

2024 OC Transit Vision: Appendix C

Corridor Scoring Methodology

Overview

Priority corridors were identified through stakeholder engagement, and were scored using 10 ranked criteria. The criteria was ranked by relative importance, and the final composite score was calculated by multiplying the score of the highest ranked criteria by 10, the second highest ranked by 9, the third highest ranked by 8, and so on, and summing the multiplied scores then dividing by 55 to obtain a composite score ranging between 1-5. The criteria are as follows:

				Bin Upper Bound			
	Units	Coefficient	Aggregation	1	2	3	4
Boardings per Mile (2050)	Boardings/mi	0.18	-	Long List Corridors**	577	673	770
Trip Intensity: Block group density of LOCUS trip ends (O and D)	Trips/sqmi	0.16	Block group average	29.5	45.4	63.5	93.2
Equity: Block group density of pop (income < 150% of poverty)	Persons/sqmi	0.15	Block group average	0.22	0.71	1.65	3.99
Existing Ridership: Block group density of boardings	Boardings/sqmi	0.13	Block group average	0	N/A*	0.07	0.4
Mode share: Block group ratio of boardings to LOCUS origin trips	Boardings/Trips	0.11	Block group average	0	N/A*	0.26	1.16
Outreach Results: Percentage of Responders who listed Corridor in Top 5	Percentage	0.09	-	Long List Corridors**	23.25	27.00	31.00
Cost per passenger: Cost of Corridor divided by Projected Ridership (2050)	\$/Passenger	0.07	-	Long List Corridors**	28,083	24,101	20,218
Key Destinations: Top 2 Destinations' LOCUS trip ends in quarter mile buffer	Trips	0.05	Average scores of top 2 destinations	32,038	47,536	62,189	84,367

Transit Propensity Index	-	0.04	Block group average	2.35	2.80	3.17	3.49
Intercity Travel: LOCUS City O-D Pair Trip Totals	Trips	0.02	Trip totals of city pairs	75,012	169,570	232,876	401,156

Note that all are positively correlated except Cost per Passenger, which places higher values in lower bins.

*More than 40% of block groups have a raw value of 0, so categorical value 2 was not used.

**Long List Corridors were not surveyed for the outreach results, and were not included in the modeling of the projected rider increase, so their scores were set to the default value of 1.

Boardings per Mile (2050)

All short list corridors were modeled as Limited-Stop Bus and Fixed-Guideway BRT with two scenarios for each mode: one with State College – Bristol (short list) and one with State College - Bristol - Long to Airport (long list). The average across these four modeled numbers was used to calculate projected ridership for each corridor (year 2050). For State College – Bristol, only the scenario with the short list corridor was used to calculate its ridership, and vice versa for State College – Bristol – Long to Airport. This average number was then divided by the length of the corridor in miles.

The Boardings per Mile for each short list corridor was then divided into quartiles (25th, 50th, 75th, 100th) and each short list corridor was assigned a value from 2 to 5. Long list corridors, which were not modeled in the ridership projections, were assigned a value of 1 by default.

Trip Intensity

To calculate trip intensity of each block group, the LOCUS dataset was used. Any trips that originated or ended in the block group contributed to the total count, and this total count was divided by the land area of the block group to determine trip density. A quintile score ranging between 1-5, was assigned to each block group. The quintile bins are as listed in the overview table.

To create a score for trip intensity for each corridor, a quarter-mile buffer was created, then spatially joined to find the block groups that intersect the corridor buffer. The mean score of these block groups is the score for this category for the corridor.

Equity

To calculate the equity score of each block group, the ACS 5-year dataset was used. Variables B06012_002E and B06012_003E were summed to find the number of persons below 150% of the poverty level, then divided by the land area to determine population density. Poverty status data is only available at the tract level, not the block group level, so the block groups were assigned equity population density based on the tract they belong to. A quintile score ranging between 1-5, was assigned to each block group. The quintile bins are as listed in the overview table.

To create a score for equity for each corridor, a quarter-mile buffer was created, then spatially joined to find the block groups that intersect the corridor buffer. The mean score of these block groups is the score for this category for the corridor.

Existing Ridership

OCTA provided a shapefile of Q1 2022 Boardings by stop. A spatial join between the block group boundaries and the boardings dataset provided a dataset of boardings by block group. This was then divided by the land area to determine the boardings density of each block group. A quintile score ranging between 1-5, was assigned to each block group. The quintile bins are as listed in the overview table.

To create a score for existing ridership for each corridor, a quarter-mile buffer was created, then spatially joined to find the block groups that intersect the corridor buffer. The mean score of these block groups is the score for this category for the corridor.

Mode Share

OCTA provided a shapefile of Q1 2022 Boardings by stop. A spatial join between the block group boundaries and the boardings dataset provided a dataset of boardings by block group. This was then divided by the LOCUS trips that originated in each block group to determine the ratio between boardings and trips. A quintile score ranging between 1-5, was assigned to each block group. The quintile bins are as listed in the overview table.

To create a score for mode share for each corridor, a quarter-mile buffer was created, then spatially joined to find the block groups that intersect the corridor buffer. The mean score of these block groups is the score for this category for the corridor.

Outreach Results

The public outreach team conducted a survey asking respondents to list their top 5 out of the 12 short list corridors. The percentage of respondents that listed the corridor in their top 5 was calculated for each corridor, which was then divided into quartiles (25th, 50th, 75th, 100th) and each short list corridor was assigned a value from 2 to 5. Long list corridors, which were not included in the survey, were assigned a value of 1 by default.

Cost Per Passenger

BRT ridership modeling was performed for each of the short list corridors, with two scenarios: one with State College – Bristol (short list) and one with State College - Bristol - Long to Airport (long list). The average between these two scenarios was used to calculate projected ridership for each corridor. For State College – Bristol, only the scenario with the short list corridor was used to calculate its ridership, and vice versa for State College – Bristol – Long to Airport. The cost per mile for each corridor was based on the Harbor Blvd study and the LRTP, which was \$12,250,000 in 2017 dollars. This cost per mile was multiplied by 1.527 to escalate it to 2024 dollars. The total cost of each corridor was then calculated by multiplying the cost per mile by the length in miles of the corridor, and the cost per passenger was obtained by dividing this number by the projected ridership for each corridor.

The cost per passenger was then divided into quartiles (25th, 50th, 75th, 100th) and each short list corridor was assigned a value from 2 to 5. Long list corridors, which were not modeled in the ridership projections, were assigned a value of 1 by default.

Key Destinations

A list of key destinations was developed with stakeholder involvement. A quarter mile buffer on the point locations of each key destination was created and then joined to the block group level LOCUS trip ends. A quintile score ranging between 1-5, was assigned to each destination. The quintile bins are as listed in the overview table.

To create a score for key destinations for each corridor, a quarter-mile buffer was created, then spatially joined to find the destinations that intersect the corridor buffer. The mean of the scores of the top 2 key destinations is the score for this category for the corridor. If there was only one key destination that intersected with the corridor buffer, a score of 2 was assigned as a default for the second destination. Therefore, the calculation of the average was $([\text{score of key destination}] + 2) / 2$.

Transit Propensity Index

The calculation of the Transit Propensity Index (TPI) is detailed in the second section of this document. The TPI of each of the block groups was calculated, ranged between 1.16 to 5.22. A quintile score ranging between 1-5, was assigned to each block group. The quintile bins are as listed in the overview table.

To create a score for TPI for each corridor, a quarter-mile buffer was created, then spatially joined to find the block groups that intersect the corridor buffer. The mean score of these block groups is the score for this category for the corridor.

Intercity Travel

Travel between city pairs was calculated using LOCUS data. The jurisdiction of each city was the catchment area for trip totals.

To create a score for intercity travel for each corridor, a quarter-mile buffer was created, then spatially joined to find the cities and therefore city pairs that the corridor serves. The total number of trips from all city pairs was obtained, to which a quintile score ranging between 1-5 was assigned. The quintile bins are as listed in the overview table.

Transit Propensity Index Methodology

Overview

The TPI uses factors to determine the overall transit propensity for census block groups in OC. The raw values are binned 1-5 (zero is not used), and the bin values are multiplied by coefficient. The bin cut-off and coefficients are given in the table below:

				Bin Upper Bound			
	Units	Coefficient	Binning Direction (Correlation)	1	2	3	4
ADT (Intersection Traffic)	Cars/day	0.25	Low to high	50000	100000	200000	400000
Per Capita Income	Yearly Income/person	0.4	High to low	125000	80000	55000	35000
Density HH < \$60k	HH/acre	0.12	Low to high	0.5	1	2.5	5
Total Employment	Number of workers	0.13	Low to high	1500	5000	10000	25000
Intersection Density	Intersections/Sq Mi	0.05	Low to high	75	125	175	200
Employment Density	Jobs/acre	0.21	Low to high	5	10	25	50