![BRTB - Baltimore Regional Transportation Board]

InSITE Enhancements and 2019 Calibration/Validation

June 27, 2022

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InSITE Enhancements & Calibration/Validation

- ## Model Geography
    - Incorporate 2020 Census/Transportation Analysis Zone (TAZ) geography. Cooperative Forecasting Group (CFG) Round10 uses 2020 TAZ geography.
    - Expand model coverage area to include all of Queen Anne's County, Maryland and Adams and York Counties, Pennsylvania.

- ## InSITE Run Time Enhancements
    - Adopt multi-threaded TourCast model component software application.
    - Apply 25% population sampling to synthetic household/person roster.

- ## InSITE Calibration
    - Adjust model component parameters to reflect 2019 Maryland Household Travel Survey observed travel behaviors and choices.
   - Revised Freight Modeling System to new geography and update base year model inputs.

- ## InSITE Validation
    - 2019 validation data sets – 1) Location-Based Services (LBS), 2) Classified traffic counts, 3) On-Board Transit Survey, and 4) MDOT/MTA APC data

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Tour Destination Choice – Non-Mandatory

Tour Purpose	Expanded household survey data		Model		Difference
	Average Distance	Count	Average Distance	Count	
Meal	6.26	195,536	5.70	50,824	-0.56
Shop	4.45	416,056	4.74	117,152	0.29
Personal Business	6.97	443,569	6.69	119,949	-0.27
Social Recreation	6.18	532,969	6.40	140,845	0.22
Escort	3.98	448,391	4.78	82,351	0.80

Person Type	Average Distance	Count	Average Distance	Count	Difference
Child1	4.17	132,395	4.90	13,719	0.73
Child2	5.87	96,815	5.08	19,634	-0.80
Child3	7.71	16,426	5.34	4,575	-2.37
Adult Student	5.03	44,399	5.62	16,636	0.59
Worker	5.59	865,808	5.72	202,906	0.12
Non-Working Adult	5.09	403,303	6.00	83,952	0.91
Senior	6.03	471,864	5.87	169,699	-0.16

HH Income	Average Distance	Count	Average Distance	Count	Difference
< $15000	4.40	96,280	4.61	54,843	0.20
$15,000-$24,999	4.38	87,750	5.29	43,469	0.91
$25,000-$49,999	5.42	215,535	5.56	65,651	0.14
$50,000-$99,999	5.81	582,057	5.79	146,692	-0.01
>$100,000	5.48	1,005,527	6.22	200,466	0.73

Distance
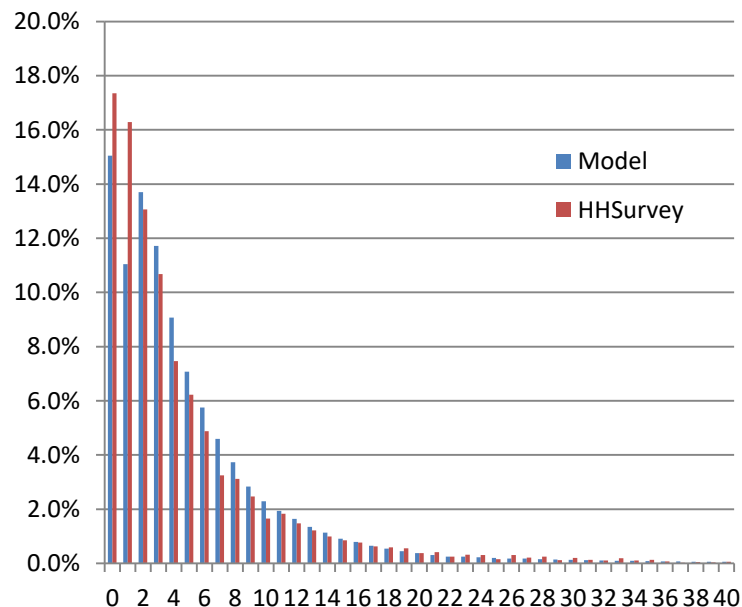
Tour Mode Choice Work and Work Based Auto Per Worker/Driver

Auto Per Worker

Tour Mode / Auto Per Worker	Expanded household survey data								Model Results							
	Zero Auto	<1	1	>1	Zero Auto	<1	1	>1	Zero Auto	<1	1	>1	Zero Auto	<1	1	>1
DriveAlone	1,360	84,221	595,227	439,262	1.1%	27.4%	59.6%	70.8%	0	20,737	155,352	131,066	0.0%	28.6%	55.4%	63.5%
SharedRide2	12,657	63,373	164,836	91,478	10.1%	20.6%	16.5%	14.7%	598	12,460	49,819	27,901	6.8%	17.2%	17.8%	13.5%
SharedRide3	2,693	17,634	91,130	38,185	2.1%	5.7%	9.1%	6.2%	315	5,972	23,864	10,595	3.6%	8.2%	8.5%	5.1%
WalkToTransit	79,548	83,704	59,692	14,013	63.3%	27.2%	6.0%	2.3%	6,177	20,211	25,942	17,149	70.0%	27.9%	9.3%	8.3%
DriveToTransit	3,829	16,122	56,676	25,983	3.0%	5.2%	5.7%	4.2%	49	7,162	9,953	11,904	0.6%	9.9%	3.6%	5.8%
Walk	17,320	23,009	20,557	8,573	13.8%	7.5%	2.1%	1.4%	1,599	3,133	9,802	4,965	18.1%	4.3%	3.5%	2.4%
Bike	8,194	19,391	10,022	3,115	6.5%	6.3%	1.0%	0.5%	81	2,893	5,486	2,865	0.9%	4.0%	2.0%	1.4%
Total	125,600	307,455	998,139	620,609	1,431,194				8,819	72,568	280,218	206,445	361,605			

Auto Per Driver

Tour Mode / Auto Per Driver	Expanded household survey data								Model Results							
	Zero Auto	<1	1	>1	Zero Auto	<1	1	>1	Zero Auto	<1	1	>1	Zero Auto	<1	1	>1
DriveAlone	1,360	123,023	765,355	230,332	1.1%	33.9%	62.0%	70.3%	0	62,749	188,591	55,815	0.0%	43.3%	59.8%	56.4%
SharedRide2	12,657	65,550	197,526	56,611	10.1%	18.0%	16.0%	17.3%	598	24,626	52,189	13,365	6.8%	17.0%	16.5%	13.5%
SharedRide3	2,693	21,484	105,816	19,649	2.1%	5.9%	8.6%	6.0%	315	9,501	24,380	6,550	3.6%	6.6%	7.7%	6.6%
WalkToTransit	79,548	84,819	67,110	5,480	63.3%	23.4%	5.4%	1.7%	6,177	28,638	23,688	10,976	70.0%	19.8%	7.5%	11.1%
DriveToTransit	3,829	23,461	65,811	9,509	3.0%	6.5%	5.3%	2.9%	49	8,782	10,863	9,374	0.6%	6.1%	3.4%	9.5%
Walk	17,320	23,903	23,664	4,572	13.8%	6.6%	1.9%	1.4%	1,599	6,011	10,140	1,749	18.1%	4.1%	3.2%	1.8%
Bike	8,194	20,929	9,939	1,661	6.5%	5.8%	0.8%	0.5%	81	4,605	5,522	1,117	0.9%	3.2%	1.8%	1.1%
Total	125,600	363,169	1,235,220	327,813	1,723,990				8,819	144,912	315,373	98,946	469,104			

Tour Mode Choice Work and Work Based Household Income/Size

Tour Mode / HHIncome	Expanded household survey data										Model Results									
	< $15000	$15,000-$24,999	$25,000-$49,999	$50,000-$99,999	>$100,000	< $15000	$15,000-$24,999	$25,000-$49,999	$50,000-$99,999	>$100,000	< $15000	$15,000-$29,999	$30,000-$49,999	$50,000-$99,999	>$100,000	< $15000	$15,000-$29,999	$30,000-$49,999	$50,000-$99,999	>$100,000
DriveAlone	11,890	16,805	92,639	339,253	632,870	34.3%	41.4%	50.6%	57.2%	54.5%	5,275	12,954	28,484	91,454	168,988	46.5%	54.4%	56.0%	55.4%	53.3%
SharedRide2	6,124	8,405	30,476	99,033	182,673	17.7%	20.7%	16.6%	16.7%	15.7%	1,616	3,280	7,767	27,177	50,938	14.2%	13.8%	15.3%	16.5%	16.1%
SharedRide3	2,601	2,879	14,705	33,847	91,030	7.5%	7.1%	8.0%	5.7%	7.8%	491	1,125	3,246	12,834	23,050	4.3%	4.7%	6.4%	7.8%	7.3%
WalkToTransit	9,655	8,810	31,334	64,075	122,617	27.9%	21.7%	17.1%	10.8%	10.5%	2,670	4,622	7,846	17,262	37,079	23.5%	19.4%	15.4%	10.5%	11.7%
DriveToTransit	1,088	437	5,246	26,853	68,327	3.1%	1.1%	2.9%	4.5%	5.9%	142	347	933	7,989	19,657	1.3%	1.5%	1.8%	4.8%	6.2%
Walk	3,196	2,200	6,775	20,973	35,738	9.2%	5.4%	3.7%	3.5%	3.1%	1,060	1,308	2,217	5,803	9,111	9.3%	5.5%	4.4%	3.5%	2.9%
Bike	104	1,042	1,936	8,640	29,001	0.3%	2.6%	1.1%	1.5%	2.5%	96	196	351	2,528	8,154	0.8%	0.8%	0.7%	1.5%	2.6%
Total	34,658	40,578	183,111	592,674	1,162,255						11,350	23,832	50,844	165,047	316,977					

Tour Mode / HHSize	Expanded household survey data								Model Results							
	1	2	3	>3	1	2	3	>3	1	2	3	>3	1	2	3	>3
DriveAlone	162,685	342,075	236,647	352,050	55.7%	58.9%	53.7%	50.3%	41,494	91,796	67,987	105,878	62.1%	62.1%	53.2%	46.9%
SharedRide2	29,234	88,256	86,882	122,338	10.0%	15.2%	19.7%	17.5%	4,489	20,011	26,412	39,866	6.7%	13.5%	20.7%	17.7%
SharedRide3	5,488	14,377	24,066	101,131	1.9%	2.5%	5.5%	14.5%	1,711	3,419	8,701	26,915	2.6%	2.3%	6.8%	11.9%
WalkToTransit	59,932	72,269	46,766	57,526	20.5%	12.4%	10.6%	8.2%	10,283	17,743	13,267	28,186	15.4%	12.0%	10.4%	12.5%
DriveToTransit	13,252	29,201	25,322	34,176	4.5%	5.0%	5.7%	4.9%	2,459	5,663	5,480	15,466	3.7%	3.8%	4.3%	6.9%
Walk	15,951	22,797	12,861	17,273	5.5%	3.9%	2.9%	2.5%	5,105	5,980	3,506	4,908	7.6%	4.0%	2.7%	2.2%
Bike	5,580	11,833	7,975	15,335	1.9%	2.0%	1.8%	2.2%	1,329	3,107	2,520	4,369	2.0%	2.1%	2.0%	1.9%
Total	292,122	580,807	440,519	699,829					66,870	147,719	127,873	225,588				

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Vehicle Miles of Travel

VMT by functional class

Functional class	Daily Observed VOL	Daily Modeled VOL	% Diff
Interstate/freeway	24,389,354	24,776,811	2%
Toll road			
Primary arterial	9,551,118	9,485,180	-1%
Minor arterial	6,360,219	5,208,612	-18%
Collector	2,994,695	2,150,124	-28%
Other (incl. ramp)	1,357,225	1,436,139	6%
Total	44,652,611	43,056,866	-4%
Some counts are on Centroid Connectors and externa stations			
What variable has each toll link identified ?			

VMT by county

County	Daily Observed VOL	Daily Modeled VOL	% Diff
Baltimore City	2,429,581	2,387,679	-2%
Baltimore County	7,914,812	7,719,645	-2%
Anne Arundel	6,179,557	5,698,546	-8%
Howard	3,569,198	3,365,258	-6%
Carroll	1,069,914	1,071,425	0%
Harford	2,650,370	2,264,272	-15%
Mont/PG/Frederick	19,423,255	18,620,246	-4%
D.C.	305,085	511,122	68%
Queen Anne's	886,380	1,285,770	45%
Adams/York	224,458	132,902	-41%
Total	44,652,611	43,056,866	-4%
BMC Region	24,699,812	23,792,596	-4%
	23,813,432	22,506,826	-5%

VMT by area type

Area type	Daily Observed VMT	Daily Modeled VOL	% Diff
1	16,153,197	17,013,414	5%
2	12,763,159	11,599,177	-9%
3	10,539,570	9,437,804	-10%
4	3,142,752	2,840,075	-10%
5	1,363,931	1,261,830	-7%
6	166,929	214,146	28%
7	382,701	518,564	36%
8	119,183	143,177	20%
9	21,189	28,680	35%
Total	44,652,611	43,056,866	-4%

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MDOT MTA Boardings by Mode

Boardings by Mode

BUS

METROLRT

MARC

	Trips by Number of Transfers*	MTA Bus				Rail (LRT & Metro Subway)				Commuter Rail (MARC)				Total			
		Target	Model	Diff	% diff	Target	Model	Diff	% diff	Target	Model	Diff	% diff	Target	Model	Diff	% diff
1	0	71,240	62,232	-9,008	-13%	25,501	20,464	-5,037	-20%	13,568	3,464	-10,104	-74%	110,309	86,160	-24,149	-22%
2	1	52,969	50,228	-2,741	-5%	15,714	18,004	2,290	15%	9,514	7,380	-2,134	-22%	78,197	75,612	-2,585	-3%
3	2	14,766	12,508	-2,258	-15%	6,023	9,016	2,993	50%	6,069	6,772	703	12%	26,858	28,296	1,438	5%
4	3+	1,514	852	-662	-44%	1,086	1,828	742	68%	1,289	8,492	7,203	559%	3,889	11,172	7,283	187%
	Total	140,489	125,820	-14,669	-10%	48,324	49,312	988	2%	30,440	26,108	-4,332	-14%	219,253	201,240	-18,013	-8%
	Estimated Boardings**	211,605	203,620	-7,985	-4%	79,341	90,832	11,491	14%	55,959	72,508	16,549	30%	362,832	366,960	4,128	1%
	Transfer Ratio	1.51	1.62	0.11	7%	1.64	1.84	0.20	12%	1.84	2.78	0.94	51%	1.65	1.82	0.17	10%

*Source: *2018 On Board Transit Survey - BMC Analysis*, Table 9
**Estimated boardings are total boardings on all submodes for linked trips on the defined submode. Boardings estimates in this table should not be compared to total boardings by submode on the "Route" tab.

	% Trips by Number of Transfers	MTA Bus				Rail (LRT & Metro Subway)				Commuter Rail (MARC)				Total			
		Target	Model	Diff	% diff	Target	Model	Diff	% diff	Target	Model	Diff	% diff	Target	Model	Diff	% diff
1	0	51%	49%	-1%	-2%	53%	41%	-11%	-21%	45%	13%	-31%	-70%	50%	43%	-7%	-15%
2	1	38%	40%	2%	6%	33%	37%	4%	12%	31%	28%	-3%	-10%	36%	38%	2%	5%
3	2	11%	10%	-1%	-5%	12%	18%	6%	47%	20%	26%	6%	30%	12%	14%	2%	15%
4	3+	1%	1%	0%	-37%	2%	4%	1%	65%	4%	33%	28%	668%	2%	6%	4%	213%
	Total	100%	100%	0%	0%	100%	100%	0%	0%	100%	100%	0%	0%	100%	100%	0%	0%
	Transfer Ratio	1.62	1.62	0.00	0%	1.64	1.84	0.20	12%	1.84	2.78	0.94	51%	1.65	1.82	0.17	10%

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For More Information

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