

TECHNICAL MEMORANDUM

DATE: June 13, 2014
TO: Jerry Smiley, URS
CC:
FROM: Jim Harvey, ATG
RE: Central Corridor Initial LPA Transit Ridership Forecasting
Methodology and Summary Ridership Forecasts

Overview

This memorandum provides a summary of the development of initial transit ridership forecasts used to compare final alternative transit modes, route alignments and implementation strategies for high-capacity transit service in Austin's Central Corridor. **The modeled base ridership produced by the travel demand model is approximately 16,000 riders per day. With additional riders anticipated from special markets, such as special events and other visitor trips, typical event day ridership could approach 20,000 or more. Based upon this range and comparison between current year model results and CapMetro observed ridership, the project team believes that the median value of 18,000 is a reasonable preliminary estimate of 2030 ridership.**

The ridership forecasts, in conjunction with information on costs and operational constraints, were used by the Central Corridor Advisory Group (CCAG) to select a locally preferred alternative (LPA). The transit ridership results for the urban rail service selected as the LPA are contained in the appendices to this memorandum.

Travel Demand Model

Based on peer review comments, Capital Area Metropolitan Planning Organization (CAMPO) undertook an effort in 2012 to refine its regional travel demand model to incorporate Federal Transit Administration (FTA) guidance on best practice methods as well as to provide enhanced ability to model premium transit modes such as bus rapid transit and urban rail transit. As part of the model refinement, CAMPO calibrated the transit component of the model using data obtained from Capital Metro transit onboard surveys conducted in 2005 and 2010.

Because of its focus on compliance with FTA New Starts guidelines, this version of the CAMPO model was selected for use in analyzing high capacity transit alternatives in the central corridor. CAMPO issued a license for use of the selected version of the travel demand model for the duration of the analysis. Because the CAMPO 2040 demographic forecasts are not final, the license allows the project team to use non-conforming demographic scenarios pending approval of the CAMPO forecasts.

Demographic Inputs

The travel demand models used demographic data such as population and employment to determine the number and location of trips that will be generated in the region during a given analysis year. Building upon CAMPO demographic estimation methodologies adapted by the City of Austin in partnership with CAMPO and Travis County staff, the project team developed forecast demographics for a 2030 study horizon year.

Using the established CAMPO control totals for the city of Austin, the project team allocated population and employment at the parcel level based upon attractiveness factors and Imagine Austin density goals for each parcel. Factors considered include local land use plans, existing zoning, development potential of the parcel, parcel accessibility and the level of development of surrounding parcels.

Once the parcel level demographic and employment allocations were complete, the parcel data were aggregated to traffic analysis zones for input into the travel demand model. Land use and demographic assumptions were held constant across all mode and alignment scenarios.

Transit Scenario Inputs

The travel demand model defines transit scenarios based upon mode characteristics and operational parameters including headways (frequency of service), travel time between stations, dwell time at each station location and transit fare. Scenarios were developed for two modes: bus rapid transit and urban rail. Headways were assumed to be 10 minutes during peak periods and 15 minutes during off peak periods. Transit fares were set at the equivalent Capital Metro fares for premium transit modes discounted to 2005 model base year dollars. Dwell times and travel times between stations were based on a detailed operations plan developed for each mode by the project team. The transit service parameters for the LPA are shown in Appendix A.

LPA Weekday Ridership Forecasts

The travel demand model 2030 ridership forecasts for the LPA predicted slightly fewer than 16,000 trips per day. The table below shows modeled ridership results for peak, off peak and weekday totals. Additional details, including boarding totals by station location and ridership by trip purpose and market segment, are provided in the Appendix.

LPA Weekday Ridership Summary	Boardings	Percent
Peak Riders	11,710	75%
Off-Peak Riders	3,870	25%
Total Estimated 24-hour Weekday	15,580	100%

Annualized Ridership

For use in subsequent analysis the modeled daily ridership was converted to an annual total using an annualization factor of 325. This factor is based on the FTA standard 300 days for typical weekday and weekend service plans plus an additional 25 days to account for Austin's unique standing as a special events venue and visitor destination. Based on this calculation, the base annual ridership for the LPA is approximately 5,200,000.

This figure is referred to as the base ridership, because the travel demand model does not account for all potential urban rail travel. Consideration must also be given to travel produced by special markets and other travel not captured by the travel demand model.

Special Markets

Because the travel demand model is calibrated based on household travel surveys of local residents and transit onboard surveys conducted during typical weekday operations, modeled ridership forecasts do not typically capture ridership from special market activities. These special markets include special events such as South by Southwest, conventions and special venues oriented to visitors such as museums and the state capitol.

To capture some of this potential market activity, the project team reviewed Capital Metro ridership data for the MetroRapid and MetroRail transit service during special events. In cases where expanded or extended service was provided, MetroRapid and MetroRail service experienced significant increases in ridership of 25% to 50% over typical levels. Using these increases as a benchmark, if extended service is provided for special events, the LPA could reasonably be expected to attract 20,000 or more riders on a typical event day.

The project team used information provided by the City of Austin on attendance at permitted special events throughout the year, the number of event days and the increased rate of

MetroRapid and MetroRail ridership to estimate special event ridership increases on the urban rail line. In addition to the base ridership, an increase of approximately 103,000 riders per year was estimated due to special events.

Next Steps / Where are we in the process?

To date, the ridership analysis has been focused on a corridor level comparison of the candidate alternatives with the aim of selecting a locally preferred alternative. With the selection of an urban rail alternative as the LPA, the ridership analysis can move into its next phase. This additional analysis would include, but not be limited to, the following elements:

Evaluation of Individual Station Locations: To date, the evaluation of station locations has been at a conceptual level. In the next phase of the analysis the project team will review each station to ensure that the station location, access to adjacent land uses and connectivity to supporting transit services are correctly interpreted in the model.

Segments of Independent Utility: The project team will examine potential opportunities to phase the implementation of the project by determining if segments of the project provide sufficient mobility benefits to stand alone, or whether the project should be implemented in its entirety.

Updated Demographic Assumptions: CAMPO is updating its demographics in preparation for development of its 2040 metropolitan transportation plan. Although these forecasts have not been officially adopted, draft data indicates the demographic scenario used in performing the ridership analysis is likely conservative.

Remaining Uncertainties: The project team has identified several areas that deserve additional examination to ensure that the travel demand model is not under reporting activity. These areas include:

- Austin Community College (ACC) and other non-UT student travel – Development plans for ACC call for a significant presence in the area of the Highland Station. ACC and other colleges in the area are treated as a special generator in the model. In the next phase, these special generators will be reviewed to ensure that this travel market is being fully captured.
- UT Medical Center and other new development – Anticipated economic activity from new development in the study area that was not included in the original CAMPO socioeconomic forecasts could not be fully accounted for because of the adopted control totals. The assumptions about these trip generators will be reviewed and reassessed.

- Additional examination of special markets – To date, the examination of urban rail trips that may be generated by special markets such as special events and visitor oriented venues have been studied only at the conceptual level. Given the City of Austin’s status as a major event center and visitor destination, it is likely potential ridership from these sources has been under estimated.

Review of current Capital Metro transit system ridership data shows substantial variability based on school term, months with special events, etc. This variability leads the project team to think the potential underestimation from the cumulative uncertainties listed above could represent an additional 10%-15% in potential ridership. When applied to the urban rail corridor, this differential would be a daily ridership closer to 18,000 riders per day.

Appendix A: Summary of Modeled LPA Transit Ridership Results

Table A-1 – Preliminary Model Assumptions, LPA

NB Station Number	Station Name	Station Location	Exclusive Guideway/Mixed Traffic	Speed of Segment	Park and Ride	Rough Estimate of PnR Parking Spaces	"Hide and Ride" Drive Access Permitted?	Fare	Peak Headways	Off-Peak Headways	UR Dwell Time (sec)
1	Grove	E. Riverside Dr. / Grove Blvd.	Exclusive Guideway	As per Ops Plan	Park and Ride	500	Yes	\$1.50	10	15	20
2	Pleasant Valley	E. Riverside Dr. / Pleasant Valley Rd.	Exclusive Guideway	As per Ops Plan	Park and Ride	500	Yes	\$1.50	10	15	20
3	Burton	E. Riverside Dr. / Burton	Exclusive Guideway	As per Ops Plan			Yes	\$1.50	10	15	20
4	Lakeshore	E. Riverside Dr. / Shore District Dr.	Exclusive Guideway	As per Ops Plan			Yes	\$1.50	10	15	20
5	Travis Heights	E. Riverside Dr. / Travis Heights Blvd.	Exclusive Guideway	As per Ops Plan			Yes	\$1.50	10	15	20
6	South Central Waterfront	E. Riverside Dr. / TxDOT Offices	Exclusive Guideway	As per Ops Plan			Yes	\$1.50	10	15	20
7	Convention Center	Trinity St. (NB) / E. 4th St.	Exclusive Guideway	As per Ops Plan			Yes	\$1.50	10	15	35
8	East 7th	Trinity / 7th	Exclusive Guideway	As per Ops Plan			Yes	\$1.50	10	15	20
9	Capitol	Trinity St. (NB) / E. 11th St.	Exclusive Guideway	As per Ops Plan			Yes	\$1.50	10	15	20
10	Medical School	Trinity St. (NB) / E. 17th St.	Exclusive Guideway	As per Ops Plan			Yes	\$1.50	10	15	20
11	Stadium	San Jacinto Blvd. / E. 23rd St.	Exclusive Guideway	As per Ops Plan			Yes	\$1.50	10	15	20
12	UT North	E. Dean Keeton St. / San Jacinto Blvd.	Exclusive Guideway	As per Ops Plan			Yes	\$1.50	10	15	20
13	St David's	Red River St. / E. 32nd St.	Exclusive Guideway	As per Ops Plan			Yes	\$1.50	10	15	20
14	Hancock / Red Line	Clarkson Ave. / E. 43rd St.	Exclusive Guideway	As per Ops Plan	Park and Ride	500	Yes	\$1.50	10	15	35
15	Airport Blvd	Airport Blvd. / E. 53 1/2 St.	Exclusive Guideway	As per Ops Plan			Yes	\$1.50	10	15	20
16	ACC Highland	Middle Fiskville Rd. / Clayton Ln.	Exclusive Guideway	As per Ops Plan	Park and Ride	500	Yes	\$1.50	10	15	20

Table A-2 – LPA Projected Demand by Time of Day (2030)

	Count	Percent
Peak	11,710	75%
Off-Peak	3,870	25%
Total Estimated 24-hour Weekday	15,580	100%

Table A-3 – LPA Projected Demand by User Type (2030)

	UT Students	Transit Dependents (0-vehicle households)
Count	2,700	3,800
% of Total Est. Project Demand (n=16,000)	17%	24%

Table A-4 – Estimated CMTA System Trips by Time Period (2030)

	Peak	Off-Peak	Total
Build (with UR)	107,570	74,280	181,850
No-Build (without UR)	97,620	73,540	171,160
Difference [(Build)-(No-Build)]*	9,950	740	10,690

Table A-5 – Estimated 24-hour LPA Weekday Boardings by Direction and Access Mode, Peak and Daily (2030)

	Peak Walk	Peak Drive	Total Peak Boards	Daily Walk	Daily Drive	Total Daily Boards
Northbound	4,300	2,310	6,610	6,340	2,530	8,870
Southbound	2,800	2,310	5,100	4,190	2,520	6,710
Total Estimated 24-hour Weekday	7,100	4,620	11,710	10,530	5,050	15,580

Table A-6 – LPA Ridership Distribution by Trip Purpose and Access Mode (2030)*

	Walk Access	Park & Ride	Kiss & Ride	Total
HBW – Home Based Work	3,680	2,050	1,800	7,530
HBNW-OTHER – Home Based Non-work Other	2,410	80	170	2,660
HBNW-EDUC – Home Based Non-work Education	3,570	680	170	4,420
NHB – Non-Home Based	990	60	120	1,170
Total Estimated 24-hour Weekday	10,650	2,870	2,260	15,780

**Note: Totals in mode choice tables differ slightly from assignment totals, as some trips do not find a valid path during the assignment step.*

Table A-7 – Estimated 24-hour LPA Weekday Boardings by Station, Direction, and Time Period (2030)

Urban Rail Station	Direction	Peak Boardings	Off-Peak Boardings	Total Boardings
Grove	Northbound	550	90	640
Pleasant Valley		1,850	930	2,780
Burton		20	10	30
Lakeshore		350	340	690
Travis Heights		50	30	80
S Central Waterfront		270	170	440
Convention Center		280	60	340
E 7th		540	150	690
Capitol		420	90	510
Medical School		330	60	390
Stadium		420	110	530
UT North		380	80	460
St David's		70	50	120
Hancock / Red Line		300	70	370
Airport Blvd		30	20	50
ACC Highland		-	-	-
Total Northbound		5,860	2,260	8,120
ACC Highland	Southbound	1,210	270	1,480
Airport Blvd		270	80	350
Hancock / Red Line		1,040	350	1,390
St David's		150	120	270
UT North		620	180	800
Stadium		570	250	820
Medical School		390	80	470
Capitol		450	50	500
E 7th		310	60	370
Convention Center		530	50	580
S Central Waterfront		140	40	180
Travis Heights		30	10	40
Lakeshore		80	70	150
Burton		50	-	50
Pleasant Valley		10	<10	10
Grove		-	-	-
Total Southbound		5,850	1,610	7,460
Total Estimated 24-hour Weekday		11,710	3,870	15,580