

Comments on Metro's Draft Faregating Analysis Report

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There are a number of misleading assumptions and incomplete cost analyses in this report that raise questions about its results. In essence, revenue loss through fare evasion has been estimated much higher than it is, and costs – both for equipment and for operations – are estimated much lower than they will be. Moreover, some basic assumptions about the benefits of gated entry/exit and the drawbacks of the proof-of-payment system are questionable.

Overall:

The November 15th staff report to several Metro board committees conveying the subject report starts with this phrase: “Los Angeles Metro remains the only non-barrier subway system in North America”. That statement is misleading.¹ No other non-barrier subway system has ever existed in North America. There are reasons for this. The Los Angeles Metro is the only North American subway line designed and built after proof-of-payment fare enforcement concept was introduced into North America in the late 1970's. The Los Angeles Metro is also the only subway line integrated with an extensive light rail and commuter rail system both of which rely on proof-of-payment fare collection.

All new light rail systems in the United States and all new commuter rail systems in the United States use proof-of-payment fare collection because: a) it is a very cost-efficient means of enforcing fares and is already proven in many rail systems throughout Western Europe, b) it would be nearly impossible and too costly to enclose most light rail and commuter rail stations in Los Angeles to provide them with fare gates, and c) no light rail or commuter rail system with proof-of-payment has found this fare collection system to be unworkable or undesirable. Given that all other Southern California rail systems use proof-of-payment fare enforcement, it is reasonable to employ it in the Red Line as well. Nevertheless, as the Board Report states, questions persist about the Red Line.

The report implies that a barrier system is needed to collect distance-based fares. This is not true; all new commuter rail systems in North America (including Metrolink) have distance-based fares as do many subway systems in Europe. In fact, the Blue Line fare equipment was specified to handle zone-based fares, but this fare structure was ultimately not implemented.

Cost of Fare Evasion:

Summary: In the *Faregating Analysis Report*, the loss of revenue estimated for the existing proof-of-payment relative to a barrier system is up to 10 times higher than it should be.

The TMD Report determined fare evasion rates for Metro's rail lines, but applied these rates incorrectly to revenues. On page 5, authors of the *Faregating Analysis Report* states: “Fare evasion, currently estimated at approximately 6% of people inspected, results in revenue loss of approximately \$5.6 million out of \$40 million annual revenue.” What the analysis has done is take

¹ When BART started in 1972 it was the only rail system in the U.S. with full automatic train control. Using the same logical, one could have said afterwards that “BART remains the only automated train control subway system in North America” and argued that it should revert to manual train control.

Metro's annual rail ridership and multiplied it by 6%, then multiplied the result by the base \$1.25 fare (74.3 million annual riders x 6% x \$1.25 = \$5.6 million). But the *average* Metro fare is not \$1.25, but 60¢ (from the 2005 National Transit Database) because most riders use monthly, weekly, day or other type of passes variously discounted from the full fare. The estimated revenue loss should be \$2.67 million, at most. But even using 60¢ may yield a high estimate of lost revenue because many fare evaders would not ride at all if they had to pay and therefore even less actual fare revenue has been lost. But certainly it is incorrect to assume all fare evaders would otherwise purchase Metro's highest fare, one-at-a-time, for all their trips.

The report acknowledges that even under a barrier system there is fare evasion. It estimates fare evasion in barrier systems (from anecdotal evidence) to be 1%-2%. It then uses 1% in its calculation of "net" fare evasion. There are two reasons using 1% is too low: a) the tripod gate, recommended by the Metro staff, is given 0 points in the "resistance to fare evasion" category, and b) the stations with these gates will normally be unmanned. If one assumes a fare evasion rate of 2% for fare gates, then the *net* fare evasion revenue loss becomes \$1.78 million (\$2.67 million - \$0.89 million).

Finally, a fundamental part of any proof-of-payment system is the ability to get back lost revenue from cheaters who are caught and pay the fine. Besides being the penalty necessary to enforce the law against fare evasion, the idea is that the agency cannot check everyone, so the fine is set high enough that one person caught "pays for" many others not caught. For example, if the average fine collected is \$50, then each fine "pays for" 80 fare evaders (\$50/60¢) not caught.

Barrier fare systems do not include this enforcement mechanism. They have no fare inspectors, no fare citations, no fare evasion court enforcement, and no fine revenues. The *Faregating Analysis Report* does not state what the annual total fine revenues are, but at least some of that amount should be counted as revenue.² If only 1% of fare evaders (that is, 1% of the 6% of passengers who evade fares) are caught and an average return of \$30 is collected, the annual revenue from fines is \$1.33 million, if 2% are caught, fine revenues equal fare evasion losses.

Add back the \$1.33 million in fine revenues collected and the net loss of revenue becomes \$0.45 million (\$1.78 million - \$1.33 million). This loss is one-tenth the \$5.6 million the Report estimates!

Analysis of Fare Gates:

Summary: The analysis of fare gates does not present a fair comparison with the no-barrier system. The fare gate chosen is the worst of the gated alternatives and the one with the least resistance to fare evasion. The discussion of Homeland Security issues has nothing to do with the issue of fare gates and is therefore misleading.

The table on page 20 of the *Faregating Analysis* summarizes a review of fare gate options available. It is reproduced below, but with No Barriers as one of the options. I have also added a "Total" row at the bottom. (4 is "most desirable", 0 is least desirable.)

Adding the existing proof-of-payment (no barrier) system to the table clearly shows its overall superiority. In every attribute but "security and resistance to fare evasion" the no barrier system is far superior to any other.

² Most of these revenues stay with the court system and one can question whether Metro should be credited with any court-generated revenues. Without these fine revenues court cost might have to be increased through general funds.

Barrier →	No Barrier	Tripod Turnstile	Bi-parting Leaf	Paddle	Sliding Panel	High Wheel
Cost	4	4	2	2	1	3
Throughput	4	2	4	3	3	0
Ease of Use	4	1	4	2	4	0
Maintenance	4	4	2	2	1	4
Reliability	4	4	2	3	1	3
Security & Resistance to Fraud	0	0	1	2	3	4
ADA/Bicycle/Stroller Access	4	0	4	4	3	0
Aesthetics	4	1	4	2	3	0
Total	28	16	23	20	19	14

The Metro staff instructed the consultant to cost only the least expensive tripod turnstile system. One bi-parting leaf gate will have to be included in every entrance because of ADA and other requirements. Moreover, there are no add fare machines yet included in the estimate. It is not clear what a patron in the paid area is to do when he/she needs to add value to their ticket.

Finally, the Report has a lengthy description of security features thought to be needed for Homeland Security reasons. But none of these systems have anything to do with the fare gates being discussed; they cannot be added inside the gate housing and would have to be additional equipment. They can be added whether the fare system is barrier or no barrier.

Cost of Retrofitting Stations:

Summary: Costs to retrofit light rail station entrances appear low compared with cost to retrofit Red Line stations. There are large cost benefits from eliminating subway station mezzanines needed primarily for fare collection.

The report includes an estimate of the cost of retrofitting fare gates into stations and points out that existing Red Line stations already have provisions for fare gates (e.g., power and data conduits and floor stub-outs). Nevertheless, this work is estimated to cost \$16.5 million for the 24 Red Line station entrances, or \$700,000 per entrance. The cost estimate to retrofit 40 light rail entrances, that were not designed to accommodate fare gates and have no conduits properly located is \$19 million, or \$475,000 per entrance. The latter amount appears understated because much more work will be needed at light rail stations.

It should be noted that the principal reason for the mezzanine level in these stations is for the fare gate arrays. A proof-of-payment system having no fare gates does not require a mezzanine level. If fare gates were not required, the entire station box could be raised 30-feet in future stations at a

cost savings of at least 33%. This is not a trivial amount: stations account for 50% of the cost of a mile of subway all costs included (one station/mile), or \$200 million each. Saving \$67 million over 10 stations is almost \$700 million!

Operating Costs:

Summary: There are three areas whose costs may have been underestimated: fare gate maintenance is not included, fare media costs are substantial, and on-going, adequate fare inspection of the light rail system appears low.

Fare gates cost money to maintain and the Faregating Analysis Report excludes these costs. The real question to be answered is: will the extra revenue derived from adding fare gates off-set the added cost to pay for and maintain the fare gates? A detailed study done in 1999 for the Atlanta subway system evaluated just this question. It concluded that the annualized capital and maintenance costs were far higher than extra revenues gained. The reason is quite simple: There is no way to recover the additional capital cost and maintenance cost of fare gates if all you gain is the 5-6% additional passenger revenue you lose with proof of payment. Fare gates are not worth the investment to prevent such a small loss of revenue with proof of payment.

The cost of expensive fare media has been excluded from the cost analysis (page 4). However, it is clearly crucial. For example, the report notes (page 47) that limited-use smart cards, which could be the fare medium, will cost 20¢ each with an annual estimated cost of \$8 million. Another alternative fare medium described is long-life plastic smart cards estimated to cost \$5 each, the cost perhaps to be borne by each rider. No cost estimate is given for these long-life cards in the report, but to get some feel for the amount, if the 74.3 million annual riders make an average of 100 trips with each such a card, the cost of these cards (to somebody) will be \$3.7 million annually.

Finally, the Report states that the contract for “civilian” fare inspectors will be cancelled at an annual savings of \$7.03 million. Instead, there will be fare inspectors on light rail lines and Metro’s mobile Security Force at gated stations. Somehow, the cost of inspecting all the light rail (and Orange) lines and adding mobile attendants on Red Line stations (Option 1) will drop to \$1.4 million. This is 20% of the \$7 million cost of inspecting all lines now. The report does not explain how this can be possible since the entire light rail network will still need fare inspection. If the same level of fare inspection continues on the light rail network, one could assume a \$3.5 million cost because ridership on the Red Line approximately equals ridership on the light rail lines.

In Summary:

The fundamental issue is that adding fare gates to the rail system to avoid the presumed loss of 6% of the revenue is a highly questionable investment. The change from open stations with proof of payment to fare gates involves substantial capital investment and continuing costs to maintain the equipment—if nothing else. In other words, the presumed additional revenue with fare gates (which is highly questionable, as estimated) is unlikely to be sufficient to offset the capital investment and additional maintenance costs, both of which appear to be underestimated. In economic terms, fare gates would be an investment with diminishing returns to scale, given the relatively small loss of revenue with the current proof of payment system.