

AORTA's March 25, 2006 rebuttal to:

***TriMet Response to AORTA Letter
March 15, 2006***

The March 8, 2006 letter from the Association of Oregon Rail and Transit Advocates (AORTA) to the Federal Transit Administration (FTA) suggests that ridership will grow faster than projected by the regional travel demand-forecasting model and, therefore, additional service that will exceed system capacity at the Steel Bridge needed to serve the region's Westside. AORTA bases their concerns on the MAX Red and Blue Line ridership that they note has grown at an average of 5.5% per year during the last six years.

AORTA's analysis applies an overall MAX growth rate to peak hour service to reach their conclusion. This produces inaccurate results.

TriMet's response to our letter raises the question of ridership forecasting in several points. We will deal with this issue in a single section at the end.

- *A growing proportion of MAX ridership has come in the off-peak - or a 'spread' peak - where there is available capacity without adding new trains. The growth in the peak hour ridership past the Westside "peak load point" (Goose Hollow) has been nearly flat (+/- 1.5%) - in contrast to 5.7% all-day ridership growth.*

Until APC's were installed on rail vehicles, TriMet had no reliable peak load counts for Max at Goose Hollow, so we really don't know what medium to long term trends are in Westside Max peak loads. They may or may not be "flat." However, the ability of light rail to reduce peak hour demand on the highway network is one of its most important functions. If it is not accomplishing this, it is disturbing and is probably due to the following: 1) slow operation through the central city discourages regional patronage and 2) increasingly crowded trains. The first probably can only be significantly improved with downtown grade separation in the future but the second can be improved with more trains during the peak and better train spacing.

According to TriMet's Fall APC counts for 2004 and 2005 the westside outbound maximum load factor (Goose Hollow) increased from 4,200 to 4,319 in the 3:30 to 6:00 PM peak (+2.8%) and from 2,081 to 2,320 (+11.5%) in the 4:30 to 5:30 peak of the peak.

In the peak, trains became 19.1% more crowded (136 to 162 av. pass. / trip) and during the peak of the peak, trains became 24% more crowded (154 to 191 av. pass. / trip).

Although this is only a one-year trend, it is probably the most accurate cordon count available for west-side service. Average loads disguise the fact that with the current uneven headways, some peak trips are much more crowded than others.

Overcrowding coupled with uneven scheduled headways during the peak (ranging from 3 minutes to 10 minutes) unnecessarily discourages peak hour ridership. Anecdotal evidence confirms this trend. In the Thursday, March 02, 2006 Oregonian, reporter Jerry Boone writes: "TriMet has decreased the number of trains on its Blue Line and the result has been standing-room-only conditions for rush-hour riders, some of whom say conditions are getting worse instead of better. 'It used to be OK, but in the past four months it has become really bad,' says Anna Plekhanova, who was among 40-plus riders waiting one morning last week for the 8 a.m. train at the Elmonica/Southwest 170th Avenue station. 'You have to stand with people right up in your face,' she says. 'When the doors open, the train is already full, but people just push to get more in.'"

- *This demonstrates that TriMet and this region have been successful in serving many kinds of trips, not just those occurring in the peak hour. This has resulted in more efficient accurate in predicting ridership. The model is 'certified' by the Federal Transit Administration as utilization of the transit investment.*

This is commendable but irrelevant.

- *Currently, a number of yellow and red line trains are 'single' car trains. TriMet can significantly increase carrying-capacity on those lines by adding a second MAX car to those trains - without any change in operation or consumption of Steel Bridge capacity. The AORTA numbers ignore this.*

The carrying capacity of the Yellow Line trains is irrelevant to the west-side capacity issue, since Yellow Line trains will be diverted to the Mall and are therefore unavailable for satisfying Westside demand. Currently only two single car trains are still operating on the Red Line to Beaverton at any time near the peak. These depart Pioneer Square at 3:50 PM and 4:05 PM respectively. No single-car trains operate Westbound from Pioneer Square in the 4:30 to 5:30 peak of the peak, which is why they were ignored by AORTA.

- *During the past six years, the red line was introduced as new service to the Westside, along the Banfield and to the Airport. Much of the compounded growth rate is because of the one-time bump resulting from that service. Over the last six years, average weekday Blue and Red line boarding ridership has grown by an average 5.7% annually - and 3.2% in the last year - but again, this has been disproportionately off-peak. Peak hour demand has been relatively flat.*

This appears to be a restatement of the first claim, that peak ridership to Washington County is not growing, and is not expected to grow. See further analysis below.

- *Instead of AORTA's simple extrapolation, Metro's travel forecast is based on specifically forecasted housing location, household size, job location, other demographics and land uses, and has been very accurate in predicting ridership. The model is 'certified' by the Federal Transit Administration as part of its review of technical methods. TriMet believes that the ridership estimates are accurate and the service to Washington County has been sized to accommodate the forecast ridership in 2025. This includes any transferring passengers from the Washington County Commuter Rail line.*

See later analysis of ridership forecasting below.

- *Projected 2025 Westside MAX peak hour, peak direction ridership of 3,300 past Goose Hollow, the peak load point, is accommodated by 16 trains, which is within the Steel Bridge 30-train capacity and 24-train estimated capacity on Morrison and Yamhill Streets. This 2025 peak load forecast has already been reviewed by FTA Project Management Oversight consultant and has been documented in the "Fleet Management Plan" and the South Corridor Project Final Environmental Impact Statement.*

See later analysis of ridership forecasting below.

- *Extensive analysis gives us confidence in being able to operate existing lines and the new Green Line with projected growth to 2025 across the Steel Bridge and through the Rose Quarter. Using an operations simulation model, VISSIM tied to an actual signal controller (hardware, just like the one at intersections) allowed us to test the 2025 scenario, proving the capacity of 30 trains per hour in each direction. An optimal signaling scenario was developed by the consultant and the City of Portland was able to convert that scenario to work in the hardware installed at the Rose Quarter intersection. Its now in place.*

Our letter did not contradict the claimed 30 trains per hour capacity through the Rose Quarter interlocking. We are concerned about the effect that the delays encountered at that service level would have on ridership and operating costs. Our point was that by diverting 14 of those 30 trains to the Mall alignment, that left a maximum of 16 trains per hour available for Westbound service to Washington County in the PM peak. Therefore the claim that Yamhill/Morrison has a capacity of 24 trains per hour, made in the previous point, is hollow, if only 16 can ever make it. In addition, TriMet's own "Downtown Light Rail Systems Analysis" document of December 2002, clearly states that the capacity on Yamhill/Morrison is 30 (not 24) trains per hour with the existing signal cycles, and 33 per hour with one alternative signal timing scheme that was deemed generally acceptable in that report.

- *Part of the results of the analysis was the finding that traffic and signal operation at the east and west approaches to the Bridge were the defining factor of being able to operate in 2025, rather than the Steel Bridge itself.*

This agrees with AORTA's analysis stated in our letter.

- *Past 2025 TriMet believes there are a number of incremental improvements which require further study related to the Steel Bridge and the Rose Quarter to meet increasing capacity requirements:*
 - *The street intersections used by MAX through the Rose Quarter could be reconfigured in coordination with redevelopment plans for that district (for example, creating a one-way grid that removes some conflicting traffic moves).*
 - *Signal systems on and approaching the Steel Bridge would be reviewed to increase the efficiency of train movements while preserving safe operations.*

AORTA, in its letter, requested that such further study occur prior to proceeding with the Mall project, since the inability to increase capacity, a potential conclusion of such a

study, is obviously a fatal flaw. For reasons described in our analysis of ridership, any such problem will arrive before 2025. Because of inconsistencies between past study results, and claims made in the FEIS, AORTA has requested an independent analysis be done.

- *AORTA suggests that there is capacity on the cross mall (Morrison-Yamhill) to operate the I-205 trains. Our findings do not support this. The existing light rail alignment on SW Yamhill and SW Morrison is controlled by traffic signals operating on a 45-second signal cycle. This allows a train to proceed to a station where a train waits through one signal cycle. As the number of trains increases over 24 per peak hour in one direction, delays will increase and service reliability will be reduced. If we exceed 24, the close spacing of stations on these streets (3rd Avenue, Pioneer Place, Pioneer Place, Library/Galleria) will become a problem. Also, more than 24 trains would put the operation of the First and Everett intersection over capacity.*

The "Downtown Light Rail Systems Analysis" of December 2002, cited in the FEIS (Chapter 1 "Purpose and Need" p.1-16), contradicts the above claims. According to that document, the signals on Yamhill/Morrison operate on a 60 second cycle during the PM peak, and have a capacity of 30 trains per hour at that timing. Station spacing is irrelevant to that capacity. That document does not say the capacity is 24, nor does it indicate that 24 is any sort of break-point for increasing delay. That document does not cover modeling of 30 trains per hour, because the requirement for East-Side service was deemed to be 33 trains per hour on Yamhill/Morrison, a conclusion apparently reached without fully analyzing the operations across the Steel Bridge. A capacity of 33 trains per hour could be achieved, according to that document, by reducing the signal cycle to 54 seconds. This had the benefit of reducing excess station dwell time, significantly offsetting the delays caused by pushing the maximum number of trains through. Net delay at that peak rate was only 1.2 minutes. Regarding First and Everett intersection capacity, we understand this to mean that automobile traffic would be diverted or delayed, not trains, at service levels above 24 trains per hour. With the multiple paths available to motorists, this would undoubtedly cause no more disruption to traffic flow than will be caused by the additional track-work and train movements planned to connect the Steel Bridge with the Mall.

- *The downtown Portland Mall alignment is designed to serve the length of the most densely developed portions of the downtown and opens up new and significant downtown destinations (e.g. Union Station and 25,000 plus students at Portland State University) to the regional rail network. It additionally provides a take-off point for future rail extensions to the southeast and southwest. Those extensions would compliment existing Green and Yellow Line service already entering the downtown from the north/northeast via the Steel Bridge.*

The Mall alignment does not significantly improve connectivity to the regional rail network. That connectivity is already provided by the Transit Mall itself. The ridership modeling that was done to compare the "Main Street Terminus" alternative (discarded earlier) with the "PSU Terminus" option confirms this. Those results, found in the "October 2003 Downtown Portland Amendment to the South Corridor Project Supplemental Draft Environmental Impact Statement" (See Table S.5-1 in the Executive

Summary, p. S-12), indicate absolutely no difference in numbers of system-wide transit originating rides between those two options. This is because switching riders from bus to rail, as the "PSU Terminus" option did, has little benefit in attracting additional ridership when it involves a short transfer trip on relatively slow surface rail. What we claim in our letter is that the Mall project actually has a negative effect on the connectivity between Washington County and both the rest of the rail network and the rest of the bus network, because it curtails capacity where it will be needed. Connectivity with future system extensions should be supplied in the future, when it can yield a benefit.

- *AORTA has proposed a downtown subway to accommodate growing rail system needs. TriMet has studied this option and estimated that cost at over \$1.3 billion and does not believe that investment is warranted at this time, and would not likely meet FTA's strict cost-effectiveness criteria.*

AORTA has not proposed that a downtown subway be added to accommodate Green Line service downtown.

- *A Portland Mall Alignment was selected as the Locally Preferred Alternative in 1998, 2003 and again in 2004 and was based on significant public processes. The public continues to be intimately involved in its design.*

The public was not made aware of the capacity problems that we are bringing to your attention. The December 2002 Downtown Light Rail Systems Analysis document states that the decision was based on political considerations, not sound transit network design principles or cost-effectiveness.

- *Washington County will continue to receive great light rail service. Headways to Beaverton will average every 3 to 4 minutes during the peak period in 2025.*

If operated at even and reliable headways, 3 to 4 minute spacings are "great." Our criticism, however, is directed at capacity, not frequency.

Ridership Forecast problems:

Our review of this letter, the project FEIS, the January 2004 Regional Transportation Plan Update (RTP), and TriMet's June, 2005 Transit Investment Plan (TIP) discovered so many serious discrepancies and illogical conclusions that we conclude that there must be serious methodological blunders behind the ridership estimates that form the underpinnings of this project. TriMet's reply, above, states: "*AORTA's analysis applies an overall MAX growth rate to peak hour service to reach their conclusion. This produces inaccurate results.*"

The fact of the matter is that we have not engaged in such simplistic analysis.

There is no plausible mechanism by which peak period ridership can remain flat over the long term while off-peak ridership grows at rates of 5% or more annually, unless service is not allowed to respond to demand. With downtown employment projected to grow at 1.7% annually (RTP) and an absolute limit on peak highway capacity in the Sunset corridor, peak transit ridership must grow at well above 1.7%.

The TIP calls for a compounded annual growth rate of 5% in transit ridership over the 16 year period from 2004 to 2020 (TIP p.2). This is the same as the RTP "2020 Preferred System." The RTP "financially constrained" goal is 3.3% compounded annually over that period (RTP Chapter 5. Page 5-6 Table 5.3 "2020 Financially Constrained System Alternative Mode Performance").

While the "financially constrained" alternative is required for Federal planning purposes, the RTP states (chapter 5) "With expected revenue, the financially constrained system is not adequate to meet the region's 20-year transportation needs. The analysis of this Financially Constrained network shows an unacceptable level of congestion, with accompanying impacts on the region's ability to adequately serve expected growth in centers and maintain adequate access to intermodal facilities and industrial areas."

Here is a quote from the FEIS: (page 1-12)

"Within Downtown Portland (sub-district 1, see Figure 1.2-2), the number of households is projected to more than double over the next two decades with the addition of 10,280 households, more than twice the growth rate of the corridor and region. Employment in Downtown Portland is expected to increase by approximately 51 percent, similar to the corridor and regional growth rates by 2025. However the number of jobs to be added in downtown is the greatest absolute increase (62,200 jobs) of any regional or town center in the region."

Employment growth of 51% over 25 years (the period in the table) is 1.7% compounded annually.

So the question appears to be, given that for Federal planning purposes, system-wide ridership should grow at 3.3% compounded annually to meet the goals of the "fiscally constrained" system, can peak ridership between the Portland CBD and Washington County be reasonably expected to grow at only 1.5% for the same two decades?

To start with, there is a discrepancy between the 2025 peak hour, peak direction ridership of 3,300 claimed in this TriMet response, and the value of 2,920 in table 4.2-8: (page 4.21) of the FEIS.

Given the highway capacity constraints to Washington County, and current mode splits for home-based work trips in the peak, one would expect peak transit growth to be close to double the rate of employment growth, or $2 \times 1.7 = 3.4\%$.

AORTA used a value of 3% in calculating future service requirements.

The FEIS, however, appears to assume that overall system ridership will only grow at 1.5%, which is not consistent with the federally approved RTP. On Pages 4-11 to 4-12, the FEIS states: "Service growth under the No-Build Alternative would be constrained by currently available revenue sources, consistent with the financially constrained transit network in Metro's 2004 RTP. Normal annual growth in service would occur over the next 20 years at an estimated rate of 1.5 percent per year."

On page 4-11, the FEIS states: "The No-Build Alternative was developed to be consistent with the transit service characteristics of the 2025 Financially Constrained Network of the 2004 Federal Update of the Regional Transportation Plan (RTP) (Metro, December 2003). The Project is similar to the No-Build Alternative except for the Portland Mall light rail alignment in downtown Portland and transit service between Gateway and Clackamas provided by light rail rather than bus (there would also be some minor bus route modifications to serve light rail stations)."

The implication is that the project is assuming a 1.5% growth rate. This discrepancy between the FEIS and the RTP must be explained.

Another major discrepancy in the FEIS, and between the FEIS and TriMet's response to our letter, is how peak ridership in the South Corridor apparently grows even faster than all-day ridership, while in the Westside corridor, peak ridership growth is "flat."

The FEIS Chapter 4, page 4-19, Table 4.2-7 shows, for the "No Build" option, 3.4% annual compounded growth for 25 years in "Home-Based Work" trips, but only a 3.0% annual growth rate for total transit trips in the South Corridor. "Home-Based Work" trips occur disproportionately in the peak, implying that peak ridership will grow somewhat faster than all-day ridership.

In contrast, table 4.2-8: (page 4-21) shows year 2025 peak hour, peak direction loads to Washington County at 2,780 for the "No Build" option. Using Fall 2005 APC counts of 2,320, this amounts to only 0.9% yearly growth over the 20 years (matching TriMet's current claim of "flat" peak-period growth).

One might expect different corridors to grow at different rates if a major new transit facility were opened in one of them but not the other. However, the differences between corridors in the FEIS under the "No Build" option, and the huge size of the differences, point to major blunders or wrong assumptions in the modeling process.

Perhaps under conditions of severe fuel shortage or extreme cost, passengers will crowd into trains, and queue up for succeeding trains when arriving trains are full, but if such conditions were input into the modeling process, the demand would be far higher than the 1.5% growth rate used as the justification for this project. In the absence of such conditions, having a maximum of 16 trains will severely discourage peak ridership, vitiating the benefits that transit should be bringing to our region.