





**Metro**

**FEBRUARY 1, 2008**

**TO: BOARD OF DIRECTORS**

**THROUGH: ROGER SNOBLE**   
**CHIEF EXECUTIVE OFFICER**

**FROM: ROGER MOLIERE**   
**CHIEF**  
**REAL PROPERTY MANAGEMENT & DEVELOPMENT**

**SUBJECT: RESPONSE TO RICHARD STANGER LETTER**  
**METRO RAIL GATING**

**ISSUE**

At the January 2008 Board meeting the report in response to Directors Fasana & Burke's motion for implementing gating the Metro Rail system was being considered. During this process, a letter from Mr. Richard Stanger to Director Katz asserting flaws in the Booz Allen Hamilton Gating Feasibility Study was circulated to Board members and staff. Staff was directed to return to the February 2008 Board meeting after thorough investigation of the assertions contained in the Stanger letter.

Following are the results of staff's analysis, in consultation with Booz Allen Hamilton, and is intended to correct certain significant inaccuracies and information provided in the Stanger letter.

**BACKGROUND**

In April 2007, the Board directed Booz Allen Hamilton to complete an assessment of gating Metro Rail. A thorough, technical analysis was performed by Booz Allen and the findings were presented by Booz Allen at the November 2007 Executive Management and Audit Committee and the Operations Committee meetings. At the November full Board meeting, staff was directed to return within 60 to 90 days with a recommendation to proceed with implementing gates for the Metro Red Line and at strategic light rail stations.

Mr. Richard Stanger's letter and critique are contained in a letter dated January 15, 2008 addressed to Director Katz and entitled "*Comments on Metro's Draft Faregating Analysis Report*" (hereinafter "Stanger Letter" or "Letter"), *Attachment A*. The Booz Allen Hamilton Gating Feasibility Study ("Feasibility Study"), the subject of the Letter's critique, was presented to the Board at its November 2007 meeting. Booz Allen Hamilton will also shortly deliver a separate document supporting the data and conclusions of the Feasibility Study and representatives of Booz Allen Hamilton will be present at all related Committee and/or Board meetings to answer any additional questions.

The attached are responses to correct information contained in the referenced Stanger document. In addition, staff has provided *Attachment B* that lists gated systems in the United States and United Kingdom that have published data on increased fare recovery after the installation of new, automated fare gates.

## **ANALYSIS OF STANGER LETTER**

### **Summary:**

The opening statements in the Stanger Letter assert that there are “a number of misleading assumptions and incomplete costs analysis” in Feasibility Study that consequently, “raise questions about its results”. Staff believes that many of the assertions in the Letter are themselves based on both a misreading of the factual data in the Feasibility Study and on inaccurate and, consequently, misleading use of the reported data contained in the Feasibility Study. In addition, many of the assertions of fact in the Letter are incorrect.

The Letter consists of five (5) main sections, each of which is addressed below. These sections are:

- “Overall”
- Cost of Fare Evasion
- Analysis of Fare Gates
- Costs of Retrofitting Stations
- Operating Costs

### **SECTION: *Overall***

#### **Summary:**

This section of the Letter discusses non-barrier light rail and commuter rail systems that are reliant on proof of payment with manual inspection and misstates that Metro is the only North American subway line integrated with extensive light rail and commuter rail systems. The Letter further states that barrier gates are not needed to implement distance based fares based on commuter rail systems, but fails to mention that most commuter rail systems have on-board conductors.

#### **Response:**

Metro’s decision to examine gating the subway and light-rail systems represents a step that is consistent with other global transit agencies, both greater and smaller in operational capacity when compared to Metro. Philadelphia, San Francisco, Boston, Baltimore, New York and London are all cities with transit agencies that have significant integration between gated subway systems and proof of payment (POP) rail services. Fare gates capture the majority of ridership so that limited inspection resources can be focused on smaller open parts of the transit system. Additionally, a majority of United Kingdom commuter lines are currently in the process of transitioning to a gated or a barrier system where possible. Therefore, the statement

that Los Angeles subway is the only system integrating light and commuter rail systems is simply incorrect.

The Letter further states the Metro Blue Line fare equipment was specified to handle zone fares but that this was not implemented. The technology of the original non-automated, cash/token Metro Blue Line ticket vending machines could have accommodated zone-based fare structures, however implementing zone-based fares on the line would be difficult, if not impossible, to enforce for reasons similar to the lack of enforcement that occurs with existing tariff regulation for rail-to-rail transfers. Metro is unable to enforce this fare policy today in the absence of fare gates or a large increase in manpower for manual enforcement.

This section of the Letter also asserts that “no light rail nor commuter rail system anywhere that has proof-of-payment fare enforcement has found it [gates] to be workable or even desirable”. This affirmation appears to be the Author’s opinion as it is not supported by any evidence or facts since the lack of gating infrastructure does not conclude that the concept is undesirable and, therefore, unwanted.

If Metro were to adopt a distance-based fare structure without a barrier system in place, the only alternative to combat fare evasion over the great distances traversed would be to greatly increase the number of fare inspectors to manually check tickets inside the paid areas of Metro stations or on board every train. This would be both impractical and cost prohibitive, as the number of riders combined with the frequency of station stops would preclude Metro from recovering a reasonable portion of fare evasion dollars and so justify the cost associated with fare inspectors. This would have significant impact on Metro service and operations. Rather, the speed and accuracy of gates would allow greater flexibility for fare policy changes now and in the future.

#### **SECTION: *Cost of Fare Evasion***

##### **Summary:**

Incorrect assumptions and misstatements in the Letter assert that the amount of \$.60 per trip (rather than \$1.25) should be applied in calculating lost revenue due to fare evasion. It also makes misstatements related to fare recovery from citations and incorrectly states the absence of fare inspectors, citations and court enforcement of evasion in gated systems.

##### **Response:**

The \$.60 value asserted in the Letter is based upon a three year old report, and does not include Metro’s recent fare increase, nor disclose that the \$.60 value is a blended average of different Metro fare products including passes, senior, children and disabled rider fares. The Feasibility Study in fact used \$1.02 (not \$1.25 as asserted in the Letter) to more accurately reflect the mix of fare products and current fare structure to account for regular, children, disabled, senior cash and pre-paid riders. Pre-paid riders already have passes and are not evaders. The probability of evasion by

senior and disabled cash riders is very low and the use of a \$.60 base is both wholly inaccurate and inappropriate.

Note further that in the Feasibility Study's cost model and business case regardless of whether \$.60, \$1.25, or a value in between is applied, there is still a positive return on investment over the 10 year term of the gating contract.

This section of the Letter also asserts the revenue loss shown the Gating Feasibility Study is up to 10 times higher than it should be when comparing the current system to a barrier system. However, the Letter applies incorrect figures to support its assumptions.

The TMD Fare Evasion Report commissioned by Metro established fare evasion cost to Metro at \$5.6 million. Booz Allen assumed for the business case shown in its report an evasion credit of \$3.8 million. Therefore the calculations contained in the letter using \$5.6 million do not reflect the values used in the Feasibility Study.

The Author also indicated that a proof of payment system has an advantage over a barrier system in its ability to "get back lost revenue" through citations. Unfortunately, there is no reference to the fact that Metro currently only recovers \$800,000 annually on ALL citations, including parking and HOV violations as well as fare evasion, with recovery on fare evasion assumed to be less than from parking or HOV citations (the L.A. Sheriffs do not provide a detailed reconciliation of the recovery amounts). There are further incorrect statements in the Letter asserting that barrier systems "have no fare inspectors, no fare citations, no fare evasion court enforcement" and thus no means to recover lost fares. However, in gated systems throughout the U.S. citations are issued and enforced in fare evasion cases. Furthermore, the Feasibility Study assumes that Metro Transit Security personnel will continue their normal duties of patrolling the system including issuing citations as cases of fare evasion are witnessed.

### **SECTION: *Analysis of Fare Gates (Table)***

#### **Summary:**

This section of the Letter focuses on the misleading comparison of turnstile barriers with "no barriers" and makes erroneous statements about Homeland Security equipment features.

#### **Response:**

The table used in the Stanger Letter should be disregarded as it alters the intent and structure of the original table which was designed to illustrate a comparison between the differing gate types and not, as is attempted in the Letter, to compare gated and non-gated systems. The altered table in the Letter attempts to compare gated and non-gated systems by inserting a "No Barrier" column. The original table does not "sum" what is shown in this altered table with "total scores" as this is not the purpose of the criteria values. The table as presented in the Letter inaccurately rates having no gates the same "zero" score as turnstile gates, thereby implying that no barriers

are identical to having turnstile gates. This is very misleading and tantamount to suggesting that removing turnstile gates in current barrier systems such as in New York would have the same evasion impact as non-barrier systems. Having no barriers is not an equal comparison to turnstiles.

The Letter further states, "In every attribute but 'security and resistance to fare evasion' the no barrier system is far superior to any other." This is simply not an accurate statement. Given the majority of gated systems around the world and the level of effort in continuous improvements being made in the industry to improve fare recovery, implement alternative fare policies, improve customer convenience as well as to ensure public safety, these ongoing developments underscore how other transit agencies value and recognize a fully integrated, automated fare system that include gates.

Please refer to *Attachment B* of this report that illustrates how new gating technology has improved transit service, security, and revenue recovery among agencies that have published data.

As a note of further caution, elsewhere in the Letter, Mr. Stanger references planning studies that he participated in over thirty years ago at the Metropolitan Atlanta Transit Authority ("MARTA"). However, those older MARTA gates were recently replaced with new technology, smart-card enabled barrier gates, similar to the system being proposed for Metro, that have resulted in 12% increased fare recovery in the MARTA rail system. A full presentation of MARTA's replacement project was made to the Metro Board by MARTA's program director at the November Board meeting.

Reference in the letter also suggests that staff directed the consultant "to cost only the least expensive tripod turnstile system." This is an erroneous statement as the Feasibility Study made no reference to cost by gate type nor concludes which gate type Metro should use. There are incorrect insinuations that staff omitted ADA considerations in the Feasibility Study. The Letter asserts that only tripod turnstiles were considered and that one bi-parting leaf gate is required per entrance array in order to address ADA requirements. Contrary to the incorrect statements in the Letter, ADA considerations with accommodations for the bi-parting leaf gate is, in fact, the assumption that is contained in the Feasibility Study, and is the proposal that was presented in the January 2008 staff recommendation to the Board.

The letter also alludes to a separation between Homeland Security features and the gating system and incorrectly indicates that the gate housings cannot include these features. It also indicates that security features are not reliant on fare gates, yet makes no mention as to the required location, operation or effectiveness of any such security system when installed in a non-barrier environment.

Additionally, the Letter does not reflect awareness of modern fare collection technology using ticket vending machines and barrier gates to detect immediate intrusion to the system with explosives and other chemicals carried by individuals. Without barrier gates, it is difficult, if not impossible, to associate a specific intruder

at the moment and place the intrusion occurs and is detected. While a variety of security measures are being explored, there is a significant difference between detection of chemicals in the ambient space to that which associates immediate intrusion with a time and location point of such an event to individuals.

### **SECTION: *Cost of Retrofitting Stations***

This section of the Letter asserts that the Feasibility Study's cost estimates are "too low" but is completely without support or justification for its stated position and, in fact, incorrectly adds the described costs for two separate options. The Letter further discusses the cost of redesigning future Metro subway stations, including arguments for the elimination of station mezzanines and provides cost estimates for savings in future station construction, none of which was a material part of the Feasibility Study.

Booz Allen was directed by the Board in April 2007 to perform a Gating Feasibility Study, which was subsequently completed and presented in November 2007. During this 7 month period, detailed site visits, consultation with Metro engineering staff and the contractor occurred. Statements made about inaccuracies in cost estimates being "too low" are not factual. All cost estimates were the product of weeks of detailed estimating by professional estimators along with multiple site surveys of every station recommended to be gated. These estimates are conservative and include sufficient contingency to cover gate implementation.

Moreover, the Letter vastly overstates Metro Red Line and light rail "station retrofitting" costs by including capital, operating and retrofit estimates. The actual retrofit cost is less than 25% of the Letter's stated amounts of \$16.5 million for Red Line and \$19 million on light rail. Because of these completely erroneous assumptions, the statement that retrofit costs will end up "much higher" is baseless.

### **SECTION: *Operating Costs***

#### **Summary:**

This section of the letter addresses three areas impacting operating costs: station attendants; fare media; and fare inspections.

#### **Response:**

There is no supporting documentation contained in the Letter on how costs utilized in the Letter's critique of \$5.8 million and \$9.6 million for station attendants are derived and the justification utilized in the Letter for numbers of attendants is based upon incorrect conclusions. With modern, current fare gate technology, transit agencies are moving away from assigned "fixed post" attendants. New automated fare gates have a reliability matrix of 99% availability. Metro Transit Security will continue to perform patrol duties, combined with CCTV support and PTEL customer

phones. Therefore, without further substantiation of the costs presented in the Letter, there is no basis for the Letter's assertion that the "biggest operational costs" will be assigned to station attendants.

There is also an assertion in the Letter that the "cost of expensive fare media[was] excluded from the cost analysis." This assertion ignores Metro's already existing automated bus and rail fare collection system based on solid state, contactless smart card infrastructure. Gating does not alter the need for smart card fare media. Whether gated or not, the business case to replace paper media was made with the award of the original UFS contract.

Lastly, questions are raised on lessening the need for fare enforcement staffing levels currently required without gates. The analysis contained in the Letter misuses the figure \$1.4 million (the number utilized for Option 1, rather than the Option 2 proposal being presented) when the correct figure, as per the Board's direction for costing Option 2 should be \$2.4 million as stated in the Feasibility Study. The cost for replacement of contracted civilian inspectors with less expensive Metro Transit Security appears not be factored into the further misstated \$3.5 million dollars the Letter asserts is needed to maintain the same level of fare inspection on the light rail network.

In summary staff concludes that the assertions and conclusions set forth in the Letter present no accurate factual basis for questioning the positive business case for gating indicated by the Feasibility Study.

### **NEXT STEPS**

Staff will return to the February Board to reconsider the item, and present options for the potential gating of Metro Rail.

Prepared by Jane Matsumoto, DEO Regional TAP Operations

### **Attachment:**

- Attachment A – Richard Stanger Letter
- Attachment B – Fare Recovery Comparative Matrix





## Comments on Metro's Draft Faregating Analysis Report

Prepared by Richard Stanger  
January 15, 2008

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 15<sup>th</sup> 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. 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 systems were 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 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 enough to have secure fare gates, and c) no light rail nor commuter rail system anywhere that has implemented proof-of-payment fare enforcement has found it to be unworkable or even undesirable. Given that all other Southern California rail systems use proof-of-payment fare enforcement, it is logical 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 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: The Faregating Analysis Report estimates the loss in revenues between MTA's existing proof-of-payment system and a barrier fare enforcement system up to 10 times higher than it should be.

The TMD Report determined fare evasion rates for Metro's rail lines. There is no reason to think these estimates are wrong. However, these rates are wrongly applied to

revenues. On page 5, the Faregating Analysis 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 Metro's annual rail ridership and correctly multiplied it by 6%, then wrongly 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), and the estimated amount of revenue loss should be \$2.67 million. But even using 60¢ may be a high estimate of fare lost because many fare evaders would not otherwise be riding, and therefore very little actual fare revenue has been lost. But for sure 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 correctly notes that even under a barrier system there is fare evasion. It estimates barrier fare evasion in barrier systems (from anecdotal evidence) to be 1%-2%. It then uses 1% in its calculation of "net" fare evasion. (My own estimate from previous work in just this area is that barrier fare evasion is more like 2%-4%.) 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. 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 have this critical element. 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 that amount should be counted as revenue.<sup>1</sup> If only 1% of fare evaders (that is, 1% of the 6% of passengers who evade fares) are caught and an average fine 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 excludes 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.

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<sup>1</sup> Some of these revenues stays with the court system. Without these fine revenues court cost might have to be increased through general funds.

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.)

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
<b>Total</b>	<b>28</b>	<b>16</b>	<b>23</b>	<b>20</b>	<b>19</b>	<b>14</b>

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.

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 Red Line work. Moreover, there are large cost benefits of eliminating subway station mezzanines needed primarily for fare collection.

The report includes an estimate of the cost of adding fare gates and rightly points out that existing Red Line stations have provisions for fare gates. It should be noted that the principle reason for the mezzanine level in these stations is for these 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!

The Report estimates the cost of retrofitting stations for fare gates. As noted, the 24 entrances on the Red Line have already been designed and built with fare gates in mind, and the necessary conduits are in place. This work is estimated to cost \$16.5 million, 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. This difference does not appear logical since so much more effort will be needed at light rail stations. I expect their costs will end up much higher than indicated.

#### **Operating Costs:**

Summary: There are three areas whose costs may have been underestimated: station attendants (up to \$15.4 million), fare media (unknown but in the many millions of dollars), and on-going, adequate fare inspection (perhaps \$3.5 million).

The biggest operating cost issue concerns the need for station attendants. The report states that "mobile station attendants are shared at the rate of one for every five stations". It is not clear how this type of manning will work when response times could be as much as 20 minutes or more. More permanent station staffing may be necessary. Staffing of an entrance will require (at least) three shifts per week, or roughly \$240,000 per year. For the 24 Red Line entrances only, the total is \$5.8 million. The staffing cost for the 40 strategic light rail station entrances is an additional \$9.6 million annually.

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.

**ATTACHMENT B**

**Fare Recovery Comparative Matrix**

The following articles reveal the impact that gate implementation has made for the following transit agencies, both in the U.S. and Europe

Transit Authority	Quote	Reference	Ridership <sup>1</sup> (000s)  LACMTA = 1,593.0
<b>United States</b>			
<p><b>New York - MTA</b></p>	<ul style="list-style-type: none"> <li>• New turnstiles were also expected to drastically reduce fare evasion that was draining the system of millions of dollars a year.</li> <li>• Fare evasion fell to less than 1% of persons entering the subway system.</li> <li>• Subway ridership grew by 3.6%, triple the previous growth rate of 1.3%.</li> </ul>	<p><b>NY Transportation Journal, Fall/Winter 1998 by Bruce Schaller</b></p>	<p style="text-align: center;">8,710.2</p>
<p><b>CTA (Chicago)</b></p>	<ul style="list-style-type: none"> <li>• <b>CTA expects to save \$12 million to \$22 million a year, mainly from reduced fare evasion at entry gates and reduced theft wherever cash has been changing hands</b></li> </ul>	<p><b>AFC, a fare deal for all (mass transit automatic fare collection systems) – Railway age, 1994, by Luther Miller</b></p>	<p style="text-align: center;">1623.9</p>

<p><b>MBTA (Boston)</b></p>	<ul style="list-style-type: none"> <li>The T, which previously projected that the new system would boost revenues 3 percent, now expects a jump of 9 percent or about \$21 million – in fare collections by the end of this fiscal year, June 30.</li> </ul>	<p><u><b>T credits Charlie Card with halting fare jumpers</b></u>   <b>By Mac Daniel, Globe Staff   February 9, 2007</b></p>	<p><b>1,238.5</b></p>
<p><b>San Francisco Muni</b></p>	<ul style="list-style-type: none"> <li>What is the estimated percent of fare evaders based on citations and warnings combined? Answer: Closer to 20% to 30%. Without sting operations was 15% to 20%.</li> <li>WHEREAS, approximately 15% to 20% of Metro riders contacted by fare inspectors are without a valid fare instrument; and</li> <li>There is some public confusion distinguishing Metro from the Bus system. Estimated revenue lost is 3 to 18%.</li> </ul>	<p><b>City and County of San Francisco Municipal Transportation Agency Citizens' Advisory Council Finance &amp; Administration Committee (FAC)FINAL MINUTES of Regular Meeting Wednesday, May 18, 2005 at 3:00 p.m.</b></p>	<p><b>678.3</b></p>
<p><b>MARTA (Atlanta)</b></p>	<ul style="list-style-type: none"> <li>The average weekday passenger count at the first 13 stations to get the new gates rose from 43,783 in April 2005 to more than 60,000 in April 2006, a 37 percent increase.</li> <li>At Inman Park, the average weekday count tripled, to 2,908. The Garnett station saw its count jump from 443 in April 2005 to 1,909 last month, a 331 percent increase.</li> </ul>	<p><u><b>New MARTA fare gates show higher ridership</b></u>   <b>Associated Press State &amp; Local Wire May 29, 2006 Monday</b></p>	<p><b>464.6</b></p>
<p><b>United Kingdom</b></p>			
<p><b>London – SouthWest Trains</b></p>	<ul style="list-style-type: none"> <li>Experience at these early sites indicated that revenue could be</li> </ul>	<p><u><b>Gates combat more than just fare dodgers – Rapid Transit review</b></u></p>	<p><b>572.0</b></p>

	<p>boosted by about 10%, more than double than expected.</p> <ul style="list-style-type: none"> <li>British Transport Police reported a 14% fall in crime on the railway in south London in 1998, the year after South West Trains installed gates at Wimbledon and Clapham Junction.</li> <li>An added benefit of automatic ticket gates is their ability to record transaction details each time a passenger passes through. This provides the operator with real time information on passenger patterns and use. This allows the operator to adjust staff schedules to meet peak demand at their respected stations.</li> </ul>	<p><b>International Railway Journal, March 2001. by Mike Wood</b></p>	
<p><b>First Group (Scotland)</b></p>	<ul style="list-style-type: none"> <li><b>Firstgroup is planning a crackdown on fare evasion after finding that installing automatic barriers at London's City Thameslink station for its First Capital Connect produced a 52% jump in revenues.</b></li> </ul>	<p><u>FirstGroup Revenues leap after ticket barrier cut fare dodging.</u> Transport by Alistair Osborn, Business Editor</p>	<p>N/A</p>

<sup>1</sup> APTA Transit Ridership Report – Second Quarter, 2007