DRCOG

Travel Demand Model

an overview

Presented to:

Presented by:

Transportation Planning & Operations Division

March 19, 2018

Travel demand modeling

- **Did you make a trip from your house this morning?**
- **Where did you go?**
- **What mode of travel did you use to get there?**
- **What route did you take?**

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WHAT IS FOCUS?

What is Focus?

activity-based travel demand

- “Travel” is a result of what people do each day.

tour-based

- for example: home to somewhere and back home
- A round trip may include intermediate stops.

disaggregate

- Data on individual households and people are used.

microsimulation

- Individual “choices” are based on random draws.
- Considered together, all choices add up to facility-level and regional outcome measures.

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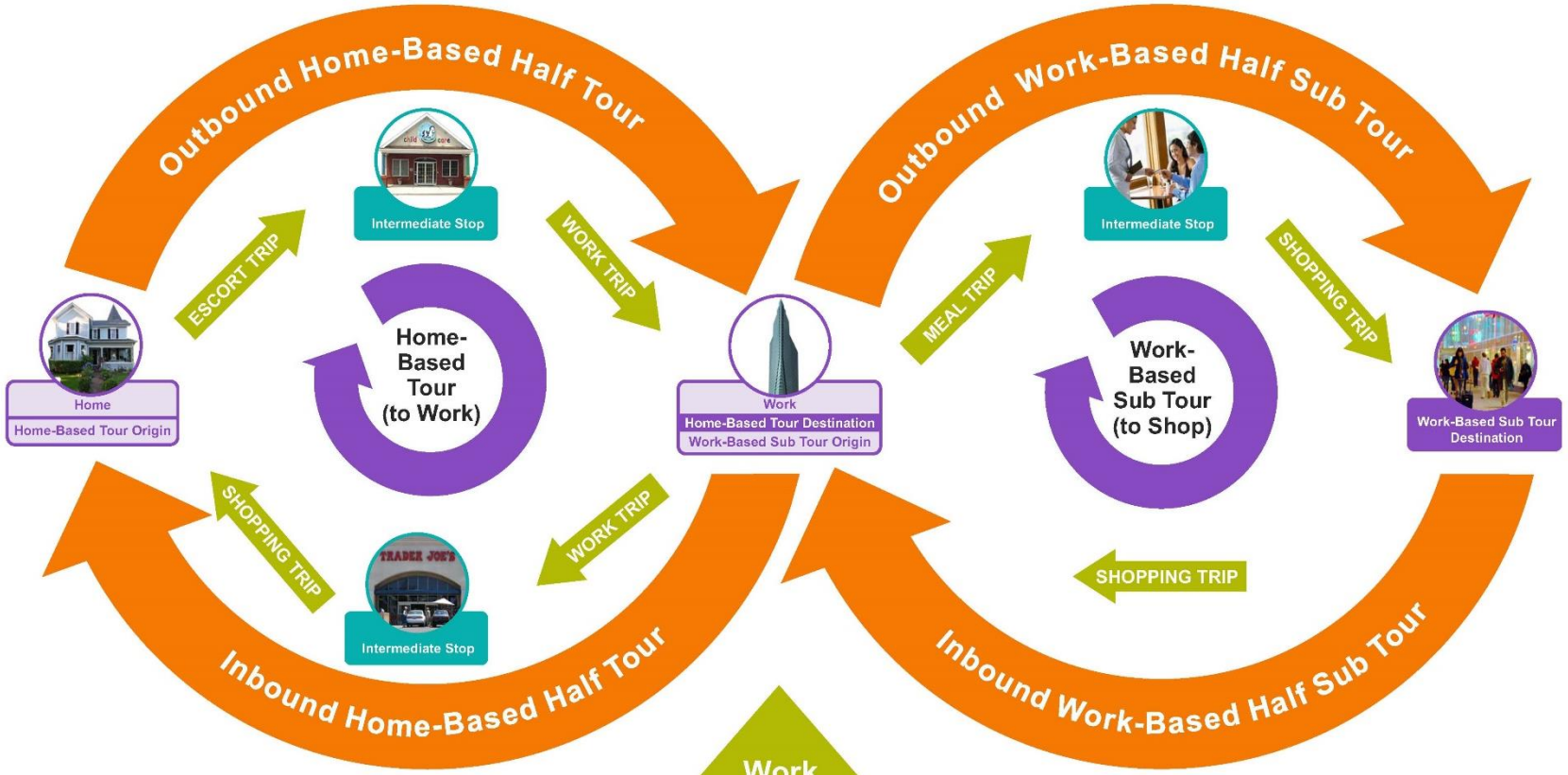
What is a tour?



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INPUT DATA

Synthetic population

households

- housing unit location
- annual income
- member composition

individuals

- age
- student or worker status
- gender
- occupational sector
- relationship with other household members

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Socioeconomic data

housing unit points

- distance to transit

establishment points

- industry sector
- number of jobs

school points

- public or private, K-8, high school or university
- enrollment

zone data

- point contents
- centroid coordinates

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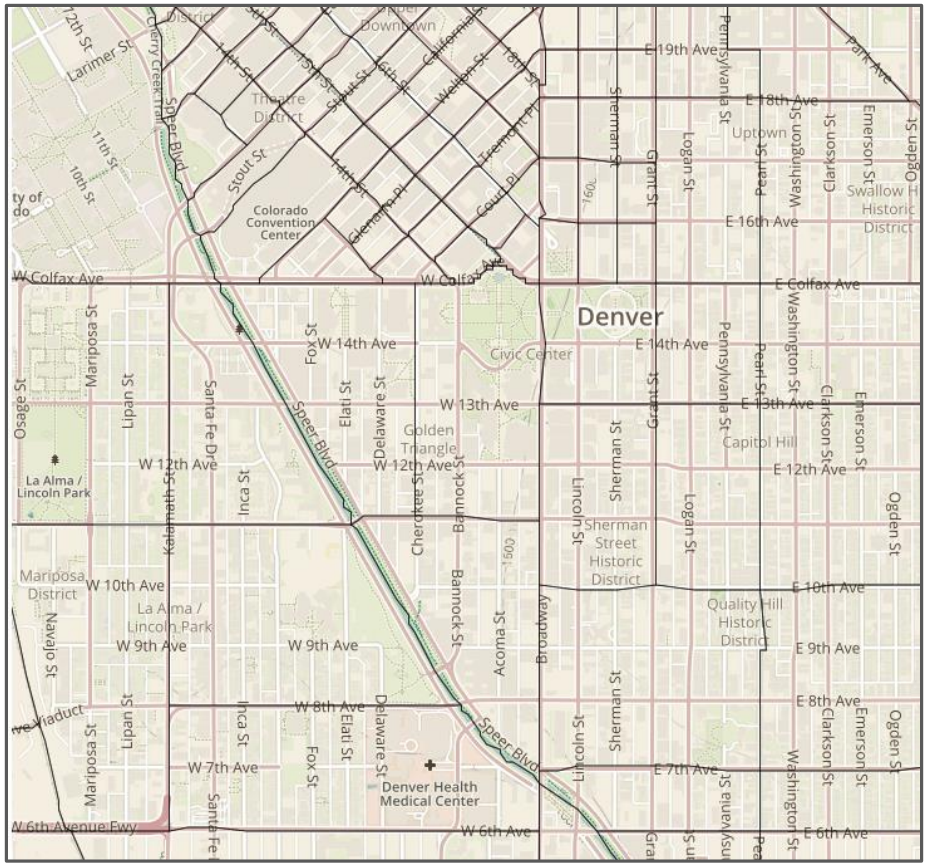
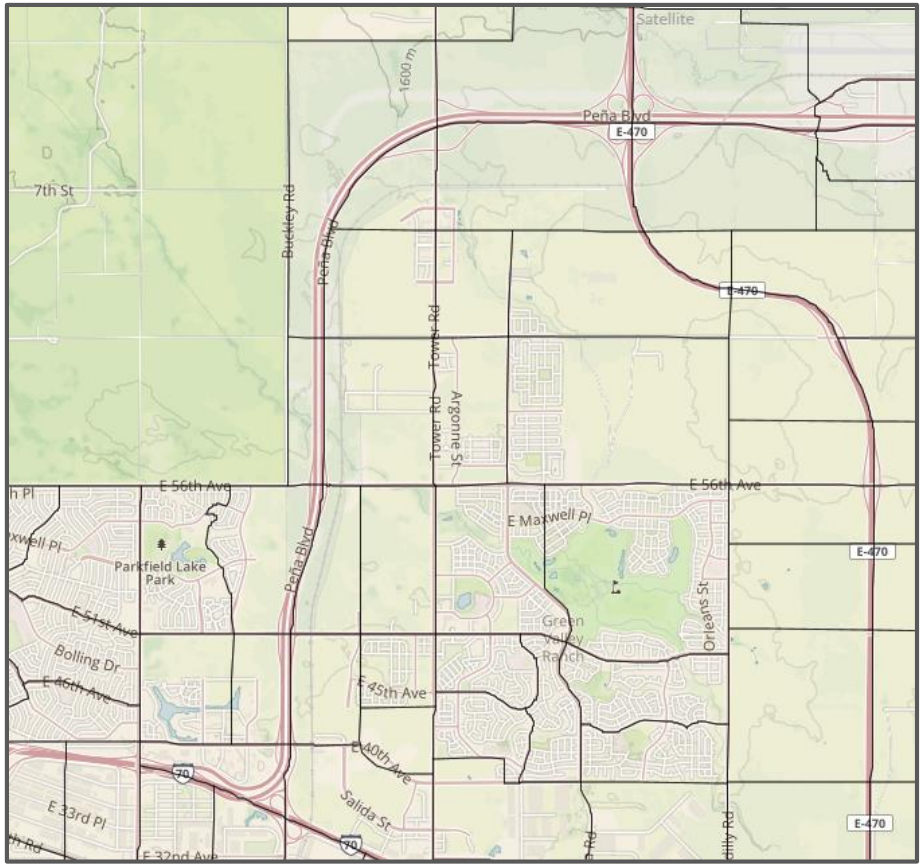
Transportation analysis zones (2,832 TAZs)





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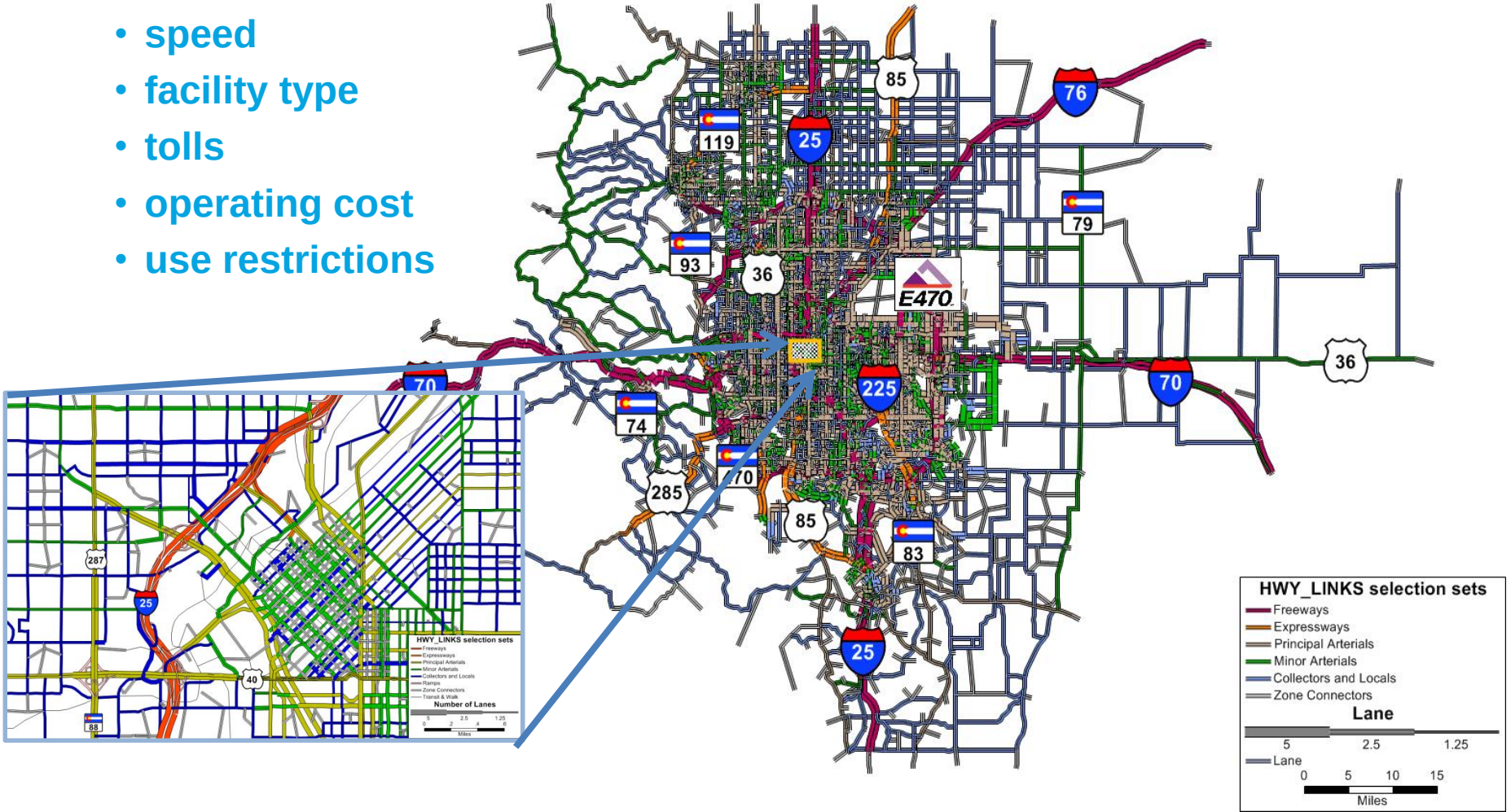
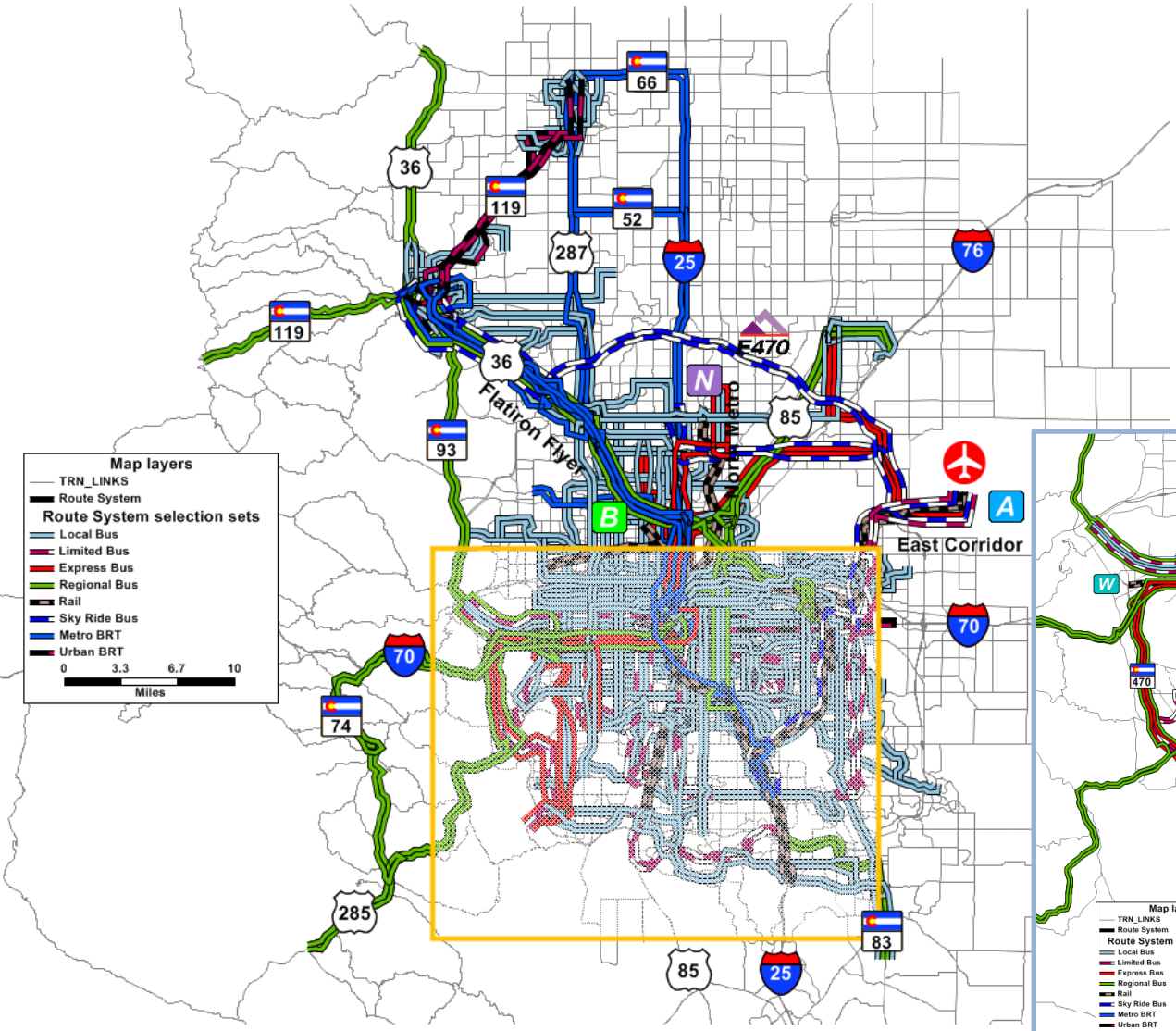
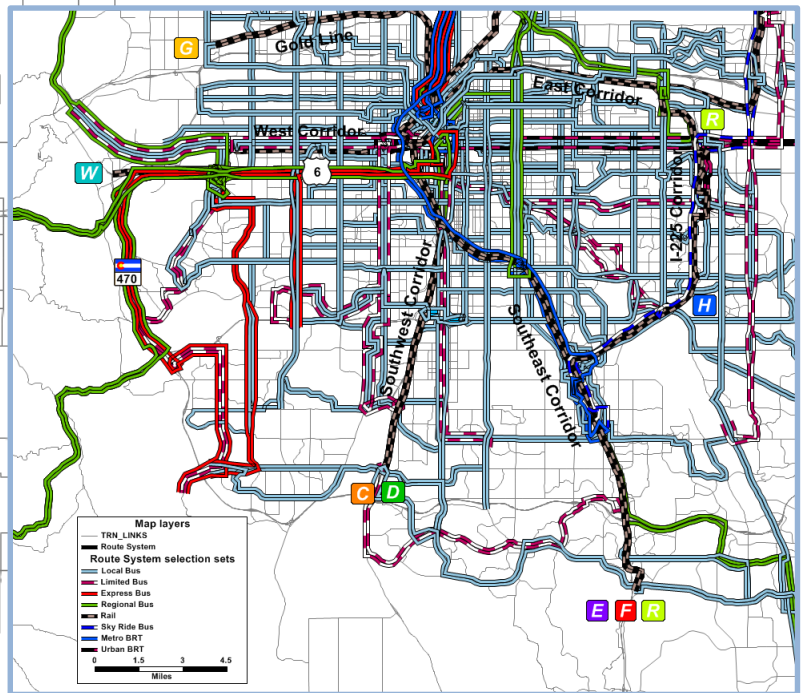
Roadway link data

- lanes
- direction
- speed
- facility type
- tolls
- operating cost
- use restrictions



Transit route information





- stop locations and dwell time
- frequency by time of day
- mode and service type
- fare

DECISIONS MODELED

Person decisions (choices)

regular workplace location

- at home or outside the home?
- which zone?

regular school location

auto availability (household)

daily activity pattern

- For which purposes will tours, trips or stops be made?

number of tours by purpose

Choice model components are calibrated to household travel survey results.

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Tour and trip decisions - weekday

number of work-based sub-tours and intermediate stops

destinations

- regular workplace or somewhere else for work travel?
- location in region?

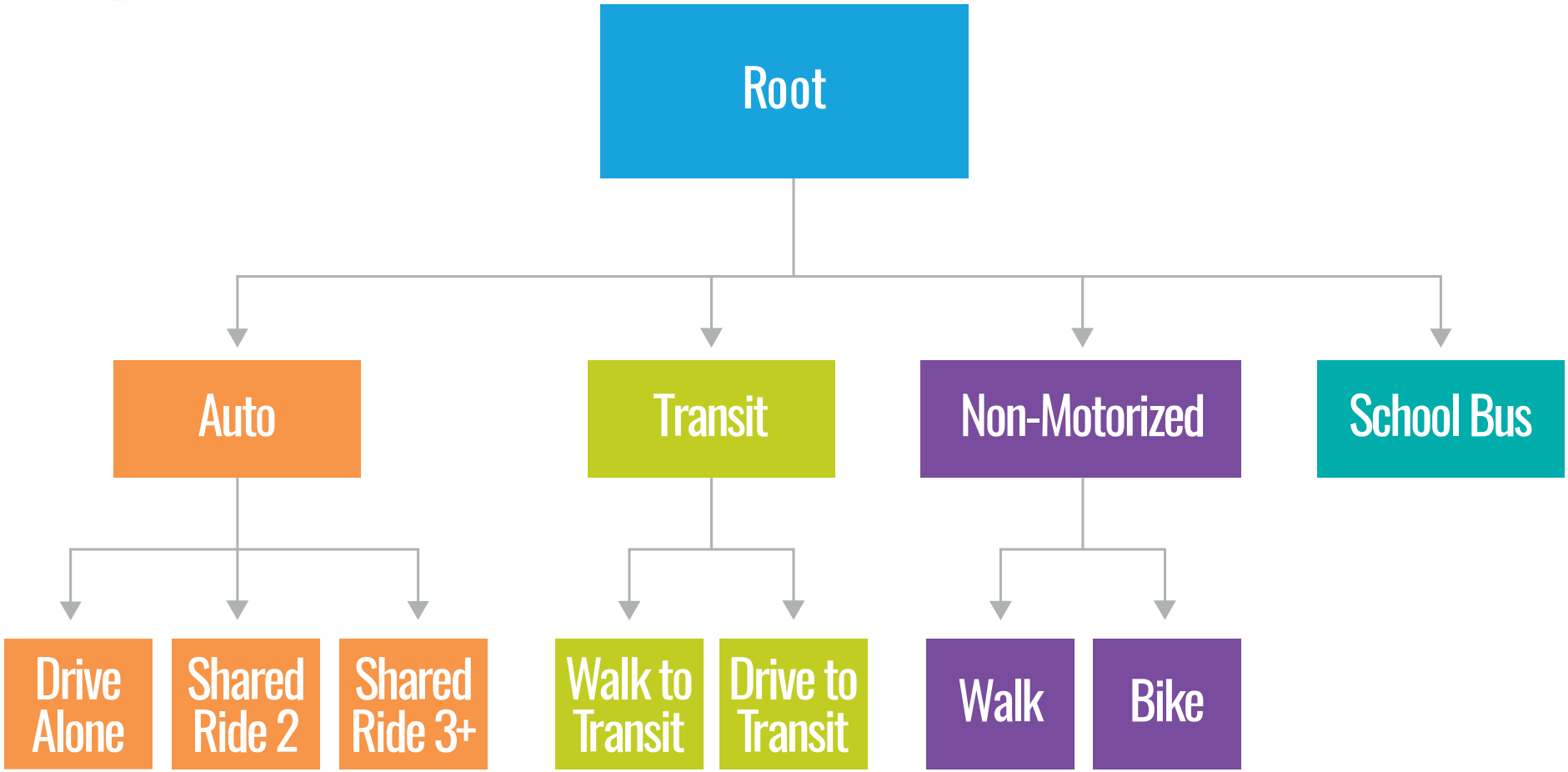
departure and arrival times

travel mode

travel route

- by highway
- by transit

Mode choices



Not all modes are available for all purposes.

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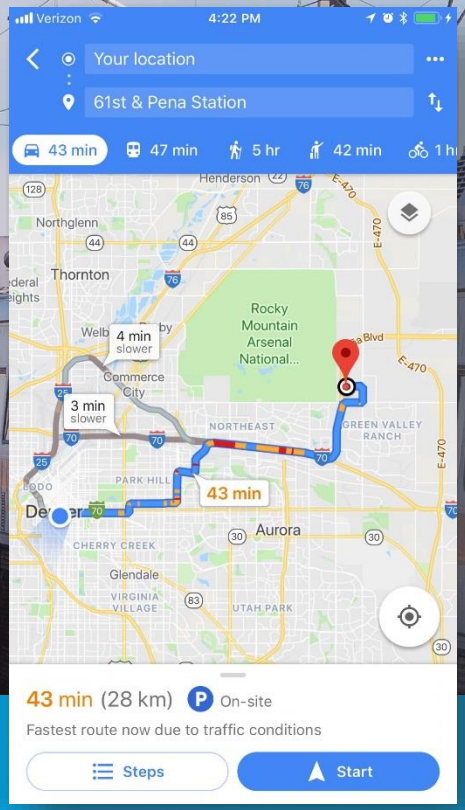
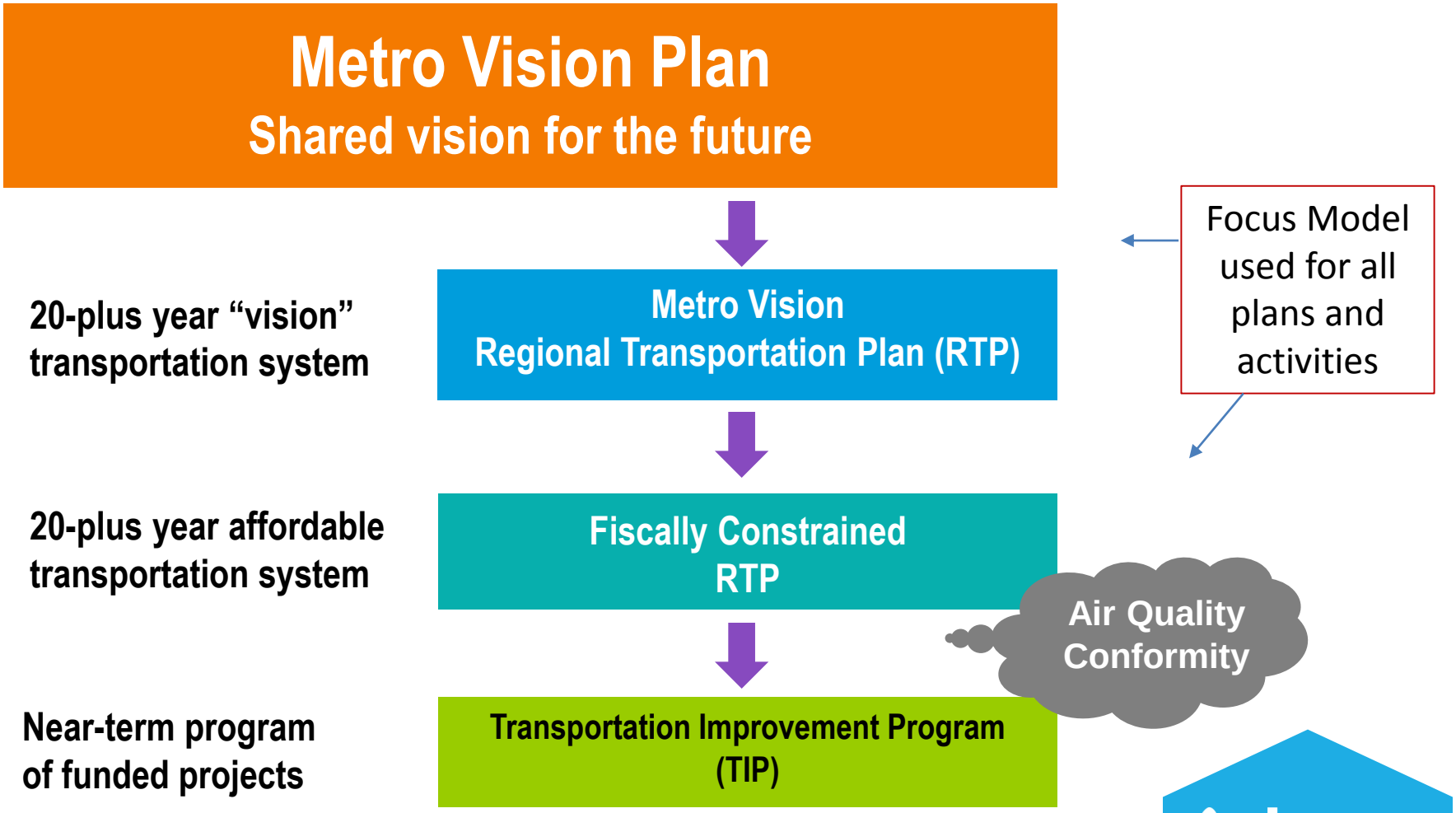


OUTPUTS & QUERIES

DRCOG Plans and transportation activities



Trip outputs

origins and destinations by TAZs

trip purpose

mode of travel

trip length distribution and average

regional weekday values:

vehicle miles traveled (VMT)	**80 million**
person trips	14 million
vehicle trips	9 million

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Output examples: Tour type

Tour type	Total
Work	1,670,155
School	901,746
Escort	718,650
Personal business	740,072
Shopping	717,832
Meal	308,277
Social recreation	752,710
Total	**5,809,442**

Trips = 14 million

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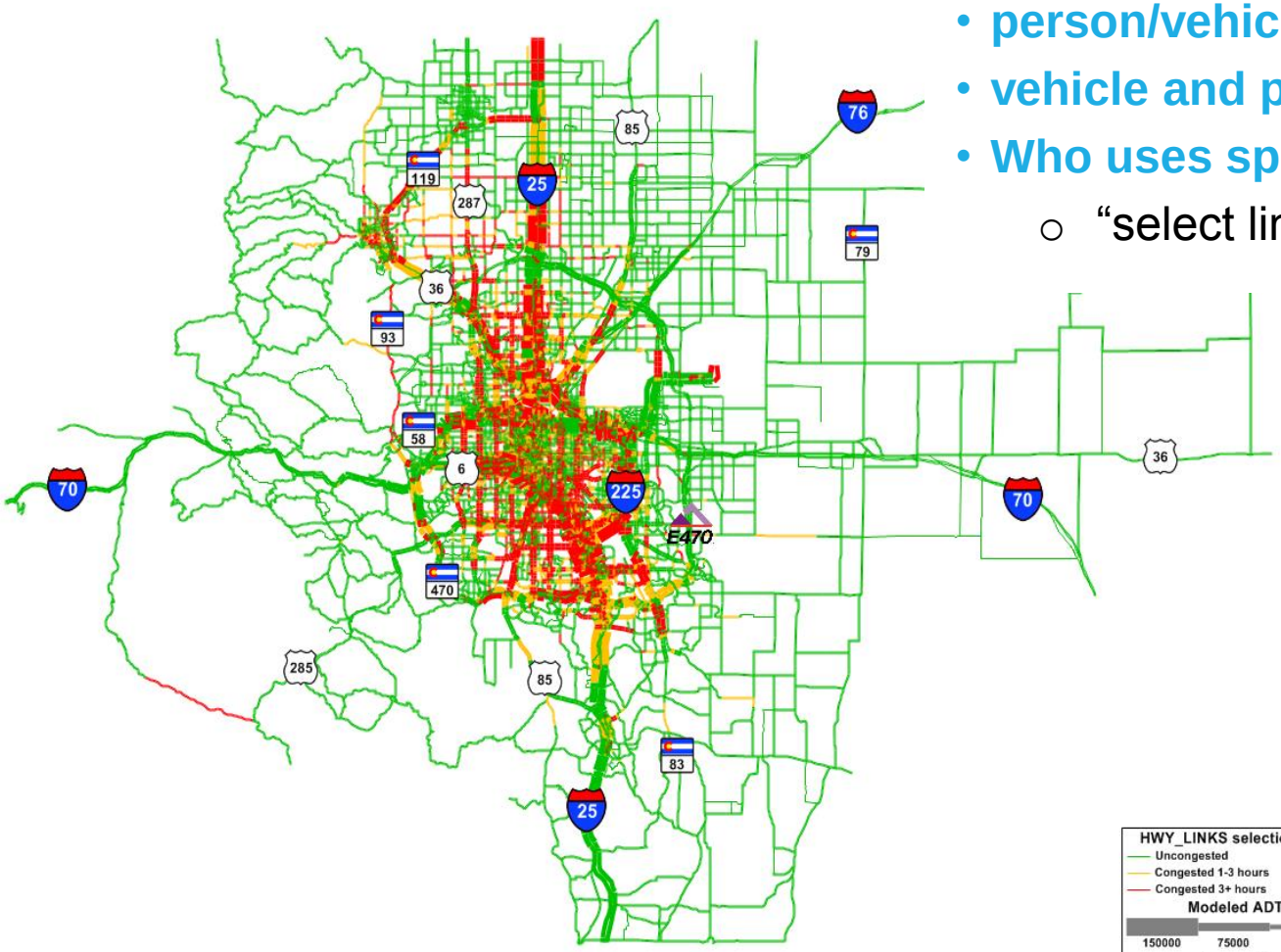
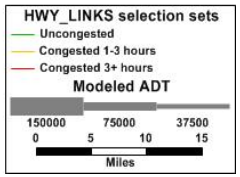
Output examples: Tour mode

Tour mode	Number of tours	Mode share
Bike	42,278	0.73%
Drive alone	2,480,314	42.69%
Drive to transit	51,994	0.89%
School bus	119,654	2.06%
Shared ride 2	1,466,384	25.24%
Shared ride 3+	1,009,056	17.37%
Walk	481,525	8.29%
Walk to transit	158,236	2.72%
Total	5,809,442	

Highway O-D table assignment outputs

- **link traffic volumes**
  - e.g. I-25: 250k/day; Tower Rd.: 20k/day
- **person/vehicle miles traveled (P/VMT)**
- **vehicle and person hours of delay**
- **Who uses specific roads?**
  - “select link” analyses





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Transit O-D table assignment outputs

Service class boardings	Modeled 2015	Modeled 2040
Free shuttle	49,100	86,700
Local bus	149,000	172,000
Limited bus	35,100	17,100
Express bus	9,300	900
Regional bus	12,300	2,500
SkyRide bus	7,500	1,400
Rail	98,500	218,000
Metro bus rapid transit (example: Flatiron Flyer)	N/A	28,100
Urban bus rapid transit (example: SH 119, Colfax)	N/A	75,900
Total	361,000	603,000

Example queries / “what ifs”

- How much will traffic volumes change due to:
  - new developments?
  - regional population growth?
  - a new (or closed down!) road or transit line?
  - change in auto operating costs?
  - change in roadway capacity – new technology?

- What are the characteristics of zero-car households?

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Example queries / “what ifs” (continued)

- What modes of travel are used to get to workplaces?
- What if transit fares double?
- How many people stop somewhere on their way home from work?
- Where do people using 61st and Peña Station live and/or work?

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