,893	884,452	210,681	240,258	NA	NA	NA	NA	550,859	609,054	174,397	218,270
Linwood	NA	NA	NA	NA	NA	NA	222,460	222,460	NA	NA	NA	NA	NA	NA	864,083	864,083
Longport Borough	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	########	########
Margate City	NA	NA	NA	NA	NA	NA	4,115,698	4,115,698	NA	NA	NA	NA	NA	NA	6,865,604	6,865,604
Mullica Township	NA	NA	NA	NA	363,334	NA	67,743	68,206	NA	NA	NA	NA	161,262	NA	52,489	52,667
Northfield	NA	NA	NA	NA	NA	NA	582,142	582,142	NA	NA	NA	NA	NA	NA	804,482	804,482
Pleasantville	NA	NA	530,520	530,520	538,471	NA	558,320	558,216	NA	NA	257,649	257,649	529,533	NA	475,399	476,839
Port Republic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	91,473	91,473
Somers Point	NA	NA	1,202,011	1,202,011	NA	NA	838,136	838,136	NA	NA	NA	NA	NA	NA	930,159	930,159
Ventnor City	NA	NA	4,943,658	4,943,658	NA	NA	1,980,292	1,980,292	NA	NA	NA	NA	NA	NA	3,854,238	3,854,238
Weymouth Township	NA	NA	NA	NA	NA	NA	185,971	185,971	NA	NA	NA	NA	NA	NA	60,989	60,989
BERGEN	**4,942,830**	**4,700,771**	**4,576,551**	**4,670,355**	**3,069,059**	**3,216,873**	**2,046,420**	**2,285,264**	**1,661,135**	**1,891,529**	**1,384,809**	**1,474,388**	**2,375,438**	**2,418,319**	**1,965,314**	**2,049,468**
Allendale Borough	NA	NA	NA	NA	1,931,828	2,629,977	1,560,071	2,108,746	2,156,571	1,540,417	1,249,163	1,299,220	1,354,013	1,306,678	1,125,366	1,216,254

by county | **by municipality** | by line | tax test

Figure C1-4. Property value per acreage by municipality



property value per acreage by county

County	Apartment				Commercial				Industrial				Residential			
	<0.5mile servi	0.5-1 mile ser	>1 mile servic	average	<0.5mile servi	0.5-1 mile ser	>1 mile servic	average	<0.5mile servi	0.5-1 mile ser	>1 mile servic	average	<0.5mile servi	0.5-1 mile ser	>1 mile servic	average
ATLANTIC	2,400,267	1,198,953	968,387	1,086,678	1,374,265	1,203,754	236,504	264,870	80,927	646,845	91,785	92,866	670,270	659,017	292,764	300
BERGEN	4,942,830	4,700,771	4,576,551	4,670,355	3,069,059	3,216,873	2,046,420	2,285,264	1,661,135	1,891,529	1,384,809	1,474,388	2,375,438	2,418,319	1,965,314	2,049
BURLINGTON	744,894	1,795,217	884,573	898,122	549,691	721,132	344,700	353,093	315,543	269,454	284,478	285,229	913,016	1,178,119	489,586	508
CAMDEN	1,083,652	1,237,153	830,230	853,195	737,504	1,199,524	504,365	551,435	151,292	442,655	200,947	202,296	1,288,015	1,468,663	617,925	679
CAPE MAY	NA	NA	4,686,994	4,686,994	NA	NA	437,013	437,013	NA	NA	NA	NA	NA	NA	1,515,731	1,515
CUMBERLAND	NA	NA	536,044	536,044	NA	NA	179,000	179,000	NA	NA	46,839	46,839	NA	NA	139,067	139
ESSEX	3,731,382	3,876,408	3,396,747	3,622,796	2,663,418	3,275,866	1,374,373	1,758,287	1,195,322	1,361,510	1,105,838	1,119,682	2,653,308	2,788,228	1,994,180	2,195
GLOUCESTER	NA	NA	637,202	637,202	NA	NA	293,632	293,632	NA	NA	234,806	234,806	NA	NA	360,339	360
HUDSON	13,464,137	13,775,195	9,435,438	12,616,846	8,096,726	9,926,998	2,849,051	5,829,081	1,954,688	2,847,991	1,406,529	1,570,990	10,599,675	11,444,670	5,433,194	8,786
HUNTERDON	NA	NA	949,662	949,662	450,595	495,224	305,896	312,182	259,432	164,364	188,961	193,159	424,926	626,901	204,540	208
MERCER	2,203,751	1,816,584	938,109	971,210	1,821,798	1,719,539	720,122	775,387	600,705	491,984	339,269	351,686	1,498,655	1,329,646	812,638	832
MIDDLESEX	2,377,618	4,371,741	1,670,173	1,770,311	2,507,910	4,086,628	1,101,586	1,262,655	733,875	873,250	706,928	709,162	2,181,094	2,271,968	1,496,213	1,546
MONMOUTH	2,994,724	2,266,718	1,256,678	1,508,070	1,772,206	3,041,032	669,174	780,954	905,590	1,752,225	374,475	394,990	2,853,049	3,079,946	909,005	1,052
MORRIS	1,846,282	2,581,603	1,179,634	1,351,676	1,563,557	1,711,473	723,364	796,726	696,582	466,692	371,435	382,500	1,561,435	1,538,227	628,860	697
OCEAN	1,163,994	NA	602,680	604,796	2,829,200	3,366,129	480,571	503,340	NA	NA	398,189	398,189	3,913,459	4,583,118	1,181,823	1,213
PASSAIC	4,817,064	4,541,138	3,990,496	4,330,421	2,770,115	3,237,253	1,392,996	1,580,877	1,284,613	1,480,113	1,127,606	1,198,048	2,331,958	2,353,808	1,089,535	1,188
SALEM	NA	NA	342,548	342,548	NA	NA	111,700	111,684	NA	NA	NA	NA	NA	NA	136,871	136
SOMERSET	2,153,985	2,001,054	2,709,999	2,677,802	1,398,496	1,866,881	651,192	709,736	771,245	679,204	465,970	479,790	1,051,755	1,204,196	674,557	697
SUSSEX	458,230	NA	413,780	414,835	388,675	560,081	129,254	129,710	NA	NA	92,500	92,500	712,548	NA	183,867	183
UNION	2,661,307	3,335,147	2,159,375	2,570,390	2,156,199	3,264,716	1,377,630	1,769,973	1,080,605	1,180,262	920,029	941,235	2,414,304	2,388,211	2,035,104	2,160
WARREN	1,328,864	1,886,661	1,157,334	1,179,215	997,182	1,306,564	246,106	263,192	474,058	442,818	125,218	127,222	842,902	1,149,722	215,623	223
New Jersey	**4,312,018**	**5,191,701**	**1,496,380**	**2,013,657**	**2,466,595**	**3,327,364**	**614,725**	**768,677**	**1,233,009**	**1,407,838**	**533,066**	**584,811**	**2,365,689**	**2,793,888**	**746,613**	**855**

note: County that has rail stations

by county | by municipality | by line | tax test

Figure C1-5. Property value per acreage by county

Property value estimation methodology – Rail lines

In addition, to property values summaries by municipality and county, values were aggregated for all rail stations along each NJ TRANSIT rail line following a similar methodology. Aggregating results for each rail line were automated using the model builder extension in for ArcGIS.

Figure 6 shows the overlapping service areas of each of the rail lines serving northern New Jersey. Figure 7 shows the estimated average per acre property values by property class (apartment, commercial, and residential) for each NJ TRANSIT rail line.

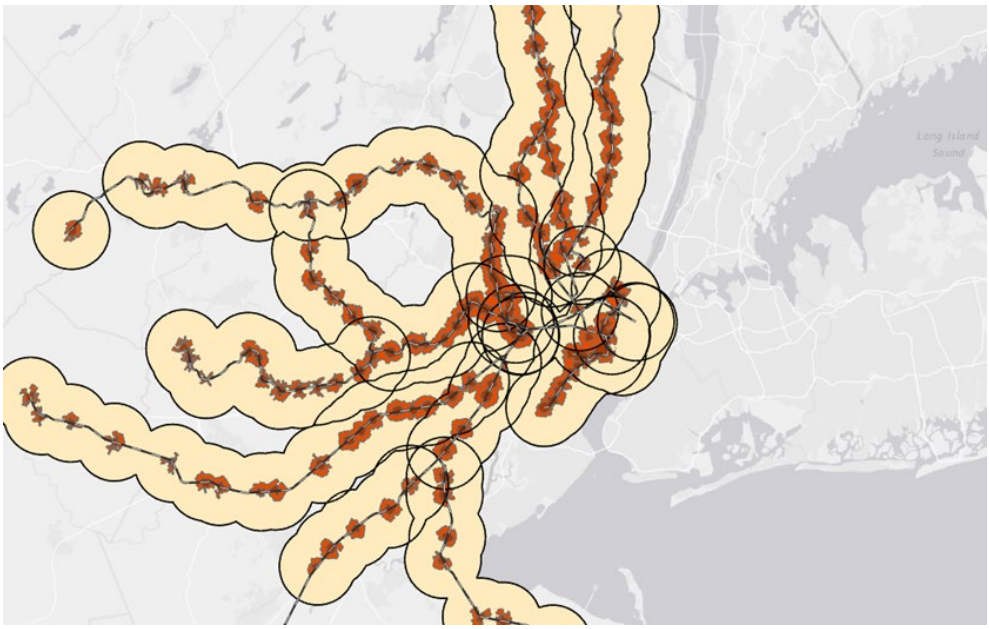


Figure C1-6. Map of < 0.5-mile network buffer (red), 0.5-1.0-mile service area (orange), and 1-3-mile service (yellow) of rail stations in northern New Jersey

property value per acreage by line

	Apartment				Commercial				Residential			
NJ TRANSIT Rail Line	<0.5mile service	0.5-1 mile servic	1-3 mile service	average	<0.5mile service	0.5-1 mile servic	1-3 mile service	average	<0.5mile service	0.5-1 mile servic	1-3 mile service	average
Atlantic City Line	1,295,232	1,401,796	934,443	986,159	1,196,143	944,516	518,322	591,038	1,183,704	1,091,321	559,259	632,716
Bergen Couty Line	9,542,033	8,927,402	4,017,315	7,142,508	6,536,320	4,760,866	2,273,757	3,343,861	5,445,616	3,875,270	1,870,521	2,588,902
Hudson Bergen Light Rail	13,874,192	13,895,600	9,323,922	12,631,120	10,038,342	8,129,908	2,729,214	5,499,269	11,535,496	11,073,006	6,421,858	9,540,612
Main Line	9,761,350	9,342,009	3,998,996	7,155,393	6,649,276	4,749,344	2,156,342	3,312,445	5,373,419	3,820,670	1,855,093	2,500,574
Gladstone (Morris & Essex)	6,611,647	7,121,901	3,834,192	5,916,585	5,166,679	4,592,530	1,142,994	2,120,744	4,290,412	3,236,665	1,381,353	1,980,561
Morristown (Morris & Essex)	6,340,741	6,350,801	2,864,730	4,937,467	4,480,497	4,077,624	1,076,702	1,772,760	4,392,265	3,393,158	1,329,407	1,900,236
Meadowlands Line	13,347,359	10,892,445	4,502,426	9,296,355	8,549,715	6,663,003	2,981,127	5,273,575	9,361,789	7,412,125	3,553,421	5,942,558
Montclair Boonton Line	6,985,274	7,473,929	2,740,139	5,078,248	4,760,662	4,421,571	1,216,084	1,941,940	4,470,260	3,262,617	1,229,999	1,711,502
Newark Light Rail	3,992,098	3,815,840	3,599,828	3,786,060	3,060,190	3,081,435	2,005,132	2,496,314	2,715,729	2,611,472	2,670,935	2,659,917
NorthEastCorridor Line	8,029,581	6,169,353	1,849,876	3,048,620	5,763,217	4,098,809	1,520,469	2,207,586	6,073,536	4,090,780	1,749,449	2,287,645
NorthJerseyCoast Line	7,653,190	6,124,958	1,959,662	3,509,132	5,388,566	3,515,938	1,281,496	2,086,697	5,004,756	3,742,860	1,739,722	2,311,890
PascackValley Line	10,043,376	9,172,552	4,101,461	7,227,397	5,960,997	5,288,678	2,039,710	3,187,498	5,457,658	4,069,612	2,151,638	2,849,963
PatcoSpeed Line	1,247,386	1,086,668	967,041	985,250	1,336,552	866,475	703,067	778,335	1,534,202	1,366,755	861,273	964,239
RaritanValley Line	1,855,459	1,607,051	1,758,590	1,744,316	1,838,101	1,195,966	810,737	903,302	1,473,179	1,285,629	893,819	943,578
RiverLine	1,552,925	1,108,167	864,949	924,143	1,005,617	778,779	437,820	507,420	1,225,609	1,060,449	858,211	913,948
Average by line	7,782,903	7,110,194	2,293,927	4,409,961	5,113,047	4,039,184	1,284,451	2,090,736	4,792,398	3,478,942	1,446,925	2,016,053

calculation method: create 0.5,1,3 mile service areas for each lines, analyze each line. "average" means average within 3 mile service area

Figure C1-7. Property value per acreage by rail line

APPENDIX C2 – EXPANDED SKETCH LEVEL ANALYSIS: BUSINESS ACCESS TO CONSUMER AND LABOR MARKETS

Prepared by: Haoyun Wang 2/25/2021

OBJECTIVE

The purpose of this analysis was to calculate the:

- Number of business establishments located close to NJ TRANSIT services;
- Business revenue/sales reported by these establishments;
- Number of jobs located close to NJ TRANSIT services; and
- Number of residents (potential labor pool) living close to NJ TRANSIT services.

For this analysis, "close to" transit was defined as within a 0.5-mile network distance of NJ TRANSIT rail and light rail stations and a 0.25-mile buffer of a NJ TRANSIT bus route.

DATA ACQUISITION AND ANALYSIS METHODS

Data cleaning, analysis, and visualization were performed using ArcGIS Pro Business Analyst extension and Geographic Information System (GIS) shapefile data acquired from the New Jersey Geographic Information Network (NJGIN) open data portal. Files used included:

- Rail stop GIS shapefile (point) from NJGIN[16]
- Bus route GIS shapefile (line) from NJGIN[17]

Data Analysis Methods

In ArcGIS Pro, the research team created 0.5-mile network distance service area buffers for all NJ TRANSIT rail and light rail stations and 0.25-mile buffer distances for all NJ TRANSIT bus routes using Network Analyst. These two shapefiles were combined and dissolved into a single polygon layer intended to represent the "service area" for NJ TRANSIT rail lines and bus routes in New Jersey. The "Enrich Layer" tool in Business Analyst was then used to calculate business establishment counts, employee counts, business sales by type in the service area and all of New Jersey. These calculations were used to estimate the proportion of businesses, business sales, and jobs associated with NJ TRANSIT's "service area." Table A1 shows the results.

[16] https://njogis-newjersey.opendata.arcgis.com/datasets/railroad-stations-in-nj
[17] https://njogis-newjersey.opendata.arcgis.com/datasets/bus-routes-in-nj

	Located within ½ mile of rail station and/or ¼ mile of bus routes			New Jersey Statewide			Percent of NJ Total Close to Transit		
	Total Businesses	Total Emloyees	Total Sales ($000)	Total Businesses	Total Emloyees	Total Sales ($000)	Total Businesses	Total Emloyees	Total Sales ($000)
Total (all types)	203,882	2,682,365	526,400,081	317,742	4,139,539	843,874,457	64.2%	64.8%	62.4%
Agriculture/Mining	2,700	16,799	2,176,883	6,192	39,604	4,938,379	43.6%	42.4%	44.1%
Construction	12,005	91,718	22,574,663	22,542	156,132	38,379,545	53.3%	58.7%	58.8%
Manufacturing	6,068	216,033	66,117,346	10,068	344,639	108,176,793	60.3%	62.7%	61.1%
Transportation	5,859	75,545	13,325,952	9,172	117,906	20,126,456	63.9%	64.1%	66.2%
Communication	1,872	17,843	9,218,065	2,618	28,139	13,271,335	71.5%	63.4%	69.5%
Utility	524	20,247	2,827,965	1,011	28,023	5,795,170	51.8%	72.3%	48.8%
Wholesale Trade	7,031	104,604	163,222,715	11,696	184,105	274,341,730	60.1%	56.8%	59.5%
Retail Trade	49,241	546,416	108,406,010	71,051	817,443	167,132,965	69.3%	66.8%	64.9%
Home Improvement	2,186	29,281	10,744,950	3,701	49,718	17,726,931	59.1%	58.9%	60.6%
General Merchandise	1,655	53,297	10,687,610	2,365	78,135	15,697,264	70.0%	68.2%	68.1%
Food Stores	6,181	82,291	15,489,536	8,660	130,439	24,962,296	71.4%	63.1%	62.1%
Auto Dealer/Gas	4,178	47,169	29,284,648	6,495	75,655	46,479,275	64.3%	62.3%	63.0%
Apparel/Accessory	3,846	38,291	5,579,754	4,917	49,056	6,922,512	78.2%	78.1%	80.6%
Furniture/Home	3,365	40,078	7,359,469	5,151	57,220	11,163,492	65.3%	70.0%	65.9%
Eating & Drinking	16,201	170,638	9,869,620	22,518	244,439	14,115,063	71.9%	69.8%	69.9%
Misc Retail	11,630	85,371	19,390,423	17,244	132,781	30,066,132	67.4%	64.3%	64.5%
Finance/Ins/Real	18,205	203,134	42,020,722	27,118	293,706	62,755,461	67.1%	69.2%	67.0%
Banks	3,540	36,666	11,529,801	5,165	52,706	16,178,338	68.5%	69.6%	71.3%
Securities Broker	2,324	31,360	9,427,419	3,645	41,335	12,944,078	63.8%	75.9%	72.8%
Insurance	3,172	48,811	7,278,561	4,770	71,356	13,768,041	66.5%	68.4%	52.9%
Real Estate/Holding	9,167	86,296	13,784,941	13,538	128,309	19,865,004	67.7%	67.3%	69.4%
Service	85,421	1,195,417	96,505,848	132,626	1,831,810	148,951,926	64.4%	65.3%	64.8%
Hotel/Lodging	1,044	30,677	2,944,482	1,885	49,476	4,892,509	55.4%	62.0%	60.2%
Auto Services	5,871	34,791	6,459,853	8,832	50,716	9,500,150	66.5%	68.6%	68.0%
Movie/Amusement	5,273	91,324	11,916,183	8,920	132,812	16,687,000	59.1%	68.8%	71.4%
Health Services	15,174	300,373	28,071,369	23,204	444,581	44,506,496	65.4%	67.6%	63.1%
Legal Services	4,928	39,790	6,026,467	6,480	50,676	7,759,820	76.0%	78.5%	77.7%
Education/Library	4,971	227,878	29,074	8,183	365,869	49,218	60.7%	62.3%	59.1%
Other Service	48,159	470,584	41,058,421	75,122	737,680	65,556,733	64.1%	63.8%	62.6%
Government	5,935	184,417	3,914	9,610	281,253	4,697	61.8%	65.6%	83.3%
Unclassified Establishments	9,021	10,193	-	14,038	16,779	-	64.3%	60.7%	

Note: 2020 data. Type classified by SIC, performed via Business Analyst ArcGIS Pro

Figure C2-1 – Business Establishments, Sales, and Employees located within NJ TRANSIT service area

APPENDIX D

Marketing Research for the Quantifiable Benefits of Transit in New Jersey

Phase 2, Task 7 Technical Memorandum: Safety Benefits of NJ TRANSIT Services

April 1, 2021

Submitted by:

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SUMMARY

In addition to reducing emissions, improving air quality, alleviating traffic congestion, reducing travel time, and reducing trip costs, public transit saves lives, prevents injuries, and decreases monetary costs associated with motor vehicle crashes. This report quantifies the traffic safety benefits of the transit service provided by NJ TRANSIT by estimating how many motor vehicle trips and miles would be generated if transit riders used cars instead of transit and experienced motor vehicle crashes at the same rate as New Jersey motorists. Data were used on transit ridership, passenger miles of travel, vehicle miles of travel, the frequency and severity of motor vehicle crashes, and the economic and human costs of those crashes. The results indicated that the service provided by NJ TRANSIT annually saves at least 15 lives and helps to avoid more than $632 million in costs associated with motor vehicle crashes. A separate analysis for young and old riders showed that NJ TRANSIT prevents an estimated 1,400 crashes involving these two population groups and saves more than $132 million annually.

INTRODUCTION

Public transportation is a safe and convenient way to travel. According to a study conducted by the American Public Transportation Association (APTA, 2016),[18] transit is ten times safer than private vehicles considering the injury and death rates from crashes. The study also indicated that transit-oriented developments, which maximize the amount of residential and business spaces within walking distance of public transport, are five times safer from traffic than automobile-oriented developments.[19] The use of transit services mitigates crash rates and fatality rates, which results in the reduction of overall costs of crashes. Figure 1 illustrates the relationship between annual transit trips and traffic fatalities across 101 selected cities/urban regions in the United States.

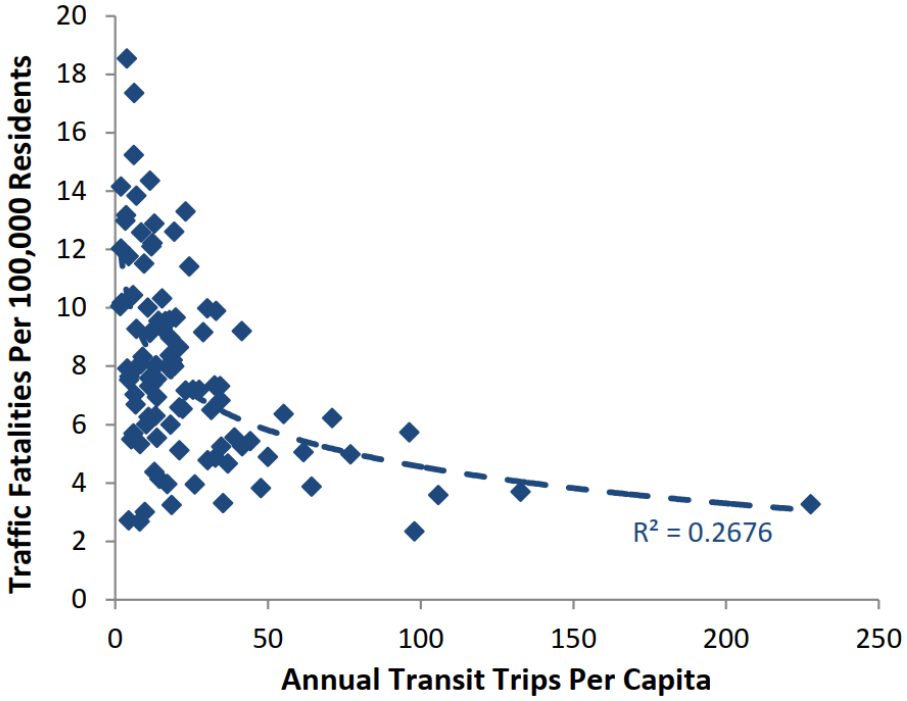


Figure 21: Traffic Fatalities vs. Transit Ridership for U.S. Urban Regions

As shown in Figure 1, the rate of traffic fatalities is inversely related to the annual transit trips per capita. The safety benefit of the transit system is also emphasized by a study conducted by Victoria Transport Policy Institute (VTPI,2014)[2] that concluded that transit is safer than the other modes of transportation. Table 1 shows the comparison of traffic

[18] Litman, T. (2016). The Hidden Traffic Safety Solution: Public Transportation; at https://www.apta.com/wp-content/uploads/Resources/resources/reportsandpublications/Documents/APTA-Hidden-Traffic-Safety-Solution-Public-Transportation.pdf

[19] Todd Litman (2014), *Safer Than You Think! Revising the Transit Safety Narrative*, Transportation Research Board Annual Meeting paper 13-4357; at www.vtpi.org/safer.pdf.

fatalities of various modes of transportation in terms of passenger miles traveled, and it shows that bus service, the urban mass transit system, and the commuter rail system have the lowest number of deaths per billion passenger-miles traveled.

Table 23: Fatalities per Billion Passenger-Miles, 2000-2014[20]

Travel Mode	Fatalities Per Billion Passenger-Miles
Motorcycle	237.57
Car or light truck driver or passenger	6.53
Local ferry boat	2.46
Commuter rail and Amtrak	0.36
Subway or light rail	0.33
Bus (transit, intercity, school, charter)	0.20
Commercial aviation	0.02

Transit travelers are less exposed to motor vehicle traffic crashes than motorists. The National Highway Traffic Safety Administration (NHTSA) states that 29% of the nationwide fatal motor vehicle crashes in 2018 involved an impaired driver,[21] 26% involved speeding,[22] and 8% involved a distracted driver[23]. Although motorists can reduce their risk of getting involved in crashes by observing speed limits, staying sober, and avoiding distractions, there are still substantial risks beyond individual drivers' control, such as mechanical failures and errors by other drivers. Therefore, even law-abiding motorists face relatively higher crash risks than transit passengers. The increased use of transit can enhance traffic safety by decreasing the number of cars on roadways. However, special attention is needed for specific populations, e.g., the older and younger population, which we address in this report. Older drivers sometimes have physical limitations, while the young drivers are less driving experience and they tend to be more aggressive.

Young Drivers

A "young driver" is a driver whose age is between 16 to 24. Motor vehicle crash is the leading cause of death among young people throughout the nation. Among people in this age range, almost 45% of the deaths are related to a motor vehicle crash.[24] In 2018, there were 34 traffic fatalities per 100,000 licensed drivers in this age range, which was 1.5 times greater than the overall fatality rate for all drivers[25]. Previous studies have demonstrated that the increased use of transit service could reduce motor vehicle crashes involving young drivers. Figure 2 compares the rates of fatalities versus the annual transit trips for both young transit riders and all transit riders. Figure 2 shows that the traffic

[20] BTS (2013), National Transportation Statistics, Bureau of Transportation Statistics (www.rita.dot.gov)
[21] NHTSA (2019*), 2018 Fatal Motor Vehicle Crashes: Overview*, National Highway Traffic Safety Administration, at https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812826
[22] NHTSA (2020), Traffic Safety Facts, 2018 Data: Speeding, National Highway Traffic Safety Administration, at https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812932
[23] NHTSA (2020), *Traffic Safety Facts*, Distracted Driving, National Highway Traffic Safety Administration, at https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812926
[24] CDC (2017), *Teen Drivers*; at https://www.cdc.gov/transportationsafety/teen_drivers/index.html
[25] IIHS (2018), Facts + Statistics: Highway; at safety https://www.iii.org/fact-statistic/facts-statistics-highway-safety

fatality rates in a community tend to decrease as travel by public transportation increases. Also, when considering traffic fatalities, young riders receive a higher benefit when using public transit than other riders.

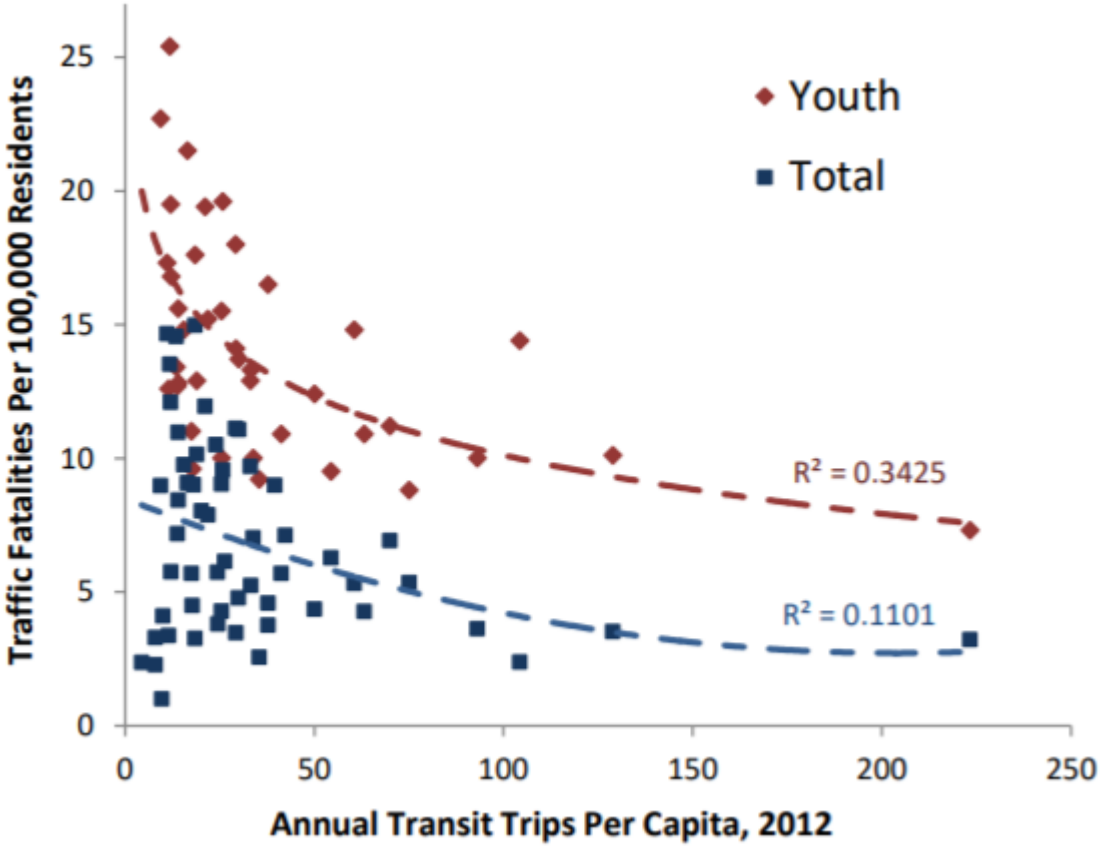


Figure 22: Youth Traffic Fatality Rate Compared to Total Fatality Rate[26]

Older Drivers

There is an increasing concern regarding the risks associated with crashes involving older drivers, defined as people aged over 65. In 2017, older adults constituted 16% of the total U.S. population, but they comprised 18% of total traffic fatalities. Between 2008 and 2017, fatalities among older drivers increased by 22 percent.[27] Crash rates per capita tend to be relatively low for older drivers, but the crash rates per vehicle-mile traveled are relatively high.[28] Older adults need suitable alternatives to driving to avoid traffic accidents. Improvements in transit service and transit-oriented developments, e.g., appropriate housing for older adults in transit-rich neighborhoods where it is safe to walk,

[26] CDC (2012), "Motor Vehicle Crash Deaths in Metropolitan Areas — United States, 2009," *Morbidity and Mortality Weekly Report*, Vol. 61, No. 28, , 20 July 2012, pp. 523-528, Center for Disease Control (www.cdc.gov/mmwr); at www.cdc.gov/mmwr/preview/mmwrhtml/mm6128a2.htm.

[27] NHTSA (2019), Traffic Safety Facts, Older Population; athttps://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812684

[28] CDC (2011), *Older Adult Drivers: Get The Facts*, Center for Disease Control (www.cdc.gov); at www.cdc.gov/motorvehiclesafety/older_adult_drivers/adult-drivers_factsheet.html.

would help to reduce their driving and the associated crash risks. Some traffic safety organizations encourage older adults to consider shifting from driving to alternative modes, e.g., walking, ridesharing, and public transit.[29] The AARP, as part of its livable communities program[30], has become an advocate for general improvements to transit service, special services for older adults, and more transit-oriented development.

Increased use of transit service results in reductions in the number of vehicles on roadways and Vehicle Miles Traveled (VMT). This reduction in VMT reduces the frequency of crashes, reduce traffic fatalities, and reduce the costs associated with crashes. By using data from various sources, Table 2 shows the safety benefits of transit services in terms of crash reduction.

Table 24: Safety Benefit of Transit in Terms of Crash Reductions

Target Population	**Reduction in Motor Vehicle Crashes**
Older Drivers	• 7% increase of VMT in 2015 decreased older driver-involved crashes by 26%.[31] • Older drivers (65+) have almost triple the fatality rate (3.4) of the national population of all ages (1.14) of 2017.
Young Drivers	• 1% reduction in mileage by young drivers may provide a 2-5% reduction in crashes.[32] • 50% increase in annual transit trips per capita decreases fatal crashes of young drivers by 12%.[33]
Overall Safety	• 1% increase in transit mode share is associated with a 5% decrease in total traffic fatalities.[34] • Each 1% reduction in motor vehicle trips typically reduces total crashes and casualties by 1.4% to 1.8%.[35]

[29] AAA (2011), *Senior Driving: Helping Seniors Drive Safer & Longer*, American Automobile Association (www.aaa.com); at http://seniordriving.aaa.com. at http://tinyurl.com/p8onojv.
[30] AARP (2014), *Livable Communities*, American Association for Retired Persons; at (www.aarp.org/livable-communities).
[31] Cicchino, J. B. (2015). Why have fatality rates among older drivers declined? The relative contributions of changes in survivability and crash involvement. *Accident Analysis & Prevention*, *83*, 67-73.
[32] Litman, T. (2012). Evaluating Public Transit Benefits and Costs: Best Practices Guidebook. Victoria Transport Policy Institute.
[33] CDC (2012), "Motor Vehicle Crash Deaths in Metropolitan Areas — United States, 2009," *Morbidity and Mortality Weekly Report*, Vol. 61, No. 28, , 20 July 2012, pp. 523-528, Center for Disease Control (www.cdc.gov/mmwr); at www.cdc.gov/mmwr/preview/mmwrhtml/mm6128a2.htm.
[34] Stimpson, J. P., Wilson, F. A., Araz, O. M., & Pagan, J. A. (2014). Share of mass transit miles traveled and reduced motor vehicle fatalities in major cities of the United States. *Journal of urban health*, *91*(6), 1136-1143.
[35] Traffic Safety Strategies, Victoria Transport Policy Institute (2018); at https://www.vtpi.org/tdm/tdm86.htm

In addition to the reduction in crashes, the benefits of transit services can be quantified by the decrease in costs of crashes. According to a study on transit benefit (VTPI,2012), Replacing 10 automobile trips with a bus trip provides a net safety benefit of 68.7¢ per mile.[36] Another study on transit safety revealed that, each transit passenger-mile provides an additional 20-40¢ savings in the cost of crashes.[37] According to one study by NHTSA, traffic safety benefits are usually estimated as $2 to $5 million per fatality avoided.[38]

For this project, the safety benefits of transit services are quantified based on:

- Reduction in vehicle miles traveled and reduction in the frequency of crashes
- Reduction in the costs associated with crashes

The following sections describes the calculation methodologies, the data that were used, and the results of the benefit calculations.

NEW JERSEY CRASH FREQUENCY/SEVERITY/COST

To estimate the number of additional crashes that would have occurred in the absence of NJ TRANSIT services, we collected various types of data (e.g., unlinked passenger miles of travel for NJ TRANSIT, the annual average number of vehicle miles travelled, and the total number of crashes). The crash data were obtained from the NJ crash query database. Table 25 shows the total crash frequency and severity in New Jersey over the past ten years.

Table 25: Crash Frequency and Severity in New Jersey (2010-2019)

Crash Severity	Crash Frequency	Percentage
Fatal Injury	5,690	0.21%
Suspected Serious Injury	12,556	0.44%
Suspected Minor Injury	116,960	4.14%
Possible Injury	492,316	17.21%
No Apparent Injury	2,223,409	78.00%
Total	**2,850,931**	**100.00%**

The total crashes were split into various crash severities based on KABCO's crash severity definition, which was developed by the National Safety Council (NSC)[39]. Table 26 provides the definitions of the crash severity levels. The proportions of crash severities are essential to calculate the comprehensive crash costs.

[36] Litman, T. (2012). Evaluating Public Transit Benefits and Costs: Best Practices Guidebook. Victoria Transport Policy Institute.
[37] Litman, T. (2015). Evaluating public transit benefits and costs. Victoria, BC, Canada: Victoria Transport Policy Institute.
[38] Blincoe, L. J. (1994). Estimating the Benefits from Increased Safety Belt Use, (Report No. DOT HS 808 133). Washington, DC: National Highway Traffic Safety Administration.
[39] FHWA (2019); at https://safety.fhwa.dot.gov/hsip/resources/fhwasa09029/sec4.cfm

Table 26: KABCO Definition of Crash frequency[40]

Crash Severity	Definition	Other Names	KABCO Scale
Fatal Injury	The victim is deceased.	Killed	K
Suspected Serious Injury	The victim has a non-fatal injury. Cannot walk, drive or normally continue the activities that they could perform before the motor vehicle crash.	Incapacitated	A
Suspected Minor Injury	An evident injury, other than fatal and incapacitating. Injury is visible, such as a lump on head, abrasion, bleeding or lacerations.	Moderate Injury	B
Possible Injury	A reported or claims of injury that is not fatal, incapacitating or moderate. Injury is not visible to the investigating officer.	Complaint of Pain	C
No Apparent Injury	Only damage of properties.	Property Damage Only	O

In this project, we used the spreadsheet tool provided by the Federal Highway Administration (FHWA) crash costs for highway safety analysis guide.[41] The FHWA provides national estimates of the costs of crashes based on their severities; however, the costs of crashes vary from state to state. The Per Capita Income (PCI) ratio of a particular state with respect to the national PCI provides the exact value of the comprehensive crash cost for a specific state. The unit cost of the severity of any crash is the product of the national comprehensive crash cost and the PCI ratio for a particular state. Table 27 lists the total comprehensive crash costs for each severity level in New Jersey over the past ten years.

Table 27: Comprehensive Crash Cost in New Jersey (2010-2019)

Severity	National Comprehensive Cost Units	NJ PCI Ratio	New Jersey Comprehensive Cost Units	Crash Frequency	Total Comprehensive Crash Cost
K	$11,295,400	1.25009	$14,120,266.59	5,690	$80,344,316,874
A	$655,000	1.25009	$818,808.95	12,556	$10,280,965,176

[40] NJ Police Crash Investigation Report (2010); at https://www.state.nj.us/transportation/refdata/accident/pdf/NJTR-1.pdf
[41] Crash Costs for Highway Safety Analysis, FHWA (2016); at https://safety.fhwa.dot.gov/hsip/docs/fhwasa17071.pdf

B	$198,500	1.25009	$248,142.865	116,960	$29,022,789,490
C	$125,600	1.25009	$157,011.304	492,316	$77,299,177,140
O	$11,900	1.25009	$14,876.071	2,223,409	$33,075,590,146
Total				**2,850,931**	**$230,022,838,827**

Estimation of the Reduction in the Frequency of Crashes in the Absence of Transit Services

The following four assumptions were made to convert the NJ TRANSIT unlinked person miles traveled (PRMT) to crash frequency:

3) Added VMT = Total PRMT X (VMT/PRMT)
4) Crash Rate = Number of Crashes/Million VMT
5) Total Crashes = Crash Rate X Million VMT
6) Crash Frequency (for each severity level) = Total Crashes X Severity Proportion

Based on the results of the first phase of the project, the value of NJ TRANSIT's annual unlinked person miles traveled (PRMT) for 2017 was 138,202,609,857(or 138.2 billion). The total number of Vehicle Miles of Travel in NJ according to the database of the National Household Travel Survey (NHTS) was 62,633,215,357 (or 62.6 billion). Therefore, the VMT/PRMT ratio for the year 2017 in NJ was equal to 0.45. Based on the New Jersey crash query, there were 277,671 crashes in New Jersey in 2017. Therefore, the crash rate, which is the ratio of the number of crashes to Million VMT, was 4.55. (See Table 28.)

Table 28: New Jersey's 2017 Crash Frequency and VMT data

Year	Annual VMT	VMT/PRMT	Annual Crashes	Crash Rate (Crashes/Million VMT)
2017	62,633,215,357	0.45	277,671	4.55

According to Phase 1 of the project, the estimated VMT in the absence of NJ TRANSIT services was 1.53 billion. Therefore, the additional number of crashes would be the product of the additional VMT and the crash rate (Total Crashes = Crash Rate X Million VMT). Table 29 summarizes the additional crashes that could occur in 2017 in the absence of transit services. In addition, the table shows the number of crashes for each crash severity level.

Table 29: Total Motor Vehicle Crashes in NJ in 2017

Crash Severity	Percentage	Total Crashes
Fatal Injury	0.21%	15
Suspected Serious Injury	0.44%	30
Suspected Minor Injury	4.14%	287
Possible Injury	17.21%	1,192
No Apparent Injury	78.00%	5,403

Total	**100.00%**	**6,927**

In the absence of NJ TRANSIT services, additional vehicles on the road will generate 6,927 total motor vehicle crashes per annum

Estimation of Crash Cost Saved by Transit Services

The following assumptions were made to calculate the additional motor vehicle crashes and their associated costs in the absence of transit services:

1) Crash cost = Total Crashes X Comprehensive Unit Crash Cost
2) Present Cost of Crash = Total Crash Cost X Consumer Price Index Ratio

The monetary safety benefits of transit services are estimated by multiplying the unit crash cost by the total number of crashes. Table 30 shows the comprehensive crash cost for each severity level in the absence of NJ TRANSIT services.

. Table 30: Comprehensive Cost of the Additional Crashes in the Absence of the NJ TRANSIT (2017)

Severity	Percentage	Crash Frequency	NJ Comprehensive Unit Crash Cost	Total Crash Cost
K	0.21%	15	$14,120,266.59	$211,803,999
A	0.44%	30	$818,808.95	$24,564,269
B	4.14%	287	$248,142.87	$71,217,002
C	17.21%	1,192	$157,011.30	$187,157,474
O	78.00%	5,403	$14,876.07	$80,375,412
Total		**6,927**		**$575,118,156**
CPI inflation ratio= 1.1		**Comprehensive Crash Cost (2020)**		**$632,629,972**

Note that the calculated crash costs were based on the crash costs published by the FHWA guideline in 2016[42]. An adjustment was made in the costs of the crashes by applying a Consumer Price Index (CPI) inflation rate, thereby converting the crash costs from 2016 to 2020.

In the absence of NJ TRANSIT services, additional vehicles on roadways will generate $632 million in crash costs annually

SAFETY BENEFITS OF TRANSIT SERVICES FOR TARGET GROUPS

Transit services are of enormous importance to the older and young populations in New Jersey. According to recent statistics of the New Jersey Division of Highway Traffic Safety

[42] CPI Inflation Calculator (2021); at https://data.bls.gov/cgi-bin/cpicalc.pl

(NJDHTS), 72 older drivers and 53 young drivers died in New Jersey due to motor vehicle crashes in 2018[43]. Motor vehicle fatalities remain the leading cause of death among teenage males and females in the State[44]. Figure 3 shows the crash frequency distribution for New Jersey crashes in last 10 years, indicating the crashes involving older drivers (65+) and non-older drivers. According to this figure, the average number of crashes in which New Jersey older drivers are involved is roughly about 47,000 per annum. One out of every six crashes in New Jersey has at least one older driver involved over this period.

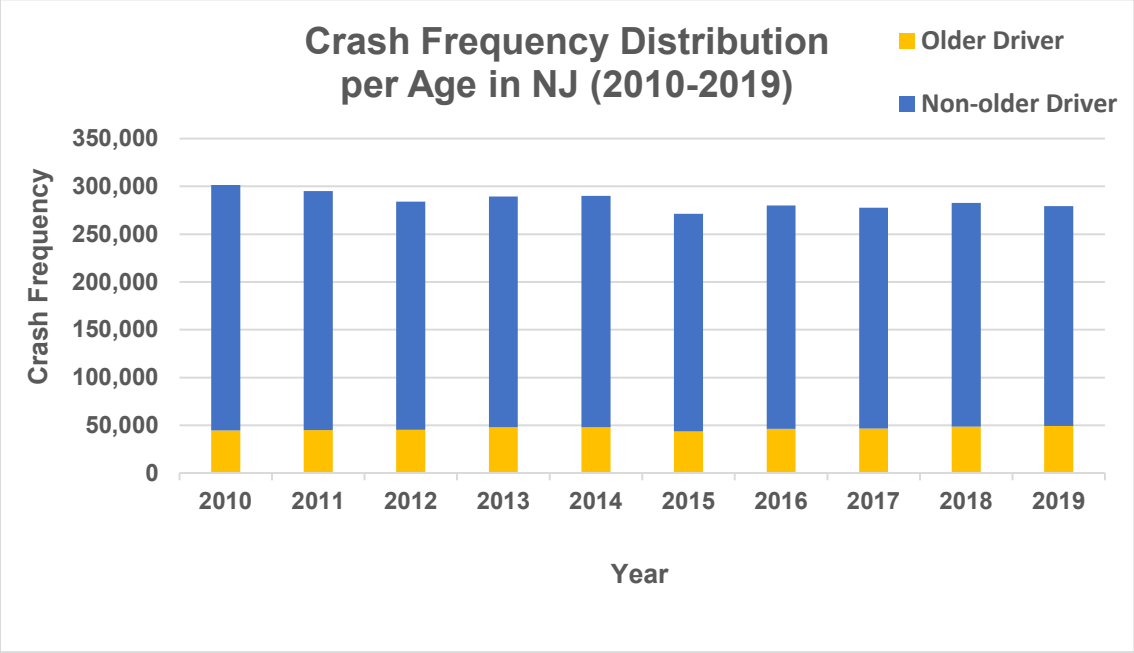


Figure 23: Crashes that Involved Older Drivers in New Jersey (2010-2019)

Figure 4 shows the crash frequency distribution for New Jersey crashes over the past 10 years, indicating the crashes involving young drivers (16-21 years old) and non-young drivers. The figure shows that the average number of crashes involving young drivers was around 38,000 per annum. Moreover, at least one young driver is involved in one out of every eight crashes in New Jersey.

[43] NJDHTS (2019), 2019 Annual Report; at https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/nj_fy19_hspar.pdf

[44] NHTSA (2018); State of New Jersey Highway Safety Plan, at https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/new_jersey_fy2018_hsp.pdf

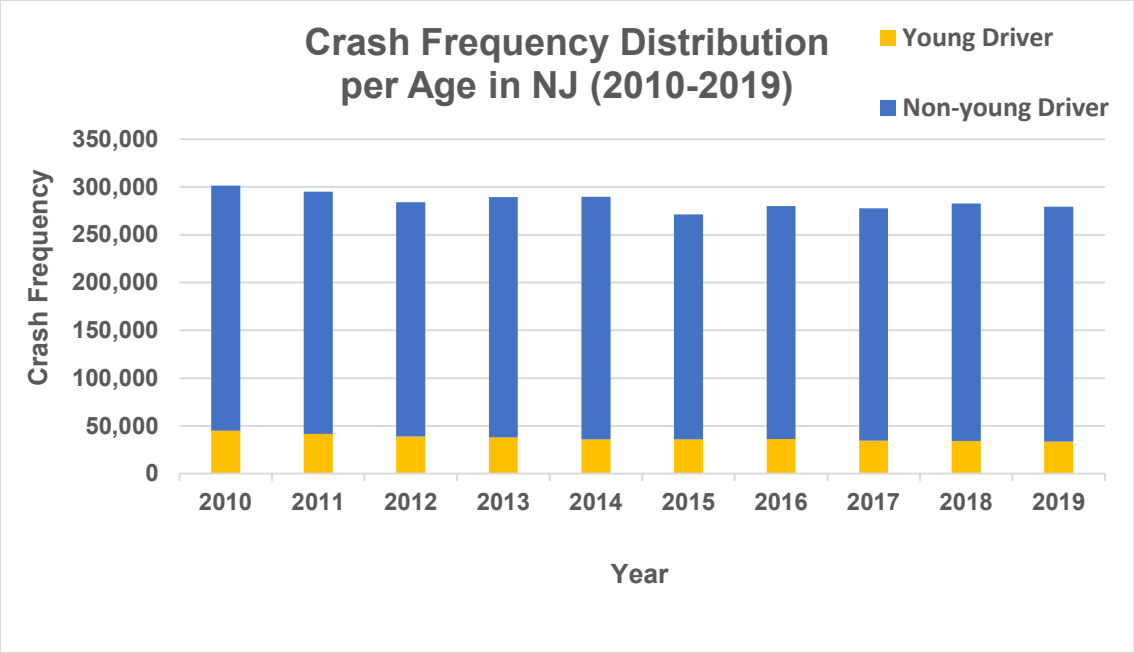


Figure 24: Crashes Involving Young Drivers in New Jersey (2010-2019)

Table 31 summarizes the total crashes involving young and older drivers and their associated costs for the last 10 years in New Jersey. The older and young drivers together contributed to 776,916 crashes (27% of total motor vehicle crashes), and together they accounted for $68 billion crash costs, which is 29% of the total crash cost in the past ten years in New Jersey.

Table 31: Summary of Crashes involving Young and Older Drivers in New Jersey (2010-2020)

Target Group	Crash Frequency	Crash Ratio	Crash Cost	Cost Ratio	Cost Ratio/Crash Ratio
Older Drivers	434,771	0.15	$42,321,745,201	0.18	1.21
Young Drivers	342,145	0.12	$25,694,628,756	0.11	0.93
Total (Older and Young Drivers)	776,916	0.27	$68,016,373,957	0.29	-
Total	2,850,931	1.00	$230,022,838,827	1.00	-

Estimation of Safety Benefit of Transit Services for Older and Young Drivers

The following assumptions were made to determine the additional motor vehicle crashes involving older or young drivers and their associated costs in the absence of transit services:

1) PRMT (for target group) = Ratio of the Ridership (for target group) X Total PRMT
2) Additional VMT (for target group) = Total PRMT (for target group) X (VMT/PRMT)
3) Crash rate = Number of Crashes/Million VMT
4) Total crashes = Crash Rate X Million VMT
5) Crash frequency (for severity level) = Total Crashes X Severity Proportion
6) Crash cost = Total Crashes X Comprehensive Unit Crash Cost
7) Present cost of crash = Total Crash Cost X Consumer Price Index Ratio

The transit ridership ratios for young and old people (i.e., the share of young and old riders as a percent of all riders) were obtained from the 2019 Fall customer satisfaction survey conducted by NJ TRANSIT. According to this survey, the ridership for young and older riders in the whole transit system were 12.4% and 7.8%, respectively. These values were used to identify the PRMT, VMT, and the crash frequency and crash cost that would occur in the absence of NJ TRANSIT services.

We noted that the total additional crashes for each target group were equal to their proportion of the transit ridership. In addition, the percentages of crashes that involved older and young drivers were 7.8% and 12.4%, respectively, of the total additional crashes (6,927 crashes). Specifically, in the absence of transit services, the total number of crashes for older and younger drivers were 541 and 859 crashes, respectively.

The proportions of the crashes that were fatal, involved severe injuries, and only caused property damage for the young drivers and older drivers were different due to drivers' characteristics and health conditions. Using the NJ crash query database, the proportions of various crash severities for crashes involving older and younger drivers were calculated. Table 32 and Table 33 show the safety benefits of transit services in terms of reductions in crashes involving older and young drivers in NJ, respectively. According to these tables, the NJ TRANSIT services have helped to decrease 1,400 crashes and saved more than $132 million in crash costs for older adults and young people combined.

Table 32: Safety Benefits of Transit Services in terms of Reductions in Crashes Involving Older Drivers (2017)

Severity	**Percentage**	**Crash**	**NJ Comprehensive Unit Crash Cost**	**Crash Cost**
K	0.28%	2	$14,120,266.59	$28,240,533
A	0.46%	2	$818,808.95	$1,637,618
B	4.44%	24	$248,142.87	$5,963,685
C	19.00%	103	$157,011.30	$16,172,164
O	75.81%	410	$14,876.07	$6,099,189
Total		**541**		$58,113,190
CPI inflation ratio= 1.1		**Comprehensive Crash Cost (2020)**		**$63,924,509**

In the absence of NJ TRANSIT services, additional vehicles on the road will cause 542 crashes and $63.9 million crash costs annually for older drivers.

Table 33: Safety Benefits of Transit Services in terms of Reductions in Crashes Involving Young Drivers (2017)

Severity	Percentage	Crash	NJ Comprehensive Unit Crash Cost	Crash Cost
K	0.14%	1	$14,120,266.59	$14,120,267
A	0.37%	3	$818,808.95	$2,456,427
B	4.55%	39	$248,142.87	$9,677,572
C	19.58%	168	$157,011.30	$26,377,899
O	75.37%	648	$14,876.07	$9,639,694
Total		**859**		$62,271,858
CPI inflation ratio= 1.1		**Comprehensive Crash Cost (2020)**		**$68,499,044**

In the absence of NJ TRANSIT services, additional vehicles on the road will cause 859 crashes and $68.5 million crash costs annually for young drivers.

CONCLUSION

The safety benefits of transit services were quantified by the number of crashes reduced, the number of lives saved, and the crash costs saved. Each year, the NJ TRANSIT services prevent approximately 7,000 motor vehicle crashes and save 15 lives. The estimated annual crash costs saved by the NJ TRANSIT is more than $632 million, highlighting the significant role of the transit system in reducing crash costs to society overall. Special attention was given to the older adults and young people because these groups are more prone to motor vehicle crashes due to health impairments and aggressive driving, respectively. According to our estimates, NJ TRANSIT services prevent 1,400 crashes and save more than $132 million in related costs annually for these two population groups combined. The total cost of crashes involving older and young drivers in New Jersey is almost 21% of the total crash costs. Therefore, marketing the safety benefits of transit services should focus more on encouraging these two groups of drivers to use the transit system.

APPENDIX E

Marketing Research for the Quantifiable Benefits of Transit in New Jersey

Task 9 Technical Memorandum

September 25, 2021

INTRODUCTION

Phase 3 of the *Marketing Research for the Quantifiable Benefits of Transit in New Jersey* study is focused on developing the comprehensive communications and marketing framework for the transit marketing campaign. The purpose of the campaign is to broaden awareness among various constituencies in New Jersey about the benefits of public transit services.

As part of Phase 1 of the study, the research team conducted a series of four focus group sessions, one each with the following groups: 1) transit riders; 2) non-transit riders; 3) legislators, legislative staff and local elected officials; and 4) business leaders. The Phase I focus groups collected data and insights to inform decisions about which transit benefit measures are most meaningful and compelling to different audiences and what communication methods and messaging approaches might work best to tell the "story" of transit benefits in New Jersey.

Participants from each of the four sessions were asked if they were willing to participate in another round of focus group sessions later in the project. All expressed interest and a willingness to participate in a follow-up focus group session. For the Phase 3 focus groups, the research team reached out to each of the Phase 1 focus group participants requesting their participation in the follow-up session with the goal of testing different transit benefit messaging options, marketing approaches, and communication strategies. A series of four follow-up sessions were convened with a sample of the same participants organized into the same groups: 1) transit riders, 2) non-transit riders, 3) legislators, legislative staff and local elected officials, and 4) business leaders.

Jon Carnegie, the principal investigator for the study moderated the focus group sessions. Kevin Narvaez (Envision Consultants) and Andrea Lubin (RU-VTC) served as co-moderators. The moderators used a topic guide approved by the Rutgers University Institutional Review Board (IRB) at all the sessions. In addition, each participant provided verbal consent for their participation. Each session lasted approximately two-hours and all sessions were digitally-recorded.

A copy of the focus group topic guide and a summary of discussions from each focus group appear later in this report. Table 1 shows the date of each session and the number of individuals that participated in the Phase 3 focus group sessions.

Table 1 – Phase 3 focus group dates and participants

Date	Participant Group	Number of Participants
04/29/21	New Jersey business leaders	8
05/04/21	Non-transit riders	10
05/05/21	Transit riders	8
05/13/21	New Jersey elected officials	8

FOCUS GROUP SUMMARY

COVID-19 and Travel Behavior

Each session began with a brief discussion on how the COVID-19 pandemic has impacted participant travel patterns and modes. Overall, participants from each of the four sessions reported that they have traveled less during the pandemic. Many reported working fully or partially remote during the pandemic. Most reported that during the pandemic they walked or drove a private vehicle to get where they needed to go and avoided using public transit. Notably, several participants reported they continued to travel by transit during the pandemic and a few reported they began using transit during the pandemic. The groups also briefly discussed how things have changed as safety precautions have been lifted. A few mentioned a return to some in-person meetings and events in recent weeks, as well as some increased vehicular traffic on roadways.

Some optimistic comments shared related to a “return to normal” included:

- I may return to traveling by transit in the coming months, perhaps by fall 2021.
- “I have completed the vaccine and feel more comfortable taking NJ TRANSIT than I had been feeling before.”
- I have started to notice a return of vehicular traffic in recent days to my community in northern NJ. While we experienced a decrease in our commuter lot usage during the pandemic, we are beginning to see an increase. We have also experienced an influx of new residents relocating to our town from NYC “because we are on the train line” and perhaps they are anticipating returning to work in the city at some point.

In contrast, several expressed the sentiment that life may not return to pre-pandemic conditions soon, if ever:

- I stay home. My wife works in NYC but has been remote since the pandemic onset and she does not plan on returning to commuting.
- I haven't left the house since March 2020 and I have no plans to leave for the rest of this year, I am taking it "one day at a time."
- The pandemic has "permanently altered my mindset about being around a lot of people."
- "I think what we're going to find out is that New York has found that maybe they're not going to be the hub – the hub's going to be at home." "I don't know if we're going to get back to where we were."

Finally, several of the elected official participants noted the impacts of reduced transit ridership on their communities. Most notably, one participant observed that the reduction in commuter parking lot usage has contributed to significant loss in local revenue. Another echoed those sentiments and reported that his town's commuter parking lots are also only currently at about 15-20% capacity.

Telling the "Story" of Transit's Impact on New Jersey

At each focus group session, participants were shown a series of infographics that were organized around three overarching "headlines:" 1) Transit is good for the economy, 2) Transit is good for the environment, and 3) Transit is good for people. The infographics communicated 19 "storylines," and close to 100 related statistics and facts. Mr. Carnegie explained that the statistics communicated were based on pre-pandemic travel patterns. The three overarching headlines were.

As was the case during the Phase 1 focus groups participants responded most positively to marketing material that:

- Clearly and simply communicated a core message;
- Utilized uncomplicated graphics; and
- Used bold colors to communicate core messaging and statistics, especially when combined with softer color schemes in the overall design.

Elected officials expressed a strong preference for infographics that offered more detail. They frequently noted that messages are most compelling when framed from a positive perspective rather than in negative terms. For example, it is better to communicate that things are better with transit rather than to say how bad things would if transit did not exist. While the elected officials expressed understanding or agreement with most of the fact presented, they were consistently interested in having a link and or footnote to more information, sources, and details. The transit riders and non-transit riders were more skeptical of the facts presented and wanted to know about sources, calculation methods as well. Interestingly, business leaders were the one group that acknowledged accepting the presented statistics across storylines at face value, not requesting citations or additional information.

Elected officials were more likely to connect with the economic storylines than the other focus group participants. More so than the other groups, transit riders were interested in seeing information on a wide range of benefits. The transit riders and non-transit riders connected with the people storylines more than the business leaders and elected officials.

Across sessions, the majority of participants preferred the monochrome magenta-colored “Did you know?” icon over the multi-colored version. Interestingly, one participant asked if the “Did you know?” icon would be a link to access more information about the overall campaign. Another remarked that the placement of the icon seemed “random” in certain storylines and its placement should be more consistently placed to yield the greatest impact.

There was no overall consensus on a preferred headline banner style. Some noted they were drawn to the beveled option which had a “3-D” look, while others expressed preference for the shadow-style banner.

In total, three storylines resonated most positively across all four sessions. These were:

- ***Economic Storyline 10 – NJ TRANSIT is good for the economy – Tourism***
    - Participants appreciated that this storyline was applicable to many. They also responded well to the graphics and the positive messaging.

- ***People Storyline 2 – NJ TRANSIT provides access to opportunity***
    - Participants noted the infographic was easy to read and appreciated that it told a positive, compelling story.
- ***People Storyline 5 – Attention Students***
    - Participants liked the layout and colors used and the “straight to the point message” that communicates useful information.

Other popular storylines include People Storyline 6 that presents information on NJ TRANSIT discounted fares for military veterans, Environment Storyline 1 about greenhouse gas emissions; and Economic Storyline 1 that focused on job creation. The two storylines that appeared to generate the least positive feedback across sessions was People Storyline 3 about NJ TRANSIT’s service area and Economic Storyline 5 that shows the impact public transit has reducing highway travel congestion.

The sections that follow provide more specific commentary on each of the 19 infographics presented and discussed during the focus group sessions.

Economic Benefits

Economic Storyline 1 – NJ TRANSIT creates jobs

Economic storyline one (Figure 1) presents a simple, single fact about NJ TRANSIT's role in job creation. All groups had a positive reaction to this storyline. One noted "It's a net positive as far as I can see." Participants also liked the NJ TRANSIT branded colors used.

Figure 1. NJ TRANSIT creates jobs

All groups requested clarification for the 19,000 additional job statistics and several recommended replacing the briefcase image with icons that represent the diversity of jobs that spending on NJ TRANSIT generates, such as in the field of construction and engineering. Participants in all sessions also expressed support for the addition of a link to access information on NJ TRANSIT job opportunities and how to do business with NJ TRANSIT.

Economic Storyline 2 – NJ TRANSIT generates economic activity

Economic storyline two (Figure 2) presents a simple, single fact related to the economic benefits of transit. The most positive reactions to this infographic were communicated by elected officials, who noted its "simplicity."

Figure 2. NJ TRANSIT generates economic activity

Many participants disliked the term "economic activity," noting it is too general and "ambiguous." One participant asked if a pie chart could be added to show the breakdown of the economic activity generated.

Regarding the design and layout of the infographic, most respondents in all four sessions noticed the dollar bill image and the text surrounding the bills first. Several reported liking the inclusion of the photo-like image of the train. Several transit riders and non-transit riders identified the "$5 billion" statistic as powerful, noting it should appear more prominent in the infographic. Finally, given the use of the train image, there was some uncertainty across groups regarding whether the statistics referenced rail service only or all NJ TRANSIT services. One noted the addition of a bus or light rail image might clarify that the statistics include all NJ TRANSIT services.

Economic Storyline 3 – NJ TRANSIT is good for the economy

Economic storyline three (Figure 3) presents multiple facts about a single topic. Most participants liked this infographic. In particular, transit riders and elected officials responded to its' positive tone and liked that the storyline "…really summarizes all the benefits of NJ TRANSIT" in one graphic." Those that expressed less favorable reactions opined that the graphic contained too much information. A number of participants remarked that the statistics about vehicles and vehicle miles traveled were not directly connected to economic benefits and seemed more related to the environment and/or quality of life.

A variety of suggestions were also shared by several participants for clarifying the icons. For example, requests were made to remove the arrows used in the “140,000” fact box; to replace the piggy bank used in the “$5 billion” fact box; and to use people icons in the fact boxes discussing jobs that better reflect NJ TRANSIT positions and jobs generated by NJ TRANSIT, such as conductors and persons in construction, engineering, etc.

Economic Storyline 4 – NJ TRANSIT reduces congestion

Economic storyline four (Figure 4) presents a simple, single fact related to NJ TRANSIT’s impact on traffic. Participants from the business and non-transit riders’ groups expressed general support for this storyline, remarking that the message quickly and clearly communicates how NJ TRANSIT contributes to congestion relief. Several in the non-transit rider group shared that the message made them think about the additional vehicle miles that could be saved if NJ TRANSIT services were expanded.

Across sessions, most reported that the image that first caught their eye was the graphic of the United States, with some requesting the map be made more colorful. Several elected officials requested that the

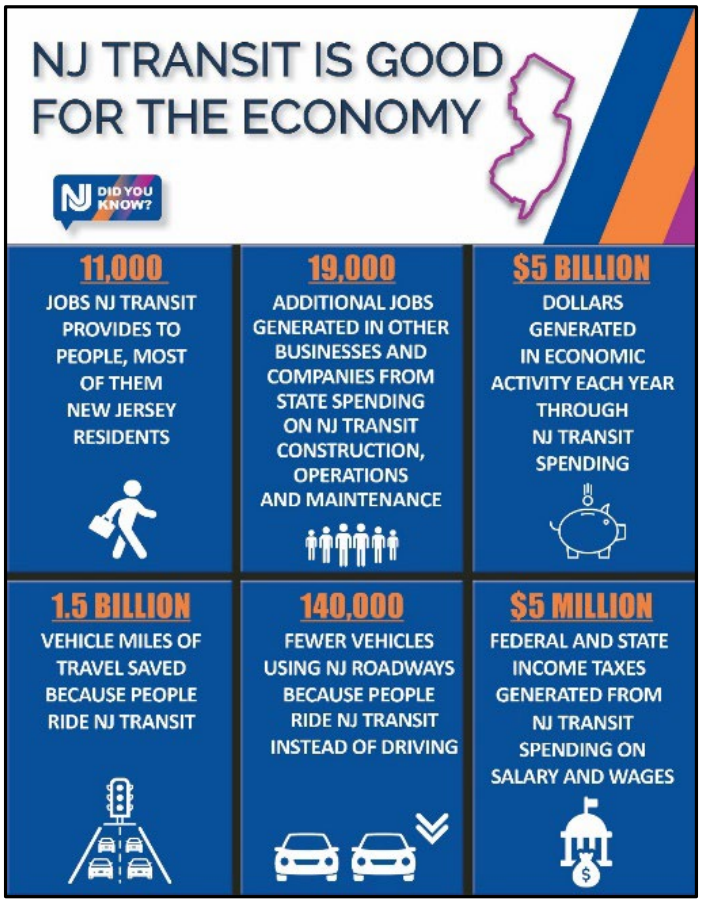


Figure 3. NJ TRANSIT is good for the economy

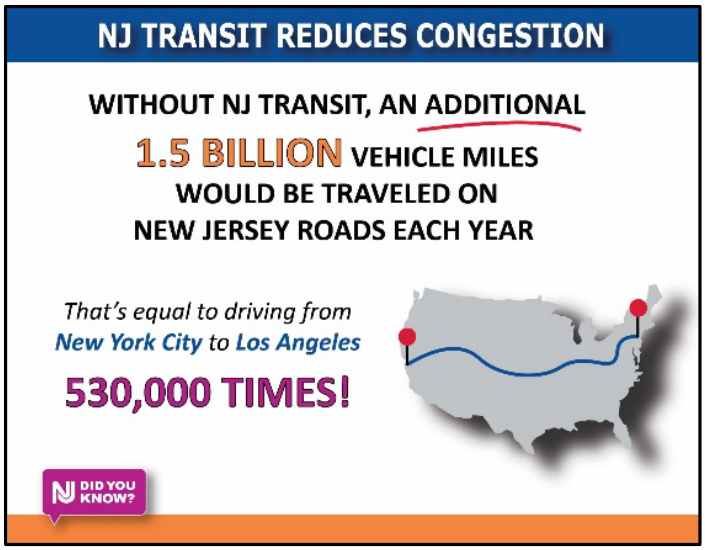


Figure 4. Public transit reduces congestion

message be communicated more positively – Instead of “Without NJ TRANSIT” say “NJ TRANSIT saves 1.5 billion…”

All participants were asked if they preferred the New York City (NYC) to Los Angeles (LA) reference or if an image showing the mileage from the earth to the moon would be better. Overall there was consensus that NYC to LA was “more relatable.” Some questioned why NYC was used as a reference point instead of New Jersey, suggesting New Jersey would be more appropriate.

Economic Storyline 5 – Public transit reduces road congestion

Economic storyline five (Figure 5) also presents a single, simple fact about NJ TRANSIT’s role in reducing congestion. Some thought the message was hard to relate to, while others remarked the infographic itself “looks congested.”

To make the storyline more positive, personally relatable to commuters, and less “abstract,” several recommended adding a statistic on how much time each person saves in traffic delays rather than the “308 years” statistic, which is for all travelers combined. Several business leaders and elected officials requested that the term “highway travel delays” be replaced with “traffic,” to be more relatable.

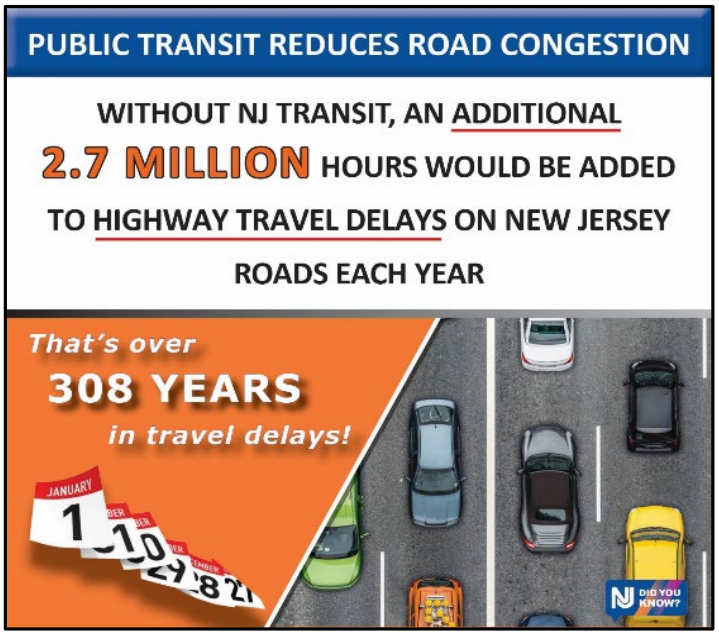


Figure 5. Public transit reduces road congestion

Regarding design and layout of the infographic, most disliked the calendar icon. Participants suggested replacing it with “a red hot stopwatch,” a clock, an hourglass, or another symbol more relatable to commuting time. Several of the groups were supportive of dividing the lower panel of the infographic into three sections to improve the clarity of the message – one section with an image of traffic; a middle section displaying the fact; and the final section showing an image with less congestion.

Economic Storyline 6 – NJ TRANSIT Reduces Congestion – Tunnel & Bridge Traffic Increase

Economic storyline six (Figure 6) presents multiple facts about NJ TRANSIT’s role in reducing congestion. The infographic appealed the most to elected officials and non-

transit riders, who offered commentary including “I like the layout,” “sums everything up,” and the statistics communicated “pop out.” One elected official stated that “These are shocking facts that definitely should encourage everyone to use public transportation,” while another interestingly observed that this storyline may help to generate support among the public for construction of the new trans-Hudson tunnels. Some noted liking that the statistics are displayed in roadway-style signage, while others did not notice that element of the infographic.

A few thought the infographic was “too busy” and “stressful.” One noted she didn’t understand what “500%” increased traffic at the Lincoln Tunnel is really communicating and suggested replacing the percentage with “6x” to communicate the traffic increase. Nearly all participants were supportive of sharing the storyline and data now, even though the calculations are based on pre-pandemic travel patterns. One recommended that the footnote communicating that this data is pre-pandemic should be made visually clearer and the year the data was generated should be added.

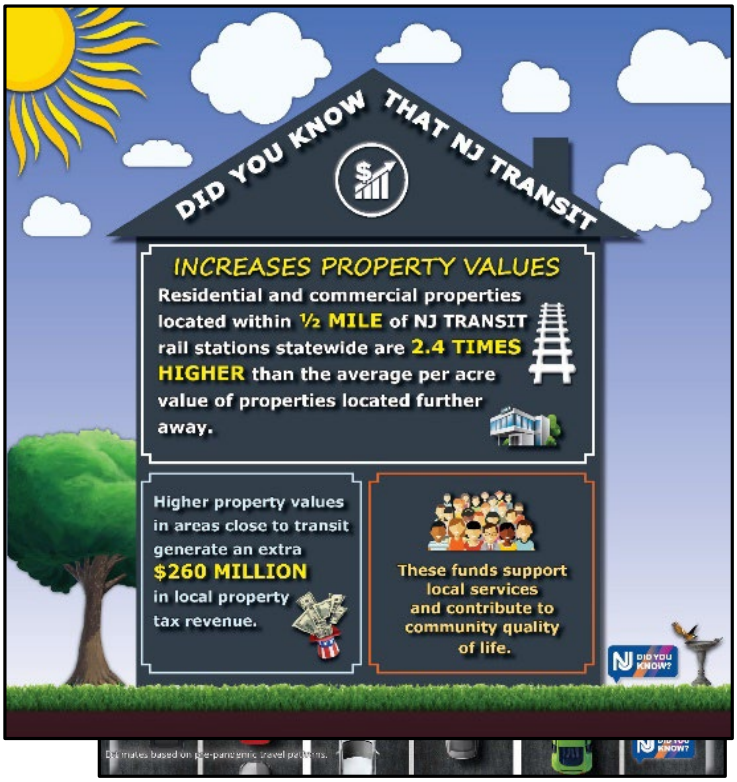


Figure 7. NJ TRANSIT increases property values

Tunnel and bridge traffic

Economic Storyline 7 –NJ TRANSIT Increases Property Values

Economic storyline seven presents multiple facts about a single topic. This infographic resonated most with the business group. Participants described the storyline as “Interesting,” “It’s different,” and “Everybody can relate to it.” In the top section discussing increased property values, several expressed a preference for replacing the phrase “located within ½ mile of NJ TRANSIT rail stations…” with “located close to NJ TRANSIT rail stations.”

Both transit riders and non-transit rider groups noted that the positive message about increased property values was diminished by the fact that property owners then have to pay higher property taxes. One participant noted that hearing about higher taxes and the icon Uncle Sam with money in hand icon was a “real turn off.” Another shared, that as a homeowner, they did not want to hear about having to pay higher taxes. Similarly,

elected official remarked that the tax message would not be appealing to their constituents. When asked, most of the business participants felt that people will not directly connect community quality of life with increased local tax revenue, and perhaps even the opposite might be true.

Regarding the layout and design of this infographic one participant remarked that it appeared too "busy." Another shared that the dark color of the house makes it seem almost "like it's polluting." This participant suggested that the house should instead be colored green. He also advised narrowing its width so that it would take on the shape of an upwards arrow, connoting "value creation," which might generate more positive feelings among viewers. Another suggested removing the bird bath icon because it seemed not to "fit."

Economic Storyline 8 – NJ TRANSIT supports growth and development

Economic storyline eight presents multiple facts suggesting that NJ TRANSIT helps to support growth and development. This message was received most positively by transit riders. They described the infographic and message as positive, "visually appealing," and "good as you read into it." One participant requested that the team add some similar positive statistics related to how NJ TRANSIT supports growth and development in south Jersey. Another requested the addition of HBLR ridership statistics.

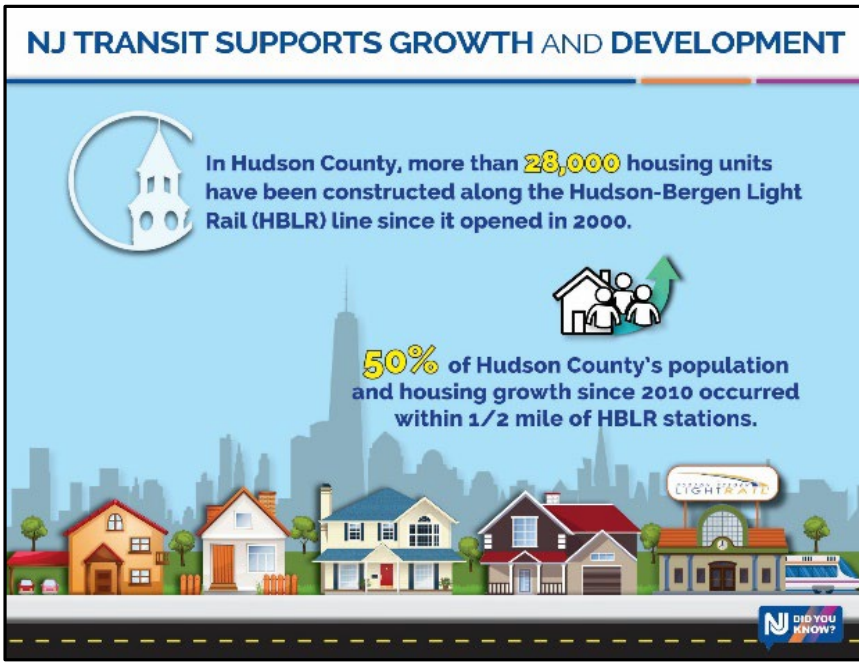


Figure 8. NJ TRANSIT support growth and development

Notably, business leaders and elected officials remarked that housing growth is not universally considered a benefit to communities. Some noted that many people believe that growth and development contribute to increased traffic congestion and drain local resources. Others noted that residents sometimes associate growth with overcrowding and gentrification that forces the relocation of lower-income residents. In response business leaders' comments, Mr. Carnegie asked if participants thought the headline should be changed to "NJ TRANSIT supports community development." Several

responded in the affirmative and offered that they felt the revised headline would be "more descriptive" and "inclusive."

Regarding the design and layout of the infographic, participants were asked if they noticed the subtle components of NJ TRANSIT branding, such as the Hudson-Bergen light rail icon in the upper-left of the image and the light rail banner over the building in the lower-right portion of the image. A few recognized these images as NJ TRANSIT branding, most did not. Requests were made by several groups to replace the housing icons shown with dwelling types that better reflect the housing stock that exists along the HBLR (i.e., high-rises, brownstones). Finally, several participants remarked that they found the color palette "pleasing" and "easy on the eyes," with one suggesting that the statistics be colored pink to make the image "pop."

Economic Storyline 9 – NJ TRANSIT connects New Jersey to the region and world

Economic storyline nine presents multiple facts about NJ TRANSIT connecting New Jersey residents to regional, national and international destinations. Transit riders and elected officials were the most supportive of this storyline, with participants remarking "This is why NJ TRANSIT is a valuable asset to us all," and "It's a lot of information, but it tells the whole story." Elected officials appreciated the message's positive tone and one stated, "It really shows that New Jersey is a hub for the rest of the world and that NJ TRANSIT is a big part of that."

Across all sessions, participants suggested making the language and metrics uniform (i.e., annual vs. daily and riders vs. travelers). Mixing metrics and references was deemed confusing. Non-transit riders preferred daily riders, while business and elected officials preferred usage of annual statistics. Transit riders did not indicate a preference. One participant suggested substituting a "+" sign for the words "More than" which begins the text in each of the fact boxes. NJ TRANSIT customer Few participants notices the map of the U.S. in the background of the infographic. Finally, some participants suggested enlarging the footnote that indicates these statistics are pre-pandemic.

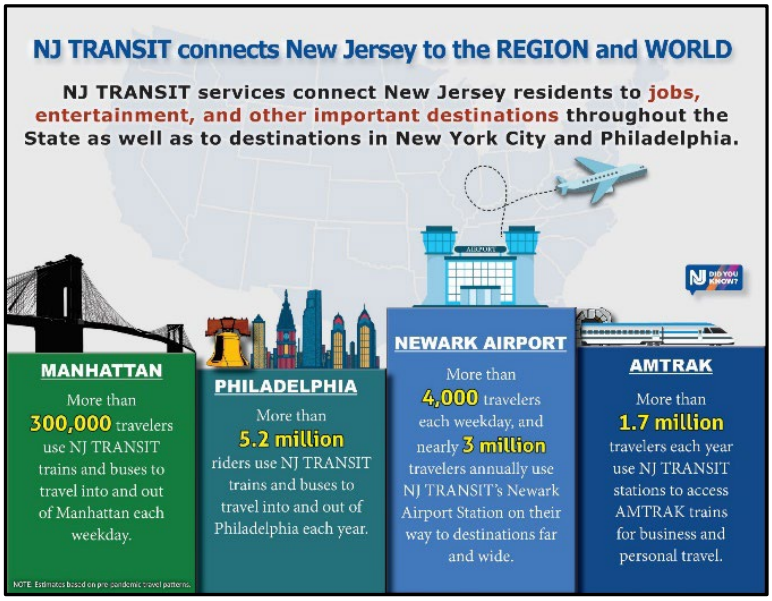


Figure 9. NJ TRANSIT connects NJ to the region and world

Economic Storyline 10 – NJ TRANSIT is good for the economy – Tourism

Economic storyline ten presents multiple facts regarding NJ TRANSIT supporting tourism. This storyline was one of three that generated the most consistent support across all sessions. Positive feedback included: “It’s very visually appealing;” “It’s nice how it shows another advantage;” “The information is applicable to a lot of people;” and “I appreciate the message, it is good for the economy, giving more people incentive to travel, on the weekend especially.”

Regarding the layout and design of the graphic, participants said: “Nice graphics, I like the sailboat, the umbrella and the beach chairs, and the banner plane;” “It’s very calming;” and “I like the colors, makes me think of summer.”

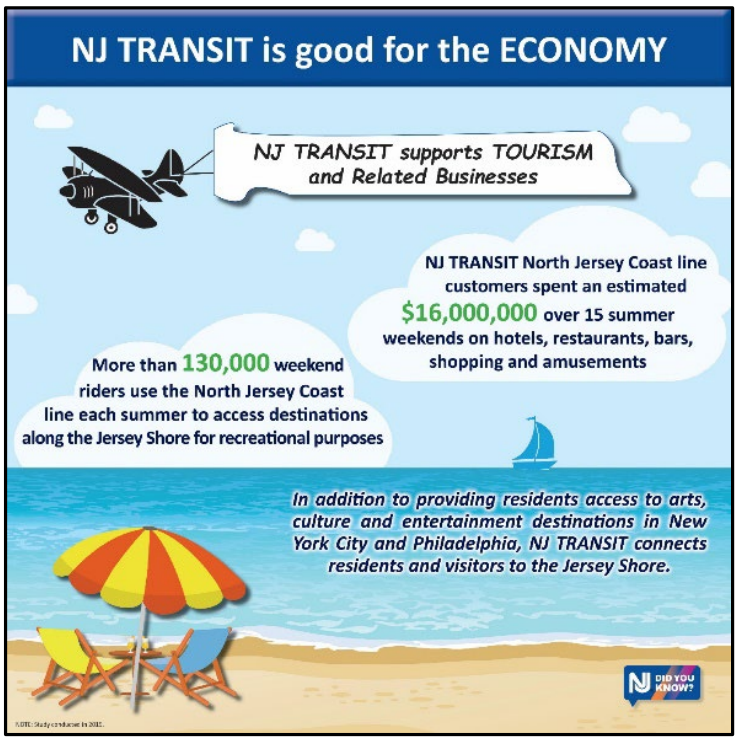


Figure 10. NJ TRANSIT is good for the economy – Tourism

Some noted that the black colored text in the ocean appeared blurry and was “hard on my eyes.” However, most indicated they were able to read the text in the water clearly. One suggested changing the color of the text in the ocean to a bolded white to see if that would make the text “pop.” Another participant shared that the beach image empty of people was “odd.” Participants in the business group expressed support for writing “$16 million” instead of “16,000,000,” noting it would be “more impactful.” Several also requested that a link be added for those interested in learning how the storyline statistics were generated, with one requesting the current footnote citing the source be enlarged.

A few other suggestions to improve this popular storyline included a recommendation to enlarge the two clouds to better accommodate the text within each. Another was to consider making the text in the plane banner similar in color and font to the text used in actual Jersey shore plane banners. For example, they often use red-colored font. Lastly, an elected official from southern NJ mentioned that a great deal of the Jersey shore is located beyond the last stop on the North Jersey Coastline, so this storyline is “cutting out a big chunk of the Jersey Shore.” A colleague suggested that the storyline perhaps

specify that the North Jersey Coastline serves beach communities located in Monmouth and northern Ocean Counties.

Environmental Benefits

Environmental Storyline 1 – NJ TRANSIT saves energy and reduces greenhouse gas emissions

Environmental storyline one presents a simple fact related to NJ TRANSIT's contribution to saving energy and reducing greenhouse gas emissions. This storyline was popular with all groups. The most positive feedback was shared by business, non-transit riders and transit riders. Comments included: "This is creative thinking; this is very well put together," "I like the whole thing," and "I like the message."

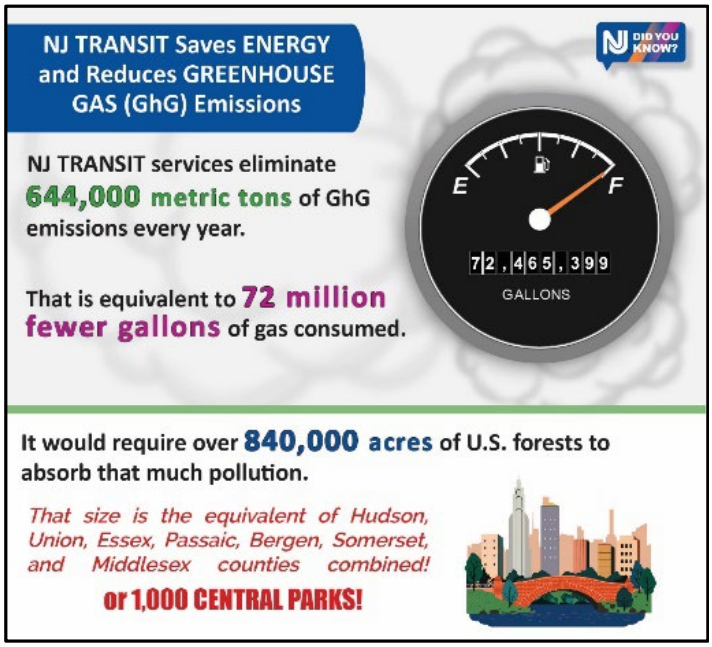


Figure 11. NJ TRANSIT saves energy and reduces greenhouse gas emissions

Participants across all groups shared mixed feelings about the gas gage and emission smoke graphics, with some liking the images and others not. One participant noted that the gas gage icon showing a full tank at 72 million gallons seems like a "mixed message," with another noting the gage should be on empty. One also suggested the emissions smoke should be drawn darker.

Mixed opinions were also shared about the "1,000 Central Parks" reference. Several liked the reference, with one noting its location in the bottom-portion of the storyline creates a "strong ending." One business leader supported the comparison because she could relate to the statistic since she was aware of the size of the park. Others suggested replacing the Central Park graphic with images instead of trees or another park that is not encroached by high rise buildings to help communicate that "we need the forest to balance the pollution." A non-transit rider suggested replacing the Central Park statistic with some of the health benefits associated with decreased greenhouse gas emissions.

Several participants in the transit rider and elected official groups questioned the inclusion of the seven county acreage equivalent for the 840,000-acre statistic. They noted that viewers may not be familiar with the geographic size of New Jersey counties.

An elected official recommended replacing the image of Central Park with a map that highlights the seven counties listed in the storyline. Finally, there was support for including a link for those seeking information on how the statistics were generated. One participant remarked “These numbers definitely make me look for a footnote.”

Environmental Storyline 2 – NJ TRANSIT means less pavement and less pollution

Environmental storyline two presents multiple facts on multiple topics related to NJ TRANSIT’s role in reducing pollution. This storyline was most popular among the transit rider group, who shared “I’m glad this message is being conveyed” and noted the storyline “connects the message to something tangible.” A number of participants suggested the infographic communicates too much information, requiring the viewer to make too many connections. As one business participant shared, “I don’t want to spend that intellectual energy.” Participants suggested possibly condensing the message in the upper portion of the infographic below the headline into one group of text and merging the two bulleted facts in the storyline below the parking space section.

As with other storylines, the elected official group requested the team frame this message in a positive light, suggesting replacement of the text “If everyone that uses NJ TRANSIT today were to start driving tomorrow…” with “Because people use NJ TRANSIT we’ve saved 30-50,000 parking space in NJ.”

In terms of infographic design and layout, most participants recognized that the yellow fact boxes resembled parking spaces and several indicated they liked the comparison to “10,000 basketball courts.” Others suggested a comparison to football fields would resonate more with the public. Participants liked the water image, but several suggested the water should be depicted “less pristine,” to demonstrate pollution. A participant suggested that placing a red “X” over the pollution icons would help communicate a reduction in stormwater runoff and its associated pollutants. This would suggest that these pollutants “are not there because of NJ TRANSIT.”

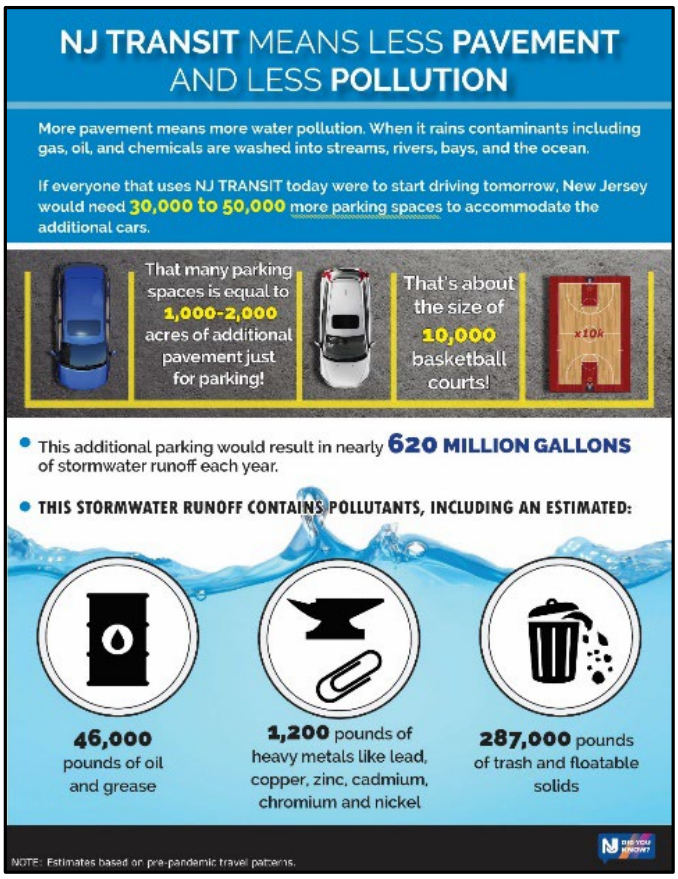


Figure 12. NJ TRANSIT reduces pavement and pollution

Benefits to People

People Storyline 1 – NJ TRANSIT customers are diverse

People storyline one shows multiple facts regarding the diversity of NJ TRANSIT's customer base. Transit riders were very supportive of this storyline, sharing commentary like: "This is great – a colorful way to show the diversity of usage and users and if you appreciate numbers and statistics you get a clear picture from what's going on and how it's nearly for everyone," and "It made me more aware of the type of people that utilize NJ TRANSIT."

Critique varied and focused on both layout and content. Regarding the former, several participants across sessions noted that usage of the same color scheme in various sections of the infographic was confusing because it seemed to connote a connection among disparate facts. Others remarked that the use of multiple single person icons to communicate the proportion of different races served was hard to follow. They suggested replacing the people icons representing race with a pie chart or adding a legend identifying customer race distribution.

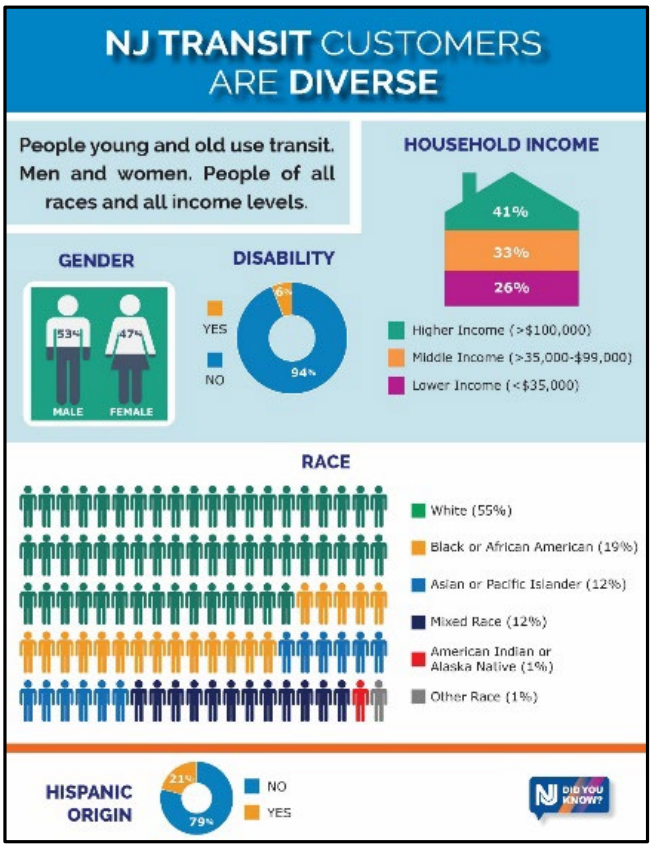


Figure 13. NJ TRANSIT customers are diverse

Regarding content, across sessions, participants felt the gender statistics were not needed or useful, especially because transit usage is relatively evenly split by gender. Several participants also noted it is not positive to show that 94 percent of persons with disability in the state do not use transit. Opinions were split on whether adding age data could be useful. Interestingly, business leader participants observed that the household income statistics "sends a message that NJ TRANSIT is expensive." The graphic indicates that the more NJ TRANSIT customers (41%) report being high-income, which leaves the impression that "the costs of riding NJ TRANSIT are too high for middle- and lower-income people."

Elected officials shared the most feedback on this storyline, offering various recommendations. In general, they requested inclusion of more detailed statistics on NJ TRANSIT customers, with one stating "…the more information you can fit in is helpful

but it definitely needs to look good too." Requests included presenting NJ TRANSIT customer demographics by transit mode; adding a link for information on NJ TRANSIT customers by county or region; and communicating how the diversity of NJ TRANSIT customers compares with the State's population.

People Storyline 2 – "NJ TRANSIT provides access to opportunity"

People storyline two presents multiple facts conveying information about NJ TRANSIT's system characteristics. This storyline and infographic was one of three that generated a high level of support across all sessions. Positive feedback included: "I love this," "excellent," "interesting," "Good to see multiple transit modes represented," "Easy to read," "This is how an infographic should look," "Tells a compelling story, and "It's direct, it's to the point, it covers everything."

Regarding layout and design, participants generally did not recognize the use of NJ TRANSIT branded colors. For consistency, one participant requested removing of the bus stop icon in the bottom half of the storyline, as similar icons are not used to depict commuter or light rail lines in that portion of the infographic. Many shared positive feedback on the fonts, such as "I like the font choices, they're bold" and "Something about the fonts, it just kind of conveys the magnitude of the services that are provided." However, one requested that the number of fonts used be limited to one-two.

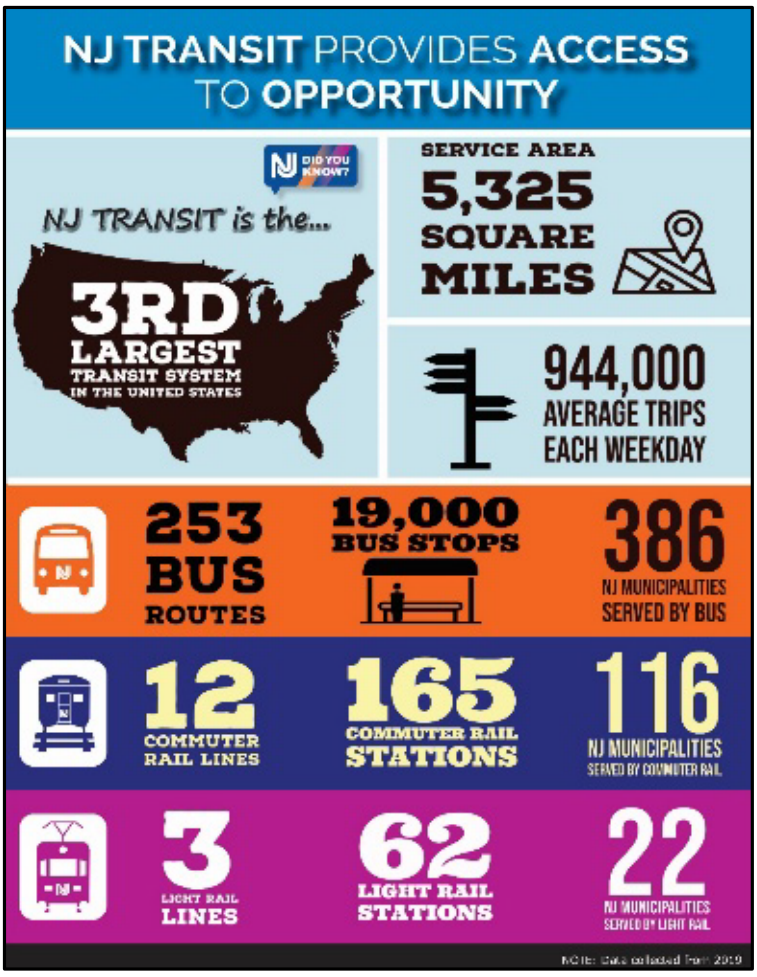


Figure 14. NJ TRANSIT provides access to opportunity

Several elected officials as well as participants in the transit and non-transit user groups commented on the statistic "NJ TRANSIT is the 3rd largest transit system in the United States." Some said the fact made them wonder who the first and second were, with another noting that the statistic is "not meaningful to me." One shared that he did not mind that this fact is included, but requested it not be so prominently shown in the

storyline. Mr. Carnegie asked several groups if they preferred the statistic be replaced with “NJ TRANSIT is the largest statewide transit system in the United States.” Many liked this suggestion, with one noting “it just sounds better.”

People Storyline 3 – Did you know NJ TRANSIT is the largest statewide transit system, and the third largest overall, in the United States

People storyline three conveys information about the size of NJ TRANSIT and the agency’s service area. This storyline generated the least positive feedback among the people storylines across all sessions. However, several business leaders shared positive feedback, including “I was able to ‘zero right in’ to the message” and one of the transit riders noted “This is my favorite one so far because I didn’t know the facts that are stated here.”

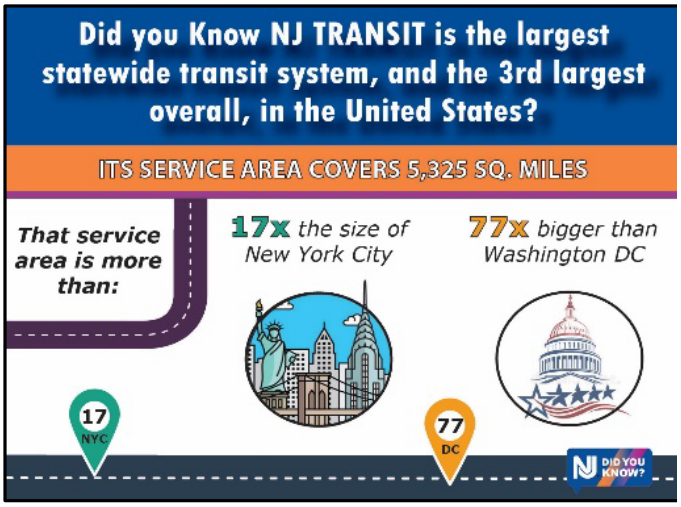


Figure 15. NJ TRANSIT service area

Critical comments characterized the infographic as “confusing” and “hard to follow.” Many opined that the term “service area” was ambiguous. Others did not like the comparison of NJ TRANSIT’s service area to the geography of a city, with several suggesting comparing NJ TRANSIT’s service area to the size of other transit systems would be better.

Regarding design and layout, several participants remarked they did not like the teardrop shaped mile marker icons, with one describing them as “redundant.” Others noted there was too much white space. Mr. Carnegie also asked participants what geographies they think are included in the term “New York City.” Responses varied, with some indicating the five boroughs and others stating only Manhattan.

People Storyline 4 – NJ TRANSIT helps older adults and people with disabilities get around

People storyline four presents multiple facts on topic of NJ TRANSIT’s role in providing mobility to disadvantaged populations. This storyline resonated most existing transit riders, who remarked “I like the focus on the disabled,” It’s “warm and fuzzy,” “makes me think NJ TRANSIT is serving people who most need it,” “I like the layout,” “It’s kind of refreshing,” and it’s “effective.”

Several asked for a definition of the term “community transportation” because it was not familiar to them. Others questioned why only $44 million is given to counties and not-for-profits for community transportation. As one remarked, “it sounds like a big number when I look at it, especially in that big orange bold, but when I think about it relative to what the federal government spends on anything it seems really small.” An elected official compared the figure to the State’s $44 billion budget this year, and remarked that $44 million is “…not a lot of money, and that kind of makes me sad.”

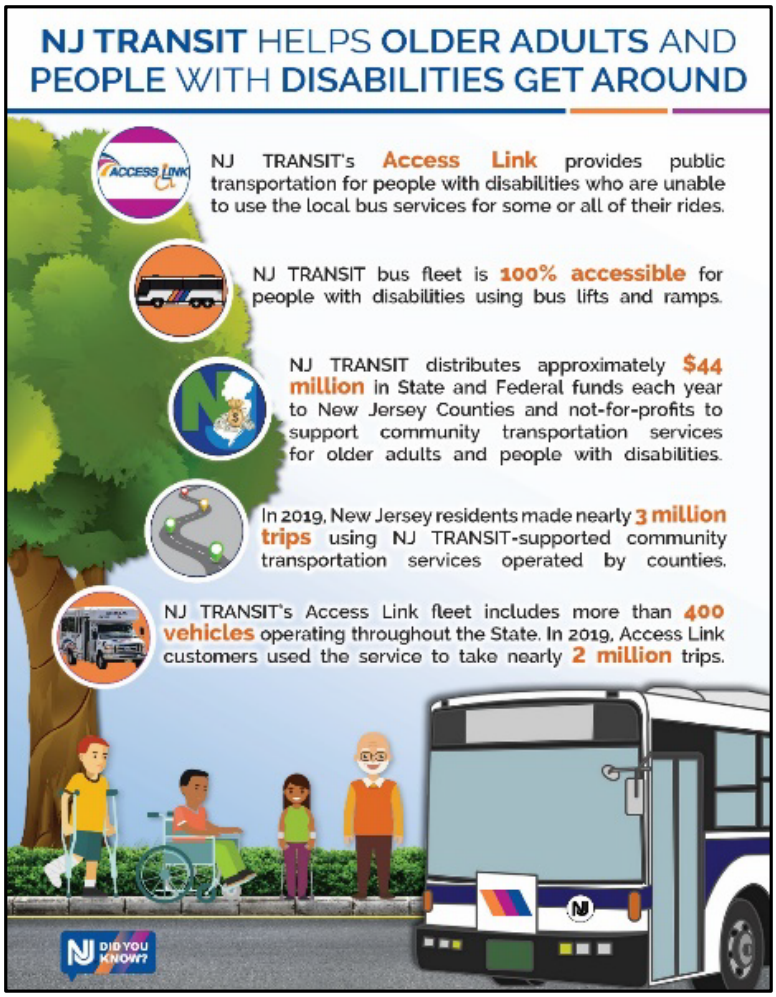


Figure 16. NJ TRANSIT helps older adults and people with disabilities get around

This storyline also generated discussion related to Access Link across sessions. One business leader observed that Access Link is not available statewide so not all persons with disabilities can use the service. A non-transit rider asked for clarification on Access Link’s service coverage in the state. Another stated, “It’s a nice graphic, but I think it is misleading. Access Link is a wonderful thing but it has so many problems and this just makes everything look rosy.” Several voiced support for inclusion of a link for those interested in more information on Access Link. One also suggested including an Access Link vehicle as part of the infographic. Regarding design and layout, another participant noted that the bus image seems “cold” and “empty” because the window is opaque, with no driver or passengers visible. Another requested replacement of the older adult in the infographic with a senior who offers a “better representation of the older population.” Finally, a participant suggested adding the fact that persons with disabilities are eligible for half-price fare on NJ TRANSIT fixed-route services.

People Storyline 5 – Attention Students

People storyline five is a personal appeal alerting viewers about NJ TRANSIT's student discount program. This storyline was one of three that generated a high level of support across all sessions. Those that liked the storyline cited reasons including the colors, layout, and the "straight to the point" message. One noted that it's an "attention grabber," while another shared "I definitely appreciate how simple this one is." Elected officials acknowledged this storyline would appeal to their constituents.

Figure 17. NJ TRANSIT student discount program

One transit rider recommended altering the text to say "if their school participates" instead of "when their school participates" to help make it seem more likely that a viewer's school participates in the program. Another suggested clarifying if participating colleges include any schools in neighboring states like NY and how many colleges overall participate. Across all the groups, participants discussed the storyline's text directing viewers to a link for more details on the program. Some supported changing the text to read "Visit link to see if your school participates in the program." An elected official participant suggested instead stating "85 schools participate. Click link to see if yours is one of them."

People Storyline 6 – NJ TRANSIT supports military veterans

People storyline six is another personal appeal message alerting the viewer to NJ TRANSIT's military veteran discounted fare program. Most participants across sessions shared positive comments about this storyline, including "It's a good message," "I didn't know this," and "This is excellent."

Two participants expressed what they described as a "disconnect" between the banner language "NJ TRANSIT supports military veterans" and the storyline text that describes eligibility for the discounted fare program because the does not specifically mention "veterans" and is more inclusive of active duty military and their dependents. They recommended this be clarified. One suggested changing the banner to read "NJ TRANSIT supports military personnel and veterans." Another recommended including in the storyline that reduced fare is half-price standard fare.

Participants across sessions disliked the current grey color scheme, which was described by one as “pretty subdued” and as “somewhat offensive” by another. Several recommended using a mix of red, white and blue coloring. One recommended that the colors be more “eye popping,” so that veterans take notice and can take advantage of this discount “that they deserve.”

Regarding graphics, an elected official suggested additional people icons be added, including females, to represent the five branches of the U.S. military. Another idea mentioned was to utilize the circular military icons that represent the five service branches.

Figure 18. NJ TRANSIT reduced fares for veterans

People Storyline 7 – “NJ TRANSIT improves safety by reducing crashes”

People storyline seven presents multiple facts related to NJ TRANSIT improving roadway safety by reducing vehicle crashes. This storyline generated the most positive feedback from non-transit and transit riders, who shared “This is one of my favorites – it’s to the point, and it’s an easy picture to understand.” Other positive comments included it’s “Catching,” “Refreshing,” and “Powerful.”

Participants across sessions were primarily drawn to the crashing vehicles graphic. While some recognized the graphic as powerful, others did not like usage of a crash to demonstrate how NJ TRANSIT improves safety. One transit rider opined that “It seems like you are leading with a negative message,” with the image of a car crash and fire. This participant added, “It’s giving me

Figure 19. NJ TRANSIT improves safety by reducing crashes

the message that by me driving it's like I'm doing something that I shouldn't do." Several elected officials also requested the message be framed more positively, with one recommending addition of the text "Because so many people use NJ TRANSIT, we have 7,000 fewer crashes than we might otherwise have." Another suggested calculating additional statistics that demonstrate "If another X people used NJ TRANSIT, there would be X fewer crashes on the road."

Based on this feedback, suggestions were sought from the group for a different image that could communicate the safety improvement. One suggested a graphic for "get home safely." Another suggested using an image of a very dented car with a visibly aggravated driver standing next to it. Still another recommended that the crash graphic be placed on the side of the storyline and a bus with customers traveling by the crash be added to demonstrate how the bus continues to travel by the accident, getting customers safely and happily to their destination.

APPENDIX E1: BUSINESS LEADERS FOCUS GROUP

The New Jersey business owners focus group was convened virtually on Thursday, April 29, 2021 from 1:00 to 3:00pm using the Zoom platform. The primary purpose of this follow-up focus group was to gain insights and obtain feedback from business owners on the New Jersey-specific "storylines" developed by the research team for the planned marketing campaign focused on describing public transportation's contribution to quality of life in New Jersey. The team sought information on how these storylines resonated with the participants as NJ business owners and how they might resonate with their employees and customers. Feedback on timing of the marketing campaign was also sought. Finally, impacts on participant travel behavior due to the ongoing COVID-19 pandemic was discussed.

Several potential Phase 3 focus group dates were shared with all eight business owners who participated in a Phase 1 focus group session, with the meeting date selected based on participant feedback on the best date for the majority. Once confirmed, participants were sent an email with detailed information on the session date, time, and other logistic details related to joining the virtual meeting via the Zoom platform.

The focus group discussion was facilitated by Jon Carnegie, the principal investigator for the study. Mr. Carnegie was assisted by Kevin Narvaez (Envision Consultants) and Andrea Lubin (Rutgers Voorhees Transportation Center). Each participant was welcomed upon arrival and a verbal consent form was read aloud by Mr. Carnegie to the assembled group, which reminded participants of the purpose of the study and emphasized their rights as research subjects. He also provided an overview of the topics to be covered during the two-hour discussion. The verbal consent form was approved by the Rutgers University Institutional Review Board (IRB), which is part of the University's Human Subjects Protection Program (HSPP).

Participant Profile

A total of seven individuals participated in the focus group, with the majority identifying as female, age 45 and older. Participants were racially diverse, with their respective business located in one of five New Jersey counties: Hudson, Mercer, Middlesex, Monmouth, or Somerset. Participant business types varied and included engineering firms; consultancy businesses; restaurants; real estate; aesthetic skincare; and an international trade corporation.

Discussion Summary

Mr. Carnegie began the focus group by asking participants to introduce themselves, share their business location in the State, and then discuss how the COVID-19 pandemic has impacted how they travel. Participants discussed both travel pattern changes, as well as some mode changes. Overall participants reported that they have

traveled less during the pandemic. They also gave a “thumbs up” when Mr. Carnegie inquired if they felt optimistic about some level of normalcy returning as the pandemic continues. Commentary shared on traveling during the pandemic included the following:

- I haven’t used transit for the past year and instead drive into NYC when I need to go there. I may return to traveling by transit in the coming months, perhaps by fall 2021.
- Prior to the pandemic I traveled by transit to NYC for recreational purposes and to Philadelphia for work purposes. However, due to the “perceived dangers” of using transit during the pandemic, I have stopped using transit and decreased the frequency of trips to NYC and Philadelphia. My employees are generally working remotely and those that come into the office who used transit prior to the pandemic now travel to work by Uber instead.
- My family and I have continued to drive as well as use transit during the pandemic. My husband takes the train to work and my daughter takes the train to Philadelphia. We enjoy relaxing on the train and have taken “the necessary precautions” while traveling on transit during the pandemic.
- I have asked my employees not to take transit to/from work during the pandemic for fear that if one or more contracts COVID-19, I will have to close my restaurant. During the pandemic I included in the classified advertisement for new hires that prospective employees had to be able to travel to the restaurant not using transit. Thus, my employees have opted to walk or drive to work during the pandemic. During the pandemic I also began driving one of my employees who lived in Newark to work who had previously commuted by PATH train and scooter to the restaurant. Unfortunately, because she was dependent on my schedule for rides her work shift was reduced and she made the decision to quit because of her reduced hours.
- About a month ago I removed the language from the classified job posting indicating hires could not travel to/from work by transit, but my worry about employees traveling by transit and contracting COVID-19 remains a serious concern for me.
- My restaurant employees have continued to walk, bike, or use a scooter to access work during the pandemic, with one employee traveling by train. I have continued to drive to/from the restaurant and my other job permits me to work remotely from home. I have not taken public transit during the pandemic.
- As a real estate agent my primary travel mode is by car. Due to the pandemic many clients living in urban areas including NYC, Newark, and Elizabeth are seeking to relocate to the suburbs. Many are seeking residences in municipalities with a train station, as well as in suburban communities with close proximity to NYC so that they will have multiple commuting options to the city if/when they return to the office.
- I have traveled much less during the pandemic and work remotely from home. I am planning to travel to NYC tomorrow though and anticipate taking the train for

my trip if the schedule meets my needs for the first time since the pandemic began. I always prefer traveling to NYC by train due to the ease and convenience.

Mr. Carnegie and Mr. Narvaez presented a series of three overarching headlines, 19 unique storylines, and close to 100 sub-stories and related facts to demonstrate the beneficial impacts of transit and then requested participant feedback on each. They reported that statistics communicated in the storylines are based on pre-pandemic travel patterns.

As noted, each storyline presented fell under one of three main headlines as follows: 1) economic benefits; 2) environmental benefits; and 3) benefits to people. Mr. Carnegie requested that participants think about the benefits of transit presented in the context of their business in terms of both their customers and employees, as well as their own personal opinions.

Economic Benefits

Economic Storyline 1 – "NJ TRANSIT Employs over 11,000 People" – Option A

This infographic presents a simple single fact infographic. Participants made the following observations:

- Some confusion was expressed about what the two statistics (11,000 & 19,000) in the infographic are attempting to communicate. On a similar note, one participant shared that the infographic does not explain if there is a need for this state spending or the additional jobs associated with it.
    - After Mr. Carnegie provided background detail on the statistics communicated, one participant suggested the text be altered to include language to clarify the statistics by stating that "NJ TRANSIT directly employs over 11,000 people." She noted that detail should also be added to clarify the types of 19,000 jobs generated by state spending on NJ TRANSIT, such as construction jobs, various vendors, engineering services, etc.
- I like the infographic as is. The colors used made the words "people" and "jobs" immediately stand out, which peaked my interest.
- Since people are not typically "socially conscious," you should make it clear how this this information relates to and/or could benefit the individual. In response, Mr. Carnegie inquired if pairing the message with a link to job and business opportunities with NJ TRANSIT would address that concern and the group responded affirmatively.

Economic Storyline 1 – "NJ TRANSIT Employs over 11,000 People" – Option B

This infographic presents the same information as shown in Option A, but in a different graphical style. Participants made the following observations:

- Overall preference for the layout style used in Option B, noting it "looks better," in comparison to Option A. They explained that the linear panel layout used in Option B makes it easier to distinguish and understand the two facts being communicated.
- While one participant noted liking the font and colors used in Option B, overall preference among the group was expressed for Option A's color palette. As one participant shared, I like the colors used in Option A better, as they "reached out and grabbed you." Option A's colors are "bolder;" "brighter;" and are more "striking."
    - Mr. Carnegie asked if participants were aware that the colors used in the storyline for both options are NJ TRANSIT branded colors. Some responded affirmatively, while others noted they were not aware of this fact.
- Option B states "The spending on NJ TRANSIT generates…" instead of "State spending on NJ TRANSIT generates…" as used in Option A. Text used should include "State spending" to be clear with the audience.
- The NJ TRANSIT 'Did you know' image colored in magenta is more prominent in Option B, which is preferable to the multi-colored 'Did you know' image used in Option A.

Economic Storyline 2 – "NJ TRANSIT Generates Economic Activity"

This infographic also presents a simple single fact infographic. Participants made the following observations:

- Mr. Narvaez asked what images or text in the infographic participants were drawn to upon first glance. One responded she registered the train image first, followed by the dollar signs and bills. Another shared that she was first drawn to the dollar bill images.
- The message is somewhat "confusing" and took me a while to understand. On a similar note, another participant reported that she did not know what the term "economic activity" means as used in the infographic. She inquired, "Is it a good economic activity?"
- I like the images and colors used.
- I suggest using a color other than green for the text "For every $1" and "$2 is generated" as the current text color is too similar to the color of the dollar bills presented. Usage of a different color for that text would help the information

presented stand out better. Another suggestion to help present the message clearer is to use equal signs and/or arrows in the layout. For example, “Every $1 invested in transit = $2 generated in economic activity.”

- I like the message as I understand how it relates to me as an individual.
- Mr. Carnegie asked if the infographic’s message that “For every $1 invested in NJ TRANSIT, $2 is generated in economic activity” was surprising. One responded that she had never thought about this topic prior to today and another noted she thought the economic activity generated would be greater.
- When asked if participants noticed the infographic’s headline “NJ TRANSIT Generates ECONOMIC ACTIVITY,” one responded yes and that its’ inclusion was helpful.
- When asked if a bus image should also be included in the infographic or used instead of the train, one participant responded that she likes the train image used that includes NJ TRANSIT colors as “it is showing movement,” like the positive economic activity generated by NJ TRANSIT.

Economic Storyline 3 – “NJ TRANSIT is Good for the Economy”

This infographic presents multiple facts about a single topic. Participants made the following observations:

- I like it. It provides a great summary of benefits “as long as people have the chance to read it and absorb it.”
- Some discussion was had about the storyline fact that states “1.5 billion vehicle miles of travel saved because people ride in NJ TRANSIT.” Specifically, the concept of VMT may be confusing to readers. Another shared that discussing VMT seems like less of a direct connection to the economy. On this topic, one participant remarked that this VMT fact as well as “140,000 fewer vehicles using NJ roadways because people ride NJ TRANSIT instead of driving” both make her think of the environmental benefits of transit and that it may be positive if readers think of multiple benefits associated with transit when reviewing this infographic.
- Six information blocks may be too much for people to digest; consider using more direct facts focused on the economy.
- Mr. Carnegie asked if participants had specific feedback on the icons employed in the infographic. One responded that she liked the icons used. Another suggested that the icon discussing job generation that displays multiple human figures could perhaps show figures dressed in various work attire, such as construction uniforms, etc.

Economic Storyline 4 – "Public Transit Reduces Road Congestion – Option A

This infographic presents a simple single fact infographic. Participants made the following observations:

- Several shared positive feedback including: "Really interesting," "I like it," "It's an easy read and a quick read, too."
- The storyline banner 'Public transit reduces road congestion' did not standout for me in this infographic.
- This storyline is very interesting and makes me think of transit's major environmental benefits, including reduced carbon emissions.
- When asked what images or text in the infographic participants were drawn to upon first glance, several responded the positive message and one remarked the extent of the beneficial impact of transit regarding reduced road congestion.
- Mr. Narvaez inquired if participants accepted the fact presented in this infographic at face value and if they would like an option included to learn more information. Most noted they accepted the statement as fact, but also noted they would like the opportunity to learn more about the topic. Support was expressed for including a "learn more" link in the infographic which, one participant noted would give the fact "more credibility." Inclusion perhaps of the reference for this fact at the bottom of the infographic was also suggested by one participant who noted however that she did not question the validity of the fact because it is coming from NJ TRANSIT.

Economic Storyline 4 – "Public Transit Reduces Road Congestion" – Option B

This infographic presents the same information as shown in Option A, but utilizing a different reference point. Participants made the following observations:

- Overall support for Option B over Option A because the reference point used in Option B – driving from New York City to Los Angeles – was described as "more relatable" than driving to the moon.
- Make the map graphic more colorful (currently colored in grey).

Economic Storyline 5 – "Public Transit Reduces Road Congestion" – Highway Travel Delays

This infographic also communicates a single, simple fact. Participants made the following observations:

- Hard to relate to – specifically, the unit of measure used (years) is difficult to grasp.
- Instead of saying “Highway travel delays” say “traffic” or “travel time delays.” Readers will be able to relate better to those suggestions.
- Consider linking the message to other savings, such as fuel costs saved and/or that less time spent in roadway congestion means more time for family/friends. Also “frequency and proximity of cars in the road can damage the infrastructure which is a huge cost on taxpayers.” Mr. Carnegie responded that these issues are included in other storylines.
- Consider using an image other than the calendar pages to communicate the message “308 years in travel delays.” For example, “I envision a cartoon from B.C. and a character with a wheel from a primitive time.”

Economic Storyline 6 – “NJ TRANSIT Reduces Congestion” – Tunnel & Bridge Traffic Increase

This infographic presents multiple facts about a single topic. Participants made the following observations:

- “Interesting statistics”
- “That’s it?” - I thought the statistics showing tunnel and bridge traffic increase would be greater, especially at the Holland Tunnel. To clarify, Mr. Carnegie explained that the analysis undertaken to develop these figures assumed that Port Authority PATH service continued to operate and was used by a percentage of NJ commuters traveling to/from NYC.
- Mr. Carnegie asked if it occurred to anyone that it would be impossible for the tunnels/bridges to accommodate the calculated increase in traffic presented in this infographic. One person responded affirmatively, while several others responded in the negative.
- This storyline tells me that NJ TRANSIT is “an absolute necessity.” Further, it “shines light on the importance of public transportation as a solution to existing economic and social problems.”
- Mr. Carnegie reminded the group that the calculations and statistics presented are based on pre-pandemic travel patterns.

Economic Storyline 7 – “Did you know that NJ TRANSIT Increases Property Values”

This infographic communicates multiple facts about multiple topics. Participants made the following observations:

- Support expressed for this infographic: “Interesting,” “As a relator, I love this and I would use this,” “It’s different,” “Everybody can relate to it,” “Such good information, my god it’s so exciting to have all this information.”

- I like the circular image included on the roof that shows dollars/values increasing
- Mr. Narvaez asked if the storyline gets lost in this infographic as it is currently presented in the roof image. Several participants responded that the storyline was clear.
- Mr. Carnegie asked if the participants preferred the language "located with ½ mile of NJ TRANSIT rail stations" or instead "located close to NJ TRANSIT rail stations." Preference for the latter was expressed.
- Mr. Carnegie asked if anyone made a connection between quality of life and local tax dollars; one responded affirmatively.

Economic Storyline 8 – "NJ TRANSIT supports growth and development"

This storyline presents multiple facts about multiple topics. Participants made the following observations:

- Two noted that housing growth is not considered a positive development to everyone. For example, growth can lead to increased traffic congestion and negative effects to local resources. One participant who resides along a train line shared that this message of housing growth resonates positively for her.

  Mr. Carnegie responded to the concerns expressed regarding showing housing growth as a positive benefit by asking if the group preferred the storyline banner to be changed to say "NJ TRANSIT supports community development." Several expressed a preference for this revised storyline banner, indicating it is "more descriptive" and "inclusive."
- To make the two main statistics presented in this infographic "pop," – the "28,000" figure and the "50%" figure – I recommend changing their text color from yellow to pink. Using pink font for those statistics will also pick up the pink used in the car images included in the infographic, contributing to greater visual cohesion.
- Mr. Carnegie asked if anyone picked up the subtle components of NJ TRANSIT branding used in the infographic, such as use of the Hudson-Bergen light rail icon in the upper left of the image and the light rail banner over the building in the lower-right portion of the image. One responded that she didn't pick it up until Mr. Carnegie point it out.

Economic Storyline 9 – "NJ TRANSIT connects New Jersey to the region and world"

This infographic presents multiple facts about a single topic. Participants made the following observations:

- Mixed feedback shared on this storyline:

    - This message is not relevant or appealing to me, especially in comparison to the other infographics presented to us today. I also expected that the statistics shown would be greater because I associate “public transit” in NJ as encompassing PATH, but these storylines exclude PATH.
    - This message is interesting. I like thinking about the number of people using NJ TRANSIT to access these destinations and that without it [NJ TRANSIT] they may not go.
    - I really like this infographic. “It makes me feel proud to be in New Jersey that this is the benefit of living in New Jersey because we have access to Philadelphia, Manhattan, Newark airport, Amtrak to just go anywhere in the world.”
- Most of the statistics in the infographic communicate annual data, impacts, etc. Why do you communicate weekday statistics for Manhattan? It seems inconsistent. Instead show the annual statistic for 300,000 travelers each weekday. Mr. Carnegie responded that the annual statistic would approximate 76 million.

Text Facts – “NJ TRANSIT supports business”

No infographic was presented but rather a series of facts about how NJ TRANSIT supports business. Participants made the following observations:

- Some of the figures seem low because PATH service is not factored into the calculations.
- The statistic “62% of all sales transactions in the State happen at business located close to transit” is not as relevant now because so many residents have begun to or increased their online shopping since the onset of the pandemic.
- I like the fact about bringing employees to their jobs.
- One participant shared that her restaurant benefitted from NJ TRANSIT providing transport to NYC residents seeking to access New Brunswick outdoor dining during the pandemic when many NYC establishments were closed.

Economic Storyline 10 – “NJ TRANSIT is good for the economy” - Tourism

This infographic presents multiple facts on a single topic. Participants made the following observations:

- “I like it,” “It’s interesting and I like it,” “It’s nice how it shows another advantage”
- The images look “fun,” I like how the images are summer-oriented
- I suggest you write “$16 million” instead of “16,000,000.” Several agreed that the former presentation will be “more impactful.”

- Mr. Carnegie reported that the team used a beveled banner to help the storyline stand out and asked participants to confirm if the storyline did indeed stand out. Several responded affirmatively.

Text Facts – "NJ TRANSIT Supports Tourism and related businesses" - Newark

No infographic was presented but rather a series of facts communicating an aspect of tourism benefits focused on Newark venues. Participants made the following observations:

- I like how it drills down to the benefits
- I would like this as an infographic if you included similar statistics demonstrating how NJ TRANSIT supports tourism in other NJ communities as well, such as New Brunswick and Montclair

Text Facts – "NJ TRANSIT Supports Tourism and related businesses" – Meadowlands and Atlantic City

No infographic was presented but rather a series of facts communicating an aspect of tourism benefits focused on the Meadowlands and Atlantic City. Participants made the following observations:

- Presenting these statistics in the six-box layout used in storyline #3 would be helpful in communicating this message
- "Again, that's it?" - I thought the statistics communicated would be greater

<u>Environmental Benefits</u>

Environmental Storyline 1 – "NJ TRANSIT saves energy and reduces greenhouse gas emissions"

This infographic presents the first of several environmental benefit storylines shared. The graphic presents a simple fact on a single topic. Participants made the following observations:

- Several expressed support for this storyline
- I like that the storyline uses the reference point of "1,000 Central Parks" because I know the size of Central Park, so I can relate to the statistic being communicated
- I like the gas gage graphic used, as well as the smoke drawn around the gage

Environmental Storyline 2 – "NJ TRANSIT means less pavement and less pollution"

This infographic presents multiple facts on multiple topics. Participants made the following observations:

- It's hard to read because the font is small
- Too much information presented, too many connections I have to make as a reader -
  "I don't want to spend that intellectual energy"
- Interesting information, but seems that parking lots will exist regardless of NJ TRANSIT services. Mr. Carnegie clarified that the message being communicated regarding parking is that more parking spaces would need to be constructed to accommodate the additional vehicles if all NJ TRANSIT customers were to start driving instead of using NJ TRANSIT, which would yield pollution via stormwater runoff.
- Layout suggestions shared to clarify the infographic messages about parking spaces/pavement and stormwater pollution:
  - Consider creating two separate infographics – one that discusses pavement and another that discusses pollution
  - Consider arranging the message and graphics so that the story flows from left to right
  - Consider making the infographic double-sided

Text Fact – "NJ TRANSIT means less pavement and less pollution" – Pavement trapping heat from the sun

No graphic was presented but rather one fact regarding pavement trapping heat from the sun. Participants made the following observations:

- Several reported that the fact that pavement traps heat from the sun which raises surrounding air temperatures was important and/or interesting to them

Benefits to People

People Storyline 1 – "NJ TRANSIT customers are diverse"

This infographic is the first of several that presents storylines demonstrating transit benefits related to people. The graphic presents multiple facts on a single topic. Participants made the following observations:

- Consider highlighting the importance of transit accessibility to accommodate diverse customers
    - Highlight how “inclusive” NJ TRANSIT services are by communicating information about people with disabilities who have access to NJ TRANSIT services
- “It sends a message that NJ TRANSIT is expensive” - The statistic communicating that the greatest percent of NJ TRANSIT customers (41%) report being high income and white (55%) makes me think that “the costs of riding NJ TRANSIT are too high for middle and lower income people.” You might be sending the wrong message with this infographic.
    - I thought that the statistics would show that a greater percentage of lower income persons use NJ TRANSIT
- Showing the gender breakdown of customers is not that relevant
- The storyline says that “People young and old use transit” but no age-related data is communicated

Text Fact – “NJ TRANSIT is more affordable than travel alternatives.”

No infographic was presented but rather several facts. Participants made the following observations:

- This is hard for the general public to understand; the message might be relevant for policymakers
- It is unclear what is encompassed in the term “housing expenses” that is used in this storyline
- To make the storyline message clearer, consider reframing it as a “case study” to show examples of two different hypothetical NJ families – one that uses transit and one that does not – and share details related to their transportation and housing expenses

People Storyline 2 – “NJ TRANSIT provides access to opportunity”

This infographic presents multiple facts on a single topic. Participants made the following observations:

- Strong support for this storyline shared - “I love this,” “excellent,” “Interesting”
- “The numbers are impressive, but what does it mean in real practice?” In other words, I would like to know information such as how NJ TRANSIT is helping low-income residents access work and how effectively NJ TRANSIT is operating their services
- Consider adding information about Access Link to show that NJ has services for persons with disabilities

People Storyline 3 – "Did you know NJ TRANSIT is the largest statewide transit system, and the 3rd largest overall, in the United States"

This infographic presents a single fact on a single topic. Participants made the following observations:

- "I like the layout," "It's interesting"
- I was able to "zero right in" to the message
- Comparing NJ TRANSIT's service area to "17x the size of New York City" diminishes NJ TRANSIT's service area size

Text Facts – "NJ TRANSIT is good for people" – Access to Opportunity

No graphic was presented but rather several facts. Participants made the following observations:

- Some noted these facts were interesting; limited discussion on these facts

People Storyline 4 – "NJ TRANSIT helps older adults and people with disabilities get around"

This infographic presents multiple facts on a single topic. Participants made the following observations:

- "I like it; I think everybody's represented" - Consider adding the data in this storyline with the data in Storyline 14 – NJ TRANSIT provides access to opportunity
- Access Link is not available statewide so not all persons with disabilities can use this service. For example, I work with adults with disabilities and many do not have Access Link available near their home and thus have difficulty accessing employment. Mr. Carnegie responded that perhaps the team will add available data from prior Rutgers research demonstrating residential and job accessibility by showing the proportion of residents with a disability living within the Access Link service area, as well as the number of employers located with the Access Link service area.
- Explain what is meant by "community transportation services"

People Storyline 5 – "Attention Students"

This graphic presents a personal appeal. Participants made the following observations:

- Participants liked this infographic and shared positive feedback about the colors used, the layout, and the "straight to the point" message

People Storyline 6 – "NJ TRANSIT supports military veterans"

This graphic presents a personal appeal. Participants made the following observations:

- Limited discussion but overall support for the message and infographic

People Storyline 7 – "NJ TRANSIT improves safety by reducing crashes"

This graphic presents multiple facts on a single topic. Participants made the following observations:

- "Wow" these statistics on the number of potential crashes and crash-related costs really capture my attention. "I didn't expect those numbers at all."
- One participant shared that she was first drawn to the blue and yellow cars involved in a crash
- The numbers are not so persuasive, but the message is effective

Text Facts – "NJ TRANSIT is good for people" – Health Benefits

No graphic was presented but rather several facts. Participants made the following observations:

- Several shared that the health-related facts communicated are interesting. One noted that an infographic on this message would be appealing because many persons are health conscious.

Marketing Campaign Timing

The final topic discussed was timing for the marketing campaign. As the state emerges from COVID-19 pandemic lock-downs and safety precautions are being slowly lifted, Mr. Carnegie asked participants if they feel it is OK to start talking about the benefits of transit. General consensus was that it was fine to move forward with the benefits campaign, recognizing that some persons may not be returning to their pre-pandemic travel patterns. One participant reported that the information being communicated in these storylines is relevant now, while another noted it is good to communicate how NJ TRANSIT services positively impact different areas, such as the environment, as they simultaneously provide a mobility service to customers. Another commented that she has noticed traffic patterns returning to pre-pandemic conditions in recent weeks.

Conclusion

This session's participants were comprised of a cohort of New Jersey business owners operating a diverse array of businesses in one of five New Jersey counties. As determined in the first focus group session convened with these individuals, all reported familiarity with NJ TRANSIT services and some level of experience using one or more NJ TRANSIT modes.

Participants briefly discussed their travel behavior during the COVID-19 pandemic. They noted both travel pattern changes, as well as some mode changes. Overall, participants reported that they have traveled less during the pandemic. Several stopped using transit during the pandemic to access destinations including NYC and Philadelphia for work and/or recreational trips, while one shared that she and her family continued to use both transit and drive during the pandemic. Another noted he was planning to travel by train for the first time since the pandemic onset later that week.

Participants shared positive and constructive feedback on the majority of storylines and facts presented. While there was clear support for storyline messaging and design that was easy for the reader to follow, participants were also supportive of storylines not designed to be a quick read and that required the viewer to spend more time to digest the content. Overall, this group seemed most drawn to economic storylines, and they were the only group showing support for Economic storyline 7.

The seven storylines that generated the most positive feedback on design and messaging were:

- Economic Storyline 1 – “NJ TRANSIT Employs over 11,000 People” – Option B (*with requests to use Option A’s color palette)*
- Economic Storyline 4 – “Public Transit Reduces Road Congestion” – Option B
- Economic Storyline 7 – “Did you know that NJ TRANSIT Increases Property Values”
- Economic Storyline 10 – “NJ TRANSIT is good for the economic” - Tourism
- Environmental Storyline 1 – “NJ TRANSIT saves energy and reduces greenhouse gas emissions”
- People Storyline 2 – “NJ TRANSIT provides access to opportunity”
- People Storyline 5 – “Attention Students”

APPENDIX E2 - NON-TRANSIT RIDERS FOCUS GROUP

The non-transit riders focus group was convened virtually on Tuesday, May 4, 2021 from 5:00 to 7:00pm using the Zoom platform. The primary purpose of this follow-up focus group was to gain insights and obtain feedback from non-transit riders on the New Jersey-specific "storylines" developed by the research team for the planned marketing campaign focused on describing public transportation's contribution to quality of life in New Jersey. The team sought information on how these storylines resonated with the participants as non-transit riders. Impacts on participant travel behavior due to the ongoing COVID-19 pandemic was also discussed.

Several potential Phase 3 focus group dates were shared with all non-transit riders who participated in a Phase 1 focus group session, with the meeting date selected based on participant feedback on the best date for the majority. Once confirmed, participants were sent an email with detailed information on the session date, time, and other logistic details related to joining the virtual meeting via the Zoom platform.

The focus group discussion was facilitated by Jon Carnegie, the principal investigator for the study. Mr. Carnegie was assisted by Kevin Narvaez (Envision Consultants) and Andrea Lubin (Rutgers Voorhees Transportation Center). Each participant was welcomed upon arrival and a verbal consent form was read aloud by Mr. Carnegie to the assembled group, which reminded participants of the purpose of the study and emphasized their rights as research subjects. He also provided an overview of the topics to be covered during the two-hour discussion. The verbal consent form was approved by the Rutgers University Institutional Review Board (IRB), which is part of the University's Human Subjects Protection Program (HSPP).

Participant Demographics

As shown in Table 1, six of the 10 focus group participants were female and four were male. Sixty percent of the participants were age 45 or older. Sixty percent identified as White or Caucasian and 40 percent as Black or African American. While the overwhelming majority reported Middlesex as their county of residence, the session did include a few participants from Mercer, Ocean, and Union counties as well.

Table 2 – Non-transit riders focus group participant demographics

Variable	Category	Number	Percentage
Gender	Female	6	60%
	Male	4	40%
Age	18-24	0	0%
	25-34	1	10%
	35-44	3	30%

	45-54	2	20%
	55-64	3	30%
	>=65	1	10%
Race	White or Caucasian	6	60%
	Black or African American	4	40%
County of Residence	Mercer	1	10%
	Middlesex	7	70%
	Ocean	1	10%
	Union	1	10%

Note - Due to rounding, not all totals equal 100 percent.

Discussion Summary

Mr. Carnegie began the focus group by asking participants to introduce themselves, share their residence location, and discuss how the COVID-19 pandemic has impacted how they travel. Participants discussed travel pattern changes, with one reporting a mode change as well. Overall, participants reported that they have traveled less during the pandemic. While all indicated they drive to meet their travel needs, one participant noted that she began using transit during the pandemic to access medical appointments. Commentary shared on traveling during the pandemic included the following:

- I haven't traveled anywhere other than to the grocery store during the pandemic and I travel by car.
- I am traveling less. I travel by car to work two days per week as my work days in the office are staggered due to the pandemic. Last weekend my family and I traveled by car to South Jersey, as we are beginning to "venture out a little more."
- I have worked remotely from home during the pandemic. I recently began seeing some of my clients in-person.
- I work in commercial real estate so I am typically in the field and my travel patterns and frequency remained overall the same throughout the pandemic, except for the time period during the pandemic onset when I traveled slightly less. I also work from home now instead of going into the office and think that may stay the same as the pandemic wanes.
- Overall I have been traveling less for day to day activities, but I did make a trip by plane to California recently.

- I began using NJ TRANSIT train service during the pandemic so I could access a doctor's office located in the Bronx. I also anticipate that I will soon begin using paratransit to access a doctor's office located in Elizabeth.
- I have traveled exclusively by car during the pandemic. I am traveling less and have not gone to NYC since prior to the onset of the pandemic. I have been working primarily remotely and drive occasionally to my office in Piscataway. I anticipate returning to the office in June with a staggered schedule.
- I haven't left the house since March 2020 and I have no plans to leave for the rest of this year, I am taking it "one day at a time."
- I began a job in August 2020 that necessitated I work in an office-environment five-days a week. I drive to my job.

Mr. Carnegie and Mr. Narvaez presented a series of three overarching headlines,19 unique storylines, and close to 100 sub-stories and related facts to demonstrate the beneficial impacts of transit and then requested participant feedback on each. They also shared that statistics communicated are based on pre-pandemic travel patterns.

As noted, each storyline presented fell under one of three headlines as follows: 1) economic benefits; 2) environmental benefits; and 3) benefits to people.

Economic Benefits

Economic Storyline 1 – "NJ TRANSIT Employs over 11,000 People"

This infographic presents a simple single fact infographic. Participants made the following observations:

- "It's a net positive as far as I can see" – an additional 19,000 jobs translate to more money for the local economy
- "What does that do for me?" – this message does not make me more inclined to take transit. Mr. Carnegie explained that the goal of this project is to make people aware of the benefits of transit to New Jersey.
- Some confusion was expressed about the difference between the two statistics (11,000 & 19,000) in the infographic and what they are attempting to communicate:
    - Regarding the 19,000 statistic, one participant noted it "seems like a doubling of NJ TRANSIT jobs"
    - The meaning of the 11,000 statistic is clear to me, but not the 19,000 statistic
- Mr. Carnegie inquired if pairing the message with a link for more information, including on job and business opportunities with NJ TRANSIT would be helpful and most of the group responded affirmatively. One noted she would click on the

link to find out more about NJ TRANSIT spending because NJ TRANSIT services are expensive and it would be helpful to know “where our money is going.” Another said he would be interested in seeing detail on available NJ TRANSIT jobs via the link, including salary information.

- Regarding colors & graphics:
    - The magenta color used in the graphic is “nice”
    - The blue/white left portion of the storyline is easier to read than the magenta portion as it “pops out” more
    - It’s good to include the people icons as you have them in the left portion of the storyline as it helps communicate the message that NJ TRANSIT creates jobs, which is an especially important message now as many people grapple with job loss. You should replace the briefcase icon with people icons representing different jobs (e.g. construction) in the magenta portion of the storyline. Several agreed with this suggestion.
    - Mr. Carnegie asked the group if they noticed the colors used in the storyline are NJ TRANSIT branded colors. The group responded in the negative.
- One participant asked if the jobs encompassed in the statistics presented are helping the NJ economy or if the jobs represented in the statistics instead reflect outsourced hires from other countries. It should be more specific.
- One shared that based on her recent experience taking a NJ TRANSIT train to NYC Penn Station and buying food from vendors at and surrounding the station, she associates those vendors with NJ TRANSIT, even though she knows they are not affiliated with the agency. She also noted how expensive the food item was that she purchased at Penn Station after disembarking a NJ TRANSIT train, which made her think “how much inflation there is around NJ TRANSIT.” She added that she “sees the train station as creating jobs across borders.”

Economic Storyline 2 – “NJ TRANSIT Generates Economic Activity”

This infographic also presents a simple single fact infographic. Participants made the following observations:

- Several questioned how the statistics presented in this storyline were generated
- This “didn’t strike any chords with me”
- The small box graphic that includes the $5 billion statistic caught my eye and “says more than the rest” of the storyline. I noticed the $5 billion because it is such a large figure. It would be helpful to include information on how that statistic was generated.
- I like the storyline because the message of a $2 return on every $1 spent is a “pretty good return.” The storyline also “lends itself definitely to a hyperlink for people who want more information.”

- One participant questioned why NJ TRANSIT service is not better since this storyline demonstrates that a significant amount of money is invested into the transit system
- The term “economic activity” used in the storyline is too ambiguous:
    - “I would blow this off in a second because to me it’s like fake advertising, it’s just there to grab you. If it was real, it would tell you something about the economic activity itself.”
    - One participant asked if a pie chart could be added to the storyline that shows the breakdown of the economic activity generated. Mr. Carnegie inquired if participants would prefer a pairing of the message with a link for more information or if they instead prefer the inclusion in the storyline of the suggested graphic with more detail. The participant requesting a pie chart noted inclusion in the storyline of the detailed graphic would be best.
- Mr. Carnegie asked what images or text in the infographic participants were drawn to upon first glance. Responses include the train image and the green dollar bills. One noted that whenever she sees the color green she associates that with “growth” and as a “positive.”
- Mr. Carnegie asked participants if the photographic rendering of the train image was meaningful to them or if they would prefer a “cartoon-style” image instead. One responded that he liked that the photographic rendering of the train image as it reflects the modernized train system. Another said the image is “good,” as it looks “sleek” and “fast.”
    - Mr. Carnegie asked if anyone read the headline first. A few responded affirmatively. However, one noted that he read the headline last, and another described the headline as “very vague.” Mr. Carnegie also inquired if the group liked the headline as presented in a ‘shadow’ style. One responded affirmatively noting it gave the text a “3-D effect.” Another noted that it “made it harder to read.”
- Mr. Carnegie asked if the group noticed the “Did you know” bubble include in this and other storylines showed thus far. Several responded affirmatively, expressing preference for the magenta-colored bubble instead of the multi-colored bubble, noting the former is “clearer.”
- Mr. Narvaez asked if participants thought the statistics communicated were only associated with NJ TRANSIT train service. Most responded they assumed the statistics related to train service. Mr. Carnegie clarified that the statistics include all NJ TRANSIT services.

Economic Storyline 3 – “NJ TRANSIT is Good for the Economy”

This infographic presents multiple facts about a single topic. Participants made the following observations:

- “It gives you much more detail”
- “It’s a lot to take in, I think it’s just too much,” “it’s a lot to digest”
- “The layout is confusing” – not easy to read; not easy on the eyes
    - Consider shading the 6 fact boxes in different NJ TRANSIT branded colors to better differentiate them
    - Consider adding arrow icons to show connections among the facts presented
- “Not applicable to everyone”
- My eye goes right to the $5 billion figure because it’s a large figure
- The 140,000 statistic about roadway congestion stands out to me and makes me think “if we didn’t have NJ TRANSIT I can’t imagine what our traffic would be like.” She added, “It’s significant in telling us how much this effects our lives and the traffic piece hits home to me.” She also noted that she sees this statistic and the 1.5 billion statistic located in the box next to it as demonstrating quality of life benefits of transit and not so much economic benefits.
- Several questioned the use of the arrow icons in the 140,000 figure box, noting they are confusing. One suggested maybe using an icon that communicates less than “<” instead of the arrows

Economic Storyline 4 – “Public Transit Reduces Road Congestion

This infographic presents a simple single fact infographic. Participants made the following observations:

- “I like it. Honestly when I think of NJ TRANSIT and that it keeps other people off the road that makes me happy.” Another participant concurred with this sentiment.
- Two participants noted that the USA map “jumped out” to them, but they found the inclusion of the map initially confusing because the focus of the storyline is on NJ TRANSIT and New Jersey.
- Having previously driven from Los Angeles to New York City I can relate to the long distance this message is communicating. “I just thought wow, 530,000 times!” He added that anyone who had made this trip would understand the extreme distance this message is communicating.
- Several questioned how the 1.5 billion vehicle mile statistic presented in this storyline was generated. Mr. Carnegie clarified that the data was calculated based on survey data provided to the US Census Bureau about their travel behavior.
- This storyline made me “think of how much more we could save if we put NJ TRANSIT in all the towns because a lot of towns don’t have NJ TRANSIT.”

Another made a similar comment about the benefits of transit expansion and noted that maybe the storyline can include a statistic indicating the additional mileage that would be saved if transit was available in more communities.

- I like this message – "I think it hits the point, I think it's good, kind of reminds me of like the back of a Snapple bottle [random facts.]"

Economic Storyline 5 – "Public Transit Reduces Road Congestion" – Highway Travel Delays

This infographic also communicates a single, simple fact. Participants made the following observations:

- "It looks congested," "Looks a little bit busy"
    - Including the graphic of the cars in traffic makes me think the opposite of reduced congestion, which is this storyline's banner
    - "The point of infographics is to have minimal words"
    - Consider breaking the panels up to make the message clearer – show one with lots of traffic; a middle pane could display the fact; and the right-side pane could show a reduced congestion image
    - Remove the calendar icon, it confuses the message
- Mr. Carnegie pointed to the headline banner, noting it is presented in a 3-D beveled bubble style. Preference for this type of banner in comparison to the others shown thus far was expressed overall by the group, but two reported they didn't notice a difference

Economic Storyline 6 – "NJ TRANSIT Reduces Congestion" – Tunnel & Bridge Traffic Increase

This infographic presents multiple facts about a single topic. Participants made the following observations:

- Generally positive support for this storyline:
    - In terms of effectively communicating why NJ TRANSIT services are beneficial and needed, "this ad works to me the best for people to understand."
    - "I like the layout," "Sums everything up," the statistics communicated "pop out"
    - "To say that Lincoln Tunnel traffic would increase 500%, that would make me go take the train." He added the statistics "definitely make me not want to put my car on the road and spend an additional 3-4 hours to get to NYC."
- "Way too busy"

- Two noticed the usage of traffic display signs in this storyline
- General feedback about color on this and other infographics shown – white text stands out well on blue and green backgrounds
- Mr. Carnegie reminded the group that the calculations and statistics presented are based on pre-pandemic travel patterns and asked if that was ok with the group. Most acknowledged this was fine, with several noting their assumption that the pandemic traffic levels are temporary and will return to pre-pandemic or close to pre-pandemic conditions at some point. One participant did disagree, expressing his opinion that these statistics are not relevant at all now during the pandemic with many persons not commuting to their jobs and moving out of cities.

Economic Storyline 7 – "Did you know that NJ TRANSIT Increases Property Values"

This infographic communicates multiple facts about multiple topics. Participants made the following observations:

- Group consensus was that the positive benefit communicated in the upper portion of the storyline about higher property values is "displaced" by the statistic communicated in the lower-left hand box about higher property taxes. One participant noted that both the tax message and icon of the money in Uncle Sam's hat "really turns me off."
- "It's a lot of good information, but the way it is laid out I don't know who would take the time to read it," "It's busy," the print is too small in the lower two boxes.
- "I live close to a train station and I don't think being able to hear the train helps my value any."
- "I like this actually" – very good points
- "Is there a reason that we keep only showing NJ TRANSIT as a train?" "I haven't seen anything with buses yet."
- One participant explained she was not really sure what specific local services benefit from the generated tax funds mentioned in the bottom-ride of the storyline.

Economic Storyline 8 – "NJ TRANSIT supports growth and development"

This storyline presents multiple facts about multiple topics. Participants made the following observations:

- Several shared that the color palette used was "pleasing" and "easy on the eyes"
- Several remarked that the statistic "50% of Hudson County's population and housing growth since 2010 occurred within ½ mile of HBLR stations" does not seem significant nor does it "draw me in." Mr. Carnegie acknowledged their

feedback and explained that the 50% number is a very high overall growth statistic to have happened in the limited space of a ½ mile around transit stations.

- Consensus that the housing icons depicted should better reflect a mix of the residential dwelling types that actually exist along the HBLR, including apartments and high-rise complexes

Economic Storyline 9 – "NJ TRANSIT connects New Jersey to the region and world"

This infographic presents multiple facts about a single topic. Participants made the following observations:

- Several lamented the usage of multiple metrics in the infographic, specifically both daily and annual statistics. They noted doing so was confusing and that only one metric should be presented. Preference for sharing weekday statistics was expressed by several.
- One participant questioned if there is a difference between the term "travelers" and "riders," which are both used in the storyline
- One participant shared that the statistics about Newark airport and Manhattan resonated with him as they demonstrate the convenience afforded in accessing these destinations via transit

Economic Storyline 10 – "NJ TRANSIT is good for the economy" - Tourism

This infographic presents multiple facts on a single topic. Participants made the following observations:

- Support was expressed for this storyline - "Good information," "I like this graphic," "Really good graphics," "The information is applicable to a lot of people"
- Several shared that the black colored text in the ocean was "hard on my eyes."

Environmental Benefits

Environmental Storyline 1 – "NJ TRANSIT saves energy and reduces greenhouse gas emissions"

This infographic presents the first of several environmental benefit storylines shared. The graphic presents a simple fact on a single topic. Participants made the following observations:

- Overall support was communicated for this storyline:
    - “The top part really resonates with me…what really jumped out is that it is equivalent to 72 million gallons of gas consumed.”
    - “I like the whole thing,” “I like the message”
    - “This is creative thinking; this is very well put together”
    - “Anything that is saving energy and is environmentally friendly resonates with me, so I like the whole thing”
- One participant noted that the gas gage icon showing a full tank at 72 million gallons seems like a “mixed message”
- Several confirmed they noticed the smog graphic located behind the gas gage
- One participant requested replacement of the current image of Central Park in the bottom of the storyline with an image of either Central park or another park that is not encroached by high rise buildings to help communicate that “we need the forest to balance the pollution”
- One participant wondered if the statistic presented in the bottom portion of the storyline was “verifiable.”
- One participant suggested replacing the bottom image with some of the health benefits associated with decreased Greenhouse gas emissions and a few agreed

Environmental Storyline 2 – “NJ TRANSIT means less pavement and less pollution”

This infographic presents multiple facts on multiple topics. Participants made the following observations:

- “It’s an interesting parallel they are trying to make with pavement and water run-off,”
  “a lot of good information”
- The message is not clear
- This storyline is a “a little more ‘science-y’”
- “This one is polluting my screen…I feel like I am drowning.” Another participant agreed with this sentiment
- “I like this because I never consider storm water run-off
- Font used is “too small”
- The anvil icon used to connote a heavy metal is “not clear”

Benefits to People

People Storyline 1 – "NJ TRANSIT customers are diverse"

This infographic is the first of several that presents storylines demonstrating transit benefits related to people. The graphic presents multiple facts on a single topic. Participants made the following observations:

- Several noted it is not positive to show that 94% of persons with disability in the state do not use NJ TRANSIT – "that's a horrible stat to put in an infographic advocating for NJ TRANSIT"
- "I feel like it shows that it's [transit] for everybody"
- It is difficult to read the percentages of males and females using NJ TRANSIT as displayed in the gender icons
- The usage of some of the same colors in the Hispanic origin pie chart as used in the race chart above it is confusing – utilize different colors

People Storyline 2 – "NJ TRANSIT provides access to opportunity"

This infographic presents multiple facts on a single topic. Participants made the following observations:

- Strong support for this storyline shared – "This is a good graphic," "It's readable," "Good to see multiple transit modes represented," "Easy to read," "The font is very good, clear," "This is how an infographic should look"
- Two noted that reading the statistic stating that "NJ TRANSIT is the 3rd largest transit system in the United States" makes them wonder who the first and second largest transit systems are in the country. Mr. Carnegie suggested that fact could be replaced with "NJ TRANSIT is the largest statewide transit system in the United States." Overall preference was expressed for this proposed change – "it just sounds better" one remarked.

People Storyline 3 – "Did you know NJ TRANSIT is the largest statewide transit system, and the 3rd largest overall, in the United States"

This infographic presents a single fact on a single topic. Participants made the following observations:

- General dislike of this infographic, with the sentiment shared by several that the message was "confusing" and "hard to follow"
    - I don't think most people know the size of Washington, DC so that statistic is not helpful

    - "I think it is a little weird" comparing NJ TRANSIT's service area to the geography of a city. Perhaps compare instead NJ TRANSIT's service area size to that of other transit systems.
- Several shared that they did not like the 'teardrop' shaped icons/markers used at the bottom of the graphic to indicate 17x NYC and 77x DC – they are "redundant"
- Mr. Carnegie asked participants what geographies they think are included when they see the word "New York City." Most indicated the five boroughs, but a few said only Manhattan. Most agreed using the 5 boroughs as a reference point was "more relatable."

People Storyline 4 – "NJ TRANSIT helps older adults and people with disabilities get around"

This infographic presents multiple facts on a single topic. Participants made the following observations:

- Several participants discussed the $44 million figure. One participant expressed confusion as to why NJ TRANSIT distributes $44 million to counties and not-for-profits for transportation. Another questioned why only $44 million is given to counties and not-for-profits for community transportation.
- "It's a nice graphic, but I think it is misleading. Access Link is a wonderful, wonderful thing but it has so many problems and this just makes everything look rosy."
- One participant noted that the last fact communicated that the Access Link fleet has only 400 vehicles that provide 2 million annual trips demonstrates that additional vehicles are needed to meet need. As she stated, "Your waiting time is unbelievable if its only 400 vehicles for 2 million trips. We need more vehicles."
- One participant asked for clarification on Access Link's service coverage in the state. Mr. Carnegie responded the team could add a bullet explaining that the Access Link service area is anywhere within ¾ mile of a local NJ TRANSIT bus route. Mr. Narvaez then asked if a link to more information on Access Link should be added to the storyline. The group agreed that would be helpful
- One participant suggested adding the fact that persons with disabilities are eligible for half price fare on NJ TRANSIT fixed-route services

People Storyline 5 – "Attention Students"

This graphic presents a personal appeal. Participants made the following observations:

- Overall support expressed for this infographic – "It's good information because we do have quite a few colleges in the area," "It's nice"
- One participant opined that the discounted monthly pass should be made available to part-time students as well, as a means to further help reduce SOV travelers

People Storyline 6 – "NJ TRANSIT supports military veterans"

This graphic presents a personal appeal. Participants made the following observations:

- Limited discussion but overall support for the message and infographic - "I didn't know that, it's very interesting"
- One participant suggested the color palette for this storyline should be red, white, and blue instead of grey
- One participant suggested that it should be included in the storyline that reduced fare is half-price standard fare

People Storyline 7 – "NJ TRANSIT improves safety by reducing crashes"

This graphic presents multiple facts on a single topic. Participants made the following observations:

- Strong support for this storyline - "This is important. That jumped right out at me because driving in New Jersey is almost like, you know, bumper cars," "This is one of my favorites – it's to the point, and it's an easy picture to understand," "The colors standout"
- Mr. Carnegie asked what specifically stood out to participants in this infographic. Most noted the car crash icons and one noted the storyline banner found in the skyline in the top half of the infographic. Another shared that the fact that 7,000 more crashes each year would occur on NJ roadways if all NJ TRANSIT customers stopped using transit and started driving really stood out to him.

Marketing Campaign Timing

Marketing campaign timing was not specifically discussed, but the group expressed real interest and support for several of the storylines. Several also communicated a sense of hope during the conversation that a return to more normal, pre-pandemic conditions was on the horizon. Also, no one indicated during the course of the conversation that they felt discussing any of these transit benefits was inappropriate due to the ongoing pandemic.

Conclusion

This session's participants were comprised of a cohort of ten New Jersey residents who were primarily non-transit riders. Participants resided in one of four counties, with 60 percent reporting they were 45 years of age or older. Sixty percent identified as white or Caucasian and 40 percent as Black or African American.

Participants briefly discussed their travel behavior during the COVID-19 pandemic. They noted travel pattern changes, with one also noting a mode change. Overall, participants reported that they have traveled less during the pandemic, with many sharing that they have been working remotely. All but one noted their main transport mode is driving. The participant who changed modes during the pandemic began using NJ TRANSIT rail service to access medical appointments. Several expressed that they have begun traveling more recently for either work or recreation, with one sharing that she just returned from a trip she made by plane to California.

Participants shared positive and constructive feedback on the majority of storylines and facts presented. While there was clear support for storyline messaging and design that was easy for the reader to follow, participants were also supportive of storylines not designed to be a quick read and that required the viewer to spend more time to digest the content. Notably, the economic headline infographics seemed to appeal to this group less compared to the other three groups. Similar to the transit rider and elected official groups, the non-transit rider group also requested verification for several of the facts and statistics presented in various storylines, unlike the business group, who in contrast seemed comfortable with the statistics at “face value.”

The 8 storylines that generated the most positive feedback on design and messaging were:

- Economic Storyline 4 – “Public Transit Reduces Road Congestion”
- Economic Storyline 6 – “NJ TRANSIT Reduces Congestion” – Tunnel & Bridge Traffic Increase
- Economic Storyline 10 – “NJ TRANSIT is good for the economy” - Tourism
- Environmental Storyline 1 – “NJ TRANSIT saves energy and reduces greenhouse gas emissions”
- People Storyline 2 – “NJ TRANSIT provides access to opportunity”
- People Storyline 5 – “Attention Students”
- People Storyline 6 – “NJ TRANSIT supports military veterans”
- People Storyline 7 – “NJ TRANSIT improves safety by reducing crashes”

APPENDIX E3 – TRANSIT RIDERS FOCUS GROUP

The transit rider focus group was convened virtually on Tuesday, May 5, 2021 from 6:00 to 8:00pm using the Zoom platform. The primary purpose of this follow-up focus group was to gain insights and obtain feedback from transit customers on the New Jersey-specific "storylines" developed by the research team for the planned marketing campaign focused on describing public transportation's contribution to quality of life in New Jersey. The team sought information on how these storylines resonated with transit riders. Impacts on participant travel behavior due to the ongoing COVID-19 pandemic was also discussed.

Several potential Phase 3 focus group dates were shared with all transit riders who participated in a Phase 1 focus group session, with the meeting date selected based on participant feedback on the best date for the majority. Once confirmed, participants were sent an email with detailed information on the session date, time, and other logistic details related to joining the virtual meeting via the Zoom platform.

The focus group discussion was facilitated by Jon Carnegie, the principal investigator for the study. Mr. Carnegie was assisted by Kevin Narvaez (Envision Consultants) and Andrea Lubin (Rutgers Voorhees Transportation Center). Each participant was welcomed upon arrival and a verbal consent form was read aloud by Mr. Carnegie to the assembled group, which reminded participants of the purpose of the study and emphasized their rights as research subjects. He also provided an overview of the topics to be covered during the two-hour discussion. The verbal consent form was approved by the Rutgers University Institutional Review Board (IRB), which is part of the University's Human Subjects Protection Program (HSPP).

Participant Demographics

As shown in Table 2, seven of the eight focus group participants were male and one was female. Half of the participants were age 55 or older, with one-quarter age 25-34. Fifty-percent identified as white or Caucasian, 38 percent identified as African American or black and one participant identified as Asian. Twenty-five percent of participants resided in Essex County and 25 percent in Middlesex County. The session also included participants from four other counties, specifically Hudson, Mercer, Somerset, and Union.

Table 3 – Transit riders focus group participant demographics

Variable	Category	Number	Percentage
Gender	Female	1	13%
	Male	7	88%
Age	18-24	0	0%

	25-34	2	25%
	35-44	1	13%
	45-54	1	13%
	55-64	2	25%
	>=65	2	25%
Race	White or Caucasian	4	50%
	Black or African American	3	38%
	Asian or Pacific Islander	1	13%
County of Residence	Essex	2	25%
	Hudson	1	13%
	Mercer	1	13%
	Middlesex	2	25%
	Somerset	1	13%
	Union	1	13%

Note - Due to rounding, not all totals equal 100 percent.

Discussion Summary

Mr. Carnegie began the focus group by asking participants to introduce themselves, share their residence location, and then discuss how the COVID-19 pandemic has impacted how they travel. Participants discussed both travel pattern changes, as well as some mode changes. Overall participants reported that they have traveled less during the pandemic. Notably, three indicated that they continued using various NJ TRANSIT services regularly throughout the pandemic to reach work and other destinations. The remainder have been relying primarily upon other transport modes to meet trip needs. Several mentioned using NJ TRANSIT services to access NYC for recreation purposes pre-pandemic, but have not yet returned to doing so. Two mentioned they do not anticipate returning to transit anytime in the near future. Commentary shared on traveling during the pandemic included the following:

- I am an independent contractor and have been working from home and traveling less. I used to travel to NYC for work but have not done so during the pandemic.
- I have traveled to my office location in New York by car about four days per week during the pandemic as my home is crowded with three young children participating in remote learning. I have avoided using public transit since the onset of the pandemic and even though I am fully vaccinated, I have no immediate plans to use transit because I don’t want to take “extra chances.” I have flown by plane about three times for work travel.
- In general, I prefer train travel, but I have only taken the train occasionally since the onset of the pandemic. I live in Linden near the train station. Prior to the

pandemic I took the train to NYC several times a month for recreational purposes but I have not been to NYC since the onset of the pandemic. When Mr. Carnegie inquired if this participant would return to more frequent train travel in the future, he responded in the negative, noting that the pandemic has "permanently altered my mindset about being around a lot of people."

- I am self-employed, live in Bayonne, and travel to approximately 900 nail salons in the NJ/NY area. I have continued to travel on NJ TRANSIT bus, light rail, and train throughout the pandemic and drive minimally. I find that transit travel is faster and helps me avoid vehicular tickets. I have been very proactive as a transit customer during the pandemic, telling fellow passengers to put on their mask if they did not have it on while traveling. I have also avoided traveling by transit to any particular geographic area during the pandemic that was spiking at a given time with COVID-19 rates.
- I am a real estate property manager and live in Princeton. I used to travel by train to NYC pre-pandemic several times a month for work-related trips but have stopped doing so since the onset of the pandemic and now drive instead to NYC when needed. I don't desire or foresee going to NYC by transit in the near future but I did take my first train trip in NJ this past weekend.
- I live in Newark. I continued taking NJ TRANSIT bus during the pandemic but I also took more Uber trips as well.
- I live in Plainsboro. I currently work at a retail store and also teach at Rutgers and Middlesex County college. The course I teach transitioned to an online format during the pandemic so I have not had to commute to the school. I drive or bike to my retail job currently and did so prior to the pandemic as well. I took public transit once since the onset of the pandemic – "It's a great resource to have available."
- I use both Access Link and NJ TRANSIT bus and have continued using both during the pandemic. I use bus service to access an evening support group I lead in Montclair (#34 Bus) because Access Link cannot meet my schedule needs. I also use the bus to take trips to/from Newark and Caldwell. "I have completed the vaccine and feel more comfortable taking NJ TRANSIT than I had been feeling before."

Mr. Carnegie and Mr. Narvaez presented a series of three overarching headlines, 19 unique storylines, and close to 100 sub-stories and related facts to demonstrate the beneficial impacts of transit and then requesting participant feedback on each. They also shared that statistics communicated are based on pre-pandemic travel patterns.

As noted, each storyline presented fell under one of three headlines. Please note that in this session the facilitators opted to present those headlines in the reverse order of their presentation in sessions one and two, with the specific presentation order as follows: 1) benefits to people; 2) environmental benefits; and 3) economic benefits.

Benefits to People

People Storyline 1 – "NJ TRANSIT customers are diverse"

This infographic is the first of several that presents storylines demonstrating transit benefits related to people. The graphic presents multiple facts on a single topic. Participants made the following observations:

- Strong support expressed for this storyline:
    - "This is great – a colorful way to show the diversity of usage and users and if you appreciate numbers and stats you get a clear picture from what's going on and how it's nearly for everyone"
    - "Great colors"
    - "I think it looks great too"
    - "It made me more aware of the type of people that utilize NJ TRANSIT"
    - "When I finished reading it the point that you're trying to get across is very clear"
- "Looks pretty accurate based on what I see on transit" but where do you get the data? Mr. Carnegie responded the data is from NJ TRANSIT customer surveys.
- It might be interesting to add age data to the storyline
- Mr. Narvaez asked if anyone was confused by the usage of some of the same colors in various sections of the storyline because it was not the team's intention to communicate a connection among the different sections. One responded "I definitely had to re-read a couple of things." Another said the repetitive colors was not confusing to him.
- It's busy. Maybe tighten it up.
- The faceless icons used to depict gender give a feeling of "emptiness" - the "point of this educational paper is to make NJ TRANSIT feel full of diversity and full of people and having two empty figures doesn't do that." Consider using a pie chart instead to show the customer gender breakdown

People Storyline 2 – "NJ TRANSIT provides access to opportunity"

This infographic presents multiple facts on a single topic. Participants made the following observations:

- Strong support for this storyline expressed:
    - "I like this, it's very positive" - "Something about the fonts, it just kind of conveys the magnitude of the services that are provided"

    - "I like the font choices, they're bold"
    - "Somehow the way the numbers are pictured really conveys the strength of the system"
    - "Tells a compelling story"
    - "It's direct, it's to the point, it covers everything"
    - This storyline would appeal to someone who is considering moving to New Jersey, as they would "feel comfortable" knowing public transit services are available.
- One shared that the storyline might communicate too many statistics
- The fact communicated that "NJ TRANSIT is the 3rd largest transit system" is "not meaningful to me." Maybe instead show a map of NJ TRANSIT's service area to show comprehensive it is. Mr. Carnegie suggested that fact could be replaced with "NJ TRANSIT is the largest statewide transit system in the United States." Some preference was expressed for this proposed change shared by Mr. Carnegie.
- Mr. Carnegie asked if the group noticed the usage of NJ TRANSIT branding colors in the storyline. One participant responded that he noticed that "right away."

People Storyline 3 – "Did you know NJ TRANSIT is the largest statewide transit system, and the 3rd largest overall, in the United States"

This infographic presents a single fact on a single topic. Participants made the following observations:

- A mix of reactions were shared about this storyline. Positive feedback included:
    - "This is my favorite one so far because I didn't know the facts that are stated here," He added, "The strength is in the simplicity of it"
- Some confusion and suggestions for improvement were also expressed:
    - "Why the reference to other places? Are we trying to attract people from other places? To a certain degree its irrelevant. If I'm a NJ TRANSIT rider it's the quality of the service rather than how big or small we are relative to Washington, DC or Utah for that matter" Mr. Carnegie responded that the team was trying to give viewers a reference point for the magnitude of 5,325 square miles.
    - What does service area measure or mean?
    - "The graphic to me is not powerful, it's empty" - The dominance of white space in the storyline does not communicate extensive transit coverage

    - Consider communicating how many customers NJ TRANSIT serves and compare that figure to the number of customers served by DC Metro or the NY subway
- Mr. Carnegie reported that the team used a shadowed banner to help the storyline stand out and asked participants to confirm if the storyline did indeed stand out. One responded he didn't notice it, but said that it does provide "a little contrast."
- Mr. Carnegie asked what images or text in the infographic participants were drawn to upon first glance. One replied the white space, another mentioned the Chrysler building icon.
- Mr. Carnegie asked participants what geographies they think are included when they see the word "New York City." Most replied Manhattan.

People Storyline 4 – "NJ TRANSIT helps older adults and people with disabilities get around"

This infographic presents multiple facts on a single topic. Participants made the following observations:

- Overall support expressed for this storyline:
    - "I like the layout," "It's kind of refreshing," "Effective"
    - "Appears informative"
    - It's "warm and fuzzy," makes me think NJ TRANSIT is serving people who most need it
    - "I like the focus on the disabled"
    - The statistics may give persons in the community with disability who are apprehensive about traveling somewhere a comfort in using NJ TRANSIT
- Mr. Carnegie asked what images or text in the infographic participants were drawn to upon first glance. One responded he started with the headline and then proceeded to read the storyline from top to bottom. He then reviewed the orange-colored text to "see if it was relevant to me"
- Mr. Carnegie asked what the group thought of the $44 million statistic communicated. One responded that "it sounds like a big number when I look at it, especially in that big orange bold, but when I think about it relative to what the federal government spends on anything it seems really small." Another asked for clarification on the distribution formula to the counties of the $44 million.
- One participant suggested including an Access link vehicle image instead of fixed-route bus as currently depicted.

People Storyline 5 – "Attention Students"

This graphic presents a personal appeal. Participants made the following observations:

- Overall support for this storyline expressed:
    - The bolded 25% statistic presented "catches your eye"
    - "While I appreciate the message it doesn't apply to me"
    - "I thought it was good"
- One recommended altering the wording to say "if their school participates" instead of "when their school participates" to help make it seem more likely that a viewer's school perhaps participates in the program
    - Mr. Carnegie inquired if it would be helpful to change the wording that directs viewers to the link included in the storyline to say "Visit X link to see if your college participates in the discount program." The group supported that suggestion.
- One participant opined that even a 25% monthly pass discount is not a lot for low-income students. Mr. Carnegie responded that there are other programs available for low-income students.

People Storyline 6 – "NJ TRANSIT supports military veterans"

This graphic presents a personal appeal. Participants made the following observations:

- Overall support for this storyline was expressed:
    - "This is excellent"
    - "It's a good message, I didn't know this"
    - "The colors could be a little bit more appealing…but you know I appreciate the message." Mr. Carnegie asked if usage of red, white, and blue coloring would be preferred and one responded affirmatively. Another noted the color palette could use some "enhancement" as it's "pretty subdued"
    - Mr. Narvaez asked if the group would prefer to see a screenshot depicting how to access the discounted ticket. One responded it makes sense as is, "what needs to be done is very simple"

People Storyline 7 – "NJ TRANSIT improves safety by reducing crashes"

This graphic presents multiple facts on a single topic. Participants made the following observations:

- Overall support was expressed for this storyline:
    - "Catching," "Refreshing," "Powerful"

- "I like it, it's creative"
- "Personally, this appeals to me"
- "Sometimes I'll run across an opinion somewhere where someone says I don't use mass transit so why should I pay for it so this kind of reminds folks like that this is why you pay for it."

- One participant opined that "It seems like you are leading with a negative message" with the image of a car crash and fire. This participant added, "It's giving me the message that by me driving it's like I'm doing something that I shouldn't do." In response, Mr. Narvaez asked the group if they had suggestions for a different image that would demonstrate how NJ TRANSIT improves safety. One suggested communicating something positive like NJ TRANSIT helps you "get home safely." Another suggested using an image of a very dented car with a visibly aggravated driver standing next to it.
- Mr. Carnegie asked what images or text in the infographic participants were drawn to upon first glance. Responses were shared by a few and focused on the car crash image and the storyline banner
- Mr. Carnegie asked if participants accept the facts presented in the storyline or if they felt they needed to be verified. One replied that the facts presented seem "reasonable." In follow-up Mr. Carnegie asked if participants would like a link included the storyline to access more information on one or more of the statistics. One responded that a link would be helpful if the ad was displayed digitally, but if printed on a flier it would be unnecessary
- One participant suggested adding information to the storyline showing the average NJ auto insurance premium increase following a crash based on the statistics shown

<u>Environmental Benefits</u>

Environmental Storyline 1 – "NJ TRANSIT saves energy and reduces greenhouse gas emissions"

This infographic presents the first of several environmental benefit storylines shared. The graphic presents a simple fact on a single topic. Participants made the following observations:

- "The information is good, the color scheme could be better" - I like the usage of green and blue in environmentally-focused storylines, but not the color red
- I like the 1,000 Central Parks statistic included at the bottom of the storyline – that statistic provides a "strong ending"
- Several noted they would like more information on how the statistics presented were generated - "These numbers definitely make me look for a footnote" – I wonder about the methodology used to determine the 644,000 metric tons of

GHG emissions every year. Another mentioned the 72 million statistic. Mr. Carnegie responded that a link could be added.

- Mr. Carnegie asked if participants noticed some of the subtle components used in the storyline. Participants replied they noticed the full fuel gage image. They did not acknowledge noticing the smog or the 72 million figure included on the gas gage.
- Mr. Carnegie asked what images or text in the infographic participants were drawn to upon first glance. A few responded the full fuel gage.
- One participant suggested eliminating the mention of several specific NJ counties as a means to communicate the 840,000-acre statistic, as viewers may not be familiar with the geographic size of NJ counties

COMPONENT - Environmental Storyline 2 – "NJ TRANSIT means less pavement and less pollution"

This infographic was not presented to the other three groups. It represents a component that is included in the full Environmental storyline 2 discussed immediately after. Participants made the following observations:

- A lot to read through to get to the point – "You're trying to get to the basketball court as a reference and you gotta go through a couple of mazes"
- "The basketball court is intriguing and it makes it so you want to read through this story even if it is long"
- Grammatical correction suggested in the fact box on the far-left side – change "If everyone that uses" to "If everyone who uses"
- Mr. Carnegie asked if the group realized that the fact boxes where designed as parking spaces. "Eventually, yeah" one replied.

Environmental Storyline 2 – "NJ TRANSIT means less pavement and less pollution"

This infographic presents multiple facts on multiple topics and includes the component discussed immediately above. Participants made the following observations:

- "It's a good message…I'm glad this message is being conveyed"
- "Connects the message to something tangible"
- Mr. Carnegie asked if anything included in the storyline should be eliminated or shortened. Suggestions included:
    - Shorten the message in the upper portion of the infographic below the headline into one group of text

    - Merge the two bulleted facts in the storyline below the parking space section into one bullet. The participant suggested “Each year this additional parking would result in nearly 620 million gallons of stormwater runoff, which contains pollutants, including an estimated:”
- Mr. Carnegie asked what images or text in the infographic participants were drawn to upon first glance. One responded the headline.
- Mr. Carnegie asked for feedback on the water image presented in the lower-third of the storyline. One responded that the blue water caught his eye first. Another shared that he likes the water image as it ties into the message.
- “I give a thumbs up to the anvil”

Economic Benefits

Economic Storyline 1 – “NJ TRANSIT Employs over 11,000 People”

This infographic presents a simple single fact infographic. Participants made the following observations:

- The group acknowledged that overall they saw this storyline as positive
- “Uses the NJ TRANSIT colors, that’s good”
- Need to clarify the 19,000 jobs statistic. After Mr. Carnegie provided background detail on the statistics communicated, he indicated a link could be added to the storyline that would offer more detail to viewers.
    - One participant suggested presenting the two job-related statistics as a single statistic
- Mr. Carnegie asked for feedback on the icons used in the storyline. One responded that they are “simple and powerful.” Mr. Carnegie inquired if it would be helpful if a diversity of icons replaced the briefcase used in the right-side fact box. Those icons could demonstrate the diversity of jobs that spending on NJ TRANSIT generates, such as in the fields of construction, engineering, etc. Some of the group expressed support for this idea.
- Mr. Carnegie asked if participants would like to see the addition of a link for information on NJ TRANSIT job opportunities and how to do business with NJ TRANSIT. Several acknowledged that was a good idea.

Economic Storyline 2 – "NJ TRANSIT Generates Economic Activity"

This infographic also presents a simple single fact infographic. Participants made the following observations:

- The box that includes the $5 billion statistic should be designed to "stand out more," perhaps make it bigger
- Mr. Carnegie asked what images or text in the infographic participants were drawn to upon first glance. Several responded the train image and one mentioned the "For everyone $1" statistic.
- Mr. Carnegie asked if participants thought the statistics communicated were only associated with NJ TRANSIT train service. Mr. Carnegie clarified that the statistics include all NJ TRANSIT services. One suggested that a bus or light rail image should be added to make that message clear to viewers.
- One participant suggested that the dollar bill images should not be drawn to overlap one another since the message is trying to communicate growth and thus the bills shown should appear whole and large.
- Mr. Carnegie asked if the group noticed the "Did you know" bubble included in this storyline. Several responded affirmatively, expressing preference for the magenta-colored bubble instead of the multi-colored bubble, describing the former as "more appealing" and as "a lot more capturing, a more unusual color"
- Mr. Carnegie asked if anyone had difficulty with the phrase "economic activity" that is employed in the storyline. One noted he had no issue with it. Another said he found it "ambiguous" and suggested using "economic growth" instead.

Economic Storyline 3 – "NJ TRANSIT is Good for the Economy"

This infographic presents multiple facts about a single topic. Participants made the following observations:

- "It covers everything"
- One participant requested photos perhaps be used in some of the storylines, such as this one.
- "When I look at this I see two E's – 'e' for economy and 'e' for environment." He added, however, "the theme of this is economy but again when you go below, environment is shouting out." Mr. Carnegie acknowledged the comment and offered that the statistics in the lower-left fact boxes are often associated with the economy.
- Mr. Carnegie asked if anyone had difficulty with the two downward arrows included in the fact box with the two vehicles. Several replied that they did not understand the message communicated via those icons. The group discussed

options for communicating fewer cars. One suggested perhaps placing dashed lines around the car icons to indicate they are disappearing.

Economic Storyline 4 – "Public Transit Reduces Road Congestion

This infographic presents a simple single fact infographic. Participants made the following observations:

- Participants shared mixed feedback on this storyline. Positive feedback focused on comments such as "I actually like it, it's simple, it explains it, it gives it relative to what 1.5 billion miles equates to," "It's an important message and it's well-presented." Negative feedback included the sentiment "It didn't grab me" and "I read this and thought, so what?" One participant suggested perhaps communicating information on additional roadway potholes that would be created with the additional vehicle miles traveled without NJ TRANSIT service. He added that the storyline "needs some concluding statement that makes it meaningful. Otherwise we're just sponsoring road trips."
- Mr. Carnegie asked what images or text in the infographic participants were drawn to upon first glance. One responded and said the map graphic.
- Mr. Carnegie asked if participants would prefer replacement of the NYC to Los Angeles map and statistic with an image instead that shares a different calculation and reference point – specifically mileage from the earth to the moon. One responded and indicated preference for the NYC to Los Angeles statistic because it is easier to understand.

Economic Storyline 5 – "Public Transit Reduces Road Congestion" – Highway Travel Delays

This infographic also communicates a single, simple fact. Participants made the following observations:

- "This is good but I want to know how this relates to me personally." – To make the message more personally relatable and less "abstract", the participant suggested adding the average commute delays per driver, such as an additional 30 minutes per day. Another participant disagreed and stated, "That does mean something to me." Another similarly added, "We live in NJ, I think hours spent in traffic is a very relevant metric to us."
- Mr. Carnegie inquired if usage of the language "highway travel delays" was ok with the group. One responded and noted it was ok.
- Several comments were shared on the bottom portion of the storyline:
    - "It caught the eye"
    - Mr. Narvaez asked for feedback on the calendar image used in the bottom portion of the storyline. One participant suggested replacing the calendar

with what he described as “a red hot stopwatch,” that would be “burning red” and “combusting almost,” conveying the way most people feel in traffic.

- Several suggested the vehicles shown should be displayed in a manner communicating even more congestion – they should be shown “bumper to bumper”
- In response to feedback, Mr. Carnegie noted that perhaps the team could split the bottom section into three panels to make the message clearer – show one with lots of traffic; a middle pane could display the fact; and the right-side pane could show an image with no vehicular congestion

Economic Storyline 6 – “NJ TRANSIT Reduces Congestion” – Tunnel & Bridge Traffic Increase

This infographic presents multiple facts about a single topic. Participants made the following observations:

- “Yeah that’s good, that’s stressful just to look at. Can we go to the next one?”
- “This makes me very nervous. I did this for 16 years going across the George Washington Bridge.”
- Mr. Carnegie reminded the group that the calculations and statistics presented are based on pre-pandemic travel patterns and asked the group if they were ok with the storyline communicating pre-pandemic levels. The group noted they were fine with it. One added the team may have to update the statistics post-2021.
- Mr. Carnegie asked if the group noticed that the statistics are displayed in roadway-style signage. They responded in the negative.
- Mr. Carnegie noted that it is impossible for the traffic scenario presented to actually clear within 24-hours, as the tunnels/bridges could not accommodate the calculated increase in traffic presented in this infographic.
    - To help communicate this message, one participant suggested adding to each tunnel or bridge roadway sign the amount of time it would take a driver to reach NYC if NJ TRANSIT customers who travel into NYC daily decided to instead drive. For example, communicate that travelers would not arrive until “tomorrow.”

Economic Storyline 7 – “Did you know that NJ TRANSIT Increases Property Values”

This infographic communicates multiple facts about multiple topics. Participants made the following observations:

- “As a homeowner, I really wouldn’t want to see the bottom left-hand corner.” Overall group recognition that elements of this storyline will appeal to different audiences.
- The dark color of the house makes it seem almost “like it’s polluting.” This participant suggested that instead the house should be colored green. He also advised narrowing its width so that it would take on the shape of an upwards arrow, helping to denote “value creation” and generating a positive feeling among viewers.

Economic Storyline 8 – “NJ TRANSIT supports growth and development”

This storyline presents multiple facts about multiple topics. Participants made the following observations:

- Support expressed for this storyline:
    - “This is a more positive message than the one about property taxes [shown in the previous storyline]”
    - “I like this, it’s visually appealing to me. I think the color schemes are good, it’s not too font heavy or text heavy.”
    - “The message is good as you read into it”
- One participant requested that the team add some similar positive statistics related to how NJ TRANSIT supports growth and development in the southern region of the state
- One participant requested that the NJ TRANSIT ridership figures generated by the HBLR should be added

Economic Storyline 9 – “NJ TRANSIT connects New Jersey to the region and world”

This infographic presents multiple facts about a single topic. Participants made the following observations:

- Mostly positive feedback communicated:
    - This is a “positive message”
    - “This is why NJ TRANSIT is a valuable asset to us all”
    - “It’s a lot of information but it kind of tells the whole story”
    - “I like the airplane” graphic
- Request made to not use both annual and weekday daily metrics in the storyline as doing so could “obscure the message.”
- Mr. Carnegie asked if participants noticed the map of the USA as the background in this storyline and participants responded in the negative.

- One participant suggested removing the words “More than” which begin the text included in the four fact boxes and replace with a plus sign.
- One participant noted the inter-state transit travel focus of this storyline

Economic Storyline 10 – “NJ TRANSIT is good for the economy” - Tourism

This infographic presents multiple facts on a single topic. Participants made the following observations:

- “I appreciate the message, it is good for the economy, giving more people incentive to travel, on the weekend especially”
- “I like the colors, makes me think of summer”
- Empty beach looks “odd”
- One participant questioned how the $16 million figure was generated and would like a link or footnote added to the storyline to access more information
- Mr. Carnegie asked if the black text in the portion of the storyline within the ocean image was difficult to read. The group said it was not difficult to read.
- Mr. Carnegie noted the headline banner is beveled and asked if the group preferred this format to the shadow style. One responded that he prefers this beveled style.

Marketing Campaign Timing

Marketing campaign timing was not specifically discussed, but the group expressed interest and support for several of the storylines. Also, no one indicated during the course of the conversation that they felt discussing any of these transit benefits was inappropriate due to the ongoing pandemic.

Conclusion

This session’s participants were comprised of a cohort of eight New Jersey residents who were primarily NJ TRANSIT customers. Participants resided in one of six counties, with 50% from Essex and Middlesex counties. Half of the participants were age 55 or older, with one-quarter age 25-34. Fifty-percent identified as white or Caucasian, 38 percent identified as African American or black and one participant identified as Asian.

Participants briefly discussed their travel behavior during the COVID-19 pandemic. They noted travel pattern changes and overall reported that they have traveled less during the pandemic, with many sharing that they have been working remotely. Notably, three indicated that they continued using various NJ TRANSIT services regularly throughout the pandemic to reach work and other destinations. The remainder have been relying

primarily upon other transport modes to meet trip needs. Two mentioned they do not anticipate returning to transit anytime in the near future.

Participants shared positive and constructive feedback on the majority of storylines and facts presented. While there was clear support for storyline messaging and design that was easy for the reader to follow, participants were also supportive of storylines not designed to be a quick read and that required the viewer to spend more time to digest the content. Notably, this group expressed support for the most storylines compared to participants from the other three sessions. For example, they supported all but one of the people storylines and both of the environmental storylines. Also, some of the economic storylines that did not appeal to the business owners or non-transit riders held appeal to this group (Economic storyline 3,8,9). This group was also the only one to express overall positive feedback for People storyline 4, Environmental storyline 2, and Economic storyline 8. Finally, similar to the non-transit rider and elected official groups, they also requested verification for several of the facts and statistics presented in various storylines.

The 13 storylines that generated the most positive feedback on design and messaging were:

- People Storyline 1 – “NJ TRANSIT customers are diverse”
- People Storyline 2 – “NJ TRANSIT provides access to opportunity”
- People Storyline 4 – “NJ TRANSIT helps older adults and people with disabilities get around”
- People Storyline 5 – “Attention Students”
- People Storyline 6 – “NJ TRANSIT supports military veterans”
- People Storyline 7 – “NJ TRANSIT improves safety by reducing crashes”
- Environmental Storyline 1 – “NJ TRANSIT saves energy and reduces greenhouse gas emissions”
- Environmental Storyline 2 – “NJ TRANSIT means less pavement and less pollution”
- Economic Storyline 1 – “NJ TRANSIT Employs over 11,000 People”
- Economic Storyline 3 – “NJ TRANSIT is Good for the Economy”
- Economic Storyline 8 – “NJ TRANSIT supports growth and development”
- Economic Storyline 9 – “NJ TRANSIT connects New Jersey to the region and world”
- Economic Storyline 10 – “NJ TRANSIT is good for the economy” - Tourism

APPENDIX E4 – ELECTED OFFICIALS FOCUS GROUP

The NJ elected official focus group was convened virtually on Thursday, May 13, 2021 from 1:00 to 3:00pm using the Zoom platform. The primary purpose of this follow-up focus group was to gain insights and obtain feedback from NJ elected officials on the New Jersey-specific "storylines" developed by the research team for the planned marketing campaign focused on describing public transportation's contribution to quality of life in New Jersey. The team sought information on how these storylines resonated with the participants as elected officials and how they might resonate with their constituents. Impacts on participant travel behavior due to the ongoing COVID-19 pandemic was also discussed.

Several potential Phase 3 focus group dates were shared with all NJ elected officials who participated in a Phase 1 focus group session, with the meeting date selected based on participant feedback on the best date for the majority. Once confirmed, participants were sent an email with detailed information on the session date, time, and other logistic details related to joining the virtual meeting via the Zoom platform.

The focus group discussion was co-facilitated by Andrea Lubin (Rutgers Voorhees Transportation Center) and Kevin Narvaez (Envision Consultants). Stephanie Crozier, VTC, assisted. Each participant was welcomed upon arrival and a verbal consent form was read aloud by Ms. Lubin to the assembled group, which reminded participants of the purpose of the study and emphasized their rights as research subjects. She also provided an overview of the topics to be covered during the two-hour discussion. The verbal consent form was approved by the Rutgers University Institutional Review Board (IRB), which is part of the University's Human Subjects Protection Program (HSPP).

Participant Profile

A total of 8 individuals participated in the elected officials focus group, with four identifying as male and four as female. Three were senior staff representing a New Jersey Assembly member; five were New Jersey municipal elected officials. Participating state elected officials represented one of the following three legislative districts: 22, 33, or 36. Together, these districts cover multiple municipalities located in Bergen, Hudson, Middlesex, Somerset, and Union counties. Participating municipal elected officials heralded from the communities of Bloomfield (Essex County), Montgomery (Somerset County), Old Bridge (Middlesex County), Summit (Union County), and Toms River (Ocean County).

Discussion Summary

Ms. Lubin began the focus group by asking participants to introduce themselves, share the legislative district or NJ municipality they serve, and then discuss how the COVID-19 pandemic has impacted how they travel. Participants discussed both travel pattern

changes, as well as some mode changes. Overall participants reported that they have traveled less during the pandemic. Several noted the impacts of reduced transit ridership on their communities in the form of reduced usage of their commuter parking lots, which contributes to municipal revenue. Several also noted that while travel patterns and levels may not return to pre-pandemic conditions, they have noticed movement toward some more normal conditions overall. A few mentioned a return to some in-person meetings and events, as well as increased vehicular traffic on roadways.

Commentary shared on traveling during the pandemic included the following:

- I travel by car, and have traveled much less since the onset of the pandemic. We have not had regular legislative sessions in Trenton and have also had fewer events that we must attend. The assemblyman I represent was driving three-four times per month to Trenton prior to the onset of the pandemic, but that transitioned to only a few times during the past year due to the pandemic.
- I began this job with the assemblywoman two months ago and commute to the office by train four days a week. Overall I have driven less during the pandemic, especially after I began this job.
- I stay home. My wife works in NYC but has been remote since the pandemic onset and she does not plan on returning to commuting. Our town's transit commuter lots were 99-100% full in 2019, but were only at 15% capacity in the first four months of 2021. Commuter parking is a revenue generator for our community so we monitor this closely and are hopeful by September, as more children are vaccinated, parents will feel more comfortable traveling more frequently. We are uncertain though.
- I have worked from home the past 15 or so years. In my role as deputy mayor we have been convening township meetings and handling other municipal functions via Zoom during the pandemic. My wife is a lobbyist in Trenton and this is the first week she has traveled to Trenton in months. She is beginning to see the return of some in-person fundraisers. We have one NJ TRANSIT bus route that serves our community and I am not aware of how the pandemic has impacted that line's ridership. I do know that vehicular traffic in my area has been greatly reduced during the pandemic, especially noticeable during rush hour. I am not sure if people have really yet begun returning to in-person work.
- I work in the healthcare field with 11 hospitals statewide and have reduced my travel somewhat. I have had more virtual meetings during the pandemic. I have started to notice a return of vehicular traffic in recent days to my community in northern NJ. While we experienced a decrease in our commuter lot usage during the pandemic, we are beginning to see an increase. We have also experienced an influx of new residents relocating to our town from NYC "because we are on the train line" and perhaps they are anticipating returning to work in the city at some point.

We have seen “a huge decrease” in rail ridership in our community during the pandemic and the DeCamp bus line has stopped running completely, which is a significant issue because the line was heavily used by residents to directly access midtown Manhattan. One participant responded that no DeCamp buses are currently operating due to effects related to the pandemic.

- My commute has remained relatively the same during the pandemic, I travel five minutes to my office. However, I did work remotely for several months. I also have not been commuting to Trenton for meetings.
- I am retired so my travel patterns have not changed. Our community is along Route 9, where the #139 NJ TRANSIT bus operates and our commuter parking lots are only currently at about 15-20% capacity. “I’m waiting for the shoe to drop.” “We know NJ TRANSIT is going to go bankrupt…there’s no way they can be going this whole year without ridership.” “I think what we’re going to find out is that New York has found that maybe they’re not going to be the hub – the hub’s going to be at home.” “I don’t know if we’re going to get back to where we were.”

Ms. Lubin and Mr. Narvaez presented a series of three overarching headlines, 19 unique storylines, and close to 100 sub-stories and related facts to demonstrate the beneficial impacts of transit and then requesting participant feedback on each. They also shared that statistics communicated are based on pre-pandemic travel patterns.

As noted, each storyline presented fell under one of three headlines. Please note that in this session the facilitators opted to present those headlines in the reverse order of their presentation in sessions one and two, with the specific presentation order as follows: 1) benefits to people; 2) environmental benefits; and 3) economic benefits.

Benefits to People

People Storyline 1 – “NJ TRANSIT customers are diverse”

This infographic is the first of several that presents storylines demonstrating transit benefits related to people. The graphic presents multiple facts on a single topic. Participants made the following observations:

- Overall, there were several requests for inclusion of more detailed information:
    - Consider presenting NJ TRANSIT customer demographics by transit mode as that would tell a “totally different story.”
    - Consider adding a link to the storyline for information on NJ TRANSIT customers by county or region, as well as by transit mode as noted above
    - “For elected officials, the more information you can fit is helpful but it definitely needs to look good too”

- I don't like the information included in the text box on the top left, it is "repetitive" and "a little dumb."
- One noted that it might be relevant to include data on customer age via a pie chart or other graphic, while another responded that she was not certain if age is a relevant statistic to communicate because "everyone takes NJ TRANSIT."
- The gender information is not needed because NJ TRANSIT usage is relatively evenly split by gender
- Several suggestions were shared related to the race statistics communicated:
    - Consider communicating how the diverse races of NJ TRANSIT customers track with NJ population demographics - "If this was going to be targeted to representatives, state and local, then maybe if it was done, the race ridership pie chart side by side with the actual race pie chart then you would actually get a lot more information as to how they're tracking with each other."
    - The current presentation of multiple single person icons to communicate different races is difficult to follow and not so effective. There is too much to look at. "My eyes have to move all over the place to make any sense of this chart." Replace with a pie chart or just show the race legend without the people icons. Another approach is to show a single row of icons, with the colors varying by proportional representation of each race.
- When asked, the group noted that the usage of some of the same colors throughout the storyline was not confusing. One participant did advise that in creating these storylines overall that the team should consider that some viewers are color-blind and "with ADA being the law of the land we do have to accommodate for that."

People Storyline 2 – "NJ TRANSIT provides access to opportunity"

This infographic presents multiple facts on a single topic. Participants made the following observations:

- Overall support for this storyline although one noted it was "so busy"
    - "There are a lot of numbers on here but I think you've organized them well"
    - This is a "really good one"
- Mr. Narvaez asked what images or text in the infographic participants were drawn to upon first glance. Several remarked the map of the United States
- For consistency, consider removing the bus stop icon placed in the bottom half of the storyline, as similar icons are not used to depict commuter or light rail lines in that portion of the infographic

- Ms. Lubin asked if the group noticed the usage of NJ TRANSIT branding colors in the storyline. No one acknowledged noticing the usage of the NJ TRANSIT branded colors
- The group discussed the statistic in the top left of the storyline that says "NJ TRANSIT is the 3rd largest transit system in the United States." One shared that he did not mind that this fact is included, but requested it not be so prominently placed in the storyline. He added that the other two statistics in the top half of the storyline that provide information on NJ TRANSIT's service area and average weekday trips "gives me a certain context for the size of the system and then I'd rather just move on to the bus routes and the rail lines and the light rail lines"
    - Ms. Lubin suggested that the fact about NJ TRANSIT being the 3rd largest transit system in the US could be replaced with "NJ TRANSIT is the largest statewide transit system in the United States." One participant noted preference for the existing fact, noting it is more powerful.
- The storyline is very busy. Consider relocating the storyline banner to the middle of the storyline under the map of the USA, as that may help make the storyline easier to read by creating a focal point
- Consider limiting the number of fonts used to one-two, instead of using multiple fonts

People Storyline 3 – "Did you know NJ TRANSIT is the largest statewide transit system, and the 3rd largest overall, in the United States"

This infographic presents a single fact on a single topic. Participants made the following observations:

- Several remarked that they did not know what "service area" means as used in this context
- One asked if the storyline is seeking to compared NJ TRANSIT's service area with the service areas of the transit systems that serve NYC and Washington, DC or with the size of those cities. The team clarified the latter is correct.
- Ms. Lubin asked what images or text in the infographic participants were drawn to upon first glance. Several noted that the shadow-style banner was the first thing they noticed and that it "pops." One also shared that the storyline's white space is very prominent and he noticed that right away
- Consider extending the image of the Washington Capital outside the boundaries of the circle in which it is enclosed, similar to how the Chrysler Building and Statute of Liberty icons extend beyond the circle in which they are enclosed
- The 17 and 77-mile marker icons on the roadway are not really helpful

- Ms. Lubin asked participants what geographies they think are included when they see the word “New York City.” Responses were split – several remarked Manhattan and several responded the five boroughs

People Storyline 4 – “NJ TRANSIT helps older adults and people with disabilities get around”

This infographic presents multiple facts on a single topic. Participants made the following observations:

- Ms. Lubin asked what images or text in the infographic participants were drawn to upon first glance. Several said the bus. One noted that the bus image seems “cold” and “empty” because the window is opaque, with no driver or passengers visible.
- “Just a lot of text on this slide”
- Replace the senior citizen icon in the lower portion of the storyline who has a “strange beard and hair and clothing,” and “…get a better representation of the older population.”
- Why is a rail icon not included in the storyline? Mr. Narvaez clarified that this storyline is focused on NJ TRANSIT bus and Access Link service
- Mr. Narvaez inquired what the group thought of the $44 million statistic communicated, asking if it sounds like a significant amount of money. One responded that “As someone who works in state government and you know we are dealing with a $44 billion budget this year that’s not a lot of money, and that kind of makes me sad.” She added, “We could totally be giving more money.” Another noted that the budget for his town of 23,500 residents is $29 million, so the $44 million statistic for statewide community transit services does not seem large.

People Storyline 5 – “Attention Students”

This graphic presents a personal appeal. Participants made the following observations:

- Overall support for this storyline expressed:
    - It’s an “attention grabber”
    - “I definitely appreciate how simple this one is”
    - The group acknowledged this storyline would appeal to their constituents
- Clarify if participating colleges include any schools in neighboring states like NY and how many colleges overall participate
- Ms. Lubin inquired if it would be helpful to change the wording that directs viewers to the link included in the storyline to say “Visit X link to see if your college participates in the discount program.” One participant suggested instead stating “85 NJ colleges participate. Click link to see if yours is one of them.”

People Storyline 6 – "NJ TRANSIT supports military veterans"

This graphic presents a personal appeal. Participants made the following observations:

- Overall support for this storyline's message, but various changes were requested as noted below.
- Two participants expressed what they described as a "disconnect" between the banner language "NJ TRANSIT supports military veterans" and the storyline text that describes eligibility for the discount program but does not specifically mention "veterans." Eligibility clarification is needed. One suggested changing the banner to read "NJ TRANSIT supports Military personnel and veterans"
- Ms. Lubin asked for feedback on the colors used. One described them as "so subdued" and "somewhat offensive." Ms. Lubin asked if usage of red, white, and blue coloring would be preferred. One responded affirmatively but another explained it doesn't matter what color palette is used – what matters is that the colors and graphics make the storyline "eye popping," so that veterans take notice and can take advantage of this discount "that they deserve."
- In addition to the silhouette of the marine currently shown, consider including some additional icons to represent service people, including females, from the five branches. Another idea is to utilize the circular military icons that represent the five branches of the US military.

People Storyline 7 – "NJ TRANSIT improves safety by reducing crashes"

This graphic presents multiple facts on a single topic. Participants made the following observations:

- Ms. Lubin asked what images or text in the infographic participants were drawn to upon first glance. Several noted the car crash image. One mentioned that only one car shows visible damage and another added it doesn't really look like they crashed, but rather that "a bomb went off behind them."
- Several requested that the message be framed in a more positive manner – "I don't love how it's framed, like if you stopped, then this would happen." She added it would sound better if instead the message was "Because so many people use NJ TRANSIT, we have 7,000 less crashes that we could have." Another suggested calculating additional statistics that demonstrate "If another X people used NJ TRANSIT, there would be X less crashes on the road." He added that message could incentivize people to use NJ TRANSIT services
- In line with the requests to employ more positive messaging, it was suggested that the car crash be replaced with a more positive safety-related image. One suggested that the crash graphic be placed on the side of the storyline and a bus with riders traveling by the crash be added to demonstrate how the bus continues to travel by the accident, getting riders safely and happily to their destination.

- Consider adding a link to explain how the statistics were generated, “if you want people to really believe in the numbers.”
- One pointed out the “Did you know” bubble included in this storyline and asked if it was a link for more information. Mr. Narvaez responded it is included in each storyline and is not currently a link.

Environmental Benefits

Environmental Storyline 1 – “NJ TRANSIT saves energy and reduces greenhouse gas emissions”

This infographic presents the first of several environmental benefit storylines shared. The graphic presents a simple fact on a single topic. Participants made the following observations:

- “Again your throwing numbers up, where do they come from?” Include a link or footnote with information on how the statistics were generated. Or consider adding more clarifying detail in the storyline. As one noted however, “the more facts the better, but if someone is not going to believe these numbers on their face then they’re probably not going to click on the link either.”
- “I don’t know if I love the gas gage. It just keeps grabbing my attention because maybe the size of it and the smoke around it, but it doesn’t really get me too far as far as the message.”
    - The gas gage image should show the tank as empty, which would be more powerful
    - Several noted they did not associate the 72 million pictured in the gas gage with the 72 million statistic of fewer gallons of gas consumed
- One requested that the emission smoke surrounding the gage be drawn darker or more in focus because it is “very muted the way it is.”
- Replace the image of Central Park at the bottom of the storyline with an image of trees
    - We should not use NYC landmarks, even though many are familiar, because the storyline focus is NJ TRANSIT
    - Replace the image of Central Park with a NJ map that highlights the seven counties listed in the storyline to demonstrate what proportion of the state is equivalent to the 840,000-acre statistic. That might be more effective

Environmental Storyline 2 – "NJ TRANSIT means less pavement and less pollution"

This infographic presents multiple facts on multiple topics and includes the component discussed immediately above. Participants made the following observations:

- "This is a lot of information but it's interesting information because I've never even thought about this, and I am someone who takes the train a lot now, so this would be awesome to share because I don't think people would think about this and I know I definitely haven't."
- Several requests to make the message more positive. Replace "If everyone that uses NJ TRANSIT today were to start driving tomorrow…" with "Because people use NJ TRANSIT we've saved 30-50,000 parking space in NJ."
- Ms. Lubin asked what images or text in the infographic participants were drawn to upon first glance. One noted the anvil, another said the car images. The group acknowledged recognizing the fact boxes were designed as parking spaces
- Several requested the replacement of the basketball court reference with a football field reference, explaining people do not associate basketball courts as significantly large and a football field would be more appealing
- It is not clear if the icons shown at the bottom of the storyline are all generated by stormwater runoff due to people not taking NJ TRANSIT. Mr. Narvaez clarified the message being communicated is that the additional parking spaces that would be constructed if NJ TRANSIT was eliminated would generate the stormwater runoff described in the bottom portion of the storyline. Mr. Narvaez asked if the group felt those icons were necessary to include. One responded and several agreed that the icons should remain with a "red X" placed over each, to show that these pollutants "are not there because of NJ TRANSIT," which is a positive message.
- Several requested that the water in the lower third of the storyline be colored brown or at least less "pristine" to communicate pollution – "when our roads flood it doesn't look like that." Another suggested making the water a darker green color, more like "ocean water."

Economic Benefits

Economic Storyline 1 – "NJ TRANSIT Employs over 11,000 People"

This infographic presents a simple single fact infographic. Participants made the following observations:

- Overall support for this “positive” storyline was expressed – “Very good,” “It’s awesome”
- Where do the statistics come from? Ms. Lubin indicated a link could be added to the storyline that would offer more detail on the 19,000 statistic to viewers
- Replace the suitcase icon with icons that demonstrate the diversity of jobs that spending on NJ TRANSIT generates, such as food vendors, construction, etc. Another shared that use of the briefcase makes him think of passengers using the service to commute
- Ms. Lubin asked if participants would like to see the addition of a link for information on NJ TRANSIT job opportunities and how to do business with NJ TRANSIT. Several acknowledged that was a good idea
- Support expressed for the magenta-colored ‘Did you know’ icon included in all the storylines instead of the multi-colored one. One remarked that the placement of the ‘Did you know’ icon seems “randomly placed” in certain storylines, which is not helpful

Economic Storyline 2 – “NJ TRANSIT Generates Economic Activity”

This infographic also presents a simple single fact infographic. Participants made the following observations:

- Support expressed for this storyline - “It’s very simple”
- I didn’t realize that after reading “For every $1 invested in NJ TRANSIT” that I should next read the phrase “$2 is generated in economic activity.” Make the connection between these two phrases clearer to the viewer by combining them into one sentence
- Ms. Lubin asked what images or text in the infographic participants were drawn to upon first glance. Most noted the dollar bills and the text surrounding the dollar bills
- Mr. Narvaez asked if participants thought the statistics communicated were only associated with NJ TRANSIT train service and he clarified that the statistics include all NJ TRANSIT services. Several noted they assumed all NJ TRANSIT services were included, but one was uncertain
- Ms. Lubin asked if anyone had difficulty with the phrase “economic activity” that is employed in the storyline. One responded “I’ve never known what that meant.” Another said “growth sounds more compelling,” but then inquired if using the term growth would be accurate
- Request for the addition of a link for those interested in the source of the statistics presented. Another responded to this request by explaining, “I think most folks are just interested in getting to where they need to go on time”

Economic Storyline 3 – "NJ TRANSIT is Good for the Economy"

This infographic presents multiple facts about a single topic. Participants made the following observations:

- The group expressed very strong support for this storyline
    - "I really like the graphic, it divides everything into boxes, it's neat"
    - "All the stats are very compelling"
    - "Concise," "Helpful," "It really summarizes all the benefits of NJ TRANSIT"
    - This storyline provides more information and has a positive tone
- "I think you need to work on the icons in each one of these pictures"
    - The downward arrows used in the 140,000 fact box are "confusing"
    - The $5 billion fact is about generating money, but usage of a piggy bank icon in that fact box communicates money saved, which is not the correct message
    - The person icon carrying a suitcase used to portray the 11,000 NJ TRANSIT jobs statistic is not reflective of many NJ TRANSIT workers. Consider showing a conductor image or a person wearing a hard hat
    - The icon of the cars at a stop signal used in the 1.5 billion fact box does not communicate vehicle miles of travel saved. Instead show that image or the 1.5 billion statistic in a circle with a large 'X' through the circle
- Consider un-bolding the key statistics colored in orange that head each of the six boxes so that they flow more clearly with the text immediately below each. For example, in the first box, you could say "11,000 is the number of jobs NJ TRANSIT provides…"

Economic Storyline 4 – "Public Transit Reduces Road Congestion

This infographic presents a simple single fact infographic. Participants made the following observations:

- Communicate this message more positively – Instead of "Without NJ TRANSIT" say "NJ TRANSIT saves an additional 1.5 billion…"
- Write 'x 1.5 billion' over the travel line shown in the map to communicate the message of vehicle miles traveled
- Correct the destination point for Los Angeles on the map as it is too far north as currently depicted

- Ms. Lubin asked what images or text in the infographic participants were drawn to upon first glance. Several replied the map graphic and one noted the “1.5 billion” statistic
- Ms. Lubin inquired if the group would prefer the map depict the driving distance between NJ and Los Angeles. The group responded affirmatively, with one stating “we’re not selling NY, we’re selling NJ”
- Mr. Narvaez asked if participants would prefer replacement of the NYC to Los Angeles map and statistic with an image instead that shares a different calculation and reference point – specifically mileage from the earth to the moon. One said that was would be “ok,” but no preference for the earth to moon reference point was expressed. Another noted preference for the NYC or NJ to Los Angeles statistic because it is easier to relate to, especially if you have made that trip before

Economic Storyline 5 – “Public Transit Reduces Road Congestion” – Highway Travel Delays

This infographic also communicates a single, simple fact. Participants made the following observations:

- “Again, they’re always negative” – request to communicate the message in a more positive manner
    - To make the storyline more positive and personally relatable to commuters, add a statistic on how much time each person saves in traffic delays due to NJ TRANSIT
- “It also took me a second to realize you were talking about travel delays and saved time.”
- One noted a delayed reaction to understanding that the cars depicted are following the rules of the road. She suggested changing the solid white traffic line in the image in the lower right to the color yellow, to reflect the two-way traffic flow depicted
- The group suggested the calendar image be replaced with a clock, hourglass, or another symbol more relatable to commuting
- The group discussed usage of the phrase “highway travel delays.” One shared that when he read the phrase ‘travel delays, he thought about transit-related delays he has experienced. The group suggested replacing with “traffic delays,” as “Everybody understands that.”

Economic Storyline 6 – “NJ TRANSIT Reduces Congestion” – Tunnel & Bridge Traffic Increase

This infographic presents multiple facts about a single topic. Participants made the following observations:

- Mostly supportive comments shared for this storyline:
    - "These are shocking facts that definitely should encourage everyone to use public transportation"
    - This storyline may help to generate support among the public for construction of the new trans-Hudson tunnels.
    - The delays communicated in the highway signs were "eye catching" and clearly convey the message
- One noted she didn't understand what "500%" increased traffic at the Lincoln Tunnel is really communicating and suggested replacing it with "6x" to communicate the traffic increase instead
- Ms. Lubin reminded the group that the calculations and statistics presented are based on pre-pandemic travel patterns and asked the group if they were ok with the storyline communicating pre-pandemic levels. All responded yes. One suggested making the footnote that communicates this information visually clearer and adding the year that the statistics are from in place of saying "pre-pandemic."
- Ms. Lubin asked if the group noticed that the statistics are displayed in roadway-style signage. They responded yes, with one noting "that was effective"
- Request for the addition of a link for those interested in the source of the statistics presented – "how did they arrive at these numbers?"
- One shared that this message made him think that "If NJ TRANSIT shut down today it would be its own pandemic...New York City could not exist as the employment hub of the area."

Economic Storyline 7 – "Did you know that NJ TRANSIT Increases Property Values"

This infographic communicates multiple facts about multiple topics. Participants made the following observations:

- Limited comments were shared on this storyline
- One shared that the information communicated on increased property values is "so true"
- "You probably don't want to show that one down by me in Ocean County, cause we're a little jealous" – was a comment made reflecting on the limited rail service in the southern region of the state
- Ms. Lubin asked if the group liked the colors used in this storyline. All responded affirmatively and one suggested removal of the bird bath icon included in the lower right portion of the storyline, noting "it just doesn't fit."
- Ms. Lubin asked for feedback on the statistic included in the lower-left portion of the storyline in terms of how it would appeal to their constituents. The group

responded the message would not be appealing. One explained, “I think they’re going to think they are paying a lot of extra real estate taxes because the value of their house went up because of the train.” Another said “I would just stay away from it.”

Economic Storyline 8 – “NJ TRANSIT supports growth and development”

This storyline presents multiple facts about multiple topics. Participants made the following observations:

- Support not expressed for this storyline that focuses on local development and growth, as residents tend to associate such growth with overcrowding and gentrification that forces lower-income residents to relocate. A Hudson County participant shared, “all we hear about is there’s too many freaking people here.” Another shared that this message will not appeal to Bergen County residents because they have been waiting for almost 20 years for the HBLR’s extension into the county. Still another remarked “anytime you talk in local government, you start talking about development and people are like, lose their minds.”
- Ms. Lubin asked if anyone noticed the incorporation of the HBLR logo and light rail signage in the storyline. One said when he first saw the logo he thought it was a “church steeple.” Another noted she only noticed the NJ TRANSIT light rail logo located at the bottom left of the storyline after Ms. Lubin mentioned it and opined that it is hard to see because the font is so thin and it looks faded
- Request to make the housing icons look more reflective of the housing stock located along the HBLR

Economic Storyline 9 – “NJ TRANSIT connects New Jersey to the region and world”

This infographic presents multiple facts about a single topic. Participants made the following observations:

- Mostly positive feedback communicated:
  - “I like this one, it’s cool”
  - “It really shows that New Jersey is a hub for the rest of the world and that NJ TRANSIT is a big part of that.”
- Request made to not use both annual and weekday daily metrics in the storyline as doing so is confusing. Preference expressed for use of annual statistics.
- Request to enlarge the footnote that indicates these statistics are pre-pandemic

Economic Storyline 10 – "NJ TRANSIT is good for the economy" - Tourism

This infographic presents multiple facts on a single topic. Participants made the following observations:

- Support communicated for this storyline:
  - "It's very visually appealing for sure"
  - "The plane with the banner, like that's such a Jersey shore thing, so that's awesome, I really like that"
  - "Nice graphics, I like the sailboat, the umbrella and the beach chairs, and the banner plane"
  - "It's very calming"
- Enlarge the footnote in the lower left that cites the source of these statistics
- One mentioned that a great deal of the Jersey Shore is located beyond the last stop on the North Jersey Coastline, so this storyline is "cutting out a big chunk of the Jersey Shore." In response, another participant suggested that the storyline perhaps specify that the North Jersey Coastline serves beach communities located in Monmouth and northern Ocean Counties
- Request to create a storyline highlighting tourism related to the NJ TRANSIT Atlantic City Line. Ms. Lubin shared that the team has generated the statistics for that storyline but has not yet developed the infographic
- One asked "Do you think people really care about this or is this just for a sales pitch in north Jersey and New York City?"
- Ms. Lubin asked if the black text in the portion of the storyline within the ocean image was difficult to read. The group said it was not difficult to read, with one adding that the white-colored text outline makes it very visible. Another suggested changing the color of the text in the ocean to a bolded white to determine if that makes the text "pop"
- Enlarge the two clouds to better accommodate the text within each. As it is, the text is too close to the edge of the clouds
- Consider making the text in the banner being pulled by the plane similar in color and font to the text used in actual Jersey shore plane banners. For example, they often use red-colored font

Marketing Campaign Timing

Marketing campaign timing was briefly discussed and the group was fully supportive of discussing any of these transit benefits now, during the ongoing pandemic. When asked if they felt it was appropriate to do so, one responded "absolutely." Another explained

that “part of returning to normal is using things like mass transit to get to where you want to go.”

Conclusion

This session’s participants were comprised of a cohort of eight NJ elected officials, with four identifying as male and four as female. Three were senior staff representing a New Jersey Assembly member; five were New Jersey municipal elected officials. Participating state elected officials represented one of the following three legislative districts: 22, 33, or 36. Together, these districts cover multiple municipalities located in Bergen, Hudson, Middlesex, Somerset, and Union counties. Participating municipal elected officials heralded from the communities of Bloomfield (Essex County), Montgomery (Somerset County), Old Bridge (Middlesex County), Summit (Union County), and Toms River (Ocean County).

Participants briefly discussed their travel behavior during the COVID-19 pandemic. They discussed both travel pattern changes, as well as some mode changes. Overall participants reported that they have traveled less during the pandemic. Several noted the impacts of reduced transit ridership on their communities in the form of reduced usage of their commuter parking lots, which contributes to municipal revenue. Several also noted that while travel patterns and levels may not return to pre-pandemic conditions, they have noticed movement toward more normal conditions overall.

Participants shared a mix of positive and constructive feedback on the storylines and facts presented. Compared to participants from the other three sessions, the elected official group expressed strong preference for fewer of the storylines and made two key requests that were repeated often 1) Frame the storyline and messaging in as positive a manner as possible; and 2) Provide a link or footnote to source/offer information on the statistics presented. Also interesting, they expressed support for the greatest number of economic storylines (six total) as compared to the participants from the other three groups. They did not express strong preference for either of the environmental storylines. They were also the only group to express strong support for Economic storyline 2.

The 9 storylines that generated the most positive feedback on design and messaging were:

- People Storyline 2 – “NJ TRANSIT provides access to opportunity”
- People Storyline 5 – “Attention Students”
- People Storyline 6 – “NJ TRANSIT supports military veterans”

- Economic Storyline 1 – “NJ TRANSIT Employs over 11,000 People”
- Economic Storyline 2 – “NJ TRANSIT Generates Economic Activity”
- Economic Storyline 3 – “NJ TRANSIT is Good for the Economy”
- Economic Storyline 6 – “NJ TRANSIT Reduces Congestion” – Tunnel & Bridge Traffic Increase
- Economic Storyline 9 – “NJ TRANSIT connects New Jersey to the region and world”
- Economic Storyline 10 – “NJ TRANSIT is good for the economy” - Tourism

APPENDIX F

Marketing Research for the Quantifiable Benefits of Transit in New Jersey

FINAL TRANSIT BENEFITS MARKETING CAMPAIGN INFOGRAPHICS

Visual Reference of Final Deliverable Materials 02/09/2022

INFOGRAPHIC TYPE	*Storybook*	*Social Media*		SUM
	8.5x11	1080x1080	1200x600	
ECONOMY (E)	8	17	3	28
PEOPLE (P)	10	11	2	23
ENVIRONMENT (EV)	3	9	1	13
	21	37	6	64

ECONOMY

8 – Storybook 8.5x11 infographics

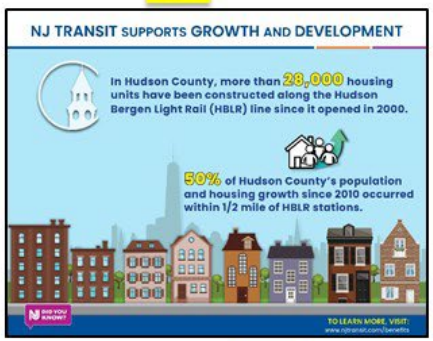
20 – Social infographics

NJ TRANSIT is good for the ECONOMY – Storybook (8.5x11 Infographics)

E.1

E.2

E.3



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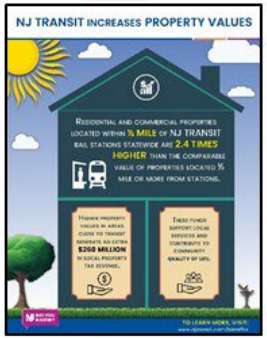
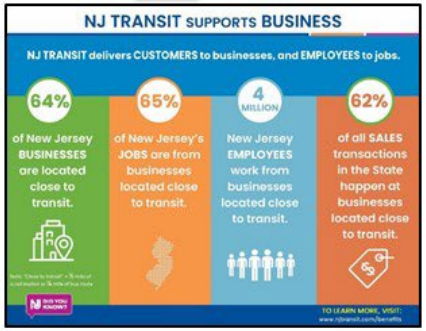


E.5

E.6



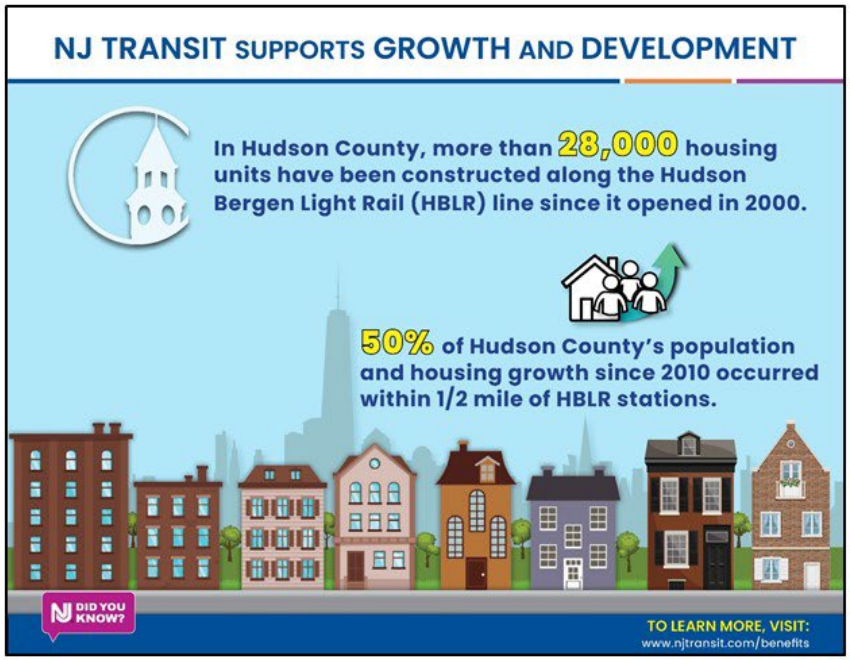
E.7

E.8

E.1 8.5x11 Infographic #1

E.2 8.5x11 Infographic #2

E.3 8.5x11 Infographic #3



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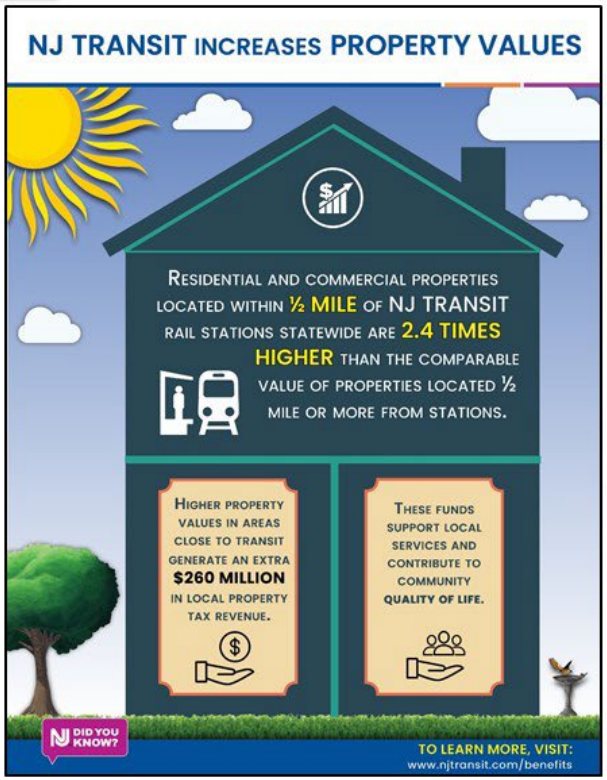
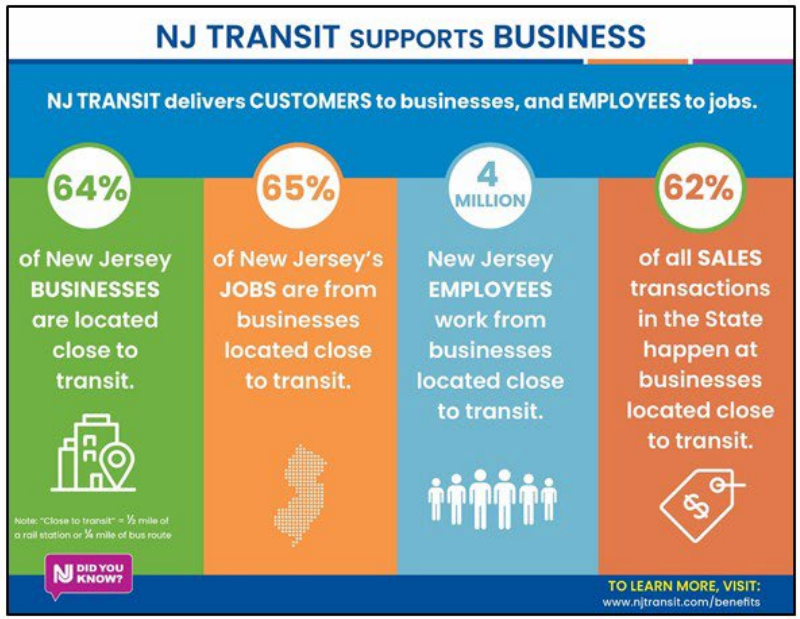


E.5 8.5x11 Infographic #5

E.6 8.5x11 Infographic #6



E.7 8.5x11 Infographic #7

E.8 8.5x11 Infographic #8

Social Media

Economy

SOCIAL MEDIA

E.1.1

1080 x 1080 - Social

E.1.2

1080 x 1080 - Social

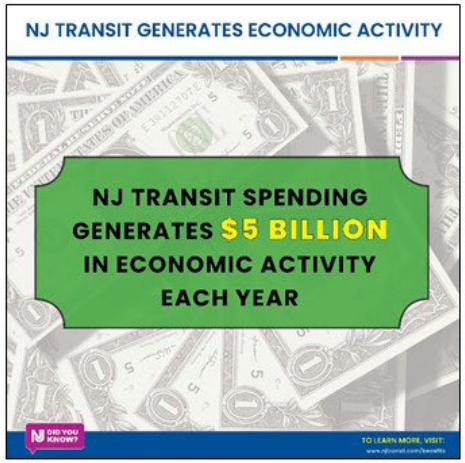
E.1.3

1200 x 600 - Social

SOCIAL MEDIA

E.1.4

1080 x 1080 - Social

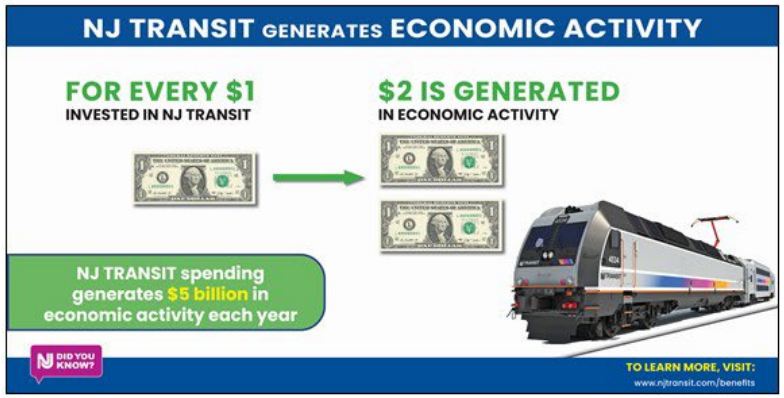


E.1.5

1080 x 1080 - Social

E.1.6

1200 x 600 - Social



SOCIAL MEDIA

E.2.1

1080 x 1080 - Social

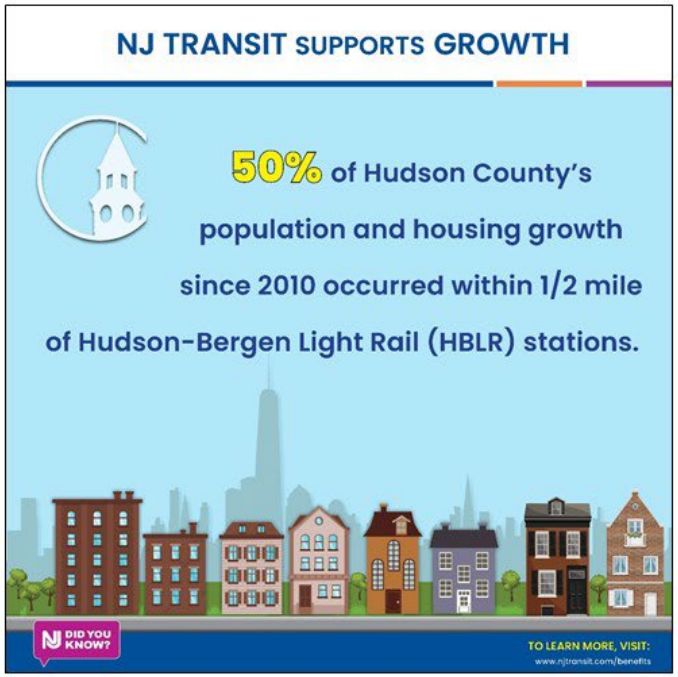
E.2.2

1080 x 1080 - Social

SOCIAL MEDIA

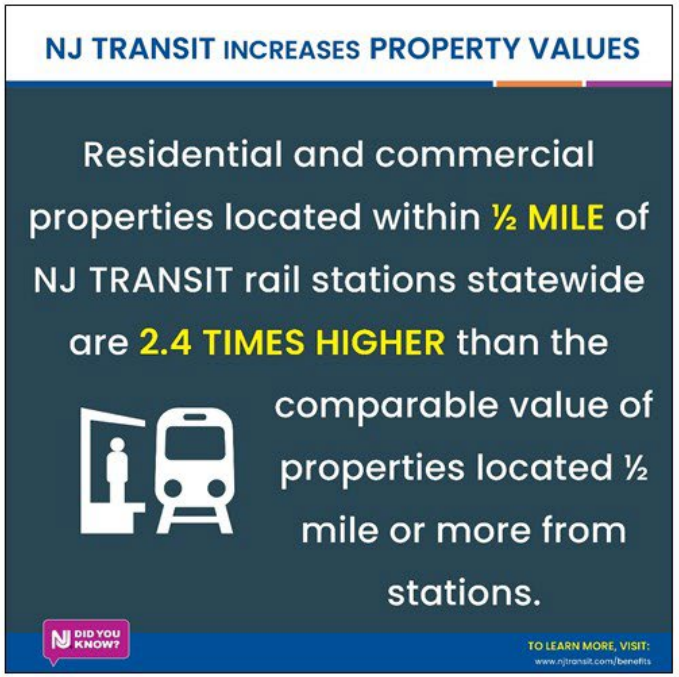
E.3.1

1080 x 1080 - Social



E.4.1

1080 x 1080 - Social



SOCIAL MEDIA

E.5.1

1200 x 600 - Social

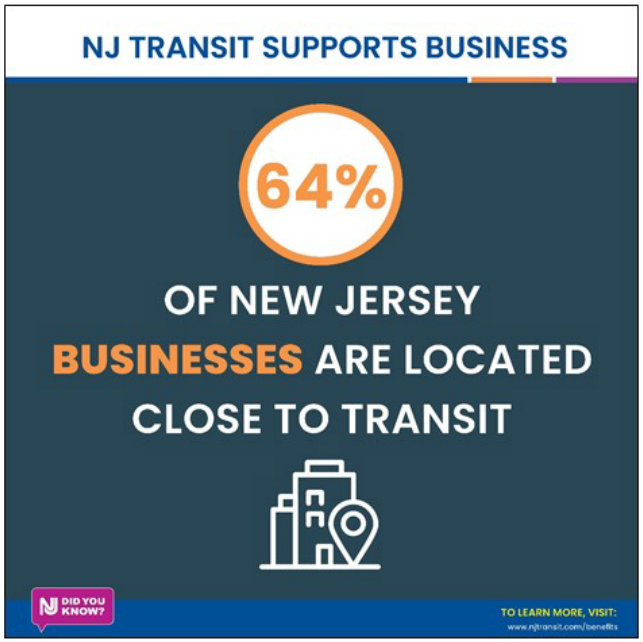
E.5.2

1080 x 1080 - Social

SOCIAL MEDIA

E.6.1

1080 x 1080 - Social



E.6.2

1080 x 1080 - Social

SOCIAL MEDIA

E.6.3

1080 x 1080 - Social

E.6.4

1080 x 1080 - Social

SOCIAL MEDIA

E.7.1

1080 x 1080 - Social

E.7.2

1080 x 1080 - Social

SOCIAL MEDIA

E.8.1

1080 x 1080 - Social

E.8.2

1080 x 1080 - Social

NJ TRANSIT is good for PEOPLE

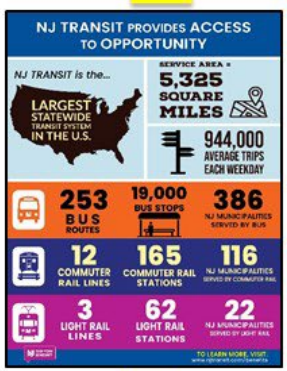
10 – Storybook 8.5x11 infographics

13 – Social infographics

NJ TRANSIT is good for PEOPLE – Storybook (8.5x11 Infographics)

P.1

P.2



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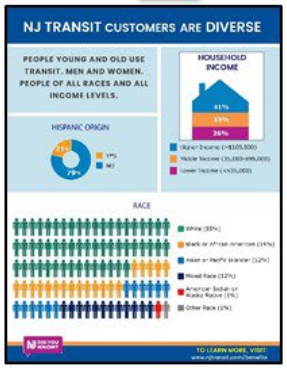

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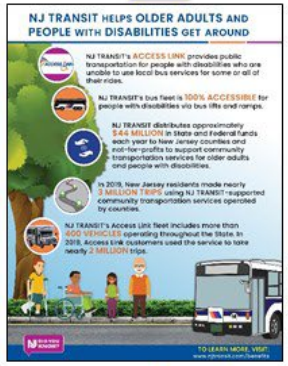

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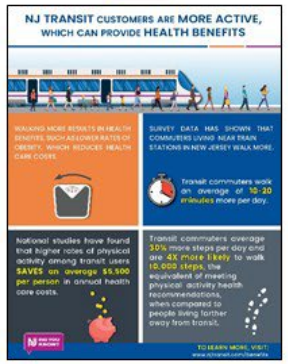
P.6



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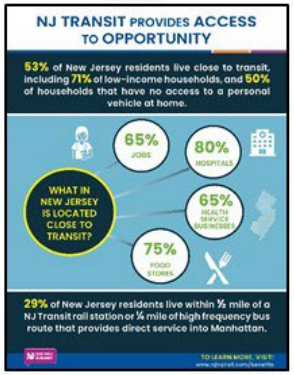
P.8



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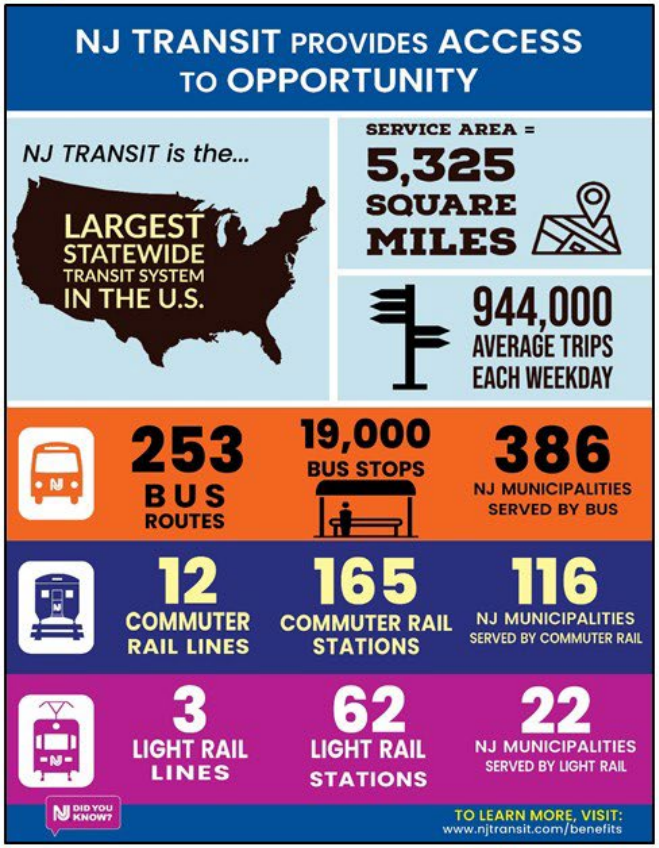
P.10

P.1 8.5x11 Infographic #1

P.2 8.5x11 Infographic #2



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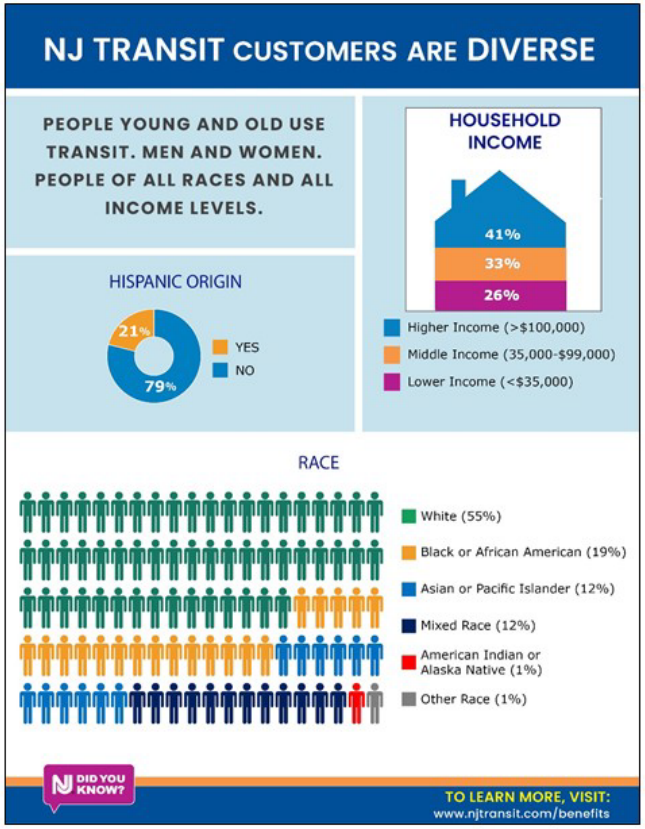

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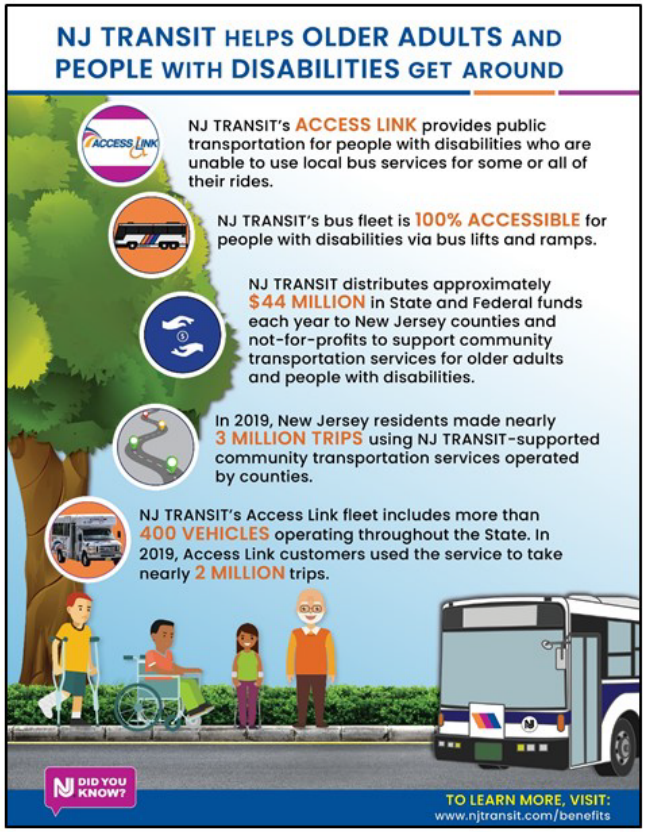

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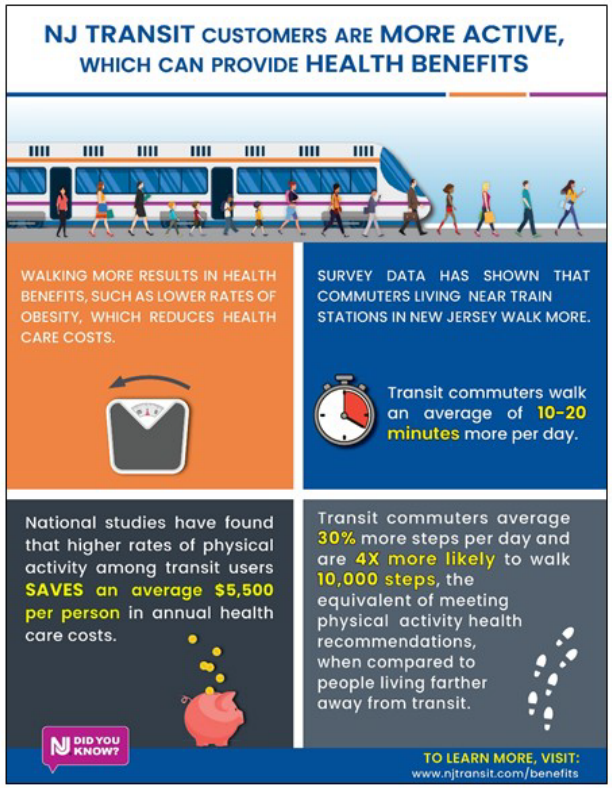
P.6 8.5x11 Infographic #6



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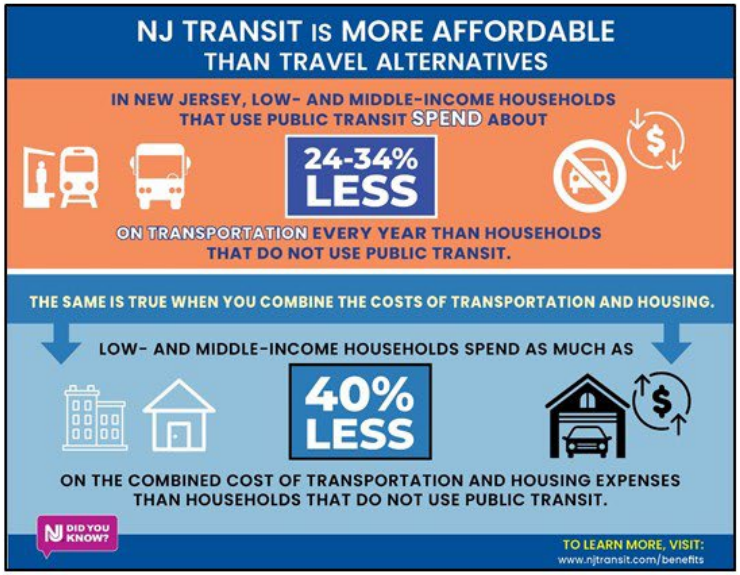

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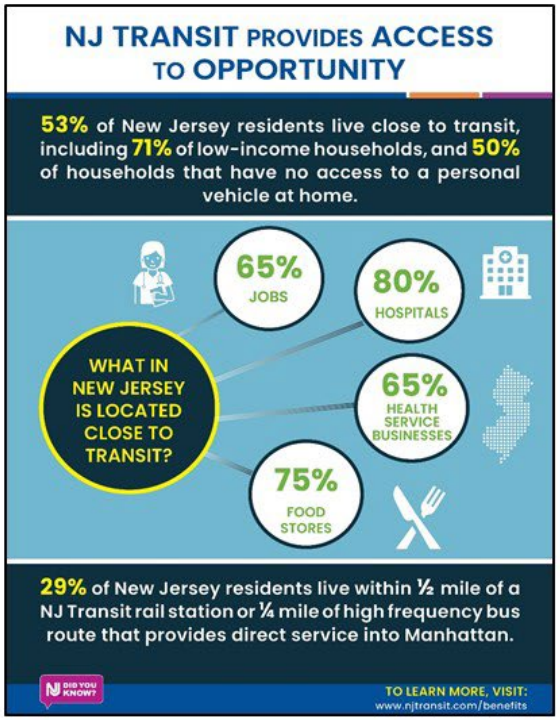


P.9 8.5x11 Infographic #9

P.10 8.5x11 Infographic #10

Social Media

People

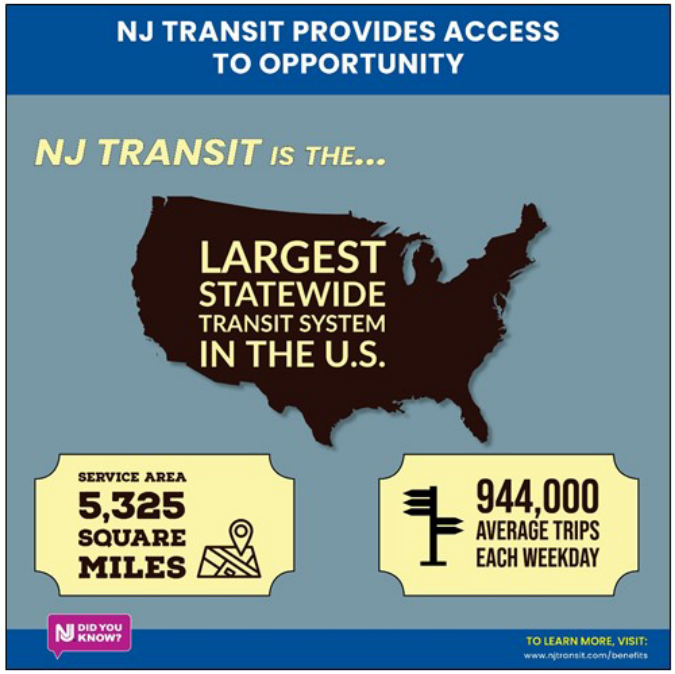
P.1.1

1200 x 600 - Social

SOCIAL MEDIA

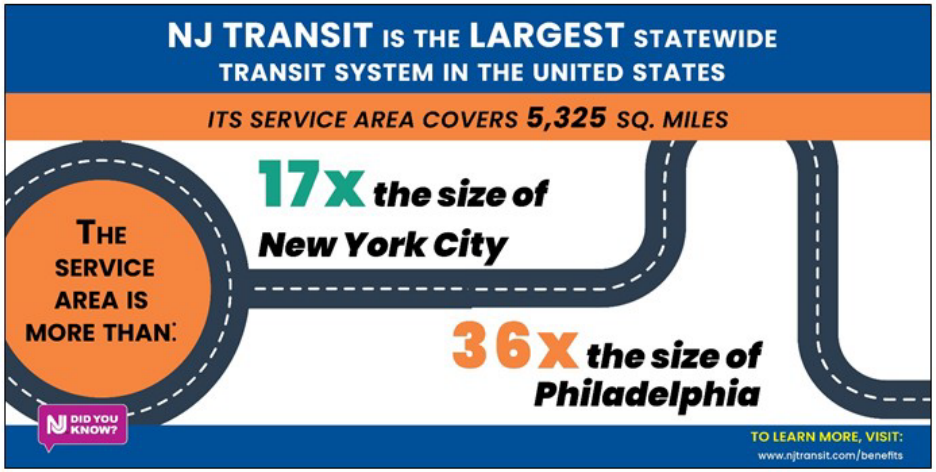
P.2.1

1080 x 1080 - Social



P.2.2

1200 x 600 - Social



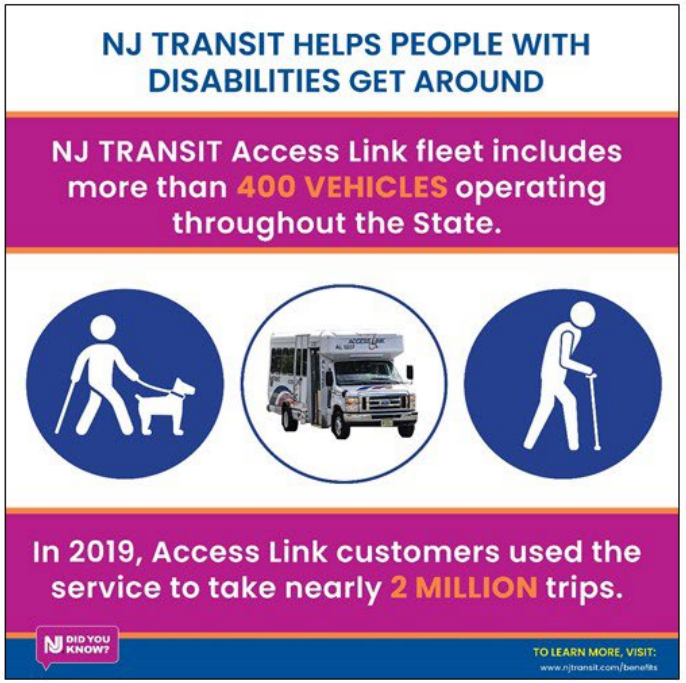
SOCIAL MEDIA

P.4.1

1080 x 1080 - Social

P.4.2

1080 x 1080 - Social



SOCIAL MEDIA

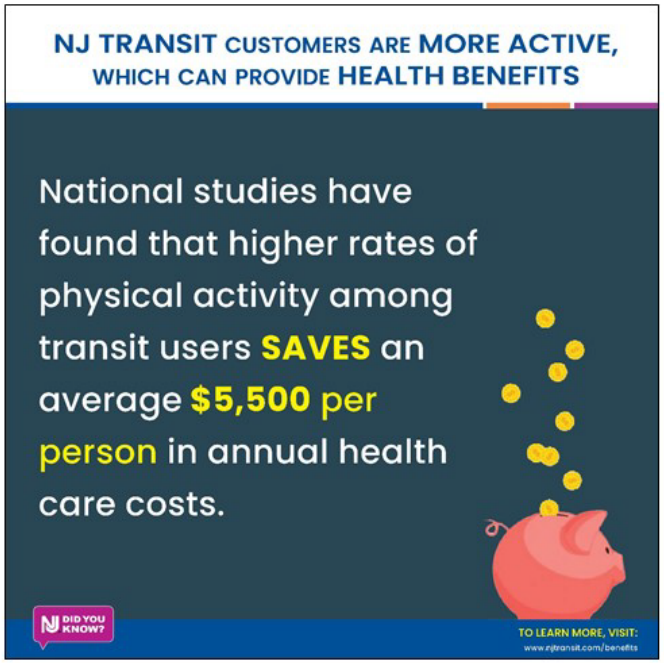
P.5.1

1080 x 1080 - Social

SOCIAL MEDIA

P.6.1

1080 x 1080 - Social



P.6.2

1080 x 1080 - Social

SOCIAL MEDIA

P.7.1

1080 x 1080 - Social

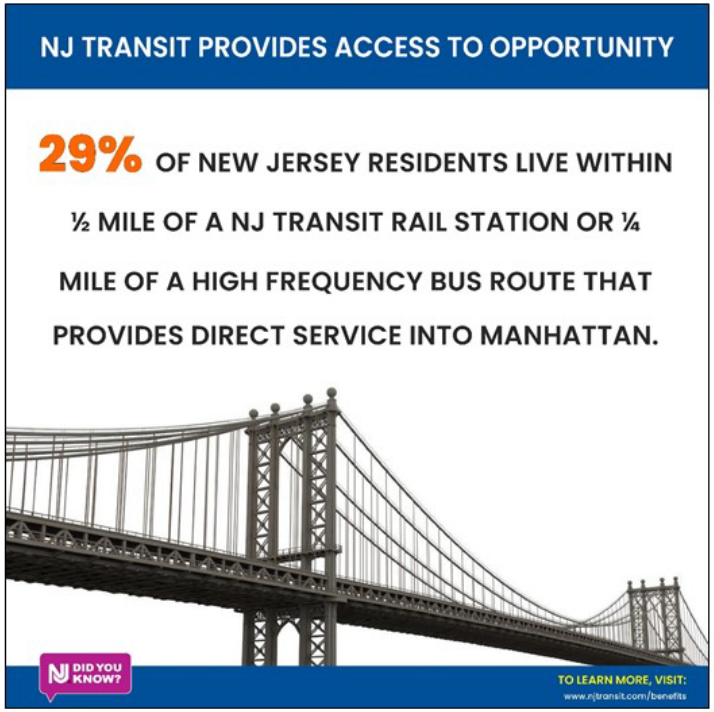
P.7.2

1080 x 1080 - Social

SOCIAL MEDIA

P.8.1

1080 x 1080 - Social



SOCIAL MEDIA

P.10.1

1080 x 1080 - Social

P.10.2

1080 x 1080 - Social

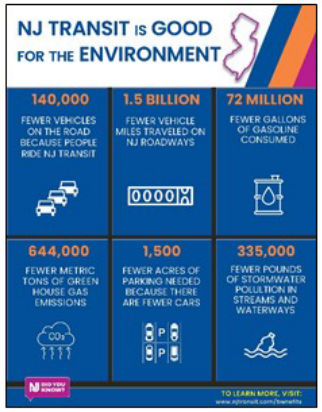
NJ TRANSIT is good for the ENVIRONMENT

3 – Storybook 8.5x11 infographics

10 – Social infographics

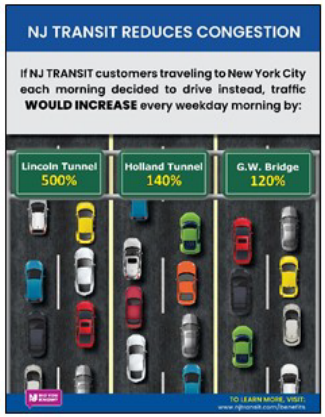
NJ TRANSIT is good for the ENVIRONMENT – Storybook (8.5x11 Infographics)

EV.1

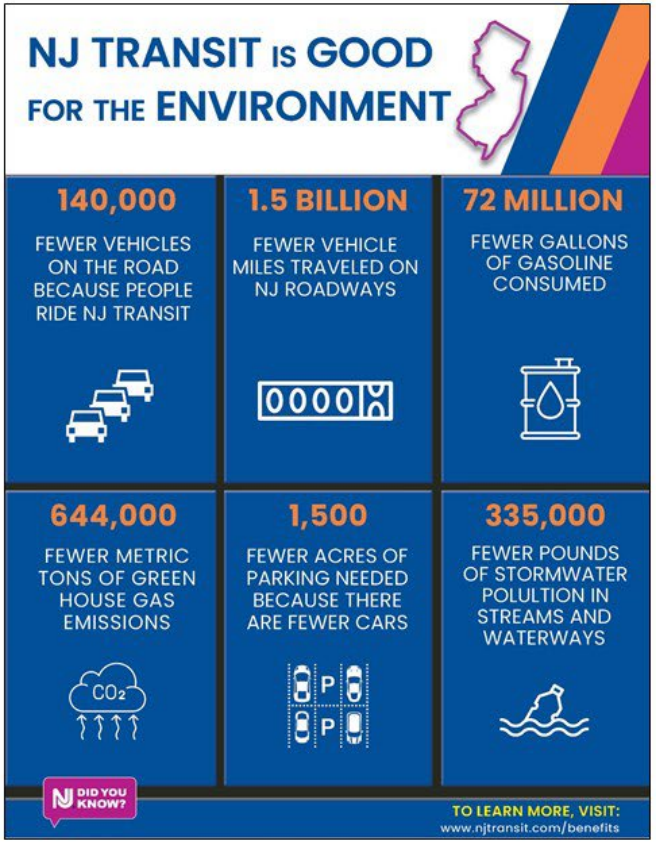


EV.2

EV.3

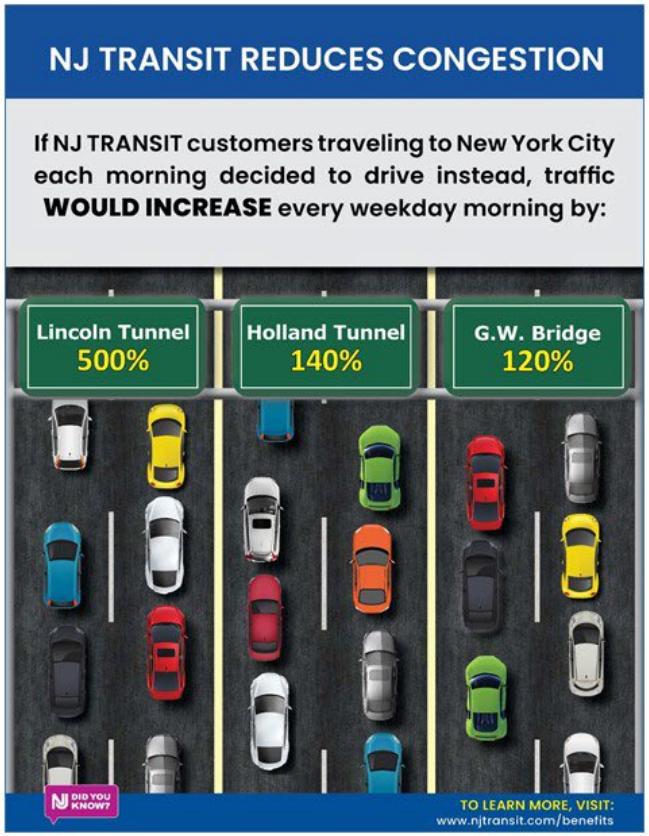


EV.1 8.5x11 Infographic #1



EV.2 8.5x11 Infographic #2

EV.3 8.5x11 Infographic #3



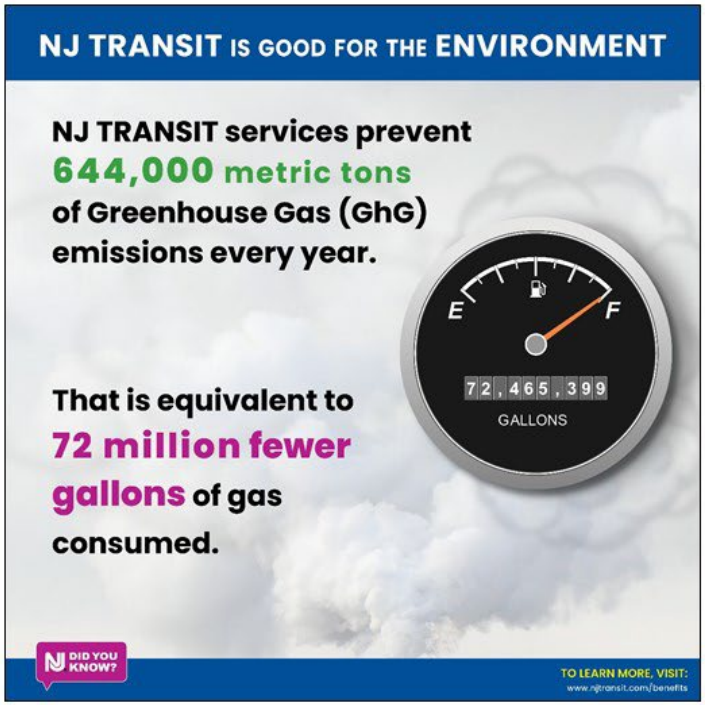
Social Media

Environmental

SOCIAL MEDIA

EV.1.1 1080 x 1080 - Social

EV.1.2 1080 x 1080 - Social



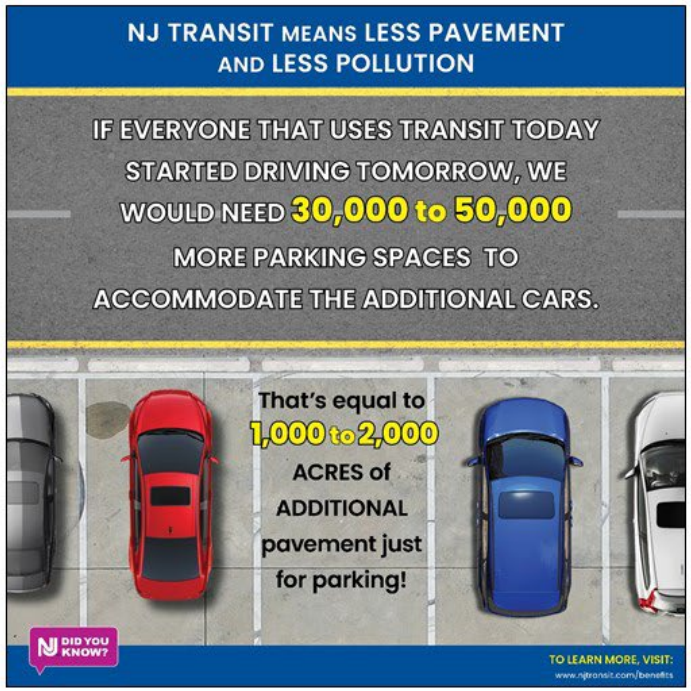
SOCIAL MEDIA

EV.1.3 1080 x 1080 - Social

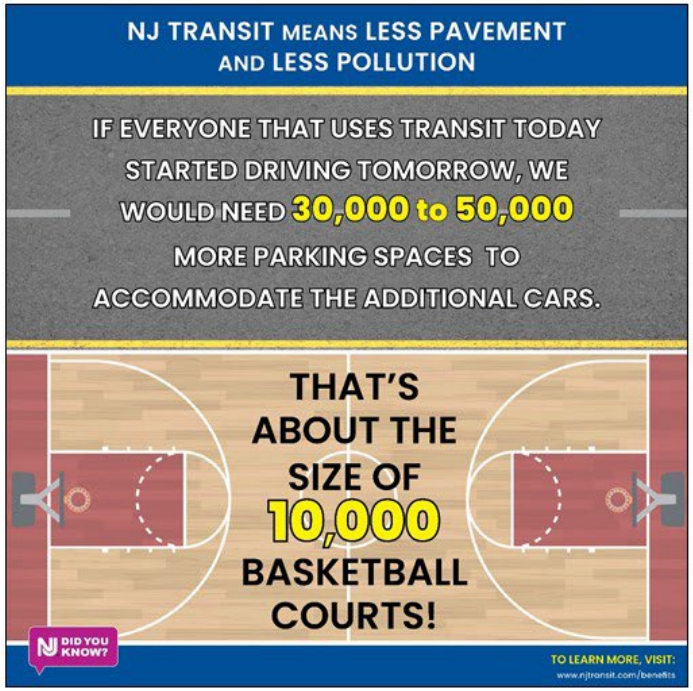
EV.1.4 1080 x 1080 - Social

SOCIAL MEDIA

EV.2.1 1080 x 1080 - Social



EV.2.2 1080 x 1080 - Social



SOCIAL MEDIA

EV.2.3

1200 x 600 - Social

SOCIAL MEDIA

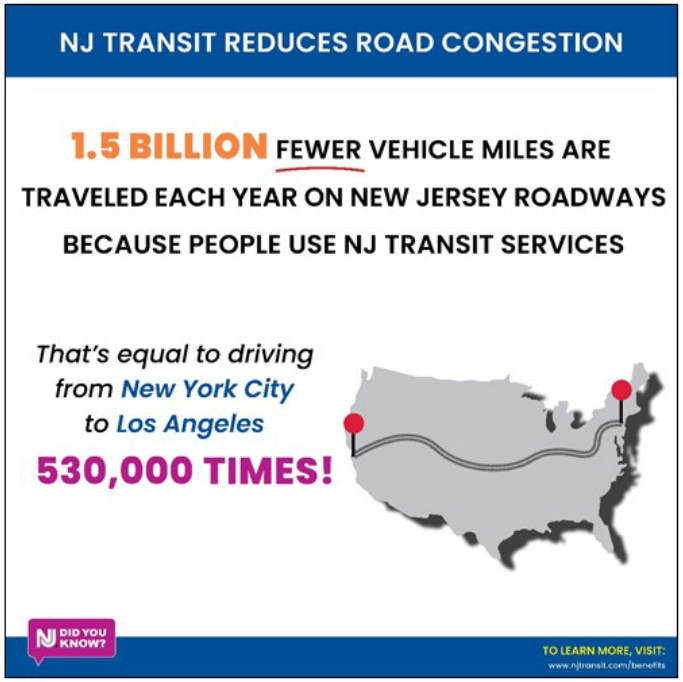
EV.3.1

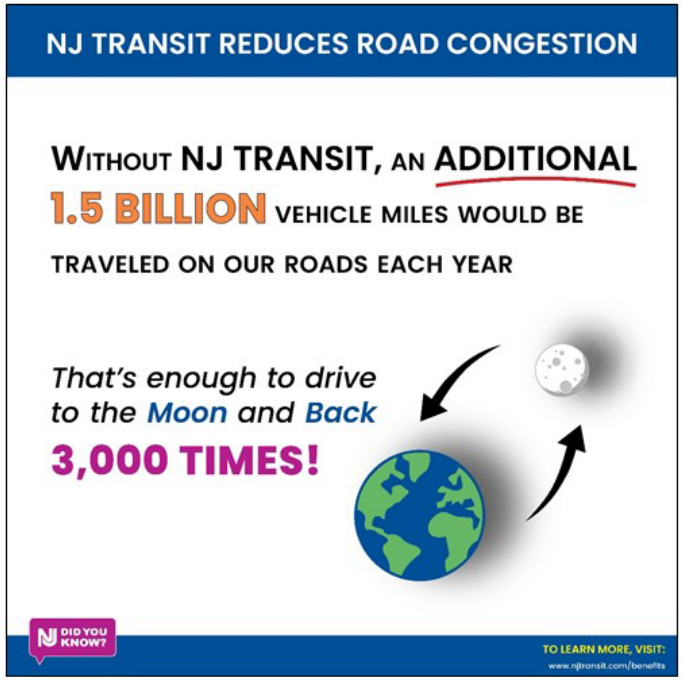
1080 x 1080 - Social

SOCIAL MEDIA

EV.3.2

1080 x 1080 - Social



EV.3.3

1080 x 1080 - Social