UPDATE ON THE NEW BKR MODEL

TRANSPORTATION COMMISSION
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WHY ARE WE HERE

To brief the Commission about

- The progress of the new model development
- How the modeling tools are used by staff
- How the Commission may see the results of modeling in other topics

No action is requested of the Commission

WHAT IS A TRAVEL FORECAST MODEL?

- A computerized travel forecasting tool

- Uses land use and transportation network data and other assumptions as inputs

- Generates forecasts of
  - Where, how and when people are likely to travel on a typical weekday
  - Which routes they will likely take
  - Volumes, travel times/speeds/delay

ABOUT THE BKR MODEL

Through an interlocal agreement with Kirkland and Redmond, Bellevue developed the first BKR model in the late 1980's
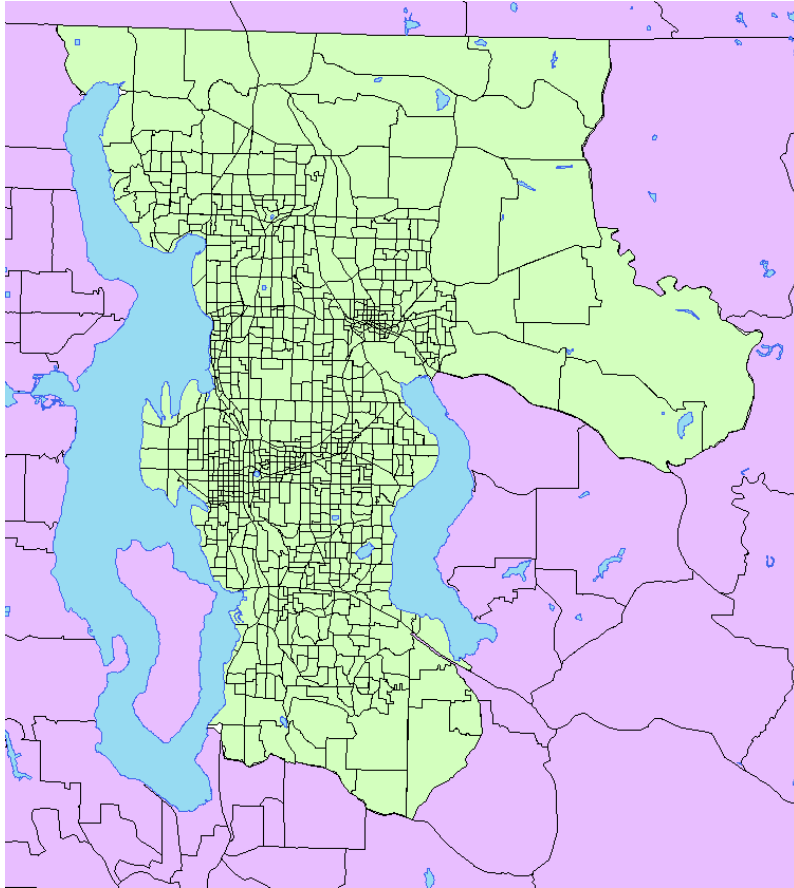
HOW THE BKR MODEL IS USED

Planning examples:

- 20 year Comprehensive Plan development and update
- 12 year Transportation Facility Plan development
- 6 year Capital Improvement Program development

Special Study examples:

- Downtown Transportation Plan and Downtown Livability Initiative
- Wilburton Commercial Area Study
- Development impact review for concurrency
- Impact fee analysis
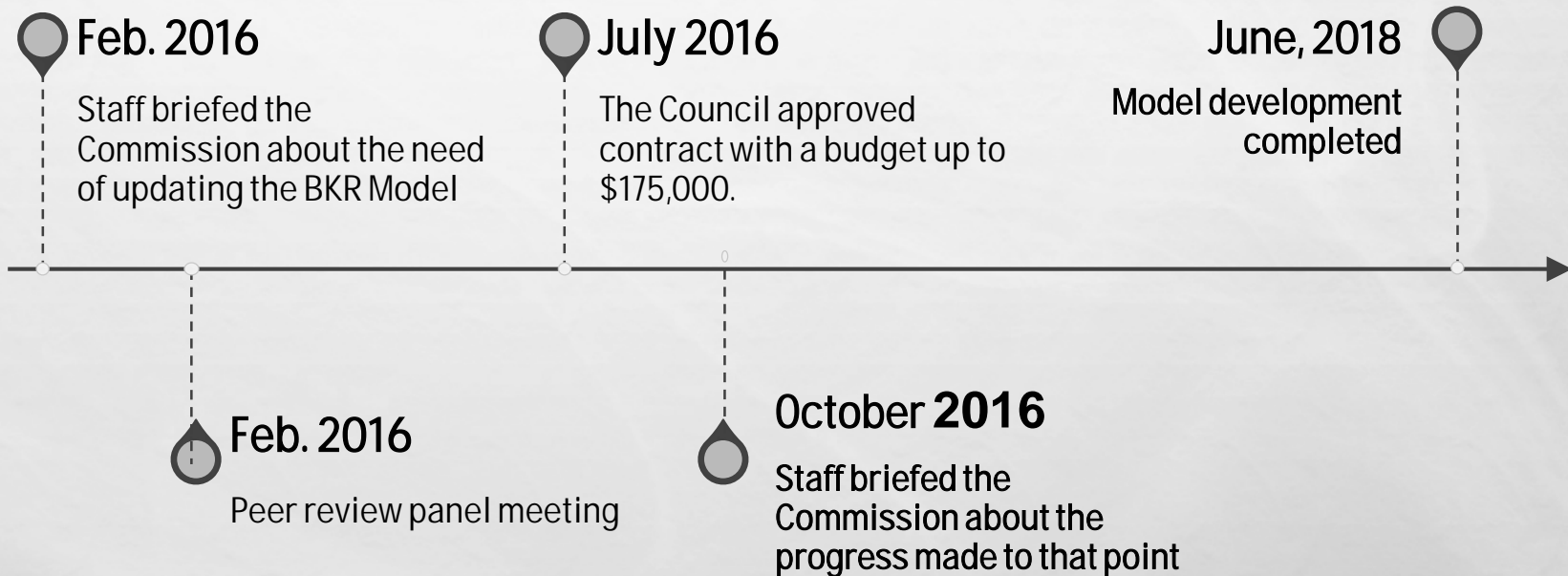- Light rail station area planning
- Roadway closure/construction impact analyses
- Grant applications

WHY DEVELOP A NEW MODEL

- New, more robust modeling techniques have been developed and tested around the country.

- The existing model zones are relatively large and can be refined to improve forecasts

- The existing BKR model doesn't include all important travel modes such as bike and walk

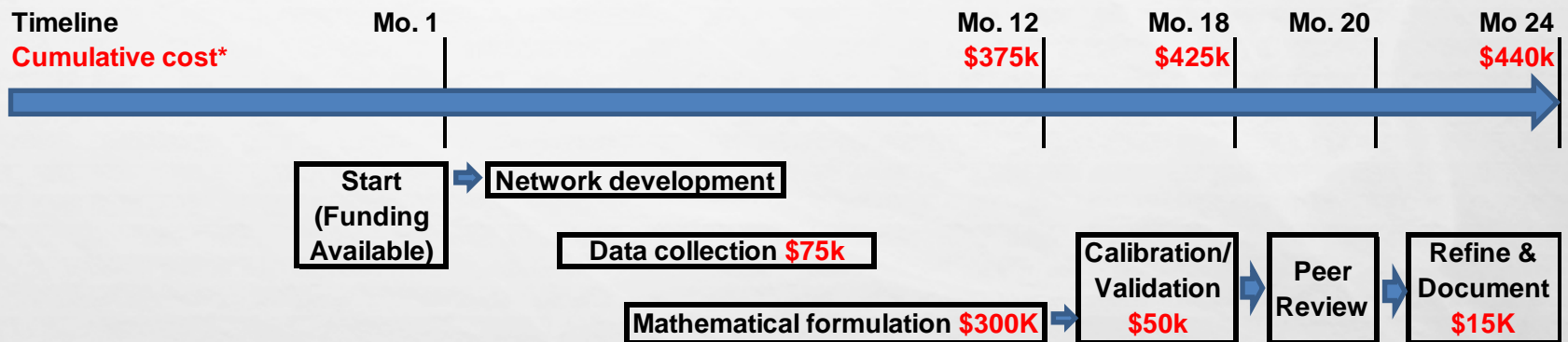- New regional survey data is available

EXPECTATIONS OF THE NEW BKR MODEL

- **Multi-modal:**
  - Generate multimodal performance Metrics
  - Assess multimodal needs and potential usage

- **Sensitive to changes in:**
  - Land use: densities, mixed use
  - Travel options & transportation technologies
  - Congestion
  - Transportation policies such as tolling and parking cost

A BRIEF HISTORY

Feb. 2016

Staff briefed the Commission about the need of updating the BKR Model

July 2016

The Council approved contract with a budget up to $175,000.

June, 2018

Model development completed

Feb. 2016

Peer review panel meeting

October 2016

Staff briefed the Commission about the progress made to that point

ORIGINAL ESTIMATED TIMELINE

Timeline	Mo. 1		Mo. 12	Mo. 18	Mo. 20	Mo 24
Cumulative cost*			**$375k**	**$425k**		**$440k**

Start (Funding Available) ➡ **Network development**

Data collection $75k

Mathematical formulation $300K ➡ **Calibration/Validation $50k** ➡ **Peer Review** ➡ **Refine & Document $15K**

WE ARE HAPPY TO REPORT

- **Partner cities contributed over $150,000 to the model development.**

- **The model development has been completed on schedule and under budget!**

- **The new model meets and exceeds most of the expectations!**

MODEL COMPONENTS NEW VS. EXISTING

Components	Existing	New
Zones	474	1086
Job Categories	5	9
Population	Household	Person
Modes	4	8
Travel Forecasts	Trips	Trips & Tours
Bike	○ (empty)	● (full)
Walk	○ (empty)	◐ (half)
HOVs	◔ (quarter)	● (full)
Park & Ride	● (full)	● (full)
Tolls	◔ (quarter)	● (full)
Parking Price	◐ (half)	● (full)

MODEL SENSITIVITY COMPARISON: NEW VS. EXISTING

Factors	Existing	New
Mixed Land Use	◑	●
Land Use Density	◑	●
Parking Price	◕	●
Tolls	◕	●
Congestion	◕	●
Transit Pass Ownership	⊕	●
New Technologies	⊕	◔

HOW THE NEW MODEL PERFORMS

Screenline Volume Comparison

Modeled Volume vs. Counts (AM and PM Peak Period)

$y = 1.1101x - 2873.8$

$R^2 = 0.9825$

- Counts vs BKRCast
- - - - Reference
.... Linear (Counts vs BKRCast)

BKRCast Flow

Counts
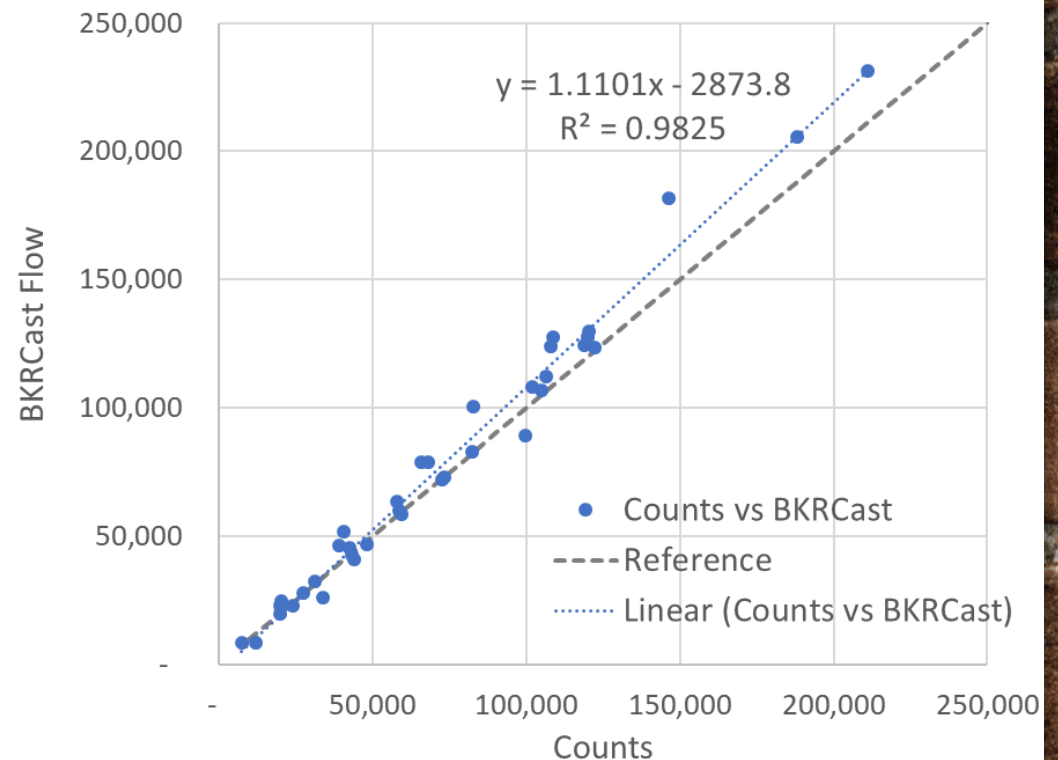
BACKCAST

- **1995 Jobs and population**
- **1995 roadways**
- **1995 Operating cost**
- **No change on other parameters**

Backcast PM with updated coefficients and operating cost
Screenline Scatterplot
A= -26.066   B= 0.995   R2= 0.900   RMSE= 353.953
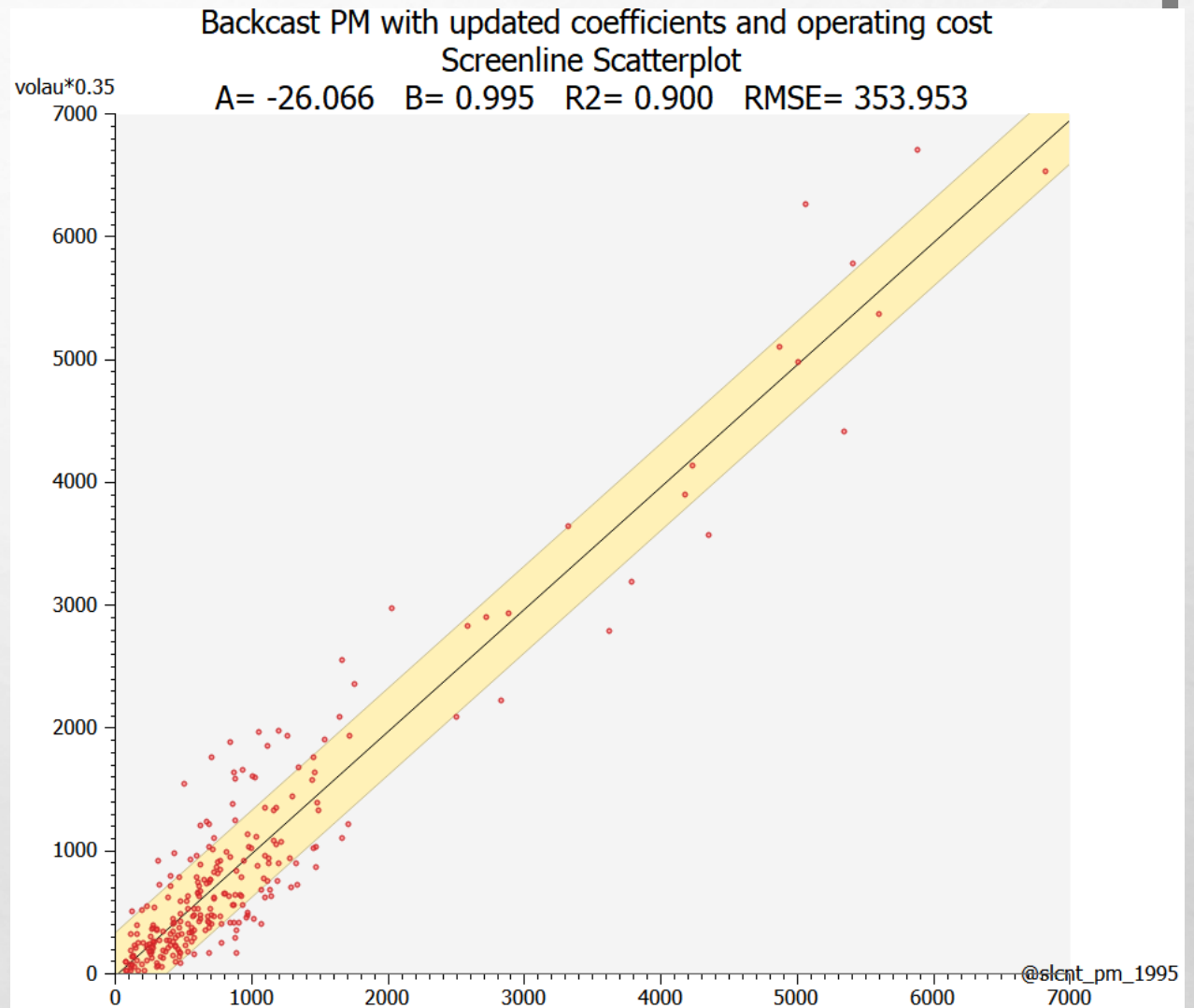
WHAT THE NEW MODEL IS AND IS NOT

- Is a "what-if" analysis tool that generates data to inform decision making

- Is not a tool to predict what exactly will happen; rather it is a tool to help perform relative comparison of different scenarios/alternatives.

NEXT STEPS

- **Test applications to on-going projects in parallel to the existing model**

- **Update pre- and post data processors**

- **Gradually phase- out the existing model**

- **Complete switch to the new model when it is fully proven, likely within the next year or two.**

QUESTIONS AND DISCUSSION
THANK YOU!

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