CONNECTING THE REGION

Transit Forecasting Analysis Procedures

Presentation to Expert Review Panel

February 11, 2005

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History of Transit Modeling

	1986	1988	1991	1993	1996 - Present
Application	Seattle Metro 6-Year Plan	Seattle Metro Development	Regional Transit Project (RTP)	Regional Transit Project (RTP)	Sound Transit (ST) New Starts Projects Support ST Phase 2
Build-Up Stages	4	4	3	3	3
Growth Estimation	Fratar	Regional Trips	Fratar	Regional Trips	Fratar
Mode Choice:					
Primary (Logit)	Incremental	Incremental	Incremental	Incremental	Incremental
Sub-Modes (Logit)	N.A.	Incremental	Synthetic	Incremental	Incremental
Coefficients	Regional Model	Regional Model	Borrowed	Regional Model	Regional Model
Transit Surveys	King County 1985	King County 1985	King County 1985	3-County 1992	3-County 1992
Base Year Validation	1985	1985	1985	1992	1999 & 2002

Why Incremental Methods?

- Simple
- Transit-specific
- Based on observed transit travel patterns
- Established transit market in “core” area
- Close interface with regional model
- Applied in distinct stages
- Transparency & quick turn-around
- Review/accepted by FTA for New Starts planning

Data Requirements

- Transit O/D survey information and transit counts by time-of-day
- Journey-to-Work (JTW) Census data for base mode shares
- Operating bus speed information
- Transit levels of service
- Estimates of growth in demographic variables, trips, congestion, and costs

ST Model vs. PSRC Model

	ST Model	Regional Model
Zone System	Compatible (Additional Zones within the 3-County ST Boundaries)	
Number of Zones	737	850
Travel Time and Cost Coefficients	Similar	
Zonal Parking Costs	Similar	
Land Use Projections	Regional Model	
Growth in Trips	Regional Model	
Congestion	Regional Model	
Bus Speed Degradation	Regional Model (FTA Request)	

Transit Forecasting in Stages

- Stage 1
  - Changes in demographic variables / trips
- Stage 2
  - Changes in travel costs and roadway congestion
- Stage 3
  - Changes in transit levels of service

Forecasting Stages 1 & 2

- Stage 1
  - Estimate of travel growth (from the regional model) is applied to base observed transit trips
- Stage 2
  - Estimates change in transit shares and trips due to change in highway congestion and travel costs
  - Uses coefficients from the regional model
- Stages 1 & 2 are revised only whenever PSRC releases new external data (e.g., land use)

Stage 3 – Transit Service

- Estimates final transit trips for each alternative by access mode – walk vs. auto access
- Uses changes due to transit service levels
- Uses coefficients from the regional model
- Emphasis on detailed analysis of alternative transit networks
- Stage 3 used many times during a project evaluation analysis

In-Vehicle-Time Coefficients

Region	HBW	HBO	NHB
PSRC Model	-0.0300	-0.0200	-0.0200
ST Model	-0.0300	-0.0200	-0.0200
FTA Guideline		-.020 to -.030	

Wait Time / In-Vehicle-Time Weights

Region	HBW	HBO	NHB
PSRC Model	2.00	2.00	2.00
ST Model	2.00	2.00	2.00
FTA Guideline		2.00 to 3.00	

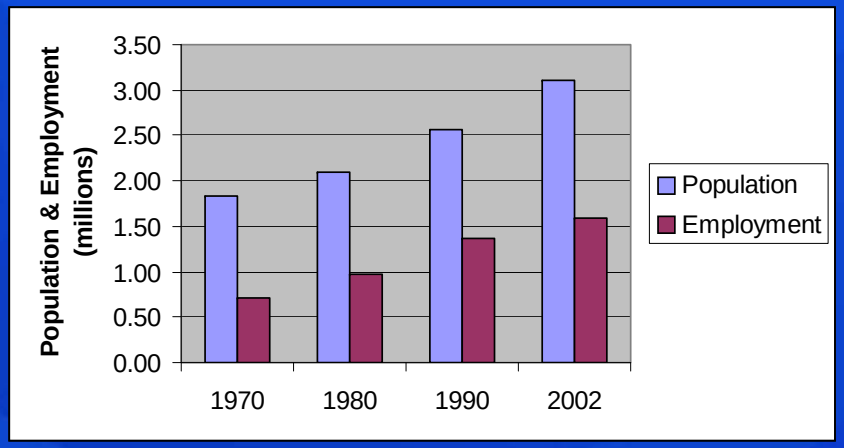
Implied Values of Travel Time ($/hour)

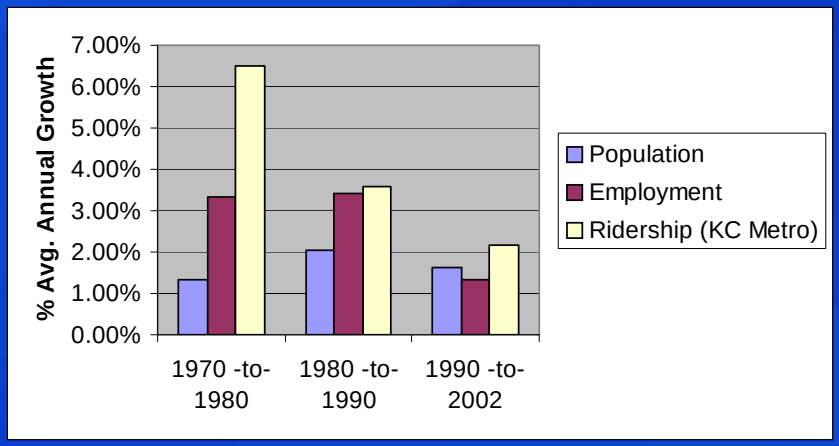
	HBW	HBO	NHB
Most Models	Within 25-to-50% of Regional Average Wage Rate		
3-County Hourly Average Wage Rate (2002 $)		$22	
PSRC Model (2002 $)	$7.20	$4.77	$4.77
ST Model (2002 $)	$7.20	$4.77	$4.77

Change in Fares vs. Inflation

	1980	1985	1992	2002
KC Metro One-Zone	$0.50	$0.65	$1.10	$1.50
Avg. Annual Change 80-02		5%		
KC Metro Two-Zone	$0.75	$1.00	$1.60	$2.00
Avg. Annual Change 80-02		5%		
Inflation Rate 80-02		4%		
CT Express Bus to Seattle	NA	$1.00	$1.50	$3.00
Avg. Annual Change 85-02		7%		
Inflation Rate 85-02		3%		
PT Express Bus to Seattle	NA	NA	$2.00	$2.50
Avg. Annual Change 92-02		2%		
Inflation Rate 92-02		3%		

Historical Growth in Population / Employment vs. Ridership

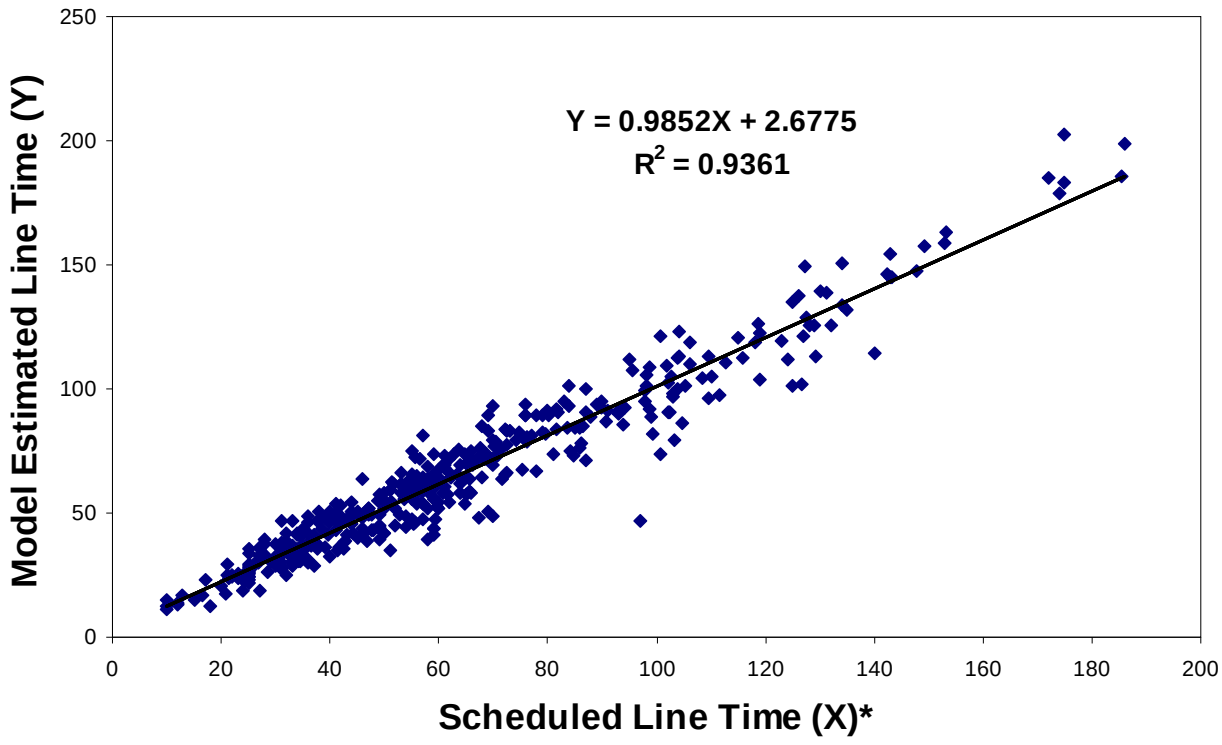




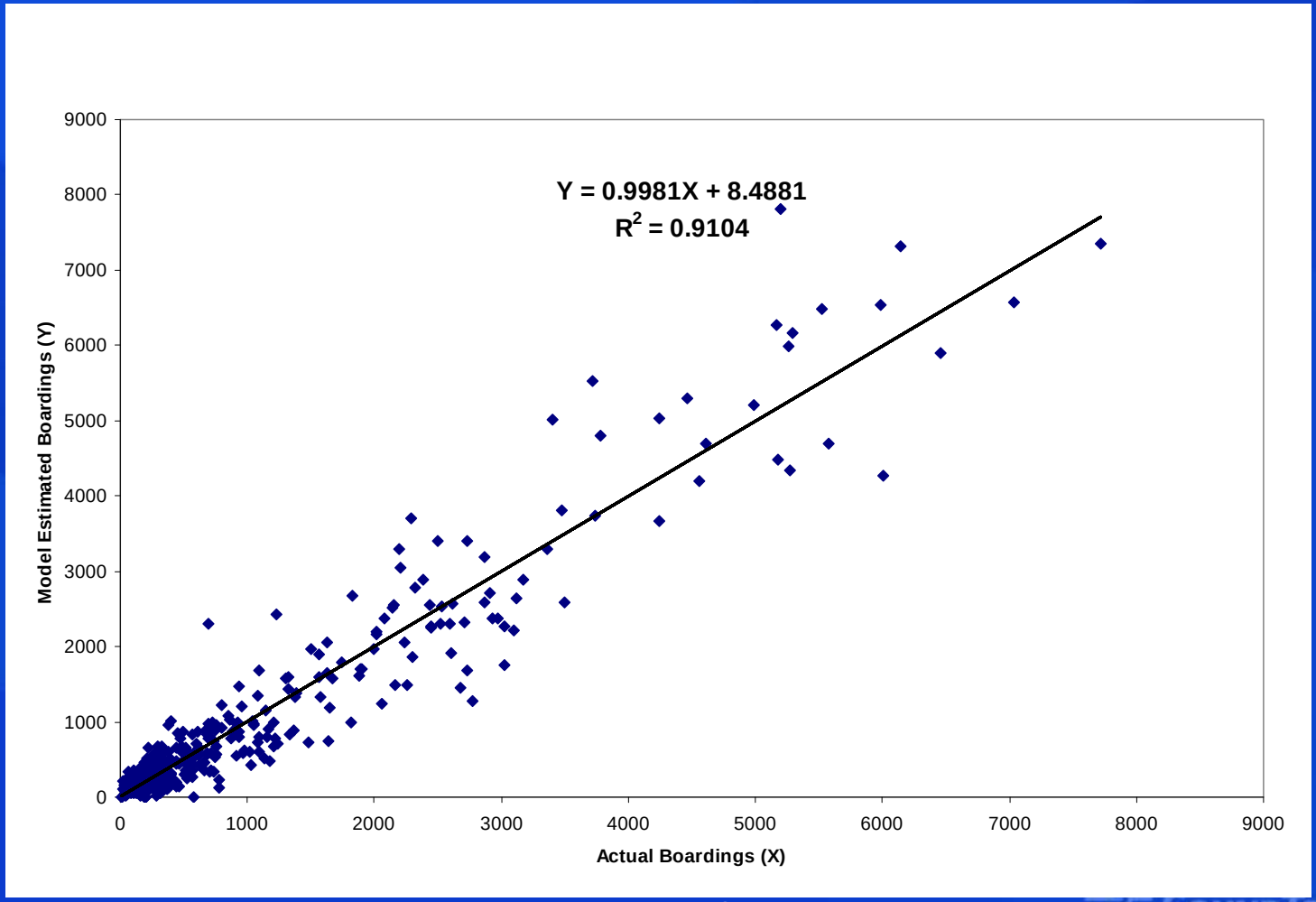
ST Model 2002 Validation

- Updated transit networks in all three counties
- Transit travel time analysis
- Assembled ridership counts by route/segment and by time-of-day (more comprehensive for King Co.)
- Updated base year 1992 transit trip tables using demand matrix adjustment process

ST Model 2002 Validation Results
PM Peak Transit Time Comparison



ST Model 2002 Validation Results
Daily Boardings Comparison



Limitations of Incremental Methods

- Requires baseline of observed transit trips
- Is more applicable to areas with relatively good existing transit coverage
- Not intended for highway network analysis

Areas of Possible Refinements

- Further transit network refinements
- Further analysis on bus operating speeds over time
- Reliance on the new regional model for estimates of growth in travel and congestion
- Continued coordination / feedback with PSRC for further review /refinement on the new regional model – particularly, for conformity with the FTA guidelines for transit modeling

In-Vehicle-Time Coefficients

Region	HBW	HBO	NHB
San Diego	-0.0250	-0.0100	-0.0100
Portland	-0.0363	Varies	NA
Sacramento	-0.0250	-0.0210	-0.0350
Denver	-0.0180	-0.0120	-0.0131
St. Louis	-0.0228	-0.0238	-0.0230
Dallas	-0.0297	-0.0037	-0.0122
Cleveland	-0.0178	-0.0080	-0.0135
Seattle:			
PSRC Model	-0.0300	-0.0200	-0.0200
ST Model	-0.0300	-0.0200	-0.0200
FTA Guideline		-.020 to -.030	

Wait Time / In-Vehicle-Time Weights

Region	HBW	HBO	NHB
San Diego	2.00	2.00	2.00
Portland	1.25	0.27	NA
Sacramento	1.52	2.62	2.34
Denver	3.00	6.34	2.50
St. Louis	2.50	2.50	2.50
Dallas	1.85	4.00	7.00
Cleveland	2.13	2.00	1.94
Seattle:			
PSRC Model	2.00	2.00	2.00
ST Model	2.00	2.00	2.00
FTA Guideline		2.00 to 3.00	