North Central Florida Regional Planning Council

II

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December 8, 2022

TO: Technical Advisory Committee Long-Range Transportation Plan Working Group

FROM: Scott R. Koons, AICP, Executive Director SRK

SUBJECT: **Meeting Announcement and Agenda**

On December 15, 2022, the Technical Advisory Committee Long-Range Transportation Plan Working Group will meet at 2:00 p.m. in the **Regional Transit System Administration Building, Room 5264, 34 SE 13th Road, Gainesville, Florida.**

STAFF RECOMMENDATION

I. Introductions (if needed)*

Page #1 **II. Approval of Meeting Agenda** **APPROVE AGENDA**

Page #3 **III. Gainesville Urbanized Area Transportation Study - Long-Range Transportation Plan Model Conversion** **RECEIVE PRESENTATION**

The Florida Department of Transportation Central Office and its Model Contractor, PTV Group, Inc. will discuss the statewide long-range transportation plan model conversions, including conversion of the Gainesville Urbanized Area Transportation Study model.

Page #9 **IV. Gainesville Urbanized Area Transportation Study - Modeling Analysis Upgrade** **UPGRADE TO TOURING MODEL**

The Florida Department of Transportation Central Office and its Model Contractor, PTV Group, Inc. will discuss upgrading from the four-step gravity model to a touring model for the 2050 Long-Range Transportation Plan update.

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TO: Technical Advisory Committee Long-Range Transportation Plan Working Group

FROM: Scott R. Koons, AICP, Executive Director

SUBJECT: Gainesville Urbanized Area Transportation Study - Long-Range Transportation Plan Model Conversion

STAFF RECOMMENDATION

Receive Presentation.

BACKGROUND

As required by federal legislation, the Metropolitan Transportation Planning Organization for the Gainesville Urbanized Area is responsible for long-range transportation planning for the Gainesville Metropolitan Area. The adopted cost feasible plan consists of project recommendations to the Florida Department of Transportation.

The Metropolitan Transportation Planning Organization coordinates with the Florida Department of Transportation to maintain the Gainesville Urbanized Area Transportation Study model. This model is Alachua Countywide. Recent Gainesville Urbanized Area Transportation Study long-range transportation plan updates have been done on the Citilabs, Inc. Cube Voyager platform. The Florida Department of Transportation has recently changed its long-range transportation plan platform by contracting with PTV Group, Inc. PTV Group's Visum software is the new platform.

The Florida Department of Transportation Central Office and its Model Contractor, PTV Group, Inc. will discuss the statewide long-range transportation plan model conversions, including conversion of the Gainesville Urbanized Area Transportation Study model.

Exhibit 1 is an edited statewide model conversion list from the FSUTMSOnline.net website. Exhibit 2 includes information on the Visum platform.

EXHIBIT 1

FSUTMSOnline.net *

Wednesday, September 15, 2021

Florida Standard Urban Transportation Model Structure (FSUTMS) Models To Be Converted to New Platform

The Florida regional and statewide travel models will be transitioning to new modeling platforms with the anticipated model conversion completion date of July 2023. The two software platforms available for this transition are PTV Visum and TransCAD.

Florida Department of Transportation Districts and their metropolitan planning organization partners will work collaboratively to choose a software platform and develop a schedule for model conversions. This schedule is expected to follow the long-range transportation plan update schedule shown below.

Florida Department of Transportation District	Metropolitan Planning Organization	Long-Range Transportation Plan Due Date
6	Miami-Dade TPO	September 26, 2024
7	Hillsborough County MPO	November 5, 2024
7	Forward Pinellas	November 13, 2024
2	North Florida TPO	November 14, 2024
7	Hernando Citrus MPO	December 4, 2024
7	Pasco County MPO	December 11, 2024
4	Broward MPO	December 12, 2024
4	Palm Beach TPA	December 12, 2024
5	River to Sea TPO	July 23, 2025
2	**Gainesville MTPO**	**August 26, 2025**
5	Space Coast TPO	September 10, 2025
1	Charlotte/Punta Gorda MPO	October 5, 2025
3	Florida-Alabama TPO	October 14, 2025
4	Martin MPO	October 19, 2025
1	Sarasota-Manatee MPO	October 26, 2025
3	Capital Region TPA	November 23, 2025
5	Ocala/Marion County TPO	November 24, 2025
4	Indian River County MPO	December 9, 2025
5	Lake-Sumter MPO	December 9, 2025
5	MetroPlan Orlando	December 9, 2025
1	Polk TPO	December 10, 2025
1	Collier MPO	December 11, 2025
1	Lee County MPO	December 18, 2025
4	St. Lucie TPO	February 3, 2026
1	Heartland Regional TPO	March 10, 2026
3	Bay County TPO	June, 2026
3	Okaloosa-Walton TPO	December 9, 2026

MPO - Metropolitan Planning Organization
MTPO - Metropolitan Transportation Planning Organization
TPA - Transportation Planning Authority
TPO - Transportation Planning Organization

Shaded cells show areas not scheduled for model conversion at this time.

*Edited Florida Department of Transportation FSUTMSOnline.net excerpt

PTV GROUP

PTV Visum

Multimodal transportation planning software.

PTV Visum is the world's leading transportation planning software. It is the standard for macroscopic simulations and macroscopic modeling of transport networks and transport demand, public transport planning, and for the development of transport strategies and solutions. With PTV Visum, you create transportation models that provide insights for long-term strategic planning and short-term operational use.

Your Benefits

Reliable transportation of future investments

Cost-benefit analysis for new mobility infrastructure and public transport.

Develop balanced sustainable mobility concepts

Evaluate transport concepts for sustainability, accessibility & more.

Simulate multimodal transport

All existing and future transport modes and their interactions.

Integrate all mobility data

Bring together mobility data and provide powerful analysis tools.

High performance for more efficiency

Fastest and most advanced algorithms for travel demand modeling.

Seamless integration with PTV Vissim

Easily combine macro and micro modeling.

A selection of PTV Visum references

DEPARTMENT OF TRANSPORT

DB

European Commission

TRANSPORT FOR LONDON
EVERY JOURNEY MATTERS

Key Functions

High-performance algorithms for quick and accurate results

PTV Visum transport planning software supports the evolution of mobility systems through data-based assessments of scenarios. These models are complex, due to the diversity of human mobility and its interactions with its surroundings. To effectively evaluate many possible future variants, short model run times are critical. The PTV Visum algorithms are therefore continuously optimized with new methods and techniques, such as contraction hierarchies and parallel processing. Especially in the key area of traffic assignment, amazing accelerations have been achieved in recent years.

Multi modal transport modeling

With PTV Visum, you plan multimodal transportation in a city or a region, get information on the mode split, analyze all travel processes in detail, and find the best solutions for present and future mobility challenges. Use PTV Visum software to develop a master transportation system plan for the entire region, even when there is little data available.

Efficiently create and maintain transportation models

Developing and maintaining transportation models means using data from many providers and sources. PTV Visum offers a variety of interfaces to import such data and to integrate it into the model. In addition to generic formats for tabular and GIS data, there are specialized interfaces for public transport data, demand matrices, and signal controls.

Assess air and noise pollution from transport

PTV Visum includes procedures for calculations of emissions and noise from transport, so you can assess these impacts without additional software. When used early in the planning process, it can help to detect unwanted effects of transport measures, such as increases in total emissions due to detours.

Detailed traffic flow simulation of large-scale transport networks

The powerful mesoscopic assignment method Simulation-Based Assignment (SBA) enables fast and accurate traffic flow simulation of large networks. As a result, the network effects of local traffic management strategies are assessed easily and accurately.

Activity-based demand modeling (ABM)

PTV Visum supports Activity-Based Demand Models (ABM), which model mobility decisions of individuals instead of groups of people. As a result, daily activity and travel schedules are created with information on start times, time spans, locations, and mode. Easily integrate and manage your ABM demand data; store surveyed or synthesized households, persons, tours, and trips; and connect them to the database. Trips can be assigned to static assignment paths for analysis.

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December 8, 2022

TO: Technical Advisory Committee Long-Range Transportation Plan Working Group

FROM: Scott R. Koons, AICP, Executive Director SRK

SUBJECT: Gainesville Urbanized Area Transportation Study - Modeling Analysis Upgrade

STAFF RECOMMENDATION

Upgrade to Touring Model.

BACKGROUND

The Metropolitan Transportation Planning Organization coordinates with the Florida Department of Transportation to maintain the Gainesville Urbanized Area Transportation Study model. With the Florida Department of Transportation-supported long-range transportation plan model conversion to PTV Group's Visum software as the new platform, there is an opportunity to upgrade the modeling analysis tool.

Currently, the Gainesville Urbanized Area Transportation Study model is a four-step gravity model that includes the following four steps:

- Trip Generation (how many trips?);
- Trip Distribution (where to?);
- Mode Choice (which mode of travel?); and
- Trip Assignment (what route?).

Additional steps commonly include the following steps:

- Network building;
- Transit;
- Bicycle and pedestrian;
- Time-of-day; and
- Reporting.

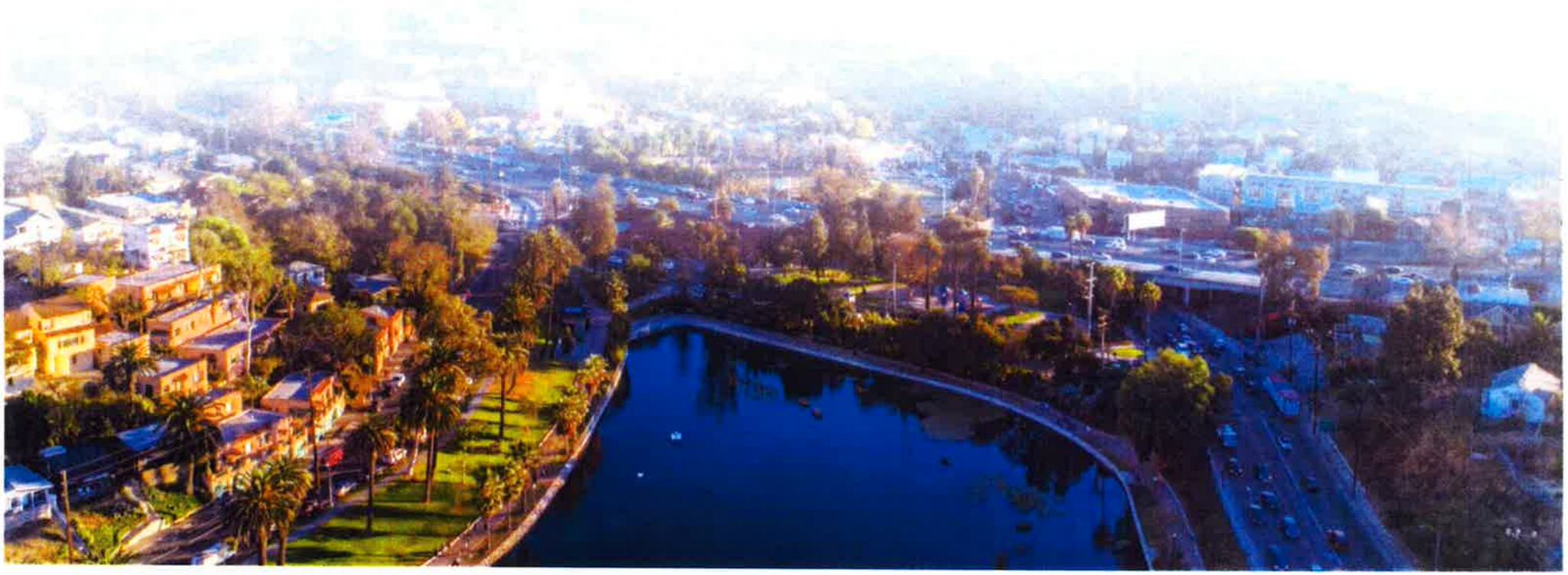
The Florida Department of Transportation Central Office and its Model Contractor, PTV Group, Inc. will discuss upgrading from a four-step gravity model to a touring model as a component to the conversion of the Gainesville Urbanized Area Transportation Study model.

Exhibit 1 is a copy of PTV Group's Touring Model handout. Exhibit 2 includes excerpts from the Northeast Regional Planning Model training session handouts.

EXHIBIT 1

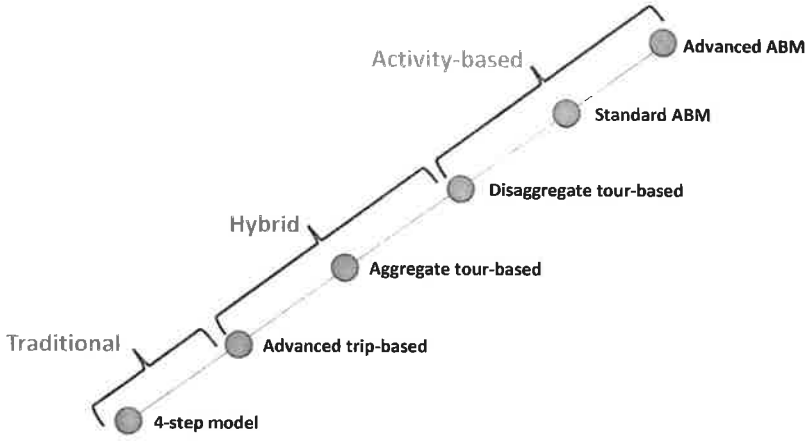
PTV GROUP

Gainesville Tour-Based Model



What is a tour-based model?

- Tour-based models generate travel at the tour level
- Tour-based models sit somewhere in between a trip-based and an activity-based model
- Tour-based models provide a lot of flexibility to achieve ABM-level performance with the simplicity of a trip-based model.



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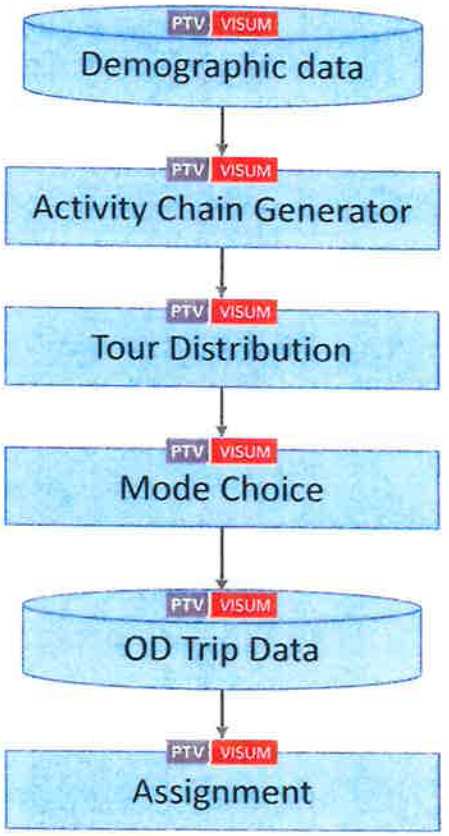
Visum Tour-based model steps

- Set up as an activity chain-based model
- Activity chains are home-based tours
- Tour-based model steps in Visum:
  1. Activity chain generation
  2. Activity chain distribution
  3. Mode choice
  4. Assignment



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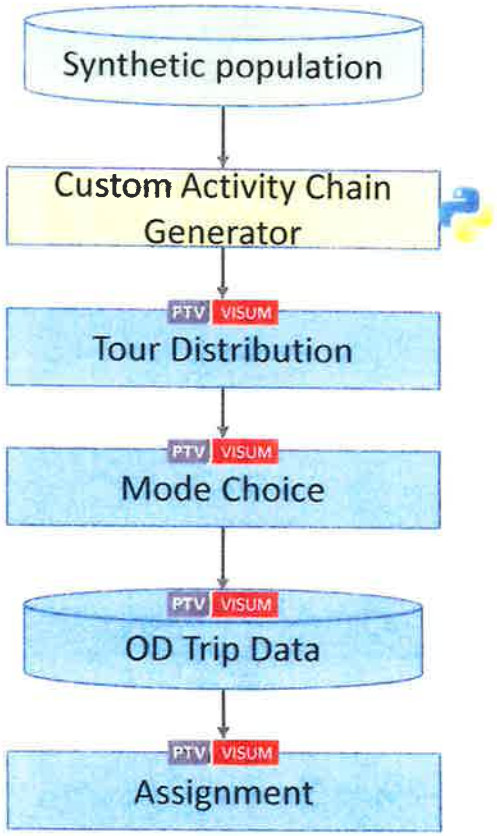
Flexible tour/activity chain generation

Options for activity chain generation

1. Start with a disaggregate synthetic population and a custom activity chain generator

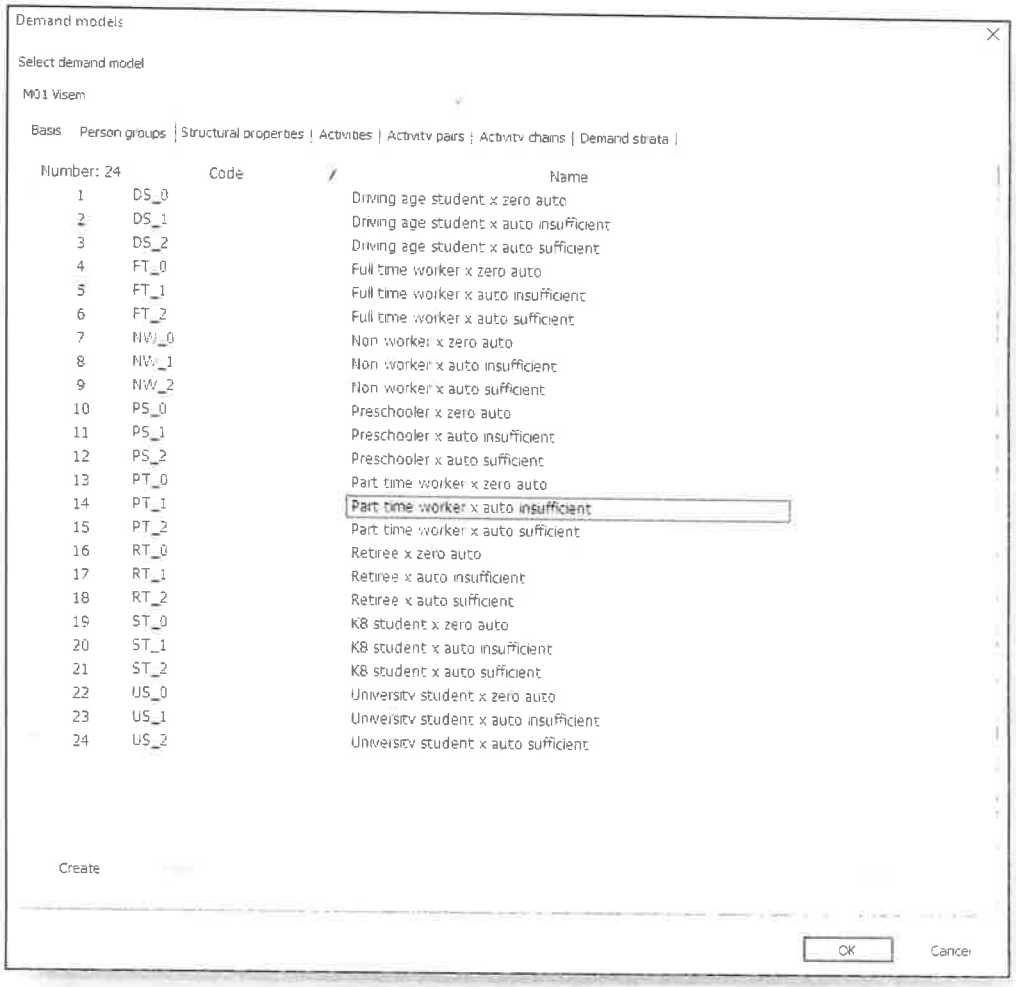
2. Aggregate zonal calculations in Visum

3. Aggregate zonal calculations with detailed socio-demographic segmentations



How to set up a tour-based model in Visum?

1. Define person groups
   - Person type
   - Auto Ownership



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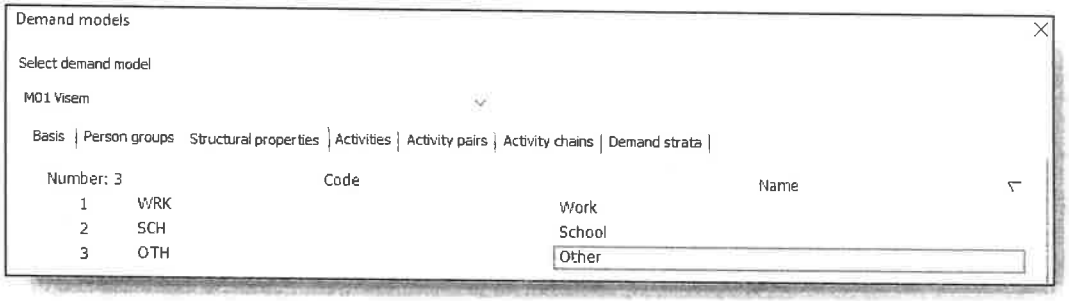
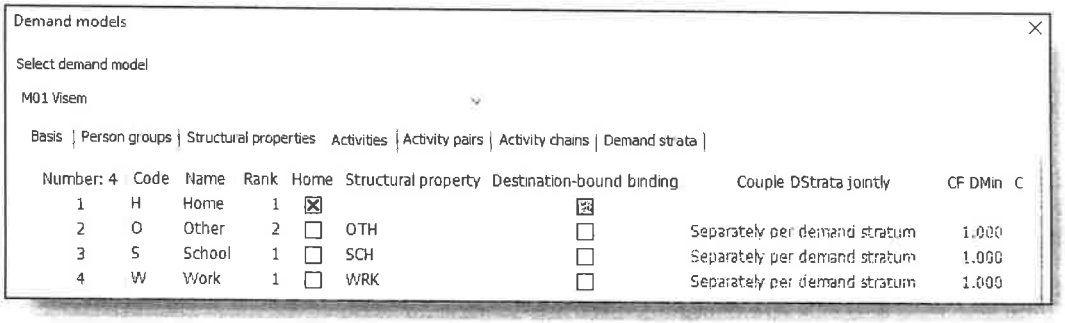
How to set up a tour-based model in Visum?

2. Define activity attractors

3. Define activities and ranking





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How to set up a tour-based model in Visum?

4. Define activity pairs and time series

Demand models

Select demand model

M01 Visem

Basis | Person groups | Structural properties | Activities | Activity pairs | Activity chains | Demand strata |

Number: 12	Code	Name /	Origin activity	Destination activity	Time series
1	HO	Home - Other	H Home	O Other	13 HO_OTH12 HO_FT13 HO_OTH14 HO_PT13 HO_OTH
2	HS	Home - School	H Home	S School	16 HS_STU15 HS_OTH16 HS_STU15 HS_OTH16 HS_STU15 HS_OTH
3	HW	Home - Work	H Home	W Work	18 HW_OTH17 HW_FT18 HW_OTH
4	OH	Other - Home	O Other	H Home	26 OH_OTH25 OH_FT26 OH_OTH27 OH_PT26 OH_OTH
5	OO	Other - Other	O Other	O Other	29 OO_OTH28 OO_FT29 OO_OTH30 OO_PT29 OO_OTH
6	OW	Other - Work	O Other	W Work	34 OW_OTH33 OW_FT34 OW_OTH
7	SH	School - Home	S School	H Home	36 SH_STU35 SH_OTH36 SH_STU35 SH_OTH36 SH_STU35 SH_OTH
8	SO	School - Other	S School	O Other	38 SO_STU37 SO_OTH38 SO_STU37 SO_OTH38 SO_STU37 SO_OTH
9	SW	School - Work	S School	W Work	42 SW_OTH41 SW_FT42 SW_OTH
10	WH	Work - Home	W Work	H Home	44 WH_OTH43 WH_FT44 WH_OTH
11	WO	Work - Other	W Work	O Other	46 WO_OTH45 WO_FT46 WO_OTH
12	WW	Work - Work	W Work	W Work	50 WW_OTH49 WW_FT50 WW_OTH

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How to set up a tour-based model in Visum?

5. Define activity chains

Demand models

Select demand model

M01 Visem

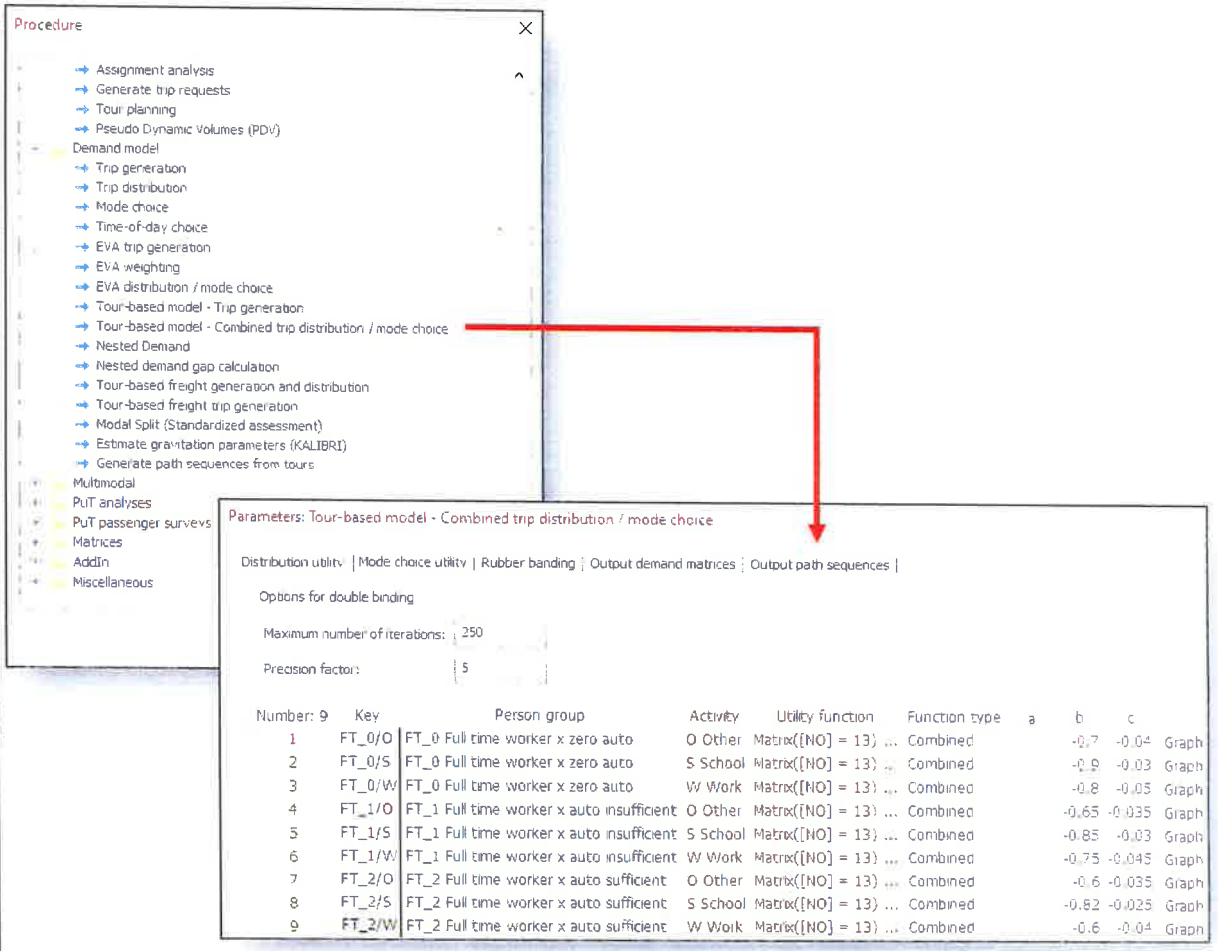
Basis | Person groups | Structural properties | Activities | Activity pairs | Activity chains | Demand strata

Number: 10	Code	Name	Sequence of activities
1	HOH	HOH	H,O,H
2	HOOH	HOOH	H,O,O,H
3	HOWH	HOWH	H,O,W,H
4	HOWOH	HOWOH	H,O,W,O,H
5	HSH	HSH	H,S,H
6	HSOOH	HSOOH	H,S,O,O,H
7	HSWH	HSWH	H,S,W,H
8	HWH	HWH	H,W,H
9	HWOH	HWOH	H,W,O,H
10	HWWH	HWWH	H,W,W,H

How to set up a tour-based model in Visum?

Set up the model in procedure sequence:

6. Specify distribution utility



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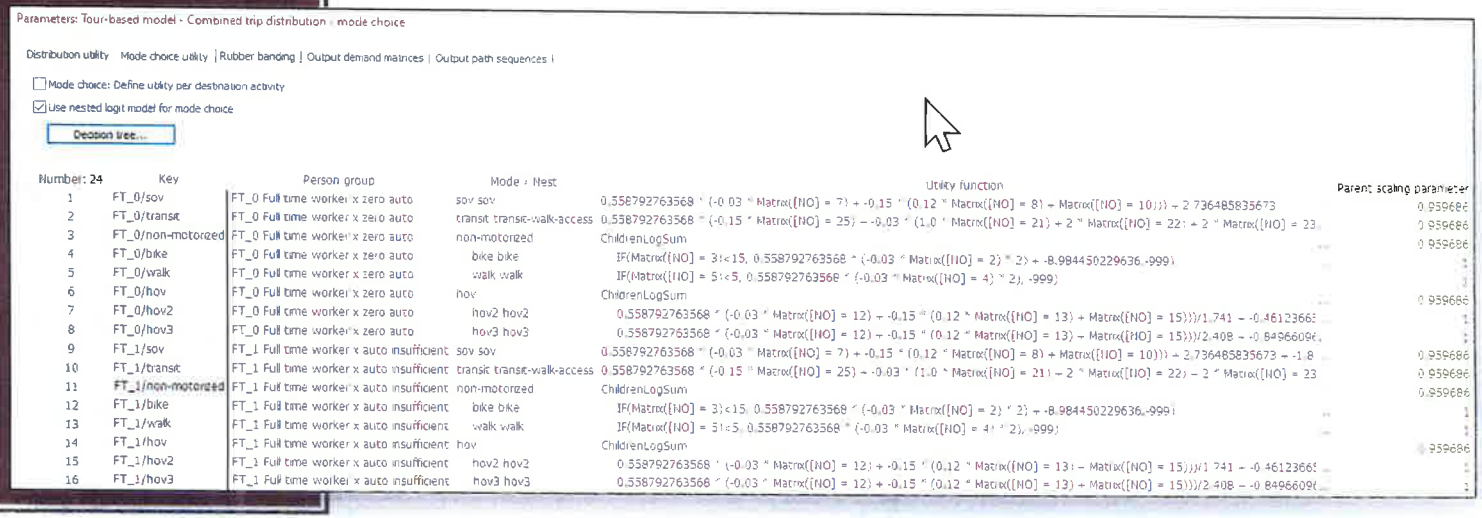
How to set up a tour-based model in Visum?

7. Specify mode choice model (nested logit available)



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How to set up a tour-based model in Visum?

8. Enable rubber banding for intermediate stops

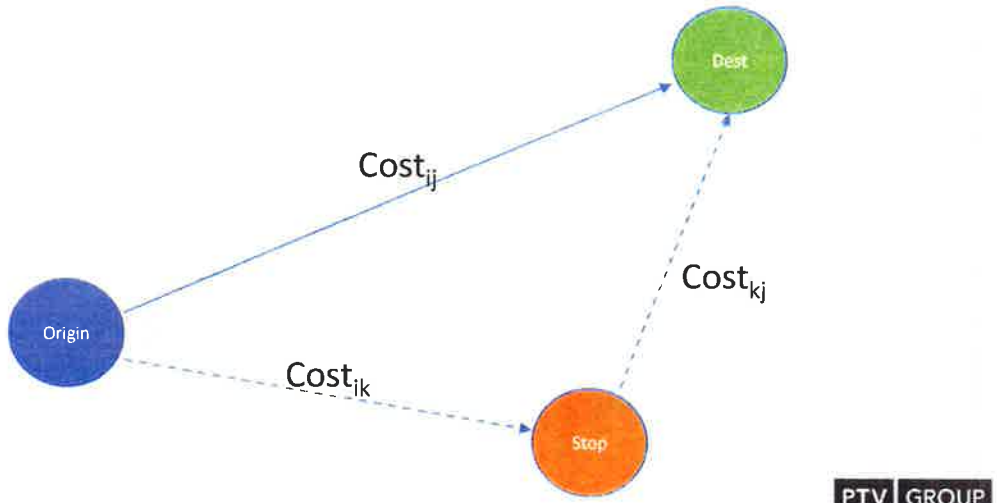
Rubber banding considers out-of-direction travel costs for intermediate stops in activity chains:

$Cost_{ijk} = [Cost_{ik} + Cost_{kj}] - Cost_{ij}$

Parameters: Tour-based model - Combined trip distribution / mode choice

Distribution utility | Mode choice utility | Rubber banding | Output demand matrices | Output path sequences |

	Demand stratum	Person group	Activity chain	Activity chain with main activity	Use rubberbanding	Rubberbanding weight
1	HOH_FT_0	FT_0 Full time worker x zero auto	HOH HOH	H[O]H	☐	
2	HSH_FT_0	FT_0 Full time worker x zero auto	HSH HSH	H[S]H	☐	
3	HWH_FT_0	FT_0 Full time worker x zero auto	HWH HWH	H[W]H	☐	
4	HOOH_FT_0	FT_0 Full time worker x zero auto	HOOH HOOH	H[O]OH	☐	
5	HOWH_FT_0	FT_0 Full time worker x zero auto	HOWH HOWH	HO[W]H	☐	
6	HSWH_FT_0	FT_0 Full time worker x zero auto	HSWH HSWH	H[S]WH	☐	
7	HWOH_FT_0	FT_0 Full time worker x zero auto	HWOH HWOH	H[W]OH	☐	
8	HWWH_FT_0	FT_0 Full time worker x zero auto	HWWH HWWH	H[W]WH	☐	
9	HOWOH_FT_0	FT_0 Full time worker x zero auto	HOWOH HOWOH	HO[W]OH	☐	
10	HSOOH_FT_0	FT_0 Full time worker x zero auto	HSOOH HSOOH	H[S]OOH	☐	



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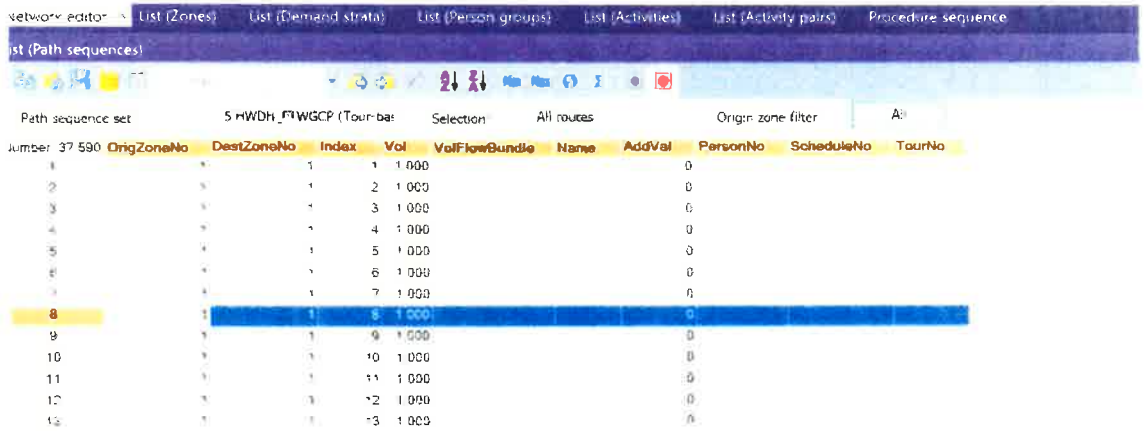
Visualization

- Visualize tours
- Tours integrated with select link analysis



Visum tour-based vs Other Model Types

	4 - Step	Tour-Based	ABM
Population Data	TAZ	**TAZ**	TAZ TAZ + MAZ
Travel Organized By:	Trip	**Tour**	Tour
Fast Runtimes	Yes	**Yes**	No
Third Pary Software Required	No	**No**	Yes
Link Non-Home-Based Trips	No	**Yes**	Yes
Microsimulation Error	No	**No**	Yes
Spatial Consistency Between Trips	No	**Yes**	Yes
Improved Mode Choice	No	**Yes**	Yes
Improve Ride Sharing Representation	No	**Yes**	Yes

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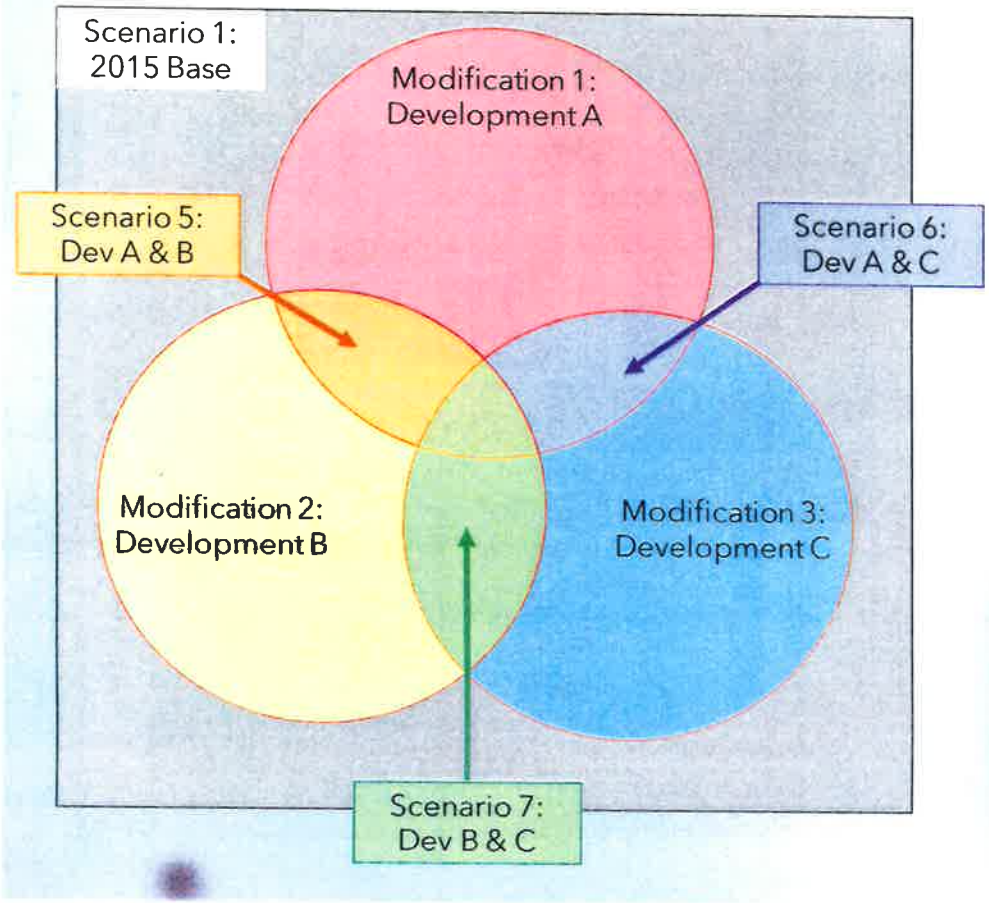
Scenarios



Running and creating scenarios (Using the Scenario Manager)

It operates off the basis of building project-specific modifications that can be combined into scenarios.

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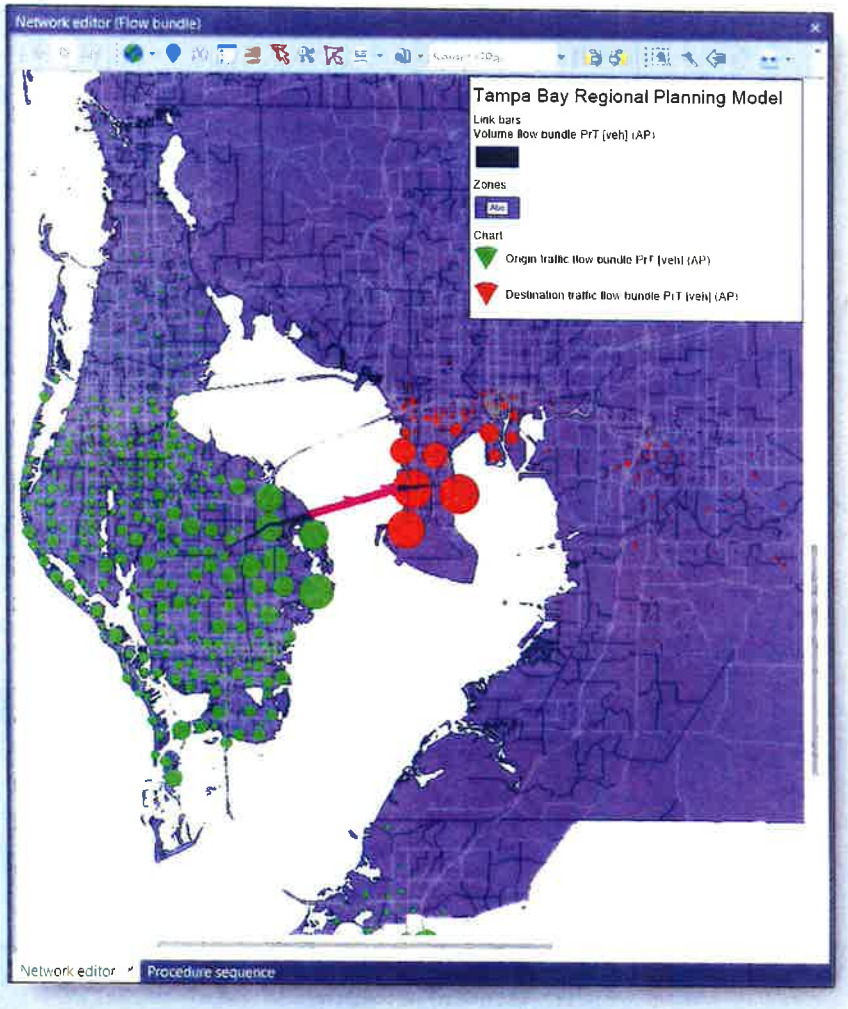
the mind of movement



Select Link Analysis

Visum allows us to select a link (or series of links) and visualize a flow bundle through that link.

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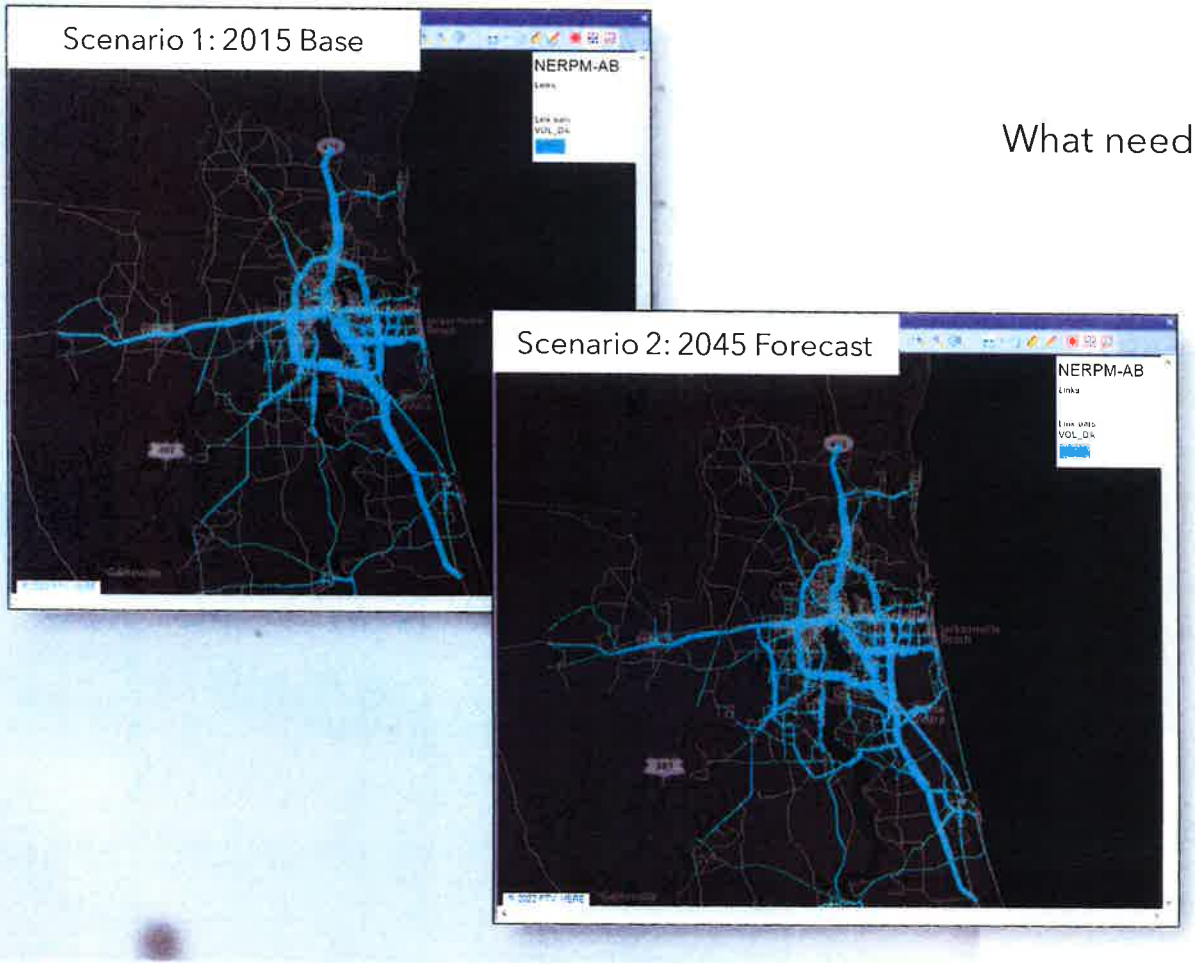
Scenario Comparison

Example: 2015 vs 2045



What needs to be done to compare these scenarios?

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Land Use Update Scenario

We will explore creating three scenarios that change the land use settings of the TAZs/MAZs in our network.

- Add households
- Add employment
- Add hotel units

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Transit Edit Scenario

In this example we will extend transit lines to serve a new residential development in MAZ 30310 and 30314.

1. Add a new stop

2. Extend line Commonwealth/Lane EB and Commonwealth/Lane WB to serve this stop

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