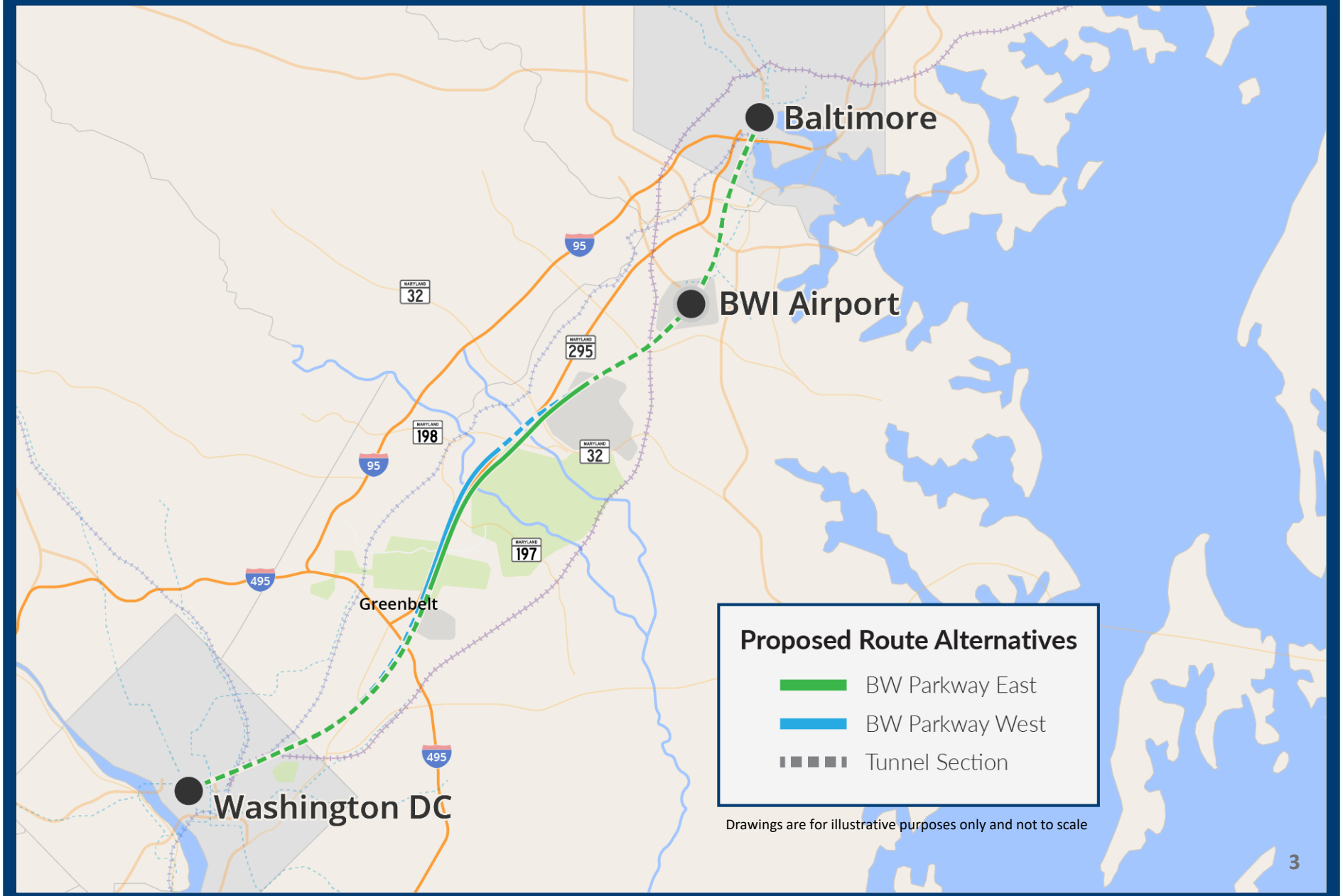
Presentation to MWCOG

Ian Rainey (TNEM)

March 25th, 2022

Long-term Vision: DC-New York

Initial Segment: DC-Baltimore



Drawings are for illustrative purposes only and not to scale

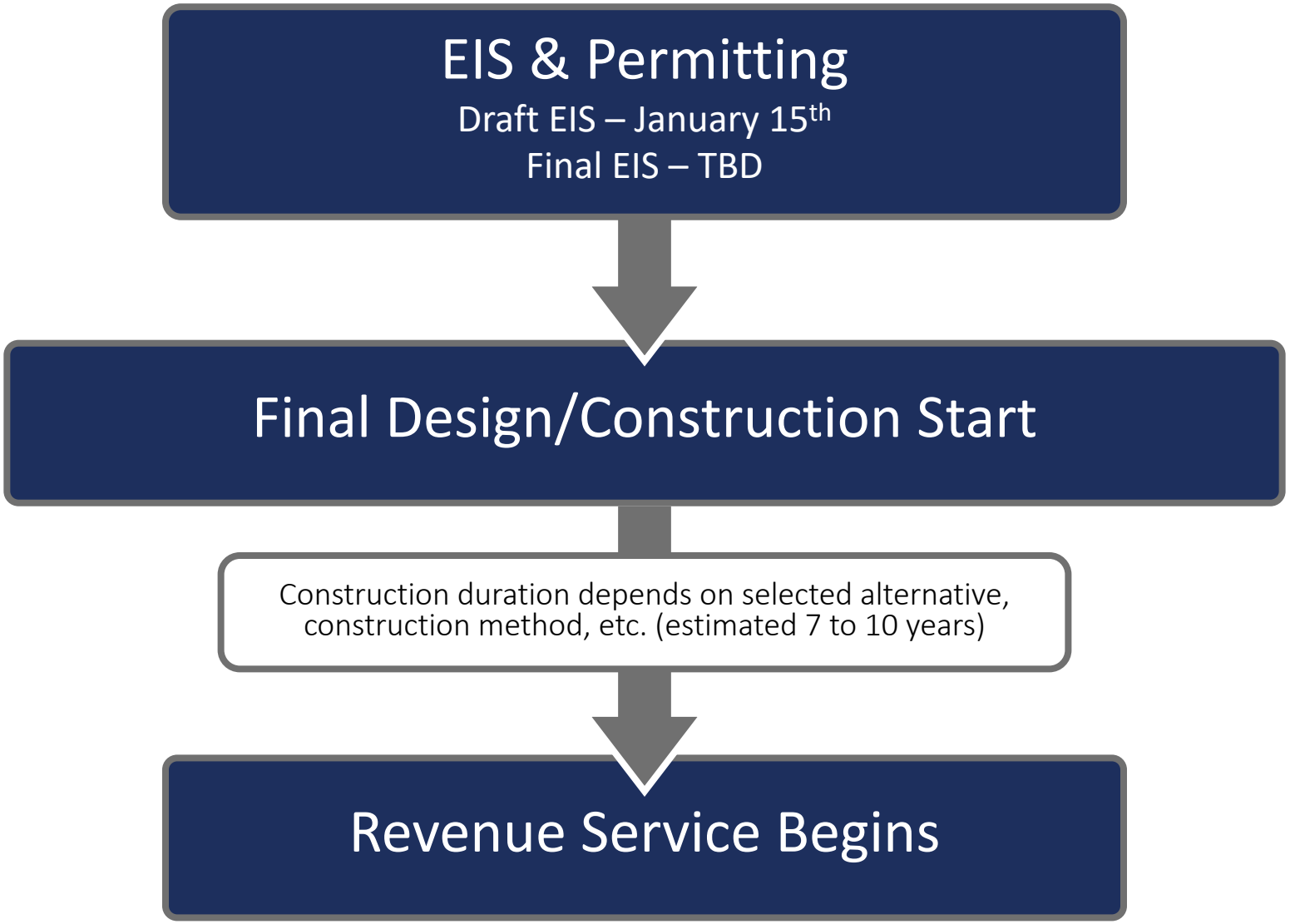
Project Purpose

- From the Project Draft EIS:

- ***The purpose of the SCMAGLEV Project is to evaluate, and ultimately construct and operate, a safe, revenue-producing, high-speed ground transportation system that achieves the optimum operating speed of the SCMAGLEV technology to significantly reduce travel time in order to meet the capacity and ridership needs of the Baltimore-Washington region."***
- ***The SCMAGLEV Project is needed to address the following transportation issues and challenges:***
  - ***Increasing population and employment***
  - ***Growing demands on the existing transportation network***
  - ***Inadequate capacity of the existing transportation network***

- The full P&N can be accessed here: https://www.bwmaglev.info/index.php/component/jdownloads/?task=download.send&id=4&catid=3&m=0&Itemid=101

Washington-Baltimore Schedule



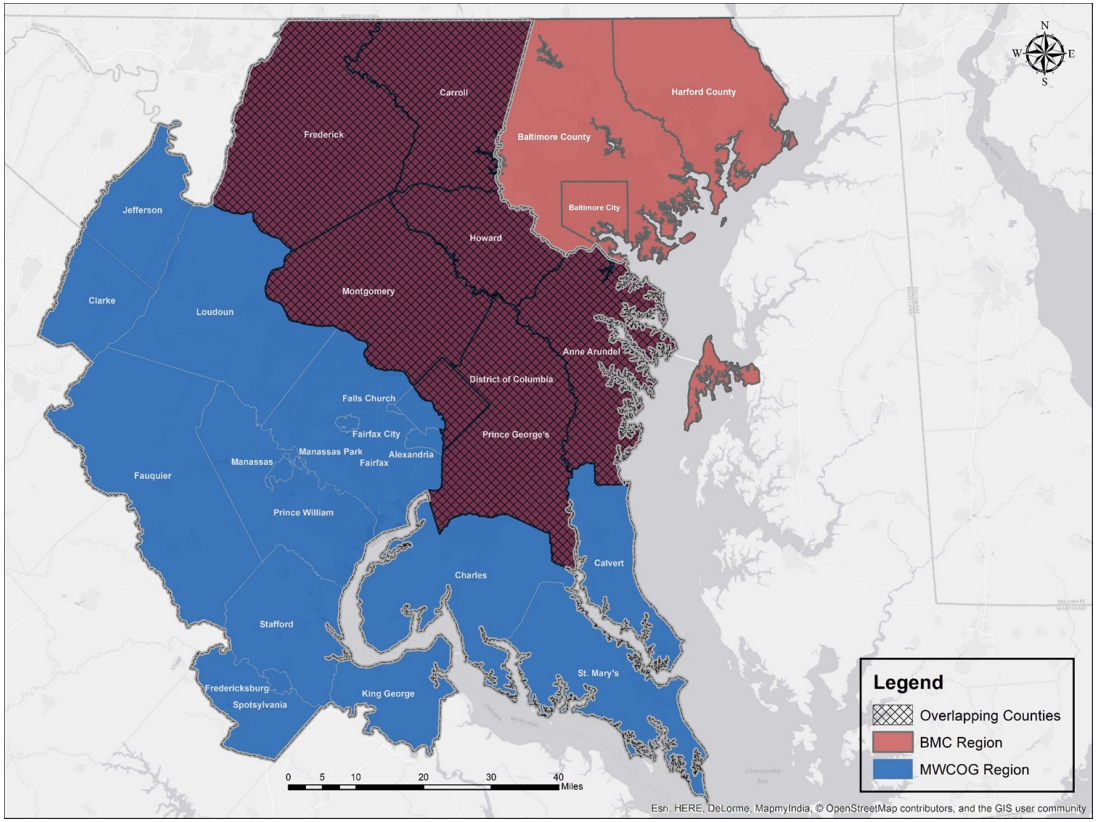
Forecasting Travel Demand for the Baltimore-Washington Superconducting MAGLEV

Larry Pesesky
Louis Berger / WSP

Study Area

Study Area

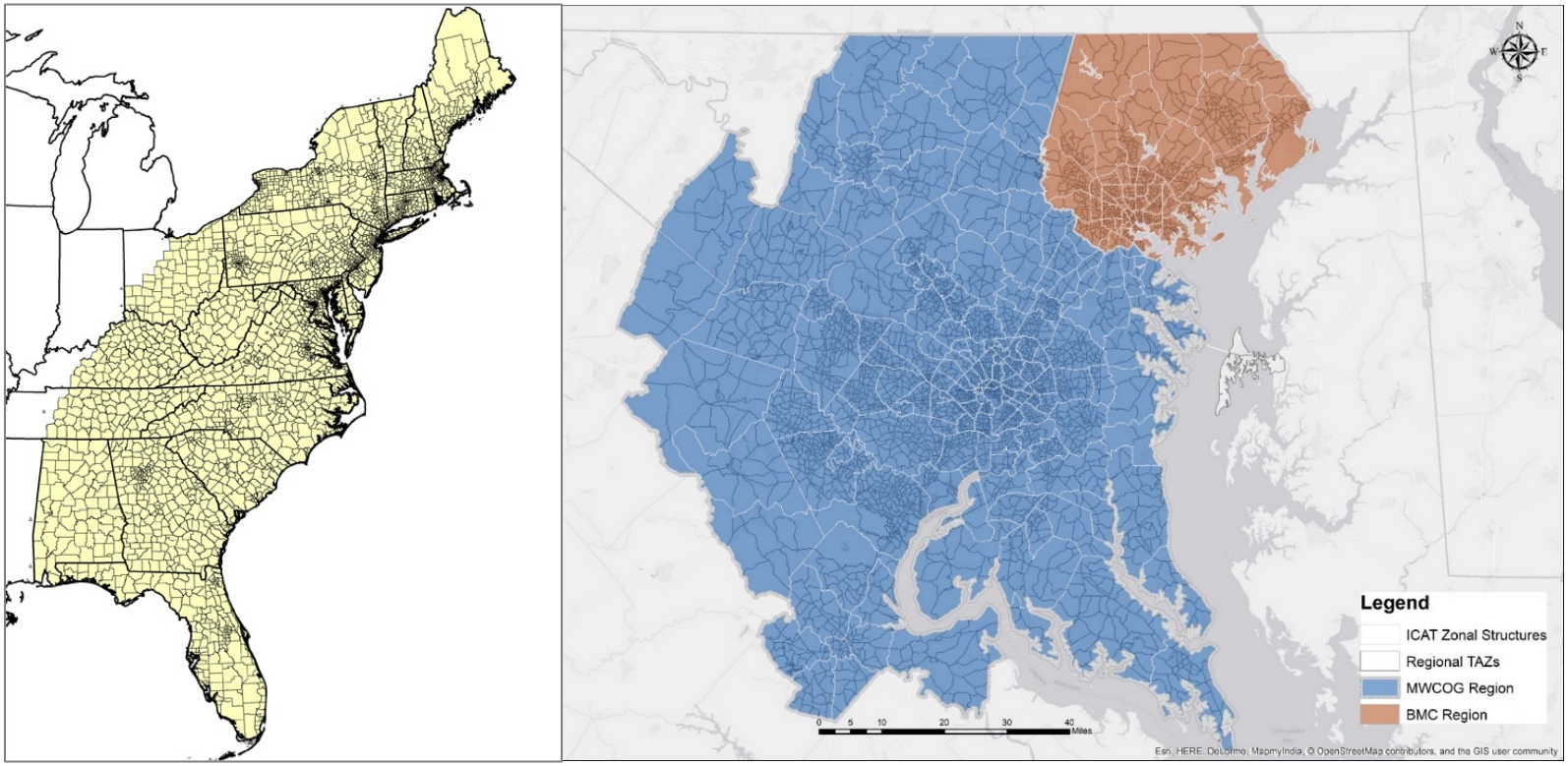
Baltimore-Washington Study Area



- Study area defined by the jurisdictional boundaries of two MPOs
- MPOs supplied critical information to the study
  - Socioeconomic demographic forecasts
  - BMC and MWCOG models provided zonal structure and network characteristics
- Baltimore/Washington Market Area
  - BMC
  - MWCOG
- Overlapping region covering seven counties
  - District of Columbia
  - Prince George's
  - Montgomery
  - Frederick
  - Carroll
  - Howard
  - Ann Arundel

Study Area

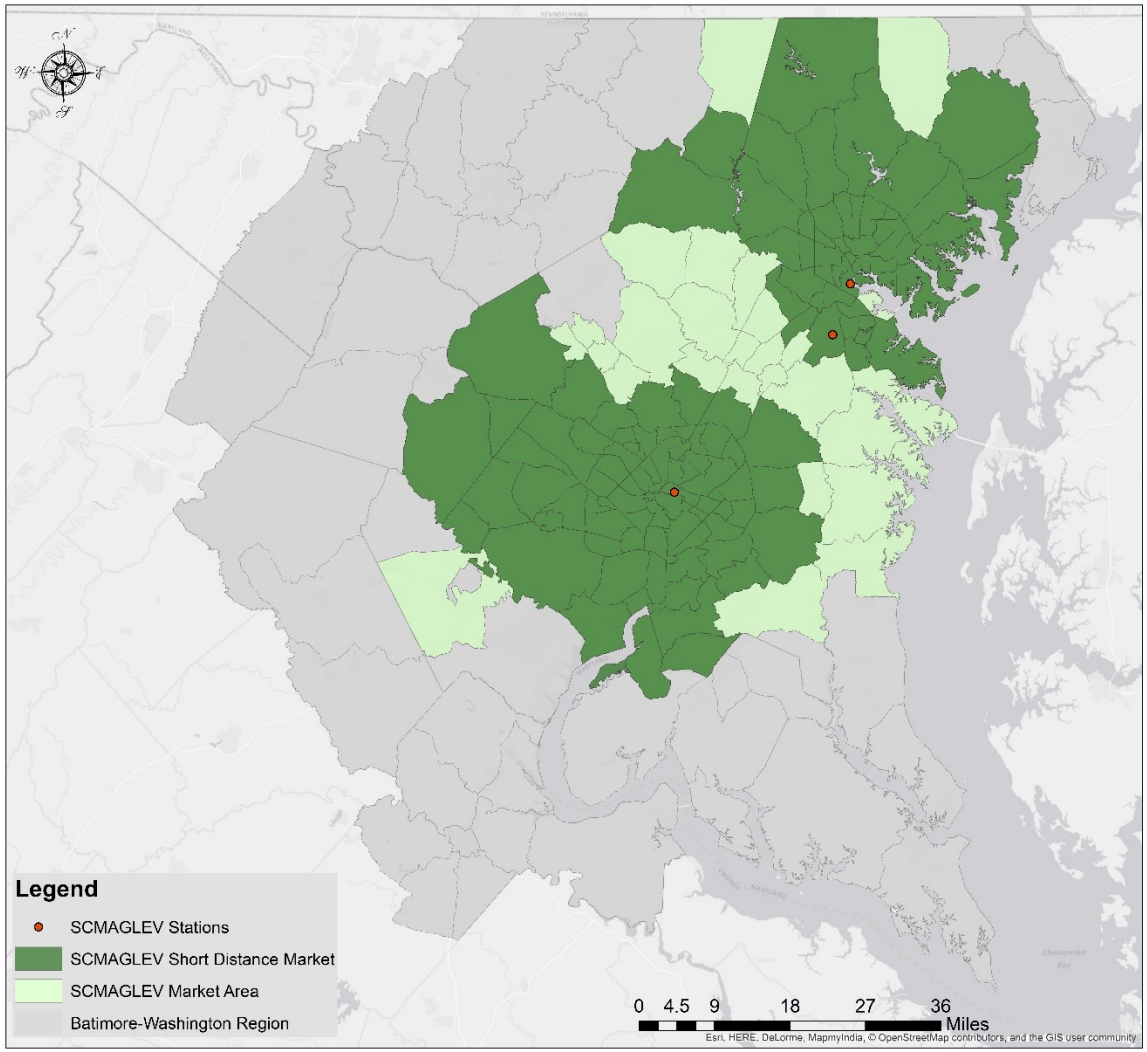
Zonal Structure



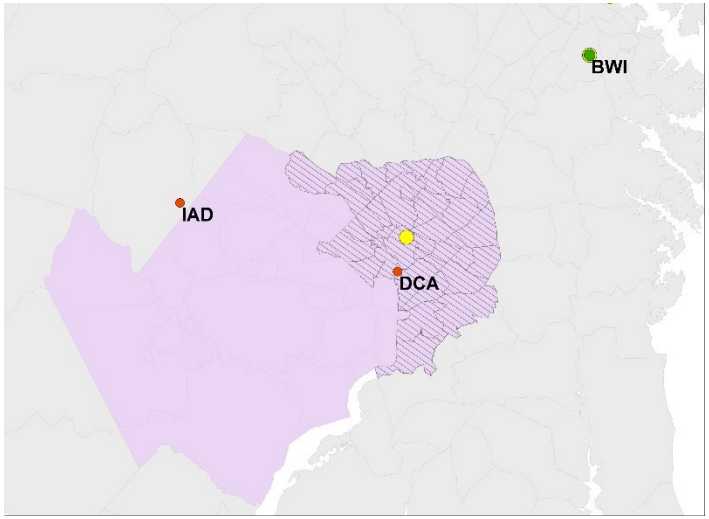
- Based on the integrated corridor analysis tool (ICAT) developed for the I-95 Corridor Coalition model - 3,200 zones across 16 state DOTs
- Provides the basis for evaluating capital investments that affect multi-state travel
- More granular zonal definitions in denser urban areas – 207 ICAT zones in study area

Study Area

SCMAGLEV Market Areas – Intercity Travel

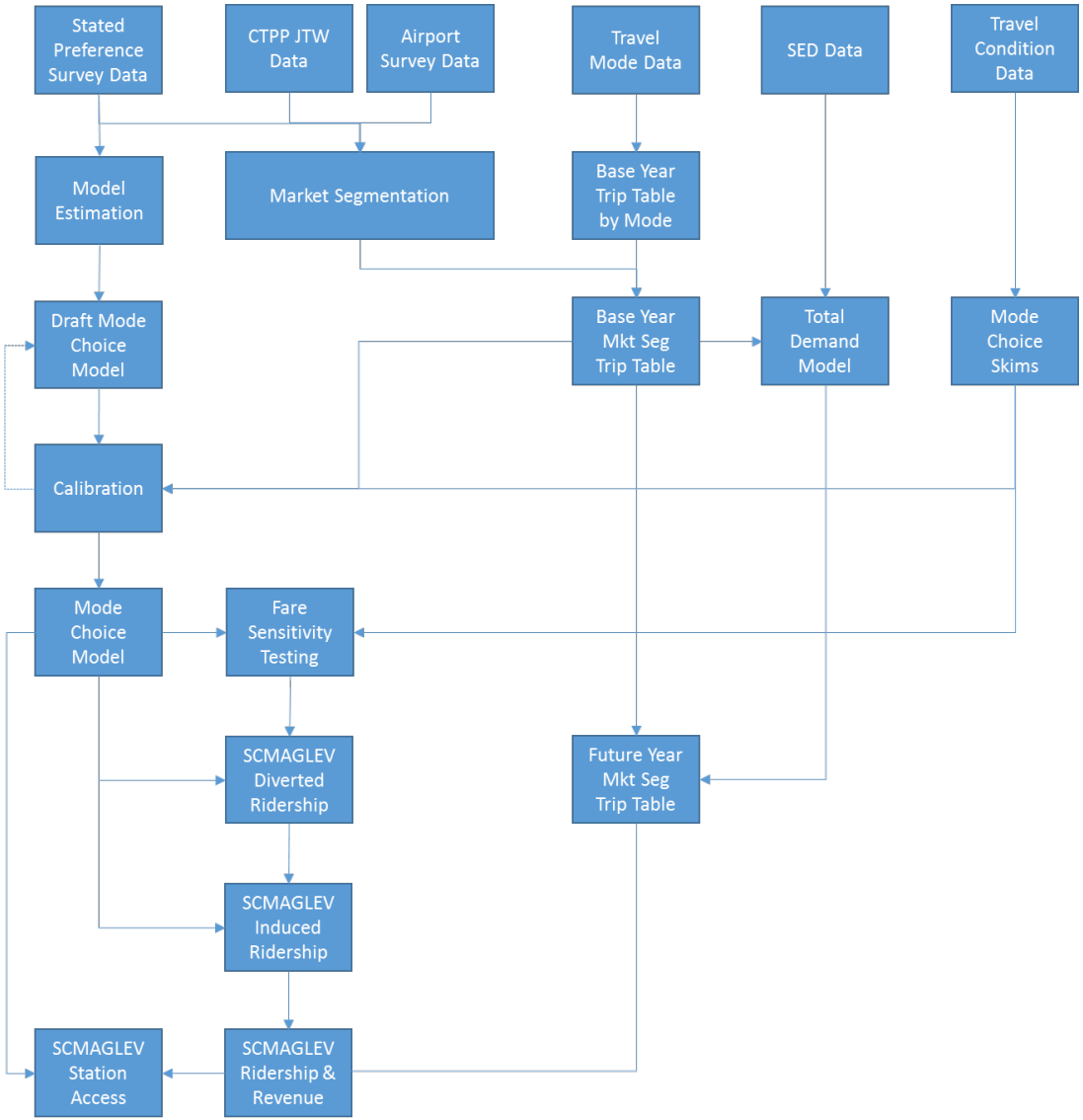


- Further refinements to catchment area to account for actual access travel time to station and trip table consistency with other benchmarks
  - 30-40 min access/egress time
  - Benchmark to trip table characteristics of previous studies
- Airport access and airport choice markets delineated separately from wider study region



Overview of Forecast Process

Overview of Forecast Process

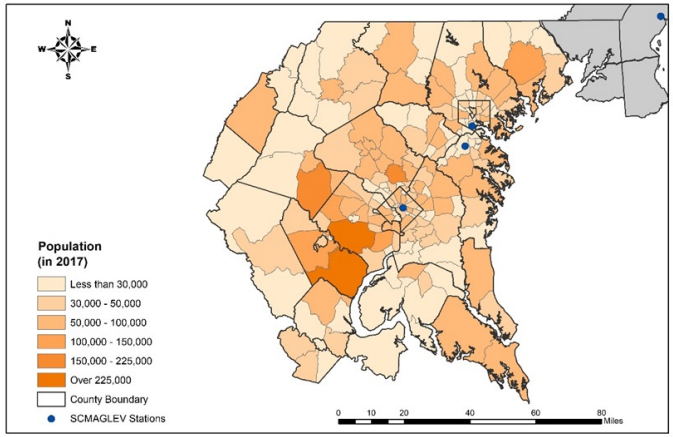


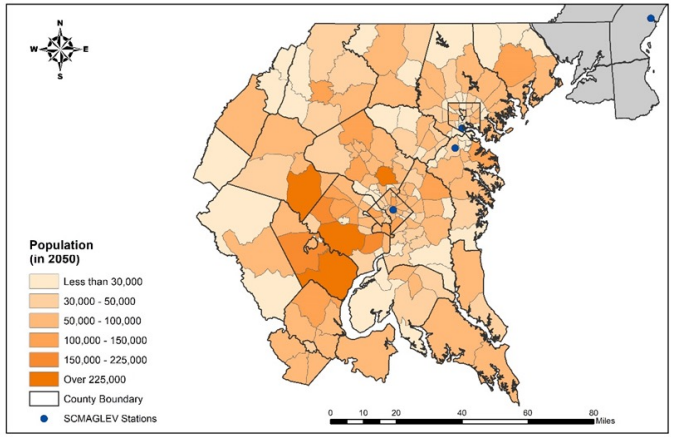
- Data collection
  - Travel mode data
  - SED data
  - Travel condition data (LOS) by mode
- Base year trip table development
- Market segmentation
- Total demand model development
- Future year trip table development
- SP survey
- Model estimation & calibration
- Fare Sensitivity Testing
- SCMAGLEV Ridership
  - Diverted
  - Induced
- SCMAGLEV Station Access

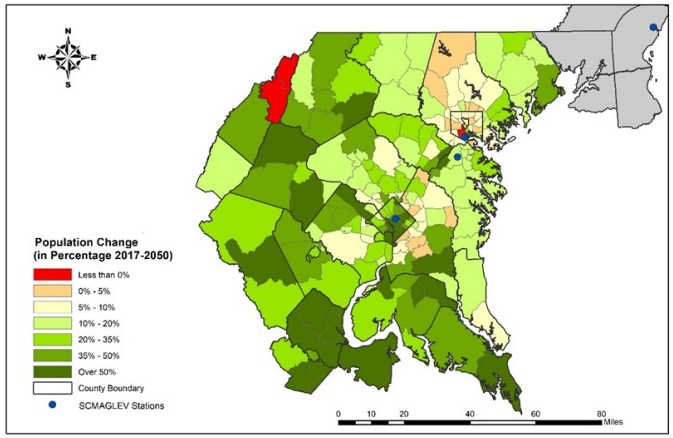
Market Assessment

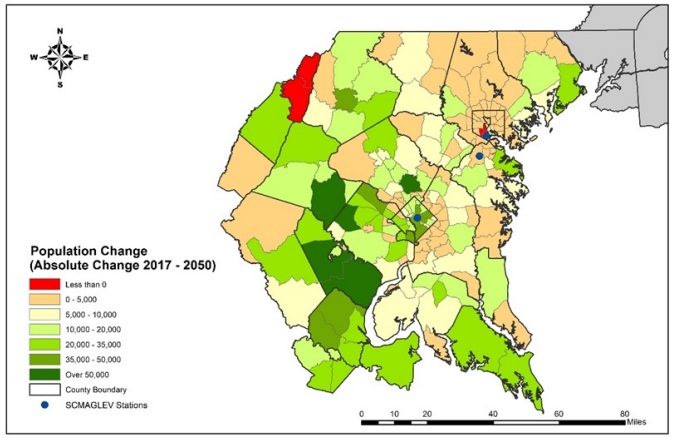
Market Assessment

Population – 2017 vs. 2050





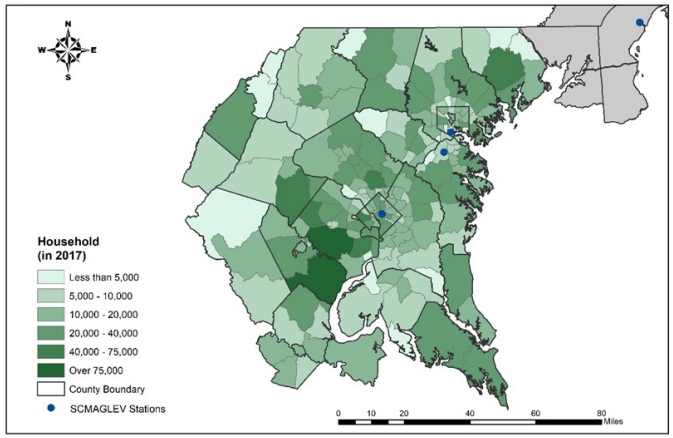


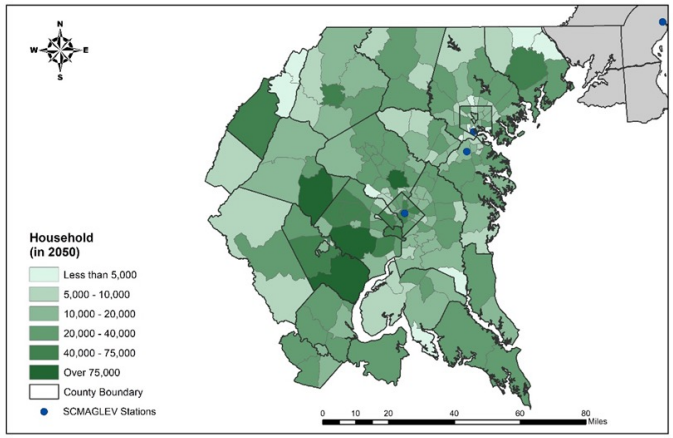


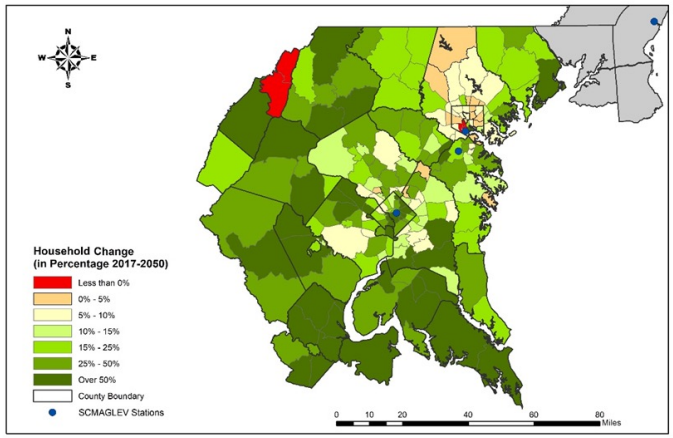
- Higher rates of growth in the DC suburbs

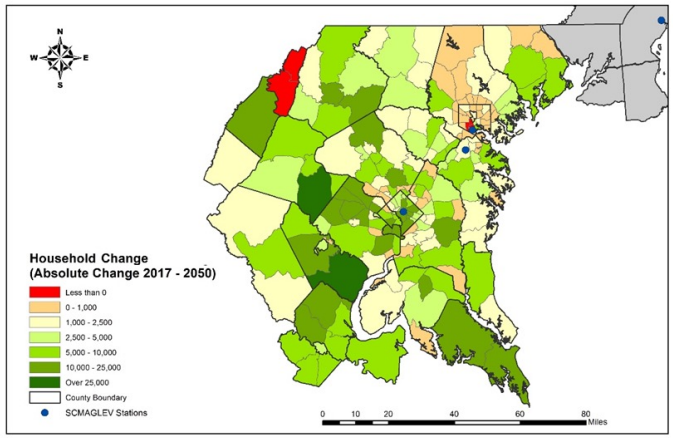
Market Assessment

Households – 2017 vs. 2050





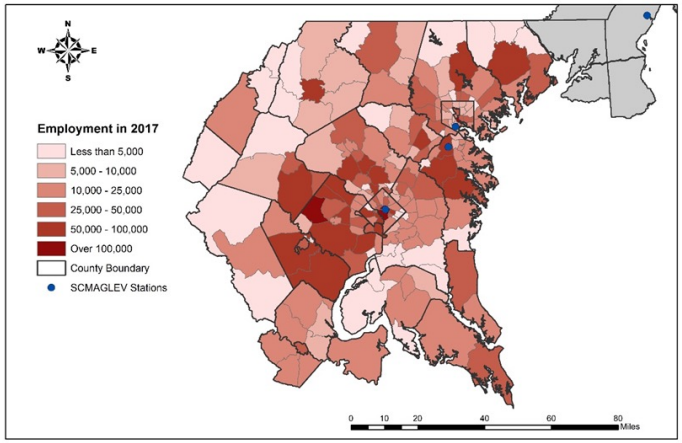


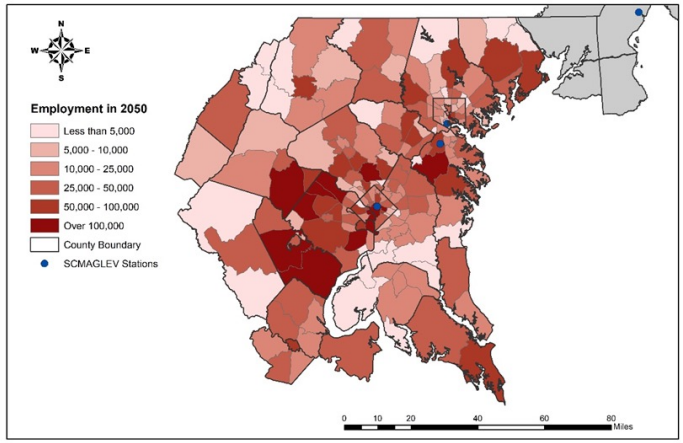


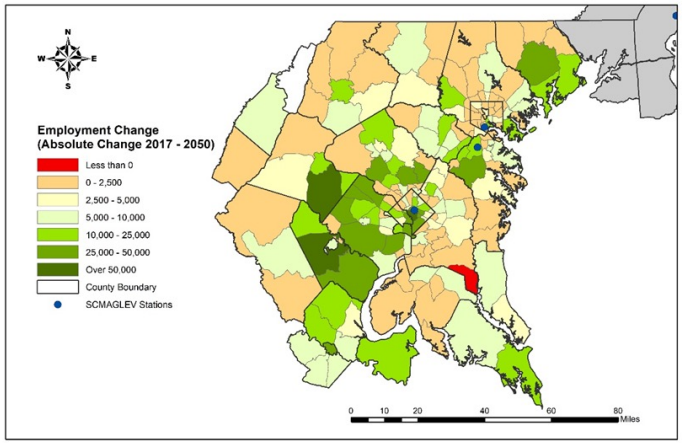
- Higher growth on the Washington side

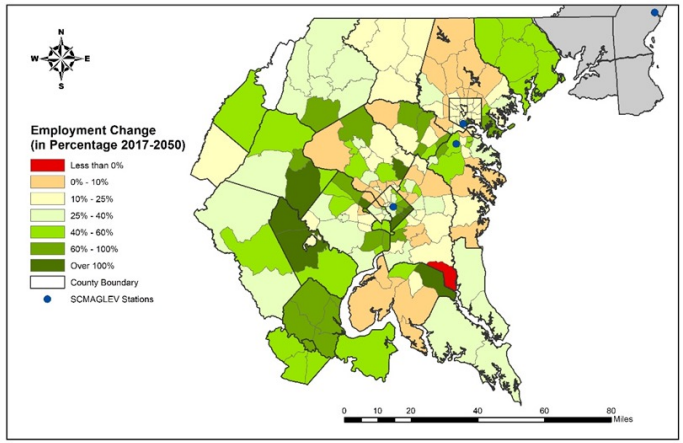
Market Assessment

Employment – 2017 vs. 2050





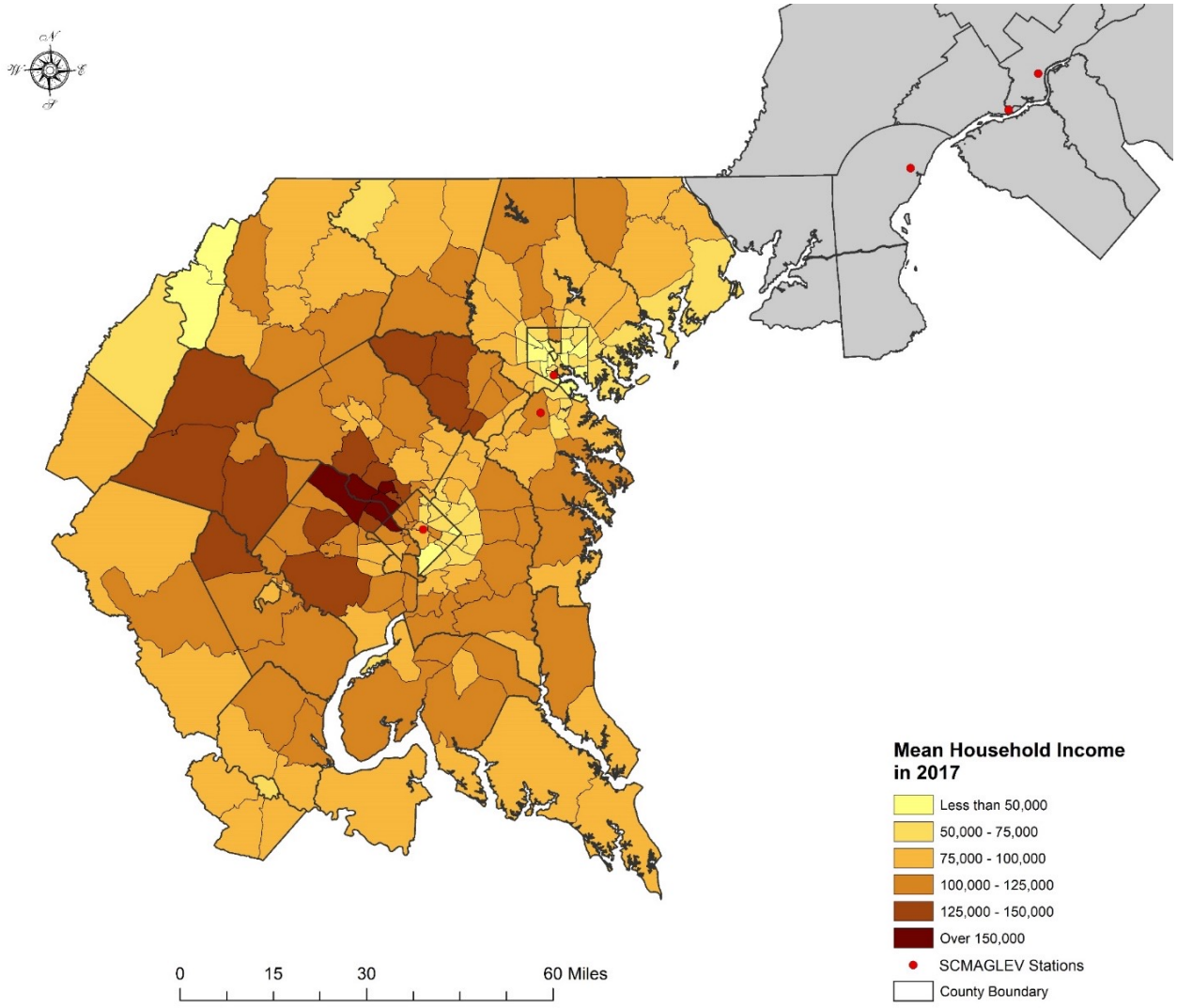




- Higher growth on the Washington side

Market Assessment

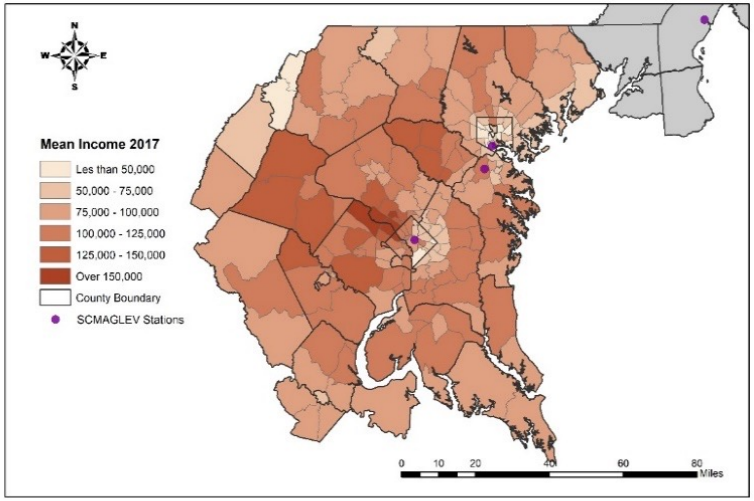
Mean Household Income – 2017

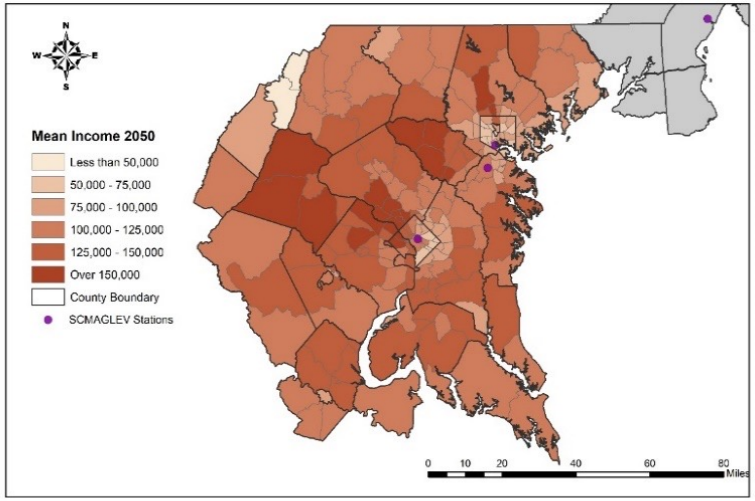


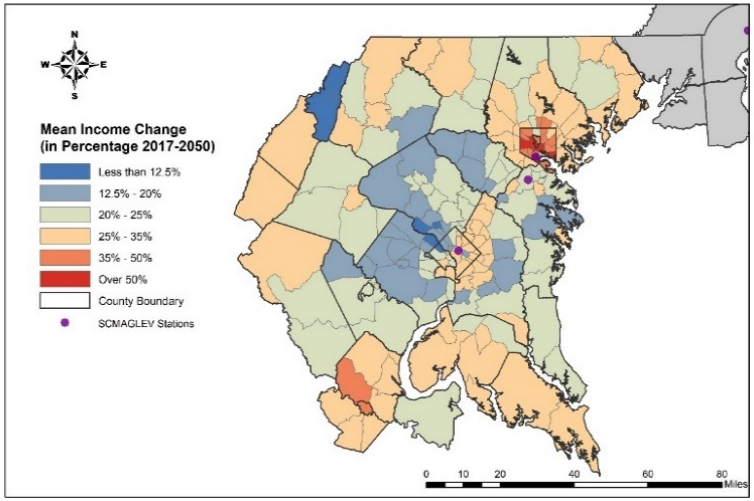
- Needed to develop forecast of household income common to the study area
- Utilized data from ACS to develop zonal estimates in base year
- Calculated mean household income based on resulting profiles
- Developed projections based on third party vendor projections of county level changes in household income profiles

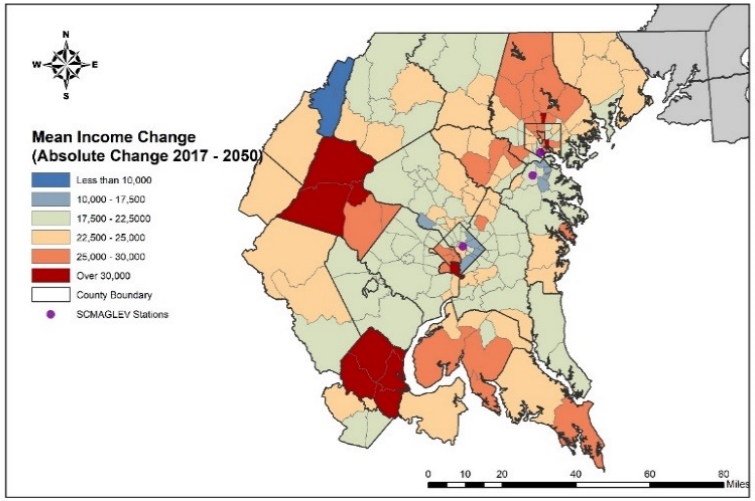
Market Assessment

Mean Household Income – 2017 vs. 2050



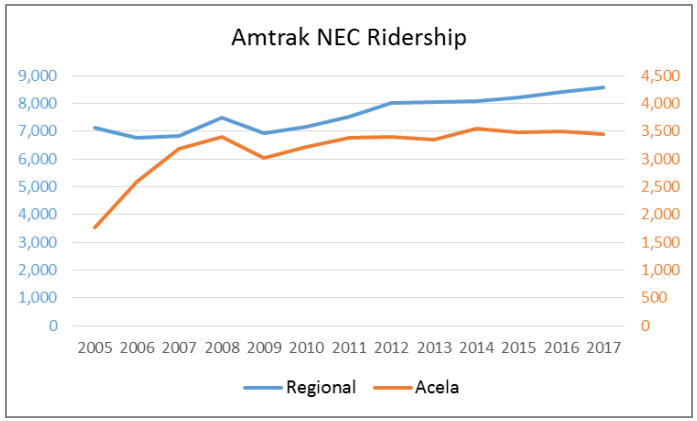


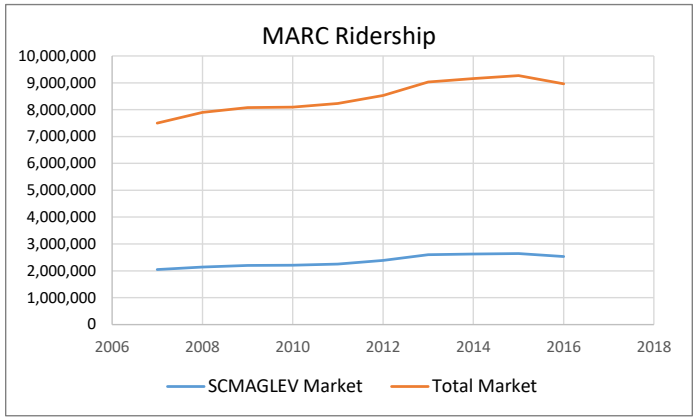




Trip Table Development

Trip Table Development





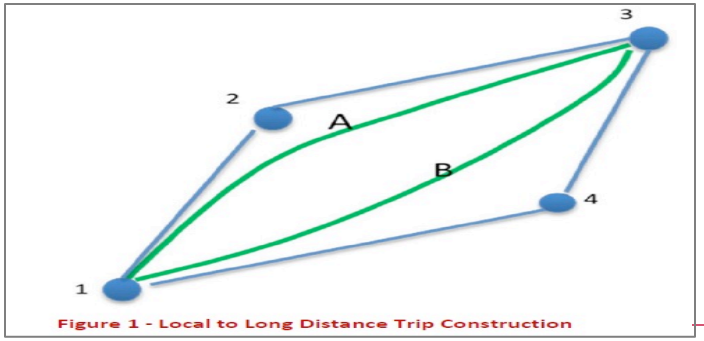


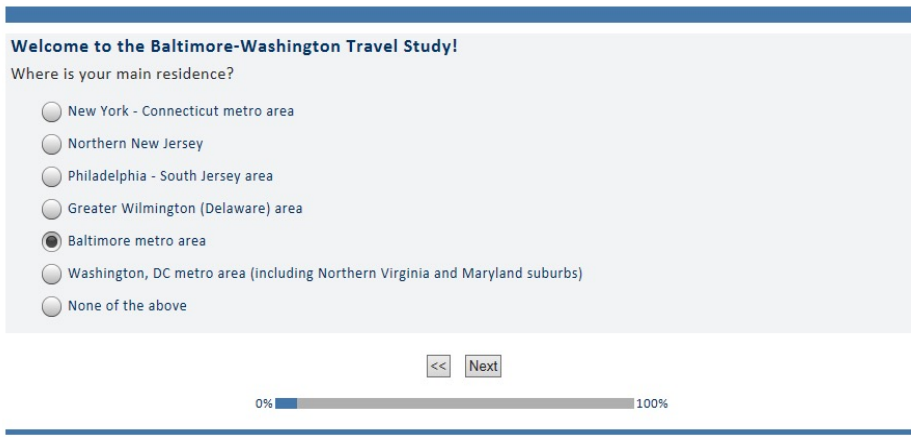
Figure 1 - Local to Long Distance Trip Construction

- Several data sources were reviewed to obtain base year estimates of intercity trip generation and distribution within the corridor
- Rail
  - Amtrak
  - MARC
- Bus
  - NEC Commission Study
  - RSG Bus Ridership Study
- Airport Access Trips
  - Ground Access Surveys
    - MWCOG
- Auto
  - AirSage
    - Benchmarked against other data sources
      - Regional model trip files
      - CTPP journey to work flows

Stated Preference (SP) Survey

Stated Preference Survey

Survey Instrument and Administration



	Baltimore-Washington
Intercept Survey	832
Internet Survey	643
Total	1,475

- Online questionnaire
- Customized for each respondent based on responses to previous questions
- Survey Administration
  - In-Person Interview
    - MARC BWI station and onboard MARC train Penn Line (10/30/17-11/5/17)
    - BWI Airport (12/5 – 12/19)
  - Self Administered
    - E-panel Survey (November/December 2017)
    - Employer Survey (December 2017)

Stated Preference Survey

Survey Structure

- Screening Questions
- Reference Trip Characteristics (OD, mode, purpose, party size, time of day, day of week)
- Stated Choice Exercise
  - Hypothetical scenarios that include current modes for travel along the corridor as well as SCMAGLEV
  - Choose based upon presented information taking into account circumstances of an actual trip along the Corridor
- Respondent Characteristics

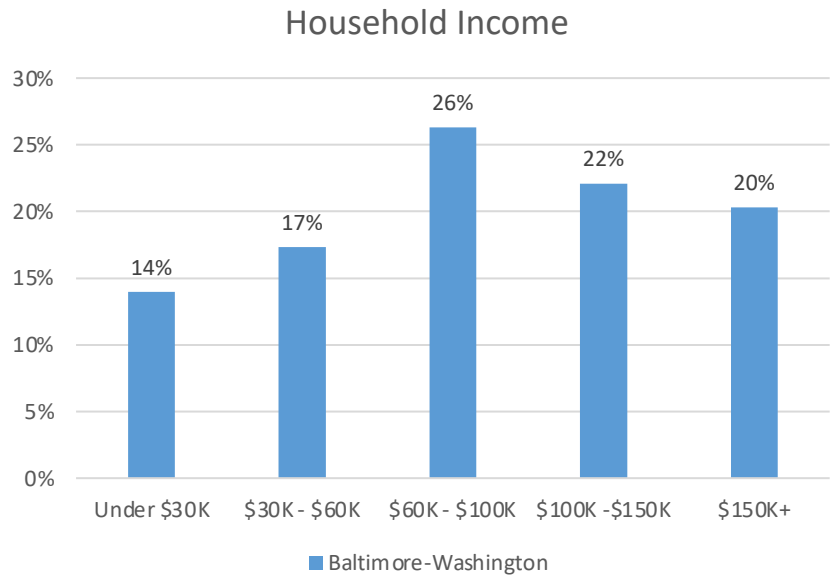
Stated Preference Survey

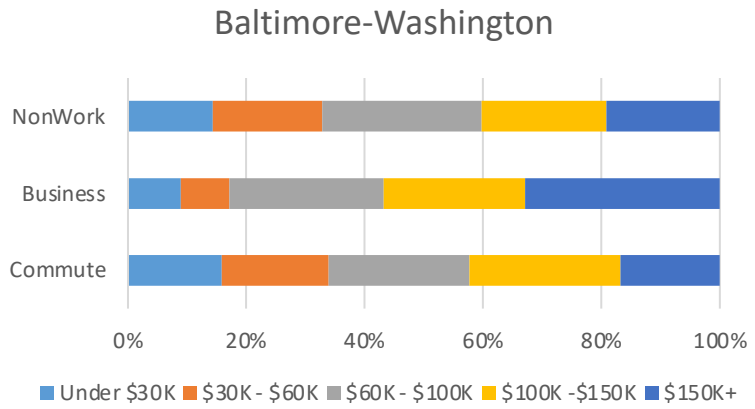
Stated Choice Exercise

- 8-12 hypothetical choice questions pitting SCMAGLEV against existing modes of travel
- Level-of-service characterization of each mode varies in each choice task
- Respondent required to make choices through trade-offs balancing time, cost, and overall modal preference

Stated Preference Survey

Respondent Household Income

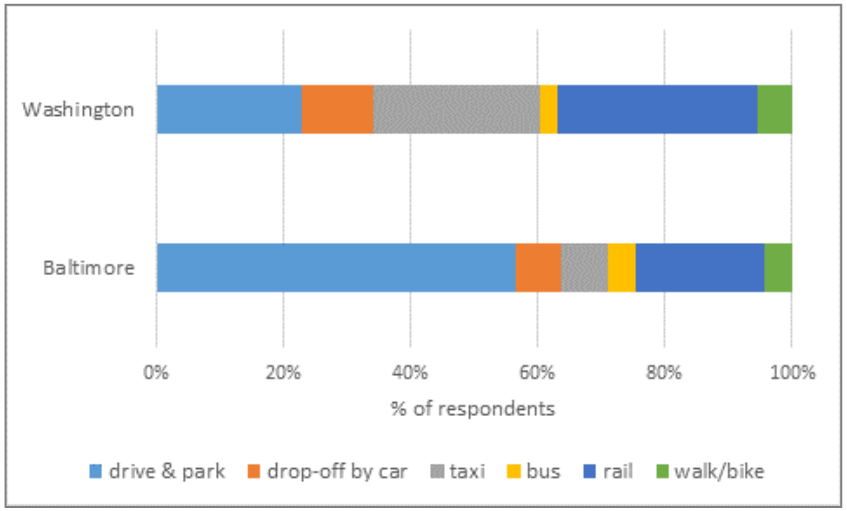


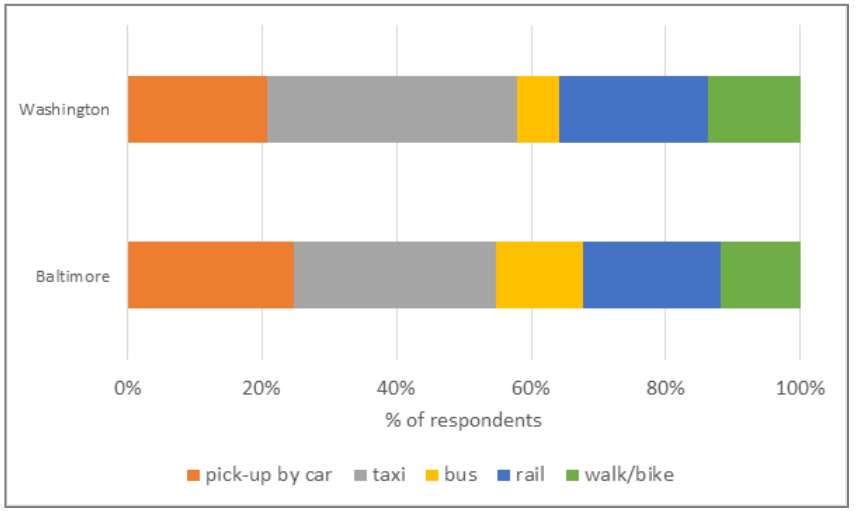


- Survey household income profiles used to synthesize trip origin-destination distribution in disaggregated trip tables

Stated Preference Survey

Station Access / Egress (non-auto modes)





- Higher rates of station access by auto in Baltimore region
- Patterns of non-auto station access used to support station access and egress model calibration in ridership model

Model Estimation

Model Estimation

- Implied Value-of-Time (VOT) $/hr
  - Measure of price sensitivity

$$VOT = \frac{\beta_{time\ (utils/min)} \times 60_{min/hr}}{\beta_{cost\ (utils/\$)}}$$

- Base model evaluation of SP survey data conformed with U.S. DOT guidelines of VOT for surface and non-surface modes of travel

Travel Demand Model

Louis Berger

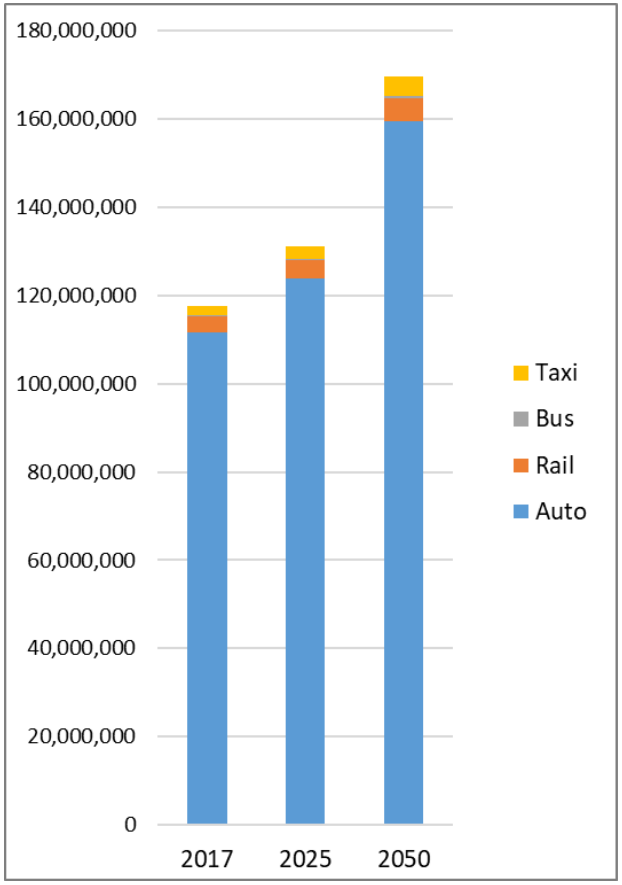
Travel Demand Model

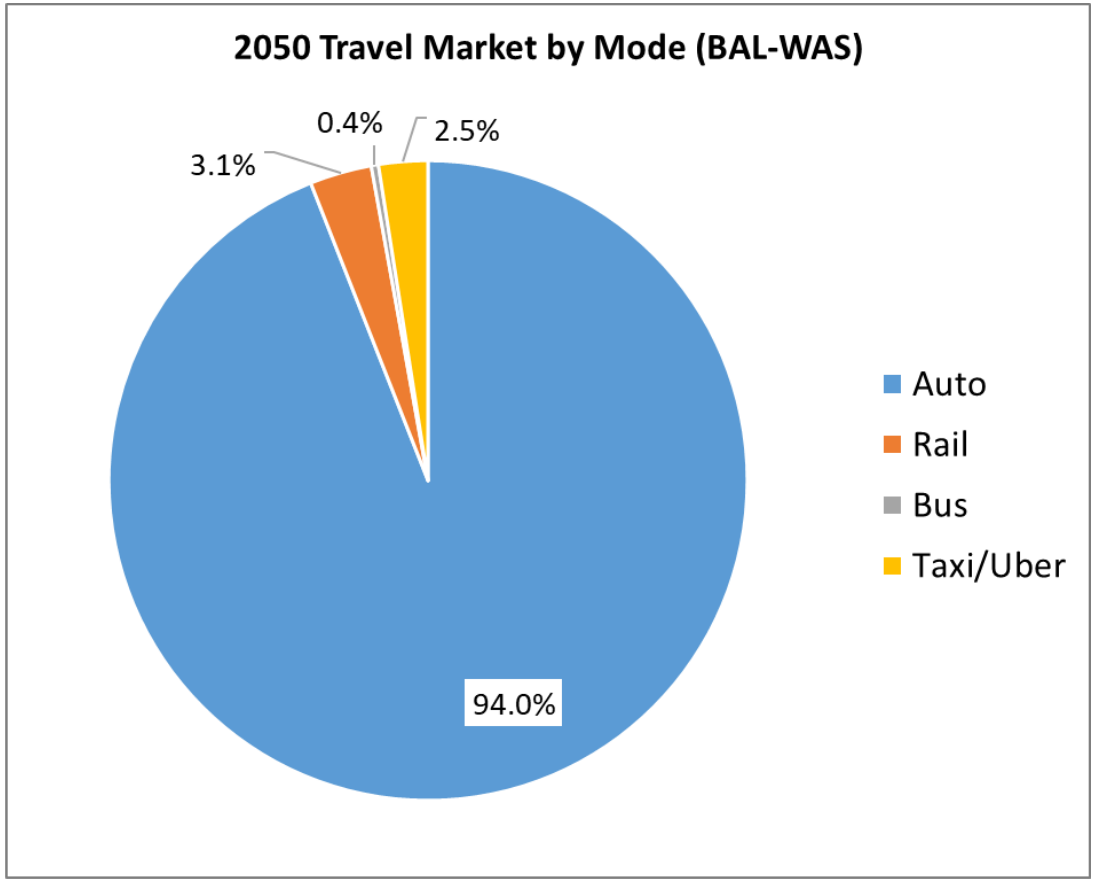
Overview

- Ridership and revenue conducted on spreadsheet-based model supported by inputs from regional travel demand models
- Time-of-day
  - AM (6am-9am)
  - MD (9am-4pm)
  - PM (4pm-7pm)
  - NT (7pm-6am)
- Model forecast horizons 2025 and 2050
- Induced ridership
  - Generalized cost approach (commuter, business, non-business)
  - Airport choice model (airport access trips)
- Travel times obtained from Google Directions API as well as scheduled service travel time
  - Benchmarked and evaluated against regional model travel times
- Station access and egress modeled using access and egress coefficients from model estimation

Summary of Model Results

No-Build Travel Market





SCMAGLEV Forecasted Ridership

Year	Diverted Trips				Total Diverted Trips	Induced Trips	Total SCMAGLEV Ridership
	Auto	Rail	Bus	Taxi/ TNC			
2030	11,380,467	2,122,750	253,107	582,217	14,338,541	2,718,370	17,056,911
2045	14,877,281	2,610,204	309,733	860,551	18,657,769	3,709,269	22,367,238
	67%	12%	1%	3%		16%	

SCMAGLEV Daily Trips by Station (2045)

	Station			
	Baltimore	BWI	Washington	Daily Total
# Trips	19,205	17,549	33,315	70,069
% Total	27%	25%	48%	

SCMAGLEV Ridership by Market Segment (2050)

	Market Segment				
	Commute	Business	Non-Business	Airport Business	Airport Non-Business
% Total	25.4%	15.4%	44.6%	8.2%	6.3%
% Non-Airport	30%	18%	52%	-	-

Q&A

Thank You