Downtown Transportation Plan Update

DOWNTOWN TRANSPORTATION PLANNING
BKR TRAVEL DEMAND MODEL

TRANSPORTATION COMMISSION
SEPTEMBER 13, 2012

Presentation and Discussion

- BKR Travel Demand Model Results Overview
- 2010 Base Year Downtown Congestion
- 2030 Baseline Downtown Congestion
- Internal Downtown Trips

BKR Travel Demand Model

Based on Daily Person Trips

2010 Base Year

2030 Baseline

Travel "Market"

Attracted to Downtown
Produced by Downtown
Internal to Downtown

Trip Purpose

Home-Based Work **HBW**
Home-Based Other **HBO**
Non Home-Based **NHB**

Trip Mode

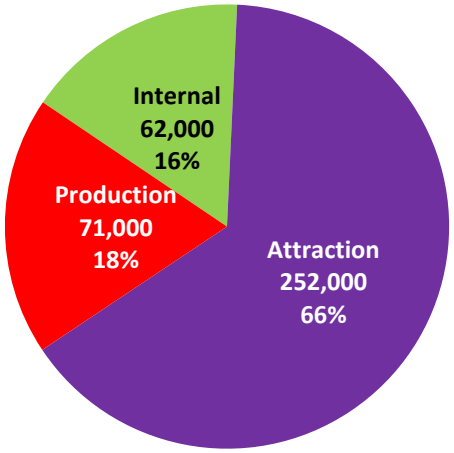
SOV
HOV
Transit

"Existing Conditions"

Forecast Travel Demand

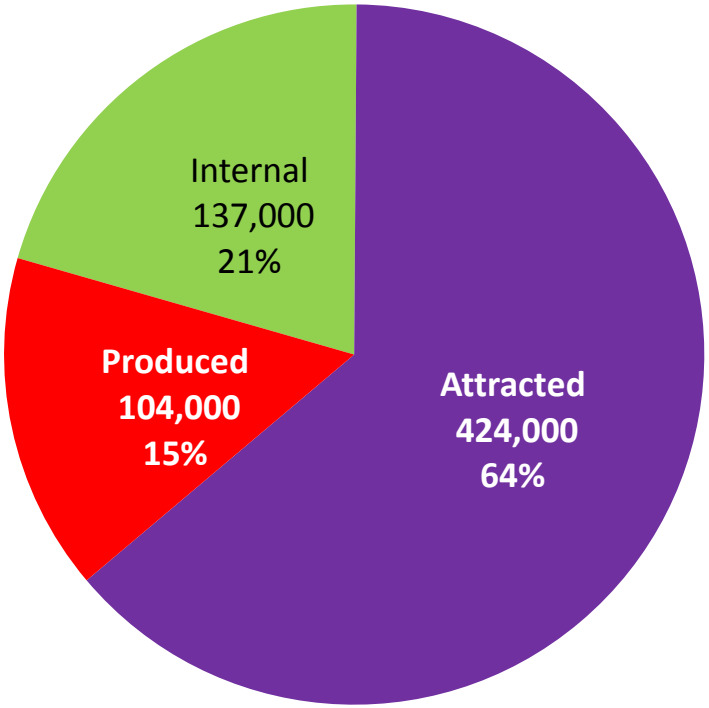
BKR Model – Total Downtown Person Trips

2010 Daily Person Trips



385,000

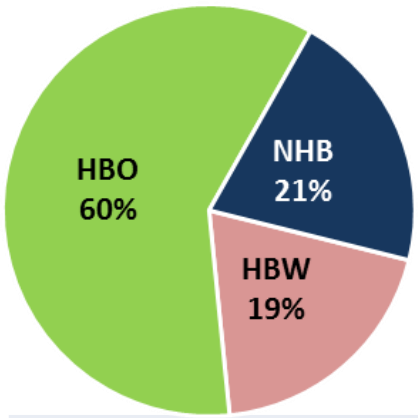
2030 Daily Person Trips



665,000

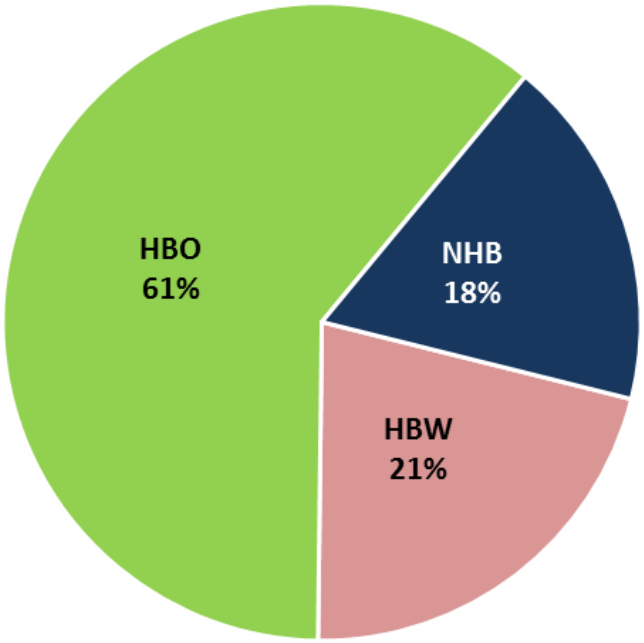
Trips Attracted to Downtown from Out

Total Trips Attracted to Downtown from Outside of Downtown 2010



252,000

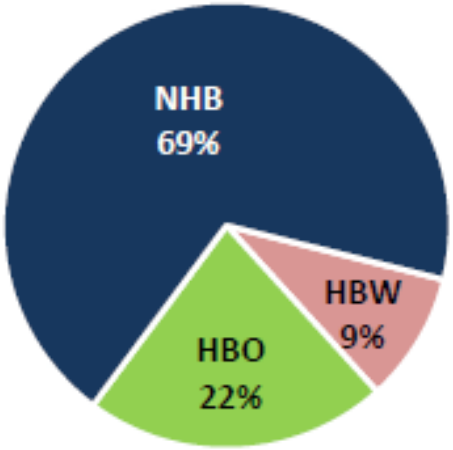
Total Trips Attracted to Downtown from Outside of Downtown 2030



424,000

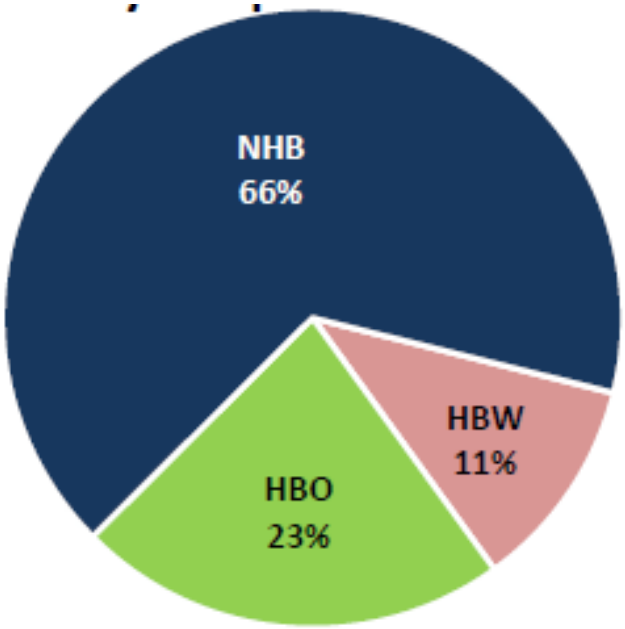
Trips Produced Downtown Attracted Out

Total Trips Produced in Downtown Attracted Outside of Downtown 2010



71,000

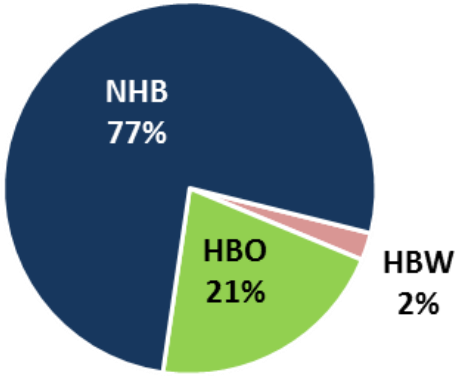
Total Trips Produced in Downtown Attracted Outside of Downtown 2030



104,000

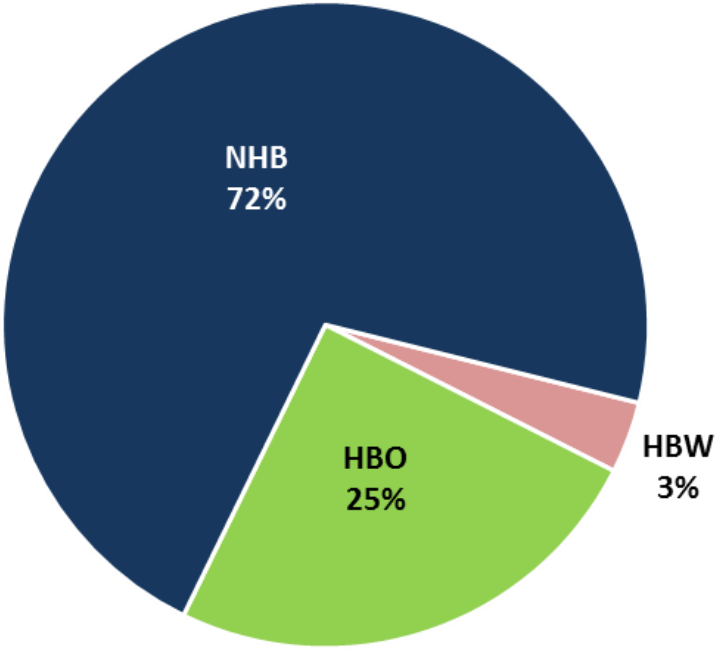
Trips Produced Downtown Stay Internal

Total Trips Produced in Downtown and Attracted within Downtown 2010



62,000

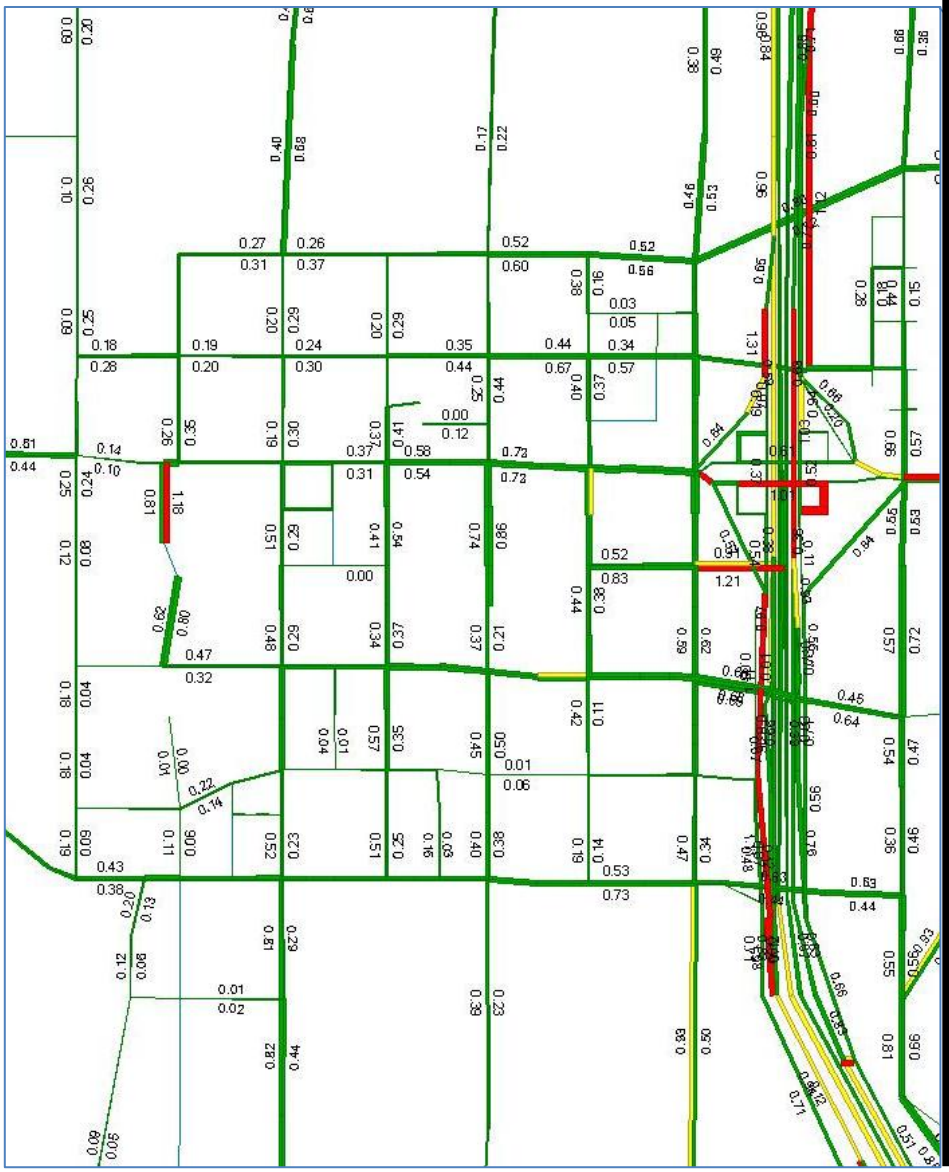
Total Trips Produced in Downtown and Attracted within Downtown 2030



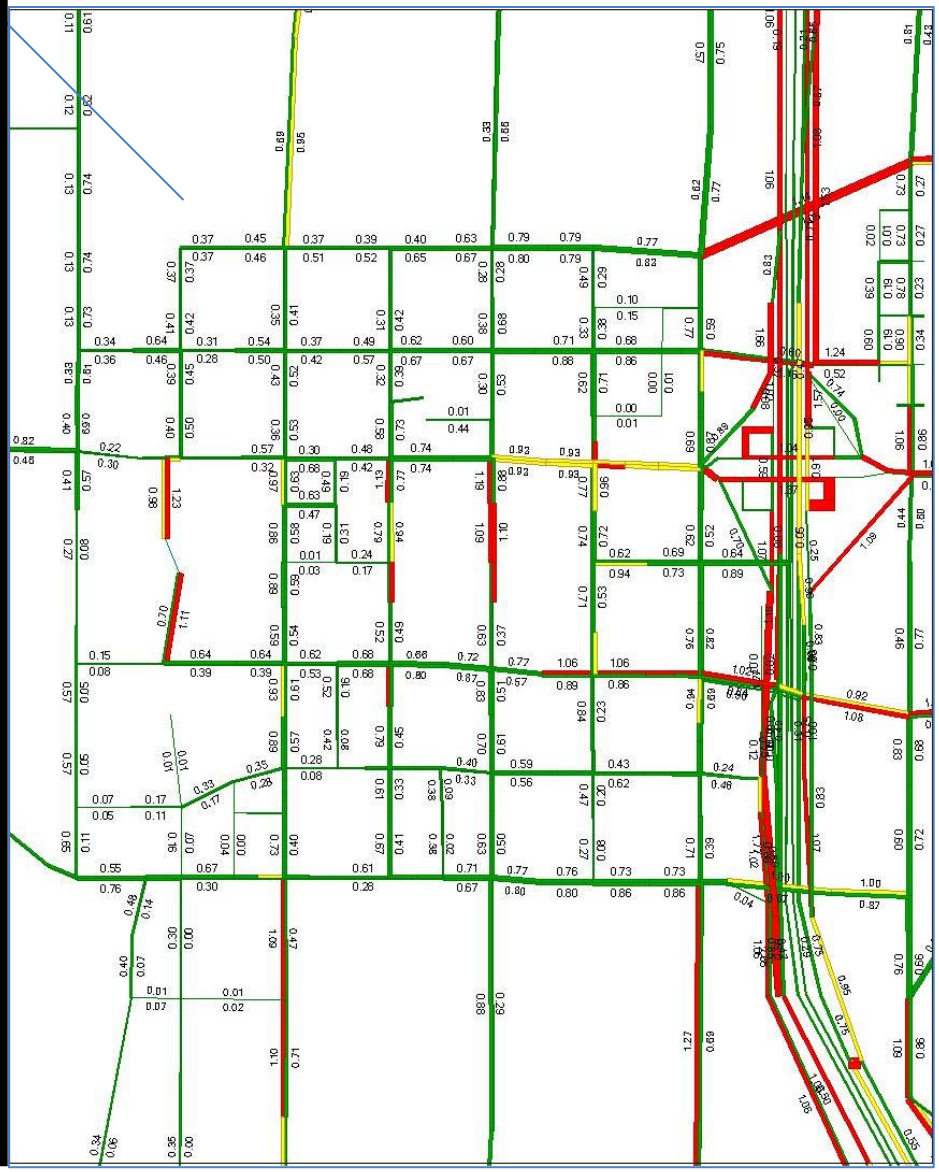
137,000

Downtown LOS Analysis

2010 Segment Volume/Capacity Ratio

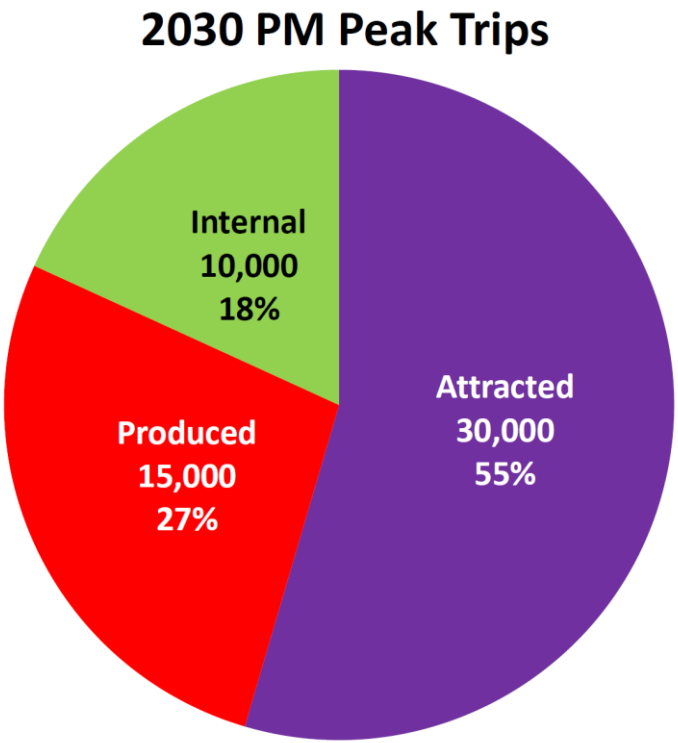


2030 Segment Volume/Capacity Ratio

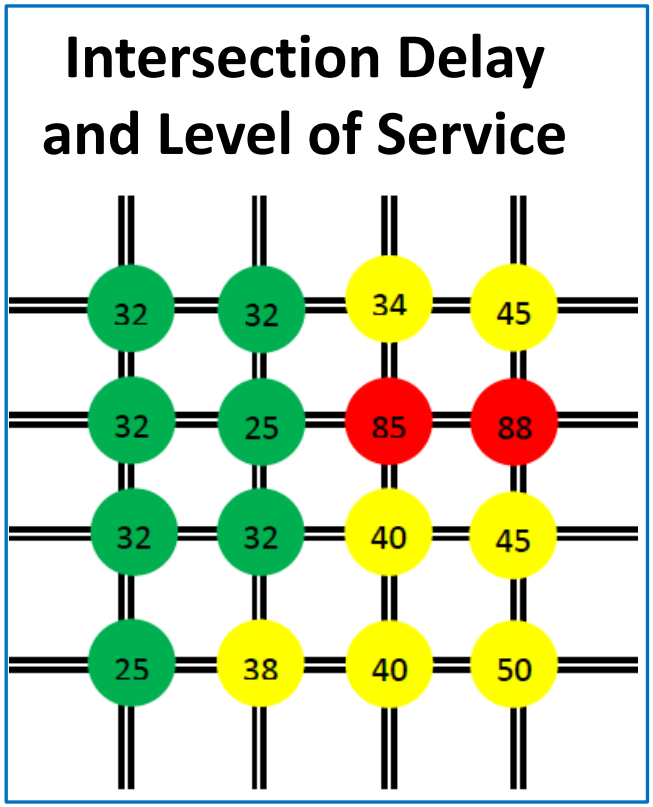


Downtown Transportation Modeling

BKR
Travel Demand Modeling



Synchro
Operational Analysis



Level of Service - Synchro Analysis Model

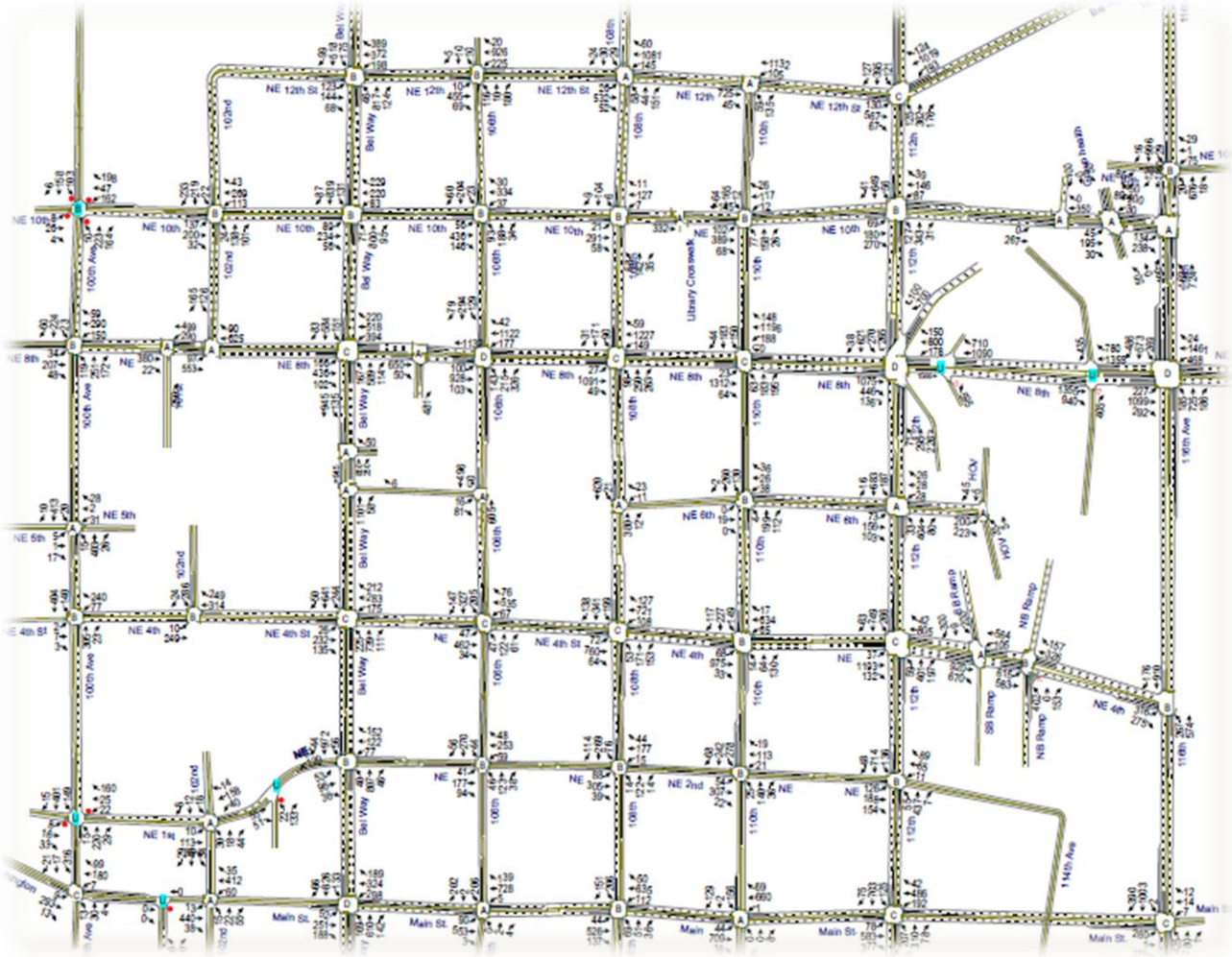
- BKR is for Travel Demand modeling
- Synchro is a model used for intersection operation and vehicle capacity analysis
- Synchro provides a measure of congestion based on turning movement projections- level of service (LOS)
- LOS is based on seconds of delay for vehicles at intersection

Level of Service	Average Delay (seconds/vehicle)
A	≤ 10
B	> 10 – 20
C	> 20 – 35
D	> 35 – 55
E	> 55 – 80
F	> 80

Source: Highway Capacity Manual, Transportation Research Board, 2000

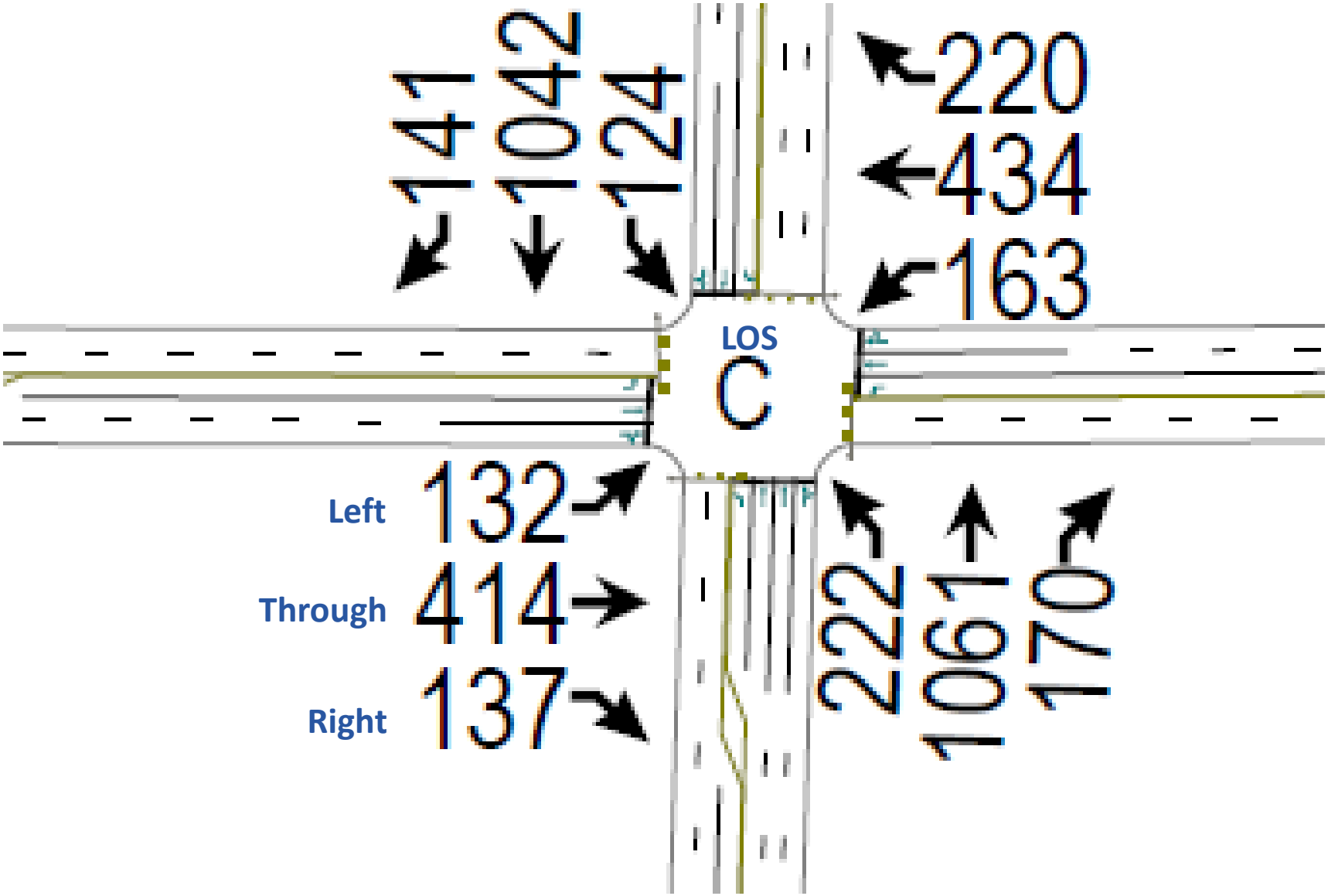
Synchro Analysis Model

Sample Output of Turning Movement Forecasts and Vehicle LOS



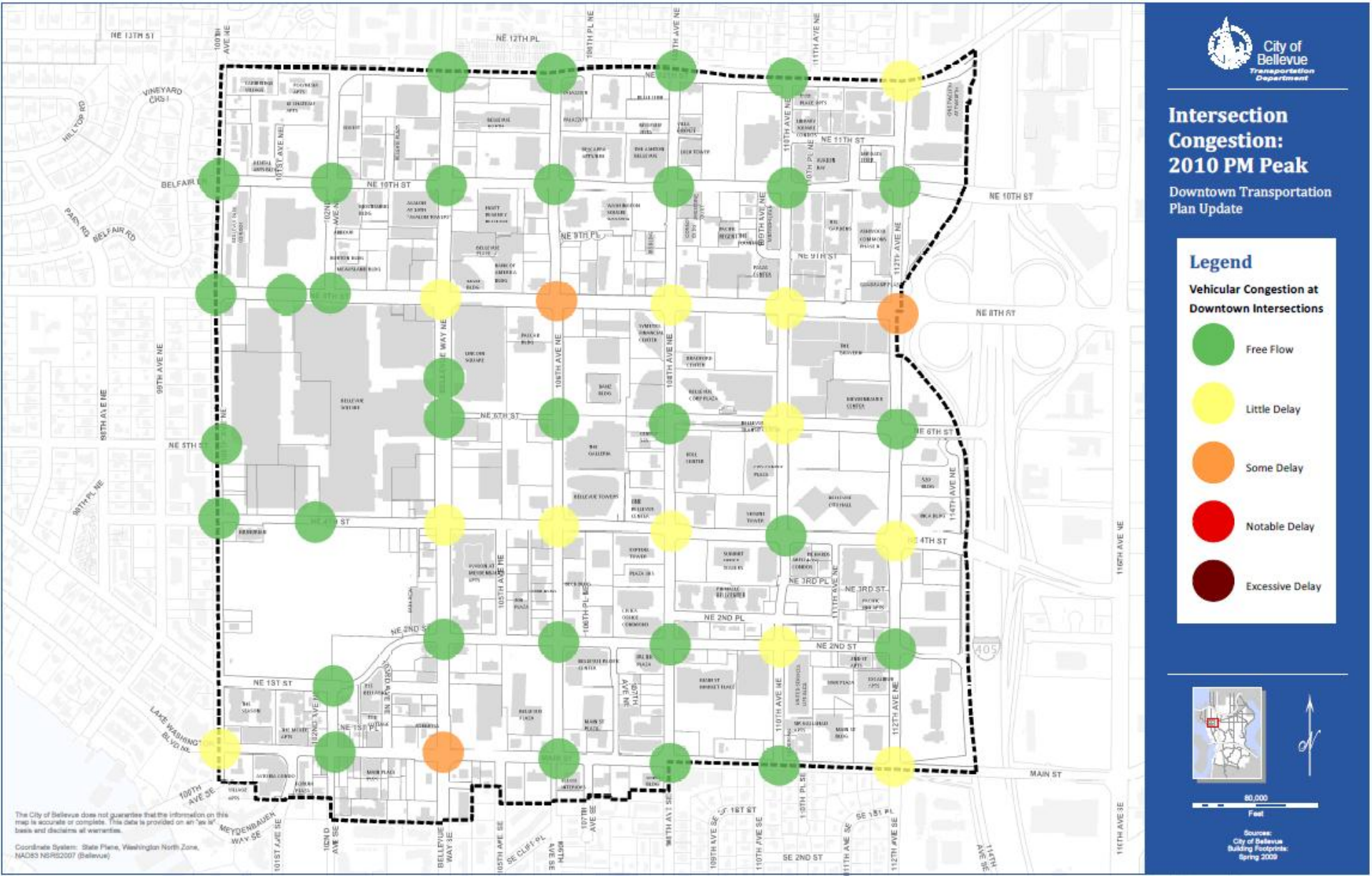
Synchro Analysis Model

Sample Intersection Close-Up



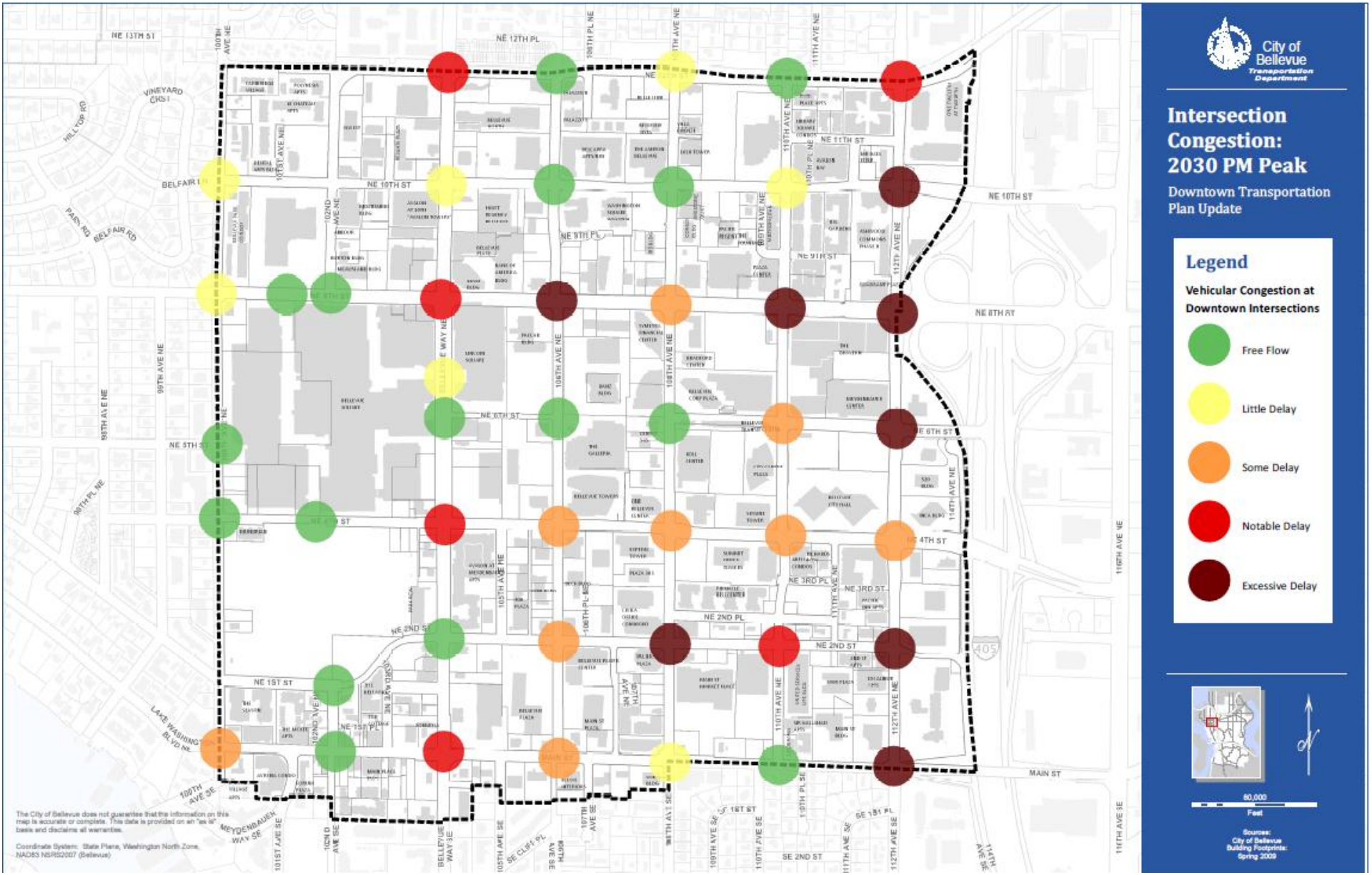
Downtown LOS Analysis

Sample 2010 Base Year PM Peak Hour Congestion

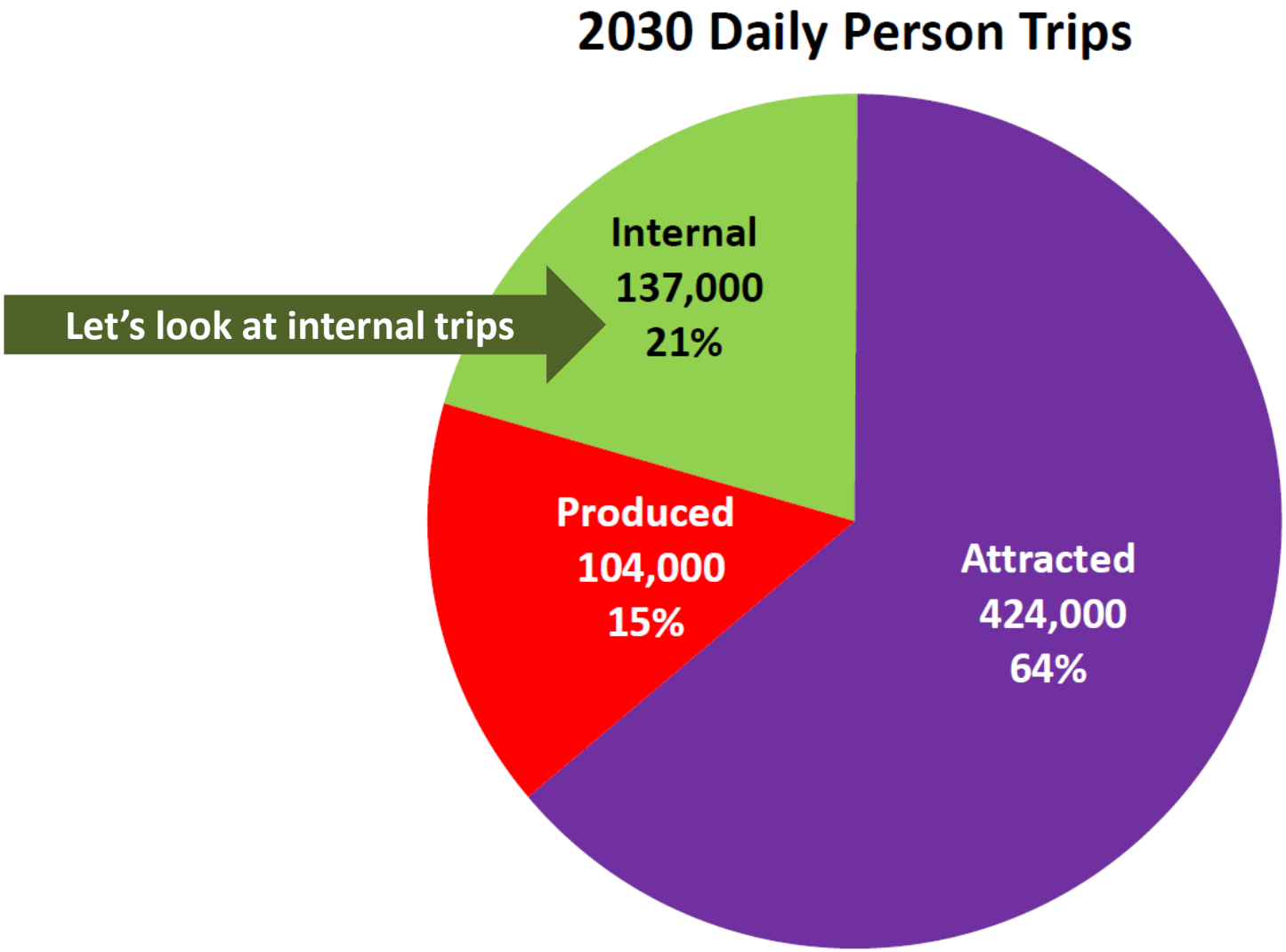


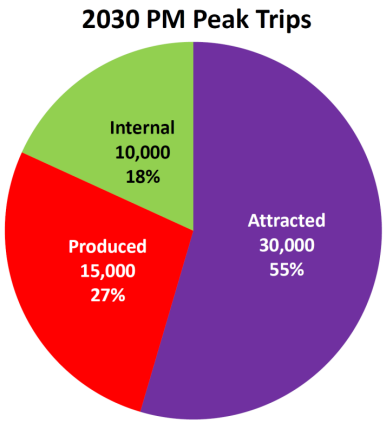
Downtown LOS Analysis

Sample 2030 Baseline PM Peak Hour Congestion



Downtown Travel Demand Analysis

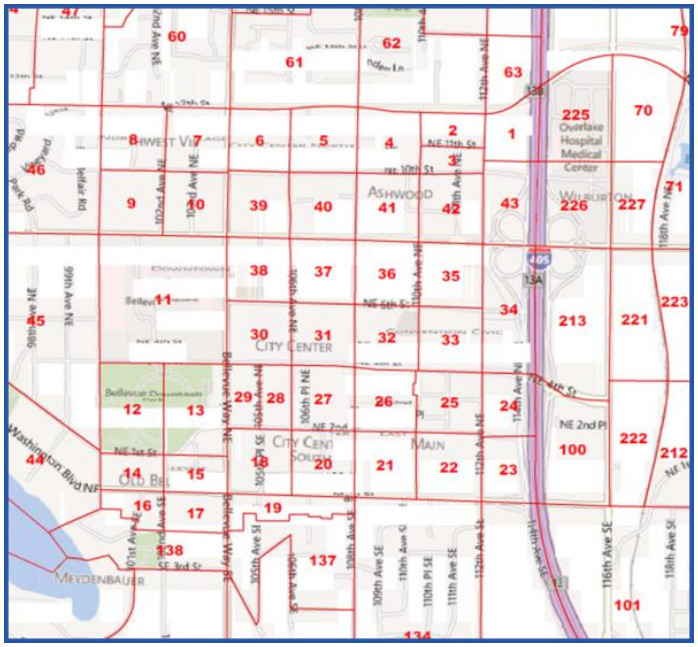




Downtown Travel Demand and LOS Analysis

- Person trips forecast between TAZs are all considered to be motorized
- Trips assumed w/in a Downtown TAZ = 0
- Not every trip Downtown is a motorized trip - many trips between Downtown TAZs are short "walk trips"
- Forecast 137,000 Daily internal trips and 10,000 PM Peak internal trips; so need to pay attention to these
- How to forecast walk trips?
- Two categories:
  - No Car Available (transit/carpool)
  - Short Trips

15 Trips



BKR Downtown Internal Trips

Distance Methodology for Calculating Downtown Walk Trips: Short Trips

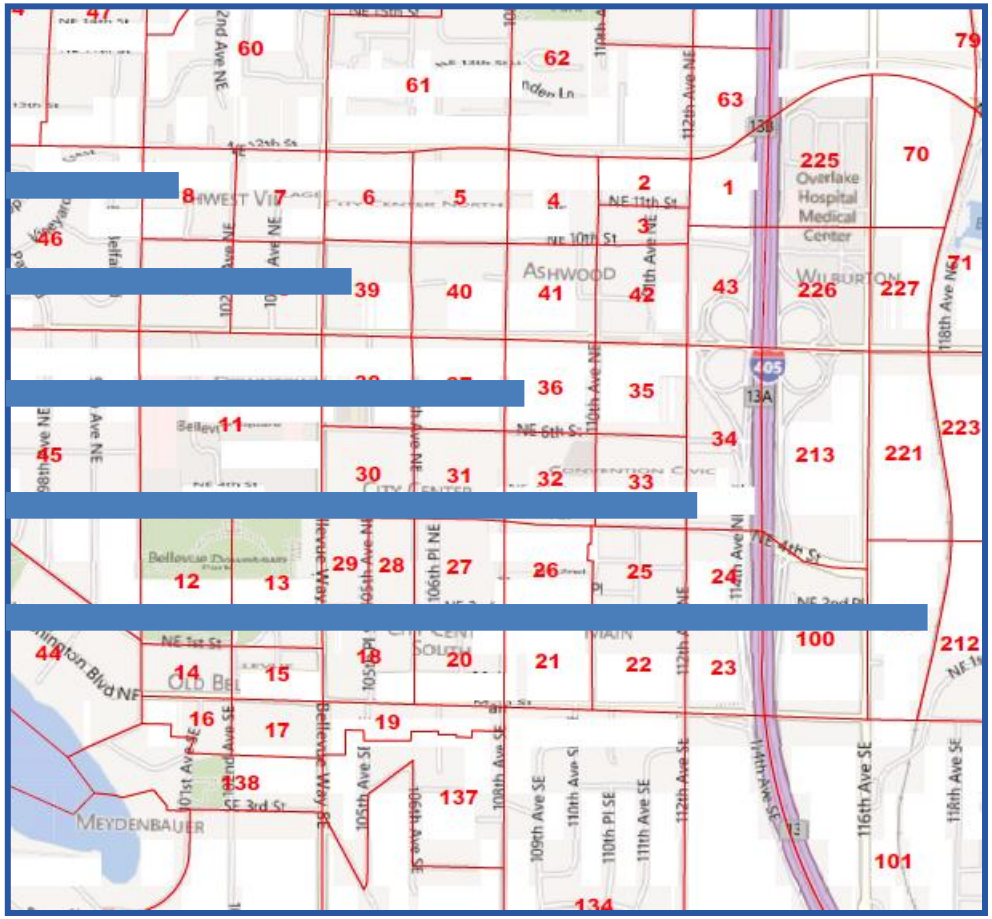
0-.25 miles: 70% walk

.25-.50 miles: 50% walk

.50-.75 miles: 30% walk

.75-1.0 miles: 10% walk

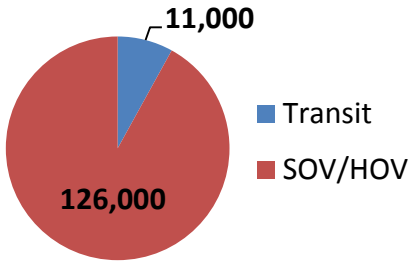
>1 mile: 5% walk



2030 Walk Trip Calculation Methodology

How Many Daily Walk Trips?

137,000
Internal Auto Person Trips



Distance (mi)	Walk Likelihood
0.0 – 0.25	70%
0.25-0.5	50%
0.5-0.75	30%
0.75-1.0	10%
> 1.0	5%

126,000
Auto Person Trips

−

39,000
"No Car" Deduction

−

37,000
Short Trip Deduction

=

50,000
Auto Person Trips

39,000
Walk Trips

+

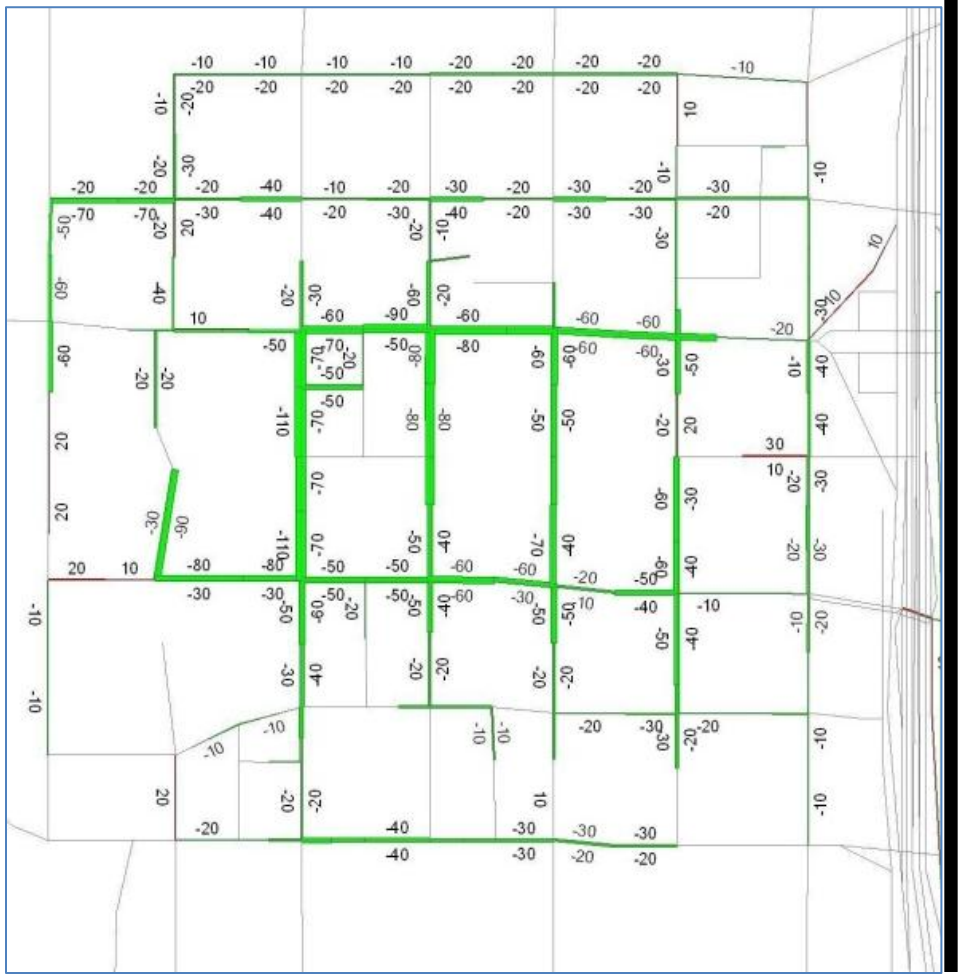
37,000
Walk Trips

=

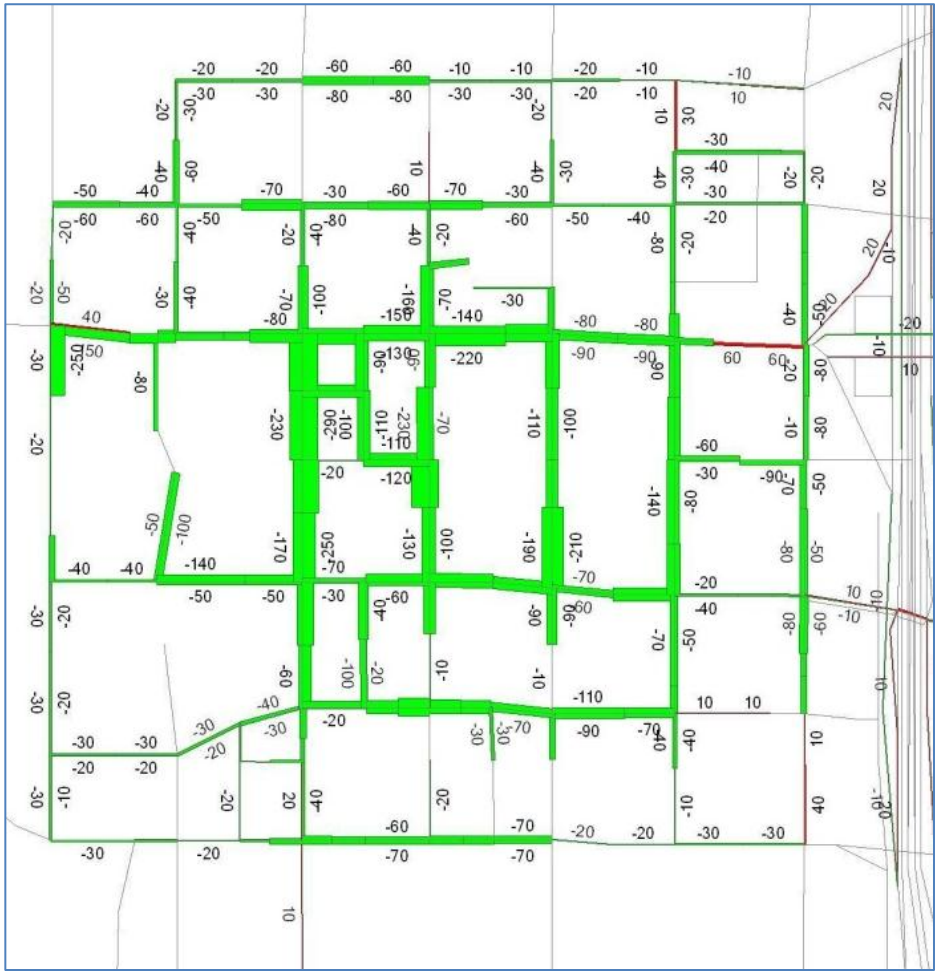
76,000
Walk Trips

Downtown Short Trip Vehicle Trips Reduced

2010 Segment Vehicle Trip Reduction



2030 Segment Vehicle Trip Reduction



Walk Trips and Level of Service Analysis

STATUS: Staff is performing "validation" of the walk trip calculation methodology for 2010 BaseYear – a necessary step prior to forecasting walk trips for the 2030 Baseline

ANALYSIS: If methodology validates to 2010, staff will perform the walk trip calculation to forecast 2030 walk trips and Downtown intersection level of service

REPORTING: Staff will provide a report on the results from both the original model output and the output from the walk trip calculation.

Next Meeting

October 25

- **Downtown Pedestrian Facility Recommendations**
  - Mid-Block Crossings
  - Sidewalks
  - Through Block Connections
  - Pedestrian Corridor
- **Downtown Modeling Results**
  - Walk Trip Calculation Results
  - Intersection Level of Service – 2010/2030

Thank you!

Kevin McDonald
Judy Clark
Sean Wellander

www.bellevuewa.gov/DowntownTransportationPlanUpdate