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Technical Memorandum

To: Eugene Chamber of Commerce
Cc: BEST
Date: November, 28 2016
Subject: Gateway EMX Ridership Follow-Up

On June 17, 2016, CSA presented to the Eugene Chamber of Commerce Local Government Affairs Committee (LGAC) the results of a performance assessment on the Gateway EMX project. Our manual count methodology for the original assessment had a relatively small sample size. In our professional opinion, the sample size was adequate for evaluation purposes. Nevertheless, some of the LGAC member's had questions regarding sample size and whether the results were representative of the typical conditions. As follow-up to these questions, CSA has worked with LTD obtain additional data. LTD provided Automated Passenger Count (APC) data for the EMX from entire month of October in 2015. The assessment in this Tech Memo evaluates the LTD APC data.

DATA DISCUSSION:

The data provided by LTD is attached to this Tech Memo. The data is average boardings and alightings for the month of October 2015. This is a large sample size and there are few, if any, data limitations for a sample size this large. The data provided has been aggregated by stop and is an average of all the weekdays for the entire month. There are some data limitations from the data structure itself. Because the data is aggregated, it is not possible to calculate the actual loading of individual busses by segment between stops. Disaggregated APC data that includes the individual counts for each individual bus is necessary for that type of analysis. Thus, the data structure does not make it possible to calculate a "true load factor" for individual segments. The stop activity data is adequate, however, to estimate a proxy for load factor by summing the stop activity data across a number of stops in one portion of the route and then dividing by the miles on that portion and then dividing by the number of busses in the day (assumed to be 93 busses per day based upon the schedule).

With respect to stop activity analysis, the APC data and the manual count stop survey data collected in the initial assessment are structured in a similar manner. These data structures can be compared directly.

The APC data did include a couple of missing data points. No activity data for either the Postal Way Stop or the Pavilion Stop was provided. The count data for these stops was imputed using the Kruse Way Stop for the Postal Way Stop and the Sacred Heart Stop for the Pavilion Stop. While not perfectly accurate, these stops should have very similar characteristics and these imputed calculations are adequate for analysis purposes.

Stop Activity Assessment:

The initial assessment compared the 2025 projected stop utilization at locations selected by the original EA documentation used to justify the project with full-day manual counts taken by CSA of activity at those stops. The results of that initial assessment are provided in the Below Table 1

Table 1
Original Manual Count Analysis

	Alightings	Boardings	Total 2015 Ridership	EA Predicted 2025 Ridership	Percent
Springfield	329	294	623	4,537	13.7%
Centennial	133	167	300	791	37.9%
Gateway	196	188	384	173	222.0%
Sacred Heart	59	36	95	857	11.1%
Totals			1,402	6,358	22.1%

The original results showed relatively dramatic differences between projected rider utilization at these stops and the actual observed utilization.

Table 2
APC Data – Gateway EMX Only Activity

	Alightings	Boardings	APC October 2015 Data	EA Predicted 2025 Boardings and Alightings	Percent
Springfield	573	456	1,029	4,537	22.7%
Centennial	193	221	414	791	52.3%
Gateway	245	244	489	173	282.7%
Sacred Heart	48	45	93	857	10.9%
Totals			2,025	6,358	31.8%

Overall, the counts are pretty similar although the APC data is slightly higher overall. The data still shows a large difference between the projected stop activity and the observed activity.

The APC data reveals what was suspected in the initial assessment – that the Springfield stop activity projections in the EA included boardings and alightings for the Gateway EMX *and* the Franklin EMX. The ridership data that was counted in the original assessment was specific to the Gateway EMX and so is the data in Table 2. In other words, the ridership tables above only count boardings leaving Springfield Station and headed onto the Gateway EMX route and alightings arriving at Springfield Station from the Gateway EMX Route. This remains the logical way to project stop activity as part of the Environmental Assessment. The NEPA review should have been directed at the impact of the Gateway project specifically and the EA would have benefitted from a distinction between the two rider projections to provide a meaningful description of the actual project reviewed in the EA. Nevertheless, the APC data does include the data sufficient to make the comparison to the projections in the EA that included all boardings and alightings at Springfield Station and the same is reported in below Table 3:

Table 3
APC Data – Gateway and Franklin EMX Activity

	Alightings	Boardings	APC October 2015 Data	EA Predicted 2025 Boardings and Alightings	Percent
Springfield	1,820	1,837	3,657	4,537	80.6%
Centennial	193	221	414	791	52.3%
Gateway	245	244	489	173	282.7%
Sacred Heart	48	45	93	857	10.9%
Totals			4,653	6,358	73.2%

With the Springfield data that appears to align with the data assumptions in the EA, the stops are operating approximately 27% below the EA projections and the total stop activity is highly influenced by the Franklin EMX where 2,600 of the average daily stop activity is sourced.

With respect to the Gateway Station, the higher ridership count over the projection appears due to elimination of transfers in the EA projections versus the observed transfers that are occurring under existing conditions. The EA predicts transfers at Gateway Station will be near zero in the future year. However, observations at the platform during the manual count indicated a significant number of transfers occurring at the Gateway Station. Simply put, the EA projections include very different assumptions about future system transfer connectivity than the existing conditions.

Ultimately, just like in the original assessment Sacred Heart Station and Centennial Station present the best data sets to evaluate the true performance of the Gateway EMX against the EA projections. Centennial is at the heart of the route and is reflective of the ridership on the inner “two-way” portion of the Gateway EMX. Sacred Heart is the main station at the center of the hospital which was a major destination of the Gateway EMX project. Even these two stations do, however, have their own complexities, as follows:

- Centennial Station also has the potential for transfers between Route 13 but they present a limited problem for comparison purposes because the long-term EMX planning described in the EA shows a similar route to Route 13. Thus, Centennial Station has existing transfer patterns that should be substantially consistent with future year assumptions that were in the EA (but were not well defined). Also, the structure of the EA projections for 2025 at Centennial Station has a clean basis to create an upper and lower bound on the projections by considering the 2025 EA projections with and without transfers. The actual observed conditions for transfers at Centennial will fall somewhere between zero and the amount projected in the EA for Centennial.
- Sacred Heart station is one of three Gateway EMX stations at Peace Health/Riverbend. The original EA only planned two stations at the hospital. As such, one might expect a portion of the rider utilization projected in the EA to be diluted due to the extra station in this area that was ultimately constructed. An approximate mathematical solution can be achieved by dividing the count at Sacred Heart by 3 and multiplying it by 2 to reflect an even distribution of the ridership amongst three rather than two planned stops.

Applying solutions to the above issues yields two alternative tables for which a true *apples to apples* comparison should be mathematically bounded, as follows:

Table 3
APC Data – No Adjustments

	Alightings	Boardings	Total 2015	2025 EA Projections	Percent
Centennial	193	221	414	791	52.3%
Sacred Heart	48	45	93	857	10.9%
Totals			507	1,648	30.8%

The above table reflects the straight comparison of the APC trips at the central hospital transit stop and assumes transfer patterns similar under current conditions to the planned conditions in 2025. The above table represents the lower bound of observed performance relative to projections in the EA. The below table has two adjustments from the above table. It adjusts proportionally the count for Sacred Heart to reflect the ultimate build-out of three stops as opposed to two and it assumes no transfers from Route 13 to the Gateway EMX are occurring at Centennial (even though it appears some are). The below table represents the upper bound of observed performance when compared to the EA projections:

Table 4
APC Data – EA Adjustments

	Alightings	Boardings	Total 2015 with adjustment to Sacred Heart as if there were 2 stations	2025 EA Projections without Transfers at Centennial	Percent
Centennial	193	221	414	468	88.5%
Sacred Heart	48	45	140	857	16.3%
Totals			554	1,325	41.8%

With operations beginning at the start of 2011, the Gateway EMX is one third of the way through the planning projection time period to 2025. The EMX is operating in the range of **69 percent to 59 percent below** the projections in the EA with only ten years of time for ridership growth to attain projections. It is not impossible that ridership projections will be attained over the next 10 years but it would appear to be unlikely. While stop activity is slightly higher than the manual counts taken from the initial assessment, the APC data confirms the original findings.

Service Utilization Assessment:

For the reasons described in the Data Discussion section above, the structure of the aggregated and averaged data does not make it possible to specifically calculate load factors for each EMX segment in a manner that can be directly compared with the projections in the EA. However, a proxy for load factor can be estimated by summing the data for multiple stops and dividing it by the miles of service and then by the number of busses. This methodology yields the below table:

Table 5
APC Data – EMX Service Area Activity

Service Area Segment	Total Boardings and Alightings	Route Length	Boardings and Alightings Per Mile	Boardings and Alightings per Mile per Bus
Franklin EMX	16,625	3.66	4,542	48.8
Gateway EMX (Non-Loop Portion)	3,047	1.78	1,712	18.4
Gateway EMX (Loop Portion)	1,632	4.03	405	4.4

The above table shows just how much lighter the activity on the loop portion of the Gateway EMX is. The numbers of the loop portion go down even more dramatically if it is further broken down into the connection to the Gateway Station versus the rest of the loop. The segment from Hayden Station to Gateway Station is less than a mile and has over half the boardings and alightings of the entire loop portion of the Gateway EMX. The remaining portion of the loop has just 2.6 boardings and alightings per mile per bus.

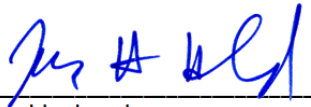
Conclusions:

While the stop activity performance is slightly better with the APC data than the original manually counted assessment, the APC data essentially confirms the overall conclusions from the original assessment. The main findings still hold:

1. The Gateway EMX is performing well below the EA projections for 2025 and it would appear unlikely that those projections will be attained.
2. The underperformance is primarily attributable to the loop portion of the route. Activity levels in this area are approximately one tenth the intensity experienced on the Franklin portion of the EMX.
3. From a capacity standpoint, it would appear that either the frequency of service combined with the large busses on the Gateway EMX results in substantial unused capacity.

Additional analysis does not appear warranted at this point. More detail is unlikely to change the results because the ridership is what the ridership is. Additional analysis should focus on specific actions to make the service more efficient through some combination of streamlined service, attracting additional new riders, and route alterations.

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