TCRP SYNTHESIS 96

TRANSIT COOPERATIVE RESEARCH PROGRAM

Off-Board Fare Payment Using Proof-of-Payment Verification

Sponsored by the Federal Transit Administration

A Synthesis of Transit Practice

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TRANSIT COOPERATIVE RESEARCH PROGRAM

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TRANSIT COOPERATIVE RESEARCH PROGRAM

The nation's growth and the need to meet mobility, environmental, and energy objectives place demands on public transit systems. Current systems, some of which are old and in need of upgrading, must expand service area, increase service frequency, and improve efficiency to serve these demands. Research is necessary to solve operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the transit industry. The Transit Cooperative Research Program (TCRP) serves as one of the principal means by which the transit industry can develop innovative near-term solutions to meet demands placed on it.

The need for TCRP was originally identified in *TRB Special Report 213—Research for Public Transit: New Directions*, published in 1987 and based on a study sponsored by the Federal Transit Administration (FTA). A report by the American Public Transportation Association (APTA), Transportation 2000, also recognized the need for local, problem-solving research. TCRP, modeled after the longstanding and successful National Cooperative Highway Research Program, undertakes research and other technical activities in response to the needs of transit service providers. The scope of TCRP includes a variety of transit research fields including planning, service configuration, equipment, facilities, operations, human resources, maintenance, policy, and administrative practices.

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The TCRP provides a forum where transit agencies can cooperatively address common operational problems. The TCRP results support and complement other ongoing transit research and training programs.

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Cover Figure: Phoenix Valley METRO light rail special event fare inspection shown using temporary queuing barriers (*Courtesy*: Phoenix Valley METRO).

FOREWORD

Transit administrators, engineers, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and unevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There is information on nearly every subject of concern to the transit industry. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day work. To provide a systematic means for assembling and evaluating such useful information and to make it available to the entire transit community, the Transit Cooperative Research Program Oversight and Project Selection (TOPS) Committee authorized the Transportation Research Board to undertake a continuing study. This study, TCRP Project J-7, "Synthesis of Information Related to Transit Problems," searches out and synthesizes useful knowledge from all available sources and prepares concise, documented reports on specific topics. Reports from this endeavor constitute a TCRP report series, *Synthesis of Transit Practice*.

This synthesis series reports on current knowledge and practice, in a compact format, without the detailed directions usually found in handbooks or design manuals. Each report in the series provides a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems.

PREFACE

By Donna L. Vlasak
Senior Program Officer
Transportation
Research Board

The objective of this synthesis was to document the state of the practice in terms of experiences related to the application of proof-of-payment (PoP) on transit systems in North America and internationally, updating the information provided in the 2002 *TCRP Report 80: A Toolkit for Self-Service, Barrier-Free Fare Collection*.

The subject is more complex than evasion rates. It involves related subjects such as inspection rates, enforcement techniques, duties of fare inspection personnel, adjudication processes, and the kinds of penalties involved for evasion. In addition, there is the need for acquiring capital equipment and, perhaps, handheld verification devices if smartcards are used. PoP fare collection has evolved to where it can be found on bus rapid transit, regular bus service, heavy rail transit, streetcars, passenger ferries, and commuter rail.

A literature review, organized into five issue groupings related to PoP fare collection, is provided, as well as the results of a selected, on-line survey of transit agencies in the United States and Canada that yielded a 100% response rate (33 of 33 responses). Seven case studies offer detailed reviews of transit agency PoP fare collection experiences in Buffalo and New York City, New York; Dallas, Texas; Los Angeles and San Francisco, California; Minneapolis, Minnesota; and Phoenix, Arizona. Six areas deserving future study are identified as well.

Thomas F. Larwin, Lee Engineering, San Diego, California, and Yung Koprowski, Lee Engineering, Phoenix, Arizona, collected and synthesized the information and wrote the report, under the guidance of a panel of experts in the subject area. The members of the topic panel are acknowledged on the preceding page. This synthesis is an immediately useful document that records the practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As progress in research and practice continues, new knowledge will be added to that now at hand.

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Note: Many of the photographs, figures, and tables in this report have been converted from color to grayscale for printing. The electronic version of the report (posted on the web at www.trb.org) retains the color versions.

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OFF-BOARD FARE PAYMENT USING PROOF-OF-PAYMENT VERIFICATION

SUMMARY

In the transit industry, if the subject of off-board fare payment and proof-of-payment (PoP) verification comes up, what follows normally are inquiries related to fare evasion. These inquiries typically start with an interest in learning how much evasion occurs and wondering out loud about the honesty of most people.

However, the subject is significantly more complex than evasion rates. It involves related subjects such as inspection rates, enforcement techniques, duties of fare inspection personnel, adjudication processes, and the sort of penalties involved for evasion. Plus, there is a need for acquiring capital equipment, mainly ticket vending machines (TVMs) and, perhaps, handheld verification devices if the operator uses smart cards as part of its fare media.

Use of off-board PoP fare collection allows convenient, quick, all-door passenger boarding for transit systems. Generally, there are no conductors on board the transit vehicle, it is typically not possible to purchase a fare on board, and there are no barriers or gates to restrict entry onto a station platform. Transit customers typically purchase fare media at TVMs on the station platform, online, or at retail outlets, and carry their valid ticket or pass while riding. To enforce fare payment, inspection personnel check riders throughout the system, request that they show their proof of fare payment, and issue citations imposing a fine to riders without a valid ticket or pass.

North American experience with PoP fare collection began with the SeaBus passenger ferry service in Vancouver, British Columbia, and then, in 1980–1981, with the light rail transit (LRT) systems in Edmonton and Calgary, Alberta, and San Diego, California. Most early applications of PoP that followed were limited to LRT systems. However, gradually, PoP fare collection has evolved to being used on bus rapid transit (BRT) and regular bus services, heavy rail transit, streetcars, passenger ferries, and commuter rail.

Research on the subject of PoP fare collection was somewhat limited until 2002, when another TCRP report was published: *TCRP Report 80: A Toolkit for Self-Service, Barrier-Free Fare Collection*. The report provided a thorough summary of experiences related to application of PoP fare collection on transit systems in North America and internationally as well. *TCRP Report 80* continues to be a worthwhile reference for any transit operator using PoP fare collection, and especially, for any operator considering use of PoP. Although some of the data in the report are out-of-date, its guidelines remain useful resource material.

The basis for this study's scope of effort is to assess the North American state of practice concerning the sort of inquiries that were noted at the outset above and an update on the experiences reported in *TCRP Report 80*. This synthesis reports on the state of practice of PoP fare collection, including a literature review, a survey of transit agencies with PoP experience, and interviews with seven transit agencies.

The focus of available research literature was implementation of PoP fare collection, BRT applications, and fare evasion. A summary of the findings follows:

- Enforcement practices are an essential part of the PoP fare collection function and, as such, operators must address the role of discretion in issuing citations for fare evasion.
- Conversion of a traditional pay-on-boarding fare collection system to PoP fare collection faces different issues than starting PoP on a new service. For cases involving a conversion, an incremental approach toward PoP implementation is a practical alternative to doing it in a single shot.
- The regular presence of uniformed officers on transit vehicles is likely to be seen by riders as the best way to provide them with a safe feeling while riding.
- PoP fare collection has been found to have application for BRT services, but whether it will prove to be cost-effective will largely depend on the loading volumes at the BRT stops/stations and the need for boarding at the rear doors to ensure a relatively high bus operating speed.
- The management of the fare inspection function and control of fare evasion will significantly benefit from collection of fare evasion data to permit disaggregate analysis (i.e., by time of day, day of week, and location).
- A wealth of material was found to be available from transit operators that use PoP fare collection, such as policies and ordinances, performance reports, standard operating procedures, manuals, audits, and special reports. These materials are generally available to other operators and provide a source of research not often available in the public forum. As a product of this study, a reference and resource base has been established within the TRB Committee on Light Rail Transit (Standing Committee AP075) website at http://research.lctr.org/trblrt/.
- Fare evasion and fare abuses make for popular headlines in the local news media. It is important for PoP operators to be proactive and have a program and strategy for dealing with the media on fare abuse issues, including preparation of a regular management report that presents the data and trends related to fare evasion and a summary of enforcement efforts.

The second major task of this study was to conduct an online survey. The survey was transmitted to 33 transit agencies, 27 in the United States and six in Canada. A 100% return resulted. Of these operators, 30 (90.9%) employed PoP fare collection for one or more their services in 2010–2011. Further, 29 of the 30 were either not considering any changes to PoP use (17 of them) or were in the process of implementing PoP on more services (12). Of the three operators not using PoP, two were considering using PoP for future services.

A summary of the significant results from survey responses is provided here:

- A majority of PoP fare enforcement personnel are directly employed by the public transit agency (60%) and have police powers (58%).
- Almost all operators allow inspectors to issue warnings when warranted (96.5%), and the average number of citations issued were 3.5 more than the numbers of warnings. Thirty-nine percent of the operators issue more warnings than citations. The majority of agencies indicated that they were satisfied with the accuracy of their measured fare evasion rate—86.2% were either satisfied or better.
- Almost two-thirds (62.1%) of the operators do *not* set fare evasion goals, and 72.4% do *not* set inspection goals. The predominant actions taken by operators to curb fare evasion spikes are special "sweep" tactics during which 100% of the riders are inspected during a specific period of time and at a specific location.
- Across all modes, the range of fare evasion rates observed was from 0.1% to 9.0%, with an average of 2.7% and a median of 2.2%. For inspection, the rates ranged from 0.4% to 30.0%, with an average of 11.3% and a median of 9.2%. There can be substantial fluctuation in the fare evasion rates for an operator. Examination of variance in fare evasion rates over a 12- to 14-month period for five operators found that the highest monthly rate was as much as 5 times as large as the lowest.

- The fine for a first fare evasion offense averaged $121; for repeat offenses, the maximum averaged $314. For repeat offenders, there are also nonfinancial penalties, the three main ones being that the penalty escalates to a misdemeanor, a summons is issued to appear in court, or the individual is excluded from using the system for a period of time. Most operators (58.6%) treat the first fare evasion as a civil offense as opposed to a criminal offense.
- To facilitate enforcement of fare payment, 70% of the operators designate the station platform areas as "paid zones."
- Almost all of the operators' TVMs issue single-ride tickets (96.6%), and the majority issue day passes (69%) and monthly passes (55.2%) as well.
- Smart cards are used by 13 of the 30 operators in either contactless (11 operators) or magnetic-stripe (2 operators) versions. Of those with smart cards, 10 operators have cards that are reloadable (i.e., can be reloaded with additional value). For smart card fare payment verification purposes, 11 operators rely on handheld verification devices.
- A small majority (56.3%) of the respondents expressed being moderately or very satisfied with the cost-effectiveness of their PoP fare collection operation.

The third study task involved a detailed review of the PoP fare collection experiences of seven case study operators:

Buffalo, New York—Niagara Frontier Transportation Authority

Dallas, Texas—Dallas Area Rapid Transit

Los Angeles, California—Los Angeles County Metropolitan Transportation Authority

Minneapolis–St. Paul, Minnesota—Metro Transit

New York City, New York—New York City Transit

Phoenix, Arizona—Valley Metro Rail, Inc.

San Francisco, California—San Francisco Municipal Transportation Agency

Interviews with each of the seven resulted in identifying a set of common experiences. These experiences form a group of practices for other operators to consider, whether they use PoP fare collection today or are considering its future use:

- Using a customer-oriented enforcement to fare payment rather than a traditional policing approach,
- Implementing an agency-administered adjudication process,
- Instituting an administrative process for payment of the fare evasion penalty,
- Creating a focused fare inspection team with nonsworn officers,
- Adding smart cards to the menu of fare media available for fare payment,
- Employing PoP fare collection on BRT services,
- Using independent management audits as an aid in reviewing an agency's PoP experience,
- Expanding the provision of public information via the Internet and the YouTube online video,
- Deploying a "show of force" on a new service using PoP fare collection,
- Using sweeps (also referred to as blitzes, surges, or enhanced fare enforcement) to demonstrate uniformed presence on the system in a serious way, and
- Using temporary barriers and turnstiles for crowd control at special events.

The case study interviews along with survey responses and the literature review produced questions for which no answers were found in available research. As a result, six areas deserving of additional research were identified:

- The range of loading volumes that would result in PoP fare collection being a cost-effective alternative;
- The relationship among the evasion rate, rates of inspection, and penalty amounts;
- A manual or guidelines for statistical analysis of fare evasion;
- A transit smart card forum for PoP operators;
- The cost-effectiveness of alternative adjudication processes;
- The costs—capital, operating, and maintenance—of alternative off-board PoP fare collection and enforcement approaches.

CHAPTER ONE

INTRODUCTION

PROOF-OF-PAYMENT FARE COLLECTION IN NORTH AMERICA

Off-board proof-of-payment (PoP) fare collection is a relatively recent application in North America. Typically, the majority of PoP operations require a transit customer to purchase fare media off-board the transit vehicle. For instance, purchase could be at a ticket vending machine (TVM) on a station platform, via the Internet, or at a retail outlet. With a valid ticket or pass in hand, the customer is permitted to board the transit vehicle through any door. The customer does not have to show the proof-of-payment to the driver, and there are no conductors on board.

As a result, enforcement of fare payment through inspection is a necessary function of PoP to ensure fare compliance. The enforcement relies on fare enforcement/inspection personnel who randomly ask riders to show proof-of-payment. Passengers unable to do so may be issued citations imposing a fine as a deterrent to fare evasion.

PoP fare collection is also referred to as self-service, barrier-free (SSBF) fare collection and sometimes as the "honor system." For purposes of this study, the focus is on off-board fare payment and PoP fare verification. For consistency and simplicity, "PoP" is used throughout this report to represent the broader subject of self-service and stations with or without barriers. A common component is the need for enforcement to verify that passengers possess valid fare payment. As for the term "honor system," strictly defined, it involves no PoP verification, that is, no enforcement, and is not employed by any transit operators in North America.

PoP fare collection had its North American beginnings with SeaBus ferry services in Vancouver, British Columbia. However, the introduction of PoP on ground transit services began with the start of Edmonton and Calgary, Alberta, and San Diego, California, light rail transit (LRT) services in 1978–1981. Edmonton LRT, which initiated service in 1978, actually did not use PoP fare collection until 1980. Calgary and San Diego LRT services followed in succession in 1981 with use of PoP from the start of revenue service in each case.

From those beginnings, PoP has essentially become the standard fare collection method on subsequently developed North American LRT lines. Over these 30-plus years, there have been many changes to how PoP fare collection has been carried out. Comparison of transit operators employing PoP will uncover many variations in operating practices and adjudication procedures. The emergence of smart cards for basic fare media has made it more convenient for riders to pay their fares but, at the same time, has added a challenge for operators with respect to effective enforcement of fare payment.

In addition to the LRT experiences, in recent years, PoP has been extended to other transit modes: regular bus, bus rapid transit (BRT), heavy rail transit (HRT), modern streetcars, and commuter rail (CR).

STUDY OBJECTIVES

This synthesis collected data on existing transit operations using PoP verification in North America. The objective of the synthesis was to provide a state-of-the-practice report that can be used as a resource by public transit agencies and operators on the subject of PoP. It is intended to be of practical use for those operators in the development process of a new transit service, especially a high-capacity service. However, as a resource on the practices and experiences of current transit operators using PoP fare collection, the report can be of practical benefit to those same operators by providing an exchange of ideas on ways to improve their fare collection operation.

The scope of the study was broadly outlined to include the following aspects of PoP fare collection: the types of fare media used, the inspection function, measuring of performance of the function, legal bases and adjudication options, the types of TVMs needed to support PoP, and policies and procedures used to manage the function on a daily basis.

STUDY PROCESS AND TECHNICAL APPROACH

The work plan involved three primary tasks: a literature review, a survey of North American transit operators using PoP fare collection, and detailed case studies of seven of the operators.

The resulting survey was conducted of 33 North American transit properties, 27 in the United States and six in Canada. The geographic locations of these properties are shown

in Figure 1. All 33 properties responded to the questionnaire for a 100% response rate.

A tabular summary of the study's 33 survey respondents indicating each agency's use of PoP is shown in Table 1. There are 30 of the operators that presently use PoP. A breakdown by service mode shows that these operators use PoP on seven different modes:

	Number of Operators	Number of Routes
Bus rapid transit	9	21
Light rail transit	23	56
Streetcar (modern, vintage)	2	2
Heavy rail transit	2	3
Commuter rail	7	8
Passenger ferry	1	1
Bus (non-BRT)	5	

NOTE: These bus operators use PoP in a modified or hybrid way with the combination of fare inspection and front-door fare collection.

Table 1 also shows the number of routes in each region on which PoP is applied (except for the non-BRT bus routes). As of early 2011, there were a total of 30 transit properties operating 91 routes in North America in which off-board PoP fare collection was used. Thirty years earlier, there were three operators with a single route each.

The study's survey was also used to find out whether any of the operators were considering changes to their fare collection system. The results are shown in Table 2, which provides an update on the future anticipated use of PoP by each of the 33 transit operators.

Of the 33 operators surveyed, 29 (88%) employ PoP and either are not contemplating any significant change or are considering adding more routes under their agency's PoP fare collection function.

Table 2 shows that three of the 33 operators have never used PoP (Honolulu, Memphis, and Pittsburgh). Two of them, Honolulu and Pittsburgh, are considering future use on one or more routes. One operator, Vancouver TransLink, is planning to eliminate PoP on its services and go to a barrier enforcement system.

FIGURE 1 Locations of 33 North American transit operators participating in the survey.

TABLE 1
SUMMARY OF TRANSIT OPERATORS PARTICIPATING IN THE STUDY

Region	Operator	Principal Transit Modes Operated						
		Bus (non-BRT)	BRT	LRT	MS/VT	HRT	CR	Ferry
Baltimore, Maryland	Maryland Mass Transit Administration	•		2		•	•	
Buffalo, New York	Niagara Frontier Transportation Authority	•		1				
Calgary, Alberta	Calgary Transit	•	•	3				
Charlotte, North Carolina	Charlotte Area Transit System	•		1				
Cleveland, Ohio	Greater Cleveland Regional Transit Authority	•	1			1		
Dallas, Texas	Dallas Area Rapid Transit	•		3			1	
Denver, Colorado	Regional Transit District	#		7				
Edmonton, Alberta	Edmonton Transit System	•	•	1				
Eugene, Oregon	Lane Transit District	•	1					
Everett, Washington	Community Transit	•	1					
Honolulu, Hawaii	Honolulu DTS Rapid Transit Division	•						
Houston, Texas	Metropolitan Transit Authority of Harris County	•	•	1				
Las Vegas, Nevada	Regional Transit Commission of Southern Nevada	#	2					
Los Angeles, California	Los Angeles County Metropolitan Transportation Authority	•	1	3		2		
Memphis, Tennessee	Memphis Area Transit Authority	•			•			
Minneapolis–St. Paul, Minnesota	Metro Transit	•		1			1	
Newark, New Jersey	NJ Transit	•		3			•	
New York City, New York	MTA–New York City Transit	•	2			•		
Oceanside, California	North San Diego County Transit District	•		1			1	
Ottawa, Ontario	Ottawa Regional Transit Commission	•	7	1				
Phoenix, Arizona	METRO Light Rail			1				
Pittsburgh, Pennsylvania	Port Authority of Allegheny County	•		•				
Portland, Oregon	Tri-County Metropolitan District of Oregon	#		4			1	
Sacramento, California	Sacramento Regional Transit District	•		2				
Salt Lake City, Utah	Utah Transit Authority	•	1	3			1	
San Diego, California	San Diego Metropolitan Transit System	•	•	3				
San Francisco, California	San Francisco Municipal Transportation Agency	#		6	1			
San Jose, California	Santa Clara Valley Transportation Authority	•		3				
Seattle, Washington	Sound Transit	•		1			2	
St. Louis, Missouri	Bi-State Development Agency	•		2				
Toronto, Ontario	Toronto Transit Commission	•		•	1	•		
Vancouver, British Columbia	TransLink/SkyTrain	#		3			1	1
York, Ontario	York Region Transit/Viva	•	5					

BRT—bus rapid transit, LRT—light rail transit, MS—modern streetcar, VT—vintage trolley, HRT—heavy rail transit, CR—commuter rail.

• indicates a transit service mode operated by this operator, but PoP is not employed.

1 indicates a service that uses PoP fare collection and the number of PoP routes.

indicates a service that uses PoP fare collection and is one of the seven case studies.

# indicates fare/ticket inspectors are deployed on buses in combination with on-board fare collection.

TABLE 2
SUMMARY OF FUTURE ANTICIPATED USE OF POP FARE COLLECTION

	Regarding PoP in the Future				
	Use PoP Now			Never Used	
Operator	Not Considering Any Significant Change	Considering Adding More Routes	Considering/ Planning Its Elimination	Considering on One or More Routes	Not Considering
Baltimore—Maryland Mass Transit Administration	1				
Buffalo—Niagara Frontier Transportation Authority	1				
Calgary Transit	1	-			
Charlotte Area Transit System	1				
Cleveland—Greater Cleveland Regional Transit Authority	1	-			
Dallas Area Rapid Transit	1	-			
Denver—Regional Transit District		1			
Edmonton Transit System	1	-			
Eugene—Lane Transit District		1			
Everett—Community Transit		1			
Honolulu DTS Rapid Transit Division		-		1	
Houston—Metropolitan Transit Authority of Harris County		1			
Las Vegas—Regional Transit Commission of Southern Nevada		1			
Los Angeles County Metropolitan Transportation Authority		1			
Memphis Area Transit Authority					1
Minneapolis–St. Paul—Metro Transit		1			
Newark—NJ Transit	1				
New York City—MTA–New York City Transit		1			
Oceanside—North San Diego County Transit District	1				
Ottawa Regional Transit Commission		1			
Phoenix—METRO Light Rail		1			
Pittsburgh—Port Authority of Allegheny County				1	
Portland—Tri-County Metropolitan District of Oregon	1				
Sacramento Regional Transit District	1				
Salt Lake City—Utah Transit Authority	1	-			
San Diego Metropolitan Transit System	1	-			
San Francisco Municipal Transportation Agency	1				
San Jose–Santa Clara Valley Transportation Authority		1			
Seattle—Sound Transit	1				
St. Louis—Bi-State Development Agency	1				
Toronto Transit Commission		1			
Vancouver TransLink/SkyTrain			1		
York Region Transit/Viva	1				
Total	17	12	1	2	1

REPORT ORGANIZATION

The synthesis is organized as a summary of each of the following three main tasks in chapters two, three, and four, respectively. The last chapter presents a summary and conclusions, followed by appendixes.

Chapter two covers a literature review with a focus on *TCRP Report 80: A Toolkit for Self-Service, Barrier-Free Fare Collection. TCRP Report 80* was the most thorough research effort on the subject of PoP fare collection when published in 2002. Some of its relevance may be diminished not only because of the time that has passed but the breadth and inten-

sity of experiences that have been accumulated with the U.S. and Canadian transit operators that employ PoP fare collection. In addition, this chapter summarizes significant findings from current research on the subject of PoP fare collection.

Related to the literature search, in the report contains a bibliography that includes an annotated portion of references plus a section where special resources collected from participating transit operators are listed and made available on the TRB website.

Chapter three provides a summary of a survey of North American transit operators employing off-board PoP fare collection. Introduced above, the survey was sent to 33 North American operators. Responses were tabulated, and the chapter comprises 32 tables to display resulting summaries of key statistics, relationships, and findings from the surveys.

Chapter four presents in-depth summaries of what is happening with seven transit operators that use PoP for one or more routes in their respective systems. These seven cases were selected to represent a sampling of regions having a diverse range of conditions with PoP fare collection experiences to include bus and rail modes, differing geographical areas of North America, and a range in the length of time PoP has been in operation. They are as follows:

- Buffalo, New York—Niagara Frontier Transportation Authority (NFTA);
- Dallas, Texas—Dallas Area Rapid Transit (DART);
- Los Angeles, California—Los Angeles County Metropolitan Transportation Authority (LA Metro);
- Minneapolis–St. Paul, Minnesota—Metro Transit;
- New York City, New York—Metropolitan Transportation Authority (MTA)–New York City Transit (NYCT);
- Phoenix, Arizona—Valley Metro Rail, Inc. (METRO Light Rail); and
- San Francisco, California—San Francisco Municipal Transportation Agency (SFMTA, Muni).

Chapter five is a summary of the conclusions reached from the prior three chapters. These include conclusions reached about the current state of the practice, trends related to how the PoP function is carried out among the transit operators, and gaps in available data and information that suggest the need for additional study.

The five chapters comprise the body of the report. However, significant information is included in appendixes to the report:

Appendix A: Survey Instrument

Appendix B: Participating Agencies

Appendix C: Example of Statutory Provisions Concerning Fare Evasion Enforcement

Appendix D: Example Performance Report

Appendix E: Example Manual and Standard Operating Procedures (SOPs)

Appendix F: Example Enforcement/Inspector Job Description

CHAPTER TWO

LITERATURE REVIEW

This chapter summarizes findings from a literature review related to off-board transit fare payment using PoP verification. The primary sources of material reviewed include the following: transportation-related databases (e.g., TRB's Transportation Research Information Services and the Organisation for Economic Co-operation and Development Joint Transport Research Centre's International Transport Research Documentation, APTA, California Partners for Advanced Transportation Technology); U.S. DOT- and TCRP-sponsored research; individual reports prepared by or for transit agencies; and magazine/journal articles, media news articles/reports, and Internet blogs.

The materials reviewed from the above sources have been organized into five groups as an aid to practitioners who have to deal with the variety of issues related to PoP fare collection:

- Experiences with implementation,
- BRT applications,
- Measuring fare evasion,
- Managing PoP within the organization, and
- Fare collection and fare evasion coverage in the media.

In aggregate, the items reviewed as part of this study represent a comprehensive research resource on the subject of PoP fare collection. Not all of the material that was gathered has been summarized in this chapter. However, as part of this study, a reference and resource base has been established within the TRB Committee on Light Rail Transit (Standing Committee AP075). The majority of resources collected have been transferred to the committee and are available on the committee's website at http://research.lctr.org/trblrt/.

EXPERIENCES WITH PROOF-OF-PAYMENT IMPLEMENTATION

The 2002 *TCRP Report 80* remains a relevant and thorough research document on the subject of PoP fare collection (*1*). In addition, reports from New York City, San Francisco, and Vancouver provide a range of experiences on the real-world, practical aspects of operating PoP.

TCRP Report 80 contains a wealth of data and information on the subject of PoP fare collection. The data in the report are from 2000–2001 and, as a result, some of its relevance has been diminished. Even so, the report addresses the full range of issues and parameters that an agency must consider in determining the applicability of PoP, including those related to policy and enforcement issues, operational issues, and capital and equipment issues. At the time, the report noted that the number of North American systems using PoP totaled 28, with the services being predominately LRT lines (15 of the 28) and CR lines (nine of the 28). There were also two HRT and two BRT services.

The objective of the report was to "develop a set of guidelines for use by transit agencies implementing or considering use of SSFC [self-service fare collection]" and to "provide practical guidance to policy makers, planners, researchers, and operating managers." In retrospect, *TCRP 80* has been found to accomplish this objective. It provides guidance that covers major aspects of PoP operations and enforcement, such as use of special field audits or surveys to augment monitoring of evasion rates, development of inspection strategies to supplement the normal inspection process with targeted 100% sweeps, practices with regard to discretionary powers concerning issuance of citations, passenger information strategies, and dealing with the complexities associated with different forms of fare media.

DeMarino discusses a more recent application of PoP having to do with its implementation on a new BRT service for NYCT (*2*). The report provides a thorough history of the development of PoP fare collection for NYCT's Select Bus Service (SBS), the underlying enforcement philosophy, enforcement tactics and strategy, how to measure effectiveness, and the "art and science of proper discretion" in "fair" enforcement. This reference is useful for an operator preparing to organize a fare enforcement function as well as operators who want to review their existing PoP function and take advantage of NYCT's experiences.

A different implementation scope is covered in a paper by Watry and Straus from 2000, which deals with conversion from traditional fare collection to PoP (*3*). The authors provide a comprehensive summary of the experiences of the first system in the United States, San Francisco Muni's LRT, to undertake such a conversion. The conversion process was faced with unique problems associated with a mixture of right-of-way types, station and platform configurations,

and operating environments. Unique was the combination of on-board and off-board fare collection necessitated by the street-running portion of its light rail system where TVM placement was not practical. The authors discuss the incremental nature of the conversion process. The process created special problems related to the enforcement function and with regard to providing clear public information to the riders. Because the transition to PoP represented change to the riders and to the operators, resistance was encountered. The riders were concerned that crime would escalate on the multicar trains without Muni personnel on board the trailing cars. The labor union representing the operators feared layoffs and job reductions.

In 2008, the NRG Research Group prepared a study for Vancouver TransLink's SkyTrain system (the brand name of its automated rail transit system) that examined a variety of issues related to PoP (*4*). An extensive telephone interview survey combined with a survey of TransLink's "Listens" online panel resulted in substantial statistical summaries of four related issues: attitudes toward implementing controlled access at SkyTrain stations, perceptions regarding the frequency and severity of fare evasion on the SkyTrain system, passengers' feelings of personal security on board SkyTrain and at SkyTrain stations, and passengers' views of the smart card concept. Key findings were

- Strong support for a smart card system,
- Overestimation of fare evasion by transit riders and nonriders alike, and
- Passengers' feeling generally secure when riding SkyTrain.

BUS RAPID TRANSIT APPLICATIONS

Application of off-board fare collection is one of the key quality-of-service considerations for BRT development in North America. As has been found for LRT operations, allowing for quick multidoor boarding and eliminating on-board fare collection can help shave significant time off a transit vehicle's journey.

The National BRT Institute 2009 report prepared for the FTA includes a thorough discussion of the service characteristics of BRT (*5*). Included in chapter two, "Major Elements of BRT," is a 19-page section on fare collection. This report is especially relevant for purposes of comparing and evaluating PoP fare collection with alternative approaches. It includes comparative information regarding capital costs and operating and maintenance costs associated with alternative fare collection approaches. Mentioned are "hybrid" approaches to PoP such as a case in which passengers with prepaid fares are allowed to board through the rear door of the vehicle. This would also be a case in which there might be limited off-board TVMs available. There is also a review of the different types of fare media and associated costs.

Votaw authored a report presenting detailed comparisons of fare payment operations on BRT services (*6*). The issue addressed by the research was whether "off-board fare collection involving ticket vending machines and proof-of-payment enforcement" is the most appropriate form of fare collection for Santa Clara Valley Transportation Authority's (VTA) future BRT services. Four case studies were evaluated as part of the research effort: Cleveland Healthline, Boston Silver Line, Las Vegas Metropolitan Area Express and ACE Gold Line, and Santa Clara VTA future lines. Each of the case studies includes a summary of lessons learned from the interviews and reports. In addition, the author interviewed transit operators from other U.S. areas.

TCRP Report 90 from 2003 contains a useful discussion of fare collection considerations in planning and design of BRT projects (*7*). Data related to passenger service times and station dwell times for different fare payment options are offered. For single-door channel, the suggested default times are as follows:

	Time/Passenger (s)
Prepayment	2.5
Single ticket or token	3.5
Smart cards	3.5
Exact change	4.0
Swipe or dip cards	4.2

NOTE: Add 0.5 s/passenger to boarding times when standees are present. Subtract 0.5 s/passenger from boarding times and 1.0 s/passenger from front-door alighting times on low-floor buses.

For two boarding streams, the passenger service times are 1.8 s for prepayment and 2.4 s for smart cards.

MEASURING FARE EVASION

When the subject of PoP fare collection comes up, fare evasion inevitably seems to be part of the discussion. Accurate analysis of fare evasion is difficult. Even in the best analyses, there is some amount of error. Research efforts in Edmonton, San Francisco, Los Angeles, and New York City were found to deal with the complexities of measuring fare evasion.

Clarke et al. reported on a research effort in Edmonton that evaluated 3 years of fare evasion data (*8*). In 2005, the fare evasion rate for the LRT was 6%, and there was a general feeling among city officials that the rate was too high. In that same year, the city redeployed the security staff to serve the buses as well. This meant that fewer ticket checks could be made on the LRT. In early 2007, it was decided to

issue more fines and fewer warnings for evading fares on the LRT—a decision that was not publicized. Using weekly data for 163 weeks, the researchers examined the effect of the lower inspection rates and the higher fining rate on LRT fare evasion and found that the largest change in fare evasion rates—a reduction of 21% (from 5.3% to 4.2%)—was when the chance of receiving a citation (rather than a warning) was substantially increased.

Lee reported on the results of a comprehensive sampling of fare evasion in San Francisco (*9*). The work was performed by SFMTA in 2009 and involved a survey of 41,239 customers on 1,141 transit vehicle runs, bus and light rail. SFMTA uses a hybrid or modified PoP fare collection system for its system of bus and light rail services. At subway light rail stations, faregates are used; at light rail surface stops, prepaid customers can board at any door, whereas cash-paying riders must pay at the front door and obtain a transfer/fare receipt. Results from the survey provided disaggregated data with regard to specific modes and routes, time periods, level of enforcement, use of rear-door boarding, and transit vehicle occupancy. The average fare evasion systemwide was found to be 9.5%.

In 2007, Transportation Management & Design, Inc., undertook a systematic sampling of fare payment on LA Metro's rail transit lines and the Orange Line BRT (*10*). The sampling was 100% of the patrons on each vehicle boarded. The inspection was performed in "plain clothes," and citations or warnings were not issued. The resulting analysis provided fare evasion statistics by line, time of day, and weekdays and weekend days. Overall, the evasion rate ranged from 3.5% to 6.9% for the lines, with the Orange Line BRT at 5.6%.

Reddy et al. reported on substantive research on the subject of fare evasion in the NYCT subway operation (*11*). The authors discussed NYCT's multipronged approach for managing subway fare evasion, an approach that also can be applied where PoP fare collection is employed. The approach includes advanced automated fare collection turnstiles designed with security features to physically prevent abuse and facilitate audits, a legal framework that gives transit police tools to enforce law and order, data collection and analysis that keep an accurate picture of evasion trends and TVM vandalism, and a comprehensive press strategy that ensures that NYCT's efforts in clamping down on evasion are publicly communicated.

MANAGING PROOF-OF-PAYMENT WITHIN THE TRANSIT ORGANIZATION

An objective of this study was to assemble materials related to PoP operations from the transit operators. These materials can provide a foundation for agencies considering PoP fare collection and for those desiring to benefit from the practices of others. These materials include statutes/ordinances/policies, performance reports, management audits, manuals and SOPs, and fare inspector job descriptions.

Statutes, Ordinances, Policies

Statutes related to fare enforcement, officer authorities, penalties, and adjudication were reviewed from California, Minnesota, New Jersey, New York, Texas, and Washington. Several local policies and ordinances related to PoP and fare evasion were also available from New Jersey Transit, Salt Lake City Utah Transit Authority (UTA), San Diego Metropolitan Transit System (MTS), Tempe (Arizona), and Seattle. As examples, two California statutes that cover a range of fare enforcement and adjudication definitions and functions can be found in Appendix C.

Agency Performance Reports

Sample reports have been received from transit agencies in Buffalo (NFTA), Dallas (DART), Denver Regional Transit District (RTD), Edmonton Transit System, Los Angeles (LA Metro), Minneapolis–St. Paul (Metro Transit), New Jersey Transit (NJT), Salt Lake City (UTA), San Diego (MTS), San Francisco (SFMTA), Seattle (Sound Transit), and St. Louis (Bi-State). They range from formal to informal, and from one page to 15 to 20 pages. An example of a concise monthly report is included in Appendix D. This sample is from the UTA in Salt Lake City. It is one page, titled "Public Safety Monthly Report," and contains key statistics for the month: total ridership, passengers checked, violations, citations, and violator percentage.

Management Audits

Four audits were reviewed: two conducted by the Metropolitan Council (Minneapolis–St. Paul) for the Hiawatha LRT and Northstar Commuter Rail lines, respectively; one for SFMTA; and one for Vancouver TransLink. The Vancouver audit is discussed below, and the Minneapolis–St. Paul and San Francisco audits are reviewed in their respective case studies in chapter four. The audits are rather lengthy and for that reason are not reproduced in this report's appendixes, but all are available on the LRT Committee website (http://research.lctr.org/trblrt/).

Although Vancouver was not selected as a case study candidate, it is the only operator in this study that uses PoP fare collection and indicated that it was planning to move away from PoP and implement a barrier system. This audit was performed in 2007 for Vancouver TransLink by PriceWaterhouseCoopers (*12*). The scope of work of the audit included reviewing and offering recommendations with regard to the methodology for estimating the amount fare evasion and the processes and procedures for fare checking and fare enforcement. A summary of recommendations from the audit is listed here:

- Strengthen fare enforcement by pursuing ways to link violation tickets with other governmental functions (e.g., driver license renewal) to create significantly enhanced consequences of evasion.
- Shift the TransLink security group to a risk-based allocation of fare checking to focus on stations and routes with higher potential revenue loss.
- Strengthen fare enforcement by implementing more significant consequences to evaders, including removal from the property.

Manuals and Standard Operating Procedures Pertaining to Proof-of-Payment

A variety of manuals and SOPs have been developed by transit properties for carrying out the operation of PoP fare collection. There is no standard pattern, and each agency develops its unique approach to its individual functions.

- *Fare Enforcement Manual*—Denver RTD, 14 pages. As an example, this manual is included in Appendix F.
- *Guidelines and Procedures for Fare Collection System*—Metro Transit (Minneapolis–St. Paul), 21 pages.
- *SOP-Fare Enforcement*—Metro Transit (Minneapolis–St. Paul), two pages. As an example, this document is included in Appendix E.
- *Fare Enforcement Process Manual*—NJT, 14 pages.
- *Standard Operating Procedures for Fare Inspectors*—NJT, 13 pages.
- *SOP-Proof of Payment Light Rail Fare Inspection*—Santa Clara VTA, seven pages.
- *SOP-Authority and Limitations for Code Compliance Personnel*—San Diego MTS, five pages.
- *SOP-On train and Station Operations for Code Compliance Personnel*—San Diego MTS, two pages.

Each of these documents is available on the TRB LRT Committee website (http://research.lctr.org/trblrt/).

Fare Inspector Job Description

Job descriptions for a fare inspector position (or similarly titled position) were obtained from NFTA, NJT, NYCT, Phoenix Valley METRO, Santa Clara VTA, and Sound Transit. An example included in Appendix F is the job description for a "fare inspector" from Santa Clara VTA.

FARE COLLECTION AND FARE EVASION IN THE MEDIA

Transit fare evasion and fare abuses are a common focus of media attention. Fare evasion is a form of fraud and a violation or crime, and it reduces revenue available for transit operations. This loss of income can, in turn, be directly related to an equal amount of subsidy that is required from taxpayer sources.

As a consequence, the media attention is deserved, and the performance reports and independent audits mentioned above are ways that transit management gives the subject its attention. A search of news reports in late 2010 and early 2011—newspaper articles, television reports, Internet blogs—provides a sample of how transit fare evasion is reported by the media. The reports show that there is no standard when it comes to treating information dealing with revenue loss, and any dollar lost is a significant matter to taxpayers.

The point of this discussion is to note the importance of the subject and recognize the legitimate media interest in the subject. Public information on fare compliance—and fare abuses—needs to be recognized as an integral part of the fare collection function, especially as related to PoP and its reliance on inspection to monitor compliance.

Following is a random list of headlines from news media reports that were observed between December 2010 and June 2011. A scan provides a sampling of the range of issues associated with fare collection—and the public attention that fare evasion receives:

- "RTA board approves $50 fine for juveniles who ride without paying"—Cleveland
- "Fare cheats cost city millions"—Edmonton
- "Zero-tolerance fare inspection begins Monday on Metro Light Rail"—Phoenix
- "Investigation: RTD letting many riders travel for free"—Denver
- "Fare evasion crackdown won't solve all of TTC's problems"—Toronto
- "Muni employee punched while writing fare evasion citation"—San Francisco
- "It's like Christmas in June for some Calgary C-Train riders"—Calgary
- "MTA bus fare evaders beware: $100 fine awaits"—New York City
- "Metro's new fare card system to cost extra $2.4 million"—St. Louis
- "T seeks to sharply raise fines for fare evaders"—Boston
- "ABC 4 investigation: Riding UTA for free"—Salt Lake City
- "TransLink looks to crack down on fare evasion. Are turnstiles really needed?"—Vancouver
- "Patco may test open-payment fare collection"—Philadelphia
- "SD fare fraud probe reaches south of the border"—San Diego.

CHAPTER THREE

SURVEY OF TRANSIT OPERATORS USING PROOF-OF-PAYMENT FARE COLLECTION

A survey was sent to the 33 agencies described in chapter one for purposes of canvassing transit operators employing PoP fare collection in North America. All 33 responded (a 100% response rate). This chapter discusses the results of the survey.

Table 1, in chapter one, listed the survey respondents and showed the diversity of services on which PoP fare collection is used by the 30 North American transit operators that were surveyed. Each of the 30 operators relies on off-board fare collection for at least part of its services where PoP is used. However, some systems use fare inspectors on services where a modified or hybrid form of PoP is used.

Modified or hybrid PoP is defined as a situation in which there is a combination of off-board and on-board fare collection along with random fare inspection on the transit vehicle. For example, SFMTA uses PoP on all its services but is not using completely off-board fare payment, requiring front-door boarding on buses, with the driver being involved in fare collection and inspection. Other operators, especially with buses, operate in similar ways, with their buses being equipped with fareboxes to allow single-ride on-board purchase. The primary reasons for using fare inspectors in these situations are rear-door boarding by pass users and the use of smart card fare media.

Responses to the survey questions in the paragraphs that follow are organized into nine sections:

1. Organizational and Personnel Aspects of the Fare Enforcement Function,
2. Monitoring and Inspecting for Fare Payment,
3. Measuring Performance,
4. Legal Aspects and Adjudication,
5. Proof-of-Payment Fare Collection Operations,
6. Fare Media and Fare Purchase Options,
7. Ticket Vending Machines,
8. Smart Cards and Stored-Value Cards, and
9. Transit Industry Pulse Regarding Proof-of-Payment Fare Collection.

ORGANIZATIONAL AND PERSONNEL ASPECTS OF THE FARE ENFORCEMENT FUNCTION

The fare enforcement function was found to be largely carried out by agency employees, in some cases with assistance from other local agencies or through contracts with private forces. Table 3 shows the predominant use of agency employees for fare enforcement by 26 of the respondents (86.7%). Even so, a variety of employer–contract arrangements were found. Eighteen (60%) of the operators use agency employees only for fare enforcement, whereas in seven cases security contractors provide fare enforcement assistance.

TABLE 3
FARE INSPECTOR EMPLOYER ARRANGEMENTS

Arrangement	*n*	%
Agency employees	18	60.0
Agency employees + city/county jurisdiction	4	13.3
Agency employees + private contractor	3	10.0
Agency employees + city/county jurisdiction + private contractor	1	3.3
Private contractor	2	6.7
Private contractor + city/county jurisdiction	1	3.3
City/county jurisdiction	1	3.3
Total responding agencies	30	100.0

As might be expected, the fare enforcement function typically resides within a transit agency's police or security department. Of the 30 operators responding, for 83% (25 of 30), the fare enforcement function is within the police or security department. In four of the cases, the function is within the operations department or is in a shared function between operations and security. In one case, the function is under the risk management department.

It was found that 58.6% (17 operators) of the fare inspection forces have police powers (see Table 4). In 10 of the 17 instances, 100% of the fare inspection force possesses such powers. Thus, slightly more than one-third (34.4%) of the 29

operators employ fare inspection officers who are all qualified with police powers.

TABLE 4
FARE INSPECTORS WITH LAW ENFORCEMENT POLICE POWERS

Power	*n*	%
Yes, officers have police powers	17	58.6
No	12	41.4
Total responding agencies	29	100.0

Table 5 shows what other functions the fare inspection force carries out. Most of the officers also provide basic policing and security services (79.3%) and enforce agency ordinances (58.6%). For five operators (17.2%), the fare inspection force assists with passenger counts.

TABLE 5
ADDITIONAL DUTIES OF FARE INSPECTORS

Duty	*n*	%
Policing/security	23	79.3
Passenger counts	5	17.2
Enforce other ordinances of the agency	17	58.6
Other	8	27.6
None	2	6.9

Multiple responses allowed; percentages do not add to 100%.

In Table 6, the number of inspectors [full-time equivalents (FTEs)] employed by the operators was compared on a financial basis and productivity basis. The data were judged to not be sufficiently reliable to allow for an evaluation by mode. For the respondents, the average number of employees per $100,000 was found to be 1.15 and the median 1.43.

TABLE 6
NUMBER OF INSPECTORS RELATED TO COSTS AND RIDERSHIP

Duty	Number of Inspectors (FTEs)	
	Per $100,000 Annual Inspection Budget	Per 1,000 Daily Riders
Average	1.15	0.51
Median	1.43	0.39
Total responding agencies = 24		

The data were examined to determine whether differences exist between agencies using their own employees for fare enforcement and agencies employing contract private employees. The average number of inspectors per $100,000 for the two operators with contract private employees was found to be substantially higher than the average and median, at a rate of 2.58. So, although the two samples represent a limited data set, the numbers provide an incentive to dig deeper on the subject in future research.

The productivity of inspectors was also measured in terms of inspectors per 1,000 daily riders and is shown in Table 6. The average and median were 0.51 and 0.39, respectively, and there was quite a large range in the numbers, from 0.04 inspectors per 1,000 riders to 2.00.

MONITORING AND INSPECTING FOR FARE PAYMENT

Each operator has internal procedures, written or perhaps unwritten, that deal with fare evaders. In many instances when an inspector encounters a rider without valid proof of fare payment, there is some discretion involved in whether to issue a citation. In most situations, the fare inspection force is authorized to issue warnings. As noted in chapter two, examples of SOPs from various properties are available at the TRB LRT Committee's website (http://research.lctr.org/trblrt/).

With regard to issuing citations, as indicated in Table 7, nearly all of the 29 respondents authorize their inspectors to issue warnings (96.5%). Two-thirds (19 of 29) of the respondents issue written and oral warnings, whereas in nine cases only oral warnings are permitted.

TABLE 7
TYPES OF WARNINGS AUTHORIZED FOR FARE EVASION

Warning	*n*	%
Written and oral	19	65.5
Oral only	9	31.0
None	1	3.4
Total responding agencies	29	

Percentages to do not add to 100% because of rounding.

Of the 28 agencies that issue warnings, 26 provided data on the number of annual citations and warnings issued and, of those, eight do not keep records of the number of warnings issued. For the remaining 18 operators, the relationship between the numbers of citations issued compared with warnings showed a wide range. In Table 8, a comparison between citations issued with warnings issued is summarized for these 18 operators. If citations equal warnings, then the value would be 1.00. As shown in Table 8, seven agencies have values less than 1.00, indicating that they issue more warnings than citations over the course of a year. For the 18 responding agencies, the average is 3.5 more citations than warnings and the median is 1.1.

When it comes to monitoring fare evasion, counts are conducted in a variety of ways. As shown in Table 9, the most common is by way of the fare inspection force; 65.5% of the agencies use inspector counts. Internal agency samples

(37.9%) and audits (31.0%) are other common methods for making the counts. In one case, a formula is used based on the percentage of the type of revenue collected and total ridership.

TABLE 8
COMPARISON OF RATIO OF CITATIONS TO WARNINGS ISSUED

Ratio of Number of Citations to Number of Warnings Issued	*n*	%
10.0 or over	2	11.1
4.0–9.9	4	22.2
1.0–3.9	5	27.8
Less than 1.0	7	38.9
Total responding agencies	18	100.0

TABLE 9
HOW FARE EVASION IS SURVEYED

Method	*n*	%
Inspector counts	19	65.5
Internal agency audit function	9	31.0
Independent audits by contractor	2	6.9
Periodic samples by agency staff	11	37.9
Periodic samples by another public entity	1	3.4
Automatic passenger counters	7	24.1
Other	1	3.4
Total responding agencies	29	

Multiple responses allowed; percentages do not add to 100%.

The survey found that most operators are satisfied with the accuracy of their estimates of fare evasion. As shown in Table 10, 86.2% of respondents indicated being satisfied or better. One of 29 expressed extreme dissatisfaction with the accuracy of its fare evasion counts.

TABLE 10
SATISFACTION WITH FARE EVASION STATISTICS

Level	*n*	%
Extremely satisfied	5	17.2
Very satisfied	10	34.5
Satisfied	10	34.5
Not satisfied	3	10.3
Extremely dissatisfied	1	3.4
Total responding agencies	29	100.0

MEASURING PERFORMANCE

The survey found that a majority of agencies do not have either evasion or inspection goals. Of 29 respondents, 37.9% (11) have set fare evasion goals and 27.6% (8) have set inspection goals. The goals average 4% for fare evasion and 10% for inspection. One agency has a goal of 1,000 inspections each day. A summary of respondents follows:

	No. Agencies That Set Goals	Range	Average
Fare evasion rate goals	11	2.15% to 15%	3.8%
Inspection rate goals	8	3.5% to 25%	9.6%

The survey inquired as to recent actions taken to reduce fare evasion. Table 11 indicates that the primary action is implementation of a special sweep involving 100% inspection of riders; 75.9% (22 of 29) employ this action. Hiring more inspectors (34.5%) is the second likeliest tactic, and engaging the assistance of local law enforcement agencies (27.6%) is the third likeliest. Other reported tactics include

- Redeployed, saturated, and focused on customer education/assistance;
- Addressed attendance issues with inspectors and focus on increasing the inspection rate;
- Added TVMs at one high-volume station and also added bolder, clearer graphics on the machines;
- Engaged and educated passengers;
- Expanded duties of field operations personnel to provide authority to inspect fares;
- Varied fare inspection schedules; and
- Implemented special sweep tactics, but then had to scale them back because of community concerns.

TABLE 11
ACTION(S) TAKEN TO REDUCE FARE EVASION

Action	*n*	%
Increased budget	4	13.8
Hired more inspectors	10	34.5
Implemented special sweep tactics	22	75.9
Increased overtime for inspectors	4	13.8
Engaged the assistance of local law enforcement agencies	8	27.6
Added turnstiles/gates at some stations	1	3.4
Other	8	27.6
No special actions taken	1	3.4
Total responding agencies	29	

Multiple responses allowed; percentages do not add to 100%.

The 11 agencies that set inspection goals were asked whether the goal is adjusted on a regular basis. Table 12 shows the results: Two agencies indicated yes—one noted

that the rate was adjusted at least monthly and another responded that it varies on the basis of changes in the evasion rate.

TABLE 12
INSPECTION RATE ADJUSTMENT BASED ON THE MEASURED EVASION RATE

Adjustment	*n*	%
Yes, on a regular basis, at least monthly	1	9.1
Yes, varies depending on evasion rate trend	1	9.1
No	9	81.8
Total responding agencies	11	100.0

Reporting on fare evasion was found to be a normal part of the agency's performance reports for 86.2% (25 of 29) of the operators. Table 13 shows that, of the 25 that regularly report on performance, the most common report (60%) is monthly. Another 28% of the operators report quarterly. The table can also be used as a guide for operators wishing to view example reports from any of the agencies.

Fare evasion statistics are reported in different ways, as shown in Table 14. A vast majority include evasion rate (84%, or 21 of 25). Most also report numbers of citations and warnings issued (76% and 64%, respectively). In addition, two operators noted the following:

TABLE 13
SUMMARY OF FARE ENFORCEMENT PERFORMANCE REPORTING BY OPERATOR

Operator	Regular Report Made?	Weekly	Monthly	Quarterly	Annual	Other
Baltimore—Maryland Mass Transit Administration	Yes	1	1		1	
Buffalo—Niagara Frontier Transportation Authority	Yes		1			
Calgary Transit	Yes			1		
Charlotte Area Transit System	Yes				1	
Greater Cleveland Regional Transit Authority	No					
Dallas Area Rapid Transit	Yes			1		
Denver—Regional Transit District	Yes			1		
Edmonton Transit System	Yes		1			
Eugene—Lane Transit District	Yes		1			
Everett—Community Transit	No					
Houston—Metropolitan Transit Authority of Harris County	Yes		1			
Las Vegas—Regional Transit Commission of Southern Nevada	Yes	1	1	1	1	
Los Angeles County Metropolitan Transit Authority	Yes		1			
Minneapolis–St. Paul—Metro Transit	Yes			1		
Newark—NJ Transit	Yes	1	1			
New York City—MTA–New York City Transit	Yes					1
Oceanside–North San Diego County Transit District	No					
Ottawa Regional Transit Commission	Yes		1			
Phoenix—METRO Light Rail	Yes		1			
Portland—Tri-County Metropolitan District of Oregon	Yes		1			
Sacramento Regional Transit District	Yes		1			
Salt Lake City—Utah Transit Authority	Yes		1			
San Diego Metropolitan Transit System	Yes					1
San Francisco Municipal Transportation Agency	Yes				1	
San Jose—Santa Clara Valley Transportation Authority	Yes			1		
Seattle—Sound Transit	Yes		1			
St. Louis—Bi-State Development Agency	Yes			1		
Vancouver—TransLink/SkyTrain	No					
York Region Transit/Viva	Yes		1		1	
Total	25–Yes	3	15	7	5	2
	4–No					

There were 29 responding agencies; "Other" were (1) New York City "as requested" and (2) San Diego MTS "semiannual."

- "We have 'education' categories where the officer shows the customer how to use the TVM. There are subcategories that include those who comply and buy a fare or noncompliance if they choose not to buy a fare. We have a courtesy ride category and a 'took off' category where we track those who exit the vehicle or platform when they see an officer approaching."
- "We include enforcement rate [or the rate of fining, defined to be equal to the number of citations/(number of citations + number of warnings)]."

TABLE 14
MEASURE OF FARE EVASION PERFORMANCE

Measure	*n*	%
Number of citations issued	19	76
Number of warnings issued	16	64
Number of inspections	15	60
Evasion rate (evasions/rider)	21	84
Inspection rate (inspections/rider)	13	52
Other	4	16
Total responding agencies	25	

Multiple responses allowed; percentages do not add to 100%.

From the survey and follow-up contacts, current data on fare evasion and inspection rates were collected from 22 of the operators using PoP fare collection. The results are shown in Figures 2 and 3. Data were reported for 19 LRT operators. For the other transit modes, data were obtained for CR (5 operators), BRT (6), bus (1), and HRT (1).

Evasion Rates (Figure 2)

- The range for 31 operations was from 0.1% to 9.0%.
- The average across all modes was 2.7%, and the median was 2.2%.

Inspection Rates (Figure 3)

- The range in rates, 23 in all, was from 0.4% to 30.0%.
- The average across all modes was 11.3%, and the median was 9.2%.

When viewing the data across transit modes, the limited experiences for all but LRT prevented any conclusion other than that the rates are generally similar for all modes. Other factors (e.g., operating environment, time of day, day of week, on-board loads) are likely to be more of an influence on the evasion rate than service mode.

When evasion rates are compared with inspection rates for those where paired data are available, as displayed in Figure 4, no direct correlation is found. There is a wide scattering of evasion rates where inspection rates are less than 20%. A similar chart was developed for the *TCRP Report 80* data and is displayed in Figure 5. As with current experience, no direct correlation between the evasion and inspection rates is shown. However, a wide scattering of

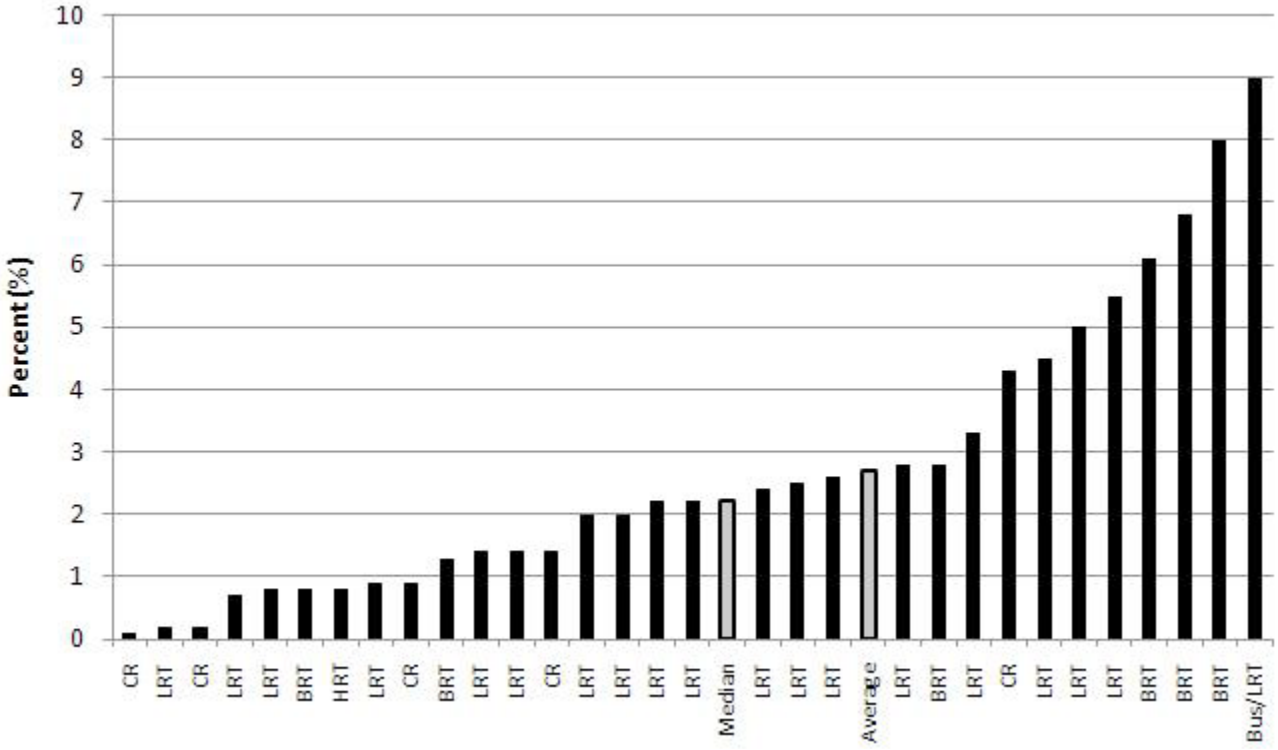

FIGURE 2 Survey of evasion rates.

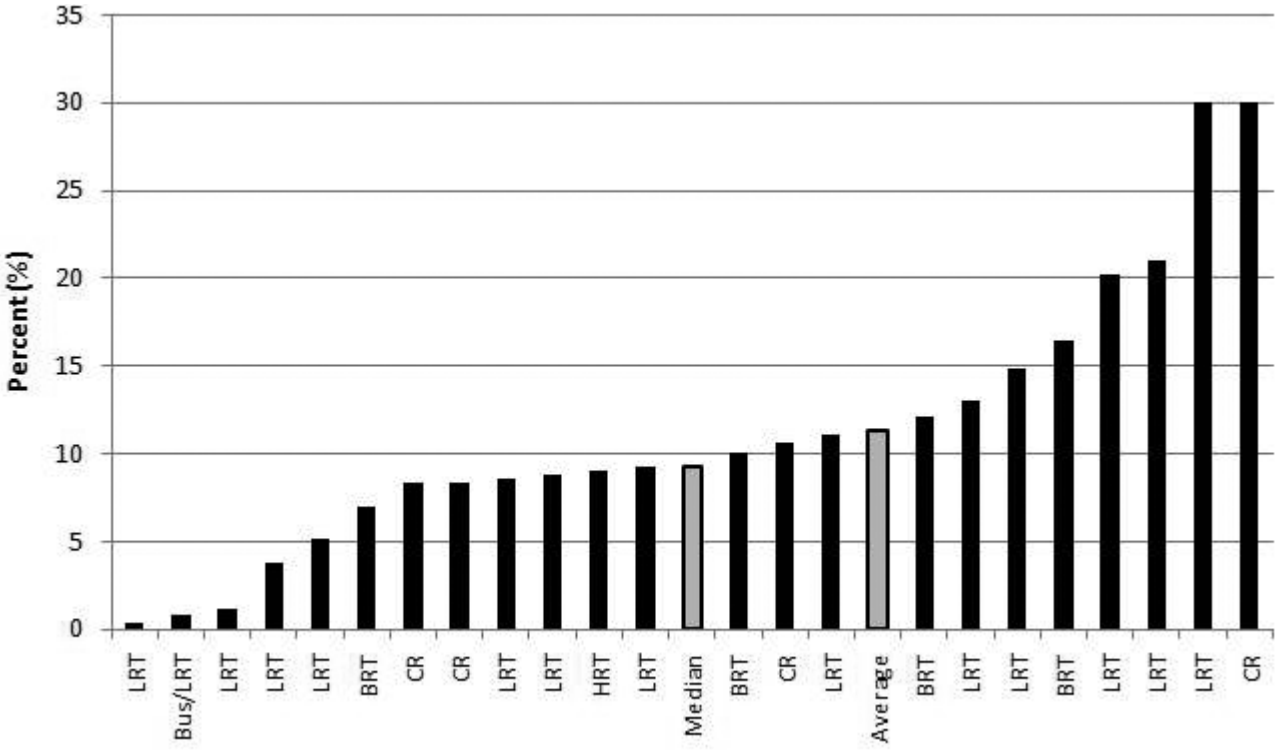

FIGURE 3 Survey of inspection rates.

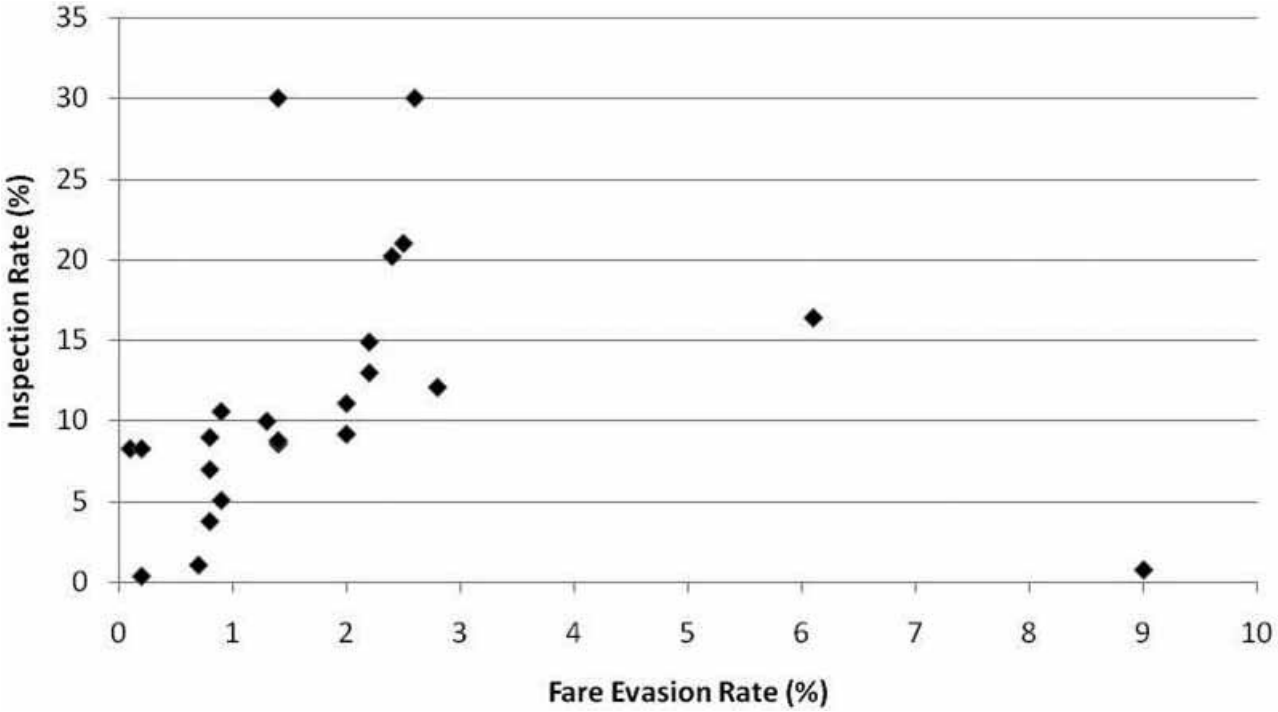

FIGURE 4 Evasion rates vs. inspection rates—2011.

evasion rates is shown, mostly for inspection rates greater than 15%.

Operators and researchers making use of the evasion and inspection data are advised to be careful about the transferability of any of the data. There are a number of reporting issues related to measuring fare evasion that compromise transferability:

1. There are definitional issues on what is included as "evasion." The definition used in the *TCRP Report 80* and in this study includes warnings issued. Follow-

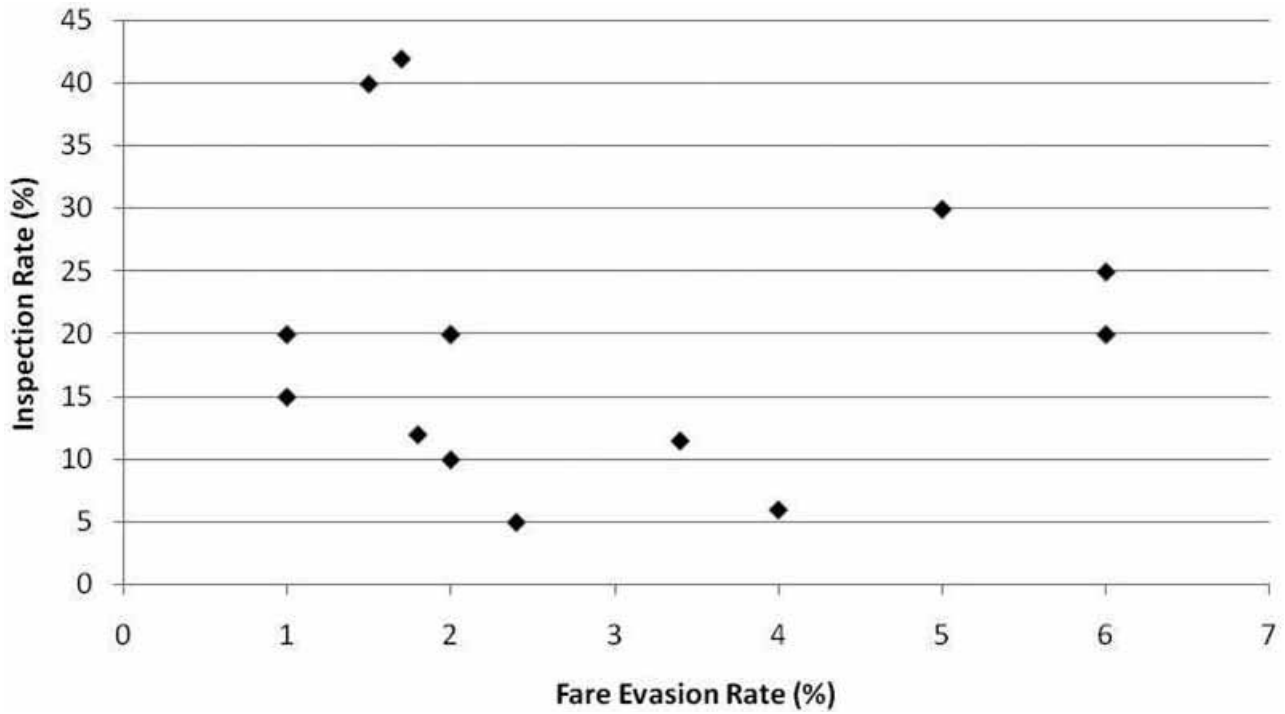

FIGURE 5 Evasion rates vs. inspection rates—*TCRP Report 80.*

ing are the definitions of evasion and inspection rates used in this study:

Fare evasion rate—The percentage of passengers inspected who **DO NOT** possess adequate PoP. Further, evasion is defined to be the total number of violators (i.e., warnings and citations) rather than citations alone.

Inspection rate—The percentage of the agency's total passengers [i.e., on the PoP service(s)] who have been approached by a fare inspector and requested to produce PoP.

2. There is the agency's policy with regard to issuing warnings and the discretion permitted the inspector. As noted in the discussion of Table 8, among 18 responding agencies, the number of citations issued average 3.5 times the number of warnings issued. Eight operators do not keep records of warnings.

3. There is the issue with regard to sampling technique. To obtain a statistically reliable count of evaders requires a technique that covers the route's or system's geography, at all times of the day and week. Such a technique will account for the normal variance inherent in daily ridership patterns and numbers for any operator. There is no standard industry approach.

4. Some operators use monthly systemwide statistics for calculating the evasion rate and others use samples based on 100% sweeps. With the latter, the basis becomes a 100% sample and the definition of fare evasion rate becomes.

   Fare evasion rate (***100% inspection***)—The percentage of passengers inspected that **DOES NOT** possess adequate proof of payment **during a zero-tolerance, 100% inspection**. Further, evasion is defined as the total number of violators (i.e., warnings and citations) rather than citations alone.

5. Finally, there are deployment techniques that will influence the evasion numbers, either up or down depending on the method and its objective. "Heavy" enforcement when inspections increase for a short period of time can tamp down the evasion rate as word spreads. The use of discretion can be modified further, spiking or diminishing the numbers.

To gain further perspective on the variance in the fare evasion statistics, rates obtained through follow-up with several operators were compared for five systems (four LRT and one CR) over a 12- to 14-month period. This comparison is summarized in Table 15, showing the spread in fare evasion rates (i.e., low to high over that period) and the average over the 12- to 14-month period.

During a 12-month period, quite a spread can be seen for Operator B, ranging from a low of 1.34% to a high of 4.84% over a 14-month period. For Operator A, its highest rate (2.93%) was more than 5 times its lowest rate (0.58%) over 12 months.

TABLE 15
COMPARISON OF THE VARIATION IN FARE EVASION RATES OVER AN EXTENDED PERIOD OF TIME

	Range					
Operator	Low	High	Spread (High–Low)	Ratio (High/ Low)	Span	Average Over Span
A (LRT)	0.58	2.93	2.35	5.05	Jan.–Dec. 2010	0.99
B (LRT)	1.34	4.84	3.50	3.61	Jan. 2010–Feb. 2011	2.31
C (CR)	0.65	1.19	0.54	1.83	Jan.–Dec. 2010	0.87
D (LRT)	1.52	2.85	1.33	1.88	Jan.–Dec. 2010	2.19
E (LRT)	1.26	1.60	0.34	1.27	Jan.–Dec. 2010	1.40

All numbers are percentages.

LEGAL ASPECTS AND ADJUDICATION

The 30-plus years of North American experience with PoP have demonstrated the increasingly significant role of the adjudication function. Included here is a discussion of these subjects: the different legal authorities underlying fare enforcement, penalty schedules for evasion, percentage of fine revenue received by the operator, procedures for issuing warnings and citations, and the use of judicial and administrative procedures to adjudicate citations issued.

For most operators, either the state/province or a regional/county/local jurisdiction provides the legal basis for the fare enforcement of fare payment. As indicated in Table 16, 69.0% (20 of 29) of the operators are legally authorized to enforce fare payment by a state or province, and 51.7% (15) by a local political entity. There were six (20.6%) of the operators that showed up in each category as they have a combination of both the state and local laws providing their legal basis.

TABLE 16
LEGAL BASIS OR AUTHORITY FOR ENFORCEMENT OF FARE PAYMENT

Authority	*n*	%
Federal law	1	3.4
State/provincial law	20	69.0
Regional/county/local ordinance	15	51.7
Total responding agencies	29	

Multiple responses allowed; percentages do not add to 100%.

The survey results show that the adjudication process for fare evasion does not find its home in any single type of court. Table 17 shows that a municipal/local court serves the largest number of operators, 11 (36.7%). Eight (26.7%) of the agencies have their own agency adjudication process and another one is in process. As indicated in chapter four, LA Metro expects to have an in-house adjudication process implemented by the end of 2011.

TABLE 17
FARE EVASION CITATION ADJUDICATION

Adjudicator	*n*	%
Superior court	5	16.7
Municipal court	11	36.7
County/province court	9	30.0
Agency	8	26.7
Total responding agencies	29	

Multiple responses allowed; percentages do not add to 100%.

Each agency operates with either an approved policy statement or a set of administrative procedures, or both. All 29 respondents indicated that they have a policy and/or an administrative procedure that provides guidance to the enforcement function. Table 18 shows the distribution; of the total, 18 operators (62.1%) indicated that they have a policy or administrative procedure. Further, of the total, nine (31.0%) have a combination of both.

TABLE 18
POLICY OR PROCEDURES USED IN ADMINISTERING POP INSPECTION

Type	*n*	%
Adopted policy	18	62.1
Administrative procedures	18	62.1
Other	3	10.3
Total responding agencies	29	

Multiple responses allowed; percentages do not add to 100%.

The survey found that in almost every case the penalty schedules for each of the operators differ. As shown in Table 19, the experiences are balanced among agency policies and ordinances, state or provincial laws, and regional or local ordinances, with 11 of the respondents for each of the three categories. In addition, however, four (13.8%) operators have a penalty schedule from a combination of the regional/

county/local ordinance and either the state or agency policy/ordinance.

TABLE 19
HOW BASIC PARAMETERS OF THE PENALTY SCHEDULE FOR FARE EVASION ARE SET

Source	*n*	%
Agency policy/ordinance	11	37.9
State/provincial law	11	37.9
Regional/county/local ordinance	11	37.9
Total responding agencies	29	

Multiple responses allowed; percentages do not add to 100%.

The survey sought information pertaining to the penalty and fine schedules for fare evasion offenses. A summary of the results is provided in Table 20, and key findings follow:

- Unlike some international practices, there were no reported instances where riders without PoP could pay at the time of the offense.
- Three operators only provide warnings for a first offense.
- The average fine for a first offense is $121, and the median is between $100 and $110.
- Of the 26 respondents, five operators increase the penalty for a second offense.
- The average fine for second offense is $142, 17% greater than the average fine for a first offense.
- The maximum fines average $314, and the median is $250. The average does not include two operators that have maximum fines of $5,000 and up to $25,000, respectively.
- For nine of the 26 respondents, the maximum fine is applied to the first offense and any repeat offense.

TABLE 20
SUMMARY OF FINES FOR FARE EVASION OFFENSES

	For a 1st Offense		For a 2nd Offense		Maximum Fine	
Fine	*n*	%	*n*	%	*n*	%
$0 or warning only	3	11.5	0	0	0	0
$50–$99	10	38.5	6	28.6	2	8.3
$100–$199	9	34.6	11	52.4	5	20.8
$200–$299	4	15.4	4	19.0	7	29.2
$300 and up	0	0.0	0	0	10	41.7
Average	$121		$142		$314*	
Median	$100–$110		$124		$250	

Total responding agencies = 26; no distinction made between U.S. and Canadian currencies.
*This average excludes data from two operators with a $5,000 and $25,000 maximum, respectively.

Some other comments regarding fines:

- In one case, the penalty is court fees of $220 plus an amount that ranges from $25 (first offense) to $75 (maximum). In a similar case, a flat cost of $50 is added to the court fees.
- One operator determines the cost of the fine as 2 times the amount of the adult monthly pass.
- For another operator, the maximum penalty is "theft in the 3rd degree," which carries with it a maximum penalty of 1 year in jail and/or $5,000 fine.

There were several comments about fare evasion uniquely related to a particular system:

- "We use an exclusion process. The customer is removed from the vehicle and shown how to use the TVM. Subsequent violations result in longer exclusions. Once excluded, if they return to a vehicle or transit property, they are cited by law enforcement for trespass."
- "Our PoP tickets are automatically validated with time and direction of travel when they are issued. The fare payment officers issue summonses to customers at their discretion on a case-by-case basis."
- "Another violation is when the passenger does not possess a proper ID card to utilize a reduced fare or student ticket."
- "In some cases, fare inspectors may issue two citations (e.g., counterfeit pass or misused senior or youth passes)—one citation would be for failure to display valid proof of payment while the other citation would be for a misused pass."

There was also interest in whether there is any penalty difference for different offenses. The numbers in Table 20 are for a basic situation when the passenger has no valid form of fare payment. The following additional situations were examined to find out whether operators have different fines for more specific offenses. The results show that there are virtually no differences for any of the following offenses, with one exception as noted:

- Passenger had ticket…but failed to validate—*no difference.*
- Passenger had ticket…but was not valid for trip or day—*no difference.*
- Passenger had ticket…but time was expired—*no difference.*
- Passenger had ticket…but wrong fare type—*one of 26 respondents indicated that this offense has a higher fine.*
- Passenger had monthly pass…but was expired—*no difference.*
- Passenger had stored-value card…but failed to "tap in" or swipe—*no difference.*
- Passenger had stored-value card…but there was no value remaining—*no difference.*

It was also of interest to learn the severity of the fare evasion offense for each operator. The agencies were asked whether the penalty for a first-time offense is considered civil (i.e., the offense is not made part of a criminal record) or criminal. The most severe penalty imposed for fare evasion is a misdemeanor, when the offense can be made part of a criminal record and confinement could be part of the punishment. An infraction is of lesser severity and normally requires only payment of a fine, similar to a parking citation.

The majority of the 29 operators consider the first fare evasion offense to be less than a criminal penalty, and nearly 60% treat the offense with an administrative penalty (i.e., a fine):

	n	%
Civil…an administrative action	17	58.6
Criminal…it is an infraction	8	27.6
Criminal…it is a misdemeanor	4	13.8

For the same seven types of offenses discussed above with regard to whether there are differing penalties, the survey sought to find out whether the severity of the penalty changes by offense type. What was learned was that there are no differences in how severity is treated among the seven types of offenses with any of the operators.

Related to the civil versus criminal aspects was how repeat offenders are treated. The operators have various nonfinancial ways of dealing with repeat offenders, as shown in Table 21. Seven of the 29 respondents (24.1%) indicated that they have no specific nonfinancial actions available. For the 22 operators that use nonfinancial actions for repeat offenders, there are no dominant common actions: Summons to appear in court are used by 37.9% (11 of 29) of the operators; the offense is escalated to a misdemeanor (34.5%, 10); and the individual is excluded from the system for some period of time (34.5%, 10).

TABLE 21
ACTIONS FOR REPEAT OFFENDERS

Action	*n*	%
Escalates to a misdemeanor	10	34.5
Summons to appear in court	11	37.9
Excluded from using the system for some period of time	10	34.5
Other	6	20.7
None	7	24.1
Total responding agencies	29	

Multiple responses allowed; percentages do not add to 100%.

Related to nonfinancial actions enforced against repeat offenders, respondents offered these comments:

- The penalty escalates to a gross misdemeanor with involvement by transit police.
- If the violator defaults on payment of the fine, the fare evasion becomes a criminal offense.
- Theft of service is filed.
- Options include community service hours.
- Options include civil assessment, collection agency, and Department of Motor Vehicles lien.
- In Canada, it can become a criminal offense.

The revenue resulting from payment of fines is not expected to make up for the fare revenue loss due to evasion. It was found that for 57.6% of the operators, no fine revenue is received. However, six operators receive 100% of the revenue because they have an in-house adjudication process. Another six operators receive between 50% and 89% of the total fine revenue. Because of Texas state law, DART and the Metropolitan Transit Authority of Harris County (Houston Metro) benefit from having an administrative process that offers evaders 30 days to decide whether to choose an "administrative option." With this option, the operator handles the adjudication process and the evader pays $75 to the operator. More on this Texas state law is included in the chapter four case study review of DART.

PROOF-OF-PAYMENT FARE COLLECTION OPERATIONS

Other than enforcement, two particular operational aspects of PoP were of interest in the survey: ways the operators inform customers of the need for possessing proof of valid fare payment and ways the operators deal with special events and crush loads.

Off-Board and On-Vehicle Ways of Informing Patrons of Proof-of-Payment Required

One way to assist in fare enforcement is the designation of station platform areas as "paid zones." In such zones, all people on the platform are subject to receiving a citation if they do not have proof of fare payment in their possession. As shown in Table 22, the survey found that 70% of the 30 respondents have designated all or part of their station platform areas as paid zones.

TABLE 22
OFF-BOARD PLATFORM AREAS AT STATIONS/STOPS CONSIDERED "PAID ZONES"

"Paid zone"	*n*	%
Yes, all include "paid zones"	12	40
Yes, but not all include "paid zones"	9	30
No	9	30
Total responding agencies	30	100

Table 23 shows that of the 21 operators with paid zones noted in Table 22, 18 employ various means to help inform individuals as they arrive on the platform area, mainly signing (17, or 81% of the 21). Other techniques used are markings, barriers, and turnstiles.

TABLE 23
METHODS TO INFORM PATRONS OF THE PAID ZONES

Method	*n*	%
Signing	17	81.0
Markings	4	19.0
Barriers (e.g., fencing, walls)	3	14.3
Turnstiles	2	9.5
Total responding agencies	21	

Multiple responses allowed; percentages do not add to 100%.

PoP operators use a variety of sign messages alerting customers to the need for PoP. Examples from various operators are shown in Figure 6, and a sampling of the signs and markings reported by survey respondents as "other" includes the following:

Signage

- Signage in all underground stations indicate "Must Have Valid Proof of Payment Beyond This Point,"
- The agency has signage at every bus shelter stop,
- "Proof of Payment required beyond this point,"
- Signage as entering "Paid Fare Zone" and on platforms,
- Signs saying "Now entering Proof-of-Payment Area,"
- Metal signs in the paid area and TVM markings,
- Small signs with "Paid Fare Zone" and citing the relevant laws,
- Signs at beginning and end of platforms,
- "Paid fare required beyond this point," and
- Signs mark fare paid areas (but only in subway stations).

Markings

- "Proof of payment required beyond this point,"
- Lines on platform,
- Plastic adhesive markings on the platform, and
- Floor tile stripe as entering zone.

The survey also pursued practices with regard to on-vehicle information pertaining to the need for proof of valid payment. Of the 30 operators, 83.3% (25) have signs on their vehicles alerting passengers to the need for PoP.

Special Events and Crush Loads

The survey inquired as to the procedures used for special events when peak crowding occurs over a short period of time. As shown in Table 24, 64% of the 25 respondents indicated that they use ticket sales personnel handling cash transactions. The other two primary means of handling special events crowds are use of temporary barriers (52%) and temporary kiosks or ticket booths (44%).

TABLE 24
PROCEDURES FOR SPECIAL EVENTS

Procedure	*n*	%
Use of portable ticket issuing machine	2	8
Temporary kiosk/ticket booth	11	44
Temporary queuing barriers	13	52
Temporary turnstiles	2	8
Use of ticket sales personnel handling cash	16	64
Allow free rides	2	8
Other	9	36
Total responding agencies	25	

Multiple responses allowed; percentages do not add to 100%.

FIGURE 6 Examples of sign messages informing patrons of paid zones.

Some of the miscellaneous special event procedures reported in the survey were

- Fare inspectors assisting patrons,
- Staffing fareboxes in stations,
- Suspending fare inspection for the event...riders are still required to have proper fare,
- Offering special "family" passes available on TVMs,
- Ticketing agreement with the event venue, and
- Providing customer assistance with TVMs.

Table 25 reports on ways fare inspection is handled when there are crush loading conditions. The majority, 52% (13 of 25), indicated that they position their inspection force at the vehicle doors and inspect entering passengers. Another 36% of the operators wait and do not proceed through the vehicle until the crowd begins to thin out. Below are several other measures that respondents reported:

- Having street supervisors assist;
- Conducting fare blitzes with sufficient staff to check passengers on board a train at a specific station as well as everyone who gets off the train at that station;
- Positioning inspectors at platform entrance;
- Placing portable turnstiles at a distance from the boarding location, then having the crowd feed through temporary queuing barriers to reach boarding platform;
- Relaxing inspection; and
- Pretending to get on and see whether fare evaders exit, and then citing them.

TABLE 25
SPECIAL VERIFICATION TECHNIQUES FOR CRUSH VEHICLE LOADS

Technique	*n*	%
Position inspectors at doors and inspect entering passengers	13	52
Proceed through vehicle as crowd thins out	9	36
Other	11	44
Total responding agencies	25	

Multiple responses allowed; percentages do not add to 100%.

FARE MEDIA AND FARE PURCHASE OPTIONS

Table 26 is a summary of the fare media that are available for the operators in their PoP operations. The vast majority of operators offer the following fare media: single-ride ticket, monthly pass, and day pass.

As the table suggests, a wide variety of fare media types are used. In addition, the comments offered by respondents found an even wider base of fare media types:

TABLE 26
FARE MEDIA AVAILABLE

Medium	*n*	%
Single-ride ticket	29	100.0
Round trip	10	34.5
Day pass	24	82.8
Monthly pass	26	89.7
Multiple-day pass	12	41.4
Multiple-ride pass	6	20.7
Stored-value fare card	7	24.1
Other	12	41.4
Total responding agencies	29	

Multiple responses allowed; percentages do not add to 100%.

- Student pass, college or university passes, semester passes;
- 31-day, 30-day, 14-day passes;
- Corporate pass;
- Weekly pass;
- Annual pass;
- Employer passes (in some areas called Ecopasses);
- Transfer slips;
- Special day passes (e.g., for classroom trips, jury members);
- Wristbands available for purchase for special events.

With regard to transfers, as indicated in Table 27, 86.2% of the operators allow transfers. Of the 25 responding operators, 41.4% issue free transfers and 44.8% require an additional charge when making a transfer.

TABLE 27
NETWORK TRANSFERS ALLOWED

Transfer	*n*	%
Yes, all transfers are free	12	41.4
Yes; however, there is a charge	3	10.3
Yes; however, there are differing charges depending on route transferring to	10	34.5
No	4	13.8
Total responding agencies	29	100.0

With regard to off-board fare payment, all 29 respondents indicated that they provide one or more ways to purchase fare media in this manner. Table 28 indicates that in 44.8% of the cases, some type of on-vehicle purchase is also available as well. Relatively large proportions of the operators rely on third-party outlets (86.2%), internal agency sales centers (62.1%), and the Internet (58.6%) for off-board sales.

TABLE 28
METHODS OF PURCHASING FARE MEDIA

Method	*n*	%
At station: ticket vending machine(s) on platform	28	96.6
At station: sales booth with agency personnel	10	34.5
At station: in third-party commercial outlet	2	6.9
On-board transit vehicle	13	44.8
By U.S. mail	11	37.9
Via Internet	17	58.6
At third-party outlets throughout region	25	86.2
Electronic transit funds transfer	1	3.4
Agency office(s)	18	62.1
Other	3	10.3
Total responding agencies	29	

Multiple responses allowed; percentages do not add to 100%.

TICKET VENDING MACHINES

TVMs are a common part of PoP and off-board fare payment. The TVMs associated with the first modern LRT operations in the late 1970s and early 1980s bear no resemblance to today's TVMs. In San Diego, for example, the TVMs did not even accept bills. Fares were approaching $1 for most operations, and the Susan B. Anthony dollar coin was expected to effectively replace the dollar bill. The Anthony coin and the quarter were expected to be the basis for cash fare payment for the foreseeable future. The other expectation, at least in San Diego, was that payment by passes would become increasingly predominant. To a large extent, this occurred.

Today's TVMs, as judged by the results of the survey, are much more versatile than those of 30-plus years ago. Table 29 shows the range of transactions performed by the TVMs. There are still some TVMs that accept only coins, but they represent 24.1% of the operators and are secondary machines in every case. The operators with TVMs that accept bills and coins number 25 (86.2%), and 22 (75.9%) have TVMs that accept credit cards.

TABLE 29
TRANSACTIONS HANDLED BY TVMS

Transaction	*n*	%
Accept coins only	7	24.1
Accept bills and coins	25	86.2
Accept credit cards	22	75.9
Accept debit cards	16	55.2
Make bill change	14	48.3
Other	7	24.1
Total responding agencies	29	

Multiple responses allowed; percentages do not add to 100%.

Survey respondents noted some other transactions available on their TVMs:

- Accept tokens,
- Accept paper coupons,
- Accept MetroCards,
- Validate vouchers, and
- Reload smart cards.

The versatility of the TVMs is demonstrated by the range of fare media issued, as reported by 29 operators and shown in Table 30. Various passes and stored-value cards can all be issued. Next to single-ride tickets (96.6% of the operators' TVMs issue), day passes (69.0%) and monthly passes (55.2%) are the most common forms of fare media issued.

TABLE 30
FARE MEDIA ISSUED BY TVMS

Medium	*n*	%
Single ride	28	96.6
Round trip	12	41.4
Day pass	20	69.0
Monthly pass	16	55.2
Multiple-day pass	8	27.6
Multiple-ride pass	3	10.3
Stored-value fare card—new	2	6.9
Stored-value fare card—reload	4	13.8
Other	1	3.4
Total responding agencies	29	

Multiple responses allowed; percentages do not add to 100%.

The survey inquired about practices related to the number of TVMs at a station. As indicated in Table 31, 24 of the respondents have a formal requirement to maintain at least one TVM at a station. Further, seven of those operators require two or more at each station. There was one operator with some stations with no off-board TVM.

TABLE 31
REQUIREMENTS FOR TVMS AT A STATION

Requirement	*n*	%
At least 1 TVM at each station	17	60.7
2 or more at each station	7	25.0
No formal requirement, but at least 1 at each station	2	7.1
No formal requirement, some stations have no TVM	1	3.6
No formal requirement	1	3.6
Total responding agencies	28	100.0

SMART CARDS AND STORED-VALUE CARDS

Smart fare cards are becoming increasingly prominent for North American metropolitan transit operators. This survey found that 13 (43%) of the 30 PoP operators have smart card fare media, either contactless or magnetic stripe. More than two-thirds of these operators use contactless, reloadable cards. The resulting breakdown of type of card by number of operators is as follows:

Contactless, reloadable	9
Contactless, nonreloadable	2
Magnetic stripe, reloadable	1
Magnetic stripe, nonreloadable	1

As shown in Table 32, these smart cards can be purchased in various ways, with the most prevalent being at third-party outlets throughout the region [72.7% (8 of the 11 respondents)] and at the transit agency's office (63.6%).

TABLE 32
HOW STORED-VALUE CARDS ARE PURCHASED

Method	*n*	%
At station: ticket vending machine(s) on platform	3	27.3
At station: sales booth with agency personnel	2	18.2
At station: in third-party commercial outlet	1	9.1
By U.S. mail	2	18.2
Via Internet	6	54.5
At third-party outlets throughout region	8	72.7
Agency office(s)	7	63.6
Other	4	36.4
Total responding agencies	11	

Multiple responses allowed; percentages do not add to 100%.

None of the operators' cards have anything printed on the cards after purchase to indicate the card's validity. Only in one case, for New York City Transit's SBS, was it found that printed receipts are issued when accessing the system with their MetroCards. These two items (i.e., that normally there is nothing printed on the smart card nor a receipt issued) mean that some external means to confirm validity of the smart card is required.

With smart cards in a PoP operation, at least an operation without barriers and turnstiles, there is the issue of how the riders check into the system and "pay" the appropriate fare for their trip (i.e., have the fare deducted). For the contactless cards, this checking in is normally done by tapping a verification device. This verification device can be either off-board or on-board the vehicle. For instance, SFMTA has some buses with door-mounted verification devices inside the bus on the stanchion nearest the doors. In the subway stations, the verification devices are at the platform entrances. Systems with bus and LRT operations would likely have a combination, as in San Francisco. Seven of the 11 respondents indicated that their patrons must tag-in or swipe at an off-board platform verification device.

Ten of the 12 (83.3%) respondents indicated that their riders do not have to tag-off or swipe at a verification device when exiting the vehicle or platform.

For inspection purposes and fare payment verification, there are two ways to validate fare payment. One way is through a verification unit mounted on the vehicle near the driver. This on-vehicle method would be mainly used on buses and would not be common on rail services. For rail services, the verification is by inspection personnel with handheld verification devices. Most of the operators responded that their inspection force has handheld equipment (11 of the 13).

TRANSIT INDUSTRY PULSE REGARDING PROOF-OF-PAYMENT FARE COLLECTION

The survey also sought to gain a qualitative perspective on how well PoP is working in North America. The results are contained in Tables 33 through 36, and are summarized here:

- *The fare evasion trend for their transit property was acknowledged to be generally stable* (Table 33)—64.5% (20 of 31) indicated that the trend is stable and another 19.4% indicated that it is rising.

TABLE 33
FARE EVASION TREND

Trend	*n*	%
Rising	6	19.4
Generally stable	20	64.5
Decreasing	5	16.1
Total responding agencies	31	100.0

- *The respondents' feeling toward the cost-effectiveness of PoP can be characterized as generally neutral to positive* (Table 34)—56.3% (18 of 32) expressed themselves as being moderately to very satisfied, and 31.3% (10 of 32) are not significantly positive or negative. Four operators expressed being moderately to very dissatisfied with the cost-effectiveness of PoP.

TABLE 34
OPINIONS OF THE COST-EFFECTIVENESS OF POP

Level	*n*	%
Very satisfied	8	25.0
Moderately satisfied	10	31.2
Not significantly positive nor negative	10	31.2
Moderately dissatisfied	2	6.3
Very dissatisfied	2	6.3
Total responding agencies	32	100.0

TABLE 35
RIDERS' FEELINGS OF SAFETY AND SECURITY

Feeling	*n*	%
Very comfortable	9	29.0
Moderately comfortable	15	48.4
Not too comfortable or uncomfortable	4	12.9
Not very comfortable	2	6.5
Very uncomfortable	1	3.2
Total responding agencies	31	100.0

- *The respondents rate the riders' feelings about their safety and security while on-board the PoP services to be generally comfortable* (Table 35)—77.4% (24 of 31) respondents indicated that they judge the riders to be moderately comfortable to very comfortable. Three respondents indicated some concern about safety and security and rate their feelings as not very comfortable to very uncomfortable.

- *The respondents rate the feelings of the general public toward PoP to be slightly less positive than the riders'* (Table 36)—59.4% (19 of 32) expressed judgments that the public is moderately to very positive about PoP services. On the negative side, 18.8% (6) of the respondents believe that the public's overall feelings are moderately negative toward PoP fare collection.

TABLE 36
THE GENERAL PUBLIC'S OVERALL PERCEPTION OF POP

Perception	*n*	%
Very positive	6	18.8
Moderately positive	13	40.6
Not significantly positive or negative	7	21.9
Moderately negative	6	18.8
Total responding agencies	32	100.0

Percentages to do not add to 100% because of rounding.

CHAPTER FOUR

CASE STUDIES

Seven transit operators were selected to examine current practices of North American off-board PoP fare collection in more detail:

Buffalo, New York—Niagara Frontier Transportation Authority;

Dallas, Texas—Dallas Area Rapid Transit;

Los Angeles, California—Los Angeles County Metropolitan Transportation Authority;

Minneapolis–St. Paul, Minnesota—Metro Transit;

New York City, New York—New York City Transit;

Phoenix, Arizona—Valley Metro Rail, Inc.; and

San Francisco, California—San Francisco Municipal Transportation Agency.

These operators were selected to represent a cross-section of regions having a diverse range of conditions, with PoP fare collection experiences to include bus and rail modes, differing geographical areas of North America, and a range in the age of the systems. The comparative characteristics of the seven operators are provided in Table 37.

BUFFALO, NEW YORK—NIAGARA FRONTIER TRANSPORTATION AUTHORITY (NFTA)

Public transportation has existed in Buffalo for more than 170 years. In 1967, NFTA was created by the New York State Legislature. Its LRRT (light rail rapid transit, which is the formal term applied in Buffalo to its line) service followed San Diego as one of the early "new starts" in the United States beginning Metro Rail revenue service in May 1985.

NFTA Metro Rail is unique compared with the other new starts in that the portion of the line in downtown Buffalo is at-grade in a pedestrian–transit mall and the outlying portion is underground. NFTA Metro Rail is a 6.2-mi (10-km) line consisting of 15 stations connecting downtown Buffalo to northern portions of Buffalo (see Figure 7).

Although Metro Rail ridership has generally declined over the past 20 years, there has been a modest upswing in usage since 2005. The average weekday ridership in 2010 was 21,585. Compared with other U.S. LRT lines, the ridership is low; how-

TABLE 37
CASE STUDY OPERATOR SYSTEM CHARACTERISTICS

Location	Operator	PoP Initiated	Modes	Route Length (mi/km)	Stations (*n*)	Annual Ridership (1,000s)
Buffalo, New York	Niagara Frontier Transportation Authority	1984	LRT	6.2/9.9	15	6,216
Dallas, Texas	Dallas Area Rapid Transit	1996	LRT	72/115	55	17,799
			CR	34/54	10	2,469
Los Angeles, California	Los Angeles County Metropolitan Transportation Authority	1990	BRT	14/22.5	13	7,043
			LRT	61.7/98.7	57	46,650
			HRT	17.4/27.8	16	47,900
Minneapolis–St. Paul, Minnesota	Metro Transit	2004	LRT	12.3/19.7	19	10,322
		2009	CR	40/64	6	710
New York City, New York	MTA–New York City Transit	2008	BRT	17/27.2	69	21,200
Phoenix, Arizona	METRO Light Rail	2008	LRT	20/32	28	12,600
San Francisco, California	San Francisco Municipal Transportation Agency	1993	Bus	n/a	n/a	167,333
			LRT	35.5/57	33	42,447
			Streetcar	6/9.6	8	7,002

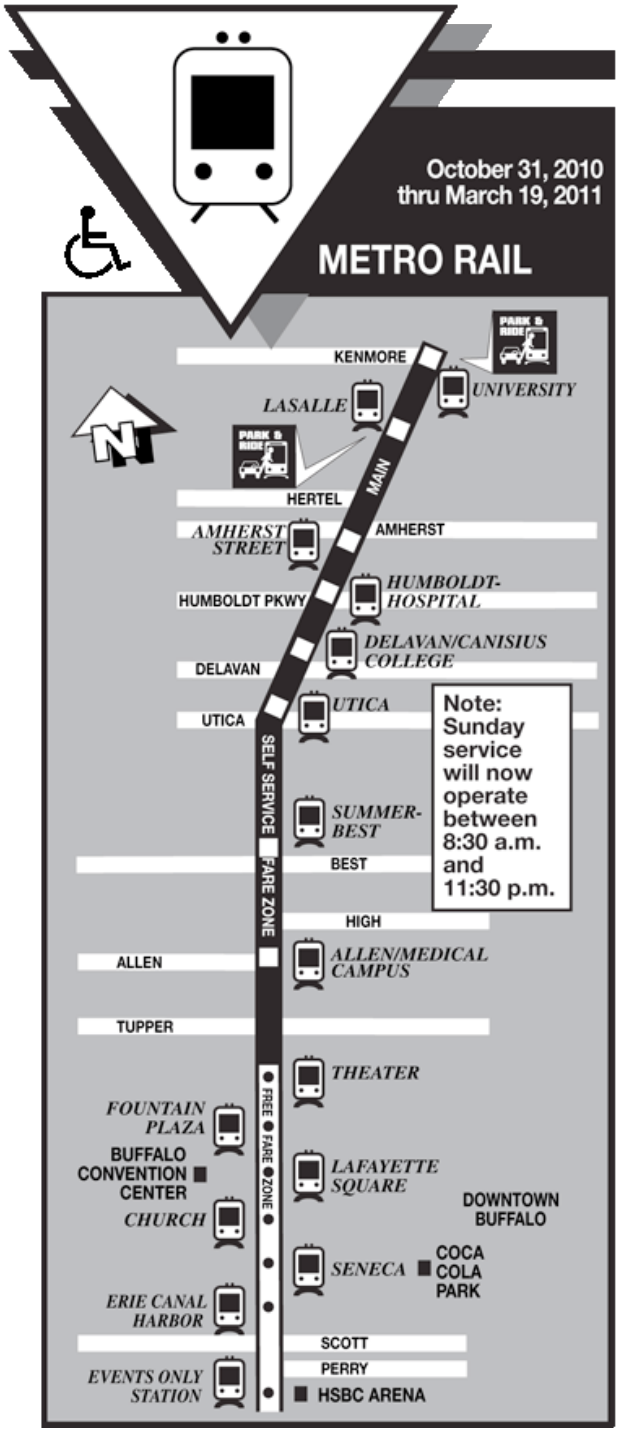

FIGURE 7 NFTA Metro Rail route map.

ever, this figure masks the line's service productivity as measured in passengers per line-mile, which is relatively high and second to Houston among the new starts post-1980 (*13*).

Basis for Decision to Use Proof-of-Payment Fare Collection

As part of the design of Buffalo's LRRT system, a wide array of fare collection systems and technologies was evaluated. A number of factors were considered including, primarily, compatibility with the design of the system's surface section (a transit–pedestrian mall) with street-level boarding, capital and operating costs, and the implementation of similar fare collection systems on other new light rail projects.

In 1982, the NFTA Board of Commissioners approved the staff recommendation for an off-board barrier-free PoP fare collection system.

Prior to construction of Buffalo's LRRT, east–west crosstown bus routes that crossed Main Street diverted via Main Street into the downtown area to provide direct service. With the new frequent, high-capacity service on the LRRT, it was decided to end downtown service on the crosstown routes and force transfers onto the LRRT to complete these trips into downtown. To avoid forcing these passengers to pay extra for this transfer, NFTA adopted a concept of free transfers on and off rail to/from bus. In September 2010, NFTA restructured its routes and fare schedule, resulting in "one zone, one fare, one system." The new plan eliminated zones and transfers, reduced the need for 12 types of passes, and instituted a $4 one-day pass; monthly systemwide passes were reduced from $77 to $64. Day and monthly passes can be used on both rail and bus.

Fare Media Used and Availability

Metro Rail travels on Main Street in downtown Buffalo, and all passengers who use only this portion travel free. Travel to and from the subway portion (and within) relies on PoP fare collection. Metro Rail tickets and passes are available at all rail stations. Transfers have been eliminated systemwide, but free bus-to-rail PoP tickets (similar to transfers) are available from bus operators and are valid for continuing a bus trip on Metro Rail or Route #8 Main buses to maintain these free transfers.

Examination of fare media proportional usage on Metro Rail indicates that 31% of the riders primarily rely on monthly passes (an example is shown in Figure 8). At 29%, single-ride fares make up the second largest category of fare media used. These one-way tickets are good for one ride in one direction within 1 h of purchase and on connecting buses. Other passes that can be used include day passes, round-trip tickets, and student passes. NFTA employees, police, fire, and mail carriers in uniform ride free.

FIGURE 8 NFTA Metro monthly pass.

NFTA Metro's College/University Unlimited Access Pass program allows students of participating colleges and universities unlimited access to the Metro Bus and Rail system. These passes have a magnetic stripe that is swiped on bus fare boxes and is a flash pass on Metro Rail.

The Buffalo Board of Education provides transportation for high schools and some charter schools via NFTA Metro as well. These student IDs are valid only on trips to/from home and school using the most direct routing. Each school issues cards with school name, student photo, and home address.

The TVMs that were part of the initial 1985 operation were very simple compared with today's TVMs. They accepted coins and tokens only. There were three types of machines during those initial years: coins only, tokens only, and dollar bill change makers.

Some original TVMs are still in use, but the newer TVMs also accept $1, $5, $10, and $20 bills. Two or more TVMs are required at each station in case one should malfunction; examples are shown in Figure 9. There are 55 TVMs for the entire system. In addition, monthly passes can be purchased at third-party outlets throughout the region.

NFTA Fare Collection Study

The Main Street transit–pedestrian mall is 1.2 mi (1.9 km) long and its function is under review. An evaluation is being conducted about opening portions of the street to traffic to bring back more activity to the street. From the beginning in 1985, this downtown portion of the LRRT system has been a free-fare zone. As a transit–pedestrian mall, the Metro Rail stations are part of the sidewalk system. Thus, any redesign of the street cross-section necessitates reviewing the entire station design, its integration with the sidewalk, and placement of the associated fare collection system. In addition, the rail car door entrances are above street level, so a boarding platform must be maintained at every station.

As part of the redesign evaluation, a parallel consultant study is under way that will evaluate introduction of smart card technology and involves the following tasks:

- Evaluating the feasibility of a system whereby rail passengers will have to pass through turnstiles on entering and exiting the rail system, and
- Reviewing technology options to "tighten" control in lieu of eliminating the PoP fare collection system.

FIGURE 9 NFTA patrons purchasing fares from TVMs.

Public Information Regarding Proof-of-Payment System

Information on fare collection and need for PoP is included in the agency website, on rail timetables, and in each light rail vehicle. Signage in all underground stations indicates "Must Have Valid Proof of Payment Beyond This Point."

On the Metro Rail timetable there is substantial emphasis on PoP information in two places:

- Under a box described as "Transfers-Tokens-Fareboxes" is the following statement: "**Free bus-to-rail proof-of-payment tickets** are available from bus operators and are valid for continuing your trip on Metro Rail or #8 Main Street buses only."
- Under another box entitled "FARE COLLECTION" there is a list of six advisories, three of which directly alert passengers to proof-of-payment:
  - "Metro Rail features self-service fare collection. To speed you on your way, there are no turnstiles or ticket takers, but you must carry proof that you paid your fare. This is called 'proof of payment.'"
  - "'Proof of payment' can be a bus-to-rail proof-of-payment ticket, Metro day pass, monthly Metro pass or your rail ticket. Tickets may be purchased from vending machines at any station, but be sure to purchase one before you board the train. A token is not accepted as 'proof-of-payment.'"
  - "At some time during your journey, you may be asked to show your proof of payment to a Metro Ticket Inspector. If you do not have it, you'll be issued a summons, similar to that given for a parking violation. To avoid unnecessary expense and embarrassment, remember to purchase a ticket, or have your transfer or pass handy before you ride."

Fare Enforcement Function

NFTA created the Transit Authority Police Department (TAPD) in 1984. The TAPD is responsible for law enforcement on the NFTA Metro system, as well as the NFTA Boat Harbor, the Buffalo Niagara International Airport, and Niagara Falls International Airport. The department currently has an authorized strength of 86 sworn officers with three civilian personnel. Transit police officers have the authority to exercise police powers and duties, as provided for law enforcement, in traffic and criminal matters within the NFTA's jurisdiction. Police substations are located at all underground Metro Rail stations.

NFTA police officers in train patrol units inspect the Metro Rail stations and platforms, enforce rules and regula-

FIGURE 10 NFTA Metro fare inspectors checking customers for PoP.

tions, and detect and deter crime. Officers are assigned to uniformed and plainclothes details.

Fare inspection is largely handled by Metro fare inspectors. These inspectors are employees within the Niagara Frontier Transportation Metro System Rail Department. An on-duty inspector checking for payment on a Metro Rail platform is shown in Figure 10. Fare inspector positions are open to all NFTA Metro employees and are represented by Local 1342 of the Amalgamated Transit Union.

NFTA Metro provides this description of the job for a Metro fare inspector:

> The job involves checking and enforcement activities relative to the self-service fare collection system. It consists of checking patrons for valid evidence of fare payment, issuing citations to violators, assisting the public in understanding fare payment procedures and Metro service, observing for and reporting of unsafe and irregular conditions, exercising sound judgment relative to all aspects of assigned duties, and the protecting of Company property. (*14*)

There are five FTE Metro fare inspectors. They do not have police powers and are considered to be "transit ambassadors" as part of NFTA's Customer Appreciation Program. They are authorized to issue oral warnings instead of citations to fare evaders in certain situations. Metro fare inspectors routinely perform "blitzes" in combination with NFTA police officers, and these blitzes form the basis for keeping track of the agency's fare evasion trend.

Fare Compliance and Inspection

A Metro Rail fare evasion rate chart is presented every month to the board. "Fare evasion" is determined by "blitzes" during which Metro fare inspectors inspect 100% of the riders in a concentrated period of time. Trends from April 2008 through December 2010 show a relatively wide fluctuation in fare evasion by month, ranging from 0.29% (December 2008) to 4.00% (January 2010). The stated objective of the chart is to keep a management watch on the fare evasion rate trend and, in particular, to be prepared to take action when the rate moves above 2.00%.

There is no target percentage for the number of passengers who are inspected on a daily basis, but in general, Metro fare inspectors check about 8.6% of underground passengers on board trains in rail stations.

Transit Adjudication Function

Fare enforcement adjudication takes place at the NFTA Transit Police Headquarters. The Niagara Transit Adjudication Bureau was created in 1984 by New York Public Authorities Title 11-A - Section 1299-EEE (*15*). There are 10 sections that define the role of the authority; explain when default decisions can be made, the hearing process, and the appeal process; and give the bureau power to enforce civil penalties for violations of laws, rules, and regulations.

Initially, some 25 years ago, the fine for fare evasion was set at $20. Currently, the penalty is $50, which is less than the price of the $64 adult monthly pass. Although this amount is generally low compared with other agencies, there is a progressive nature to the penalty that will occur if not paid within a certain period of time, for example,

- *If paid within 11 and 39 days, $100*—If it is not paid in part or a hearing is not requested within 10 days, then the penalty will increase to $100.
- *If paid between 40 and 70 days, $180*—If no action is taken within an additional 30 days, then the penalty will reach $180.
- *If paid between 71 and 101 days, $280*—Another 30 days of nonpayment or a request for a hearing will raise the penalty to the maximum of $280.

The Niagara Transit Adjudication Bureau is the adjudication unit for summonses issued to individuals alleged to have violated New York Codes, Rules and Regulations Title 21 Miscellaneous, Chapter XXIII Niagara Frontier Transportation Authority. Section 1151.21 "Fare Evasion" (*16*) describes what constitutes a fare evasion offense. Section 1151.22 "Attempted Fare Evasion" (*17*) shares identical wording but applies to "a person who shall enter upon the paid zone" instead of rail transit vehicle.

Fare evasion is a civil penalty until an individual has two or more unpaid "active" fare evasion violations; then it becomes a criminal offense. The individual can then be arrested and charged with "theft of service" at Buffalo City Court. If an individual defaults on payment, the bureau can file a civil judgment as long as the address on file is accurate and mail is not returned. After 2 years, if an address does not exist, those records are purged from the system.

About 10% of fare evasion summons are dismissed or voided. For more than 10 years, the bureau has accepted monthly payment as low as $5 per month until the penalty is paid in full. More tickets have been paid since this option was implemented. NFTA receives all citation revenue and applies it back to transit operations. Citations for fare evasion numbered 4,526 last year.

DALLAS, TEXAS—DALLAS AREA RAPID TRANSIT (DART)

Authorized by state legislation, DART is a regional agency created when following approval by local vote in 1983. It is a transit development entity as well as the operator for bus and rail services and high-occupancy vehicle (HOV) lanes

in the Dallas area. DART's service area includes Dallas and 12 suburban jurisdictions. The agency is governed by a 15-member board of directors appointed by the city councils, eight from the city of Dallas and seven appointed by the suburban cities.

Off-board PoP is used for fare collection on the regional commuter rail, Trinity Railway Express (TRE), and all of DART's LRT lines: Red, Blue, and Green. The TRE is a joint operation of DART and the Fort Worth Transportation Authority (The T) and links downtown Dallas with downtown Fort Worth with stations in the midcities. Figure 11 shows the DART rail network and the TRE route.

The initial LRT start-up was in 1996, and the system has grown incrementally since, with the most recent addition an extension to the Green Line in December 2010. The present system totals 72 mi (116 km). More LRT service expansion is planned, with additional extensions scheduled to open as early mid-FY 2012 and to continue over the next 20-plus years.

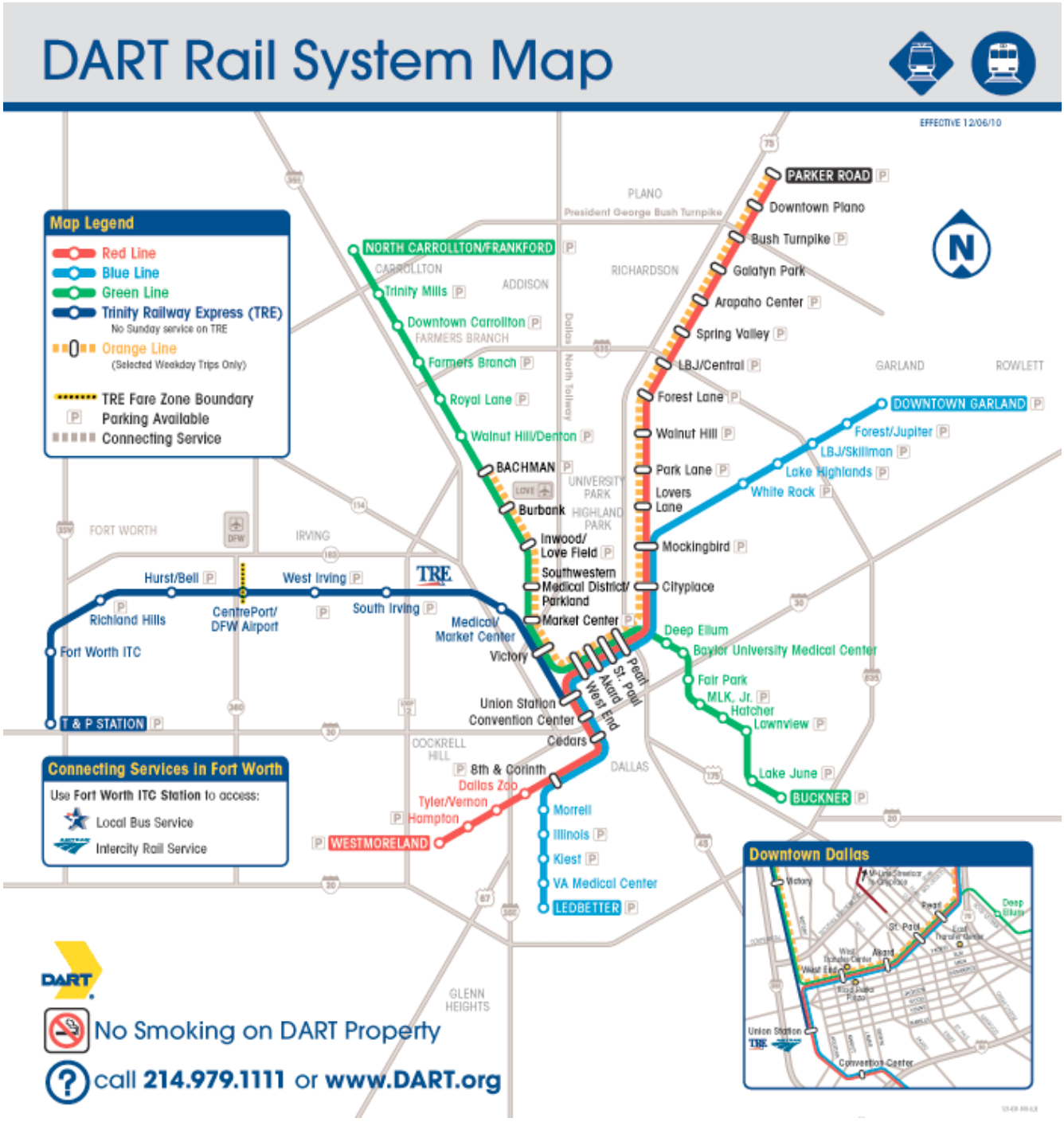

FIGURE 11 DART rail system map.

In 2010, annual ridership on the TRE was 2,469,000, or approximately 10,900 daily. For DART's LRT lines, annual ridership was 17.8 million, or 57,800 on an average weekday. However, with the addition of the expanded Green Line service, the average weekday ridership for January 2011 rose to 72,700, an increase of 26%.

Use of Proof-of-Payment Fare Collection and Evaluation of Barrier Fare Collection System

As with most modern LRT systems in North America, the case for use of PoP fare collection was generally assumed to be a complementary feature. The predominant at-grade nature of the system being planned seemingly dictated a barrier-free system.

However, as with other systems, policymakers expressed an interest in the feasibility of having a barrier system to deal with the real (and perceived) matter of fare evasion. As a result, in 2002 an "LRT Station Fare Barrier Study" was performed for DART (*18*).

The purpose of the study was to determine the possibilities for providing greater control of access to the system through use of a barrier system as a way to increase revenue by reducing or eliminating the number of people riding trains without paying. The analysis assumed turnstiles and fencing would be added, plus additional TVMs near station entrances.

The analysis found some unique problems associated with the physical nature of DART's then-existing LRT system:

- Existing stations with adjacent bus drop-off areas typically do not have adequate space for TVMs, a fence, and pedestrian movement inside the fence.
- Generally, there is inadequate space at most stations to provide for a fence and pedestrian movement.
- Fencing would be virtually impossible to install at the downtown transit mall stations because of the sidewalk nature of the stations.
- The trackway cannot be fenced at at-grade stations, thus permitting unauthorized access to the platform around the end of the fencing.

The cost for installing a barrier fare collection system (not including five stations due to infeasibility) for 59 stations (existing and buildout) was estimated to be $46 million (2002 dollars). Management concluded that the cost was prohibitive and the project was not undertaken.

Fare Media Used and Availability

DART's fare structure is divided into four categories defined by the quality of its basic services:

- *Local*—covers all local bus and LRT services.
- *System*—includes all local services, plus DART express bus services, and TRE train service between downtown Dallas and the Dallas–Fort Worth (DFW) regional airport TRE station.
- *Regional*—includes all DART services and Fort Worth Transportation Authority services (The T), TRE services, and Denton County Transportation Authority commuter express services.
- *Reduced*—includes reduced-fare programs for disabled, seniors (65+), children (5–14), and other special fare programs.

PoP experience on DART's rail line indicates that 78% of its riders primarily rely on day passes. At 14%, single-ride fares make up the second-largest category of fare media used. These are valid for 90 min from the time of purchase and cannot be used as a transfer. There are also passes that include monthly, multiple days, employer corporate passes, annual passes, college student passes, and vouchers for nonprofit organizations.

DART uses two types of TVMs:

- *Type A* (shown in Figure 12)—These TVMs dispense single-ride tickets and day passes (both for all four categories of service) that are valid only on the date of purchase. The machines accept coins and bills only.
- *Type B* (shown in Figure 13)—These are the newer TVMs and offer more versatility by allowing use of credit and debit cards. In addition to single-ride tickets and day passes, the Type B TVMs allow purchase of 7-day and 31-day passes (except for reduced-fare users). These TVMs have contactless smart card reading devices for possible use in the future.

Public Information Regarding Proof-of-Payment System

"How to Use a DART Ticket Vending Machine (TVM)" on the DART website has a prominent paragraph that states,

> **Note:** Hold on to your ticket or pass and be prepared to show them to a DART Fare Enforcement Officer, DART Police Officer or other uniformed DART or TRE personnel.

Step 5 on a DART web page titled "Six Easy Steps to Riding a DART Train" states, "Hold on to Your Ticket. Fare inspectors may inspect your ticket as proof-of-payment."

For customers, there are public information signs announcing PoP on arrival at the station platform, on the platform, and on the train. An example of a post-mounted sign is shown in Figure 14. One of the in-vehicle signs is shown in Figure 15.

FIGURE 12 DART TVM Type A.

FIGURE 13 DART TVM Type B.

FIGURE 14 Post-mounted "Proof-of-Payment Required" sign at entrance to DART platform.

FIGURE 15 DART PoP information sign posted in light rail vehicle.

Fare Enforcement Function

DART maintains its own police department, which includes responsibilities for police services over the TRE, bus, HOV lanes, and LRT. Within the DART organizational structure, the chief of police reports directly to the executive vice president of operations. DART police officers are designated as special-purpose peace officers by state statute to provide police services on the transit system.

State Legislation Related to Fare Enforcement and Evasion

In 2003, DART was the beneficiary of state legislation that created two statutes related to fare enforcement: One deals with the enforcement of fares, including definition of a fare evasion offense and the associated penalty; the second allows the agency to employ civilian fare enforcement officers with specific prescribed authorities. A summary of the two statutes is provided here:

(a) *Texas Transportation Code (TTC) Section 452.0611,* "*Enforcement of Fares and Other Charges; Penalties*" (*19*)—There are seven subsections that deal with the role and authority of an executive committee, the need to post signs alerting passengers to each area where possession of a fare is required, and the definition and various aspects of what constitutes a fare evasion offense. In this section, the offense is classified as a Class C misdemeanor (i.e., least severe) and is not a crime of moral turpitude (i.e., it does not go on the individual's criminal record).

(b) *Texas Transportation Code Section 452.0612,* "*Fare Enforcement Officers*" (*20*)—There are six sub-

sections that define the employment of, duties, and authorities of a fare enforcement officer. The section also prescribes that the officer must complete a 40-h training course, be uniformed, and not carry a weapon while performing duties. Further, the fare enforcement officer is not a peace officer and has no authority to enforce criminal law.

DART's Fare Enforcement Function

The implementation of the provisions contained in the above statutes enabled DART to hire and train civilians specifically for fare enforcement. Until 2003, the fare inspection and enforcement had been carried out solely by DART's police officers.

Today, law enforcement of DART's rail services is carried out by police officers (with police powers) and fare enforcement officers (FEOs), who are nonsworn personnel with no police powers. The FEOs were created as a direct result of TTC Section 452.0612. FEOs are uniformed, as required by the same code section.

DART has more than 45 FEOs assigned to support TRE and LRT fare enforcement efforts. Although FEOs are limited to issuing fare evasion citations, DART police officers are readily available for assistance with disruptive patrons or issues requiring police intervention. Similarly, the FEOs know that their only function is fare enforcement. The presence of FEOs for fare enforcement allows DART police management to reallocate police officers to address other crimes and "hot spots." DART police deployment of a combination of police officers and FEOs on TRE and LRT proves effective in customer service and increased police visibility and passenger sense of security.

To effectively oversee the rail services, the police department has divided the system into 10 geographic sectors. During daily operations, a team of police officers and FEOs is assigned to each sector. DART police officers' response time to situations on the LRT requiring police attention on average is 5 to 7 min.

DART police have executed signed memoranda of understanding with each city that DART rail lines and buses pass through to delineate DART police officers' duties and responsibilities with regard to traffic enforcement, incidents, and accidents affecting DART assets and operations. In addition, the DART chief of police meets with service area chiefs of police a minimum of once a year.

DART police also maintain a contract with a private security firm that provides armed guard services with distinctive uniforms at DART transit centers, park-and-ride lots, and bus operations facilities.

Guidelines for Fare Enforcement Officers

Upon passage of the state legislation in 2003, DART's chief of police developed a general order with its purpose to provide "guidelines for the fare inspector position" (*21*).

In addition to a statement of purpose, the general order has six sections:

1. *Overview*—Describes the fare inspectors' responsibility: to inspect passengers' tickets and/or passes to ensure that they are in compliance with DART PoP requirements. "Fair and impartial inspections will instill trust, appreciation, and continued use of DART as a means of safe and reliable transportation."

2. *Fare Media*—Lists valid fare media.

3. *Procedures*—Deals with fare inspection, enforcement, dealing with passengers with disabilities, service interruptions, counterfeit passes, and other crimes and offenses.

4. *Uniforms and Appearance*—Lists what is expected and any items that are prohibited.

5. *Prohibited Conduct*—Identifies the consequences of engaging in prohibited conduct.

6. *Court Appearance*—States that FEOs have to appear in court in support of a citation that was issued.

DART Adjudication Process

The 2003 state legislation, in particular TTC Section 452.0611, included provisions that authorized DART to handle fare evasions by either an administrative or judicial resolution process. As a result, DART has developed an adjudication process that allows an individual who receives a fare evasion citations two choices:

1. *Administrative Resolution*—This an administrative procedure managed by DART that permits a person to pay a $75 "administrative fee" within 30 days and avoid a criminal court proceeding. The individual can pay in person at DART offices, by mail, or by using the DART store (DARTstore.org). However, this administrative procedure is for fare evasion citations only and not for other violations. Further, persons who choose this option can no longer contest the citation.

2. *Judicial Resolution*—In this case, the person proceeds through a court procedure and may offer a "not guilty" plea. If found guilty, the individual is subject to a penalty fine from $150 to a maximum of $500. In addition,

the violation would be considered a Class C misdemeanor (i.e., a relatively minor offense in the same category as a traffic ticket). For citations that go through judicial resolution, DART receives $5 for each citation.

There are three primary features of DART's in-house administrative remedy:

1. *The administrative choice decriminalizes fare evasion*—Prior to 2003, juvenile fare evaders were charged with "theft of service," and if they did not pay the fine, the offense was made part of their criminal record. This is no longer the case.

2. *There is a financial incentive for the rider to select the administrative choice*—If the administrative choice is followed then an "administrative fee" of $75 is charged. In comparison, the minimum fine of $150—and ranging up to $500—would be the cost for being found guilty if the judicial alternative is chosen.

3. *There is a revenue return to DART*—All the revenue from the administrative process is kept by DART and helps offset the costs of the process and fare inspection. From 2004 to 2010, the annual fine revenue returned to DART from this process has increased from $48,000 to $182,000.

DART estimates that 20% to 30% of the citations issued are resolved via the administrative alternative. DART tries to make it relatively easy to select this option: First, it is less expensive, and second, it does not require an appearance at the Justice of the Peace Court with the possibility of criminal charges and a possible fine of more than $500. The DART Store website devotes five pages to the subject of fare evasion citations, with instructions for payment and 14 frequently asked questions.

Fare Compliance and Inspection

For FY 2011, the police department established a goal of having an LRT evasion rate no greater than 3.75% (*22*). Saturation inspections conducted in mid-January 2011 found the following fare evasion characteristics:

- *LRT had generally lower evasion than the TRE*—During the day, the range for LRT was 2.1% to 3.9%, whereas the TRE ranged between 2.7% and 6.3%.
- *The off-peak period experienced higher evasion rates than peak periods*—For LRT, the range was 2.7% to 3.9%; for the TRE, it was 4.9% to 6.3%.
- *Fare evasion was lowest during the a.m. peak period*—LRT was 2.1%, and the TRE was 2.7%.
- *A substantial number of evasions were for "reduced pass violations"* (*i.e., where the individual was not qualified to ride on a reduced fare*)—About 26% of the LRT and 32% of the TRE fare evasions were for these violations.

For both LRT and TRE services, DART bases its fare evasion measurements on the 100% saturation counts within a given LRT/TRE sector. Examining LRT services only, the January 2011 saturation data indicated a rate that averaged about 3%, which was within the agency's goal.

A record is not kept of inspections or passenger contacts involved with the FEOs checking for PoP. However, based on extrapolation of the 3% fare evasion rate, it appears that the overall inspection rate is roughly about 7% of DART's total LRT ridership [i.e., calculated assuming 3,080 evasions per average month in 2010 (the number of evasion citations issued was 29,929 and the number of warnings, 6,177, for a total of 36,106, or 3,080 per month) and an average 2010 monthly ridership of 1,500,000].

Future Smart Card Project Under Way

A smart card procurement process is under way, with a late 2011 award scheduled. The resulting project will be broad and will evaluate alternatives of acquiring replacement TVMs or procuring accessories to the existing TVMs. DART has two primary objectives with its smart card project: to minimize the number of fare media and to achieve a goal of 80% noncash card users.

LOS ANGELES, CALIFORNIA—LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY (LA METRO)

The third-largest public transportation system in the United States, Los Angeles Metro operates a system of bus and rail services that includes the following high-capacity services (see Figure 16):

- *Orange Line*—BRT, also referred to as "Metro Liner";
- *Blue, Gold, and Green Lines*—LRT;
- *Red and Purple Lines*—HRT subway. These lines and the Blue, Gold, and Green Lines are also collectively referred to as "Metro Rail."

These high-capacity services combine to form a network of 73 mi (117 km) of rail transit and 14 mi (22.4 km) of BRT service. The rail and BRT lines overlay an extensive system of bus routes (Metro Local, Metro Express, Metro Rapid). In addition, LA Metro coordinates county-wide transit plans and policies for 16 bus operations provided by municipal operators. Including special shuttles, expresses, and paratransit services, 46 municipal bus operations are coordinated under the LA Metro "umbrella" of transit services.

FIGURE 16 LA Metro high-capacity transit network map.

LA Metro was created by state legislation and has other core responsibilities besides operation of transit services, including responsibility for planning and developing highway and mass transit facilities and services in Los Angeles County.

Orange Line BRT

Of interest as a case study is LA Metro's use of PoP across all modes—BRT, LRT, and HRT. In particular, the Metro Orange line is of interest because it is an example of BRT service operated in a primarily reserved off-street right-of-way.

The Orange Line is located in the San Fernando Valley of Los Angeles and runs from the northern terminus of the Metro Red Line in North Hollywood to the Warner Center in Woodland Hills. This east–west line is operated over a landscaped 13-mi (20.8-km) exclusive transit facility constructed in the former Southern Pacific Railroad right-of-way and 1.0 mi (1.6 km) of city streets using 60-ft (18.3-m) articulated low-floor buses, branded as "Metro Liners." Weekday ridership on the Orange Line in December 2010 was 23,957; for Saturdays, it was 14,369, and Sunday/holidays, 9,130.

Thirteen stations are provided along the line, spaced approximately 1 mi apart and generally serving major activity centers such as the Van Nuys Government Center; the Warner Center, which is the third-largest employment center in Los Angeles County; and two colleges. There are park-and-ride lots at five stations, totaling about 3,000 parking spaces. The stations feature signage displaying operating information and such amenities as public telephones, bicycle racks, TVMs, security cameras, and distinctive original art. Operational enhancements include traffic signal priority on the city street portion, stations with raised platforms to allow for faster bus loading and deboarding, and intelligent transportation system technologies that include the ability to maintain constant distances between buses and to provide passengers with visual displays telling them when the next bus will arrive.

Basis for Decision to Use Proof-of-Payment Fare Collection

Proof-of-payment fare collection was initially decided on as part of the early development decisions related to LA Metro's first high-capacity line, the Blue Line, which opened for revenue service in 1990. The other high-capacity lines followed: Red Line in 1993, Green Line in 1995, Gold Line in 2003, and Orange Line in 2005.

In the 1980s when the rail transit development process was under way in Los Angeles, two organizations were involved: Southern California Rapid Transit District (SCRTD) and Los Angeles County Transportation Commission (LACTC). The two agencies were combined in 1993 to form the present-day LA Metro.

SCRTD was responsible for the eventual Red Line HRT project, and LACTC was responsible for the Blue Line LRT project. From the start of its development process, LACTC essentially assumed that the Blue Line would use PoP fare collection. However, in a 1982 action by the SCRTD Board of Directors, a barrier system was recommended for the Red Line. The staff report noted, "The primary reason for not selecting barrier-free was the lack of experience with it on a North American high-volume heavy-rail system and the associated risk it was felt that SCRTD would be taking with an unproven concept" (*23*).

Subsequently, in 1986, the SCRTD board changed its position and decided to use PoP on the Red Line. The staff report cited above included a review of experience with barrier-free fare collection in North America and internationally. It also considered fraud rates in Los Angeles associated with other industries. In the report, SCRTD staff built a case for the use of PoP, noting these benefits of proceeding with a barrier-free system:

- A significant reduction in the procurement cost of the fare collection equipment,
- Improved fare integration with bus and light rail,
- Improvement in fare equipment reliability, and
- Reductions in system operating and maintenance costs.

The report also cited "favorable acceptance" of barrier-free systems in North America, noting that "San Diego, Calgary and Edmonton are successfully using barrier-free fare collection on their light rail lines" and "Buffalo, Portland and Vancouver have successfully implemented barrier-free fare collection on their light rail and automated guideway systems."

At the same time, SCRTD decided to design its Red Line for barrier equipment to preserve the option of converting to a barrier system in the future. It was also noted that the Red Line stations, as well as the LACTC's Blue Line stations, were to be designated "paid areas" with the TVMs placed off-platform.

Now, 25 years later, all of LA's high-capacity transit lines have been designed to use PoP fare collection. However, as noted above, the Red Line was also designed to incorporate gates and turnstiles in the future. The topic of whether to add gates has been brought up regularly over the years, especially after the Red Line opened in 1993. Currently, as discussed later in this case study, a capital improvement project to install gates at all Red Line stations and many of the Blue, Gold, and Green Line stations is under way.

Fare Media Used and Availability

At 25%, single-ride fares make up the second-largest category of fare media used. LA Metro riders primarily (39%) rely on other fare media such as weekly passes, transfers (to transfer to municipal operators), freeway express tickets and upgrades, tokens, and student monthly passes. Day passes (see Figure 17) and monthly passes are also available, including an EZ transit pass that permits travel on most other local operators.

In 2001, LA Metro adopted smart card technology as its future multimodal, multioperator fare media system. The objective was to allow seamless travel on all LA Metro services as well as on Metrolink (the regional commuter rail system) and the municipal operator systems (also referred to as "Munis"). The system was called Transit Access Pass, or TAP. The acronym is also used in a variety of ways to describe how to use the new card (e.g., to "TAP" on to the system).

Riders who purchase TAP cards and use them in the PoP portion of the system must tap on the target of a stand-alone verification device or TVM located on the station platform or on the target located on the right side of a turnstile. If transferring, then the user must repeat the tap before boarding the next line. There is no visible printing added to the TAP card. The cards can be used to store value or to pur-

FIGURE 17 LA Metro reduced-fare day pass.

chase a time period, such as a month. They are durable plastic with an electronic chip inside to permit reuse once the time has expired or the value has gotten low. Currently, six of the 16 Munis also use the TAP cards. The various fare idiosyncrasies represented by LA Metro and the Munis present a complicated set of interoperator fares and transfer conditions. This set of complexities has slowed the pace of progress toward having all operators accept the TAP card.

The TVMs total 333 for the 92 stations on the combination of Orange Line and rail network. They can issue single-ride tickets and day passes and "reload" TAP cards. The machines accept credit and debit cards and bills and can provide bill change.

Public Information Regarding Proof-of-Payment System

LA Metro makes considerable public information available about its fare collection system, mainly as related to its relatively new TAP card. There are signs on-vehicle, and there are signs on all station platforms noting that PoP is required (as shown in Figures 18 and 19 from Orange Line BRT stations). The signs, which state "Ticket Required Beyond This Point," are on the approaches to all stations and above the gates in stations where there are gates past a certain point.

As shown in Figure 20, on trains there are also posters reminding riders about tapping the TAP card that read "Don't Forget to TAP. It's Required!"

Compared with other operators, LA Metro maintains a diverse set of information brochures on various aspects

FIGURE 18 LA Metro column-posted public information sign alerting passengers to PoP on Orange Line at entrance to BRT platform.

FIGURE 19 LA Metro overhead public information sign alerting passengers to PoP on Orange Line BRT platform.

FIGURE 20 LA Metro public information sign reminding users to TAP.

of its fare collection system. For instance, examples of LA Metro's printed public information materials include the following brochures:

- *Metro Bus and Metro Rail Rider's Guide*—Fares, TAP Cards, Safety Tips, Disabled Services, Contact Information, and More! In this brochure there is a section on "Paying your fare," which describes the need to pay the fare before boarding along with a warning that "Failure to pay the proper fare is a violation of Section 640 Penal Code and may result in a fine up to $250 and 48 hours community service."
- *TAP User's Guide.*
- *Metro Rail turnstiles have new lighted alerts.*
- *Switch to Direct Deposit on a TAP ReadyCARD.*
- *One Card for Everything,* The benefits of a prepaid Visa card plus a TAP card—use it everywhere!
- *College/Vocational TAP Card Application.*
- *Seniors: Apply for your TAP card now.*
- *TAP is replacing Disabled ID cards, stamps & passes.*
- *Don't forget to TAP. It's required!*

Fare Enforcement Function

LA Metro has had a contract with the Los Angeles County Sheriff's Department for all law enforcement services related to transit. For this purpose, the sheriff's department has set up a separate Transit Services Bureau (TSB), which is located within LA Metro's offices.

With 300 law enforcement personnel providing service to LA Metro, the TSB is the second-largest transit policing force in the United States. Of this total force, 71 (or 24%) are sheriff's security assistants and are the personnel largely responsible for fare enforcement on the rail transit lines and the Orange Line. The 229 uniformed deputies have broader responsibilities and aid fare enforcement as required (e.g., when sweeps are performed). The vast majority (90%) of the force have full police powers.

Fare Compliance and Inspection

When the region's first modern rail line, the Blue Line, opened for service in 1990, the board wanted to make sure that a strong enforcement message was sent to the riders. Consequently, the board mandated an inspection rate of 25%. Over time, this inspection rate has been moderated and today stands at 10%. As of December 2010, the inspection rate was below that level, ranging from just over 9% on the Red Line to 23% on the Gold Line. The inspection rates are 17.5% for the rail lines (i.e., both LRT and HRT) and 16.4% for the Orange Line.

The board's policy objective is to limit fare evasion to less than 2%. Related to the subject of fare evasion, an October 2007 study found fare evasion for all high-capacity lines for LA Metro to be 5.5%, with the Orange Line essentially at the average (5.6%) (*10*). Key findings from this 2007 assessment include the following:

- Fifteen percent of the riders without valid fares had incorrect fares; that is, these were riders with PoP but who were short the required fare for their rides (e.g., age-ineligible).
- Fare evasion rates differed by day of the week: 5% weekdays, 6% Saturdays, 7% Sundays.
- Evenings had the highest evasion rates of 8% to 10%.
- The lowest evasion rates, 3% to 5%, were observed during the morning and afternoon peak periods.

LA Metro's monthly fare enforcement summaries routinely show lower evasion rates than the 2007 study. The sheriff's TSB prepares monthly crime analysis summaries in which detailed fare inspection and evasion statistics are recorded. For 2010 (11 months through November), total fare evasion, including warnings, reflected the following evasion rates:

LRT	
Blue Line	0.7%
Gold Line	0.6%
Green Line	0.9%
BRT	
Orange Line	0.8%
HRT	
Red Line	0.8%

"Modified" Proof-of-Payment Fare Collection

PoP continues as the fare collection system for these high-capacity lines. However, in 2008, LA Metro proceeded with a project to install gates/turnstiles at most of the stations on its high-capacity network. The objective was to have 85% of all high-capacity system riders pass through gates. Further, all future LA Metro rail lines are to be designed for gates. As a result, most of Metro's rail stations today have a "modified" PoP fare collection system in place. There is still fare inspection and PoP in force in addition to the gates.

The basis for going to a modified PoP system was confirmed by the LA Metro Board of Directors in February 2008, when it approved a Metro Rail Gating project in which all Red and Green Line stations would have gates added, plus some strategic stations on the Blue and Gold Lines (*24*).

With all stations at grade level, the Orange Line is not part of the gating project. The staff report made the case for the gating program as a

> …positive business case for cost recovery through increased fare collection and reductions in contracted fare checking personnel has also been demonstrated. The recommended gating alternative facilitates the continued successful operation and expansion of Metro heavy and light rail system and plays an integral role in the anticipated success of the Universal Fare System and TAP smart card implementation.

The report provided a list of four "tenets" for gating most Metro Rail stations:

1. Public safety is improved by gating.
2. Gating improves rail station security and is a deterrent to crime.
3. Gating is not a deterrent to the cash-paying public.
4. The proposed gating alternative presents a positive business case.

In addition, the staff report noted that there were other benefits to gating: "accurate, exact time boarding/disembarkation data; facilitation of fully functional distance based-fare programs; facilitation of new programs and revenue opportunities in combination with national credit card issuers." By early 2011, the gates were in place but were open in both directions. Several associated smaller capital projects have accompanied the gating:

- *Alert Gating Program*—A colored lighted alert is located on each gate and registers whether the entering patron has a valid fare, insufficient value of the TAP card, or did not tap. The light shows a red or green indication depending on whether valid fare is indicated. Fare inspectors may be present and can apprehend people who pass through when a red indication is displayed.
- *Acquisition of Handheld Verification Devices (LA Metro refers to these devices as Mobile Phone Validators, MPVs)*—Three hundred of these units have been issued to fare inspectors and uniformed officers in the field. These are lighter weight and smaller than the prior handhelds and are less expensive. An example of one of the handheld devices is shown in Figure 21. The new handheld devices also permit the inspector/officer to verify fare payment for TAP users. The units can communicate over the 3G data network and are adapting near field communication to interface with the TAP card. As a result, the application developed on the phone can validate, read, and display TAP card content, and can store the last eight transactions on a standard TAP card and two transactions on a limited use ticket.
- *Installation of Closed Circuit TV (CCTV) Cameras*—These new cameras focus on the gated areas to complement the gated system and also provide a communication assist to patrons.

FIGURE 21 Handheld verification device used by LA Metro sheriff's deputy assistants for fare inspection of TAP cards.

With the addition of gates to 70% of the rail stations, fare enforcement has benefited by controlled entrances. However, random fare inspection at stations and on-board remain. The result is a "modified" PoP fare collection system.

Creation of a LA Metro Transit Court

Sponsored by San Francisco, a California state law that took effect in 2007 [and is chaptered in California Penal Code 640 (*25*)] authorized LA Metro to adjudicate fare evasion and other minor transit violations through administrative review rather than through the court system.

However, in contrast to SFMTA, LA Metro has decided not to decriminalize the process. The LA Metro procedure will have two alternatives:

- *An administrative review available for 45 days*—The fare violator will be given an opportunity for an administrative review by an LA Metro Transit Court within 45 days of receiving the citation.

- *A Superior Court proceeding*—If the individual chooses to not use the administrative remedy available by either not paying the penalty for the citation or failing to request an administrative review within 45 days, then the citation will be forwarded to the Superior Court.

A Transit Court would be developed consistent with the provisions of Section 640 (c) and (e), which state the definition and various aspects of what constitutes a fare evasion offense and enforcement aspects. The ordinance for imposing and enforcing the administrative penalty is governed by Chapter 8 (commencing with Section 99580) of Part 11 of Division 10 of the Public Utilities Code and shall not apply to minors. (The entire Penal Code statute and the Sections 99580 through 99582 of the California Public Utilities Code are contained in Appendix D.)

Based on the enabling provisions of this law, LA Metro scheduled board action in early 2011 to consider creation of a Transit Adjudication Bureau (Transit Court) by the end of 2011. The staff report indicated the following:

> The purpose of the Transit Court is to have a program that benefits its customers by providing a more direct, simpler process for resolving citations issued for transit related violations, while also benefiting Metro by combining the introduction of the Transit Court with the implementation of the updated Customer Code of Conduct. The Transit Court will also benefit the Los Angeles County Courts by reducing the number of cases that are currently required to be adjudicated in the Superior Courts. (*26*)

Key milestones related to the implementation of the Transit Court include

- Adopt a bail schedule,
- Issue a request for proposals for citation processing services,
- Create the hearing examiner pool,
- Create public outreach and communication plan for Metro's customers, and
- Train staff.

Presently the staff is in the process of building the Transit Court infrastructure, which includes

- Requesting proposals for vendor citation processing,
- Scheduling the remodel of the Transit Court location,
- Coordinating citation issuance and processing with the sheriff's department, and
- Developing a complementary community service program.

MINNEAPOLIS–ST. PAUL, MINNESOTA—METRO TRANSIT

Metro Transit is an operating division of the Metropolitan Council, which also serves as the Minneapolis–St. Paul region's Metropolitan Planning Organization. Metro Transit is the largest provider of fixed-route transit service in the Minneapolis–St. Paul region. It directly operates Metro Transit Bus and Metro Transit Rail, with 78 million rides in 2010.

In addition, Metropolitan Transportation Services (MTS) is a division of the Metropolitan Council responsible for transportation planning and for providing contract operations of a portion of the regional transit system. Suburban transit authorities also provide regular-route transit service, totaling about 10% of all regional rides. All providers use a common fare structure and fare media.

Of interest in this case study are two services on which PoP fare collection is employed: the Hiawatha LRT line and the Northstar CR service.

The 12.3-mi (19.7-km) Hiawatha Line offers light-rail service to 19 stations between downtown Minneapolis and the Mall of America. The route map of the Hiawatha Line is shown in Figure 22. Dozens of bus routes are timed to connect with trains at Hiawatha Line stations. Revenue service was initiated in 2004. Major activity centers served include downtown Minneapolis, the airport, the Metrodome (home to Minnesota's professional football team), Target Field (home to Minnesota's professional baseball team), and Mall of America, a tourist destination with more than 40 million visitors each year. Annual ridership was 10,322,000 in 2010, with 35,000 riders on an average weekday.

The Northstar Commuter Rail Line offers service between Big Lake, northwest of Minneapolis, and downtown Minneapolis, stopping at six stations in six cities over its 40 mi (64 km) of service. Figure 23 displays the Northstar Line system map.

Northstar CR was opened in November 2009. Major activity centers served include downtown Minneapolis and Target Field. The Hiawatha Line and Northstar Line have termini at Target Field in downtown Minneapolis. The terminals are on separate levels, with Northstar arriving below the Hiawatha Line. Passengers ascend to the stadium and Hiawatha Line level. Annual ridership was 710,400 in 2010.

Basis for Decision to Use Proof-of-Payment Fare Collection

As was typical for modern LRT projects in North America, the decision to use barrier-free PoP was a consensus by Metro Transit's executives and governing board based on factors in the industry at the time of planning. During the Hiawatha project development process, *TCRP Report 80* became available and was relied on to a certain extent for guidance. No independent analysis of PoP fare collection was undertaken.

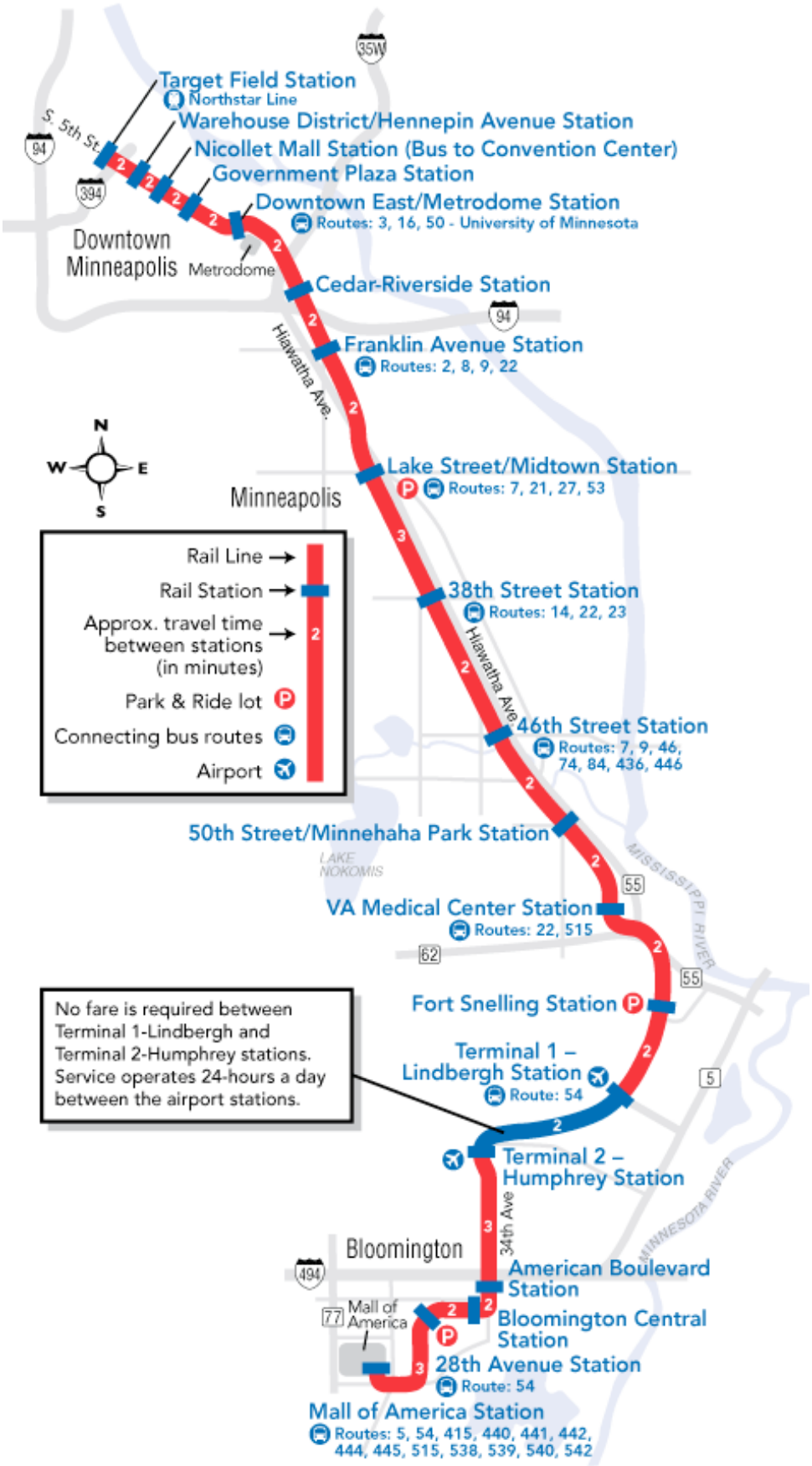

FIGURE 22 Metro Transit Hiawatha LRT line map.

FIGURE 23 Metro Transit Northstar Commuter Rail route map.

Fare Media Used and Availability

The Metro Transit fare structure includes a wide variety of fare media used on the Hiawatha LRT and Northstar services. These include magnetic-stripe tickets and Go-To smart cards, which can be used as stored-value cards, and various passes (e.g., 31 days, college, and corporate).

Pricing of bus and light-rail single-ride fare media (see Figure 24 for an example) is dependent on time of day, except for downtown zones, which are $0.50 at all times. Children younger than 5 years of age and service-related disabled vets ride free at all times. There are other fare media, including day passes, event passes, and Northstar roundtrip family passes.

FIGURE 24 Metro Transit single-ride ticket.

Off-Board Fare Purchase Required

Before boarding the LRT or a CR train, the rider must purchase a fare using one of the above-listed fare media. All rail station platforms are defined as "paid-fare zones," and are reserved for those who are purchasing tickets or for ticketed customers who are waiting for or getting off trains. Cash or a credit card can be used to buy a magnetic-stripe ticket from the TVM on the station platform or a Go-To Card, or a pass must be validated at a card reader on the platform. Language options on the TVMs include English, Spanish, Hmong, and Somali, both in text and audio. The faceplate of a TVM is shown in Figure 25.

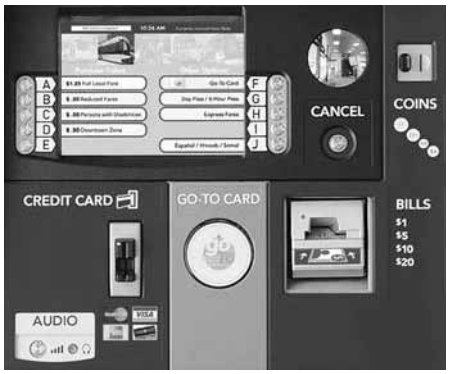

FIGURE 25 Metro Transit TVM.

The "Smart" Go-To Cards

Go-To Cards are the most commonly used fare payment medium, owing to speed and convenience of use. Go-To Cards are "smart cards" that hold multiday passes, stored value, or both, and are valid on bus, light rail, and Northstar. They can be recharged (or reloaded) with additional value, or can be loaded with a pass good for a specified number of days (i.e., 7-day pass, 31-day pass), and are made of durable plastic to facilitate long-term use. They can be protected against theft and loss if registered with Metro Transit.

The "smart" portion of the card is exemplified by how it is used for seniors, customers with disabilities, and students; the cards are specially programmed so the reader will automatically deduct the correct fare in effect at that time. The cards also permit one individual to pay for multiple riders with the one card.

Go-To Cards can be ordered online or by mail, and are also available at Metro Transit stores and Go-To Card retail outlets. Value can be added at Metro Transit Stores, Go-To Card retail outlets, online, by phone, or at ticket machines. Go-To Card readers allow users to check card balances. Card balances may also be checked remotely via phone or website. Metro Transit Go-To Card readers are shown in Figures 25 (on the TVM face) and 26 (a stand-alone Go-To Card reader).

FIGURE 26 Metro Transit Rider tapping Go-To Card prior to boarding.

Fare Collection System Details All in One Place

Metro Transit publishes a 21-page booklet for service providers and users called "Guidelines and Procedures for Fare Collection System" (*27*). The booklet contains all of the details associated with Metro Transit's fare collection system. Below is an outline of the contents:

- *Regional fare structure*—Lists fares for regional services and definitions of the numerous terms associated with the structure (e.g., rush/nonrush hours, youth, seniors, and persons with disabilities). The different fare collection equipment is also described, including farebox, ticket reading and issuing machine (TRiM), TVM, and rail and bus card readers.
- *Fare media restrictions*—Explains eligible uses and restrictions for the Go-To Card and the various passes that are available for using transit in the region.
- *Transfers*—Lists numerous conditions affecting the use of transfers (e.g., they expire 2.5 h after issuance). Transfers offer a convenience to riders but can be a challenge to control.
- *Go-To Card fare payment types*—Explains the use and pricing of the Go-To Card, along with conditions affecting group travel.
- *General Go-To Card guidelines*—Describes maintenance and registration of the Go-To Cards.
- *Refunds and exchanges*—Covers how to deal with lost, damaged, or disabled Go-To Cards.
- *Go-To Card terms and conditions*—An appendix spelling out various legal conditions.

Public Information Regarding Proof-of-Payment System

On the Metro Transit website one can click on the YouTube icon and get connected with "mymetrotransit," a series of instructional videos. Each video is about 2 min long, and those that relate to the fare collection function include "About Metro Transit," "How to Ride Light Rail," "How to Ride the Northstar Line," "About Go-To Cards," "Ticket Machines," "Types of Fares," "Transfers," "Paying for Your Fare," "Paying for a Group," "Day and Event Passes," and "Customers with Disabilities."

There are various messages to alert the riding public to PoP fare collection being in effect on Metro Transit's rail lines. There are warnings that Metro Transit police officers will randomly ask to see proof of fare payment on trains and stations. These warnings also are posted on the Metro Transit website and in its videos. In addition, each LRT and CR platform is considered a "paid zone." As a person approaches the platform, signs call attention to the need for PoP.

Fare Enforcement Function

Metro Transit has an 87-person police department headed by a chief of police who reports to the Metro Transit general manager. Fare inspection on the rail services is carried out by 18 FTE transit patrol officers who make up about 37% of the total number of FTE assigned patrol duties. These transit patrol officers have police and arrest powers and are complemented by use of part-time officers from local communities.

When Metro Transit decided to have a policing function, it started by using off-duty municipal police officers. Off-duty officers worked full time for a municipality, so scheduling of "off-duty" hours became a problem because municipal priorities came first. This was further accentuated with heightened municipal scheduling following the terrorist attacks of 9/11.

In 2002, Metro Transit created its own police force, and today all of Metro Transit's law enforcement function is managed within its police department.

Related to fare enforcement duties, Metro Transit has developed a clear statement of an SOP titled "Fare Enforcement," which notes the following:

> Metro Transit Officers will be the primary point of contact with all passengers. As such, the highest standards of professional demeanor will be expected of them. In terms of public acceptance and enforcement of the proof-of-payment system, the fare inspectors are essential to the success of the system. The philosophy for fare inspection will be high visibility, with pleasant yet firm enforcement. This philosophy dictates that Metro Transit Police Officers apply interpersonal relationship skills and law enforcement authority to gain acceptance of and compliance with the proof-of-payment system. (*28*)

Usually two-person teams work Northstar in 8-h shifts, and two-person teams on the Hiawatha LRT work three shifts during the day beginning at 6:00 a.m., 11:00 a.m., and 6:00 p.m. Saturation inspections are also regularly scheduled, at which time a police team inspects all patrons at a selected station, those on the platform as well as those deboarding trains.

Fare Compliance and Inspection

Transit police officers carry handheld verification devices (also referred to as MPVs) to verify payment by Go-To Cards. On Northstar, both police officers and conductors inspect for fare payment. However, only the officers can issue a fare evasion citation. Conductors can ask passengers to pay at the destination station or may ask them to disembark at the next station. The latter is rarely used because of the relatively long intervals between train arrivals. The conductors will also take the name of any fare evader and then share it with Metro Transit police to track repeat offenders.

Typically, a citation will not be issued if riders with a Go-To Card Pass (vs. stored value) do not tap in. Inspectors will walk them off the train to tap their card. All warnings are to be recorded with the rider's name. Metro Transit would like to increase the number of passengers who tap in.

Independent Program Evaluation and Audits

Assisting Metro Transit, the regional Metropolitan Council provides an independent audit function. In March 2008 and in October 2010, the council performed separate "program evaluation and audits" for light rail and commuter rail, respectively.

The 2008 report was devoted to the Hiawatha Light Rail line and the 2010 report concerned Northstar Commuter Rail (*29, 30*). The purpose of the two audits was generally the same: an evaluation of fare compliance issues. The specific purposes of the 2008 Hiawatha Line audit were to determine how much enforcement occurs (i.e., inspection rate) and the actual rate of fare compliance. The purposes of the 2010 Northstar Audit were to verify the accuracy of the ridership counts and assess the fare compliance.

The outline of the 2008 audit report for the Hiawatha Line offers a good idea of the process that was used and its management and policy function:

- *Introduction*—Background, purpose, scope, methodology, assurances.
- *Observations*—Fare inspection, fare compliance, fare media, handheld devices, Go-To Card data.
- *Conclusions.*
- *Recommendations*—Each recommendation is categorized by one of the following: "essential, significant, considerations, verbal recommendation."
- *Appendixes*—Statistical methods, train fare media.

Fare Compliance

Hiawatha Line—For the Hiawatha light-rail line, Metro Transit has set a "compliance goal" of 95%; in the first 5 months of 2011 operations exceeded the goal, with an average 99.3% fare compliance. Whereas most agencies report on the numbers of evaders, or fare evasion, Metro's use of the term "compliance" provides a positive slant to describing evasion.

Although the 2008 audit is somewhat dated, its findings are pertinent. The auditors found that the compliance rate for the Hiawatha Line was somewhat lower than that reported by Metro Transit police at the time (99% in 2007), ranging between 89.0% and 93.5%, depending on how one classifies riders with untagged monthly passes. Patrons using a pass fare product (College Pass, UPASS, Metro Pass, etc.) but not validating (i.e., not tapping their Go-To Card to the reader/verification device prior to boarding) are currently considered valid as these passes are still a "prepaid fare" as the current statute is interpreted, although not in compliance with agency policy for use of that type of media. The audit observed a relatively high number of Go-To Card users not validating their cards before boarding the train.

Northstar Commuter Rail—For the Northstar service, the compliance rate for January and February 2011 averaged 99.9%. The 2010 audit found a modestly lower compliance rate of 98%. The audit considered only Go-To Cards, which are considered to have higher compliance rates than the other fare media. However, the audit found that the compliance rate was lower on weekends, about 93%. Two subsequent weekend 100% saturation inspections found 100% compliance during those weekends.

Fare Inspection

Hiawatha Line—Metro Transit has set a goal of inspecting 10% of LRT customers. In 2007, the reported rate by Metro Police was 10.9%. For the January–May 2011 period, the Hiawatha Line inspection rate averaged 8.8%. However, relative to the 2011 figures, Metro reports that the inspection rate increased significantly April through December related to increased enforcement associated with baseball and football events.

The inspection rate determined in the 2008 audit was found to be somewhat lower than 10%, too. However, the audit sampling method did not include the "directed" enforcement patrols, when attention is devoted to high-risk stations and to special events when fare evasion may be known to be higher.

Northstar Commuter Rail—Metro's goal for Northstar is to inspect at least 25% of the passengers. For the January–May 2011 period, Northstar recorded an inspection rate of 30.0%.

The Metropolitan Council Audit confirmed a similar rate, finding that 30% of Go-To Card users were inspected on Northstar, 25% by police officers and 5% by conductors. On weekends, the inspection rate was found to be lower, about 14% combined.

2008 and 2010 Audit Recommendations

The two audits provide management and policymakers with useful independent confirmation of the fare compliance for the LRT and CR services. The audits provide recommendations to management; they are repeated here mainly as examples. Some recommendations from the audits are out-of-date and others have been acted on. The recommendations were as follows:

Hiawatha (2008)

1. (Significant) The council should add identifying information to U-Passes and College Passes, including the name of the valid cardholder and possibly a picture.

2. (Significant) The council should include handheld inspection terminals (HITs) machine maintenance in future supplier contracts.

3. (Significant) Use of a transfer with stored-value cards on light rail needs to be enforced more strictly.

4. (Consideration) The council should consider campaigns or incentives to encourage passengers to tag their Go-To Cards prior to boarding light rail.

Northstar (2010)

1. (Consideration) Program the TVMs to require the purchaser of group fares, such as family passes, to input the number of riders using the group fare.

2. (Consideration) Signage on board the trains should inform passengers of the fare structure and fines.

Adjudication Process

Minnesota Statute Section 609.855, "Crimes Involving Transit," identifies fare evasion as a misdemeanor and describes the various aspects of what constitutes a fare evasion offense (*31*).

Administrative arbitrators hear the initial appearance in fare evasion cases when an individual appears on a misdemeanor citation. These "hearing officers" have the authority to levy a fine if the individual admits responsibility. Alternatively, the hearing officers can dismiss the ticket if they determine circumstances warrant such action. If the case cannot be settled in this manner, then it goes to court and the person can enter a plea of not guilty and request a trial. Citations are $180 for first- and second-time offenders. Penalties can reach up to $1,000. Court costs add $11. If the case goes to court for resolution, then any revenue received is kept by the court.

During the early years of PoP enforcement, Metro Transit was concerned that the courts were being too lenient with fare evaders, in general. Management learned that the courts became more serious about upholding fines after they took a few rides with Metro Transit staff. Even so,

Metro Transit found that the juvenile courts do not treat fare evasion very seriously, with few consequences to the individual for the crime.

Special Event Operations

The Hiawatha Light Rail Line provides access to Target Field, the Metrodome, the University of Minnesota, and the Mall of America, making special event ridership high. During these high-volume times, ticket booths are open with personnel selling paper tickets. They also assist unfamiliar passengers when necessary. For Northstar, usually all fares are inspected as passengers board the train after special sports events.

Future Changes Under Way or Under Consideration

Metro Transit is considering acquisition of new handheld verification devices for its officers, ones that would be faster, more robust, and store data about frequent offenders.

NEW YORK CITY, NEW YORK—NEW YORK CITY TRANSIT (NYCT)

NYCT is an affiliate of Metropolitan Transportation Authority (MTA). The focus of this case study is NYCT's SBS. The SBS is the brand name given to NYCT's BRT services. Two SBS routes are presently operating in two arterial street corridors:

Bx12 SBS route (Fordham Road/Pelham Parkway) linking the northern part of Manhattan with the Bronx. The Bx12 was the initial SBS route, with service implemented in June 2008. Daily ridership on this service is approximately 28,000 over 27 stops. In addition to the SBS service, there is a parallel Bx12 local service. This route is shown in Figure 27.

M15 SBS route (First Avenue/Second Avenue) operating on the east side of Manhattan. This upgraded BRT service was initiated in October 2010. Approximately 34,000 average daily riders use this route over 40 stops. There is also a local M15 bus route that operates in the same corridor. The M15 SBS route is shown in Figure 28.

The branding of the SBS goes beyond its name: The buses are three-door, low-floor, articulated, and are "wrapped" in a unique design displaying "+selectbusservice." The fronts of the buses have blue lights (instead of amber) that flash on both sides of the destination sign. The SBS stops have special shelters with TVMs (locally called MetroCard Fare Collectors, or MFCs). The buses operate in exclusive bus lanes that are painted red and marked "Bus Only" on overhead gantry signs.

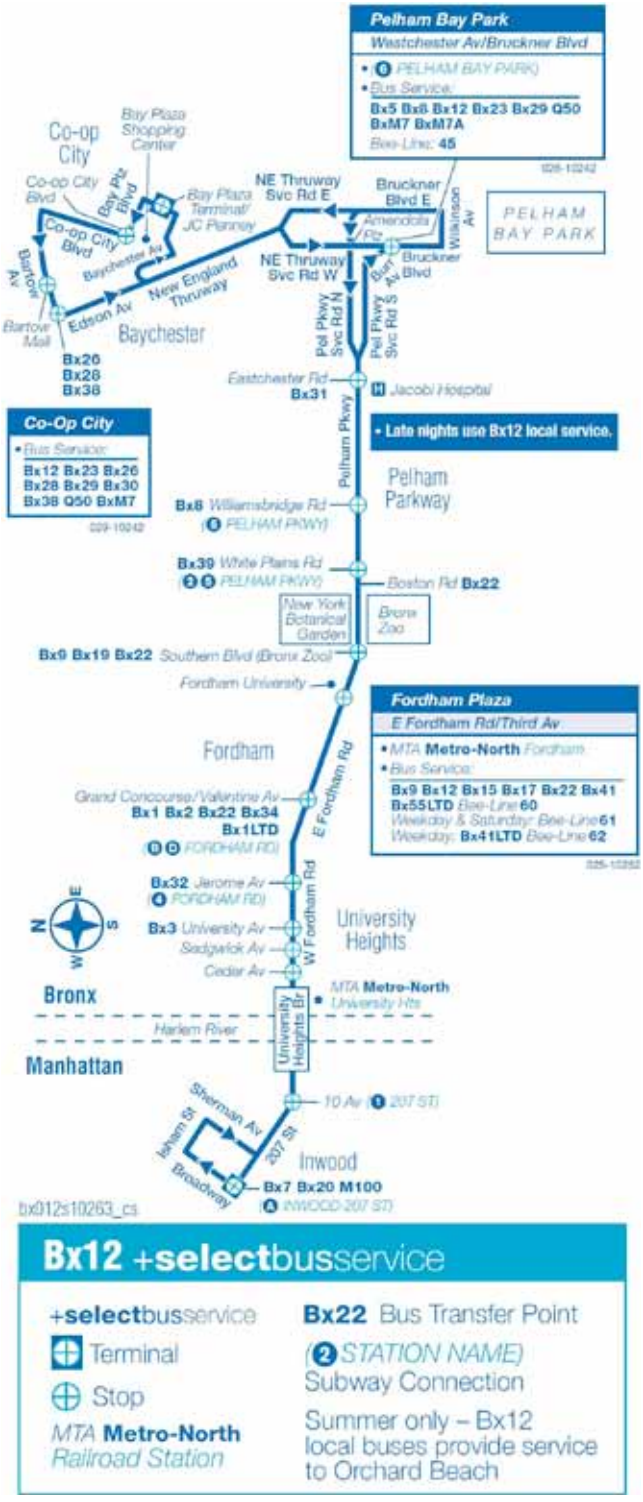

FIGURE 27 NYCT Bx12 SBS route map.

Application of Proof-of-Payment Fare Collection

A decision to use PoP for SBS routes was based on the objective of enhancing the operating speed of the service by allowing all-door boarding and eliminating the necessity of fare collection and inspection by the driver. Thus, for the Bx12 and M15 routes, boarding passengers can use all three doors of the artic-

FIGURE 28 NYCT M15 SBS route map.

ulated bus if they have valid PoP. However, passengers paying cash and needing a transfer must pass by the driver, show their PoP receipt, and request a paper transfer receipt from the driver.

For these new services, the effective use of PoP fare collection was recognized by NYCT as a key factor in determining whether the SBS routes would achieve its objectives. Also recognized were challenges presented with application of PoP and the off-board fare collection process:

PoP was a new concept for New Yorkers. The PoP fare collection process with off-board fare purchase and random inspection was a new concept for NYCT customers.

There was a mix of transit operations in the two corridors. The PoP fare collection applied to the SBS routes but not to the local routes.

All SBS riders required a printed receipt. Even riders with valid monthly or weekly MetroCards were required to approach an MFC and have a PoP receipt printed.

MetroCards and Proof-of-Payment Application

Of these challenges, the one of most concern was how to handle MetroCards because they are the medium by which fares are paid in New York City. The first MFCs that were used for SBS were engineered to read and deduct fare from MetroCards. Subway station MetroCard recharge machines (known as MetroCard Express Machines, or MEMs) were repurposed to replicate a bus farebox. Printed paper receipts were given as PoP because NYCT did not want to use handheld verification devices, which could have been stolen and private information retrieved. The result was that NYCT required that all fares be paid off-board for every ride, and that a printed receipt indicating the time and date be in the possession of the boarding passenger.

Ticket Vending Machines/MetroCard Fare Collectors

To assist with off-board fare payment, there are MFCs at each of the SBS bus stops. For the two SBS routes, there are a total of 140 MFCs, typically two at each stop. There can be up to five MFCs at the busiest stops and just one machine at the final boarding location in a particular direction. The MFCs have no utility to someone without a MetroCard. Discussed below are the two types of PoP machines:

The *MetroCard Fare Collection machine* (approximately $27,000 each) accepts MetroCards, electronic paper transfers, and single-ride tickets. It is important to note that customers with MetroCards must insert their card into the MFC, acting strictly as a validator, to acquire a PoP receipt. It takes 3 to 5 s for a MetroCard user to process the card and get a receipt. MetroCards are not sold on BRT platforms. The MFC machines use AC power and have an internal heater. Trenching 100–200 ft for power made installation of these machines challenging.

The *Coin Fare Collection (CFC) machine* (approximately $7,000 each) accepts exact fare payment in coins for full fare, reduced fare, and the half-fare student MetroCard. There is typically one CFC at each stop and a total of 72 in use. Accept-

ing coins only without change capabilities has not presented a problem because only approximately 5% of riders on SBS use cash. Those who pay cash are likely on reduced fares. These machines are solar-powered, which made installation at stops easier than for theAC-powered MFCs.

An early problem with the MFCs was caused by their not being weatherproof. Thus, shelters for the MFCs had to be constructed. The shelters caused a different set of problems during rain and snow conditions when there was often congestion among passengers trying to retrieve their PoP receipt and those waiting for the bus. These problems have been resolved as NYCT has procured new MFCs that are weatherized.

Issues with Parallel Local Routes

An SBS bus operator's duty is to drive, operate bus doors, and issue transfer receipts for cash customers. Generally, the local bus service stops near every SBS station. An unexpected situation has occurred at these joint stops. Some SBS riders will take the bus that arrives first. This situation has been resolved by NYCT having a verbal policy that the local bus service will accept PoP receipts as payment; there are about 400 cases of this each day of the 60,000-plus SBS riders.

Fare Media Used and Availability

The fare media used on the SBS routes are divided into two distinct MetroCard groups, plus a modest number of cash riders:

Approximately 50% of SBS riders use 7-day or 30-day unlimited ride MetroCards.

Approximately 43% of SBS users use a pay-per-ride (stored-value) MetroCard. These can be used to ride all subways, local buses, and express buses. An automatic free transfer is given between subway and bus or between buses within 2 h of paying a fare. There are no transfers from subway to subway or to the bus route on which a rider starts.

Cash fare payment comprises about 5% on the two SBSs, a percentage that is lower by about one-third than that for the entire NYCT bus system.

Figures 29 and 30 display two types of PoP receipts for a coin payment and for a MetroCard user, respectively.

FIGURE 29 NYCT SBS coin payment receipt.

FIGURE 30 NYCT SBS MetroCard payment receipt.

Public Information Regarding Proof-of-Payment System

Prior to beginning revenue service on the two SBS routes, extensive public information efforts were put into place. A campaign was launched to inform riders of the new off-board PoP fare collection system that would accompany the SBS routes, including the fines for evasion of fare payment.

A "show of force" was also part of the initial weeks of service. There were two facets to this "show": Partly, it was to demonstrate heavy use of inspection/enforcement personnel on the routes, and partly, it was to provide information to riders through use of "customer ambassadors" who were stationed in SBS stop platform areas. These ambassadors were used during the first 2 weeks of service to help with introduce PoP and to explain the benefits of the faster, more reliable BRT service to riders. On the Bx12 route, a third week was added when school started because a high number of students ride this route.

On the M15 line, a greater number of customer ambassadors were required because there were more SBS stops than on the Bx12 SBS line, along with differing characteristics of the corridor. It was not possible for one person to monitor both a north- and southbound stop. One thousand shifts were covered over 15 days. In contrast to the experience with the Bx12 route, riders on the M15 route expressed more resistance to the new service and the changes it brought. A primary issue was related to high passenger volumes at key stops, forcing customers to stand in queues at the MFCs and CFC machines. As riders have become more familiar with the machines, the processing times have improved and the queuing has been less of an issue.

There are ongoing efforts to provide information to riders about PoP with signs on and in the buses to alert and remind passengers that PoP is required before boarding. Plus, all the SBS MFCs are wrapped with clear instructions about how

to use PoP (in English, Spanish, and Chinese). The wraps pronounce the message in bold fashion (see Figure 31):

Speed Your Ride
PAY BEFORE YOU BOARD
Use all 3 doors to board the bus
Keep your receipt.

FIGURE 31 PoP information on NYCT MetroCard fare collectors.

FIGURE 32 NYCT "Eagle Team" fare inspectors on duty.

Fare Enforcement Function

The NYCT Department of Security manages the fare enforcement for the SBS routes. The initial request for fare enforcement assistance was to the New York City Police Department (NYPD), which declined. Next, the MTA Police Department was surveyed and also declined. In both cases, insufficient resource availability was the primary reason for declining the requests.

As a result, the NYCT Department of Security was directed to develop a plan for fare enforcement and decided to expand its successful "Eagle Team" for this purpose. This team had been assembled initially to combat graffiti vandalism and other crimes of mischief directed at transit property. The inspectors do not carry firearms and call the MTA or NYPD if help is needed. Figure 32 shows two inspectors from NYCT's Eagle Team.

NYCT's process of creating a fare inspection force was arduous and included recruiting, interviews, and background checks for each potential candidate. The new hires had to have law enforcement, security, or military experience that was consistent with the duties expected for fare inspection and enforcement. There also was an emphasis on hiring individuals who, from experience, were expected to understand how to deal with the public in situations during which summonses would be issued. Thus, the people NYCT eventually hired were experienced law enforcement personnel with good communication skills and with a demonstrated ability to de-escalate problems when they arose.

Over the first 3 years of SBS operation, NYCT found that one supervisor is required for every five inspectors. Regular daily fare inspection consists of two 8-h shifts with two "Eagle Teams" of three inspectors, one for each door. Fare inspectors can issue summonses on either the bus or sidewalk stop area as long as fare evasion was directly observed. If someone is boarding the bus without PoP, fare inspectors will typically provide assistance and educate the passenger. Fare inspectors engage an average of 3,500 to 4,500 riders per day. With the PoP concentrated on two routes, the inspectors have become familiar with many of the regular riders as well as with any trouble spots along the routes.

No summons are issued to anyone under the age of 16 years. If a minor is caught without proof of valid fare payment, then the youth is taken off the bus, sometimes police are called, and other times the parents are called.

Heavy loads are experienced on the SBS routes every day, and the inspectors have developed ways to inspect despite the crowds. One method is for the fare inspectors to remain on the bus and travel two or three stops away from the maximum load point and resume inspection as the crowding diminishes. Another technique is for the inspector to check passengers as they disembark the bus. An example of "Eagle Team" inspectors boarding a bus is shown in Figure 33.

FIGURE 33 NYCT "Eagle Team" fare inspectors boarding NYCT's SBS.

Fare Evasion

Before Studies

For purposes of measuring performance, NYCT completed special studies of fare evasion rates on the SBS routes prior to PoP implementation (*32*, *33*).

Bx12 Fare Evasion Results—About 82% of all Bx12 riders observed in June 2008 (i.e., pre-SBS implementation) paid a valid fare (accepted by farebox), and another 5% of the riders boarded under miscellaneous categories (e.g., flash pass, uniform, badge, broken farebox, dispatcher permitted boarding with no fare payment). The remaining 13% boarded under illegal circumstances, paying either a partial fare, an invalid fare, or no fare at all. This 13% fare evasion rate was found to be high compared with the bus systemwide average of 8.6%.

When disaggregating the data, it was found that about half of all Bx12 evaders were concentrated in five locations, indicating that fare evasion counts tend to be higher at certain busy locations. With regard to time of day, the highest evasion rate, approximately 18%, was observed during the peak hours of 3 p.m.–7 p.m.

M15 Fare Evasion Results—About 93% of all M15 riders observed in June 2010 (i.e., preoperation of SBS) paid a valid fare. About 0.5% of the riders boarded under miscellaneous circumstances (flash pass, uniform, badge), and the remaining 6.5% boarded under illegal circumstances, paying either a partial fare, an invalid fare, or no fare at all. Compared with the Bx12, this evasion rate was lower by one-half and also lower than the systemwide average. The highest evasion rate during the day was 8.6% and occurred in the afternoon between 1 p.m. and 4 p.m.

After Studies

In August 2010, fare evasion was studied for the Bx12 SBS route. The result showed a fare evasion rate of 6.1% as compared with the before rate of 13%, which reflects more than a 50% improvement. In spring 2011, an after study of the M15 SBS was conducted.

Fare Evasion Methodology

An approach to measuring fare evasion was developed with a 95% confidence level and an error range of ±2.6%. The approach, developed with the help of the MTA audits staff, uses a "surge" deployment of inspectors. During a surge, a team of inspectors in plainclothes boards a bus, has all doors closed, and asks to see PoP of all passengers. No summonses are issued in order not to unduly delay the bus. The fare evasion rate is then calculated by dividing the total number of passengers inspected by the number of passengers without valid PoP.

Fare Inspection and the Use of Discretion

The NYCT prepared an SOP on the "Use of Discretion When Enforcing Fare Evasion Rules on MTA NYCT Bus Routes." The philosophy underlying this SOP is to "skillfully educate the public on proper fare payment" and "get passengers into the habit of paying their fare" (*2*).

The SOP is designed to address the use of discretion and cases in which no discretion is permitted. Training includes specific, illustrative scenarios known to have been encountered by inspectors. Included is a NYCT definition of fare evasion:

Fare evasion is the act of purposely attempting to ride a New York City Transit transportation device without having paid for said ride.

Transit Adjudication Bureau

The MTA–NYCT Transit Adjudication Bureau (TAB) has existed since the 1980s with the objective to deal with graffiti, turnstile jumpers, and illegal parking near facilities. New York State Public Authorities law established TAB in Title 9—Section 1209-A (*34*). There are 10 sections that define the role of the authority; explain when default decisions can be made, the hearing process, and the appeal process; and give the bureau power to enforce civil penalties for violations of laws, rules, and regulations.

Initially, fines for fare evasion were set at a minimum of $65. With introduction of PoP in 2008, the penalty was

increased to $100 (to reflect inflation and cost of monthly pass). Fare evasion is a civil penalty. Today, TAB is the adjudication unit for summonses issued to individuals alleged to have violated NYCT's Rules of Conduct, which, for example, include fare evasion. The rules are very broad; the following is a representative list:

- Refuse to present special fare card to police officer or transit employee;
- Place one's foot on the seat of a bus, occupy more than one seat;
- Fail to pay the proper fare;
- Panhandle or beg;
- Play a radio audible to others or use amplified devices on platforms;
- Drink alcoholic beverages;
- Carry any liquid in an open container on a bus;
- Engage in unauthorized commercial activity;
- Damage bus property, including graffiti or scratchitti;
- Litter or create unsanitary conditions; and
- Smoke anywhere on NYCT property, including outdoor stations.

In 2010, 6,521 summonses and 5,516 warnings for fare evasion associated with PoP services were issued. Of those summonses, 90% were convicted and 65% to 75% of the penalties were collected. Over time, nearly all fines are recovered, because an unpaid summons restricts ability to register a vehicle or obtain a marriage license. Penalties collected are paid to the authority to the credit of a transit crime fund.

NYPD can and does issue summonses for fare evasion as well, but NYPD enforcement is primarily in the subway system.

Ancillary Benefits Arising from Proof-of-Payment

NYCT has found benefits associated with use of PoP fare collection on its SBS routes. The improved speed arising from off-board fare collection and the special traffic management features provide an operational productivity benefit, and the reduced fare evasion rate provides a revenue enhancement benefit. In addition, NYCT has found that the presence of uniformed personnel riding the buses (i.e., the fare inspectors) and their interaction with the passengers have had a substantial positive public relations effect. Furthermore, "Statistically, both the SBS Bx12 and M15 buses have become the safest, and most crime-free, bus lines in all of New York City" (*2*).

PHOENIX, ARIZONA—VALLEY METRO RAIL, INC. (METRO LIGHT RAIL)

The light rail transit operation in the Phoenix region is the responsibility of Valley Metro Rail, Inc., locally referred to as METRO Light Rail. The agency was formed in 2002 as a nonprofit public corporation and comprises five cities: Phoenix, Tempe, Mesa, Glendale, and Chandler. The METRO Board of Directors comprises a representative appointed from each of the participating cities, most often an elected official.

METRO is responsible for the development and operation of the region's high-capacity transit system and opened LRT revenue service in December 2008. At present, this initial 20-mi (32-km) line is the only service METRO operates. However, the region's Regional Transportation Plan defines a 57-mi (91.2-km) high-capacity transit system to be built by 2031. This future system contains six extensions, two of which have been adopted as LRT corridors, one to the northwest and one farther east in Mesa. There is also a modern streetcar project planned in the city of Tempe that would feed into the LRT line and would be operated by METRO.

Shown in Figure 34, the METRO Light Rail line links central Phoenix with the city's eastern side and the eastern communities of Tempe and Mesa [15 mi (24 km) are within the Phoenix and 5 mi (8 km) are within Tempe and Mesa]. Among the major activity centers served are the Central Avenue employment and business corridor, downtown Phoenix, US Airways Center, Bank One Ballpark, Sky Harbor Airport [which is a little over a 1.0-mi (1.6-km) shuttle bus ride from METRO], and the Arizona State University campus in Tempe. The line carried 12.6 million riders in 2010, an increase of 11% over its initial year of service in 2009. The average weekday ridership in 2010 was 39,335; on Saturdays and Sundays, it was 29,329 and 19,170, respectively.

Basis for Decision to Use Proof-of-Payment Fare Collection

Within the Phoenix region, the Regional Public Transportation Authority (RPTA) has the responsibility for regional public transportation services and for maintaining the Transit Life Cycle Program. Under this program, the RPTA is charged with administering the fund of regional sales tax monies approved in 2004 for public transportation purposes. The RPTA board serves as a unifying umbrella agency for transit operations and has adopted "Valley Metro" as the identity for all public transportation services in the greater Phoenix area. For example, the fare structure is a policy decision of the RPTA board, but the methods and equipment for fare collection are left to the operators.

However, the decision to use PoP for the fare collection function for the LRT line was part of the development work before there was a METRO Board of Directors. The use of PoP fare collection was decided on several years into the LRT development process and years prior to start of revenue service. No formal action was taken by any policy body. The team's decision was based on what was found to be a standard practice for new LRT systems to use PoP. The design of the fare collection system then took form from the develop-

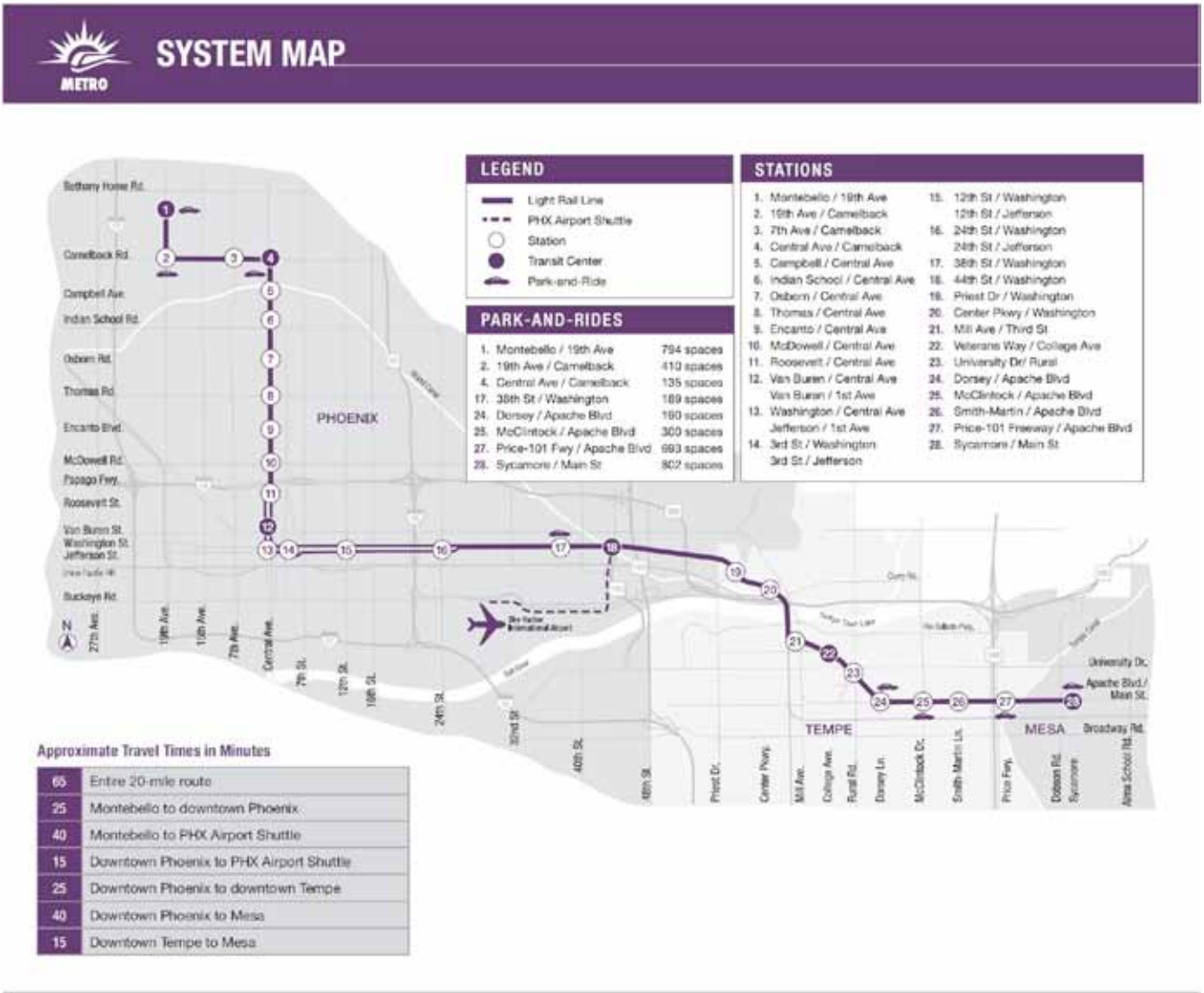

FIGURE 34 Phoenix Valley METRO Light Rail Transit route map.

ment team's visits to nearby San Diego as well as to several other western U.S. LRT operations to learn from and build on their various experiences. The development team also relied on *TCRP Report 80* for guidance.

As for fare collection system alternatives, no formal analysis was performed. The development team recognized that a significant capital cost would accompany a barrier system. It was also acknowledged that a barrier-free fare collection was "pedestrian-friendly" with Phoenix's at-grade system and with its numerous sidewalk and street median stations. The team discarded use of an on-board fare collection system because that would result in boarding delays and longer travel times.

In general, the recollections of staff who were on the development team in the late 1990s and early 2000s confirm that there was little attention to fare collection system alternatives, as PoP systems were used both in the United States and in Europe. Further, there was no significant media attention on the subject.

Fare Media Used and Availability

PoP experience on METRO Light Rail indicates that 38% of the riders primarily rely on day passes. At 18%, monthly employer-issued "platinum passes" make up the second-largest category of fare media. At 17%, 3-day passes make up the third-largest category. Single-ride and multiple-day passes in 3- and 7-day increments are also available. The Valley Metro regional system does not issue transfers. Therefore, the pricing of the all-day passes at double the one-way fare facilitates its higher usage. The system uses tickets with a magnetic stripe for all-day passes, 3-day passes, 7-day passes, and 31-day passes.

A unique feature of the process to purchase passes at TVMs is that they need to be activated prior to boarding. The

customer has the option to activate immediately or wait until another time. All-day passes and multiple-day passes can be used for both rail and bus. However, the one-ride fare is valid for a single trip on bus or light rail, not both. A single-ride ticket purchased at a TVM can be used on LRT only and is activated immediately on purchase.

In addition to tickets and passes available for purchase at the TVMs, there are monthly employer-issued platinum passes, Arizona State University (ASU)-issued U-passes, flash passes for other college students (e.g., full-time students enrolled in technical, trade, college, or graduate courses at participating schools), and Tempe-issued youth passes. The platinum passes were developed as a way to track use through an employee rideshare program. ASU U-passes are subsidized by ASU Parking and Transit Services, a self-funded auxiliary unit of the university.

Tempe-based youth ages 6–18 can obtain a free Tempe youth pass, bearing their photo. The youth pass is subsidized by the city of Tempe. For these passes, riders tap in on an orange-colored target on the TVM or on a stand-alone verification device.

There are 100 TVMs for the 28 stations and transit centers, with a minimum of two at each station entry. The machines accept bills and coins, credit and debit cards, and provide coin change.

Public Information Regarding Proof-of-Payment System

The METRO *Ride Guide* is widely available, including on the Valley METRO website, and includes information on the schedule, a map showing station locations, and details on how to use the LRT line. Prominent in these details are sections designed to inform patrons about various facets of the fare payment process, for example,

- *How to Ride*—Where to buy passes and how to activate passes.
- *Fares*—The prices of the various fare media.
- *Fare Vending Machines*—A step-by-step procedure on how to use the TVMs.
- *Proof of Payment*—An alert is noting that there is random fare inspection and that there are penalties for not possessing valid fare.

Signs alerting patrons to the need to have proof of a valid fare in their possession are apparent on station platforms and in the light rail vehicles (LRVs); most are in both English and Spanish. There are numerous signs to alert the passengers and to remind them "Valid Transit Pass Required." There are also signs specifically directed to platinum pass and U-pass riders reminding them, "Before each ride…Touch, Hold, and Go." The station platforms are designated as "paid zones," and there are signs alerting passengers that they need valid tickets to be on the platform. A platform sign reminding patrons of the need to "Tap" their card is displayed in Figure 35.

Fare Enforcement Function

Oversight Management by METRO

The enforcement function is managed by METRO's Chief of Safety/Security. Enforcement for Valley METRO is complicated because of the multijurisdictional nature of the line. METRO does not have its own transit police department and, instead, manages the function by contract with two separate organizations: enforcement within the city of Phoenix is performed by the city of Phoenix Police Transit Bureau; for the two East Valley cities, it is performed by a private contractor. In both Tempe and Mesa, the city ordinances were updated to authorize "transit enforcement aides" (employed by the contractor) to enforce fare violations. Photos of the two forces on duty inspecting fares aboard a train are shown in Figures 36 and 37.

The chief of safety/security for METRO schedules regular meetings with each of the units and then meets with the private contractor for Tempe and Mesa and the Phoenix Police Transit Bureau once a month.

METRO does not set the job descriptions for the police assistants in Phoenix. METRO established the job descriptions for the fare inspectors in the East Valley and provides

FIGURE 35 METRO public information message reminding riders to tap their pass.

FIGURE 36 Phoenix Transit Bureau Police assistant inspecting for PoP on METRO Light Rail.

FIGURE 37 Fare inspector within the East Valley cities inspecting for PoP on METRO Light Rail.

uniform written procedures to both. Each of the forces has developed fare inspection manuals to guide operations. As an example, the fare inspection manual for the private contractor includes this introduction:

> This Fare Inspection manual is intended to serve as a guide of the professional discharge of Fare Inspection duties within the Metro East Valley Light Rail. The duties of a Fare Inspector encompass all activities related to enforcement of the "The Proof of Payment Fare System" (POP) employed by the Metro Light Rail System. It is incumbent upon each Custom Protection Officer (CPO) acting as a Fare Inspector to be thoroughly familiar with these instructions, rules, procedures, and responsibilities. The Fare Inspector has responsibilities that are "pseudo law enforcement in nature". However, CPO's are never to portray or conduct themselves as law enforcement officers. (*35*)

City of Phoenix Police

In the Phoenix portion of the METRO line, fare inspection is performed by "police assistants" in the Transit Bureau of the Phoenix Police Department who are used primarily for fare enforcement and patrol of park-and-ride facilities. They do not have police powers. They wear light blue uniforms, carry pepper spray, and always perform fare inspection in groups of two, sometimes boarding opposite ends of an LRV and working toward each other. Other tactics are employed, such as "sweeping" the platforms prior to a train's arrival and inspecting fares as passengers exit trains. Sometimes a pair consists of one police assistant and one police officer. All fare enforcement personnel carry handheld verification devices and issue paper citations.

To provide additional security on the trains, police officers from the city's Transit Bureau will often ride the trains alone but normally not check for fare payment. Police assistants operate on the precinct channel consistent with their location and a shared talk channel with METRO. Fare sweeps/surges occur twice a week, during which sergeants lead individual teams of officers and police assistants to check passes on platforms before passengers board. If ridership is light, they perform a reversal during which passengers are checked as they disembark.

Private Security for the Cities of Mesa and Tempe

Within the East Valley cities of Tempe and Mesa, the inspection is performed under contract with a private security firm. If backup is required, the city of Tempe or city of Mesa Police will be called. In contrast to the Phoenix officers on the line, these officers for the East Valley cities wear white uniform shirts and are limited to fare inspection functions. They are not armed but carry pepper spray. They also use handheld verification devices shown in Figure 38. Within the city of Mesa, they issue paper citations; they use an electronic citation writer in the city of Tempe.

FIGURE 38 METRO Light Rail handheld verification device.

Fare inspection sweeps are performed randomly every week for 2 h at one station. Department of Homeland Security officers usually assist, unarmed, wearing polo shirts. A small number of warnings are issued at the beginning of the ASU semester; however, the vast majority of evaders are issued citations during sweeps.

City Codes Provide Enforcement Basis

Each of the three cities is governed by a city code that allows for the enactment of a local law, or ordinance, that deals with fare enforcement.

Because the city of Phoenix fare enforcement is through its Transit Bureau, no changes were required to allow police assistants to enforce fares on METRO Light Rail. However, both the cities of Tempe and Mesa revised their city ordinances to allow fare enforcement by a private company other than their police.

Tempe, for example, has enacted an ordinance that deals solely with transit (*36*) and describes a "transit enforcement aide" (*37*) as "a paid employee of the police department or an employee of a private entity which has entered into a contract with either the police department or a transit provider on behalf of the city." In Tempe's City code Chapter 22, Article VIII on Transit, there are four sections that describe when a passenger can be removed from a transit vehicle, the

various aspects of what constitutes a fare evasion offense (civil), and authority to give citations.

Although there is no formal training program, METRO management has updated its directives to the fare enforcement supervisors to place more emphasis on customer engagement as opposed to issuing citations. This new emphasis does not alter the main objective—to maintain as close to 100% fare compliance as practical—but redirects the officer's approach to "Engage, Educate, and Enforce," tagged as the "3 Es." Thus, the inspection rate has not been altered with this revised approach and remains targeted at about 20%.

Fare Compliance and Inspection

The fare inspection rates vary on the two geographic sectors of the LRT line. The Tempe–Mesa officers averaged 14.9% in 2010; for the Phoenix police assistants, the rate was 10.9% in 2010. METRO's average inspection rate for the entire line works out to 12.4%. During this period, METRO reports that the fare evasion rate was about 1.0%, with little variation between the Phoenix and East Valley sectors. In 2010, METRO issued 3,779 citations and 11,743 warnings, which equates to a rate of 0.32 citations for every warning issued.

In October 2010, handheld verification devices (called handheld verifiers, or HHVs, by METRO) were acquired and distributed to fare enforcement personnel; an example is shown in Figure 38. The technology in the new verification devices allows magnetic-stripe fare media and platinum passes to be electronically inspected to ensure fare payment. Subsequent to the October 2010 introduction of HHVs, higher evasion rates, averaging about 5%, have been observed. Management believes that this increase in the evasion rate resulted from noncompliant rides not being identified in the handwritten logs that were previously used.

Penalties and Fines

The penalty schedule ranges from $50 to $500. There is no automatic increase in the financial penalty on a second offense; however, repeat offenders can be excluded from using the system, and the offense can graduate to a misdemeanor. Those receiving a citation can either remit payment or show up at court. METRO does not receive any revenue from the fines paid by fare evaders. In the city of Phoenix, if someone defaults on a citation, it goes to collections and the state can recover payment by garnishing the individual's tax refund check.

There is a concern on management's part that the penalty schedule for a first offense is too low in comparison with the $55 cost of a monthly pass. It is felt that the comparatively low penalty of $50 does not provide significant incentive to encourage fare payment.

Special Event Operations

METRO's LRT line provides service to Chase Field (major league baseball) and US Airways Center (indoor home to professional basketball and other special events). With regard to the latter, admission tickets sold for events held in US Airways Center can be used as valid light rail fare on the day of the event for 4 h prior to the start of the event through the end of the transit day. The center pays a fixed amount for every attendee at the event. Based on automatic passenger counters, METRO estimates that 12% to 15% of the gate uses LRT for access to the events.

In addition, special procedures used to handle crowds at sporting events at the two venues include temporary queuing barriers (shown in Figure 39) and positioning fare inspectors at the station entries to inspect for fare payment before an individual enters the station. For special event ingress, sergeants position two police officers and four police assistants on two stations to perform fare inspection. Special event egress has crush load inspections at which passengers hold up their fare media before boarding the train instead of being checked individually with HHVs.

Changes Under Way or Under Consideration

Although no significant changes are being considered for the PoP operation, some smaller projects are under way. For example, METRO is working with its TVM supplier to obtain screens that are more readable in bright sunlight.

An effort is under way by management to review the functions of fare collection within METRO. Similar to other transit organizations, there are overlapping objectives among various functions within METRO:

- Revenue production—Finance Department,
- Speed and productivity of the system—Operations Department,
- Customer service—Public Relations Department,
- Communication and marketing of the service (e.g., print media)—Marketing Department,
- Security—money processing and fare media control.

SAN FRANCISCO, CALIFORNIA—SAN FRANCISCO MUNICIPAL TRANSPORTATION AGENCY (SFMTA, MUNI)

In November 1999, San Francisco voters passed a proposition that amended the City Charter and called for the creation of SFMTA through consolidation of the city's Municipal Railway and its Department of Parking and Traffic on July 1, 2002. Although SFMTA has been in existence nearly 10 years, the city's transit system is still often referred to locally as "Muni," short for "Municipal Railway." SFMTA operates the entire surface transportation network, encompass-

FIGURE 39 METRO Light Rail special event fare inspection using temporary queuing barriers.

ing pedestrians, bicycling, transit, traffic, and parking, and is also responsible for regulating the taxi industry. SFMTA also connects with other regional transit systems, including Bay Area Rapid Transit (BART), Caltrain, AC Transit, Golden Gate Transit, and SamTrans. In 1973, the city and county of San Francisco adopted a "Transit First" policy; the formation of SFMTA was, in large measure, an effort to improve the coordination of transportation and parking.

Annual ridership on the various Muni services for its most recent fiscal year (FY 2010) was as follows:

- Electric Trolley Coach passengers — 67.0 million total
- Motor Coach — 91.6 million
- Light Rail (LRT, also locally referred to as "Muni Metro") — 42.5 million
- Historic streetcars — 7.0 million
- Cable cars — 8.0 million

This annual total of 216 million equates to about 700,000 transit trips on an average weekday—one of the highest transit utilization rates in the United States. The Muni Metro LRT network is shown in Figure 40.

Basis for Decision to Use Proof-of-Payment Fare Collection

Unlike the other transit properties surveyed in this synthesis, all of which started PoP at the same time they initiated service, SFMTA converted from what was a standard fare collection system on a rail system dating back to the early 20th century to a PoP system. This conversion took place incrementally beginning in 1993, with off-board fare payment being available at several light rail stations. At the time, PoP was not extended to its light rail lines but gradually was expanded to include all light rail lines, and now includes the entire system of motor and trolley buses (approximately 65 lines). However, it is a modified form of PoP, with front-door boarding required on most buses.

Within Muni and for the transit-riding public, there was no substantive controversy with regard to moving toward PoP. In the operating ranks, it was generally accepted, especially by the bus drivers who, as a group, did not resist diminishing their fare collection responsibility.

Complicating the PoP fare collection for SFMTA has been the transition to the Clipper smart card system. In 2010, SFMTA introduced smart card-compatible Muni Metro faregates and began the conversion of paper passes to the Clipper Card. Clipper Cards allow stored value as well as passes (e.g., a month), and can be used on other regional services such as BART, AC Transit in the East Bay, Caltrain peninsula commuter rail, and Golden Gate Transit services to Marin and Sonoma counties. By June 2011, nearly all paper monthly passes had transitioned to the Clipper Card. The Clipper Card is sold in a plastic form (currently free, but will cost $5 by 2012) and as a paper "limited use" ticket with an

FIGURE 40 SFMTA Muni Metro system map.

embedded chip (these are free). These fare media are sold at vending machines located at the eight Muni Metro light rail underground stations. In both cases, the card can be reloaded with increased value. Customers can reuse the "limited use" ticket for a 90-day period.

One of the potential operational benefits of going to PoP for the entire system was the possibility of officially allowing rear-door boarding on some of the bus routes for Clipper Card holders. From an operational view, there are two sides to the use of rear doors for boarding: The positive side is that PoP can greatly help reduce boarding times at bus stops and thus increase the speed of some of the Muni's busiest routes. Riders with a valid Clipper Card (or other form of PoP) would be allowed to use the rear doors, and they would be required to tag their card on a stanchion-mounted verification device (these devices are already operational on all doors of Muni's buses). An example of such a device is shown in Figure 41.

However, countering the positive effect on bus speed, rear-door boarding could pose additional challenges with regard to fare compliance. Over the years, a culture of rear-door boarding has developed, particularly at busy stops. SFMTA has reported that approximately half of the people boarding through the rear doors do not have valid PoP. Figure 42 provides an example of the illegal boarding taking place on one of SFMTA's buses. SFMTA is aware of this evasion issue and has posted signs on all rear doors of buses at eye level: "STOP, ENTER THROUGH FRONT DOOR ONLY." In addition, SFMTA has implemented enforcement initiatives to control the problem.

FIGURE 41 Rear-door stanchion-mounted verification device on SFMTA bus for tagging Clipper Cards.

FIGURE 42 Illegal rear-door boarding on SFMTA bus.

Fare Media

In 2009, SFMTA conducted a comprehensive survey to determine fare payment patterns throughout the system. SFMTA updated this initial study with a smaller follow-up survey in 2010, which indicated that Muni riders use monthly passes (47%) as their primary fare media. Adult "A" passes available on the Clipper Card allow use on Muni and BART, but within San Francisco only. Adult "M" and reduced-fare passes available on the Clipper Card are valid only on Muni.

The 2010 survey also found that approximately 33% of customers paid cash and received either a paper transfer/fare receipt from the operator as PoP (on buses and at light rail surface stops) or a "limited use" ticket with an embedded chip from a vending machine (at a Muni Metro subway station). During the survey, 6% of customers used the Clipper Card as either stored valued or a pass, but this number has risen substantially as the Clipper Card has replaced paper passes. As of mid-2011, SFMTA was registering approximately 300,000 Clipper "tags" on an average weekday. Other fare media include visitor passports, ticket books, city passes, and regional discounted tickets with other transit providers. The survey found that approximately 9% of customers do not possess valid PoP.

Because Muni's entire transit network uses a PoP fare collection system, all patrons must have some form of proof of having paid a fare. Muni has 41 off-board ticket TVMs, all located at the Muni Metro subway stations. Thus, the absence of off-board TVMs at surface stops (i.e., bus, streetcar, and light rail) requires all riders paying for a single ride on the surface bus and rail lines to board at the front door, pay a fare, and request a transfer/fare receipt, even if the rider does not intend to transfer to another route. In its public information, SFMTA notes that "it is not just a transfer, it is also a fare receipt."

When entering a light rail subway station, the faregates are activated by tagging with the Clipper Card. Passengers with a paper transfer/fare receipt must pass by the station agent, who will release the faregate on visual inspection of the PoP.

Public Information Regarding Proof-of-Payment System

Because PoP is a fundamental part of the Muni system, there are numerous audio and visual reminders on Muni buses, the SFMTA website, and in public information materials. For example, the web page on "POP in brief" includes a message at the top of the page that "Proof of Payment is required throughout the Muni system. Make sure you have your pass, payment card or transfer good for 90 minutes."

SFMTA's website also includes "detailed information about Proof of Payment" with a list of 13 questions:

- When do you need Proof of Payment?
- Do I need a transfer if I'm not going to transfer?
- How can POP speed up your Metro ride and everyone else's?
- What constitutes Proof of Payment?
- What does not constitute Proof of Payment?
- How and when do you get your Proof of Payment?
- How do you board a Muni vehicle on the street or at an outside Muni station, excluding West Portal Station?
- How do you enter a Muni subway station that is controlled by faregates?
- What if you lose your Proof of Payment?
- What if your Proof of Payment expires during your trip?
- How is POP policy enforced?
- What are the penalties for not having Proof of Payment?
- What do you do if you receive a Muni transit violation?

Public information signs are located at entrances to all subway and LRT surface stations, as exemplified by the sign in Figure 43.

FIGURE 43 SFMTA PoP sign at Muni Metro surface station entrance.

Fare Enforcement Function

In the initial years of PoP, the enforcement function was carried out by the San Francisco Police Department (SFPD) as part of normal policing duties.

In 1999, 6 years after the initial limited introduction of PoP, the SFMTA Board of Directors decided to transfer the fare inspection and enforcement function to the transit organization. The first step in this transition was hiring a Muni manager of the PoP function who initially visited several LRT properties and met with fare enforcement managers to craft a plan based on the experiences of these other operators.

In 2000, following a 6-week class, Muni's first class of 21 fare inspectors graduated. There have been modest organizational changes since then, and currently fare enforcement is part of the SFMTA's Security and Enforcement Division. Transit fare inspectors are primarily responsible for fare enforcement. There are currently 42 filled full-time positions, plus five supervisors, in SFMTA's FY 2011 budget. The inspectors are uniformed and have a shield displayed. They are trained to be POST-certified (Police Officers Standards and Training is a standard curriculum for police officers) but do not possess police powers and are not armed. The job description for the position is as follows:

> Under general supervision, performs a variety of duties related to the enforcement of fare policies of the Municipal Railway (MUNI) Proof of Payment Program, and to the enforcement of other applicable civil and administrative codes, and MUNI regulations and policies. (*38*)

The transition from city police officers to transit fare inspectors occurred smoothly. With in-house staff, there is now a more focused approach to curbing fare evasion and a training commitment toward more customer assistance using what Muni management refers to as a "soft" approach to fare compliance. An example management cited was having the inspectors sometimes assist people to pay by escorting them to TVMs without issuing citations.

Muni buses carry some of the heaviest crowds in the country; on average, Muni buses board nearly 70 passengers per hour systemwide, with boardings exceeding 100 passengers per hour on some routes. Under these conditions, the staff uses several inspection techniques:

- Position inspectors at doors and inspect entering passengers,
- Proceed through the vehicle as the crowd thins out, and
- "Pretend" to board the vehicle and then question exiting passengers.

Management Audit of SFMTA Proof-of-Payment Program: 2008–2009

In 2008, a management audit of SFMTA's PoP program was initiated by the city and county of San Francisco's budget analyst at the direction of the Board of Supervisors. The purpose of the audit was to evaluate the program's effectiveness and efficiency. The scope was comprehensive and included the program's "planning and evaluation; staffing and deployment; internal controls related to citations; passenger service reports, and staff incident reports; and other issues related to fare enforcement."

The 105-page audit report also included a 29-page letter with 59 specific recommendations (*39*). SFMTA's reply was 25 pages and included a point-by-point response to each recommendation. Although it is not appropriate in this study to comment on the recommendations, the nature of the audit is instructive because it reflects an outside review (in this case by an internal audit function) of PoP enforcement and administrative details normally reserved for those actively engaged in managing the PoP function.

The 59 recommendations were divided into nine categories, and each was assigned a priority:

Priority 1—immediate implementation.

Priority 2—achieve significant progress by December 31, 2009 (i.e., within 7 months).

Priority 3—longer term implementation to have a schedule for completion by June 30, 2010 (i.e., within 13 months) or be included as part of the next annual budget.

The nine categories were as follows:

1. *PoP Performance Management*—seven recommendations that broadly related to PoP program performance (e.g., developing performance objectives, calculating and communicating inspection and fare evasion rates on a monthly basis, and determining performance measures and standards).

2. *PoP Staffing Needs*—five recommendations related to achieving appropriate staffing levels and evaluating inspector productivity.

3. *Transit Fare Inspector Deployment*—eight recommendations related to improving inspector productivity, maximizing the number of inspections, and bolstering the 100% sweeps.

4. *Complaints and Complaint Handling*—five recommendations related to handling passenger service reports.

5. *Fare Inspection Safety*—eight recommendations related to enhancing the value of incident reports and revising SOPs to better ensure the safety and security of fare inspectors.

6. *Muni Response Team and Station Agents*—five recommendations related to services, staffing, and training of the SFPD Muni Response Team, Metro station agents, and SFMTA fare inspectors "to ensure appropriate and timely law enforcement practices."

7. *Fare Evasion Fine Structure*—six recommendations related to enhancing the penalties to create greater disincentive for fare evasion.

8. *Citation Processing and Collection*—eight recommendations related to seeking legislative changes and increasing the reliability of citation data.

9. *PoP on Buses*—seven recommendations related to expanding PoP to the Muni bus fleet.

In response to the 59 recommendations, SFMTA management prepared a detailed matrix indicating whether they were in agreement with each recommendation and any action being taken in response to the recommendation. One of SFMTA's significant actions was to conduct a comprehensive fare compliance study. This survey and analysis are discussed below.

Fare Compliance and Inspection: 2009 Study

Fare evasion on Muni's services has received prominent public attention. Evasion, especially rear-door boarding, is evident to anyone using many of Muni's services. Plus, as noted above, the inspection rate is rather low compared with other systems. In 2009, the local newspaper conducted an in-house study and over a 4-day period "boarded 16 different bus and light rail lines without exhibiting a monthly pass or transfer. On 27 of those rides, reporters weren't asked to show proof of payment" (*40*). During that same period in 2009, SFMTA conducted its own analysis of fare evasion using a carefully controlled sampling process covering 1,141 vehicle runs. The purpose was to learn as much as possible about fare evasion, specifically, the amount and when and where rates tended to be higher (*41*).

The survey found the observed overall systemwide fare evasion rate to be 9.5%, with an estimated statistical margin of error of ±0.3%. On a disaggregated basis, SFMTA found the differences by mode and route, time of day, day of week, amount of inspection, and loads aboard the transit vehicles shown below:

Rate	Margin of Error
Mode	
• 4.5% to 19.9% for top 10 bus routes	±0.8% to ±2.7%
• 12.0% historic streetcar	±1.6%
• 2.4% to 5.6% light rail (except T Line)	±0.8% to ±1.6%
• 15.2% T Line light rail	±2.7%
Time of Day, Day of Week	
• 6.2% weekday (morning peak)	±0.5%
• 9.5% to 9.8% weekday (midday)	±0.7%
• 10.3% weekday (afternoon peak)	±0.6%
• 14.5% weekday (evening)	±1.3%
• 12.3% weekend	±1.3%
Level of Enforcement	
• 4.7% heavy (light rail system)	±0.5%
• 10.5% light (buses and historic streetcars)	±0.3%
Vehicle Occupancy	
• 9.2% less than 50% seated loads	±0.8%
• 9.3% to 9.5% 50% to 125% of seated loads	±0.5%
• 10.5% more than 125% of seated loads	±0.9%

Based on these disaggregated data, the following general conclusions can be reached concerning Muni's fare evasion rate:

- It is more related to geographic location of the service than to the mode.
- It increases over the course of the day, and is more than double in the evening compared with the morning peak hours.
- It decreases with a greater level of enforcement.
- Higher passenger loads do not significantly contribute to an increased fare evasion rate.

The survey also investigated the types of invalid PoP; of those comprising the 9.5% evasion rate, the breakdown is as follows:

- 50%—No transfer or fare receipt (comprises 41% actually observed with no transfer or fare receipt and 9% who were presumed not to have any because they walked away and departed vehicle);
- 26%—Invalid transfer or fare receipt;
- 7%—Age-ineligible adults with a discount senior or youth pass;
- 2%—Disabled users without proper card or without valid sticker on their card;
- 1%—Counterfeit passes or transfers;
- 14%—Individuals with other invalid PoP; for example, unvalidated youth ticket (4%), wrong month's pass (2%), observed underpays (2%), other unvalidated ticket (2%), other (4%).

Fare Compliance and Inspection: 2011

Examination of weekly counts performed by inspection staff during January 2011 reflected an inspection rate of 0.75%. This rate is significantly lower than for all other North American transit properties surveyed. However, the size and complexity of the San Francisco system accounts for the difference—a 10% inspection rate, for instance, would mean approximately 70,000 inspections each day, 12.5 times what is being carried out today.

Based on January 2011 data, inspection staff found corresponding fare evasion rates (i.e., citations plus warnings) of 4.3% on Muni Metro station platforms, 3.2% on buses, and 5.1% at light rail surface stops, for an overall average of 3.9%. These figures vary significantly from the approximately 9% systemwide rate found in the comprehensive internal 2009 audit and 2010 update. The variance is due to a different sampling methodology: Whereas the 2009 audit and 2010 update covered the entire Muni service area and collected representative samples based on route ridership, time of day, day of week, and stop location, the January 2011 audits were based on data collected from specific inspector assignments. These assignments were concentrated at certain stops, routes, and times of day, and thus do not constitute a representative system sample but do reflect the conditions in which the inspectors were performing their duties.

Introduction of New Clipper Card

Introduction of the Clipper Card has brought with it the normal complications associated with this technology. For stored-value users, a key concern is that nothing is printed on the card or limited use ticket to indicate when a single-ride purchase has expired. A cash fare purchase entitles the user to unlimited rides within a 90-min period; after 90 min, customers technically could be cited if they are still riding a vehicle and are unaware that their time has expired. On the other hand, misuse of the monthly paper passes, including use of discounted senior and youth passes by age-ineligible adults and counterfeiting, is being curtailed as the Clipper Card phases out paper passes in 2011. Senior and youth Clipper Card customers are required to submit documentation to receive special Clipper Cards that entitle them to a discount.

To aid customers using the new Clipper Card, SFMTA has published several public information brochures that have been widely distributed among stations and in their information offices (two are shown in Figure 44).

Some people have attempted to avoid paying a fare by not "tagging" the card when entering a Muni vehicle. They may have some stored value on the card, but not "tagging" prevents Muni from collecting the appropriate fare.

Smart card technology also is limited by the inability of Clipper Card readers on vehicles to communicate wirelessly in real time with card databases. If customers add value online to their cards, the new value cannot be updated automatically on the card or the card readers on vehicles. The vehicles must enter the storage yard to be updated wirelessly, resulting in up to a 72-h lag before updated account balances are accurately reflected when a customer tags a card reader. Therefore, customers may not be able to use their cards after loading value online for up to 3 days. Hardwired faregates and TVMs at Muni Metro and BART stations do not have that issue. They are updated on a real-time basis and will "write" the updated stored value information on the individual's card, thereby automatically updating it.

FIGURE 44 SFMTA brochures regarding how to use the Clipper Card.

The transition from visual to electronic inspection has also affected fare inspector productivity. Fare inspectors must now approach customers and tag their cards with their reader. Particularly on crowded vehicles, this process takes longer than asking people to hold up their PoP and performing a visual check.

Fare Enforcement Policy Changes Being Considered

Based on the 2009 in-depth analysis of fare evasion, a number of management practices have been, or are being, implemented by Muni:

- *Increasing the focus of inspection to buses and historic streetcars*—From the beginning of Muni's PoP program, the light rail lines received the bulk of attention. This focus carried over when the modified PoP went into effect to include the buses and historic streetcars. Recent efforts have been geared toward increasing fare enforcement on buses and historic streetcars.
- *Increasing fare inspection on routes and at times experiencing greater fare evasion rates*—The 2009 study identified locations where fare evasion issues are substantial, and these areas are scheduled for inspection more frequently than in the past.
- *Initiating "enhanced fare enforcement" at bus stops*—During enhanced fare enforcement, up to six inspectors check on-board and alighting customers while the vehicle waits at the stop. This technique focuses on major stops but is conducted throughout the system on a random basis so that passengers can expect enforcement at any time throughout system.
- *Contemplating a program to "officially" allow rear-door boarding on certain routes*—There are four bus corridors with a combined weekday ridership of 150,000. The productivity gains with rear-door boarding would be expected to bring major cost efficiencies.
- *Implementing a multilingual outreach program to discourage fare evasion*—SFMTA has placed public advertisement displays with an attention-grabbing graphic and a message in three languages (English, Spanish, and Chinese): "When it comes to fare evasion, we've seen every trick in the book."

In addition, to aid inspection productivity, Muni has acquired handheld verification devices to allow inspectors to verify the payment status on Clipper Cards.

Self-Administered Adjudication Process

Discussed in the LA Metro case study was a California state law that took effect in 2007, referred to as California Penal Code 640 (included in Appendix C). This statute authorized

the city and county of San Francisco (and others) to adjudicate fare evasion and other minor transit violations through administrative review rather than through the court system—essentially decriminalizing the fare violations. The purpose of the new law was to improve enforcement of fare evasion and other minor transit violations, allowing SFMTA to treat such infractions like parking tickets. The implementing provisions of the law are contained in San Francisco Traffic Code Sections 7.2 and 7.3 and spell out the local legal basis for dealing with fare evasion within the city and county:

- *Section 7.2.101. Fare Evasion Regulations.* This subsection covers various aspects of fare evasion: the requirement to have PoP, what constitutes a PoP area, misuse of fare media, location, and unauthorized use of discount fares. The area of enforcement is defined as

  > …in or about any public transit station (including an outdoor high-level boarding platform or station operated by the Bay Area Rapid Transit District), streetcar, cable car, motor coach, trolley coach or public transit vehicle to evade any fare collection system or proof of payment program instituted by the Municipal Transportation Agency.

- *Section 7.2.102. Passenger Conduct Regulations.* In this subsection, the regulations cover committing various acts while on transit premises, such as playing sound equipment, smoking, willfully disturbing others, carrying an explosive, and willfully blocking the movement of others in a facility or on a vehicle.
- *Section 7.2.103. Conversing with Operating Personnel Prohibited.* Conversation with any operator of a transit vehicle, except for the purpose of procuring necessary information, is prohibited.
- *Section 7.3. Misdemeanors.* This subsection indicates that the prohibitions shall be a misdemeanor; however, the court or issuing officer can have the charge reduced to an infraction.
- *Section 7.3.1. Other Fare Evasion and Passenger Conduct Regulations.* This subsection deals with such offenses as knowingly providing false identification to a transit representative when engaged in enforcement, interfering with a turnstile or fare register, meddling with any of the transit system's facilities or structures, and duplicating fare media (*42*).

With regard to adjudication procedures, an individual with a fare citation who wants to pay the fine without contesting it can pay $75 by any of four options: by mail, in person, by phone, or on the Internet. The person has 21 calendar days to pay the fine. If the individual wants to protest the citation, the process has three levels:

Level 1—Administrative Review. A protest must be received within 21 calendar days. If the protest is denied and the individual wants to further the protest, he or she must request an administrative hearing within 21 calendar days of the denial and pay the $75 fine.

Level 2—Administrative Hearing. This hearing is normally conducted in person with an adjudication staff, but a mail review can be requested. If denied at this level, an appeal may be requested in the Superior Court within 30 days of the decision.

Level 3—San Francisco Superior Court De Novo Hearing. The request for a de novo hearing must be accompanied with a $25 filing fee (note: "de novo" means the court considers the case anew and no deference is given to the hearing officer's decision, although the SFMTA Hearing Section's files are received as evidence). The appeal can be done in person or by mail. If the appeal is upheld, then the filing fee and penalty are refunded.

Repeat offenders do not face increasing penalties. However, if someone supplies false information to a fare inspector, the fine can be up to $500. Also, in some cases, fare inspectors may issue two citations (e.g., counterfeit passes and misused senior or youth passes).

Special Event Operations

SFMTA provides special services for sporting and special events, such as the "Bay to Breakers" annual run. For San Francisco Giants baseball games at AT&T Park, there are special ticket sales personnel and queuing barriers are set up to organize fans on the sidewalk so as not to block the street, as the stations are in the street median.

SUMMARY OF CASE STUDY OPERATORS

Evasion and Inspection Aspects

Base ridership, evasion, and enforcement results related to the seven case study operators are compared in Table 38. As discussed in this chapter, the operators represent a diverse set of operating conditions and a variety of modes. Six of the seven agencies operate an LRT mode, two have BRT modes, and two have CR operations. In one case, Phoenix, its agency essentially has sole operating responsibility over one LRT route. The others have multiple services and multiple modes. For three of the entities (Buffalo, New York City, and Phoenix), PoP is applied on only a small part of the overall regional system.

Five of the operators have fare evasion goals and, except for the Dallas TRE commuter rail, the fare evasion rates experienced are within the goal. NYCT's goal, at least initially, is to achieve fare evasion rates below what it had incurred prior to implementation of BRT SBS.

Three of the agencies set inspection goals for their services: two were set at 10% (LA Metro and Minneapolis–St. Paul Metro Transit LRT), one at 20% (Phoenix METRO), and one at 25% (Minneapolis–St. Paul Metro Transit Northstar CR).

TABLE 38
CASE STUDY OPERATOR FARE EVASION AND INSPECTION STATISTICS

Operator	Modes	Annual Ridership (1,000s)	Annual Citations + Warnings	Fare Evasion Rate (%)		Number of Inspectors (FTEs)	Inspection Rate (%)	
				Goal	Actual		Goal	Actual
Niagara Frontier Transportation Authority (Buffalo)	LRT	6,216	4,526	2.00	<2.0	5	None	8.6
Dallas Area Rapid Transit	LRT	17,799	36,106	3.75%	2.6	48	None	n/a
	CR	2,469			4.3			
Los Angeles County Metropolitan Transportation Authority	BRT	7,043	84,700	2.00–5.00	0.8	300	10	16.4
	LRT	46,650			0.8			20.2
	HRT	47,900			0.8			9.0
Metro Transit (Minneapolis–St. Paul)	LRT	10,322	4,907	5.00	0.7	18	10	8.8
	CR	710			0.1		25	30.0
MTA–New York City Transit	BRT	21,200	12,037	No worse than before implementation (13.00)	6.1	42	None	7.0
METRO Light Rail (Phoenix)	LRT	12,600	3,779	None	4.0-6.0	17	20	12.4
San Francisco Municipal Transportation Agency	Bus	167,333	57,000	None	9.0	42	None	0.8
	LRT	42,447						
	Streetcar	7,002						

n/a = data not available.

TABLE 39
CASE STUDY OPERATORS: SUMMARY OF ENFORCEMENT AND ADJUDICATION ASPECTS

Operator	Adjudication Forum	Fine Amounts for Evasion, First Offense/ Maximum	Is Fare Evasion Offense Civil or Criminal?	Fine Revenue Retained by Operator (%)	Department/ Entity Responsible for Fare Enforcement	Fare Enforcement Personnel	
						Position Title	Police Powers?
Niagara Frontier Transportation Authority (Buffalo)	Niagara Transit Adjudication Bureau	$50/$280; escalates dependent on how soon paid	Civil; criminal after two or more unpaid citations	100%	NFTA Rail Operations and Transit Police	Metro fare inspectors	No
Dallas Area Rapid Transit	DART	$75/$500	Civil if paid within 30 days; Class C misdemeanor after 30 days with a court procedure	100% if paid administratively within initial 30 days; otherwise, $5 received per citation	DART Police Department	Fare enforcement officers	No
Los Angeles County Metropolitan Transportation Authority	LA Metro Transit Court*	Fine schedule not approved yet*	Civil if paid within initial 45 days; after 45 days, criminal*	0%*	Los Angeles County Sheriff Transit Services Bureau	Sheriff's deputies	Yes
						Sheriff's security assistants	No
Metro Transit (Minneapolis–St. Paul)	County court	$190/$1,000	Civil if paid; if defaults, then becomes misdemeanor; two or more offenses are misdemeanor	0%	Metro Transit Police Department	Metro Transit patrol officers	Yes
MTA–New York City Transit	MTA–NYCT Transit Adjudication Bureau	$100/$100	Civil	100%	NYCT Department of Security	Special inspectors	No

Table 39 continued on p.71

Table 39 continued from p.70

Operator	Adjudication Forum	Fine Amounts for Evasion, First Offense/ Maximum	Is Fare Evasion Offense Civil or Criminal?	Fine Revenue Retained by Operator (%)	Department/ Entity Responsible for Fare Enforcement	Fare Enforcement Personnel	
						Position Title	Police Powers?
METRO Light Rail (Phoenix)	Municipal/ county courts	$50/$500	Civil	0%	METRO Department of Safety and Security	City of Phoenix police assistants	No
						Transit enforcement aides (private)	No
San Francisco Municipal Transportation Agency	SFMTA Customer Service Center	$75/$75	Civil	100% if paid administratively through the service center	SFMTA Security and Enforcement Department	Transit fare inspectors	No

*The Transit Court is expected to be operational by end of 2011.

In comparison to the overall evasion and inspection statistics displayed in Figures 2 and 3, the case study operators generally were found to have

- A modestly higher inspection rate, on average 12.4% compared with 11.3%.
- An average fare evasion rate in the same general range, 2.2% compared with 2.7% overall.

Enforcement and Adjudication Aspects

As shown in Table 39, four of the seven case study operators administer their own court, and one operator (LA Metro) will have its own transit court by 2012.

Although there are some unique differences as to how the adjudication process works among the seven operators, there are numerous consistencies:

- All of the operators employ forces specifically designated for fare enforcement. However, each force has different titled positions for what amounts to similar functions, mainly focused on fare enforcement.
- Fare enforcement personnel with six of seven of the operators do not possess police powers.
- The first fare evasion offense is treated as a civil or administrative matter. In four of the cases, the offense becomes a misdemeanor or criminal offense in differing situations (e.g., based on whether the initial fines were paid, how fast they were paid, or how many times the person received a citation).

One of the inconsistencies was related to the penalty schedule. The fine for the first evasion offense ranges from $50 for Buffalo to $190 for Metro Transit. The maximum amount has an even larger range: $75 to $1,000.

CHAPTER FIVE

CONCLUSIONS

For purposes of confirming the state of practice of off-board PoP fare collection, three primary efforts were undertaken: a literature review including reports prepared by or for transit operators, a survey of operators using or considering use of PoP fare collection, and detailed case studies of seven operators that use PoP for one or more services within their system.

This chapter summarizes the results of these three efforts, including lessons from the literature search, findings from the survey, and some common practices presented from the case study operators. Following these summaries are recommendations for additional research.

SUMMARY: LITERATURE SEARCH

The literature search was based on five themes: experiences with implementation, BRT applications, measuring evasion, managing for PoP, and facing media attention.

With regard to implementation, the 2002 document *TCRP Report 80: A Toolkit for Self-Service, Barrier-Free Fare Collection* remains a valuable resource for any transit operator using PoP fare collection, and especially, for any operator considering its use. Although the data in the report are generally dated, most of the guidelines in the toolkit remain practical. Enforcement practices are an essential part of the PoP fare collection function and, as such, must address the role of discretion in issuing citations for fare evasion. The regular presence of uniformed officers on transit vehicles is likely to be seen by riders as the best way to provide them with a safe feeling while riding.

On the matter of BRT, PoP fare collection has been found to have application, especially when ridership numbers are high enough. Whether it will prove to be cost-effective will largely depend on the loading volumes at the BRT stops/stations and the need for boarding at the rear doors to ensure a relatively high operating speed.

The management of the fare inspection function and the control of fare evasion will significantly benefit from collection of sufficient fare evasion data to permit disaggregate analysis (i.e., by time of day, day of week, and location).

A wealth of material is available from transit operators that use PoP fare collection, such as policies and ordinances, performance reports, SOPs, manuals, audits, and special reports. These materials are generally available to other operators and provide a source of research not often available in the public forum. As a product of this study, a reference and resource base has been established within the TRB Committee on Light Rail Transit (Standing Committee AP075). The majority of resources collected in this study and listed in the bibliography have been transferred to the committee and are available on the committee's website: http://research.lctr.org/trblrt/.

Fare evasion and fare abuses make for popular headlines in the local news media. It is important for PoP operators to be proactive and have a program and strategy for dealing with the media on fare abuse issues. Such a strategy can include preparation of a regular management report that presents the data and trends related to fare evasion and a summary of enforcement efforts being undertaken.

SUMMARY: SURVEY OF PROOF-OF-PAYMENT OPERATORS

For this study, an online survey was prepared and distributed to 33 transit operators in North America. A 100% response rate was obtained. Of these operators, 30 (90.9%) employed PoP fare collection for one or more of their services in 2010–2011. Further, 29 of the 30 are either not considering any changes to PoP use (17) or are in the process of implementing PoP on more services (12). Of the three operators not using PoP, two were considering using PoP for future services.

When PoP fare collection was initiated in the late 1970s and early 1980s in North America, its application was largely limited to LRT operations. In this study's survey, the range of transit modes using PoP was found to be diverse: LRT, BRT, heavy rail transit, commuter rail, bus (non-BRT), passenger ferry, and streetcars. The survey found that the 30 properties operate 91 routes that use PoP fare collection.

The survey results are organized into nine functional areas:

1. *Organizational and Personnel Aspects of the Fare Inspection Function*—Sixty percent of PoP fare

enforcement personnel are directly employed by the transit agency, and 58% have police powers.

2. *Monitoring and Inspecting for Fare Payment*—Almost all operators (96.5%) allow warnings to be issued by inspectors when warranted, and the average number of citations issued are 3.5 more than the number of warnings. It was found that 39.0% of the operators issue more warnings than citations. The majority of agencies indicated that they are satisfied with the accuracy of their measured fare evasion rate—86.2% were either satisfied or better.

3. *Measuring Performance*—A majority of operators (62.1%) do *not* set fare evasion goals, and even more (72.4%) do *not* set inspection goals. The predominant action taken by operators to curb fare evasion spikes are special "sweep" tactics during which 100% of the riders are inspected during a specific time and at a specific location. Across all modes, the range of fare evasion rates is from 0.1% to 9.0%, with an average of 2.7% and a median of 2.2%. For inspection, the rates range from 0.4% to 30.0%, with the average at 11.3% and the median at 9.2%. Substantial fluctuations in the fare evasion rates were observed when viewed over a 12- to 14-month period; data from five operators found that in one case the highest monthly rate was 5 times the lowest rate.

4. *Legal Aspects and Adjudication*—The fine for a first fare evasion offense averages $121; for repeat offenses, the maximum averages $314. For repeat offenders, there are also nonfinancial penalties, the three main ones being that the offense escalates to a misdemeanor, a summons is issued to appear in court, or the individual is excluded from using the system for a period of time. For most operators (58.6%), the first fare evasion offense is treated as a civil penalty rather than a criminal penalty.

5. *Proof-of-Payment Fare Collection Operations*—To facilitate enforcement of fare payment, 70% of the operators designate the station platform areas as "paid zones."

6. *Fare Media and Fare Purchase Options*—All the operators accept single-ride tickets on their PoP services; less used but prominent are monthly passes (89.7%) and day passes (82.8%); 86.2% of the operators issue transfers free or for a charge.

7. *Ticket Vending Machines (TVMs)*—Almost all of the operators' TVMs issue single-ride tickets (96.6%), and the majority issue day passes (69%) and monthly passes (55.2%) as well.

8. *Smart Cards and Stored-Value Cards*—Smart cards are used by 13 of the 30 operators in either contactless (11 operators) or magnetic-stripe (2) versions. Of those with smart cards, 10 operators have cards that are reloadable (i.e., can be reloaded with additional value). For smart card fare payment verification purposes, 11 operators rely on handheld mobile devices.

9. *Transit Industry Pulse Regarding Proof-of-Payment Fare Collection*—A small majority of operators (56.3%) expressed being moderately or very satisfied with the cost-effectiveness of their PoP fare collection operation.

SUMMARY: COMMON PRACTICES FROM CASE STUDIES

From the detailed review of the PoP experiences of the seven case study operators, common experiences can be combined into practices for other operators to consider, whether they have PoP fare collection today or are considering its future use. A summary of these practices follows:

Using a customer-oriented enforcement to fare payment rather than a traditional policing approach—Phoenix METRO reported that its fare enforcement training stresses the three Es: "Engage, Educate, and Enforce." For NYCT, the philosophy is to "skillfully educate the public on proper fare payment" and "get the passengers into the habit of paying their fare." San Francisco Muni characterizes its approach as a "soft" approach to fare compliance, assisting people to pay by escorting them to TVMs without issuing citations.

Implementing an agency-administered adjudication process—Eight of the 30 PoP operators retain the adjudication process in house. Los Angeles Metro is in the process of going that route by the end of 2011. In a board report, LA Metro notes that having a transit court "benefits its customers by providing a more direct, simpler method for resolving citations issued for transit related violations…and by reducing the number of cases that are currently required to be adjudicated in the Superior Courts."

Instituting an administrative process for payment of the fare evasion penalty—Consistent with an in-house adjudication process, the same operators offer an administrative process for payment of the fare evasion penalty. A good example is DART: Its process permits a person to pay a $75 "administrative fee" within 30 days and avoid a criminal court proceeding. DART makes payment very convenient, too. The individual can pay in person at DART offices, by mail, or by using the DART store (DARTstore.org).

Creating a focused fare inspection team with nonsworn officers—Six of the seven case study operators use person-

nel for fare inspection who do not possess police powers: Buffalo Metro fare inspectors, DART fare enforcement officers, Los Angeles sheriff's security assistants, NYCT "Eagle Team" special inspectors, Phoenix police assistants and private security, and SFMTA/Muni transit fare inspectors. The two primary advantages of this approach are labor cost savings and a force dedicated to one primary purpose, fare enforcement. In each case, the inspectors are uniformed but not armed. For incidents that require police support, the inspectors have radio contact with either transit police or municipal police.

Adding smart cards to the menu of fare media available for fare payment—LA Metro, Minneapolis–St. Paul Metro, Phoenix METRO, and SFMTA have smart cards as part of their fare payment mix, and DART is in the process of adding them. Smart cards are a popular medium for fare payment but add complications to the PoP fare collection process. The primary issue for PoP is related to there being nothing printed on the card to allow visual inspection of PoP. Although NYCT's is not a smart card, NYCT handled this issue by requiring its MetroCard users to access special TVMs, insert their card, and acquire a printed receipt. Most operators provide their inspectors with handheld verification devices. Smart cards have provided a new fare evasion offense whereby a patron with a card with value on it does not "tap in" to the system to pay a fare (and have it deducted). Knowingly or not, without "tapping" the person has avoided paying a fare.

Employing PoP fare collection on BRT services—LA Metro's Orange Line and the two NYCT Select Bus Service routes have shown that PoP can beneficially work for BRT—just as it does for LRT. The daily ridership on the Orange Line is about 24,000, and both NYCT routes exceed 30,000. Use of the rear doors for passenger boarding is necessary to minimize station dwell times for those services and provide a high operating speed. However, for BRT services where station loading volumes may not be sufficient to warrant use of the rear doors in boarding, it may not be cost-effective to use PoP.

Using independent management audits as an aid in reviewing an agency's PoP experience—As part of the study, audits for two case study operators, Minneapolis–St. Paul Metro Transit and SFMTA, were reviewed. Another study, performed for LA Metro in 2007 but not called an audit, had objectives similar to those of an audit and provided a useful review of fare evasion on Metro's high-capacity routes. However, to be useful, the audit needs to provide practical and constructive assistance and not merely search for problems.

Expanding the provision of public information via the Internet and YouTube—All of the operators provided some information on their websites regarding how to pay fares and the PoP process. Several sites were fairly minimal. On the positive side, Minneapolis–St. Paul Metro Transit went a step further and had a series of short—roughly 2 min in length—YouTube videos on a range of subjects related to using the system, including fare payment.

Deploying a "show of force" on a new service using PoP fare collection—As demonstrated in Los Angeles and New York City, heavy use of inspection enforcement as a show of force can be a valuable part of educating users exposed to PoP fare collection for the first time. However, the show of force is not limited to enforcement activities. In its case study, NYCT provided an example of a customer focus on its two new BRT routes, where it placed "customer ambassadors" at BRT stops along the routes for first 2 to 3 weeks of service.

Using sweeps (also referred to as blitzes, surges, enhanced fare enforcement) to demonstrate uniformed presence on the system in a serious way—Fare-paying passengers want to see inspectors. These sweeps, randomly deployed, also send a message to evaders, keeping them guessing as to where and when a sweep may be called.

Using temporary barriers and turnstiles for crowd control at special events—Minneapolis–St. Paul Metro Transit, Phoenix METRO, and SFMTA serve major sporting venues and rely on special techniques for managing crowds, especially post event. Use of temporary barriers and turnstiles also helps with PoP fare inspection, which can be done off-board rather than on crowded trains.

SUGGESTIONS FOR ADDITIONAL RESEARCH

Based on the literature review, surveys, and case study interviews, there are various gaps in data and questions that could not be answered within the scope of this study. These gaps and questions led to areas identified for further research:

The range of loading volumes that would result in PoP fare collection being a cost-effective alternative. At what range of loading volumes at stations/stops is all-door boarding necessary to attain a high operating speed? The evaluation of the cost-effectiveness of alternative fare collection strategies and whether to implement off-board fare payment and use PoP fare collection depends on whether all-door boarding is necessary.

The relationship among the evasion rate, rates of inspection, and penalty amounts. The relationship among these three factors is unclear. How high does a financial penalty have to be set to significantly influence the evasion rate? Which is more important to curbing fare evasion, higher penalties or higher rates of inspection? What is the best balance between financial penalties and inspection rates? How much discretion is tolerable when it comes to issuing warnings, and what influence, if any, does the rate of issuing warnings have on evasion?

A manual or guidelines for statistical analysis of fare evasion. Would there be industry benefit to having a technical manual that would provide elements of a sampling method for measuring fare evasion and a common definition? Such a manual would help practitioners—most of whom are not schooled in statistics—with statistical analysis to ensure a reasonable level of accuracy (i.e., number of samples to obtain, inspection techniques, sampling approaches to ensure representativeness, levels of disaggregation, and frequency).

A transit smart card forum for PoP operators. How does the industry keep up with the rapidly changing technological aspects of smart cards? How effective are the handheld verification devices, and in what ways can they be used to be increasingly cost-effective? There is currently no forum that would facilitate ongoing communication and transfer of experiences among PoP users.

The cost-effectiveness of alternative adjudication processes. Are the local agency processes more cost-effective than the court-oriented approaches? An evaluation of alternative adjudication processes now in operation would confirm advantages and disadvantages, as well as costs and benefits. Such an evaluation would include reviewing the details of the administrative processes, the associated costs and revenue return to the operator, and the effectiveness in discouraging repeat fare evasion offenses.

The costs—capital, operating, and maintenance—of alternative off-board PoP fare collection and enforcement approaches. One of the primary data gaps uncovered in this synthesis was related to costs (i.e., the capital, operating and maintenance associated with TVMs, verification devices, and inspection forces). In addition, some transit properties are implementing fencing and gating to assist in fare enforcement. What are the added costs—as well as any cost savings—associated with these measures?

ACRONYMS

ACE Gold Line—Brand name given to a BRT line in Las Vegas

ASU—Arizona State University (Tempe, Arizona)

BART—San Francisco Bay Area Rapid Transit

Bi-State—Bi-State Development Agency (St. Louis)

BRT—Bus rapid transit

Caltrain—Commuter rail train service in the San Francisco–San Jose peninsula

CCTV—Closed-circuit television

CFC—Coin fare collection (NYCT)

CPO—Custom Protection Officer: the title of the position used for fare enforcement by the private security firm in Phoenix

CR—Commuter rail

DART—Dallas Area Rapid Transit

DFW—Dallas–Fort Worth

FEOs—Fare enforcement officers

FTE—Full-time equivalent

HHV—Handheld verifier

HIT—Handheld inspection terminals

HOV—High-occupancy vehicle

HRT—Heavy rail transit

LACTC—Los Angeles County Transit Commission

LA Metro—Los Angeles County Metropolitan Transportation Authority

LRT—Light rail transit

LRRT—Light rail rapid transit (terminology as is used in Buffalo)

LRV—Light rail vehicle

MEM—MetroCard Express Machine (NYCT SBS)

METRO, Metro—various: Los Angeles County Metropolitan Transportation Authority, Valley Metro Rail, Inc. (Phoenix), Niagara Frontier Transportation Authority (Buffalo)

METRO Rail, Metro Rail—various: Valley Metro Rail (Phoenix), Niagara Frontier Transportation Authority (Buffalo)

Metro Transit—an operating division of the Metropolitan Council (Minneapolis–St. Paul)

MFC—MetroCard Fare Collector (name for NYCT's ticket vending machine)

MPV—Mobile phone validators

MTA—Los Angeles County Metropolitan Transportation Authority, New York City Metropolitan Transportation Authority

MTS—San Diego Metropolitan Transit System; Metropolitan Transportation Services (Minneapolis–St. Paul)

Muni/MUNI—San Francisco Municipal Railway

Munis—Short name for the municipal operators in the Los Angeles region

NFTA—Niagara Frontier Transportation Authority (Buffalo)

NJT—New Jersey Transit

NYCT—New York City Transit

NYPD—New York Police Department

PoP—Proof-of-payment fare collection

POST—Police Officers Standards and Training certification program

RPTA—Regional Public Transportation Authority (Phoenix), also called Valley METRO

RTD—Regional Transit District (Denver and Sacramento)

SBS—Select Bus Service, brand name of BRT routes operated by NYCT

SCRTD—Southern California Rapid Transit District

SFMTA—San Francisco Municipal Transportation Agency

SFPD—San Francisco Police Department

SOP—Standard operating procedure

SSBF—Self-service, barrier-free fare collection

TAB—Transit Adjudication Bureau (MTA–NYCT)

TAP—Transit Access Pass smart card (LACMTA)

TAPD— Transit Authority Police Department (Buffalo)

The T—Fort Worth Transportation Authority

TRE—Trinity Railway Express (commuter rail in the Dallas–Fort Worth region)

TRiM—Ticket reading and issuing machine

TSB—Transit Service Bureau (Los Angeles County Sheriff)

TTC—Texas Transportation Code

TVM—Ticket vending machine, or also referred to as fare vending machine

UTA—Utah Transit Authority (Salt Lake City, Utah)

VTA—Santa Clara Valley Transportation Authority (San Jose, California)

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APPENDIX A

Survey Instrument

SA-27 OFF-BOARD TRANSIT FARE PAYMENT USING PROOF-OF-PAYMENT VERIFICATION

WELCOME...and THANKS!

PROJECT PURPOSE
Under the auspices of the Transportation Research Board (TRB) the Transit Cooperative Research Program (TCRP) is conducting a Synthesis of Current Practice among transit agencies in the United States and Canada now employing off-board transit fare payment using proof-of-payment. (The acronym PoP will be used to describe this form of fare collection.) The study will develop a factual understanding of the current state-of-practice for PoP fare collection. Its purpose is to make practical information available to transit operators using PoP fare collection and to those considering its use. To assist TCRP in this study, please complete the following questionnaire regarding PoP operations within your agency. Although we ask you to identify yourself in the event information requires clarification, no agency will be specifically identified in the final report without your approval.

DEADLINE FOR SUBMISSION
Deadline for returning your completed survey is Friday, January 21, 2011.

SAVING AND CONTINUING A PARTIALLY COMPLETED SURVEY
Please be aware that you will be able to continue working on your survey in segments if you wish. On the bottom of every page you will see an option - Save and continue survey later. Clicking on this will bring a box with a query for an email address. Provide the desired email address, and click on “Save and continue survey”. An email will be sent to that address with a link to the survey. Clicking on the link will bring you to the first page of the partially completed survey. You will need to scroll down the uncompleted portion. Note- During the life of the survey, you will be sent an email with a link to the uncompleted survey only one time to a particular email. That link, however, remains active throughout the survey.

COMMENTS OR QUESTIONS?
TCRP has engaged Lee Engineering to conduct this study. If you have any questions or need clarification on aspect of the survey, please feel free to contact TCRP’s consultant for the study:

Tom Larwin
619.251.0419
tlarwin@lee-eng.com

BASIC INFORMATION ABOUT YOU AND YOUR TRANSIT SYSTEM

1. Please provide your contact information

   Agency: _____

   Name: _____

   Position Title: _____

   Phone number: _____

   e-mail address: _____

2. What modes does your agency operate? (Select all that apply)

   [ ] Bus (non-BRT)

   [ ] Bus rapid transit (BRT)

   [ ] Vintage or modern streetcar

   [ ] Light rail transit (LRT)

   [ ] Commuter rail

   [ ] Heavy rail

   [ ] Passenger ferry

   [ ] Other (please specify):

3. What is your agency's experience with PoP fare collection? (Select single most appropriate answer)

   [ ] We use on one or more routes and are not considering any significant changes

   [ ] We use on one or more routes and are considering adding more routes

   [ ] We use on one or more routes but are considering/planning its elimination

   [ ] In the past we have used on one or more routes but have eliminated its use

   [ ] We have never used but are seriously considering it on one or more routes

   [ ] We have never used and are not considering its use

INFORMATION ABOUT PoP ROUTES IN YOUR SYSTEM

4. Enter the number of routes using PoP payment by mode. (Select all that apply)

   Bus (non-BRT): _____

   Bus rapid transit (BRT): _____

   Vintage or modern streetcar: _____

   Light rail transit (LRT): _____

   Commuter rail: _____

   Heavy rail: _____

   Passenger ferry: _____

   Other: _____

5. Please provide the following descriptive data about the route(s) using PoP. (Note: the term "stations" as used here is characteristic of an LRT station, for example, as distinguished from a normal bus stop.)

	Length (miles)	Stations (number)	Annual ridership (in 1,000s, as reported in last budget year)
Bus (non-BRT)			
Bus rapid transit (BRT)			
Vintage or modern streetcar			
Light rail transit (LRT)			
Commuter rail			
Heavy rail			
Passenger ferry			
Other (please specify):			

RESPONSIBILITIES FOR FARE INSPECTION

6. Who provides your agency's fare inspectors? (Select all that apply)

   [ ] Your agency

   [ ] A single city/municipality/county

   [ ] Multiple cities/municipalities/counties

   [ ] Private contractor

   [ ] Other (please specify):

7. What department in your agency is responsible for policing or security of your system?

   _____

8. Is this the same department functionally responsible for enforcement of PoP fare verification (i.e., inspection)?

   [ ] Yes

   [ ] No (indicate which department is responsible)

9. Does any other department participate in the actual enforcement of fare payment inspection?

   [ ] Yes (please identify)

   [ ] No

FARE INSPECTION CHARACTERISTICS

10. How many inspectors are used for PoP fare enforcement (i.e., full-time equivalents in your agency's budget)?

    _____

11. What is your agency's total annual budget for your fare inspection force? (in $1,000s)

    _____

12. Do your agency's fare inspectors have any level of law enforcement officer status or police powers?

    [ ] Yes (please indicate the % who do)

    [ ] No

13. What other duties do your fare inspectors have besides fare verification? (Select all that apply)

    [ ] Policing/security

    [ ] Passenger counts

    [ ] Enforce other ordinances

    [ ] Other (please describe):

    [ ] None

WAYS TO ALERT PASSENGERS THAT THEY NEED TO HAVE PROOF-OF-PAYMENT

14. Are the off-board platform areas at your stations/stops designated as 'Paid Zones' (i.e., where a passenger is required to have valid PoP)?

    [ ] Yes-all include 'Paid Zones'

    [ ] Yes-but not all include 'Paid Zones'

    [ ] No

15. If 'Yes,' and excluding special events, to inform patrons of the paid zones do you employ (select all that apply):

    [ ] Signing...if Yes, please describe

    [ ] Markings...if Yes, please describe

    [ ] Barriers (e.g., fencing, walls)

    [ ] Turnstiles

    [ ] Nothing unique

16. Are there signs on your transit vehicles to alert/warn that all passengers must have proof-of-payment?

    [ ] Yes

    [ ] No

ENFORCEMENT-AUTHORITIES

17. For your system, what provides the legal basis or authority for enforcement of fare payment?

    [ ] Federal law

    [ ] State/provincial law

    [ ] Regional/county/local ordinance

    [ ] Other (please identify):

18. Who adjudicates the citations given for fare evasion?

    [ ] Superior Court

    [ ] Municipal Court

    [ ] County Court

    [ ] Agency

    [ ] Other (please identify):

19. In administering PoP inspection does your agency use a special policy, adopted by a policy board of directors, or set of administrative procedures essentially approved by the agency General Manager/CEO? (Select all that apply)

    [ ] Adopted policy

    [ ] Administrative procedures

    [ ] Other (please describe):

20. What sets the basic parameters of the penalty schedule for fare evasion (e.g., maximum amount, type of penalty)?

    [ ] Agency policy/ordinance

    [ ] State/provincial law

    [ ] Regional/county/local ordinance

    [ ] Other (please describe):

ENFORCEMENT AND PENALTIES—Part 1

21. What are the financial penalties for fare evasion offenses (including court costs)?

	1st offense $	2nd offense $	Maximum $
Passenger had no valid form of fare payment			
Passenger had ticket...but, failed to validate			
Passenger had ticket...but was not valid for trip, or day			
Passenger had ticket...but time was expired			
Passenger had ticket...but wrong fare type			
Passenger had monthly pass...but was expired			
Passenger had stored-value card...but failed to “tap in” or swipe			
Passenger had stored-value card...but there was no value remaining			
Other...enter the answers and describe the violation in the next question			

22. In the preceding question if the violation was indicated as “other” then please describe.

    _____

ENFORCEMENT AND PENALTIES—Part 2

23. In the case where a citation is issued for a first time fare evasion offense, is the penalty considered a civil or criminal action?

	Type of Penalty
Passenger had no valid form of fare payment	
Passenger had ticket...but, failed to validate	
Passenger had ticket...but was not valid for trip, or day	
Passenger had ticket...but time was expired	
Passenger had ticket...but wrong fare type	
Passenger had monthly pass...but was expired	
Passenger had stored-value card...but failed to “tap in” or swipe	
Passenger had stored-value card...but there was no value remaining	
Other (as described in the preceding question):	

ENFORCEMENT AND PENALTIES—Part 3

24. With regard to repeat offenders are there other non-financial actions that are enforced after a certain number of offenses? (Select all that apply)

    [ ] Escalates to a misdemeanor

    [ ] Summons to appear in court

    [ ] Excluded from using the system for some period of time

    [ ] Other (please describe):

    [ ] None

25. Who receives the revenue from these fare evasion penalties? (Select all that apply)

    [ ] Courts

    [ ] State/province

    [ ] City/municipality

    [ ] Other (please identify):

    [ ] Your agency

26. How much of the fare evasion citation/fine revenue does your agency receive? (Answer one or more)

    This % of annual total citation/fine revenue: _____

    This dollar amount per citation: _____

    Other (please describe): _____

FARE EVASION FOR PoP ROUTES—Part 1

PLEASE NOTE: We understand the nature of certain sensitive data being collected. The majority of tabulations resulting from this survey will be aggregations so that specific data cannot be linked to your agency. For any deviation from this practice we will seek your approval.

27. How many annual citations for fare evasion (associated with the PoP services only) were issued (consistent with your last full budget year)?

    _____

28. Does your agency authorize your inspectors to issue warnings to fare evaders in certain situations?

    [ ] Yes, written and oral

    [ ] Yes, but oral only

    [ ] No

29. How many annual warnings for fare evasion were issued (consistent with your last full budget year)?

    _____

30. How is the count of fare evasion surveyed in your agency? (Select all that apply)

    [ ] Inspector counts

    [ ] Internal agency audit function

    [ ] Independent audits by contractor

    [ ] Periodic samples by agency staff

[ ] Periodic samples by another public entity

[ ] Automatic passenger counters

[ ] Other (please describe):

31. How satisfied are you that your fare evasion statistics represent a reasonably accurate measurement of the actual rate of evasion (i.e., the % that you report is within a range of +2% to −2% accuracy)?

[ ] Extremely satisfied

[ ] Very satisfied

[ ] Satisfied

[ ] Not satisfied

[ ] Extremely dissatisfied

FARE EVASION FOR PoP ROUTES—Part 2

32. Is a regular fare evasion performance report provided to your agency's management and/or policy board?

[ ] Yes

[ ] No

33. If 'Yes,' how often is a report made? (Select all that apply)

[ ] Monthly

[ ] Weekly

[ ] Quarterly

[ ] Annual

[ ] Other (please describe):

34. If a regular report is prepared what are the measures regarding fare evasion performance? (Select all that apply)

[ ] Number of citations Issued

[ ] Number of warnings Issued

[ ] Number of inspections

[ ] Evasion rate (evasions/rider)

[ ] Inspection rate (inspections/rider)

[ ] Other (please describe):

FARE EVASION FOR PoP ROUTES—Part 3

35. Does your agency (either management of policy board or both) have fare evasion goals or targets that, if exceeded, prompt corrective action(s)?

[ ] Yes...the % goal/target is:

[ ] No

36. What action(s) have been taken by your agency in the last year or so to reduce fare evasion? (Select all that apply)

[ ] Increased budget

[ ] Hired more inspectors

[ ] Implemented special sweep tactics

[ ] Increased overtime for inspectors

[ ] Engaged the assistance of local law enforcement agencies

[ ] Added turnstiles/gates at some stations

[ ] Added turnstiles/gates at all stations

[ ] Other (please describe):

[ ] No special actions taken

37. Does your agency use a target or goal for the number of passengers who are to be inspected on a daily basis?

[ ] Yes...a % (indicate the % used)

[ ] Yes...a number (indicate the number used)

[ ] No

38. If 'Yes,' does the %, or number, get adjusted on a regular basis based upon the measured evasion rate?

[ ] Yes...on a regular basis, daily

[ ] Yes...on a regular basis, weekly

[ ] Yes...on a regular basis, at least monthly

[ ] Yes...varies depending upon evasion rate trend

[ ] No

TYPES OF FARE MEDIA USED

39. What types of fare media are available to be used for PoP? (Select all that apply)

[ ] Single ride ticket (paper)

[ ] Round trip (paper)

[ ] Day pass (paper)

[ ] Monthly pass (paper)

[ ] Multiple day pass (paper)

[ ] Multiple ride pass (paper)

[ ] Stored-value fare card

[ ] Other (please describe):

40. What percentage of PoP riders purchase a fare by each of these media categories (please fill in a % for those types used...note: the sum cannot exceed 100%)?

_____ Single ride ticket (paper)

_____ Round trip (paper)

_____ Day pass (paper)

_____ Monthly pass (paper)

_____ Multiple day pass (paper)

_____ Multiple ride pass (paper)

_____ Stored-value fare card

_____ Other

41. Can riders on a PoP route transfer to other routes (i.e., non-PoP routes) in your system or network?

[ ] Yes...all transfers are free

[ ] Yes...however, there is a charge

[ ] Yes...however, there are differing charges depending upon route transferring to

[ ] No

FARE MEDIA PURCHASE OPTIONS

42. In what ways can fare media be purchased? (Select all that apply)

[ ] At station...ticket vending machine(s) on platform

[ ] At station...sales booth with agency personnel

[ ] At station...in third party commercial outlet

[ ] On-board transit vehicle

[ ] By U.S. mail

[ ] Via Internet

[ ] At third party outlets throughout region

[ ] Electronic Transit Funds transfer

[ ] Agency office(s)

[ ] Other

43. What percentage of PoP riders purchase their fare media from each of these sites (please enter a % for each applicable site...note: the sum cannot exceed 100%)?

_____ At station...ticket vending machine(s) on platform

_____ At station...sales booth with agency personnel

_____ At station...in third party commercial outlet

_____ On-board transit vehicle

_____ By U.S. mail

_____ Via Internet

_____ At third party outlets throughout region

_____ Electronic Transit Funds transfer

_____ Agency office(s)

_____ Other

STORED-VALUE CARDS

PLEASE NOTE: The subject of this page is stored-value cards. If your agency does NOT use them then you can skip to the next page.

44. Which kind of a stored-value card does your agency use?

[ ] Contactless...reloadable

[ ] Contactless...non-reloadable

[ ] Magnetic stripe...reloadable

[ ] Magnetic stripe...non-reloadable

45. In what ways can one of your stored-value cards be purchased? (Select all that apply)

[ ] At station...ticket vending machine(s) on platform

[ ] At station...sales booth with agency personnel

[ ] At station...in third party commercial outlet

[ ] On-board transit vehicle

[ ] By U.S. mail

[ ] Via Internet

[ ] At third party outlets throughout region

[ ] Electronic Transit Funds transfer

[ ] Agency office(s)

[ ] Other (please describe):

46. Other than information that is printed on your stored-value card when it is manufactured, is there anything printed after its purchase by your agency to indicate its value or validity (e.g., printed on it at time of purchase, or when re-loaded, or when a fare is being paid, or when going through a turnstile)?

[ ] No, there is nothing printed on the card at any time

[ ] Yes, the value remaining on the card is printed

[ ] Yes, something other than value is printed on the card at the time of purchase

47. If your agency uses stored-value cards do your transit passengers receive a printed receipt when accessing your system (i.e., on routes using PoP fare collection)?

[ ] Yes, at station on platform

[ ] Yes, on-vehicle

[ ] Yes, both at station and on-vehicle

[ ] No

48. How do riders using stored-value cards enter your transit vehicles?

[ ] Receive printed receipt on station platform

[ ] Receive printed receipt on-vehicle

[ ] 'Tap in' or swipe at a platform receptacle

[ ] 'Tap in' or swipe at an in-vehicle receptacle

[ ] Other (please describe):

49. Do riders using stored-value cards have to 'tap out' or swipe when exiting your system?

[ ] Yes

[ ] No

50. Do your fare inspectors carry handheld devices to verify fare payment for those riders using stored-value cards?

[ ] NONE carry

[ ] SOME carry

[ ] ALL carry

TICKET VENDING MACHINES (TVMs)

51. What is the total number of TVMs (ticket vending machines) in operation (i.e., on station platforms or at stops) for the routes that use PoP?

    _____

52. Does your agency require a minimum number of TVMs at any one station or stop?

    [ ] Yes, at least 1

    [ ] Yes, 2 or more

    [ ] No formal requirement, but we have at least 1 at each stop

    [ ] No formal requirement, some stops have no TVM

    [ ] No formal requirement

53. What fare media are issued by your agency's TVMs? (Select all that apply)

    [ ] Single ride

    [ ] Round trip

    [ ] Day pass

    [ ] Monthly pass

    [ ] Multiple day pass

    [ ] Multiple ride pass

    [ ] Stored value fare card—new

    [ ] Stored value fare card—reload

    [ ] Other

54. What types of transactions do your agency's TVMs handle? (Select all that apply)

    [ ] Accept coins only

    [ ] Accept bills and coins

    [ ] Accept credit cards

    [ ] Accept debit cards

    [ ] Make bill change

    [ ] Other (please describe):

SPECIAL EVENTS

55. For special events (i.e., where there are crowded, crush load conditions on your transit vehicles) what unique procedures do you add to your operation? (Select all that apply)

    [ ] Use of portable ticket issuing machine

    [ ] Temporary kiosk/ticket booth

    [ ] Temporary queuing barriers

    [ ] Temporary turnstiles

    [ ] Use of ticket sales personnel handling cash

    [ ] Allow free rides

    [ ] Other (please describe):

56. Under crush vehicle loads what special verification techniques are employed, if any? (Select all that apply)

[ ] Position inspectors at doors and inspect entering passengers

[ ] Proceed through vehicle as crowd thins out

[ ] Other (please describe):

QUESTIONS FOR SYSTEMS WHICH NO LONGER USE PoP

PLEASE NOTE: The questions on this page apply ONLY to those transit properties no longer using proof-of-payment fare collection on any of its services.
If your property uses proof-of-payment then you can SKIP to the next page.

57. Identify the mode(s) which used PoP payment? (Select all that apply)

[ ] Bus (non-BRT)

[ ] Bus rapid transit (BRT)

[ ] Vintage or modern streetcar

[ ] Light rail transit (LRT)

[ ] Commuter rail

[ ] Heavy rail

[ ] Passenger ferry

[ ] Other (please specify):

58. How many years were PoP used?

_____

59. What were the reasons that PoP was abandoned? (Rank high to low...note: not all answers have to be selected)

_____ Fare evasion rate increasing

_____ Security concerns expressed by passengers

_____ System image was suffering in the media

_____ Passenger perceptions that there was little or no enforcement

_____ Revenue loss

_____ Policy makers lost confidence in effectiveness of PoP

_____ Cost-effectiveness was eroding

_____ Passenger volumes were too high

_____ Passenger volumes were too low

OBSERVATIONS/OPINIONS REGARDING PoP

60. What is your opinion of the cost-effectiveness of PoP?

[ ] Very satisfied

[ ] Moderately satisfied

[ ] Not significantly positive nor negative

[ ] Moderately dissatisfied

[ ] Very dissatisfied

61. What is your judgment as to the riders' feelings of safety and security on those routes using PoP fare collection?

[ ] Very comfortable

[ ] Moderately comfortable

[ ] Not too comfortable nor uncomfortable

[ ] Not very comfortable

[ ] Very uncomfortable

62. In general, what has been the fare evasion % trend in the past two years?

[ ] Rising

[ ] Generally stable

[ ] Decreasing

63. Are there reports or surveys available that summarize the opinions and perceptions of PoP fare collection? (Select all that apply)

[ ] Yes...general public

[ ] Yes...riders

[ ] Yes...non-riders

[ ] Yes...operating personnel

[ ] Yes...other (please identify)

[ ] No

64. In your judgment how would you describe the public's overall feelings or perceptions of PoP fare collection?

[ ] Very positive

[ ] Moderately positive

[ ] Not significantly positive or negative

[ ] Moderately negative

[ ] Very negative

TECHNICAL REFERENCES ARE REQUESTED

For purposes of this TCRP project, and for development of a reference library that will be available through the website of TRB's Committee on Light Rail Transit, we would appreciate receiving copies of the following reference materials from your agency:

- Laws, statutes, and ordinances that provide the legal basis for fare enforcement.
- Policies and internal operating procedures for administering PoP fare enforcement.
- Technical reports, internal audits, and surveys performed by your agency (or for your agency) on the subject of PoP fare collection.

65. If you have reports and documents relevant to the subject of "off-board transit fare payment using proof-of-payment verification" are you willing to share them in order for them to be available for transit planning and operations research and development activities?

[ ] Yes...I will upload as part of this survey (see below this question)

[ ] Yes...separately from this survey I will transmit to TLarwin@lee-eng.com

[ ] Yes...feel free to contact me

[ ] No

REVIEW/PRINT YOUR RESPONSES

Thank You!

On behalf of TRB and TCRP thank you for completing this survey. We realize that answering the questions in this survey takes time, and perhaps some digging for information on your part. However, the results of your answers will be compiled with those from other transit properties into a document that will help others, as well as your agency. When complete, this Synthesis will provide the most up-to-date information on the state-of-practice in North America with regard to proof-of-payment fare collection.

We will make sure that you receive a copy of the final report. Your cooperation, and time and effort are sincerely appreciated. If you have any questions or need clarification on aspect of the survey, please feel free to contact TCRP's consultant for the study:

Tom Larwin
619.251.0419
TLarwin@lee-eng.com

APPENDIX B

Participating Agencies

Baltimore, Maryland—Maryland Mass Transit Administration

Buffalo, New York—Niagara Frontier Transportation Authority

Calgary, Alberta—Calgary Transit

Charlotte, North Carolina—Charlotte Area Transit System

Cleveland, Ohio—Greater Cleveland Regional Transit Authority

Dallas, Texas—Dallas Area Rapid Transit

Denver, Colorado—Regional Transportation District

Edmonton, Alberta—Edmonton Transit System

Eugene, Oregon—Lane Transit District

Everett, Washington—Community Transit

Honolulu, Hawaii—Honolulu DTS Rapid Transit Division

Houston, Texas—Metropolitan Transit Authority of Harris County

Las Vegas, Nevada—Regional Transit Commission of Southern Nevada

Los Angeles, California—Los Angeles County Metropolitan Transportation Authority

Memphis, Tennessee, Memphis Area Transit Authority

Minneapolis–St. Paul, Minnesota—Metro Transit

Newark, New Jersey—NJ Transit

New York City, New York—MTA–New York City Transit

Oceanside, California—North San Diego County Transit District

Ottawa, Ontario—Ottawa Regional Transit Commission

Phoenix, Arizona—METRO Light Rail

Pittsburgh, Pennsylvania—Port Authority of Allegheny County

Portland, Oregon—Tri-County Metropolitan District of Oregon

Sacramento, California—Sacramento Regional Transit District

Salt Lake City, Utah—Utah Transit Authority

San Diego, California—San Diego Metropolitan Transit System

San Francisco, California—San Francisco Municipal Transportation Agency

San Jose, California—Santa Clara Valley Transportation Authority

Seattle, Washington—Sound Transit

St. Louis, Missouri—Bi-State Development Agency

Toronto, Ontario—Toronto Transit Commission

Vancouver, British Columbia—TransLink/SkyTrain

York, Ontario—York Region Transit/Viva

APPENDIX C

Example of Statutory Provisions Concerning Fare Evasion Enforcement

CALIFORNIA PENAL CODE SECTION 640: ACTS COMMITTED IN OR ON OR TRANSIT VEHICLES AND FACILITIES

640. (a) (1) Any of the acts described in paragraphs (1) to (5), inclusive, of subdivision (b) is an infraction punishable by a fine not to exceed two hundred fifty dollars ($250) and by community service for a total time not to exceed 48 hours over a period not to exceed 30 days, during a time other than during the violator's hours of school attendance or employment. Any of the acts described in paragraphs (1) to (3), inclusive, of subdivision (c), upon a first or second violation, is an infraction punishable by a fine not to exceed two hundred fifty dollars ($250) and by community service for a total time not to exceed 48 hours over a period not to exceed 30 days, during a time other than during the violator's hours of school attendance or employment. A third or subsequent violation of any of the acts described in paragraphs (1) to (3), inclusive, of subdivision (c) is a misdemeanor punishable by a fine of not more than four hundred dollars ($400) or by imprisonment in a county jail for a period of not more than 90 days, or by both that fine and imprisonment. Any of the acts described in subdivision (d) shall be punishable by a fine of not more than four hundred dollars ($400), by imprisonment in a county jail for a period of not more than 90 days, or by both that fine and imprisonment.

(2) This section shall apply only to acts committed on or in a facility or vehicle of a public transportation system.

(b) (1) Eating or drinking in or on a system facility or vehicle in areas where those activities are prohibited by that system.

(2) Disturbing another person by loud or unreasonable noise.

(3) Smoking in or on a system facility or vehicle in areas where those activities are prohibited by that system.

(4) Expectorating upon a system facility or vehicle.

(5) Skateboarding, roller skating, bicycle riding, roller blading, or operating a motorized scooter or similar device, as defined in Section 407.5 of the Vehicle **Code** in a system facility, vehicle, or parking structure. This paragraph does not apply to an activity that is necessary for utilization of the transit facility by a bicyclist, including, but not limited to, an activity that is necessary for parking a bicycle or transporting a bicycle aboard a transit vehicle, if that activity is conducted with the permission of the transit agency in a manner that does not interfere with the safety of the bicyclist or other patrons of the transit facility.

(c) (1) Evasion of the payment of a fare of the system. For purposes of this section, fare evasion includes entering an enclosed area of a public transit facility beyond posted signs prohibiting entrance without obtaining valid fare, in addition to entering a transit vehicle without valid fare.

(2) Misuse of a transfer, pass, ticket, or token with the intent to evade the payment of a fare.

(3) (A) Unauthorized use of a discount ticket or failure to present, upon request from a transit system representative, acceptable proof of eligibility to use a discount ticket, in accordance with Section 99155 of the Public Utilities Code and posted system identification policies when entering or exiting a transit station or vehicle. Acceptable proof of eligibility must be clearly defined in the posting.

(B) In the event that an eligible discount ticket user is not in possession of acceptable proof at the time of request, any citation issued shall be held for a period of 72 hours to allow the user to produce acceptable proof. If the proof is provided, the citation shall be voided. If the proof is not produced within that time period, the citation shall be processed.

(d) (1) Willfully disturbing others on or in a system facility or vehicle by engaging in boisterous or unruly behavior.

(2) Carrying an explosive, acid, or flammable liquid in a public transit facility or vehicle.

(3) Urinating or defecating in a system facility or vehicle, except in a lavatory. However, this paragraph shall not apply to a person who cannot comply with this paragraph as a result of a disability, age, or a medical condition.

(4) Willfully blocking the free movement of another person in a system facility or vehicle. This paragraph shall not be interpreted to affect any lawful activities permitted or First Amendment rights protected under the laws of this state or applicable federal law, including, but not limited to, laws related to collective bargaining, labor relations, or labor disputes.

(5) Willfully tampering with, removing, displacing, injuring, or destroying any part of any facility or vehicle of a public transportation system.

(e) Notwithstanding subdivision (a), the City and County of San Francisco, the Los Angeles County Metropolitan Transportation Authority, the Santa Clara Valley Transportation Authority, the Sacramento Regional Transit District, Long Beach Transit, Foothill Transit, and the Alameda-Contra Costa Transit District may enact and enforce an ordinance providing that any of the acts described in subdivision (b) or (c) on or in a facility or vehicle described in subdivision (a) for which the City and County of San Francisco, the Los Angeles County Metropolitan Transportation Authority, the Santa Clara Valley Transportation Authority, the Sacramento Regional Transit District, Long Beach Transit, Foothill Transit, or the Alameda-Contra Costa Transit District has jurisdiction shall be subject only to an administrative penalty imposed and enforced in a civil proceeding. The ordinance for imposing and enforcing the administrative penalty shall be governed by Chapter 8 (commencing with Section 99580) of Part 11 of Division 10 of the Public Utilities **Code** and shall not apply to minors.

(f) For purposes of this section, a "facility or vehicle of a public transportation system" means any of the following:

(1) A facility or vehicle of a public transportation system as defined by Section 99211 of the Public Utilities **Code**.

(2) A facility of, or vehicle operated by any entity subsidized by, the Department of Transportation.

(3) A leased or rented facility or vehicle for which any of the entities described in paragraph (1) or (2) incurs costs of cleanup, repair, or replacement as a result of any of those acts.

CALIFORNIA PUBLIC UTILITIES CODE - SECTION 99580-99582: CHAPTER 8. ADMINISTRATIVE ENFORCEMENT FOR FARE EVASION AND PROHIBITED CONDUCTS

99580. (a) Pursuant to subdivision (c) of Section 640 of the Penal Code, the City and County of San Francisco and the Los Angeles County Metropolitan Transportation Authority may enact and enforce an ordinance to impose and enforce an administrative penalty for any of the acts described in subdivision (b). The ordinance shall include the provisions of this chapter and shall not apply to minors.

(b) (1) Evasion of the payment of a fare of the system.

(2) Misuse of a transfer, pass, ticket, or token with the intent to evade the payment of a fare.

(3) Playing sound equipment on or in a system facility or vehicle.

(4) Smoking, eating, or drinking in or on a system facility or vehicle in those areas where those activities are prohibited by that system.

(5) Expectorating upon a system facility or vehicle.

(6) Willfully disturbing others on or in a system facility or vehicle by engaging in boisterous or unruly behavior.

(7) Carrying an explosive or acid, flammable liquid, or toxic or hazardous material in a system facility or vehicle.

(8) Urinating or defecating in a system facility or vehicle, except in a lavatory. However, this paragraph shall not apply to a person who cannot comply with this paragraph as a result of a disability, age, or a medical condition.

(9) (A) Willfully blocking the free movement of another person in a system facility or vehicle.

(B) This paragraph shall not be interpreted to affect any lawful activities permitted or first amendment rights protected under the laws of this state or applicable federal law, including, but not limited to, laws related to collective bargaining, labor relations, or labor disputes.

(10) Skateboarding, roller skating, bicycle riding, or roller blading in a system facility, including a parking structure, or in a system vehicle. This paragraph does not apply to an activity that is necessary for utilization of a system facility by a bicyclist, including, but not limited to, an activity that is necessary for parking a bicycle or transporting a bicycle aboard a system vehicle, if that activity is conducted with the permission of the agency of the system in a manner that does not interfere with the safety of the bicyclist or other patrons of the system facility.

(11) (A) Unauthorized use of a discount ticket or failure to present, upon request from a system representative, acceptable proof of eligibility to use a discount ticket, in accordance with Section 99155, and posted system

identification policies when entering or exiting a system station or vehicle. Acceptable proof of eligibility must be clearly defined in the posting.

(B) In the event that an eligible discount ticket user is not in possession of acceptable proof at the time of request, an issued notice of fare evasion or passenger conduct violation shall be held for a period of 72 hours to allow the user to produce acceptable proof. If the proof is provided, that notice shall be voided. If the proof is not produced within that time period, that notice shall be processed.

(c) (1) The City and County of San Francisco and the Los Angeles County Metropolitan Transportation Authority may contract with a private vendor for the processing of notices of fare evasion or passenger conduct violation, and notices of delinquent fare evasion or passenger conduct violation pursuant to Section 99581.

(2) For the purpose of this chapter, "processing agency" means either of the following:

(A) The agency issuing the notice of fare evasion or passenger conduct violation and the notice of delinquent fare evasion or passenger conduct violation.

(B) The party responsible for processing the notice of fare evasion or passenger conduct violation and the notice of delinquent violation, if a contract is entered into pursuant to paragraph (1).

(3) For the purpose of this chapter, "fare evasion or passenger conduct violation penalty" includes, but is not limited to, a late payment penalty, administrative fee, fine, assessment, and costs of collection as provided for in the ordinance.

(4) All fare evasion and passenger conduct violation penalties collected by the processing agency in the City and County of San Francisco shall be deposited to the general fund of the City and County of San Francisco.

(5) All fare evasion and passenger conduct violation penalties collected by the Los Angeles County Metropolitan Transportation Authority shall be deposited in the general fund of the County of Los Angeles.

(d) (1) If a fare evasion or passenger conduct violation is observed by a person authorized to enforce the ordinance, a notice of fare evasion or passenger conduct violation shall be issued. The notice shall set forth the violation, including reference to the ordinance setting forth the administrative penalty, the date of the violation, the approximate time, and the location where the violation occurred. The notice shall include a printed statement indicating the date payment is required to be made, and the procedure for contesting the notice. The notice shall be served by personal service upon the violator. The notice, or copy of the notice, shall be considered a record kept in the ordinary course of business of the issuing agency and the processing agency, and shall be prima facie evidence of the facts contained in the notice establishing a rebuttable presumption affecting the burden of producing evidence.

(2) When a notice of fare evasion or passenger conduct violation has been served, the person issuing the notice shall file the notice with the processing agency.

(3) If a person contests a notice of fare evasion or passenger conduct violation, the issuing agency shall proceed in accordance with Section 99581.

99581. (a) For a period of 21 calendar days from the issuance to a person of the notice of fare evasion or passenger conduct violation, the person may request an initial review of the violation by the issuing agency. The request may be made by telephone, in writing, or in person. There shall be no charge for this review. If, following the initial review, the issuing agency is satisfied that the violation did not occur or that extenuating circumstances make dismissal of the administrative penalty appropriate in the interest of justice, the issuing agency shall cancel the notice. The issuing agency shall advise the processing agency, if any, of the cancellation. The issuing agency or the processing agency shall mail the results of the initial review to the person contesting the notice.

(b) If the person is dissatisfied with the results of the initial review, the person may request an administrative hearing of the violation no later than 21 calendar days following the mailing of the results of the issuing agency's initial review. The request may be made by telephone, in writing, or in person. The person requesting an administrative hearing shall deposit with the processing agency the amount due under the notice for which the administrative hearing is requested. The issuing agency shall provide a written procedure to allow a person to request an administrative hearing without payment of the amount due upon satisfactory proof of an inability to pay the amount due. Notice of this procedure shall be provided to all persons requesting an administrative hearing. An administrative hearing shall be held within 90 calendar days following the receipt of a request for an administrative

hearing, excluding time tolled pursuant to this chapter. The person requesting the hearing may request one continuance, not to exceed 21 calendar days.

(c) The administrative hearing process shall include all of the following:

(1) The person requesting a hearing shall have the choice of a hearing by mail or in person. An in-person hearing shall be conducted within the jurisdiction of the issuing agency. If an issuing agency contracts with a private vendor pursuant to paragraph (1) of subdivision (c) of Section 99580, hearings shall be held within the jurisdiction of the issuing agency.

(2) The administrative hearing shall be conducted in accordance with written procedures established by the issuing agency and approved by the governing body or chief executive officer of the issuing agency. The hearing shall provide an independent, objective, fair, and impartial review of contested violations.

(3) The administrative review shall be conducted before a hearing officer designated to conduct the review by the issuing agency's governing body or chief executive officer. In addition to any other requirements of employment, a hearing officer shall demonstrate those qualifications, training, and objectivity prescribed by the issuing agency's governing body or chief executive as are necessary and which are consistent with the duties and responsibilities set forth in this chapter. The hearing officer's continued employment, performance evaluation, compensation, and benefits shall not be directly or indirectly linked to the amount of fare evasion or passenger conduct violation penalties imposed by the hearing officer.

(4) The person who issued the notice of fare evasion or passenger conduct violation shall not be required to participate in an administrative hearing. The issuing agency shall not be required to produce any evidence other than the notice of fare evasion or passenger conduct violation. The documentation in proper form shall be prima facie evidence of the violation pursuant to paragraph (1) of subdivision (d) of Section 99580.

(5) The hearing officer's decision following the administrative hearing may be personally delivered to the person by the hearing officer or sent by first-class mail.

(6) Following a determination by the hearing officer that a person committed the violation, the hearing officer may allow payment of the fare evasion or passenger conduct penalty in installments or deferred payment if the person provides satisfactory evidence of an inability to pay the fare evasion or passenger conduct penalty in full. If authorized by the issuing agency, the hearing officer may permit the performance of community service in lieu of payment of the fare evasion or passenger conduct penalty.

99582. (a) Within 30 calendar days after the mailing or personal delivery of the decision described in subdivision (c) of Section 99581, the person may seek review by filing an appeal to be heard by the superior court where the same shall be heard de novo, except that the contents of the processing agency's file in the case shall be received in evidence. A copy of the notice of fare evasion or passenger conduct violation shall be admitted into evidence as prima facie evidence of the facts stated therein establishing a rebuttable presumption affecting the burden of producing evidence. A copy of the notice of appeal shall be served in person or by first-class mail upon the processing agency by the person filing the appeal. For purposes of computing the 30-calendar-day period, Section 1013 of the Code of Civil Procedure shall be applicable. A proceeding under this subdivision is a limited civil case.

(b) Notwithstanding any other provision of law, the fee for filing the notice of appeal shall be as provided in Section 70615 of the Government Code. The court shall request that the processing agency's file on the case be forwarded to the court, to be received within 15 calendar days of the request. The court shall notify the appellant of the appearance date by mail or personal delivery. The court shall retain the fee regardless of the outcome of the appeal. If the court finds in favor of the appellant, the amount of the filing fee shall be reimbursed to the appellant by the processing agency. Any deposit of fare evasion or passenger conduct penalty shall be refunded by the processing agency in accordance with the judgment of the court.

(c) The conduct of the appeal under this section is a subordinate judicial duty that may be performed by a commissioner and other subordinate judicial officers at the direction of the presiding judge of the court.

(d) If a notice of appeal of the processing agency's decision described in subdivision (c) of Section 99581 is not filed within the period set forth in subdivision (a), that decision shall be deemed final.

APPENDIX D

Example Performance Report

PUBLIC SAFETY MONTHLY REPORT: January, 2011

Total Crime/Civil Incidents: 1,252
Total Citations Issued: 1,031
Total Calls for Service: 193

Crimes Against Persons

1 - Felony Assault by Prisoner
1 - Simple Assault
1 - Harassment

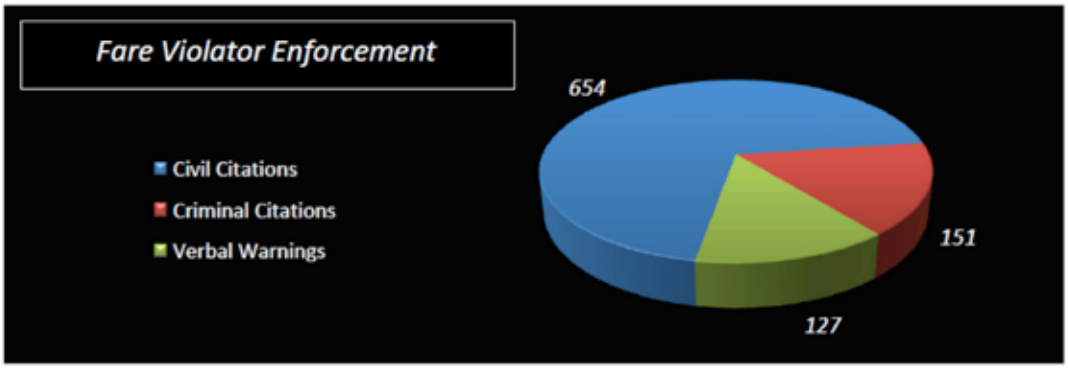
Crimes Against Property

1 - Vehicle Theft
1 - Vehicle Burglary
5 - Misdemeanor Theft
5 - Misdemeanor Criminal Mischief

Fare Enforcement Report

JANUARY	Total Ridership	Passengers Checked	Violations	Citations	Violator
TRAX	1,065,778	54,115	780	675	1.44%
BUS (MAX)	N/A	251	17	15	6.77%
FRONTRUNNER	119,098	9,918	135	115	1.36%
TOTAL	1,184,876	64,284	932	805	1.45%

Transit Officers conducted fare enforcement: **1,098** hours with 5.43% riders inspected



Top 5 Criminal Offenses

151 - Theft of Services
141 - Criminal Trespass
38 - Public Intoxication
13 - Possession Dangerous Drugs
14 - Obstruction Police

Top 5 UTA Civil Offenses

781 - Fare Violations
56 - Right of Way Hazard
21 - Parking Violations
19 - Alcohol / Tobacco Violations
17 - Unauthorized Entry (trespass)

Snapshot

On January 28, Johnny Johnson contacted our office to report that someone had posted 36 paper signs on platforms along the TRAX Line advertising a moving company. Many of the signs were Gorilla glued to TVM's costing UTA $400.00 in removal and clean up. Detective Rogers working undercover arranged to meet the owner to discuss work. The owner was arrested and booked into jail for Class "A" Criminal Mischief and Felony Possession of Forged Documents (he possessed fake Social Security cards). **Moral to the story, if you are going to vandalize UTA property do not list your personal cell phone number!**

APPENDIX E

Example of a Manual and Standard Operating Procedures (SOPs)

Fare Enforcement Manual

Effective as of
April 13, 2010

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Fare Inspection Definitions

Citation - The court approved forms used by Fare Inspectors and issued to patrons of the District who violate the Fare Policy and the Colorado Revised Statute, 18-4-802.

Controller - The designated employee on duty in Rail Control having authority over all movements on or affecting Rail alignment.

CPO - Custom Protection Officer, contracted security personnel.

Emergency - An unforeseen condition that threatens injury to passengers, employees, or the public and/or damage to equipment and property.

Fare Policy - The policy of fares to be assessed and enforced for use of the RTD Transportation System of the Regional Transportation District as established by the Board of Directors of the District.

Fare Inspector - An employee or representative appointed to conduct fare inspection and enforcement, THEFT of PUBLIC TRANSPORTATION SERVICES 18-4-802. This includes RTD Fare Inspectors, Contract Security Officers, Police Officers, Conductors, Street Supervisors/Controllers or other personnel assigned to conduct fare inspection.

Fare Inspection Sweep - A randomly scheduled fare inspection campaign, employing Fare Inspectors on trains or in stations in revenue service for a specified period of time.

Juvenile - Any patron of the RTD Transportation System who is under the age of eighteen.

LEO – Law Enforcement Officer; local, state or federal.

Service Suspension Program - A means to address disruptive activity and behavior demonstrated from passengers that frequent transit services.

Ticket Vending Machine (TVM) - A free standing ticket vending machine located on the Rail station platforms for onsite purchase of Rail tickets.

Warning Notice – a written notice that documents using a public transportation vehicle without paying the applicable fare by a passenger for later entry into the records system.

Fare Enforcement Manual

Section I: Introduction and Overview

1.1 Introduction

This Fare Enforcement Manual is a guide to the performance of Fare Enforcement duties for the Regional Transportation District. Fare Inspectors may be RTD Represented Employees, Transit Police Officers, other local Law Enforcement Officers and Contract Security Officers, Street Supervisors/Controllers, Conductors or other personnel as assigned by or contracted for by RTD. The duties of a Fare Inspector encompass all activities related to the enforcement of RTD's "Proof of Payment Fare System for Buses and Trains." Fare inspection activities are conducted in a businesslike, courteous manner being sensitive to the needs and education of RTD patrons. Fare inspection may be the initial point of contact with RTD patrons on our system; therefore, it is important to maintain a professional manner at all times. Fare inspection activity shall consistently enforce RTD policy. Fare Inspectors shall follow the guidelines and examples of proper fare, transfers and passes as written in the most recent copy the "RTD Trailblazer" Bus Operators Guide. Additional training for Fare Inspectors shall also be conducted by their primary agencies.

1.2 Overview of Proof of Payment System

The majority of weekday patrons are commuters, persons transferring to and connecting with RTD bus service and college students. In addition, weekend riders include persons attending downtown special events, shopping, entertainment and recreation. The proof of payment fare inspection program is a cost effective, user friendly system. The system is designed to accommodate the passenger loads and maintain a timely and convenient movement of ridership throughout the RTD bus and rail systems. Colorado Revised Statute 18-4-802 provides RTD the legal authority to enforce the fare inspection program:

> (1) A person commits theft of public transportation services by fare evasion if such person either occupies, rides in, or uses a public transportation vehicle without paying the applicable fare. (2) No person shall occupy, ride in, or use a public transportation vehicle without possession of proof of prior fare payment. Such proof of prior fare payment shall be presented upon demand of a fare inspector appointed or employed pursuant to subsection (4) of this section, a peace officer, or any other employee or agent of a public transportation entity. (3) Any violation of this section is a class 2 petty offense and shall be punishable by a fine not to exceed one hundred dollars. (4) (a) Public transportation entities are authorized to appoint or employ, with the power of removal, fare inspectors as may be necessary to enforce the provisions of this section.

The RTD proof of payment system fare inspection program is effective at discouraging fare evasion. A database is used to track offenders and collect fare evasion data used to evaluate the fare inspection program. This database is available 24-hours a day via the radio system. Persons receiving a citation for fare evasion may either acknowledge guilt by paying the fine or appear in court. Paying the fine acknowledges guilt to a class 2 petty offense which becomes part of the person's criminal record.

The fine schedule is designed to discourage repeat offenders. Multiple citations for fare evasion may result in suspension of transit privileges through RTD's Service Suspension Policy.

Level Citation	Scheduled Fine
1	$50.00
2	$100.00

Section II: Fare Inspection Procedures

2.1 Fare Inspection on Vehicles

At all times while on-board a vehicle, a Fare Inspector, Contract Security Officer, Conductor or other personnel assigned to conduct fare inspection activities, shall conduct fare inspection. Patrons shall be greeted courteously and treated with dignity and respect in all encounters. Every passenger's fare must be inspected on the vehicle being checked. It is vital that all patrons be treated equally. Consistency is the key to a professional fare inspection program.

On-board fare inspection shall be conducted as follows: Begin at one end of the vehicle and work through the entire length of the vehicle asking "Fare Please". Acknowledge fare produced by saying "Thank You". If a patron has either no fare or improper fare, complete a warning notice. Remain standing while completing the warning. Once you have their ID or verbal information then you will call the communications center via radio for a name check with their DOB and name. The only exception to this would be a verified Ticket Vending Machine (TVM) or validator malfunction. Some patrons will try to give you money to pay their fare. Under no circumstances will a Fare Inspector accept cash. Unvalidated coupons are the same as cash so you cannot validate or take an unvalidated coupon. Retain their ID until you are completely finished with the paperwork. Some people are reluctant to give out personal information. Your employee ID should be pointed out to the party to ease their concerns.

If they respond that they don't have an ID, try the following: "Do you have anything with your name on it? " Try to get something in writing; if that is not possible, get their information verbally. If you are taking their information verbally, ask them to spell both their first and last name, also ask them to repeat their name and DOB back to you again.

2.1.a RTD Light Rail System

The RTD Light Rail system is divided into four fare zones. Light rail fares are determined by the number of zones a passenger travels in for each one-way trip. For a map and station locations for Light Rail, (Figure 4).

2.1.b No Prior Warnings or Citations

If there are no prior warnings, then explain that the patron will receive a written warning. Tell them any information they need to know to make sure that they will have their proper fare the next time. Also inform them that if they are contacted again for fare evasion, they will be issued a citation for theft of public transportation which is a criminal offense. Return their ID and ask if they have any questions before giving them their copy of the written warning. {Note: Warnings have no expiration date in the RTD data base.}

2.1.c Prior Warnings or Citations

A prior warning results when someone has been issued a warning or been cited previously. Whenever you are notified that the passenger has a prior warning or citation, then you should issue them a citation (Figure 1). You may explain to them that they have previously received a warning or citation.

Fill out the citation quickly yet accurately and legibly. Some people will continue to ask you questions while you are filling out the citation. Tell them you will be happy to answer any questions once you have finished writing. It is very easy to make a mistake when you are giving part of your attention to answering questions. Once you are finished and have checked your work, pull out the yellow copy of the citation and hand it to the passenger along with their ID. Explain the fine, and court date.

Suggested phrasing: If you think I am wrong for citing you or if you will be unable to pay the fine, then you should go to court on "Month Day". If you do not pay the fine or appear in court, then the court will issue an arrest warrant." Explain to the patron that prepayment of the fine is the same as pleading guilty and this action will be a permanent criminal record. Ask them if they have any questions before moving on.

After you have issued them either a warning or a citation, advise them that they should deboard at the next station and purchase the proper fare.

Forged or expired RTD documents must be confiscated. Examples of items to confiscate are: forged passes, tickets, day passes, expired transfers, expired ECO Passes; expired RTD employee I.D.s including private contractors and spouse/ dependent passes. Confiscate only the sticker on any customer owned property i.e. Drivers License or Employee ID, etc. Instruct the customer to call (303)299-6000 for the reissue of an ECO pass. An Incident Report must be written for this activity with the confiscated document(s) attached.

REGIONAL TRANSPORTATION DISTRICT
THE PEOPLE OF THE STATE OF COLORADO VS:

DEFENDANT (LAST NAME) | FIRST | MIDDLE

ADDRESS

CITY AND STATE | ZIP CODE

I.D. NUMBER | TYPE | STATE | PHONE NUMBER

DOB | RACE | SEX | WGT | HGT | HAIR | EYES

SOCIAL SECURITY NUMBER | COUNTY JURISDICTION

APPROXIMATE LOCATION OF VIOLATION, STATE OF COLORADO

DATE OF VIOLATION | TIME | ☐ T

You are hereby charged with violating Section 18-4-803 (1) and/or (2) of the Colorado Revised Statutes: **Theft of public transportation services by fare evasion,** (1) failure to pay applicable fare and/or (2) failure to show proof of fare payment.

Early Payment Option
If payment is mailed within 20 calendar days of the date issued, you will receive the following fine reduction. Total Fine and Costs Due: (If paid within 20 days only)
$

Scheduled Fine
Payment must be received 3 days PRIOR to your court date or you must appear in court. Total Fine and Costs Due: (If paid after 20 days)
$

This is a Penalty Assessment Offense. You may acknowledge guilt and pay a fine and court costs in the amount shown without appearing in court and possibly paying additional fines. A payment by mail must be postmarked no later than 30 days from the date this notice was issued for the total amount due in the early payment option above. Payment after 20 days for the Scheduled fine amount may be paid up until your court date. If payment is not RECEIVED before your court date, this notice becomes a Summons requiring your appearance in court at the following time and place:

☐ Denver County Court
1437 Bannock St. Rm:108
Denver, CO. 80202

Or

☐ Clerk of Arapahoe County Court
Division A
1790 W. Littleton Blvd
Littleton, CO. 80120

On: 20 At: AM/PM

My signature is a promise to pay this penalty assessment within 20 days and receive the early payment discount. With payment, I acknowledge guilt of this charge and understand the rights I have waived as explained on the reverse side of this document.

Defendant: _____

The undersigned has probable cause to believe that the defendant committed the offense against the peace and dignity of the State of Colorado and affirms that a copy of this penalty assessment was served upon the defendant.

Fare Inspector: _____ No: _____

Print Last Name: _____ Date Issued: _____

Citation # _____

Summons and Complaint (This is a Legal Document-Read Both Sides)

Figure 1

2.2 Fare Station Checks

At all times while in a station area Fare Inspectors, Contract Security Officers, Conductors or other personnel assigned to conduct fare inspection activities, shall conduct fare inspection. These checks will be performed as assigned. The station checks will be random and performed in stations where passenger interaction is easily managed. The portable "Sandwich Board" style "Fare Check in Progress" signs will be strategically placed in the station. These give the passenger ample opportunity to produce the proper document. The Fare Station Check is both an educational and enforcement activity. All passengers must purchase proper fare before boarding the train.

2.3 Fare Sweeps

Fare sweeps are performed either at the stations or on vehicles. The information compiled is used to determine the fare evasion rate which is the number of patrons without proper fare divided by the number of patrons checked. All patrons are inspected for fare and counted. Depending on the nature of the sweep and resources available, Fare Inspectors will do written warnings during a fare sweep but may or may not conduct name checks and write citations. This instruction will be provided by the Fare Inspector Coordinator. At the end of the sweep, all information is provided to the Fare Inspector Coordinator for calculation. A minimum of two fare sweeps per week shall be performed. Special event sweeps, such as those at Invesco Field, are in addition to the two weekly sweeps.

2.4 Special Events

RTD provides services to a variety of special events. Special events may present challenges for conducting fare inspection due to the large volume of passengers moving through the system in a short period of time. Fare inspection and enforcement is conducted at all times including special event service. Special events usually require redeployment of resources to accommodate fare inspection and crowd management. Depending on the venue or event, fare inspection and enforcement instructions will be provided by the Fare Inspector Coordinator. Certain venues, such as Invesco at Mile High station, are equipped to efficiently manage fare inspection and enforcement. Temporary furnishings may be used at other venues as necessary to facilitate patron movement and fare inspection activities.

2.5 Warning Notice

The purpose of the warning notice is for documenting non-payment by a passenger. Later their information will be entered into the data records system. These two-part carbonless notices must be filled out as completely and legibly as possible (Figure 2). One copy will go to the patron and the other copy will be turned in at the completion of each day's tour of duty.

2.5.a Warning Notice for Juveniles between 10-13 years old

When contacting minors ages 10 to 13, if there is no prior warning, explain that a warning and a letter of explanation will be mailed to their parent. Also inform them that if they are contacted again for fare evasion, they will be issued a citation for theft of public transportation which is a criminal offense. If there is a prior warning, then you should issue a citation which will be mailed to their parent.

Contacting minors ages 14 to 17, all procedures for warnings or citations are the same as for adults. (See Section *2.1.c* above)

THIS IS A WARNING ONLY

LAST	FIRST	MIDDLE
ADDRESS		APT #
CITY, STATE, ZIP		
ID Type: ❑ Verbal ❑ DL ❑ Other:	ID #	ST

DOB ❑ Juvenile / /	RACE	SEX	WGT	HGT	HAIR	EYES

LOCATION	DATE / /	TIME (military)

❑ No Fare ❑ Pass ❑ Expired ❑ Transfer ❑ **Discount** ❑ Student ❑ ADA ❑ Senior ❑ **Sticker** ❑ College ❑ ECO ❑ Validation ❑ Zone	**SCC Response** ❑ No Response ❑ Negative ❑ Positive/Dates:	**Actions** Citation _____ LEVEL ❑ 1 ❑ 2 ❑ 3 ❑ 4 Suspension _____ Days

You have been found in violation of the following Colorado Statute

18-4-802 **Theft of Public Transportation services by fare evasi** person commits theft of public transportation services by fare evasi person occupies, rides in, or uses a public transportation vehicle witho the applicable fare. (2) No person shall occupy, ride in, or use transportation vehicle without possession of proof of prior fare paym proof of prior fare payment shall be presented upon demand of a fare appointed or employed pursuant to subsection (4) of this section, officer, or any other employee or agent of a public transportation enti violation of this section is a class 2 petty offense and shall be punishab not to exceed one hundred dollars **[plus court costs]**. (4) (transportation entities are authorized to appoint or employ, with the removal, fare inspectors as may be necessary to enforce the provisio section.

Print Officer Name_____ID_____

White: RTD Document Control Yellow: Patron

Work Order 378

Figure 2

2.6 Service Suspension Program

The suspension program has been formed as a means to address disruptive activity and behavior demonstrated from passengers that frequent transit services. The program serves as a system to hold passengers accountable for their actions, while promoting safe and secure transportation service for other passengers and employees. Violators are served with a "Notice of Suspension" (Figure 3). This notice describes the service suspension program; the reason for the suspension and for how long the suspension will be in effect. An RTD Transit Police Officer, any other Police Officer, Contract Security Officer, Conductor or Street Supervisor/Controller delivers to the person the "Notice of Suspension "to the violator. [Minors, 10 – 13 years old, served with a "Notice of Suspension" will have the notice mailed to their parents.] A list is formed that contains the names and dates of suspended passengers, which in turn becomes part of the data records for the fare inspection program. If the violator chooses to use the services of RTD during a period of suspension, the violator may be criminally charged with trespassing. Those served with suspensions will have the right to appeal such suspension by requesting a hearing in writing in the form of a letter addressed to the Senior Manager Security/Transit Police Chief within 10 days after receiving the notice of suspension. Colorado Revised Statutes 16-2.5-146, 18-4-802, 18-9-114, 18-9-115, 18-9-116 and 18-9-118 provides RTD the legal authority to enforce the service suspension program. The service suspension program is an RTD Board adopted program.

2.7 Suspension Criteria

The suspension periods, for **identified** violators, may be determined on a case-by-case basis but will generally follow the following criteria:

1. RTD transit policy violations and/or fare evasion:
   First Offense - Warning Notice
   Second Offense – Issue Citation
   Third Offense – Issue Citation and 30-day suspension
   Continued Offenses - Issue Citation and 90 days to 1 year suspension

2. Part II crimes that result in arrest or criminal citation such as vandalism, or disorderly conduct, etc.
   First Offense – 90-day suspension
   Second Offense – 90 days to 1 year
   Third Offense – 1 year or permanent

3. Part I Crimes resulting in arrest – (crimes against person) such as assault.
   First Offense – 1 year suspension
   Second Offense - Permanent

(If the violator is arrested for an assault on a RTD Transit employee, he/she will be permanently removed from the transportation service on the first offense).

RTD
NOTICE OF SUSPENSION

Name:_____ DOB:_____

Address:_____

This notifies you that effective immediately, **you are suspended from riding RTD vehicles and from entering any property or facility owned, operated, or maintained by RTD. Your privileges have been suspended for a period of not less than _____days from the date of receipt of this notice.** You were contacted due to your Disruptive or Illegal Conduct as follows:

_____

If you attempt to enter any RTD vehicle or facility during the period of suspension you may be cited by the local police agency or RTD may seek a Civil Protection Order against you. You may appeal this suspension in writing within 10 days to:

Senior Manager Security/
Transit Police Chief
Regional Transportation District
1600 Blake Street
Denver, CO 80202

Date:_____ Time:_____

Location of Service:_____

_____
Authorized RTD Representative or Police Officer Name & ID #

Must have incident report attached

Figure 3

2.8 Incident Report

An incident report must be completed by any Fare Inspector when: The Fare Inspector encounters an unusual or emergency situation, an unruly patron issue, assists the operator at the scene of an accident, confiscates something (pass sticker, etc.) service suspension issued, or if instructed to do so.

2.9 Paperwork

At the completion of each day's tour of duty, Fare Inspectors shall allow adequate time within the assigned workday to complete any incident reports, warnings, citations or other required paperwork. All paperwork is to be submitted to the designated supervisor. All reports and logs are an integral part of the effective and efficient operation. Do them daily!

Section III: Exemption from Paying Fare

3.1 Free Transportation Exempt from Paying Fare

(1) RTD employees in regulation uniform or in civilian clothing who present an employee ID; employee spouses who present a spouse ID; retired employees presenting a retiree ID; and RTD Board members presenting a Board ID. All RTD IDs must have the current date sticker. All uniformed police, sheriff, state, federal and park officers along with firefighters will be provided free transportation. If these officers are not in uniform then a proper governmental photo ID showing their authority and badge will provide free transportation (no retirees).

a. The following list identifies "Certified" police officers under CRS 16-2.5-101 through 16-2.5-148:

i. Sheriff (Deputy Sheriff)
ii. Coroner
iii. Police Officer
iv. Southern Ute Indian Police Officer
v. Ute Mountain Indian Police Office
vi. Town Marshal (Deputy Marshal)
vii. Fire Arson Investigator
viii. Executive Director Dept. of Public Safety
ix. Director of the Office of Preparedness, Security, and Fire Safety
x. Colorado Bureau of Investigation (Director & Agents)
xi. Colorado State Patrol
xii. Port of Entry Officer
xiii. Colorado Wildlife Officer
xiv. Colorado Parks and Recreation Officer
xv. Commissioner of Agriculture
xvi. State Brand Inspector
xvii. Executive Director of Department of Revenue
xviii. Auto Industry Investigator
xix. Director of the Division of Gaming (Gaming Investigator)
xx. Liquor Enforcement Investigator
xxi. State Lottery Investigator

xxii. Director of Racing Events (Investigators)
xxiii. Colorado Attorney General (Deputy Attorney Generals)
xxiv. Attorney General Criminal Investigator
xxv. Peace Officer Standards and Training Director
xxvi. Chief Security Officer for the General Assembly

xxvii. District Attorney (Assistant District Attorneys)
xxviii. District Attorney Investigators
xxix. Department of Corrections Inspector General (Investigators)
xxx. Executive Director of Department of Corrections
xxxi. Community Parole Officer
xxxii. Adult Probation Officer
xxxiii. Juvenile Probation Officer
xxxiv. Railroad Peace Officer
xxxv. Public Utilities Commission Member
xxxvi. Colorado National Guardsman
xxxvii. Municipal Court Marshal
xxxviii. Public Transit Officer
xxxix. Federal Special Agents (FBI, USSS, ATF, ICE, DEA, FPS, FAMS)
xl. Colorado State Higher Education Police Officer (CU, CSU, DU, Auraria, etc.)

(2) All active duty members of the Army, Navy, Air Force, Marines, Coast Guard and Reserves. The must be in uniform or show Active Duty ID card; exception is the Colorado National Guardsmen (see section above).


Light Rail Map & Station Locations
Travel In
Fare
1-2 zones
Local Fare
3 zones
Express Fare
4 zones
Regional Fare
Legend
Union Station/ Lower Downtown (LoDo)/ Coors Field/16th Street Mall
Pepsi Center/ Elitch Gardens
INVESCO Field at Mile High
Auraria West Campus
Colfax at Auraria
10th/Osage
Fare Zone A
Alameda
Fare Zone B
I-25/Broadway
Louisiana/Pearl
University of Denver
Colorado
Evans
Yale
Englewood
Southmoor
Fare Zone C
Oxford/City of Sheridan
Littleton/Downtown
Littleton/Mineral
Belleview
Orchard
Arapahoe at Village Center
Dry Creek
County Line
Lincoln
Fare Zone D

Figure 4

APPENDIX F

Example of Enforcement/Inspector Job Description

VTA Valley Transportation Authority

FARE INSPECTOR

Class Code: 1150

SANTA CLARA VALLEY TRANSPORTATION AUTHORITY
Established Date: Oct 1, 1994
Revision Date: Dec 26, 2008

SALARY RANGE

$20.94 - $29.92 Hourly
$1,675.20 - $2,393.60 Biweekly
$3,629.60 - $5,186.13 Monthly
$43,555.20 - $62,233.60 Annually

DESCRIPTION:

Definition
Under general supervision, Fare Inspectors assure customer compliance with VTA's Fare policy, rules, and regulations.

EXAMPLES OF DUTIES:

Typical Tasks
- Inspects passengers' proof of payment for validity and identifies altered fare media;
- Determines appropriate response to passengers on board VTA Light Rail without proof of payment;
- Issues written warnings and citations as authorized;
- Provides assistance and information to the public;
- Reports observations of unusual occurrences, and safety and security incidents, effectively and efficiently using radio communication and/or electronic equipment;
- Performs passenger counts and records passenger data as required;
- Assures the safety of passengers and, in event of an emergency, provides assistance to passengers, members of the public, and VTA employees;
- Educates passengers about VTA fare media and assists passengers with ticket vending machines when needed;
- Maintains and submits records and reports of activities, observations of unusual occurrences, and safety and security incidents as required;
- Testifies in court as necessary;
- Encourages fare compliance by providing a highly visible presence;
- May provide emergency assistance to Light Rail Operators and OCC upon request;
- Identifies and reports safety hazards;
- Performs related work as required.

TYPICAL QUALIFICATIONS:

Employment Standards
Sufficient training, education, and experience to demonstrate possession of the required knowledge, skills, and abilities.
Development of the required knowledge, skills, and abilities is typically obtained through a combination of training and experience equivalent to completion of the twelfth grade, and some full-time work experience involving extensive public contact. A minimum of two years of employment with VTA is highly desirable.
Applicants who have successfully completed VTA's Light Rail Operator training will be given preference for Fare Inspector positions.
Special Requirements:
- Possession of a valid California Driver's license;
- Ability to obtain an adult First Aid and CPR certificate;
- Willingness to work weekends, holidays, and odd and unusual hours;
- Ability to take and pass a background evaluation;
- Ability to take and pass a medical examination, including drug and alcohol screening and testing.

SUPPLEMENTAL INFORMATION:

Knowledge of:
- VTA bus and light rail system;
- Principles and practices of public relations and customer service;
- Light Rail vehicle safety and right-of-way safety practices.

Ability to:

Abbreviations and acronyms used without definitions in TRB publications:

AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI–NA	Airports Council International–North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	Air Transport Association
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HMCRP	Hazardous Materials Cooperative Research Program
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
PHMSA	Pipeline and Hazardous Materials Safety Administration
RITA	Research and Innovative Technology Administration
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation

TRANSPORTATION RESEARCH BOARD
500 Fifth Street, N.W.
Washington, D.C. 20001

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