SEPTA REGIONAL FARE POLICY ADVISORY GROUP

SUMMARY OF MEETING FINDINGS
ECONOMY LEAGUE OF GREATER PHILADELPHIA
JUNE 2011

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INTRODUCTION

The Southeastern Pennsylvania Transportation Authority is in the midst of transforming its fare payment systems for its bus, transit and regional rail systems. By moving to New Payment Technologies, SEPTA hopes to identify appropriate payment technologies that support new cash-less methods of fare collection, making transit more customer-friendly and cost-efficient.

Over the past two years, SEPTA engaged stakeholders and customers extensively in a discussion of the options and issues surrounding new payment technologies. Through this process, a large number of payment issues were settled through the finding of consensus among stakeholders, including:

- Eliminating paper documents and discounted tokens and replacing those instruments with new open system modes such as smart media, cell phones and chip-embedded credit cards
- Offering auto load options for smart media
- Multiple zone service to allow for tagging on and off of transit and railroad
- Encouraging payment prior to boarding for all modes
- Seamless transfers between the railroad and other parts of the SEPTA system
- Maintaining cash options for all services, with expectations for reduced use over time as smart and electronic media takes hold

Despite this progress, a number of issues regarding the use of new payment technologies on the regional rail system remained to be determined, including:

ABOUT THE ECONOMY LEAGUE OF GREATER PHILADELPHIA

Founded in 1909, the Economy League of Greater Philadelphia is an independent, nonpartisan, nonprofit organization committed to ensuring the region's prosperity through analysis and action. We bring together established and emerging leaders to understand the region's challenges and work toward innovative solutions.

- Railroad fare collection options and equipment
- Deployment of a gated barrier system in Center City Philadelphia
- Reduction in the number of regional rail zones
- Transfer Policies

With the need to come to a conclusion on these issues, SEPTA's New Payment Technologies Group engaged the Economy League of Greater Philadelphia to facilitate a set of stakeholder meetings designed to raise questions, discuss alternatives, and identify recommendations for SEPTA management and Board to use in their decisions regarding New Payment Technology capital investments and fare policies. The Economy League's role was to work with SEPTA staff to design the meetings, facilitate the meetings of a regional stakeholder advisory group (identified and assembled by SEPTA), and to compile a final report of the findings of the advisory group. The Economy League team was led by Executive Director Steve Wray, and also included Project Manager Nick Frontino and Research Intern Dylan Hayden.

The Regional Fare Policy Advisory Group and SEPTA staff consisted of the following participants:

Participant	Representing
Stephen Buckley, Director, Policy and Planning	City of Philadelphia, Mayor's Office of Transportation and Utilities
Patricia Ellis, Transit Policy & Planning Advisor	City of Philadelphia, Mayor's Office of Transportation and Utilities
Andrew Stober, Chief of Staff	City of Philadelphia, Mayor's Office of Transportation and Utilities
Richard Brahler, Sr. Transportation Planner	Bucks County Planning Commission
Randy Waltermyer, Transportation Planner	Chester County Planning Commission
Tom Shaffer, Manager Transportation Planning	Delaware County Planning Commission
Leo Bagley, Assistant Director	Montgomery County Planning Commission
Matthew Mitchell, PhD	DVARP
Joseph Hacker, Manager, Office of Transit, Bicycle & Pedestrian Planning	DVRPC
John Dockendorf	PA Department of Transportation
Eric Bruun, PhD	University of Pennsylvania
Aissia Richardson, Chair	SEPTA Citizen Advisory Council
Phil Dawson, Chair	SEPTA Youth Advisory Council
Tom Cataldi, Aberdeen Asset Management	Greater Philadelphia Chamber of Commerce
Jeff Kneuppel, Chief Engineer	SEPTA
John McGee, Chief Officer, NPT	SEPTA
Dan Casey, Director, Revenue & Ridership	SEPTA
Dennis Hiller, Chief Officer, RRMS	SEPTA
Charlie Webb, Chief Officer of Service Planning	SEPTA
Kurt Weidenhammer, Asst. Treasurer	SEPTA
Dan Fleishman, Consultant to NPT Project	TranSystems Corp.

Two meetings of the Regional Fare Policy Advisory Group were conducted, on May 19 and June 14, 2011. Each meeting was facilitated by Steve Wray of the Economy League, with SEPTA staff providing answers to questions from the Advisory Group and providing background and requested technical information.

GOALS, PRIORITIES AND VALUES

At the first meeting of the Regional Fare Policy Advisory Group, SEPTA General Manager Joe Casey identified four goals for SEPTA in the adoption of the new payment technology:

1. Protect SEPTA revenues
2. Generate the means to repay the loan that enabled SEPTA to move forward with the project
3. Improve payment convenience for SEPTA customers
4. Make the SEPTA system easier and simpler for customers to navigate and use

With those goals from SEPTA management as a framework, the Advisory Group discussed and debated the importance and weight of four key priorities for new payment technologies:

1. Convenience/Ease of use (including marginal and infrequent passengers)
2. Uniformity and equity for riders
3. Revenues, including both cost control and revenue security
4. Ridership increase

There was general agreement that all of the priorities were important and that each needed to be considered in the final decisions on new fare policy and technologies. Ideally, any new system would be easy to use and understand, helping to increase ridership, resulting in new riders and increased revenues for SEPTA.

When asked to identify top priorities, there was general agreement among the stakeholders that of the priorities ease of use (both in reality and perception) was critical to the project, as it would both result in increased ridership and perceptions of the SEPTA system in general. The stakeholders also agreed with SEPTA management that revenue security was also critical, both for SEPTA's financial security and for public perceptions of SEPTA as a fair and well-run organization, worthy of public investment.

FARE PAYMENT OPTIONS

Over the course of the two meetings, the Regional Fare Policy Advisory Group discussed a set of potential options for deployment of new fare payment technologies on the Regional Rail System. In the following, the options, as well as the current system, are described.

Current System – Under the current Regional Rail system, riders are required to have a fare instrument (monthly or weekly pass or single-ride/daily ticket) available for visual inspection and punching (for single-use tickets) by a conductor on-board the train. Conductors are

required to visually inspect the fare instrument at each zone, and cash payment on-board is required if rider has not pre-purchased a ticket (with higher on-board fares).

Ticket Vending Machine Options – A ticket vending machine (TVM) option was considered, and detailed information on how a TVM program would work for Regional Rail was provided by Matt Mitchell (see appendix for copies of letter and table). In the TVM model, ticket machines would be made available at all 154 Regional Rail stations, and the rider would be required to purchase a ticket or capture a validation receipt (if a pass holder) prior to riding the train. Alternatively, a monthly or weekly pass could be visually inspected, similar to today's system.

There would be two options for validating fares under the TVM model presented. One would be the honor system, requiring visual inspection or even scanning on demand. The second would require manual validation at each fare zone. Ticket receipts would be time dated, and would expire after a certain time and passes would be either visually inspected or pass holders could be required to acquire a receipt. Conceivably, the vending machines could accept new fare payment media, but it is uncertain how this would work.

> Self-Service (Honor System) – Under the self-service model, ticket vending machines would be placed at all 154 Regional Rail stations, and passengers would be required to tag on and off at all stations. Fare enforcement would be on a spot-check basis, with large penalties for non-compliance. Staff has concerns about the ability to pass enforcement legislation across municipal lines. While popular around the world and very easy to use and explain, there have been concerns about abuse in urban regions, and the capital expenditure for fare machines at all stations would be high. *After some discussion, the Fare Policy Advisory Group decided that the option would be risky financially and unpopular politically, and removed it from consideration after the first meeting.*

There was a difference of opinion on the potential initial capital cost of TVM machines between SEPTA staff and DVARP. However, even accepting DVARP's lower cost estimate, the total cost of capital installation would be higher for TVM's than for the gated options. SEPTA also raised concerns about on-going operating costs associated with maintenance, vandalism and cash management with vending machines required at stations as far as 35 miles from downtown Philadelphia. DVARP countered that it could be combined with parking collections and maintenance and would not represent an undue burden.

Center City Gated Options – Two of the options considered would require the installation of entry/exit fare gates at the five Center City stations (University City, 30th Street, Suburban, Market East, and Temple). SEPTA has engaged architects and engineers to verify that gates would work at the Center City stations, providing a paid area for riders at each station. In these cases, the open payment media would be used for exit and/or enter the gated areas. Capital investment requirements for the gated options include the installation of gates at the Center City stations; purchase of vending machines at the Center City stations; and validation tagging stations at the appropriate zones outside Center City. The gates and external tagging would accept all versions of new fare technology (smart media, chip-embedded credit cards,

and cell phones). Vending machines at the Center City stations would support cash, credit and debit transactions for the provision of media, which could be reused in the future.

Following are descriptions of the two gated options considered:

> *Center City gated, Downtown One Way Validation* – In this option, payment would happen only on outbound trips leaving Center City. Passengers would board trains inbound and pass freely (unpaid) when exiting Center City stations (conductors would handle destinations other than Center City). Outbound passengers would present fares for both directions at the downtown fare gates, with subsequent validation by zones either by tagging out at external validation machines, merely exiting at default zone stations, or via conductor handheld validations.
>
> *Center City gated, Downtown Two Way Validation* – In this option, the gate configuration would be the same, but now passengers would be required to pay in both directions, Passengers would present fares at the downtown gates both upon exiting (inbound) and entering (outbound), and would be required to validate though external tagging, conductor handheld validation, or exiting through the default zone. The two way option would require additional capital costs, due to the need for fare machines on both sides of the gates, as opposed to only on the outside for the one way option, and additional validation machines at outlying stations.

All options were discussed in depth at the first Advisory Group meeting, with SEPTA staff providing a presentation, answering questions and identifying information and data needs for the second meeting. At the second meeting of the Advisory Group, SEPTA provided detailed information on the potential losses due to fare evasion under the One-Way Gated scenario, as well as detailed revenue enhancement and cost estimates for each of the options (with exception of the honor system, which is actually similar in cost to the TVM model). Meeting summaries and additional information sheets are included in the appendix to this report.

EVALUATING THE OPTIONS

At the second meeting of the Fare Policy Advisory Group, SEPTA staff provided detailed responses to a number of information requests from the Advisory Group and the Economy League. This included the completion of an evaluation template on the financial implications of the various options as compared to current operations. In addition to the comparative financial analysis, SEPTA staff prepared a more detailed analysis of the potential of switching modes for return trips if the one-way fare scenario was implemented. All 154 stations were evaluated, and alternative routes were identified. Probabilities of shifting were based on time differential between the trip options, number of transfers, weather, and proximity of alternative destinations. The Advisory Group was then provided (within the meeting) with an analysis of each option and the long-term implications. (More detailed description of this process is in the meeting notes from June 14 in the Appendix.

GATED VERSUS TVM

After receiving the report and requested information, and then asking questions and discussing the options and their implications with SEPTA staff, the Advisory Group focused first on the decision of whether to go forward with the Center City gates (one way or two way, gates can handle either) or the TVM option (TVM Honor System eliminated at first meeting, plan considered was DVARP modified TVM plan).

The discussion focused on a number of issues:

- Feasibility of gates at Downtown stations – SEPTA responded that architects and engineers had concluded that downtown gates were feasible and safety/pedestrian flow issues had been addressed. In addition, customer surveys indicate a favorable disposition towards the creation of paid areas at Downtown stations, provided entry/exit for food, vending and bathrooms could be dealt with through the system software.
- Maintenance and safety for TVMs at outlying stations – Given the number of stations and geographic breadth in the regional rail network, SEPTA staff and Advisory Group members raised concerns about vandalism, the cost and feasibility of maintaining the TVM machines.
- Uniformity of fare instruments -- In addition, questions were raised about the difference there would be in fare media between regional rail and other transit services, which would be moving to a more cash-less and paper-less system. SEPTA's vision is for customers to use the same, long life smart card on all parts of the SEPTA network along with contactless credit, debit and mobile devices.
- Role of conductor – Given rising safety concerns and mandates, a consideration for SEPTA in any plan is to reduce the fare-related interactions of conductors on the Regional Rail system. There was consensus with reducing the number of direct fare transactions that conductors are involved with to address safety and operational needs.
- Revenue Security – The gated exit or entrance for Center City trips was viewed as providing better revenue security due to the mandatory tagging process.

A vote of the advisory group was held on the question of gated versus TVM. Those in favor of gated registered 9 votes; TVM 2 with one abstention. All of the represented counties supported the gated options.

ONE WAY GATED VS TWO WAY GATED

After settling upon the downtown gated options as the preferred option, the next decision was to focus on the question of the advisability of one-way fares versus two-way fares. The biggest challenge facing the group was understanding how the one-way fare options would work, and then determining whether this scenario met the standards of customer-friendly, easy to use, protecting revenues, and increasing ridership.

The current concept for one-way fare payment requires that the full roundtrip fare be paid at entry on the outbound (away from Center City Philadelphia) trip; with no fare being collected on the trip inbound to Philadelphia. For the two-way fare option, fares would be collected on

exit inbound and on entry, with tagging by zones determining the total fare in both directions. Some concerns were identified about the one-way option in the discussion over the two meetings.

- Fare evasion – There was a general concern that fare evasion, or even the perception of fare evasion, would be bad for both political and public image of SEPTA. It would raise concerns of equity, fairness, and revenue security, even if the welcoming approach resulted in new riders and increased net revenues.
- Roundtrip payment – There were also concerns raised from an equity and ridership perspective about the concept of having to pay a full roundtrip fare on entry for outbound. This amount could be prohibitive for some cash riders, even if amounts were returned upon tagging out at appropriate stations. In terms of ridership, concerns were raised that some ridership could be lost, particularly those whose commuting patterns might involve only one-way trips. While this is a small number of riders, there were concerns about this system not being fair, or that it would encourage evasion as a rider would ride inbound and catch a private ride home.
- Ease of understanding – Because of the different nature of the experience on the inbound versus outbound trip, there were concerns that this would be a difficult policy to explain and communicate.

The advantages of the two way fare system were identified as being the ease and consistency of the experience (paying and tagging – or not – at same location inbound and outbound); revenue security and reduction of fare evasion from current system. The two-way system also better facilitates the needs of one-way travelers, and the maximum fare to enter or exit the system would only be one-way, rather than round-trip. From a capital expenditure and maintenance perspective, the initial investment in and maintenance of fare machines in the Center City stations would be slightly larger on an annual basis due to the need to have machines on both inside and outside of gates. However, the increased costs would be offset by increased fare revenues due to minimal levels of fare evasion, as compared to the one-way option.

When presented with the choice between the two-way and one-way fare options, the group overwhelmingly supported the two-way option, 11-1.

FARE ZONES AND RATES

Next for consideration are the questions of fare zones. Under the new payment technology system, it is SEPTA's hope to reduce the number of fare zones in order to simplify the system and reduce the number of validation areas. Throughout the two meetings, Advisory Group Members discussed a three zone (plus Center City) system. The primary question then becomes how to deal with the zones, and which zone becomes the default zone for payment (requiring no validation).

The initial presentation by SEPTA staff assumed three zones, with Zone 2 being the default zone. In those cases, Zone 1 riders would tag off or on at validation machines at their station to reduce their fare (accomplished with NPT software) from the default fare. With Zone 2 as the

default zone, passengers entering or exiting in these zones would not tag off or validate, as they would pay (or have debited) the default fare at the Center City gates. For Zone 3, on-board validation would occur, possible due to the smaller number of passengers and longer distances/travel times between stations. The idea here was to minimize the number of validations handled by conductors, and to create a default zone which maximizes the number of riders in that zone (and the number of customers tapping only once).

An alternative was presented by an Advisory Group member to make the zone most distant (zone 3) the default zone. The rationale for this option was that by making the outer zone the default zone, there are no cases where tagging requires an increase in payment (possibly incentivizing evasion or schemes to game the system). In addition, by having the two inter zones having external tagging technology (at the station), you would then further reduce the number of on-board validations needed, allowing conductors to focus on passenger and vehicle safety and operations.

When presented the choice between the most distant zone or the second zone serving as the default zone there was unanimous support for the most distant (zone 3) to serve as the default zone.

It was determined that while three zones seem to make sense, there was a need to discuss the concept of zone consolidation in greater detail in the future.

NEXT STEPS

Advisory Group members expressed satisfaction with both the visioning process and the potential usefulness to SEPTA as the New Payment Technologies project advances. Advisory Group members were invited to submit questions regarding the fare options.

After completing this summary of findings, potential future activities of the Advisory Group include:

- Refining the Regional Rail Zone and Fare structure proposals
- Evaluating and recommending policies regarding transfer
- Advising SEPTA on potential communications needs and strategies for the planned rollout of New Payment Technologies and zone and fare structures for regional rail

APPENDIX 1

SEPTA-PREPARED DOCUMENTS

NPT Regional Fare Policy Advisory Group
May 19, 2011

The meeting began with SEPTA General Manager, Joe Casey outlining the overall goals:

1) Protect SEPTA revenues.
2) Generate a means to repay the loan that enabled SEPTA to move forward with the project.
3) More convenient to our customers.
4) Easy and simple to use for our customers.

Customers have been asking key issues concerning the new system and this select advisory group has been asked to discuss them and come to as close as a consensus as possible. Public Hearings will be held and ultimately recommendations will be given to the Board for approval.

Facilitator:
Steven Wray, Ex. Director of the Economy League of Greater Philadelphia. The Economy League is a business-led civic organization that focuses on economic development policy in the region. The Economy League will be facilitating the conversation. The project goal is to provide guidance and recommendations to SEPTA Board by the middle of June. There are two meetings planned. Two focal points are the fare collection policy which includes zones and transfer policy. We will defer transfer policy until the next meeting. If there are questions or issues that need to be addressed in between meetings, SEPTA staff will follow-up and respond.

Nick Frontino, Project Manager, of the Economy League of Greater Philadelphia.

Participants:

City of Philadelphia, Mayor's Office of Transportation and Utilities	Stephen Buckley, Director, Policy and Planning
City of Philadelphia, Mayor's Office of Transportation and Utilities	Patricia Ellis, Transit Policy & Planning Advisor
City of Philadelphia, Mayor's Office of Transportation and Utilities	Andrew Stober, Sr. Transportation Project Manager
Bucks County Planning Commission	Richard Brahler, Sr. Transportation Planner
Chester County Planning Commission	Randy Waltermyer, Transportation Planner
Delaware County Planning Commission	Tom Shaffer, Manager Transportation Planning
Greater Philadelphia Chamber of Commerce	Tom Cataldi, Aberdeen Asset Management, Inc.
Montgomery County Planning Commission	Leo Bagley, Assistant Director
DVARP	Matthew Mitchell
DVRPC	Joseph Hacker, Manager, Office of Transit, Bicycle & Pedestrian Planning
PA Department of Transportation	John Dockendorf
SEPTA Citizen Advisory Committee	Aissia Richardson, Chair
SEPTA Youth Advisory Council	Phil Dawson, Chair
SEPTA	Jeff Knueppel, Chief Engineer
SEPTA	John McGee, Chief Officer, NPT

SEPTA	Dennis Hiller, Chief Officer, RRMS
SEPTA	Charlie Webb, Chief Officer of Service Planning
SEPTA	Kurt Weidenhammer, Asst. Treasurer
TranSystems (via teleconference call)	Dan Fleishman, Consultant to NPT Project

John McGee provided a project status update through a slide presentation. SEPTA is looking for cost reduction and better information for revenue accountability than at present. SEPTA will be the first major transit operator to welcome open payments. Customers will choose how to ride SEPTA, whether it is a SEPTA branded smart card, a contactless credit card, or a mobile payment device. We are trying to eliminate the step of buying a ticket or token to ride SEPTA. When this type of system is deployed, it will need an electronic handshake to recognize the fare payment transaction.

At the previous larger advisory sessions, there have been fare payment issues that have reached consensus and Joe Casey asked that they be mentioned today as a frame of reference:

- Replace discounted tokens
- Encourage payment prior to boarding the vehicle (all modes of travel)
- Transfers for the future
- Eliminate paper document and replace with a smart media, cell phones, credit cards
- Autoload option for smart media
- Seamless transfer between railroad and other parts of the SEPTA system
- Over time, transition away from the 75 ticket offices, but continue to offer waiting rooms.
- Multiple zone services: try to implement a tag on/tag off scenario with transit and railroad

Additional issues that did not reach consensus for a variety of reasons:

- Railroad fare collection equipment investment
- Barrier system in Center City Philadelphia
- Reduce the number of zones

Steve Wray entertained a question and answer period:

Q: On all of these options, is cash an option?
A: Yes. No matter how common or available we make a SEPTA branded card or whatever the fare media will be, SEPTA will never be able to serve all of the bus stops or all of the railroad stations. On the transit side, we have vending machines at all subway elevated stations and we have them at select turn points. On the railroad, vending becomes more difficult because of the larger investment/installation/maintenance costs. It is perceived as unfair when some stations have ticket offices where you can purchase a lower price fare. This is an issue in terms of customer satisfaction and complaints.

Q: As far as seamless transfer on the system, is there anyway to incorporate PATCO and NJ Transit?
A: With an open payment system, you can use the same device. PATCO may have to invest in order to recognize other cards. PATCO is, however, having an open payment, six-month trial to be kicked off later this year.

Q: What other systems around the world are looking at open payment?
A: New York announced that their concept of operations will follow the SEPTA model. It does not include the railroad yet since their system is so large. Washington already has a contactless card. It is not open payment but an RFP for open payment has been issued and will likely be awarded within the next few years. London will be supplementing their Oyster card with open payment for the Olympics.

Q: Amtrak?
A: Amtrak is looking for a system whereby a conductor will have a real time manifest and a receipt will electronically be issued. There are trials going on in Connecticut and California.

Q: Is NJ Transit a part of this movement?
A: SEPTA staff recently visited. They are about to release an RFI regarding open payment.

Open payments is the way to go. Our RFP handles all of the open payment abilities. Europe is moving away from using credit card "stripes" and United States credit cards are problematic.

Q: Timeline SEPTA is facing?
A: SEPTA plans to ask the Board to make an award this summer to a vendor. Following that, there will be a six month design period. Usually, if you look at other properties designing fare systems, this design period is when their fare policies changed.

Priorities and Values

Discussion on importance and weight of four key priorities for new payment technologies:

- Convenience/Ease of use (including marginal and infrequent passenger)
- Uniformity/Equity for riders

Revenue was broken into two priorities:

- Cost control
- Revenue protection or security
- Ridership increase

Revenue security was number one for SEPTA. An example for financial impact, if it is negative financial impact, that ultimately means service reductions which then impacts "ease of use".

For a region-wide priority, convenience/ease of use was rated first among priorities and critical. If it is easy to use, you will increase revenue and ridership. E-Z pass was mentioned as an ease of use model. A daily user's word of mouth mentioning "ease of use" is a positive message for SEPTA. Interoperability is important between PATCO and NJ Transit. This may not be directly in SEPTA's control but should be a long-term goal for the system. There are over 1,900 daily transfers through Trenton (NJ Transit) and 700 daily transfers from PATCO to SEPTA.

Cost control and ridership affordability/revenue security was rated as a top priority.

In reality, they are all equally important, but there may be trade-offs that may have to be made with the system.

Q: For SEPTA Customer Satisfaction surveys, how does "ease of use" rank now?
A: Railroad customer service ratings overall have always been a little higher than transit riders. Ease and availability of purchasing SEPTA fares, receives the highest service elements whether it is railroad or transit. The bar has been set high. Qualitative surveys and focus groups raise other issues. There are variable ways in which fares are collected. Our conductors are taught that they must inspect all fares between every zone. For Regional Rail riders, the majority of the people do not want to leave their pass on the seat because of the possibility of theft. They can also choose to wear or display it. It challenges SEPTA to find and visibly inspect the passes and do a complete fare validation/collection on the railroad. What we have today is a hybrid from the way it really should be so that everyone is paying a fair rate vs. what the reality is under the current conditions.

Weakest part for transit is paper transfers but over time this is diminished due to increase in passes. Railroad does not have this option. We have railroad riders who choose paper tickets because they are not always collected. Phillies parade is an example. Transit was pretty close with ridership statistics compared to revenue on that day. The railroad was an utter disaster. Twice the number of people were carried that day and the revenue was supported by only pass riders. The human factor cannot compare to what an electronic device can do.

Q: Under electronic payment, would purchasing monthly fares change for employers?
A: It will probably change and become electronic one way or another. You may get a permanent card. Another way is a third party issues you a debit card. Or some employers may chose to use their company identification card for transportation.

Fare Payment Collection Options

Handouts were provided. Discussion would include the relative pros and cons, in light of NPT and SEPTA priorities discussed, of each potential fare collection option.

<u>Downtown One Way Outbound Validation</u>
Pros/Cons

- Downtown station everyone must come through electronically.
- Personal security.
- Fewest on board transactions.

Q: Since cash is an option, how would one pay electronically?
A: Conductor will have a handheld that will issue a card for the cash fare payment.

Q: Will there be multiple places to tag off?
A: Only at certain zones will it be necessary to tag off. Validators will be inbound and outbound. Majority will be outbound. Intermediate fares would remain the same as it works today. People will also have the ability to tag on in the morning and it could be considered a round trip fare. A transaction will take seconds.

Q: Standardizes the customer payment, but it is different for each zone?
A: Customer payment is standardized by zone, but it would not be the same for every passenger on the train.

Q: How can you fill your branded card?
A: Electronically, through the internet, 1-800 auto load which would be like E-ZPass. You could refill the card at external networks of third party merchants. The number of people needing to buy a new card will be significantly less since there will be a reloadable option. As we are moving toward a contactless society, it will be odd for people to not have these kind of cards or something in their wallet to pay a fare.

Q: For the scenario of customers taking the railroad inbound and using a different mode of travel to avoid paying a fare, is this being addressed? Are estimates being developed?
A: Yes. We are in the process of evaluating and will have the analysis for the next session. There are a lot of opportunities to do this, but most are not truly convenient. You may have to make one or two more transfers to get to the same location.

Q: Are free trips more valuable than a longer ride or one with a transfer?
A: (Dan Fleishman) Transit experience for free is not as attractive as many may think. Folks have a variety of things important to them. Fares are important but travel time, out of vehicle time and the number of transfers are considerably more highly valued than fares in making a decision on how and where to ride. Ridership for free may jump initially, but it tends to level off. If it is convenient to riding they will keep riding, but they won't make the trip just because it is free.

Comment: Capital cost is the least investment because it is limited to the Center City stations for fare gates, vending machines and handhelds for the conductors. A significant number of our riders travel to one of the downtown Center City stations (95%) today. This is the trip pattern here; it may not work for another railroad.

Q: One of the challenges here is if Joe Casey is in Harrisburg and one of the legislators thinks this isn't the best case, he cannot put any proof in front of him that that trend is going to stay the same?
A: There is no requirement that this must be one-way. Our investment supports bi-directional. We are not making an investment that ties us to one condition or another.

Q: Data to support where riders exit besides Center City?
A: Automatic Passenger Counters (APC). All of these options will have some level of tagging.

Q: 100% validation noted under this option should be changed.
A: Agreed that it is fair to say "high rate of off-board validation".

Q: Relying less on human element, can you explain?
A: The need for ticket sellers at stations becomes an opportunity to save costs over time as people transition over to new media. This is considerable. There may be efficiency with

conductors. Ridership doesn't change but consistency of collection improves. On any system, there will always be disputed fares whether people forget to close their trip or parts of the system do not work correctly. Interesting that for any fare payment system, the number of people going in never equal the number of people coming out.

Concerns: Is it a red flag that people who are in transit are struggling to understand how this works? Equity issue between City riders who can ride for free and Suburban riders who do not have the option to ride for free. Concerns about crowding if more inbound riders if they choose the free ride inbound.

Downtown Each Way Validation

As far as investment, more vending machines will be needed at downtown stations at both sides of the gates. This is one significant change. More validators needed at inbound side of remote stations.

Q: Is there an alternative to that, where the default zone would be a middle zone?
A: The first option would be a tag off on zone 3 (today). Validators are only at zones 1 and 2. But it cannot be applied in this option because the zone 4 and 5 passengers could buy down to zone 3. An example is passengers can gain entrance at a zone 5 station and say to the conductor they will buy their fare downtown, but have a zone 3 pass in their pocket.

Q: This has a cost efficiency side, but there would be higher capital cost involved?
A: Yes.

On Board, Each Way Validation

This option supports current fare policy structure. Vending at all 154 stations would be installed and ticket offices remain. Passengers validate at each zone via conductor and downtown. This would require a higher number of fare encounters. It essentially doubles the investment cost because of the vending machines. Maintenance and vandalism risk would be extraordinarily high.

Q: Could an optimized current system be used with vending at every station, reducing the number of ticket offices open with an opportunity for savings? If it is relied on bus and subway system, why not on the railroad? If the prepurchase experience is optimized, and a receipt is issued not a fare, can we issue a receipt for a limited amount of time reducing the chance of revenue shrinkage?
A: What this does in terms of the capital cost is really nothing. It would not do anything in terms of the maintenance cost. It would provide the opportunity for savings to offset the additional folks you would need to maintain the system.

Q: Is there documentation to collaborate the operating/maintenance cost?
A: More data will be forthcoming.

Q: We have parking machines at the stations. Do they have extraordinary maintenance and vandalism problems?
A: Yes.

Q: How much is the maintenance because of cash collection? Can we have debit only machines? With open payment, won't cash dwindle?
A: A concern is the percentage of passengers in the City without electronic media is higher than the outlying areas, which brings up an issue of equity and fairness. Placing cash vending machines in certain geographic areas only would be hard to convey to the public.

Self-service (Honor System)
Vending would be in place at all 154 stations. Essentially, all responsibility is placed on the customer. They would be required to tag on and off at all stations. There would be an enforcement team needed to be developed to supplement the conductors. They would essentially issue summons or citations to violators. This is a popular public policy tool around the world. More recently, as the trend has moved toward the electronic age it has become more and more evident that there is a high rate of abuse in urban locations, sometimes as high as 40%. There are variable customer experiences. They do not always do the right thing and spend their time looking for the enforcement team. For SEPTA, there are extraordinary revenue risks. It has worked on certain lines, as in the Hudson-Bergen light rail line in New Jersey as a commuter line. New Jersey passed legislation for enforcement.

Q: Unlikely to be supported by judicial system? What is needed? Is it a $300 fine for violators?
A: We serve a variety of municipalities and we would need enforcement criteria that supersede all of them. State law would have to be advocated by all municipalities.

Q: There is a distinction between a self service fare collection system where you have 90% validation or inspection. The chances of getting away without paying are very slim which is the model in Virginia or California where the conductor or inspector does an inspection of every fare on every train. What does not seem politically viable at this point is the European model of spot checks where fares are only checked about 10% of the time. It would be expensive because of capital costs but cheaper for operating costs?
A: This would not be a cheaper system as there would have to be a large capital investment for the vending at all 154 stations; as well as the necessary enforcement by the judicial system for fare evaders.

Q: Question on the capital cost for third and fourth options. How does it impact the viability of this option?
A: We would have to seek additional funding or financial sources to handle the capital cost.

Comment: Might be able to do validation and media at each of the stations if there are ways to reduce that capital cost through creative mechanisms or strategies as in reducing zones or using parking as a leverage. If you bike or walk to a train, you would receive a discount.

Q: Just for clarification, now that we are potentially considering only option 1 (Downtown One-way Outbound Validation) or option 2 (Downtown Each-way Validation), option 3 is 100% validation and 2 is validation of everything but zones 4 and 5?

A: The bigger distinction is the vending machines at all stations in option 3. Option 2 would have vending machines at the downtown stations. We have tried to minimize the investment and would like to give daily riders the ability to choose when to tag, morning or afternoon, and not have to tag both ways.

Q: If we go with option 1 and it fails, do we then move on with option 2? Wouldn't that be a political and public nightmare?
A: No. If we were to gate the downtown stations, we have always specified it would be for bi-directional use. We have the ability to change this system over time. We cannot predict what will happen with the distribution of electronic media. SEPTA believes mobile payment will take off in the next few years. We see this indication and believe that contactless cards will become common place. As far as other systems, they are more rigid. That is not the type of system for SEPTA's new fare collection.

Q: Is there a bigger financial picture that can be shared in terms of hard numbers? What does 10% loss in revenue look like?
A: More financial analysis can be shared at the next session.

Q: Could SEPTA share with us from a customer prospective, a daily commuter and an occasional rider, what the fare experience would be from each of the different zones?
A: At the next session, we will lay out different options and explain a default zone. We can use the existing zone structure and summarize data.

Zone Policies will be the first topic of discussion for the second session. More information will be provided prior to the meeting concerning the zones. Following zone policies will be the transfer policy discussion.

NPT Regional Fare Policy Advisory Group
June 14, 2011

The Economy League has been engaged by SEPTA to help facilitate this Fare Policy Advisory Group and will compile a report based on the discussions of these meetings. Introductions of the participants followed.

Facilitators:

Economy League of Greater Philadelphia	Steven Wray, Ex. Director
Economy League of Greater Philadelphia	Nick Frontino, Project Manager
Economy League of Greater Philadelphia	Dylan Hayden, Consultant

Participants:

City of Philadelphia, Mayor's Office of Transportation and Utilities	Stephen Buckley, Director, Policy and Planning
City of Philadelphia, Mayor's Office of Transportation and Utilities	Patricia Ellis, Transit Policy & Planning Advisor
City of Philadelphia, Mayor's Office of Transportation and Utilities	Andrew Stober, Chief of Staff
Bucks County Planning Commission	Richard Brahler, Sr. Transportation Planner
Chester County Planning Commission	Randy Waltermyer, Transportation Planner
Delaware County Planning Commission	Tom Shaffer, Manager Transportation Planning
Montgomery County Planning Commission	Leo Bagley, Assistant Director
DVARP	Matthew Mitchell, Ph.D.
DVRPC	Joseph Hacker, Manager, Office of Transit, Bicycle & Pedestrian Planning
PA Department of Transportation	John Dockendorf
University of Pennsylvania	Eric Bruun, Ph.D.
SEPTA Citizen Advisory Committee	Aissia Richardson, Chair
SEPTA Youth Advisory Council	Phil Dawson, Chair
SEPTA	Jeff Knueppel, Chief Engineer
SEPTA	John McGee, Chief Officer, NPT
SEPTA	Dan Casey, Director, Revenue & Ridership
SEPTA	Dennis Hiller, Chief Officer, RRMS
SEPTA	Charlie Webb, Chief Officer of Service Planning
SEPTA	Kurt Weidenhammer, Asst. Treasurer
TranSystems Corp.	Dan Fleishman, Consultant to NPT Project

Steve Wray led the meeting by reviewing materials provided by SEPTA since the last meeting and also material submitted by DVARP, as well as others. At the last meeting, the priorities and values were agreed upon and we will focus on them as we move forward with the discussion:

Priorities and Values

- Convenience/Ease of use (including marginal and infrequent passenger)
- Uniformity/Equity for riders
- Revenue
    - Cost control
    - Revenue protection or security
- Ridership increase

Options Under Consideration

This meeting will focus on gating versus non-gating in Center City stations, fare collection options and fare zones.

SEPTA General Manager, Joe Casey, previously outlined the overall goals:

1) Protect SEPTA revenues.
2) Repayment of the loan that enabled SEPTA to move forward with the project.
3) More convenient to our customers.
4) Easy and simple to use for our customers.

Review and Discussion of NPT Regional Rail Options
Financial Information

Current Validation

An evaluation template was provided for today's discussion. John McGee reviewed the current on-board each-way validation on regional rail which generates annual revenue of $122,000,000. There are no capital costs shown for the obsolete equipment and the annualized operating and maintenance (O&M) costs are $14,105,909. On-board staffing was left off the evaluation for this financial discussion as actual savings and operational issues could not be addressed at this time. Current FRA rules and safety were briefly overviewed in the context of time available for on-board fare collection.

Center City One Way Outbound Validation

SEPTA changes in ridership and revenue. Reduction in ridership would occur for those riders described that will shift to take advantage of a free ride. SEPTA assumed an increase in inbound ridership but a decrease in outbound ridership for the shifters and distributed a very detailed analysis on each station. Overall, it was estimated that there would be a $1.6 million loss after the first year due to shifters. The net impact on gating of the fare collection would be $5,922,880 revenue improvement. Annual revenue was calculated to be $126,337,848, a net increase.

Capital costs include: gating at $9 million, vending machines at $3 million for 55 machines in the unpaid areas in center city and airport stations. Tap machines (310 units) is estimated at $2,920,510. Costs for handheld devices (450 units) remain the same in all scenarios.
Annualized capital costs projection is $22,034,260.
Annualized O&M cost is projected to be $11,503,308.

Questions were raised concerning the loss in uncollected revenue from mode change (switchers). Dan Casey was asked to give an overview of the analysis. Out of the 155 regional rail stations, staff was charged with finding a transit alternative that would be the quickest or having the least amount of transfers to multiple vehicle rides to reach their destination. For increase in travel time in scenario one, it ranged from zero additional travel, compared to regional rail, up to 95 additional minutes of travel to reach their destination. The average across the board for all 155 stations was 36 additional minutes of travel time. There were nine out of the 155 stations that had anywhere from zero to 10 additional minutes of travel time.

The first example was the Norristown Transportation Center and Dan Casey described the analysis. The alternative transit travel would be the Market-Frankford El to 69th Street to the Norristown High Speed Line. The travel time is a total of 15 minutes on the El, 10 minute wait at 69th Street and a 26 minute transportation trip up to Norristown for a total of 51 minutes. Essentially what has happened in this case is that a 45 minute railroad trip has become a 51 minute trip with multiple transfers for a fare differential of $3.55. From the inbound direction we are looking at a revenue loss of $751 per weekday. Outbound revenue loss would be $686 per weekday. The increase in the inbound boards was 215. The fare that they are going to save is $3.50 which is $752 rounded. On the outbound direction, there would be 193 less riders now paying $3.55 of the $7.05 or $685. On a given day on the regional rail inbound side we would be losing $17,936 and $17,843 on the outbound or $35,779 total. Under this scenario, we then looked at the outcome after four months with 60% of the riders reverting back to regional rail round trips for a variety of reasons. The $35,779 loss would drop down to $14,300 per week day.

With 260 work days per year, perhaps 150 workdays the weather would cooperate for switchers and SEPTA would realize a $5.3 million loss system-wide over the 150 workdays. SEPTA then analyzed where 50 days of the year riders would continue to do this and the remaining 100 days would be the 60%/40% switch or $1.7 million on the first 50 days and $1.4 million the second 100 days which is grossed up to $3.2 million for the entire first year.

In the second scenario, SEPTA looked at the percentage of shifters. If there were 61 minutes or more of additional travel time, would zero percent shift modes of travel? This may not be a valid assumption. SEPTA concluded that maybe one or two percent may shift but 25% is probably too high. If the worst case is $5.3 million in scenario one, scenario two came to $3.9 million.

Questions were raised concerning other stations. Additional information was provided for each of the 155 stations with each scenario. SEPTA staff was thanked for the detailed information that was provided for the group.

Equity concerns were raised. It could be perceived that though it may be a low percentage of riders, some could receive a free ride.

SEPTA did not take into consideration mitigating factors that could be applied through pricing policies to discourage riders from taking advantage of a hole in the system. For example, there are pricing policies that could be used based on usage within a single day.

Concerns were raised on the impact to SEPTA if riders stopped using regional rail due to the initial higher cost of the trip if their pattern was not a daily round trip travel. SEPTA responded that these riders would have purchasing options through the fare media to accommodate them. There would be trade-offs. The cost of the one-way fare against the cost of driving and parking in town will be more attractive to some riders.

Questions were raised concerning testing the theory of one way travel. A ninety day trial was suggested. Overcrowding inbound was still a concern.

Center City Each Way Validation
Farebox revenue would remain at the current annual revenue of $122,000,000, with a net impact from the gating generating $6,266,800. Annual revenue has been calculated to be $128,266,800.

Capital costs also include gating at $9 million and additional vending machines jumps from 55 to 98 for each-way validation. Additional vending machines would now be necessary at the platform level and concourse level. Additional tap machine (up to 358 units) is estimated at $3,372,718. Annualized capital costs projection is $24,937,468.
Annualized O&M cost is projected to be $12,405,525.

Though testing of the one way is an option, this was considered a conservative option to pursue.

DVARP Optimized TVM Alternative Validation and Print
Farebox revenue would remain at the current annual revenue of $122,000,000, with a net impact from the fare controls generating $1,856,800. Annual revenue has been calculated to be $123,856,800. No gating involved in the capital costs. Center City and the Airport vending machines (110 units) would be estimated at $5,885,000 and non Center City vending machines (588 units) would be $31,458,000. This would realize an increase in network, communication and power costs from the other two scenarios. Annualized capital costs projection is $51,453,750.

Annualized O&M cost is projected to be $20,827,042, with an increase in maintaining the vending machines. Matthew Mitchell provided an overview of the TVM alternative. The concept would be for vending machines similar to the street parking kiosks in Center City. There would be much less complexity in the ticket transaction and usage of a simpler machine. Using a lower cost vending machine may bring the capital costs in line with a gated alternative. SEPTA explained concerns regarding installing and maintaining light duty vending machines at isolated railroad stations.

Preferred Options Discussion

Center City One Way Outbound Validation
In the one-way scheme, for simplicity we will assume there are three zones and the Center City zone. In the outer zone, passengers simply board trains inbound and ride to their final destination. In the middle zone, passengers board the train and ride to their final destination. On the first zone, passengers board the train and ride to their final destination. They arrive at Center City and exit through turnstiles and no fares are checked. Passengers can leave the station, they

can go to a vending machine at that point and buy a fare or they can purchase a fare when they are ready to come back for the return trip.

For the return trip, passengers must have a fare to enter the turnstile in the paid area. For the first zone, which is the lowest price, they need to tag out. When they arrive at a zone two station, which is the largest number of passengers, they will not need to tag out since this is the default zone. When they arrive at zone three, the conductor is equipped with a handheld device and is responsible for checking that those passengers have the fare for zone three.

For passholders, a relationship would be established providing a benefit if they would like to travel further than their original designation on occasion. They would be protected from a daily interaction. A fare policy decision would have to be decided on whether SEPTA would accept cash or take the fare from the backend. More options would be available to riders as in loss protection. SEPTA would have the ability to count trips and have the ability to charge if a single pass was used more than the norm.

A concern was voiced for the low income passenger who would be required to have a higher balance on their fare media card. SEPTA confirmed that was why zone two was designated as the default zone.

A question was raised on how to handle passengers traveling within a zone two. There is nothing to say SEPTA cannot change conductors' responsibilities. Random inspections could occur on non-peak trains and result in a premium fare charge. Signage notification would have to be clear to passengers.

<u>Center City Each Way Validation</u>
The conductors perform complete inspection and on-board sales in the outer zone in both directions. This is the fewest number of passengers. Everyone will have media to exit the train. You will have brought it on the train or purchased it through the conductor. Zone two is again assumed to be the default zone and there is no inspection. Default zone passengers present their smart media at their originating station as well as at downtown farelines. Zone one, if you have a fare instrument, you will have the ability to tag on. If you do not have a fare instrument, you will also need to purchase a fare when you arrive downtown. When you make your return trip, everyone validates at the turnstile. The price differential between the lower zone and default zone is adjusted on the return trip when passengers tag out at the lower zone station. Conductors will handle exceptions. Chances are passengers will already have fare media on them by the time this system is turned on whether it is a cell phone, contactless credit or debit card, a welfare payment card, etc. Passengers will also have the ability to register anonymously if they chose to do so. We are trying to move away from what we have today while addressing the weakness of the system with the least amount of transactions onboard. For example, installing readers at an additional zone would cost up to $9 million.

<u>DVARP Optimized TVM Alternative Validation and Print</u>
Matthew Mitchell explained a concept using TVM validation. A TVM would be installed at every station. Every passenger before boarding receives a fare receipt. Those with monthly passes would have a fare receipt before boarding or use their monthly pass for a visual

inspection. There would be no differences between zones. No differences via Center City. The paper receipts could expire within a certain amount of time. The chances of someone reusing a ticket are very slim. If you do not have a fare, a flat fee would be charged onboard.

Questions were raised as to how transfers would work if a decision has been made to move toward an electronic fare collection system. Matthew Mitchell suggested backend handling of fares for intermodal transfers. Back-end improvements with new payment technology lower the cost of the machines. A question was raised concerning passengers being required to have a receipt every day or for every trip in order to ride the system. A concern was stated about this alternative keeping SEPTA in the business of selling monthly or weekly paper passes. If not, then tap machinery would be needed for the electronic media to be used. This concept would be a stronger version of today's system. The weakness here is the cost for system-wide vending machines and the increase in operating and maintenance costs as each machine would collect money, dispense change, and require personnel to replace paper receipts throughout the system. Matthew Mitchell said a voucher system could be issued instead of dispensing cash. SEPTA had looked at voucher options previously and it was not an option at that time. Vandalism and security for machinery was discussed.

Professor Vuchic had issued a letter to everyone concerning his concept for self-service fare collection. This methodology was discussed at the previous Fare Policy Advisory Group meeting and the consensus was that it would not be a politically preferred option. Additional funding would be required to address revenue losses. At the last meeting the discussion involved capital investment for vending at all 154 stations; as well as the necessary enforcement by the judicial system for fare evaders in every municipality.

SEPTA looked at information from 130 interested parties, some proposing some of the equipment under a TVM type system, and ended up with three proposers. SEPTA borrowed money for this project and the goal is cost savings, enhanced revenue collection, state and federal dollar protection, compliance with FTA rules which means buy American, and ADA compliances. Purchasing machinery for $10,000 each with less durability and placing it in remote locations is a security factor. The useful life of less than 10 years was a concern. Daily security maintenance of machinery was a factor. What SEPTA is left with is more expensive machinery which is used in the transit environment.

At this point, voting for either downtown gating versus TVM option was entertained with the majority of the votes for Center City gating (9 votes for gating versus 2 for TVM and 1 abstention).

Voting for the regional rail one-way outbound validation versus each-way validation was entertained with the majority of the votes for each-way validation. (1 vote for one-way validation versus 11 votes for two-way validation).

Default Zones

Steve Wray began the default zone discussion. The initial option by SEPTA for the two-way scenario was a default zone as zone two, on-board tag validation (via conductor) in zone three and an off-board tag for zone one. For the sake of simplicity, zone one you would tag off and get

a rebate and for zone three you need the highest fare. Randy Waltermyer's alternate is zone three as the default zone (or the E-Z pass model). A rider would pay the highest fare to get on and for zones one and two would tag-off. The incentive to tag-off would be to reduce your fare. Stephen Buckley mentioned that this would ultimately be a lesser expense than a one-way fare scenario. Steve Wray asked if the default zone capital costs would increase. John McGee stated approximately $1 million would be added to the capital cost. Stephen Buckley asked to see a breakdown of the annualized costs.

Steve Wray asked SEPTA if parking would eventually be included in the fare so that you could accomplish both fares at the same time. John McGee responded that SEPTA has a limited automated parking payment plan which is driven by cost.

Stephen Buckley questioned the conductor's role when collecting fares today. When traveling between zones two and three, do they get through the entire car? John stated that the fares would be validated as zones are crossed. A question was raised concerning the increase in time for validation between stops or zones. John McGee stated that it may be a little bit of a struggle for a conductor to complete an entire car, but SEPTA in the future would have tracking capability to measure conductor effectiveness.

Referring to the Evaluation template, Dan Casey stated that the revenue assumption assumes that the pricing structure would stay the same. Currently, 70% of riders are passholders while 30% are the ticketholders which would be the incremental increase. Matthew Mitchell mentioned that 100% would have to tag to find the 30% incremental increase.

Steve Wray reiterated the pros and the cons of the default zones:

Zone three default would have a higher capital cost up to $1-2 million annual increase, increased operating expense of $1.4 million and increased revenue collection of $1.5 million. Steve Buckley asked for clarification on the revenue side and John explained this was the intermediate revenue at risk. Trish Ellis stated that we already would have two zones of fares but this is the incremental increase that would be lost at the third zone. As a rider, you would be reducing your fare to tap off the system as opposed to thinking how you would evade the fare collection. Steve Buckley stated the way to capture the zone three riders would be to have them tap out at Center City. Matthew Mitchell mentioned that with Randy's zone three model we don't have to worry about the missed riders.

Steve Wray asked if there was a consensus of the group for either zone two default or zone three default. For zone three default, what Randy Waltermyer has proposed, Steve Wray stated we could ask SEPTA for more information on some of the implications but in a general sense Randy's model appeared to be the preferred method.

Referring to more information, Matthew Mitchell asked how SEPTA would explain paying your fare depending on whether the default zone is zone two or zone three.

John McGee stated if you have a fare media you tag and then you are protected. If you didn't have fare media, you would need to pay a single fare into Center City. The fare would be the

same whether you board at zone one, two or three and would include receiving a piece of media. You would purchase the default fare at Center City before you tag out from the gates. On your return trip, the zone differential would be rebated depending upon where you tagged out. Trish Ellis asked if all stations would require tagging out and Steve Wray explained that zone three tagging wouldn't be necessary.

Matthew Mitchell asked about senior citizens, disabled and children's fares. John McGee explained that seniors and disabled would receive contactless identification cards that would enable them to ride the system. Matthew Mitchell asked about out of town senior citizens traveling on the system and John stated that depending how long of a stay, they may want to register for a SEPTA identification card or intercept someone on the fare line for visual inspection to display his or her senior citizen identification. Steve Buckley asked about fare evaders that use their relative's senior citizen identification. John McGee stated that in the future, the senior citizen's identification may be their driver's license and that sharing would be a risk for both the senior citizen and the fare evader but it is better than what we have today.

Leo Bagley asked for clarification on zoning the stations from City Hall. Dan Casey gave examples of rezoning the stations: one-third would increase, one-third would remain the same and one-third would slide to a lower zone. Trish Ellis asked about equity and the fare structure when rezoning the stations. Dan Casey stated the rezoning is driven by mileage from City Hall. Steve Wray commented that 71% of passengers are zone one and zone two and they would have tag units.

Steve Wray asked if everyone was comfortable with the discussion of default zone two versus default zone three. Randy Waltermyer reiterated that for a default zone three, 71% of the riders in the current zone one and zone two have the same experience and only zone three would differ versus a default zone two where all the customers would have a different experience between zones one, two and three. Steve Wray stated from a communications standpoint, as Matthew Mitchell mentioned, default zone two would need three different types of signage.

Considering all discussion, voting for the default zones was entertained with a unanimous vote for default zone three or the highest fare option.

Conclusion

There was discussion concerning the issues of zones and universal passenger transfers at a future meeting.

NPT Regional Fare Policy Advisory Group
Regional Rail Evaluation Template

	Current	One-Way	Each-Way	DVARP TVM Alt.
Revenue	$122.0	$122.0	$122.0	$122.0
Free Ride Shifters		(1.6)		
Improved Fare Controls		5.9	6.3	1.9
Annual Revenue	$122.0	$126.3	$128.3	$123.9
Capital Cost		$22.1	$25.0	$51.5
Validators in Middle Zones		7.3	8.0	
Total Capital Cost		$29.4	$33.0	$51.5
Annualized O&M Cost	$14.1	$11.8	$12.4	$20.8

Operating Scenarios for Regional Rail

Column one reflects current conditions and costs; column two represents the one-direction collection option with downtown validation, column three shows collection in each direction with downtown validation, column four the DVARP scenario where passengers tag in and print validation tickets at outlying stations for inspection on board.

Each of the downtown validation schemes presented by SEPTA anticipates a refined zone structure and a mid-range default zone. SEPTA views the downtown farelines as essential fare collection tools for Regional Rail.

In the one-way scheme (column two) passengers simply board trains inbound and pass freely through farelines when exiting downtown stations. On-board conductors handle exceptions (destinations other than downtown). Outbound passengers present fares at the downtown farelines to enter paid areas. Default zone passengers (the largest number of passengers) leave the train at their destination; those traveling a lesser distance tag out at their destination station (to receive the lower price differential back to their account) while those travelling further than the default zone have fares inspected by conductors. In this way the fewest number of passengers, stations and trains are impacted by a secondary inspection. As today, conductors handle exceptions, such as passengers boarding outbound trains for intermediate trips.

Collection in each direction (column three) duplicates the basis of the one-way scheme shown above but in each direction. On-board conductors perform complete inspection and on-board sales in the outer zone but in each direction. Default zone passengers present their smartmedia at downtown farelines; those without media purchase fares downtown within the paid area to exit through the farelines. Passengers boarding at a lower zone tag smartmedia at their originating station as well as at downtown farelines. Passengers boarding at a lower zone without media purchase default fares within the downtown station paid area to exit the fareline. The price differential between the lower zone and default zone is adjusted on the return trip, provided when passengers tag out at the lower zone station. As today, conductors handle exceptions.

Column four reflects costs to support the DVARP alternative of validating and printing receipts at remote stations for on-board inspection by conductors.

APPENDIX 2

DOCUMENTS PREPARED BY DVARP

DVARP

Delaware Valley Association of Rail Passengers

1601 Walnut St., Suite 1129 Philadelphia, PA 19102 215-RAILWAY www.dvarp.org

May 26, 2011

Dear Colleagues;

I've had the opportunity to speak with several of you since the stakeholder meeting last week. One of the things I've learned in those talks is that we haven't made the distinction clear enough between the TVM alternative DVARP proposes and the current fare collection system.

The talks also confirmed our understanding that SEPTA's primary concern with a RRD fare collection plan is to minimize revenue losses from uncollected tickets. Both the turnstile plans and a properly-designed TVM plan can accomplish this. The turnstile plans do it by requiring all Center City passengers to cancel their own tickets when going through the turnstiles. Our TVM plan protects revenue instead by making tickets effectively non-reusable.

Since ticket machines will be available at all stations, there is no need to purchase tickets in advance to avoid surcharges. And since multi-ride and other fare discounts are handled at the back end, regardless of the customer's payment option, there is no need to purchase tickets in advance to get a discount. All fares can be paid at the time of riding, and be valid for a short period, perhaps three hours. Tickets (or more properly, fare receipts) are printed at the time of payment, so they can carry a prominent expiration time and zone designation. No punching or other cancellation by a crew member or at a turnstile is necessary, nor does SEPTA need to stock tickets in inventory. If SEPTA has concerns about counterfeiting or other potential abuses, each receipt can be bar-coded so crews can scan them and verify they are authentic and not reused.

We have two alternatives for handling monthly passes in this system. Our alternative 3A would have passholders obtain a fare receipt from the TWM for each trip, just like single-fare riders. This maximizes simplicity for crews and consistency of the system, but it requires more machines and is a bother to the passholders.

Alternative 3B retains the existing monthly TrailPass for visual inspection on board. Depending on how the transit fare collection system is designed, it would need either the existing magnetic stripe (no change to the present TrailPass design or materials) or an RFID chip for transit functionality. If SEPTA wants more specific validation on board, an individual barcode can be printed on each pass alongside the serial number. This is most convenient for passholders and saves capital costs, but might add slightly to cost of fare instruments, depending on whether the transit modes continue to support magnetic stripe media. If customers want to use a work ID or other device as a payment instrument, it would still be possible, but they would have to obtain a receipt for each trip. There are cost tradeoffs between the two alternatives (initial costs versus ongoing costs), and a choice between them can be made once we have a better handle on those cost figures and what capabilities the transit-side hardware will have.

<u>Compromises by DVARP</u>

As I stated in the meeting last week, our proposal represents several compromises from DVARP's previously-held positions on fares and fare collection. First is the abovementioned limited validity of tickets. The back-end advances of the NPT system make this acceptable now.

Second, we support cashless machines at locations where cash handling is a genuine security risk or to save money at stations where daily ridership is very low. The open payments system, plus sales of SEPTA prepaid cards at convenience stores and other outlets means that nearly all riders will have ready access to a suitable card for use at a cashless TVM.

Third, we are willing to support a flat cash or card penalty fare for on-board purchases if TVMs are available at all stations. Besides providing an incentive to buy from the machines, this addresses SEPTA concerns about disputes over what zone a passenger boarded in when making an on-board transaction and speeds up transactions.

Comparative effectiveness

We agree that turnstiles are the most reliable means of ensuring that fares are collected in Center City, but that's only half the job. Alternatives 1 and 2 both minimize the loss from unpunched and reused Center City tickets, but they introduce new and perhaps more serious revenue losses in the rest of the system.

Checking fares in Center City is only half the job. Fares must be validated at the outlying ends of trips to ensure that passengers have paid the proper zone fare and to collect fares from those making non Center-City trips. I think we can all agree that installing turnstiles at the outlying stations is out of the question: for cost and practicality reasons.

In alternatives 1 and 2 fares are verified outside Center City either by a crew member tapping or swiping the payment card on a handheld device, or the passenger "tagging off" at a platform device. Both of these methods are at least as weak as the current system, and both are more of an inconvenience to passengers.

If we already believe that fares are being missed by the current system of crews asking passengers to show a ticket or pass and then punching tickets, how do we expect to do better with a system where crews ask passengers to hand over a farecard, credit card, cell phone, or other device? It will be a much slower process, and since fares are not deducted until the actual swipe, revenue will be lost every time a passenger is overlooked. At zone boundaries, every passenger on the train must be checked before doors open at the next station, or some riders will be able to get off without paying.

The tag-off alternative also is open to abuse. If a passenger has a friend living in zone A, the passenger can hand his or her card to that friend, and have the card tagged off in zone A, thereby paying only the zone A fare for a zone B ride. Likewise, cash riders can pay for a zone A ticket but get off in zone B, and there will be no way to tell he or she is evading the fare.

Both alternatives 1 and 2 lack any ability to collect fares from passengers making trips from one outlying point to another via Center City. Since there is no fare check for inbound passengers until reaching the turnstiles in Center City, through-tunnel riders get off the train in a paid area, and do not need a ticket or farecard to get on an outbound train.

Both the turnstile-based alternatives also rely on crew members making platform lifts to collect fares from passengers boarding outbound trains (preventing passengers from getting onto the train until they pay the crew member). With automatic quarter-point doors on the new Silverliner V fleet instead of manual doors and traps, crews will have a much more difficult time spotting boarding passengers and keeping them off the train until they come over to the crew member and pay. This loss must also be accounted for in cost/benefit calculations.

With a TVM-based system (alternatives 3A or 3B), all passengers pay the fare before boarding, including those making on-branch and through-tunnel trips. If for any reason a planned fare check is missed, the ticket is already paid for and SEPTA does not lose revenue. The only potential loss is from passengers deliberately boarding without a ticket, which will be much less of a worry in a new system than it is now. TVMs mean crew members will sell far fewer tickets on board, while new hand-held devices will speed up sales. This means crews will spend less time selling tickets, and have more time for checking that passengers have a ticket or pass.

TVMs will be simpler and less costly than SEPTA predicts

The open payments system that is the key advance in SEPTA's NPT proposal also allows us to simplify the TVM and simplify the ticket purchasing transaction (which is a customer service benefit in itself). Since multi-ride discounts are all handled at the back end, there is no longer a need to offer customers a choice of one-way, round-trip, and ten-ride tickets. The only choices necessary are destination and class of fare (regular, child/disabled, senior). At the outlying stations, we can set the default vending option to a regular fare to Center City Philadelphia. Most customers will then need only to swipe a card and press one button to complete the transaction. That's faster than our existing parking meters.

Even other transactions are simple enough that they can be accommodated with machines that are simpler and less costly than the generation of machines SEPTA used to have and which you might have seen on NJ Transit. Simplified machines like PPA parking kiosks will have all the necessary capabilities. They accept cash, magnetic stripe cards, and smart cards, print paper receipts, and cost just $10,000 to $15,000 each. They require no supporting data or power infrastructure, and are proven in everyday service on the streets of Philadelphia and other cities. We can provide a more detailed concept if you have doubts such a device would be effective in this application.

Summary

A TVM-based new payment system for the RRD is most definitely not the current system. It protects SEPTA revenue as effectively as turnstiles, simplifies the system for customers, ensures fares are properly collected from non-Center City riders, is compatible with long-term growth scenarios, and does not require distorting fare zones or other aspects of the system to make it work.

The trade-off then is between the one-time cost of TVMs and the cost of maintaining them (SEPTA has never made such a big deal about the costs of servicing parking meters), and the ongoing inconvenience and revenue losses from a turnstile plan collecting most but not all rail fares.

Our next step will be to try and flesh out more specifics of a TVM plan and its alternatives, particularly the number of machines required and the estimated total system costs, maintenance requirements and costs, and the potential for revenue losses under the turnstile plans. With that, I think you'll see the benefits of our alternative exceed the costs.

We are working on a more detailed table comparing alternatives and addressing some of the issues you raised at the stakeholder meeting (about all the alternatives) and hope to have that to you next week. In the meantime, please e-mail (mitchell@dvarp.org) or call me (215-450-7546) if you have questions or suggestions, or want to discuss any of the alternatives.

Yours sincerely,

Matthew Mitchell

Characteristic	Option 1 Downtown one-way validation (default zone B)	Option 2 Downtown two-way validation (default zone C)	Option 3A/3B Optimized TVM plan (3B includes contactless pass)
PASSENGER CONVENIENCE			
Customer payment experience standardized	Least: •Inbound and outbound procedures differ •Tag-on/tag-off differs in each zone	Medium: •Tag-on/tag-off differs in default zone	High: •Passengers stop at TVM and get receipt before all trips •In option 3B, monthly pass users have different procedure
Number of tag transactions per ride	Inbound: 0 Outbound: Zone A–2, B–1, C–2, D–3	2 (conductor validates zone D?)	1 (In option 3B, 0 for pass users)
Types of transactions	6 Card vendor Center City turnstile Platform tag-off Center City tag-off On-board zone tag Platform lift for on-branch	6 Card vendor Center City turnstile Platform tag-off On-board zone tag Platform lift for on-branch Add-fare on Center City platform	1 TVM
Train-train transfer procedure	Tag off before leaving paid area	Tag off before leaving paid area	Simply go to the train
Facilitates intermodal/interagency travel	No (one-direction fare not compatible with other modes' two-direction)	Yes	Yes
Dispute potential	High (missed tag-off, paying for two rides but using only one, misunderstanding the need to tag twice on board)	Medium (missed tag-off, misunderstanding need to tag twice on board)	Medium (failed TVM)
Permits alternate procedure for seniors (i.e. pay on board with no penalty)	No	No	Yes
Turnstile is barrier to bringing luggage	Yes	Yes	No
Bicycle access	ADA gate only	ADA gate only	All stairways
Obstructs passenger flow within station	Yes	Yes	No
Conflicts between entering/exiting psgrs.	Low	High	None
Inconvenient for passenger to change platform or go to rest room when waiting for train	Yes	Yes	No
Paper receipt to hold (may be convenient or inconvenient)	No	No	Yes

Characteristic	Option 1 Downtown one-way validation (default zone B)	Option 2 Downtown two-way validation (default zone C)	Option 3A/3B Optimized TVM plan (3B includes contactless pass)
REVENUE SECURITY			
Risk of loss from uncanceled tickets	None	None	Virtually none (requires passenger to make second trip in just hours)
Risk of loss from untagged trips	All "via Center City" travel except going to zones C/D (3%?)	All "via Center City" travel except going to zone D (4%?)	None
Risk of loss from missed zone validations	Medium (stops in zones C/D)	Low (stops in zone D)	Very low (requires deliberate evasion by passenger)
Risk of loss from missed on-branch fares	Low	Low	Very low (fare is already paid, even if not checked)
Ability to evade fares with alternate travel in paid direction	High	None	None
Ability to evade fares with reused tickets	None	None	Very low (ticket expires in 3 hours)
Ability to evade fares with associate tagging card off	Low (zone B)	Medium (zone A and zone B)	None
Ability to evade fares with minimum-value card	Low (zone B)	Medium (zone A and zone B)	None
SEPTA CONVENIENCE			
Number of sales transactions on board	Fewest	Few	Few
Types of on-board fares	2–On-branch fare by zone Additional zone fare	2–On-branch fare by zone Additional zone fare	1–Flat penalty fare
Cash handling required	Regular fares	Regular fares	Penalty fares only
On-board validation	Zones C/D only: card validation and sales transaction for every rider	Zone D only: card validation and sales transaction for every rider	All riders: visual inspection or bar-code scan, no sales transaction needed
Speed of validation transactions	Slow	Slow	Fast, doesn't require handling card
Must deal with passengers who don't have enough money to exit system	No	"Charlie on the MTA" problem	No
Captures all travel data	No, misses all inbound and via Center City trips	Yes, less detailed	Yes, train-specific

Characteristic	Option 1 Downtown one-way validation (default zone B)	Option 2 Downtown two-way validation (default zone C)	Option 3A/3B Optimized TVM plan (3B includes contactless pass)
HARDWARE REQUIREMENTS			
Center City TVM	Card vendors	Card vendors	Full-service
Center City turnstiles	Less complex	Most complex	None
Requires utility work at station stairways	Yes	Yes	No
Outlying TVM	None	None	Simplified: may be cashless
Outlying tag readers	Yes	Yes	No
COST FACTORS			
Devices to maintain	Card vendors, tag readers –fewest devices	Card vendors, tag readers –fewer devices	TVMs –most devices
Devices in field	Yes (parking)	Yes (parking)	Yes (parking and TVM)
Can reduce station agents	Yes	Yes	Yes
Can reduce train crew	Yes	Yes	Yes
Train crew involved in validation/collection	Yes	Yes	Yes
Can get cash off the trains	No	No	Yes
OTHER CONSIDERATIONS			
Platform security	Better	Better	Good, better if virtual barriers used (ticket required beyond painted line)
Crowd control	Yes, but dumb	Yes, but dumb	No
LONG RANGE CONSIDERATIONS			
Scalable	Constrained by space for turnstiles	Constrained by space for turnstiles	Not constrained
Can evolve into system for one-person operation and full off-vehicle collection	Cost-prohibitive	Cost-prohibitive	Yes

Notes:

Zone A = current zones 1 and 2, zone B = current zone 3, part of zone 4, zone C = part of current zone 4, all of zone 5, zone D = current zone 6

Concept Plan for Simplified Ticket Vending Machines

Matthew Mitchell *June 13, 2011* *version 1.0*
Send comments, questions, and suggestions to mitchell@dvarp.org

Besides making the ticket purchasing process easier for passengers, a "smart" and simple ticket vending machine can reduce NPT capital costs three ways. First, a simplified machine is cheaper to buy. Second, if we can speed transaction times, we will need fewer machines. Third, we can minimize cost for utilities, communications, and other supporting infrastructure at the stations.

Fortunately, the same features that make the New Payment Technology a "game changer" for transit can make it a game-changer for rail ticketing.

First, since all fare discounts such as round-trip and ten trip tickets are handled at the back end of the system (the system knows the rider's recent travel history and can apply discounts appropriately), there is no longer a need to sell multiply types of tickets. Similarly, since transfers are handled at the back-end, there is no need to sell a separate intermodal fare.

Second, if we make ticket vending machines available at all stations, there is no need for passengers to pre-purchase tickets. Therefore, the ticketing location is always the starting point of the passenger's trip—there is no need to allow for sales of tickets for other trips.

Third, since no pre-purchasing is necessary, tickets need be sold only for the fare period applying to the next train scheduled to arrive. Weekend fares would apply automatically when tickets are purchased on a weekend, and peak/off peak fares could be restored in a way that is transparent to the customer, if SEPTA believes this will better manage demand.

The object of this exercise is to demonstrate that using NPT technology, a ticketing process based on ticket machines typically used in parking applications can meet all the necessary requirements for RRD ticket sales, and do so in a very customer-friendly manner.

Machine characteristics

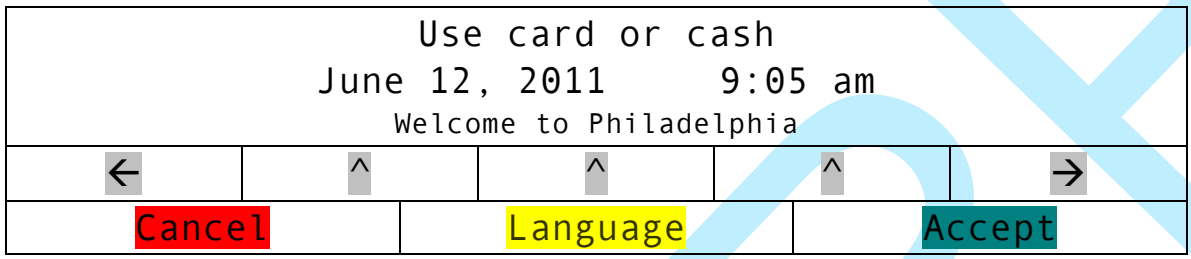
Parking kiosks of the type used on the streets of Philadelphia cost about $10,000 each (see *Philadelphia Inquirer*, June 12, B2 and other newspaper articles). They are solar powered and use wireless communications for credit/debit validation and other functions. Even allowing for additional costs to customize software for RRD use, these machines will likely cost one-fourth of SEPTA's estimates for conventional ticket machines ($53,500 each) and will save SEPTA tens of millions of dollars in capital costs, plus ongoing savings in maintenance/renovation costs from using an off-shelf product.

For purposes of this document, we will use the "Aura" kiosk from Metric Parking as an example, though this is not to say it is the only machine that can be adapted for RRD use or that it would be best. It is the machine used on the streets of Philadelphia, so many of you will be familiar with it. It accepts cash (bills and coins), magnetic-strip credit and debit cards, and contactless cards including stored-value cards, but it does not make change.

The customer interface of the Aura has a three-line alphanumeric display, a row of 5 selection buttons below it, and three more buttons under that. The lower buttons are colored red, yellow, and green. The machine prints a time-stamped ticket on completion of the transaction.

The Aura can print 4,300 tickets before needing to be resupplied, and it can hold up to 600 bills, according to manufacturer's specifications.

Figure 1. User interface of Aura parking kiosk



Options needed for an RRD ticket transaction

With current-generation rail ticket vending machines, such as the refurbished machines in service on NJ Transit, purchasing a ticket takes several steps. First the passenger inputs his/her destination. If the passenger wants to buy a ticket for a different origin point than the machine location, additional buttons must be pushed at this time. Next, the passenger must select from a menu of ticket types, including one-way, round-trip, ten-ride, senior citizen, child, and other options. Then the passenger selects the number of tickets desired. Finally, the passenger selects a payment method and completes the payment and the machine issues the ticket. The transaction sounds complex, but a passenger who has used the system before and is making a simple transaction can complete it in a few steps. "Soft keys" that change the function of machine buttons as the transaction proceeds can help, and the machines have a "memory" function that offers to repeat one of the customer's past transactions if the customer swipes a card previously used on the system. Broadband communication has replaced dial-up on these machines, so card validation is now much faster, and the entire ticketing transaction is faster.

The New Jersey machines are good, but with the investment we are making in the back-end of the NPT system, and if we commit to making TVMs available at every station, we can do better.

Tailoring a parking kiosk to RRD needs

The Aura kiosk has eight buttons, so we need to put all the necessary functions in those buttons. Two of them, the green and the red, will be to accept the transaction or cancel the transaction. We can use the yellow button as a "continue" or "more" function if the customer wants to purchase multiple fares in a single transaction, or we can follow the PPA example and use it to change the language in which menus are presented.

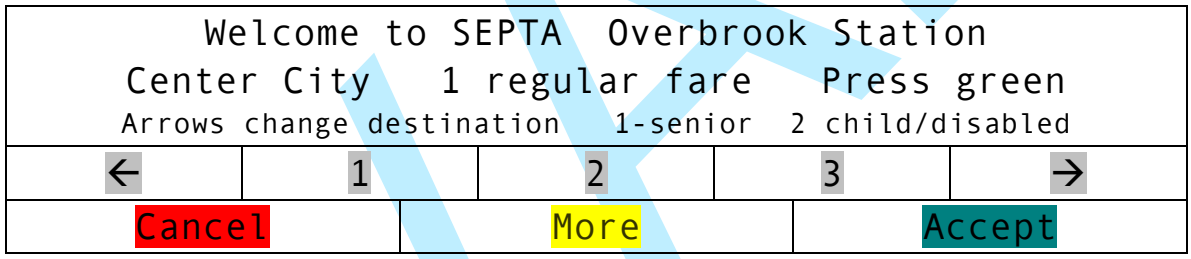
Since NPT eliminates the need to sell multi-ride tickets, and eliminates the need to sell tickets for other origin stations, the only options left for the customer are destination and class of fare (full, half, senior).

More than 90 percent of travel from outlying stations is to Center City. We can set that up as the default destination, so most riders will not have to push any destination buttons. For the passengers making on-branch or via Center City trips, a pair of arrow buttons cycle through the available zones for each trip: this system does not require us to reduce the number of zones or otherwise distort the fare structure to accommodate the payment system. At the end of the cycle, the selection returns to the default Center City option. Key destinations like the airport or Trenton can have their own spots in the sequence. An appendix to this document will show examples of how the system might work in practice.

That leaves three more buttons in the top row: we can dedicate one to senior fares and one to half fares. The last can be used for a language option or other feature. Because we presently have a flat senior fare for travel within Pennsylvania, pressing the "senior" button obviates the need to press any more buttons unless travel is out of state. It and the half-fare button are toggles: alternating between the reduced fare and the regular fare.

With this configuration or one like it, the great majority of RRD trips can be ticketed by pressing no more than one or two buttons (see "Sample transactions" below). This is actually less than needed to complete a transaction at SEPTA's central parking kiosks, which have proven to handle transactions quickly enough that only 4 machines are needed at lots that hold as many as 400 cars.

Figure 2. Aura kiosk configured for RRD use



Sample transactions

Regular fare to Center City: press the green button and pay.

Senior fare to Center City: press the "senior" button, press the green button, and pay.

Regular fare to Airport: press an arrow button until "Zone 5-Airport" appears on the display, press the green button, and pay.

Intermodal trip to stadium complex: press the green button for Center City and pay. The intermodal discount is applied by the back-end when the card is used on the subway.

Round trip to Center City: press the green button and pay. The round-trip discount is applied by the back-end when the card is used for the return trip.

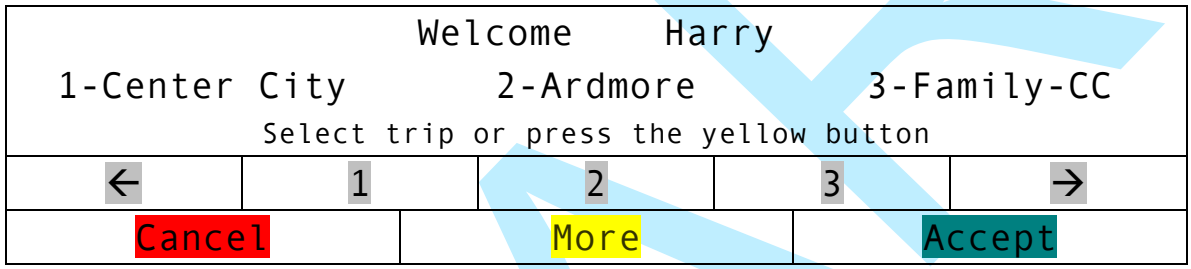
Independence Pass: press the green button for Center City and pay. The daily fare paid on any card is capped at the Independence Pass rate.

Memory and custom transactions

With two-way broadband communications available between the kiosk and the central NPT computer, we can have the same convenient memory function as NJ Transit uses. If the customer swipes his/her card first, the last three transactions can be presented on the screen, so the customer can press one of the numbered buttons to select that transaction.

And if the customer has set up an account with SEPTA and linked his or her payment card to that account, the options can even be customized by the user (see Figure 3). In this example, the third button has been programmed for a family trip: two adults and one child, to Center City. The passenger can use the NPT web site to select the trips to be displayed when the card is swiped first. With this, a complicated transaction like that family trip is handled with two buttons: the soft key to select the trip and the green button to complete the transaction.

Figure 3. Customized kiosk interface linked to registered payment card



Strengths and weaknesses of this system

The great strength of this system is that more than 90 percent of trips can be ticketed by pressing one or two buttons and swiping a card. Transactions could be handled in 10 seconds or less including card validation and printing a receipt. Second, this approach uses off-shelf technology that has proven secure and reliable even in urban settings. Capital costs could be reduced tens of millions of dollars, while maintenance and machine servicing is made easier. The kiosk can handle thousands of fare transactions (two weeks worth or more) before needing service to replenish ticket stock or remove cash.

The weakest area is in providing for on-branch and through-tunnel trips. However, these make up less than 10 percent of RRD travel, and many of these passengers are repeat customers who can take advantage of the kiosks' memory functions. On-branch and through-tunnel travel is also the Achilles heel of the RRD payment options based on turnstiles in Center City and/or tag-on, tag-off systems. Those payment options require a SEPTA employee to process those trips on the platform or on board.

Also, the simplified machines do not make change. While PPA machines do not give customers any recompense if they overpay, SEPTA machines can print a voucher that can be redeemed for cash at a Center City ticket office. Increasing use of cards to pay for fares will reduce the impact of this minor inconvenience.

Appendix–additional examples

Figure 4. Payment screen after customer pushes green button

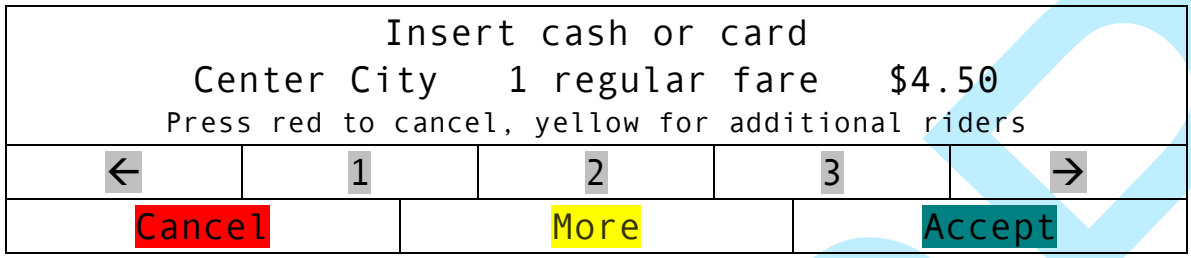


Figure 5. Display screen after customer pushes senior button

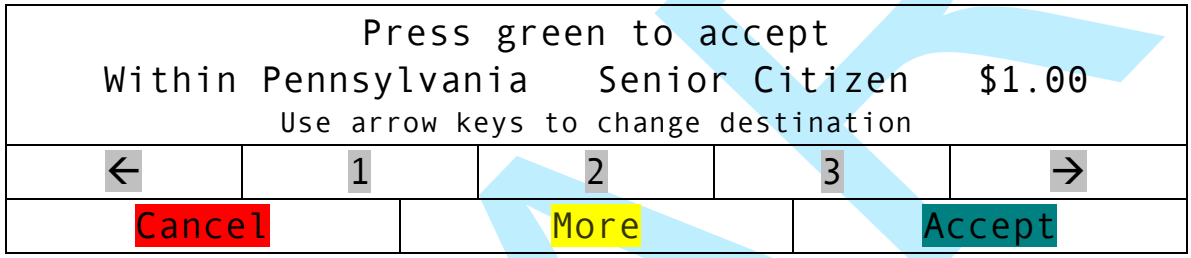


Figure 6. Display screen after customer pushes half-fare button

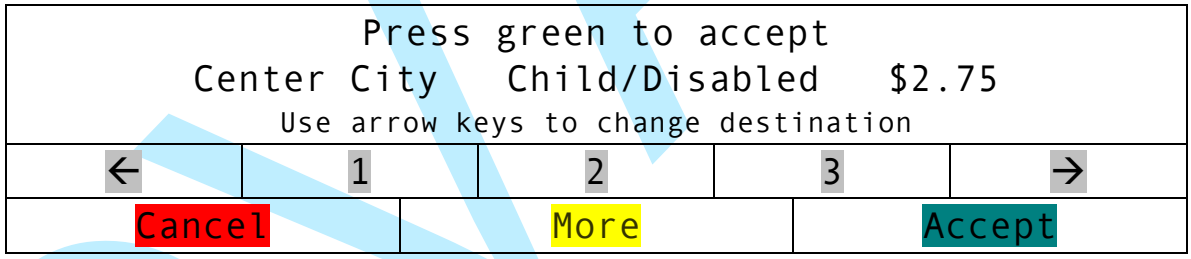


Figure 7. Completing a multiple-rider transaction

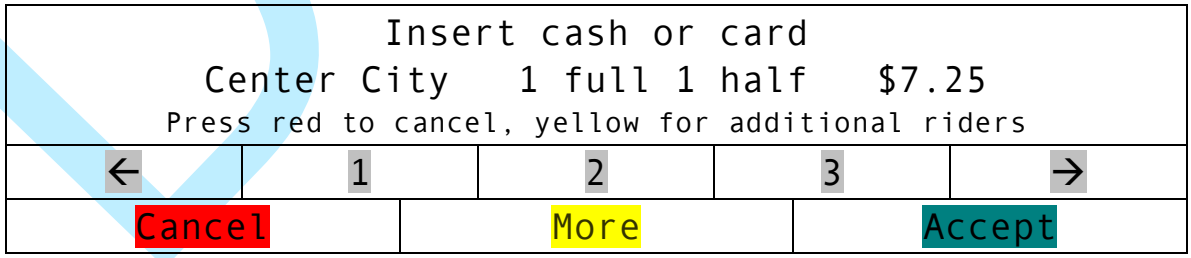


Figure 8a. Display screen as customer is changing destination

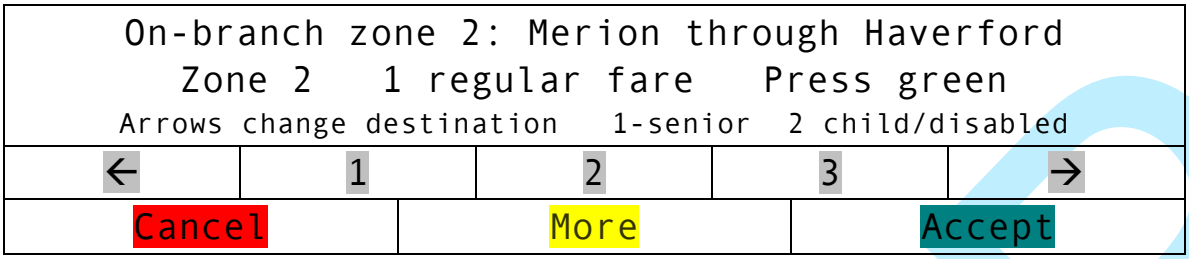


Figure 8b. Display screen as customer is changing destination

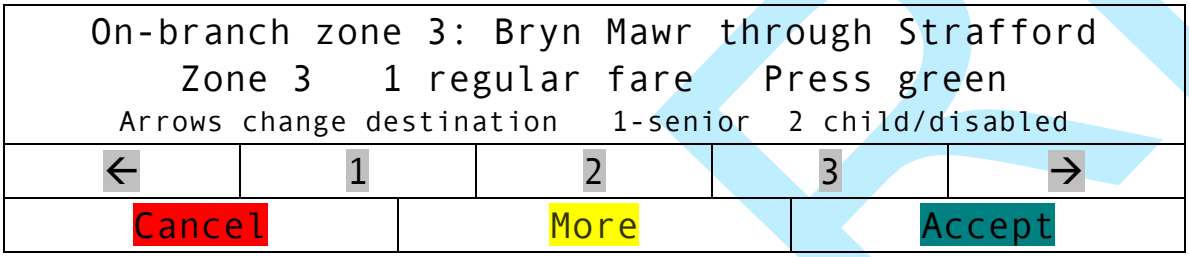


Figure 8c. Display screen as customer is changing destination

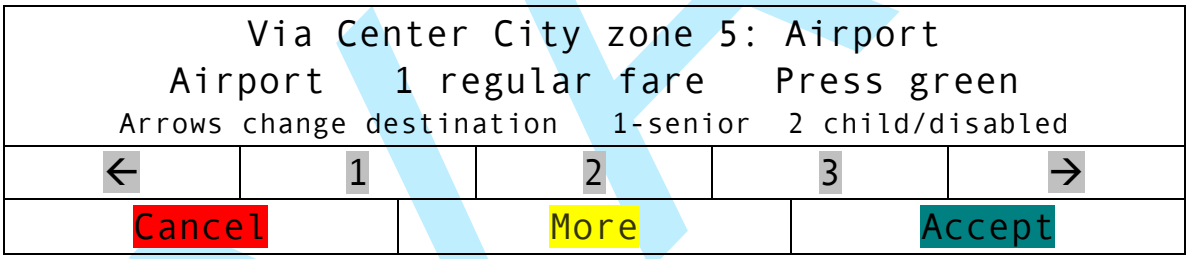


Figure 8d. Display screen as customer is changing destination