BALTIMORE METROPOLITAN COUNCIL

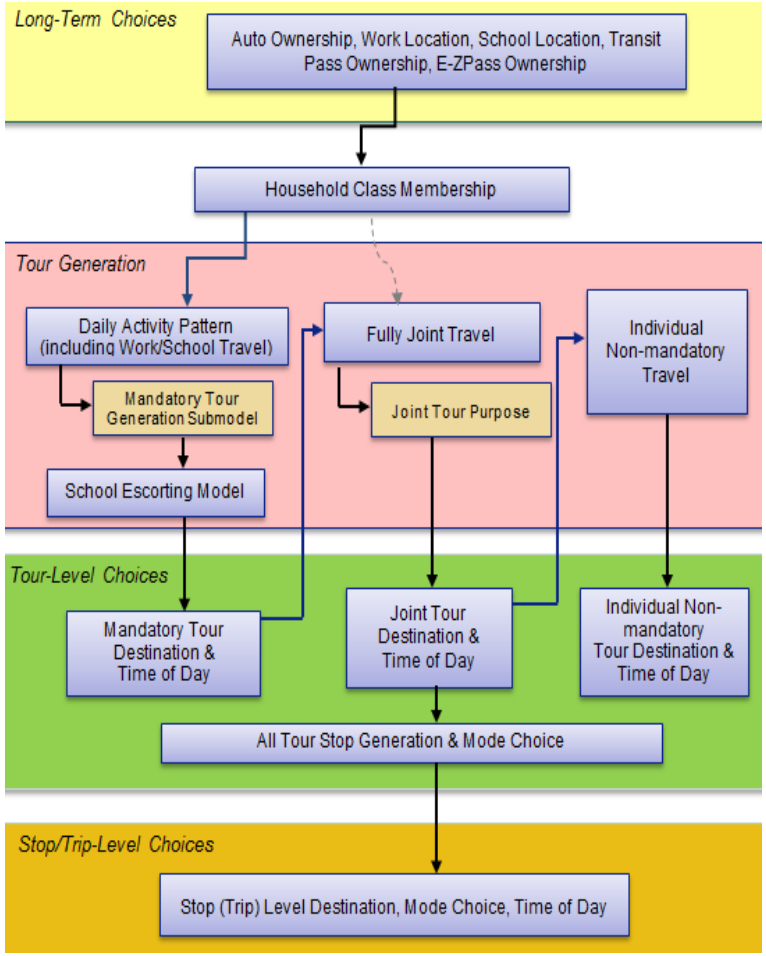
2019 BMC InSITE Update

Validation and Model Improvements

November 18, 2022

Summary of InSITE Model

- Completed in 2017
- Covers
  - Baltimore City
  - 9 MD counties (including 4 in MWCOG region)
  - D.C.
  - 2 PA counties
- Simulates activities and travel through activity-based process
- Implemented using TourCast and Cube



BMC

Recent InSITE Updates

- 2019 base year
- Expansion of model region
  - Queen Anne's County (MD)
  - York and Adams Counties (PA)
- Data/network updates
  - 2019 updates
  - Maryland Travel Survey
  - LOCUS (LBS)
- Updates to model structure
  - E.g., eliminated E-ZPass transponder ownership model

InSITE Run Time Enhancements

- **Population sampling**
  - Determined that 25% sample produced accurate results
  - Implemented within TourCast
  - Decreased run time by 45%
- **TourCast multi-processing**
  - Split households and persons according to TAZ's
  - Run a number of independent TourCast processes, each tied to a unique subdirectory of input files and a matching database
  - Run a set of scripts that coalesce results back into a single common trip matrix and common database
  - Decreased run time by 32%

2019 Base Year Model Validation Process

- Assemble necessary data
- Set up processes for validation of every component expanded region
- Updated observed data to compare with base year model results
- Perform single-pass validation (no feedback) of all activity-based components, rFreight components, highway assignment, and transit assignment
- Perform validation of the complete base year model stream using full feedback

2019 Data Updates

- 2019 MTS
- Traffic count data
- Transit ridership
- Freight model
  - BEA IO table
  - CFO shipment size table
  - Payload/% empties
  - Distribution center locations
- LOCUS (LBS data)

Use of LOCUS

- **Advantages of LBS data**
  - Much larger sample size than surveys
  - Passively collected—no response bias/errors
  - Ability to infer home and work/school locations
- **Limitations**
  - No traveler characteristics
  - Modes not known
- **Types of comparisons:**
  - O-D comparisons of tours and trips
    - Home-work/school vs. other tours
  - Time of day

Sample Validation Results
Work Location Model

Average Home-Work Distance (miles)

HH Income	Observed	Model	Difference	% of workers
<$50,000	9.1	10.3	1.2	17%
$50,000-$99,999	12.1	12.6	0.4	29%
>$100,000	13.6	13.5	-0.1	54%
All workers	**12.6**	**12.7**	**0.1**	

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Sample Validation Results

Non-Mandatory Tour Mode Choice Model

Mode Shares by Autos per Worker

	Observed				Model			
Tour Mode	Zero	< 1	1	>1	Zero	< 1	1	>1
Drive Alone	1.1%	17.6%	33.9%	51.5%	0.7%	25.2%	36.7%	48.0%
Shared Ride 2	12.9%	31.5%	30.9%	24.6%	19.8%	32.7%	28.0%	26.5%
Shared Ride 3+	3.0%	24.5%	21.5%	15.6%	14.3%	21.6%	20.6%	16.0%
Walk to Transit	42.8%	5.7%	1.7%	1.4%	33.8%	4.7%	2.0%	1.3%
Drive to Transit	0.9%	0.5%	0.3%	0.3%	0.2%	0.1%	0.5%	0.4%
Walk	36.8%	17.3%	10.6%	5.8%	29.9%	12.4%	10.9%	7.2%
Bike	1.9%	2.8%	0.8%	0.5%	1.4%	3.3%	1.3%	0.6%

Sample Validation Results
Highway Assignment

VMT by County

County	% Difference	% VMT
Baltimore City	-2%	6%
Baltimore County	-2%	18%
Anne Arundel	-8%	13%
Howard	-6%	8%
Carroll	0%	2%
Harford	-15%	5%
Montgomery/Prince George's/Frederick	-4%	43%
Queen Anne's	45%	3%
Model Region	**-4%**	

Sample Validation Results

Transit Assignment

	MTA Bus			Rail (LRT & Metro Subway)		
Trips	Target	Model	% Diff	Target	Model	% Diff
Linked	140,489	125,820	-10%	48,324	49,312	2%
Unlinked	211,605	203,620	-4%	79,341	90,832	14%

	Commuter Rail (MARC)			Total		
Trips	Target	Model	% Diff	Target	Model	% Diff
Linked	30,440	26,108	-14%	219,253	201,240	-8%
Unlinked	55,959	72,508	30%	362,832	366,960	1%

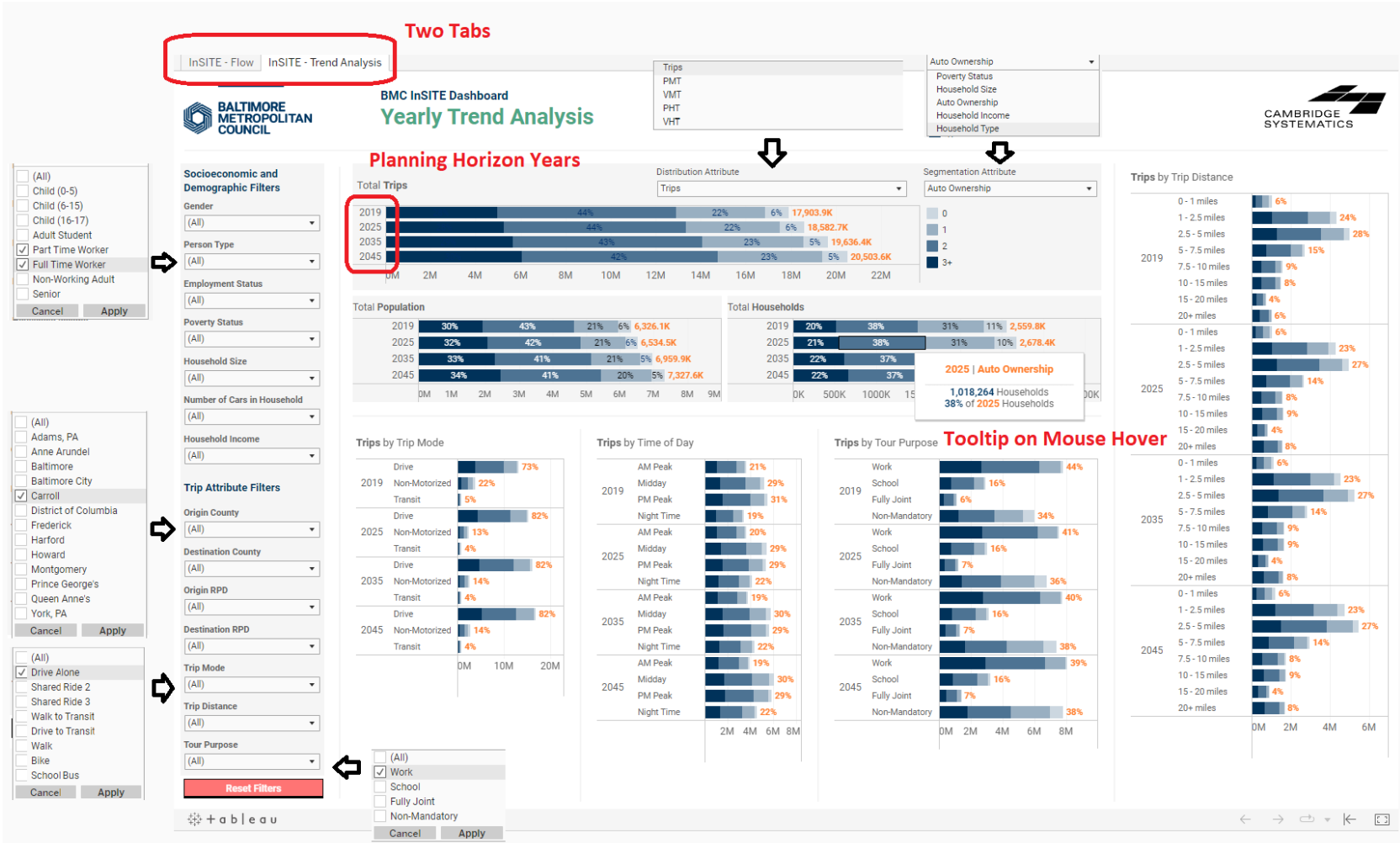
Next Steps

- BMC application support
- Additional detailed validation
- Improve transit access coding

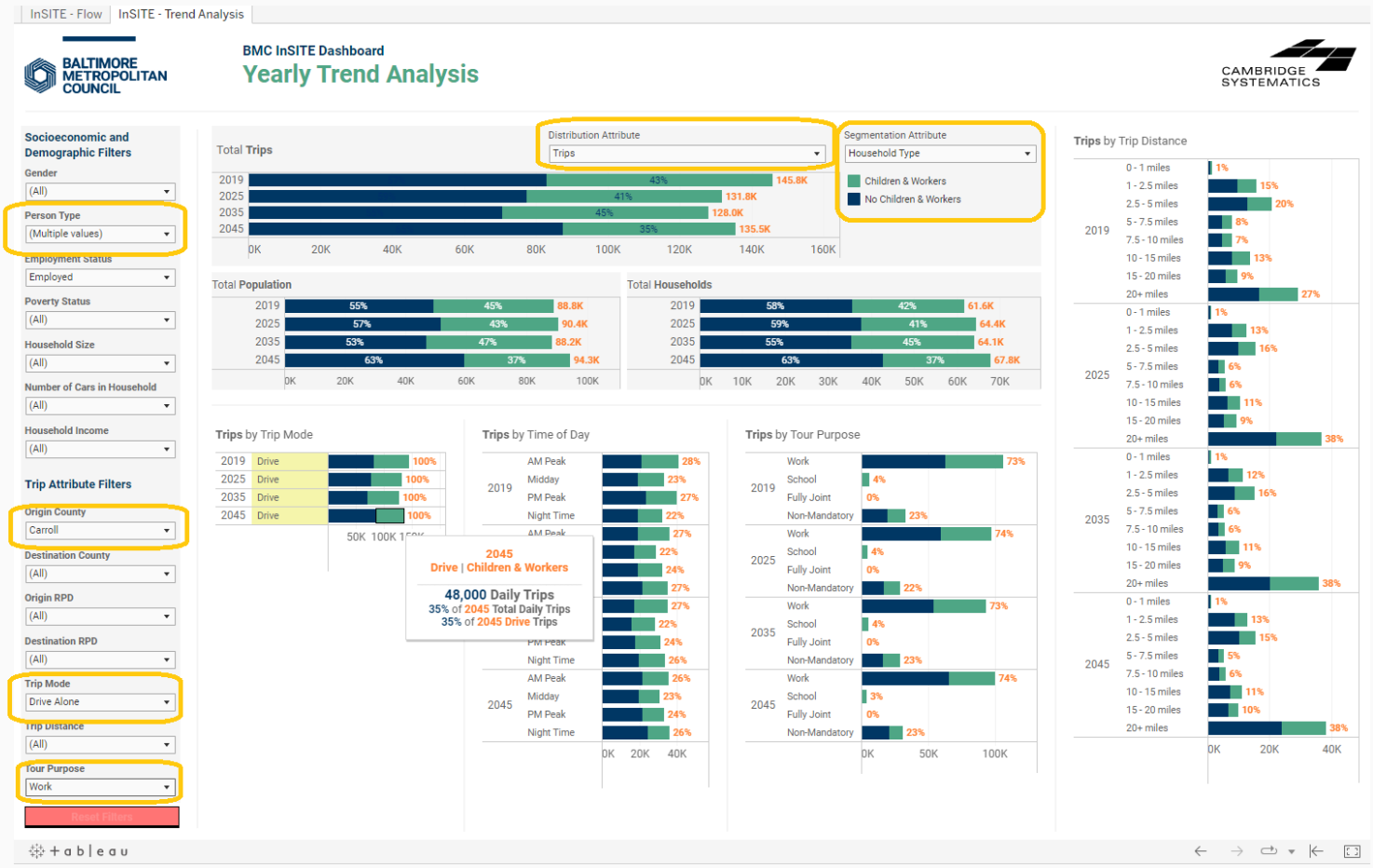
Planning Area Dashboards

- Builds off of BMC's COVID Recovery Dashboards
- Planning Areas – Air Quality, InSITE, Demographics, TIP, Freight, System Performance, Transit, Crash Data
- Engaging and Interactive
- Ability to Download, Save, and Print
- Leverage Available Data
- Easy to Maintain
- Draft Dashboards - https://public.tableau.com/app/profile/charles.baber/viz/InSiteDRAFT6/InSITE-Flow

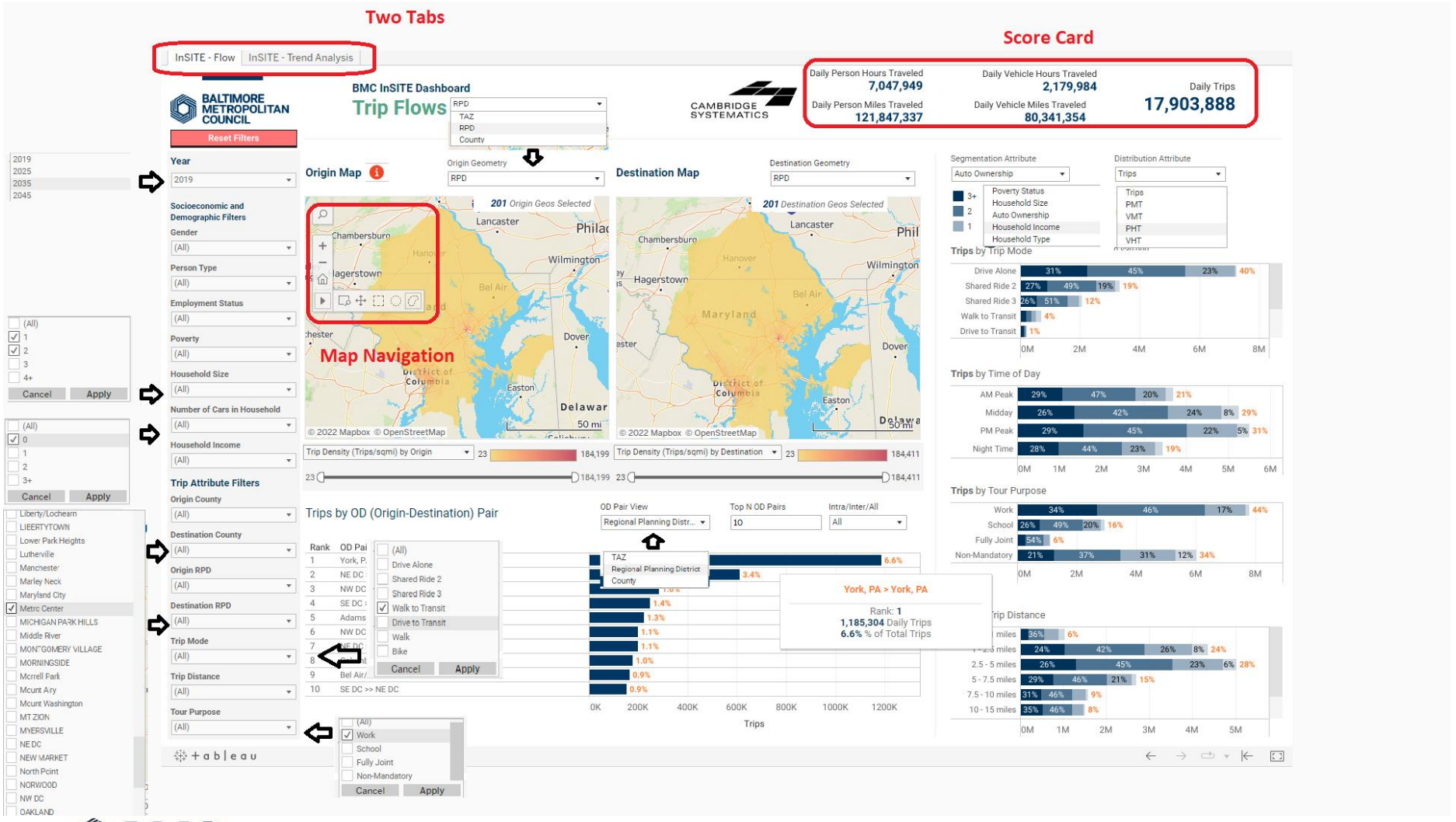
InSITE- Trend Analysis



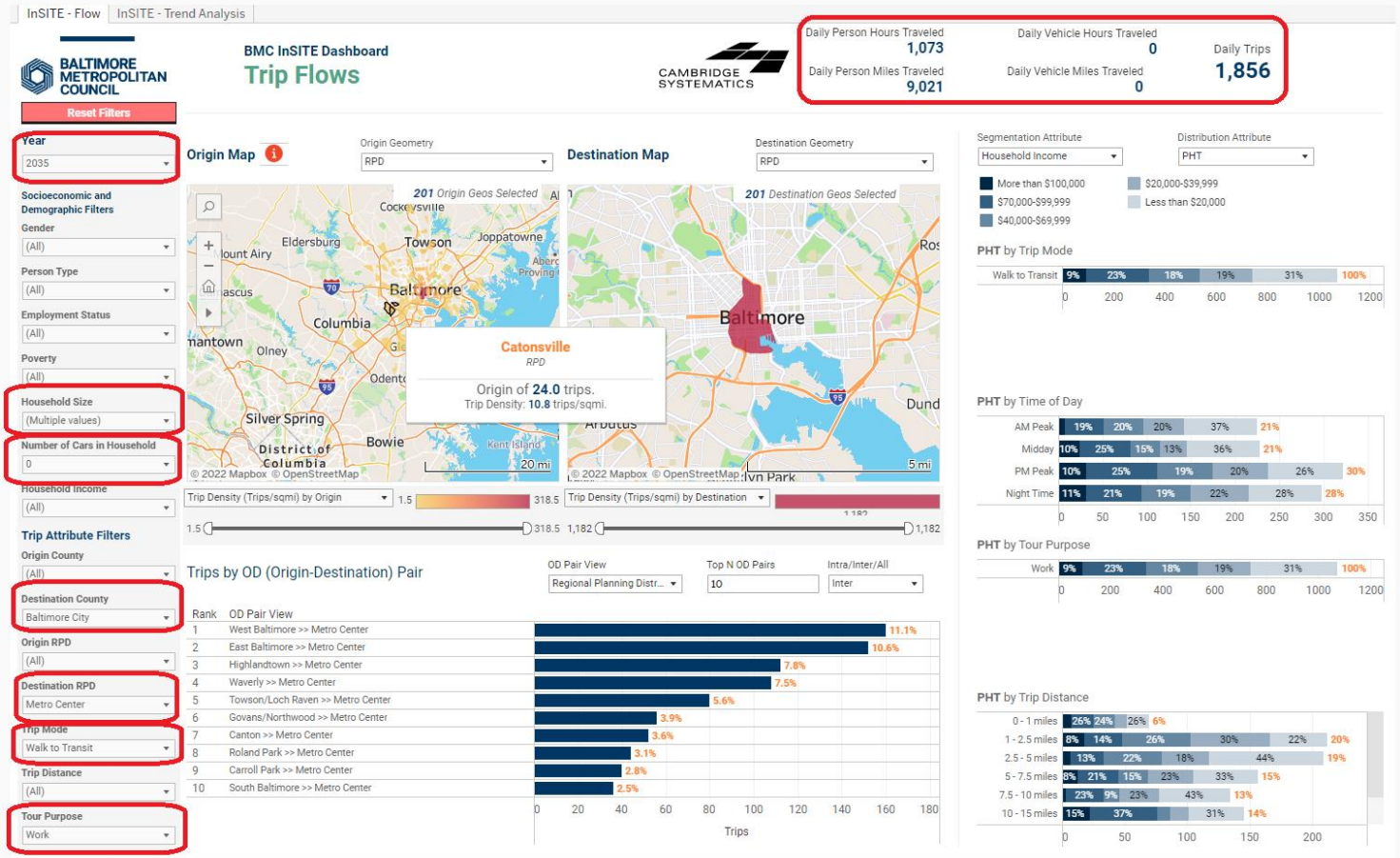
InSITE – Trend Analysis Selection



InSITE - Flow


Two Tabs
InSITE - Flow
InSITE - Trend Analysis
Score Card
BMC InSITE Dashboard
Trip Flows
BALTIMORE METROPOLITAN COUNCIL
CAMBRIDGE SYSTEMATICS
Daily Person Hours Traveled
7,047,949
Daily Vehicle Hours Traveled
2,179,984
Daily Trips
17,903,888
Daily Person Miles Traveled
121,847,337
Daily Vehicle Miles Traveled
80,341,354
Reset Filters
Year
Socioeconomic and Demographic Filters
Gender
Person Type
Employment Status
Poverty
Household Size
Number of Cars in Household
Household Income
Trip Attribute Filters
Origin County
Destination County
Origin RPD
Destination RPD
Trip Mode
Trip Distance
Tour Purpose
Origin Map
Destination Map
Map Navigation
Trip Density (Trips/sqmi) by Origin
Trip Density (Trips/sqmi) by Destination
Trips by OD (Origin-Destination) Pair
Trips by Trip Mode
Trips by Time of Day
Trips by Tour Purpose
Trip Distance
York, PA > York, PA
Rank: 1
1,185,304 Daily Trips
6.6% of Total Trips
Cancel
Apply
tableau

InSITE – Flow Analysis Selection



For More Information

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