Virginia Department of Rail and
Public Transportation

Transit Service Delivery
Advisory Committee

SB1140 Performance-Based Funding Allocation Study

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Chapter 1: Introduction and Executive Summary of Recommendations

This draft report summarizes the findings and recommendations of a series of investigations related to the Commonwealth of Virginia's new performance-based transit operating funding allocation approach.

During the 2011 General Assembly session, Senate Joint Resolution (SJR) 297 directed DRPT to examine key issues related to the distribution of funding to transit agencies within the Commonwealth of Virginia. The legislation specifically called for the examination of Virginia's current transit funding practices with respect to performance, prioritization, stability, and allocation. Since 1987, state operating assistance has been allocated to transit operators based on their total operating cost relative to the total operating costs statewide for all transit providers that receive state operating assistance. The goal of the overall study was to assist the General Assembly as it considers how changes to the distribution methods for its capital and operating programs could help improve the effectiveness of public transportation funding. DRPT completed its work in December 2012 and delivered a report to the General Assembly (Senate Document No. 11). Subsequently, the 2013 General Assembly responded to the SJR 297 findings and passed SB 1140 that established a new process for allocating state operating assistance funding above $160 million. The General Assembly also created a Transit Service Delivery Advisory Committee (TSDAC) to work with the DRPT in the development of the performance-based operating assistance allocation methodology based on transit agency effectiveness and efficiency.

Parsons Brinckerhoff was tasked by the Virginia Department of Rail and Public Transportation (DRPT) to convene a Transit Agency Working Group and facilitate its review of transit data collection issues and potential performance-based measures, and convey the group's recommendations to the Transit Service Delivery Advisory Committee (TSDAC). The Working Group was charged with addressing several issues that were unresolved by the TSDAC. The Working Group was comprised of staff from representative transit agencies across the Commonwealth, and provided a diverse set of perspectives and experiences related to operating transit around the state. The specific tasks include:

- Review data collection issues and propose long-term strategies to ensure data integrity
- Consider incorporation of refined measures relative to the appropriate sizing of transit systems for the purposes of distributing transit operating assistance
- Undertake studies and evaluation of potential benchmarking for transit systems that have marginal room for improvement because of existing exceptional performance
- Review potential measures for capturing performance with regard to congestion mitigation and service to transit dependent populations

The Working Group discussed these issues over the course of four meetings held on December 16, 2013, January 28, 2014, February 20, 2014, and March 14, 2014. The methodology, findings, and recommendations of each of these tasks are documented in the chapters that follow. Additional details are presented in appendices.

1.1 Executive Summary of Recommendations

Based on the outcome of Working Group discussions, key recommendations are as follows:

- **Data Collection:** The Working Group recommends a set of standards related to data collection practices that will be implemented for use during the FY16 allocation cycle, and notes the important leadership role that DRPT has in providing resources for improved data collection. The recommendations include:

    - Standard set of methods for calculating core measures of the operating fund allocation model, including data definitions, data collection methods, data processing methods, and data verification methods
    - Creation of a state accountability policy
    - Additions and revisions to the state's On-Line Grant Administration platform
    - Additional state technical assistance targeted for data collection

- **Sizing of Transit Systems:** Based on the Working Group's discussion, no measure(s) were identified as better indicators of system size than those currently being applied, ridership and operating cost. Therefore, the Working Group recommends to TSDAC that the current size-weight portion applied to allocate new operating formula funding remain unchanged.

- **Exceptional Performance:** The Working Group recommends against implementing an Exceptional Performance measure as part of the performance-based operating funding allocation formula. The group further recommends that DRPT re-evaluate this measure in the future along with any potential updates to the operating assistance formula as a potential allocation method if new funding to support transit programs becomes available.

- **Congestion Mitigation:** The Working Group recommends against implementing a Congestion Mitigation measure as part of the operating assistance allocation formula as well as one that would require new funding or a carve out from the existing formula. The Working Group instead recommends the establishment of a discretionary pilot grant program to provide targeted assistance for transit congestion mitigation needs. The pilot program would function as part of the existing Demonstration Project Assistance program. This program may serve as a model to determine the effectiveness of providing targeted state funding for this purpose, to inform any review of a broader program at a later time.

- **Transit Dependent Objectives:** The Working Group recommends against incorporating a Transit Dependent measure into the performance-based operating funding allocation formula as well as one that would require new funding or a carve out from the existing formula. Instead, the Working Group recommends the establishment of a pilot discretionary grant program to provide targeted assistance for transit dependent needs. This pilot program would function as part of the existing Demonstration Project Assistance program. This program may serve as a model to determine the effectiveness of providing targeted state funding for this purpose, to inform any review of a broader program at a later time.

These recommendations are documented at length in this report.

1.2 Funding of Recommended Programs

One of the questions addressed by the Working Group was how to fund the proposed pilot programs to address congestion mitigation and transit dependent objectives. Options explored included re-allocating Mass Transit Fund operating assistance, changing the apportionment of Mass Transit Fund revenues, applying existing Special Programs funds, or requesting new funding. Each of these options is summarized below.

- **Reallocate Existing Mass Transit Operating Assistance:** Presently, approximately 72 percent of Commonwealth Mass Transit Fund revenues are applied to operating assistance, which is allocated according to the performance-based transit operating funding allocation methodology recommended by TSDAC and adopted by the Commonwealth Transportation Board (CTB) in 2013 for funding above $160 million annually. This study investigated changing the operating funding allocation formula to address congestion mitigation and transit dependent objectives. However, the Working Group determined that a formula-based funding allocation method was not appropriate to accomplish these objectives, as it would thinly spread the funding across many agencies instead of providing targeted support for the strongest proposed projects and programs. In addition, appropriate statewide data to allocate funds according to these measures does not currently exist. Furthermore, CTB approval would be needed to change the formula, and the earliest this could be accomplished is for the FY (fiscal year) 2016 grant year, which will be allocated in the winter/spring of 2015. For each of the above mentioned reasons, this approach is not recommended.

- **Reapportion Mass Transit Fund Revenues:** Senate Bill (SB) 1140 specifies how the Commonwealth Mass Transit Fund is to be apportioned across special programs, operating assistance, and capital assistance. Approximately 3 percent of funding is be allocated to special programs, with approximately 72 percent for operating assistance and 25 percent for capital assistance. These percentages could be changed, and new funding categories specified, to provide funding to address congestion mitigation and transit dependent objectives. However, this step would require approval by the CTB and the General Assembly. Given the necessary lead time for legislative approval, the earliest this could be approved is during the 2016 legislative session, with implementation in FY 2017 grant year, which will be allocated in the winter/spring of 2016. Working Group members also expressed concern about permanently diverting funds from existing programs to support these objectives. The legislative approval required to enact this option also limits the flexibility of the Commonwealth to test funding for these objectives on a trial basis, and make future changes to the program. For each of the above mentioned reasons, this approach is not recommended.

- **Apply Existing Special Program Funds:** Mass Transit Fund revenues not to exceed 3 percent are annually dedicated to special programs, which includes ridesharing, transportation demand management (TDM) programs, experimental transit, public transportation promotion, operation studies, and technical assistance. By law, these funds may provide up to 80 percent of the cost of the development and implementation of projects where the purpose of such projects is to enhance the provision and use of public transportation services. Much of this funding is allocated through the Demonstration Project Assistance program, a flexible program that invests in projects to improve the efficiency of public transportation providers in all functional areas; offer creative approaches to identify and access public transportation markets; increase private sector involvement in all areas of public transportation; raise the utilization and productivity of existing public transportation services; and support safety and security investments. The Demonstration Program provides an existing vehicle to award grants that address congestion mitigation and transit dependent objectives. It permits administrative flexibility to establish a pilot discretionary grant program to provide targeted

assistance to address these objectives. Therefore, applying existing Special Program funds through the Demonstration Program is the recommended funding approach.

The degree to which funds from this program are available to support congestion mitigation and transit dependent objectives depends on the demand for Special Programs funds from other grant applications, as well as the degree of flexibility DRPT has in funding Special Program elements through other sources. In FY 2014, significantly less than 3 percent of Mass Transit Fund revenues were applied to Special Programs, in part because the Virginia Department of Transportation (VDOT) Transportation Efficiency Improvement Fund (TEIF) was applied to cover TDM and transportation management project (TMP) objectives. In addition, there were relatively few grant applications received by DRPT for Demonstration Program or other grants funded through Special Programs.

If, however, in future years VDOT funds are not available to cover TDM and TMP grants and these programs must be funded through Mass Transit Fund Special Program monies, then the remainder of Special Program funds available to address congestion mitigation and transit dependent objectives through the Demonstration Program will be diminished. Therefore, while this option is the recommended funding approach, its viability depends on the availability of funding from other sources—primarily funding flexed to DRPT from VDOT. Special Program funds should be made available to support the pilot discretionary grant programs to address congestion mitigation and transit dependent objectives to the maximum extent that funds annually permit.

- **Request New Funding:** Funds for congestion mitigation and transit dependent objectives may be addressed through new funding approved by the General Assembly, or new funds received through other channels. Initially, Working Group members considered recommending that these objectives be addressed only through new funds. However, with approval of the first new state funding for transit in a generation in 2013 (making approval of any additional new transit funding unlikely in the near-term), Working Group members reconsidered this proposal and instead recommended an existing funding source. However, when and if the General Assembly once again addresses transit and transportation funding, dedicated funding for these objectives should be considered. In the mean time, the proposed discretionary programs will serve as models to determine the effectiveness of providing targeted state funding for congestion mitigation and transit dependent objectives.

1.3 Next Steps

DRPT has a key leadership role in implementing the recommendations of the Working Group, in terms of funding, administration, oversight, and technical assistance. Program Managers and other key points of contact for transit agencies within DRPT must be well-versed in the updated data collection practices and commensurate changes in OLGA. The proposed pilot programs addressing congestion mitigation and transit dependent outcomes may be implemented administratively by DRPT, but will require appropriate prioritization within available funds to become a reality. Implementing new programs and protocols will require concerted effort by staff, in addition to existing responsibilities. Local transit agencies are likely to have questions about these recommendations and any new funding programs, and DRPT staff must stand ready to provide appropriate technical assistance to address these queries.

In short, the successful implementation of these recommendations demands careful attention by DRPT management and staff.

Chapter 2: Data Collection Practices

This chapter describes the Transit Agency Working Group's consideration of standardized data collection and reporting practices for the data used in Virginia's performance-based transit operating funding allocation formula.

The results from data collection in the FY14 and FY15 allocation cycles[1] revealed issues with data integrity and collection practices, demonstrated in part through agency reporting of data with significant year to year variances that could not be easily explained. It also revealed that DRPT had limited knowledge of agencies' data collection practices, and had no standard policy in place for verifying agency data. Given the relationship between data collection and funding allocation, investigating the issues related to the data collection process became a DRPT priority.

This chapter describes the approach to the data collection practices task and summarizes the findings presented by the consultant team and recommendations developed with the Working Group. The Working Group met four times between December 2013 and March 2014 to discuss and comment on the task research findings. The chapter is organized by methodology, research findings, working group discussion and findings, and recommendations. More detailed information about the research results, as well as supporting materials, can be found in the appendices.

This chapter recommends a set of standards related to data collection practices that will be implemented for use during the FY16 allocation cycle. The recommendations include:

- ***Standard set of methods for calculating core measures of the operating fund allocation model:***
    - ***Data definitions***
    - ***Data collection methods***
    - ***Data processing methods***
    - ***Data verification methods***

- ***Creation of a state accountability policy***

- ***Additions and revisions to the OLGA platform***

- ***State technical assistance targeted for data collection***

Note that the standards will be developed into specific policy documents with the guidance of DRPT and the Working Group in the upcoming months.

2.1 Methodology

The data collection task is focused on assessing the data practices of transit agencies and recommending standards for data collection, verification, and reporting practices. Accurate data collection is crucial to the allocation formula because the data determines how the funding is divided among agencies. Data is also used to calculate the statewide average, on which the performance-factor trend

[1] FY 14 allocation used data collected in FY 11 and FY 12; the FY 15 allocation was based on data collected in FY13. Variances were found when comparing FY11 to FY 12 data and FY 12 to FY 13 data.

analysis portion of the operating allocation formula is based. Inaccurate data used in the calculation of the statewide average could skew the trend analysis for all agencies.

The goal of the data collection task is to formulate a set of standards that can be easily implemented and will ensure accurate and consistent data reporting to DRPT. This task will result in a recommended set of standards for data definitions and agency collection, processing and verification practices, as well as an accountability policy.

In order to develop a set of recommendations that will be useful to the DRPT and local transit agencies, the consultant team conducted research on transit data collection practices both in the transit industry and in Virginia. The task research methods were:

- **Survey of Virginia local transit agencies**: A survey was developed and administered to local transit agencies to understand their current data collection practices. The survey covered four main topic areas:

  - Data collection, processing, and verification methods for core measures of the operating allocation formula
  - Resources, both technological and human, committed and available to agencies for data collection
  - Data reporting to DRPT (via the On-Line Grants Administration system) and outside of DRPT
  - Data collected for other performance measures

  The survey was distributed to all agencies via the Survey Monkey online platform, and answered by 32 out of 39 agencies. The full survey can be found in Appendix 2A.

- **Interview with Virginia local transit agencies:** The consultant team and DRPT selected 13 agencies for 60-minute follow-up interviews to dig deeper into the issues discussed in the survey. The interviews focused on understanding current data collection practices, and the needs and challenges of implementing standards. The interviews also discussed agencies' perspectives on incorporating additional performance measures, namely exceptional transit performance, congestion mitigation, and transit dependent outcomes.

  The 13 agencies were chosen based on geographic location in the Commonwealth, size of agency based on ridership and service area, type of transit service offered, and challenges and expertise expressed through the survey results. The agencies interviewed were:

  - Arlington County (ART)
  - Blacksburg Transit
  - Town of Blackstone/Blackstone Area Bus
  - Charlottesville Area (JAUNT)
  - District Three Public Transit
  - Hampton Roads Transit (HRT)
  - Loudoun County
  - Greater Lynchburg Transit Company (GLTC)
  - Potomac and Rappahannock Transportation Commission (PRTC)
  - Roanoke (RADAR)
  - Washington Metro (WMATA)
  - Williamsburg Area Transit Authority (WATA)

- Winchester Transit

The interview guide used for agency interviews can be found in Appendix 2A.

- **Best Practices Research:** The consultant team conducted a literature review to understand best practices regarding data collection and reporting in the transit industry. The following studies were reviewed:

  - TCRP 141, "A Methodology for Performance Measurement and Peer Comparison in the Public Transportation Industry." (2010)
  - Cambridge Systematics, "Introducing Performance into Public Transportation Allocation Formulas." (2012)
  - TCRP 88, "A Guidebook for Developing a Transit-Performance-Measurement System." (2002)
  - Research Results Digest 361, "State DOT Public Transportation Performance Measures: State of the Practice and Future Needs." (2011)
  - TCRP Synthesis 56, "Performance-Based Measures in Transit Fund Allocation." (2005)
  - TCRP Synthesis 34, "Data Analysis for Bus Planning and Monitoring." (1999)
  - Handbook of Automated Data Collection Methods for the National Transit Database (2003)

- **Practices of Other States:** The consultant team identified and interviewed state agencies that collect performance data and/or allocate state funds to transit operations. The goal of these interviews was to glean best practices and lessons learned from practitioners who were or may be implementing data collection policies. The agencies interviewed were:

  - Kansas Department of Transportation
  - New York State Department of Transportation
  - North Carolina Department of Transportation
  - Ohio Department of Transportation
  - Pennsylvania Department of Transportation

  State agencies were selected based on case studies from the literature and consultation with DRPT staff about peer states. The best practices interviews were conducted after the literature review and survey, concurrently with the local transit agency interviews.

The consultant team also interviewed staff from the National Transit Database (NTD) to understand their perspective on data collection practices. NTD has been the repository for transit agency data for decades, and the staff has experience developing and implementing standards for data collection and reporting. An important step in the methodology was the incorporation of comments and additional findings from Working Group meetings. The Working Group provided critical feedback and suggestions for thinking about policy issues that affect agencies with a range of resources and capabilities.

2.2 Research Findings

The results of the survey analysis, local agency interviews and best practices research provided the Working Group with a strong foundation from which to discuss findings and develop recommendations. The survey results and best practice interview results can be found in Appendix 2B. The following findings reflect high-level takeaways from the research. These ideas were used to spark Working Group

discussion of improvements to data collection practices, the nature of DRPT assistance that would be most helpful, and potential data collection standards.

Data Collection Findings

Data Definitions

- Large and small agencies report that current definitions lack detail, and in some instances, consistency--for example, what defines “cost” or “equipment”?
- Not clear that all agencies are capturing full costs of their operations and services because of confusion over what constitutes costs
- TSDAC definition of ridership uses NTD definition of unlinked passenger trips,
- NTD and DRPT definitions, and thus reported data, should be the same except when DRPT explicitly requires agencies to use a specific calculation unique to the DRPT

Data Collection Process

- Data collection involves a system of techniques, some manual, some electronic
- Staffing is often a challenge; ideal is a team of individuals dedicated to data and maintenance of data tools. Ensuring consistency may require a dedicated staff member to review data daily

Data Verification

- Technique requires checking one source against another. The greater access one has to more data sources, the more robust the verification process
- Not all agencies are able to tie ridership data to revenue data
- Most agencies are comfortable that they are able to verify data by checking one source against another or by experienced staff spotting anomalies in data

Technology

- Technology improves data accuracy and verification; also creates ongoing responsibilities (training, maintenance, upgrades)
    - Positive cost-benefit of obtaining electronic tools is not a given for some agencies—it depends on agency goals, capabilities, vehicles used
    - Some software systems work better than others based on agency goals, staff capabilities, and vehicles
    - Technologies that require additional interface/responsibility from drivers or passengers may not be suitable for some
    - Some APCs work better than others; NTD is developing standards for incorporating APC data into ridership counts
    - Some agencies have changed technology providers to reduce costs
    - Some Northern Virginia agencies rely on WMATA ridership software for the allocation of that portion of their ridership using the SmarTrip card
    - Under DRPT’s tiered capital allocation approach, data collection technology acquired with vehicle purchases and/or implemented systemwide receives the highest state participation level of funding (Tier 1). However, new technology acquired later and/or not implemented systemwide may only qualify for a lower state participation level (Tier 3.) This may be a disincentive to implementing data collection technology improvements not tied to new vehicle purchases.
- Standards should be based on agency capabilities, rather than rural/urban distinction, with a push for increasing agency capabilities over time

The literature review and interviews also provided additional high-level findings specific to ridership data collection methods as seen below. This information was helpful in sparking discussion on which technology options would be the most effective as standards, and understanding issues that may arise in implementing standards for agencies that need to transition to new technologies.

Ridership Data Collection Sources

Electronic Methods

Electronic Registering Fareboxes (ERFs)

- Advantages: Can record every fare transaction including time of day, fare category, fare medium and route; can increase ability to collect fares; more accurate data
- Disadvantages: Cannot measure mileage or hours; need regular maintenance; agencies that have a low percentage of paid fares (i.e., students pay no fare with ID)

Automatic Passenger Counters (APCs)

- Advantages: Provide data to calculate passenger miles; provide route- and stop-specific ridership data
- Disadvantages: Different types of APCs have different strengths and weaknesses depending on bus environment; need informed regular maintenance by people who understand the data needs

Smart Cards

- Advantages: Provide a way to distinguish among fare types
- Disadvantages: Implementation period may be long (6-24 months); agencies that use a smart card without ERFs would need operators to record cash transactions

Mobile Data Terminals

- Advantages: Can supplement dispatching software; record vehicle location, passenger information, mileage, etc.; can completely replace driver/operator logs
- Disadvantages: If intended to provide real-time data, only as good as wireless coverage in area (or must be uploaded after driver shifts)

Manual Methods

Operator Trip Cards/Trip Sheets/Manifests/Farebox Revenue Counts

- Advantages: Does not require extensive capital costs or special technological knowledge
- Disadvantages: Errors tend to be random; accuracy in both data collection and transcription is an issue

Operator Click-Counters (or Hand Held Units)

- Advantages: No issues with coverage or software problems; low cost
- Disadvantages: Additional duty for driver; data needs to be entered into electronic data collection system manually; portability can lead to loss or damage

The following findings came from interviews with local transit agencies on how the state could be helpful in improving the data collection process, including through the provision of technical assistance. Several

of the suggestions were adopted in some form by the Working Group during the recommendation development process.

Improvements to the Reporting Process and Technical Assistance:

- Clarify data definitions in all written/online locations
- Build identification of major variances and feedback into OLGA when data initially submitted
- Provide annual forum for agency executives
- Sponsor agency exchanges regarding industry best practices, technology information exchanges, data summits
- Include needed/desired technologies on approved state contract product order lists, or joint procurement
- Provide information on best accurate and reliable technology sources for agencies of all capabilities, e.g., availability of driver-friendly simplified electronic technology for ridership counting

The initial surveys revealed aspects of the On-Line Grants Administration (OLGA) system that some agencies found more difficult to use. Follow-up interviews provided additional perspectives regarding OLGA, as shown on the following page.

OLGA:

- Several agencies remarked on OLGA improvements:
  - Reporting process is clearer
  - Data guidelines are better defined
  - DRPT's simplification operating cost definition (now depreciation excluded)

- Several agencies unclear about OLGA annual deadlines
  - Reported receiving short (weeks) notice about year-end reporting deadline

- Agencies described issues with discrepancies between what is submitted to OLGA and what DRPT receives
  - At least one agency reported that data entered and "accepted" by OLGA later disappeared from system
  - Data entered in OLGA by agency are different than what is received on back end by DRPT; issue is improving

- Several agencies requested other improvements in OLGA
  - Some agencies suggested updating software and including more detailed definitions within OLGA
  - Ability for transit project manager to "see" data entry from transit agency view
  - Increasing ability to provide data explanations throughout grant applications

- Ability to access multiple years of previously entered OLGA data would be helpful
  - Perhaps as an Excel export
  - Perhaps using OLGA as a dashboard
  - Create comparative tool for agencies across the state (for agency use)

The following are findings from other states that collect performance data from their local transit agencies. Many of these findings were used to develop recommendations for state technical assistance, verification, and accountability policy.

Other States:

- States interviewed have attempted to create and/or implement a performance measurement system
  - The process of creating performance measure system can be difficult, or can be stalled due to decreased funding or complexity in creating an "equitable" system. Two states' performance measurement systems are not tied to funding
  - Allocation models reviewed reflect compromise between state and local agencies, or modification of formulas due to lower level of funding

- Verification techniques vary from state to state, but have staff review for variances in common
  - PennDOT implements clearest verification guidelines through "Certification of Data" form (see document in Appendix 2C)

- Several states use an accountability policy that local agencies must follow to receive funding
  - Penalties, such as loss of funding, are enforced if agencies are consistently late in reporting data or regularly submit inaccurate data

- States provide technical and/or data collection training, tailored state staff assistance, consultant and/or other resources to local agencies:
  - States provide capital assistance for new technology implementation and upgrades
  - States provide assistance through annual or triennial audits or performance reviews
  - Ohio DOT is developing a Training 101 series to assist new staff in learning components of transit operations, including data collection
  - NYSDOT, KDOT, NCDOT have held data summits, hosting agency representatives for day-long data standards training and peer exchange
  - KDOT program managers meet with rural agencies 4-6 times a year to provide training, tailored assistance, and technical resources

2.3 Working Group Discussion and Findings

During the course of four meetings held December 16, 2013, January 28, 2014, February 20, 2014, and March 14, 2014, the Working Group provided comments and additional findings in response to the information presented above. Given the scope of the data collection task and limited time available during these sessions, the discussions focused particularly on ridership data collection and verification practices, the OLGA system, and recommendations for the final set of standards for data practices. Each of these discussions is summarized below.

2.3.1 Data Collection Practices

The first three meetings revolved around the current practices employed by local agencies in collecting and reporting data, with the goal of increasing the accuracy and consistency of data reporting to DRPT. The Working Group provided suggestions for areas that needed improvements, starting with data

definitions and how agencies were collecting data for the core measures used in the operating allocation formula.

Working Group members discussed the need for clear and accessible definitions to ensure that agencies were consistent in how they determine the data reported to DRPT. The recommendation from the discussion was to create clear definitions, as well as highlight differences between DRPT definitions and NTD definitions when applicable. The idea of creating a searchable Frequently Asked Questions (FAQ) document was also raised, which would mimic the FAQs provided by FTA on the National Transit Database. The searchable FAQ document would allow agencies to troubleshoot common issues on their own before contacting their grant administrator at DRPT. Also suggested was that DRPT appoint a single point of contact to provide consistent data definitions.

Related to the notion of standardizing collection methods was the discussion on understanding available technologies for collection methods, and which were appropriate for agencies based on their capabilities and resources. A recommendation from the Working Group was the creation and DRPT approval of a set of standard data collection methods that agencies could choose from to ensure consistency among agencies that have similar resources.

The subject of user-side subsidized trips (and their associated costs) was referenced during the data collection discussion. (One agency currently provides user-side subsidies, funded by a third-party grant, for some taxicab trips.) While user-side subsidies are included within the pilot programs recommended to be funded through the Demonstration Project Assistance program, the issue of whether these trips and their subsidies should be included as a component of ridership and operating expense data for use in the operating funding allocation model was not deliberated by the Working Group.

2.3.2 Data Verification Practices

The Working Group also discussed what policies should be implemented to assist DRPT in ensuring data accuracy. Data accuracy and validation are a priority for DRPT because it wants to guarantee that high quality, accurate data is being submitted for use in the allocation formula. Through discussion of the survey findings it became clear that no common verification process is used across agencies, and that the creation of verification standards that can apply statewide is important.

The discussion highlighted the lack of a certification process for non-financial measures that would be akin to the certification process exercised by an auditor for transit financial data. DRPT would like to implement a policy to require certification by a transit agency's senior executive or governing board that the agency is adhering to the data standards policy and that data submitted to DRPT was collected and reported accordingly.

2.3.3 OLGA and Technology Improvements

Another topic of a discussion was OLGA's role in the reporting process and improvements that could be made to the system to support improved data practices. A couple of issues were discussed related to the OLGA interface and disconnect between agency submittals and DRPT reports. Members suggested that OLGA be upgraded to permit agencies to see a summary of their data entries before final submittal, as well as a comparison to the agency's prior year's submittal. Agencies would also like confirmation that data reports received by DRPT match agency submittals.

Additionally, members suggested that OLGA be enhanced to allow agencies to view and track variances from the previous year's submittal when entering their annual data. Members suggested that a helpful

feature in OLGA related to this process would be building in triggers that force agencies to explain variances (outside a pre-determined threshold) in year to year data, e.g., 700,000 monthly riders instead of 600,000) Finally members expressed the desire to create a place in OLGA for agencies to explain any variances between the current and past years' data even when differences did not exceed the threshold.

In addition to OLGA, the Working Group also discussed the procurement of data collection technology. The Working Group supports the idea of maintaining effective data collection hardware and software (pre-approved by DRPT) on the state contract lists, which would be helpful to agencies trying to procure new technology. A member raised the issue that pooled procurement might be looked upon unfavorably by FTA, and that DRPT should pay special attention to structuring a pooled procurement policy within FTA rules.

2.3.4 Data Standards

The last two Working Group meetings transitioned from discussing existing local agency data practices and research to assessing reactions of the Working Group members to recommendations for data practice standards. The Working Group agreed with a number of the recommendations presented and suggested additional recommendations and goals for the final set of standards.

The recommendation was made that verification methods should specify how frequently cross checks should occur, and that financial audit should include review of verification method for fare revenue. Also related to verification was the suggestion that variances in operating expense have a more conservative threshold of 5 percent, rather than the 10 percent recommended for other measures, to further DRPT interest in assuring the efficient use of state funds. Another suggestion was for the certification document to include a checklist of data definitions and collection methods to document the techniques used by agencies to collect and verify data.

Members suggested that annual technical workshops on best practices for data collection be part of the annual Virginia Transit Association meeting, and that data managers be invited along with senior executives. The Working Group's comments and suggestions were incorporated into the recommendations detailed in the following section.

2.4 Recommendations

To accomplish the goal of ensuring accurate and consistent data reporting by local transit agencies reporting to DRPT, the consultant team, along with the Working Group and DRPT, proposed a set of potential standards to guide agency data collection and reporting practices. In most cases, these recommendations are based on existing practices within Virginia or other states. The ideas were shaped to reflect local agencies' resources and transit agency and DRPT goals.

A summary of the recommendations is illustrated in the matrix in Figure 2.1 below. The matrix separates the standards for large urban and college town systems and those for small urban and rural systems to reflect varying resources of the agencies, and illustrates the role of the standards in the collection and reporting process. The bold text indicates recommendations for goals that agencies and DRPT should implement in the future. They are discussed in further detail later in this section.

Figure 2.1 Matrix of Standards for Large Urban/College Town and Small/Rural systems

COLLECTION PROCESS

	Large Urban/College Town	Small/Rural
Data Definitions	Existing DRPT data definitions **DRPT to clearly document and distribute definitions**	
Collection Methods	Fixed Route: ERF, AVL system, scheduling software, accounting/payroll systems Demand Response: Mobile data terminals, scheduling software	Fixed Route: Manual: cash fareboxes, manual ridership count including free fares, scheduling software **Agencies to move to simple electronic systems in 3 years** Demand Response: Mobile data terminals, scheduling software
Processing Methods	Electronic database (e.g., Microsoft Excel, Access) **DRPT to create spreadsheet templates to institute uniform calculations**	
Verification Methods	Staff review for anomalies; cross check 2 or more sources of data **DRPT to incorporate automatic variance flags into OLGA**	

Note: **Bold text** in graphic refers to recommendations for goals that are discussed in further detail later in this section

The recommendations for data collection and reporting on the following pages are categorized by:

- Data collection practices for the core measures used in the operating fund allocation model including:
  - Definitions
  - Collection methods
  - Processing methods
  - Verification methods

- Accountability policy that will:
  - Outline data collection and verification standards
  - Outline agency staff role in verification of reported data

- OLGA platform revisions to:
  - Improve platform usability for agencies
  - Assist agencies in verifying reported data and submitting supporting documentation

- State technical assistance targeted for data collection regarding:

- Assistance to agencies in procuring data collection-related technologies
- Exchange of lessons learned and best practices regarding data collection processes among agencies

The recommended standards are the baseline practices that should be implemented by agencies to ensure they are producing accurate and verifiable data. It is understood that there are agencies that, as an internal practice, employ more robust collection and reporting standards than may be suggested in the recommendations. (Those agencies should continue using those techniques.) To motivate all agencies to implement industry best practices and technological advancements, the recommendations should be reviewed, and if appropriate, updated every five years through coordination led by DRPT. Five years provides ample time for agencies to transition to and implement new technologies, and encourages all parties to remain current in their use of best practices.

2.4.1 Data Collection Practices

2.4.1.1 Data Definitions

DRPT has an established set of definitions for core measures, and thus new data definitions are not needed. A finding from the Working Group discussion and transit interviews was to clarify DRPT's definitions for reported data by highlighting existing guidance to ensure that all agencies are consistent in how they measure core metrics in the formula. Given that most of the local transit agencies report to NTD as well, it was suggested that the guidance be amended to specify those instances when DRPT and NTD definitions deviate from each other. To be most useful, the definitions would be highlighted in the Program Application Guidance document and made easily accessible to agencies when entering data in the OLGA platform.

Recommendation: DRPT should provide clear definitions of required measures for the allocation model in the DRPT Program Application Guidance and make them easily accessible on the OLGA platform. When applicable, differences between DRPT and NTD definitions for measures required by DRPT should be described in the guidance.

2.4.1.2 Data Collection Methods

Standard data collection methods will ensure consistency in the reporting process by providing agencies with a set of accepted tools they can use to collect data. The creation of minimum standards and goals will also motivate agencies that have not incorporated new technology to adhere to standards to improve the accuracy and consistency of their data. The recommendations below are categorized by measure to reflect the different tools used to collect data for each.

2.4.1.2.1 Ridership

Ridership collection methods vary depending on the resources of and services offered by the local transit agency. The standards outline collection methods for agencies that use electronic or manual methods, as well as for those that operate fixed route and demand response systems.

For agencies operating fixed route service, the electronic ridership collection methods are typically electronically registering fareboxes (ERFs) and automatic passenger counters (APCs). Many large agencies that have ERFs on every vehicle do not have their fleets fully equipped with APCs, so APCs cannot be used in lieu of ERFs for ridership counts. APCs are useful because they count each passenger independent of farebox transactions, which can be important for routes that have a large number of free

or prepaid-fare/pass customers who are not required to access the farebox. However, there are technological and maintenance issues that can reduce their accuracy. There also are different benefits to different models of APCs depending on the vehicle the device is used on, and keeping the machine well calibrated is critical to ensuring accurate data readouts. Given these additional issues, APCs are not included as a standard tool to measure ridership for use by agencies that employ electronic methods. Instead, ERFs are the standard tool from which agencies should gather ridership data. There may be exceptions to this standard, however, based on the nature of the users encountered by the agency and the fare system they employ.[2]

For agencies that operate demand response service, the electronic methods used to collect ridership data are scheduling systems and mobile data terminals aboard the vehicles. Mobile data terminals may communicate with the agency's central dispatch office or record data entered by the driver/operator that can be downloaded to an agency's database later. Other than passenger information, the mobile data terminal can also display mapping, mileage, and safety information.[3] If a trip is recorded in the scheduling software, the agency must verify that the actual pickup occurred before reporting the ridership.

Agencies that employ manual methods, whether they operate fixed route or demand response services, use the techniques of drivers entering passenger data into a log, on tally sheet, or via a click-counter device. While appropriate for smaller agencies, the goal is for these agencies to move to more automated collection methods over time. It is also important that this data be entered into a database or spreadsheet and stored electronically by the agency.

Recommendations: For local transit agencies that operate fixed route service and use electronic methods, the standard is to collect ridership data using ERFs. For agencies that operate routes with a large number of free or pre-paid/pass customers who are not required to conduct a transaction at the farebox, APCs, sampling consistent with NTD standards, or both, are acceptable for collecting ridership data on those routes.

For agencies that operate demand response service and use electronic methods, the standard is to collect and verify ridership data from the scheduling system and mobile data terminals.

2.4.1.2.2 Operating Expense

The survey results demonstrated that all agencies collect operating expense data using financial accounting software, which the Working Group believed to be adequate. The standard is to maintain the practice of using the available financial or accounting systems to collect operating expense data.

Recommendation: The standard for collecting operating expense is to use existing financial or accounting systems.

2.4.1.2.3 Fare Revenue

Fare revenue is collected in the same manner as ridership for many agencies due to the capability of ERFs to measure both the amount of fare revenue collected and type of passenger paying each fare. For

[2] The exception may exist for agencies that operate routes with a large number of free- or prepaid-fare/pass riders (e.g., students or elderly) who are not required to conduct a transaction at the farebox. If it is determined that ERFs and manual counts by the driver do not adequately capture the number of these users on a route, use of an APC may capture a more accurate ridership count. If an APC is used, measures to ensure accurate readouts should be implemented.

[3] Handbook of Automated Data Collection Methods for the National Transit Database. 2003.

agencies that do not employ electronic methods, manual count of cash fares is the primary method for collecting fare revenue data.

For agencies that operate demand response service, an electronic method for collecting fare revenue is through payment software that collects revenue for trips. That trip payment may be made in advance through the scheduling software, or on board using an electronic payment device. The electronic collection of data may be combined with a manual option (i.e., payment in cash that is counted at the end of the shift) for fare collection on demand response boardings.

Recommendations: For fixed route service local transit agencies that use electronic methods, the standard is to use ERFs to collect fare revenue data.

For agencies that operate demand response service and use electronic methods, the standard is to use payment software to collect electronically processed fare revenue.

For agencies that use manual methods (either exclusively or in addition to electronic), the standard is to manually count fare revenue collected by vehicle drivers/operators daily and by route/shift.

2.4.1.2.4 Other Operating Revenue

Other operating revenue is earned from leases, advertising, sales, contracted service and other sources. The revenue for these activities is collected through payments to agencies and recorded in their financial or accounting systems. That practice is currently in place for all agencies earning other operating revenue and the standard recommended is to continue using that method.

Recommendation: The standard for collecting other operating revenue is to count payments made through financial or accounting systems.

2.4.1.2.5 Revenue Miles and Revenue Hours

The recommended standards for collecting data on revenue miles and hours differ depending on whether the agency employs electronic or manual systems for collecting each.

For agencies that use electronic systems, automatic vehicle location (AVL) systems, scheduling software, or mobile data terminals can be used to collect data on vehicle revenue miles and hours. For agencies that use manual techniques, schedules and driver logs can provide data on vehicle revenue hours, while driver logs and odometer readings can provide data on revenue miles.

Recommendation: For local transit agencies that use electronic methods, the standard methods for collecting data on revenue miles and hours is to use AVL systems, scheduling software, or mobile data terminals.

For agencies that use manual methods, the standard for collecting data on revenue miles and hours is to use schedules, driver logs, and odometer readings. Odometer readings should either be taken from vehicles at the end of the shift, or altered by agency staff to deduct deadhead and any other non-revenue mileage if taken from vehicles at the garage.

Although the standards for the measures above allow for manual collection tools, the goal is for all agencies to move to use of automatic (electronic) data collection methods to reduce inaccuracies due to human error.

Goal: Agencies should move towards methods that assure more consistently accurate and verifiable data (i.e., simple electronic tablets for recording ridership, automatic payment systems, and AVL systems)

2.4.1.3 Data Processing Methods

Data processing methods include:

- how agencies process raw data gathered from collection methods into monthly or annual data for purposes of reporting to DRPT
- the database (whether electronic software or manual) used to record, track and store the totals over time
- the frequency of the raw data input (via digital upload or manual transcription) to the database

Standard processing methods are needed to ensure that local transit agencies are calculating monthly and annual totals in a consistent manner, and that there is a system in place to flag when pockets of data input are missed due to mechanical or human error.

Financial data collected by agencies (namely operating expense), fare revenue and other operating revenue, are subject to annual audits and thus have to follow industry and generally accepted accounting standards. Accounting standards dictate the way in which raw financial data has to be processed and recorded to ensure consistency in financial statements and financial information disseminated to the public.

Ridership, revenue miles and revenue hours are not subject to the same outside scrutiny and financial industry standards and thus would benefit from standards to ensure that local agencies are applying consistent processing techniques to calculate monthly and annual data. DRPT staff noted past experiences when agencies reported inaccurate monthly or annual figures due to missing data from particular routes or time intervals. Standard processing methods will address this issue.

The standards for processing data will dictate options for the frequency of raw data input, as well as the type of database that should be use to record, track and store monthly and annual data.

Recommendations for ridership, revenue miles and revenue hours: Raw data should be uploaded or transcribed to the local transit agency's database daily or weekly, and organized by route, driver, or vehicle in the database.

An electronic database <u>must</u> be used by each agency to record, combine, and retain data. Raw data should be processed in the electronic database prior to reporting to DRPT. Any spreadsheets that are uploaded to OLGA for the purpose of supporting reported data should be in a final format and not contain raw data.

DRPT can take an extra step to ensure consistency and accuracy in the processing of raw data by creating simple, pre-formulated spreadsheets that provide a template for organizing data, and automatically calculate monthly and annual totals.

Goal: To ensure consistency among all agencies in processing data, DRPT should create spreadsheets that are pre-formulated for all necessary measures.

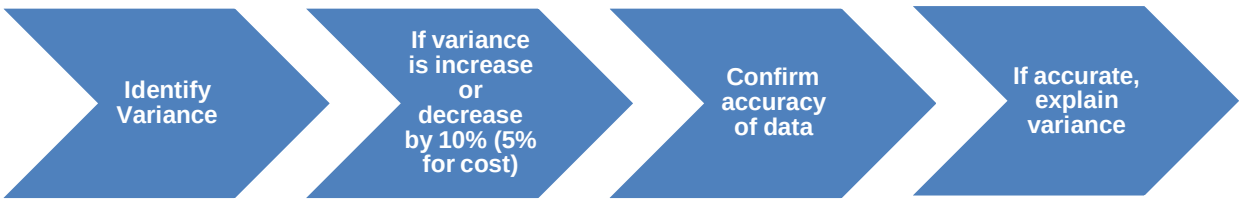
2.4.1.4 Verification Methods

Standard verification methods are critical for ensuring that reported data are accurate and reasonable, at both the agency and DRPT review stages. A verification method includes both the technique used to verify the data and the frequency of verification. Techniques can vary depending on the collection methods used, and the number or collection sources the agency has at its disposal.

At both the agency and DRPT review levels, staff should run a comparison of the measure's current year data with past year's data to test its reasonableness. For some agencies, this will be the only verification technique used because multiple data collection methods are not available, and for others this will be an additional check completed at least once during the reporting process. If there is a variance in the two figures, staff should follow the process illustrated in Figure 2.2 below.

In the process below it is recommended that local transit agencies explain variances outside a stated threshold to provide context as to why figures changed from year to year. This explanation will help DRPT understand large changes in the data certified as accurate by the agency. While a 10 percent threshold is recommended for most of the core measures, a more conservative threshold of 5 percent is recommended for operating expense, to further DRPT's interest in assuring the efficient use of state funds. Additionally the OLGA reporting system should be designed not to accept data that is outside of the aforementioned thresholds, compared to the previous year's data (e.g., 700,000 monthly riders instead of 600,000), without an explanation.

Figure 2.2 Variance Confirmation Process



The suggested techniques described in the recommendations below provide options for local transit agencies depending on their available resources and measures being verified. Accounting industry standards for financial data, namely operating expense, fare revenue and other operating revenue, are subject to annual audit and, thus, provide outside oversight and verification. Ridership and revenue miles and hours are not, and thus require more specialized standards for verification methods. The recommendations are organized by ridership, revenue hours and miles, followed by core financial measures.

2.4.1.4.1 Ridership

For ridership counts, local transit agencies regardless of whether they use electronic or manual methods should cross check two or more sources of data against each other to verify ridership. Some examples are:

- Comparing passenger counts obtained from ERFs and APCs
- Comparing 100% count (from electronic or manual methods) to NTD-approved ride check sampling data

As stated above, another recommended verification technique is for agency staff to review data for reasonableness using year-to-year comparisons. Another technique is to embed automatic triggers into the agency's internal database that flag anomalies when data are uploaded or entered into the database. If agency staff review of year to year variances is the only verification option, it should be done on a more frequent basis (rather than just once before reporting) to try and spot inaccuracies throughout the data collection process. The desired frequency for examining variances would be to match reviews with the frequency of raw data input from the processing method recommendation (i.e., daily or weekly).

Recommendation: Agencies can choose from the following options:

- Cross-check between two or more ridership data sources, and/or
- Staff review, using year-to-year comparison for variances, or through automated data triggers to flag anomalies

If agency staff review is the only verification technique used, it should be conducted on a frequent basis consistent with the recommended standard for data processing.

2.4.1.4.2 Revenue Miles and Revenue Hours

Data on revenue miles and hours are often collected using one source, such as odometer readings of AVL systems for revenue miles, and schedules or driver logs for revenue hours. As such, the verification method used can only test for reasonableness instead of accuracy since only one collection source is used. To verify revenue miles and hours, the recommended standard is to compare year to year variances to test for reasonableness.

Recommendation: The recommended standard for local transit agencies to verify data is staff review, using year-to-year comparison for variances, or through automated data triggers to flag anomalies. Since staff review is likely to be the only verification technique used, it should be conducted on a frequent basis consistent with the recommended standard for data processing. Actual revenue miles and hours should be checked against scheduled for reasonableness before submitting to DRPT.

2.4.1.4.3 Financial Data: Operating Expense, Fare Revenue, Other Operating Revenue

The data collected for operating expense, fare revenue, and other operating revenue is subject to annual financial audits, which provides a robust verification technique for these measures. Prior to reporting to DRPT, the data should also go through a staff review with past year's data to account for any large variance from year to year.

Fare revenue can be verified by an additional technique because for many agencies it shares a collection source with ridership. Fare revenue data can be compared with passenger counts to verify its accuracy. The Working Group noted that average fare must be known to verify passenger counts with fare revenue data.

Other operating revenue can also be verified using an additional technique. Other operating revenue is received from payments to agencies for contracts such as leasing, advertising, and sales, and those

payments are collected using invoices. Staff can verify operating revenue totals by comparing invoices with received payments over the year.

Financial Data (Operating Expense, Fare Revenue, Other Operating Revenue) Verification Methods

Recommendations: The recommended standard for local transit agencies to verify financial data is the financial audit process.

In addition, agencies should conduct a one-time variance check before reporting to explain any variances outside of a 5 percent threshold for operating expense data and 10 percent for fare revenue and other operating revenue.

2.4.2 Accountability Policy

The purpose of the accountability policy is to summarize DRPT data collection standards, and certify that the agency understands the standards and will adhere to them to record, combine, retain, and verify data that are reported to DRPT. It is recommended that the accountability policy be acknowledged by transit agencies annually as part of the grant agreement between transit agencies and DRPT. The accountability policy will also certify that the agency understands the relationship between reported data and operating funding received from the state, and acknowledges the penalties that can be enforced if data are consistently reported late or should DRPT review find a pattern of inaccurate data over time. Penalties can come in the form of mandating the return of previously awarded grant funding or reducing future grant awards.

The certification that the agency has complied with the accountability policy as part of the grant agreement can match each agency's schedule for annual submission of data to DRPT in OLGA for ease of submission.

Recommended Accountability Policy Components:

- Documented list of collection and verification methods for allocation funding measures
- Certified by local agency senior staff (e.g., CFO, other senior executive staff, or governing body)
  - Understanding that accuracy of reported data is tied to funding
  - Documentation that verification procedures for each data category have been followed
- Penalties enforced if state reviews reveal consistently inaccurate data reporting, or if reports are consistently delayed

2.4.3 On-Line Grant Administration (OLGA)

The OLGA system is the mechanism for reporting data from local agencies to DRPT. A number of issues regarding OLGA and data collection practices were noted through the survey and interviews with transit agencies. The issues generally fell into the following areas:

- Need for clear data definitions and accessibility to guidance on the website
- Ability to view data entries before final submission
- Ability to compare data year-to-year and explain variances

Discussions with the Working Group and a hands-on review of the OLGA platform revealed opportunities to implement recommendations for enhancing the OLGA platform to better assist local agencies and DRPT in implementing and adhering to data collection standards.

An important observation from review of the OLGA platform is the separation between "Grant Applications" (and more specifically the Operating Assistance application) and "Performance Data" in two sections on the OLGA site. All of the required measures for both the Operating Assistance application and the Performance Data report, namely operating expenses, fare revenue, and contract service, must be entered twice into OLGA by agencies. One item to note is that operating expenses are calculated differently in the Operating Assistance application and Performance data report. Both calculations are net of depreciation, but the expense calculation in the Operating Assistance application also subtracts other DRPT grant assistance.

To simplify this process, the need for an agency to access two different sections of the platform to enter its annual data should be eliminated. The requirements for annual data entry in the Performance Data section should be moved to and combined with the Operating Assistance Application as one grant application. This will make the reporting process more efficient by eliminating the redundancy of entering the same data twice, reduce the potential for confusion when using OLGA and in communications between DRPT and local agencies about the data entered, and reduce the potential for discrepancies in data definitions and other information in multiple locations. (The Performance Data section would remain only for entering the required monthly ridership data.) DRPT already has access to the different calculation methods for operating expense referenced above in the step-by-step calculation of annual operating expense in the Operating Assistance application.

Recommended OLGA Update: Reduce the Need to Re-Enter the Same Data Twice

- Move the data entry requirements for the performance measures required by the operating assistance allocation model to the Operating Assistance grant application section of OLGA (revise the Performance Data section to capture only the required monthly ridership data), and create one, multi-purpose annual application for determining the amount of operating grant assistance allocated to each agency.

It was noted by participants during Working Group sessions, and separately by DRPT staff, that data are required in the current Performance Data section that are not used in the allocation model. These line items include accident data, broken by down by reportable incidents, injuries, and fatalities, and the number of full-time, part-time, volunteer employees at each agency.

Recommended OLGA Update: Eliminate Required Reporting of Unrelated Data Measures

- Eliminate mandatory reporting of Accident and Employees (currently in the Performance Data section of OLGA) as these data are unrelated to the operating assistance allocation model

One of the recommendations suggested in the Working Group sessions was to create a clear data definition document available to agencies on the OLGA website. Review of the website revealed three guidance documents that contained information regarding operating assistance; (1) Section 4.1 in "Program Application Guidance," Section 7 in the "Grantee Handbook," and "Operating Assistance"

instructions currently under the Performance Data tab. While these documents contain information on how to enter operating assistance data into OLGA and examples for eligible expenses, they do not clearly define all of the measures in the allocation model, or provide the troubleshooting tips also sought by the agencies. Thus, there is a gap that can be filled by providing additional documents in the most useful location within the OLGA platform.

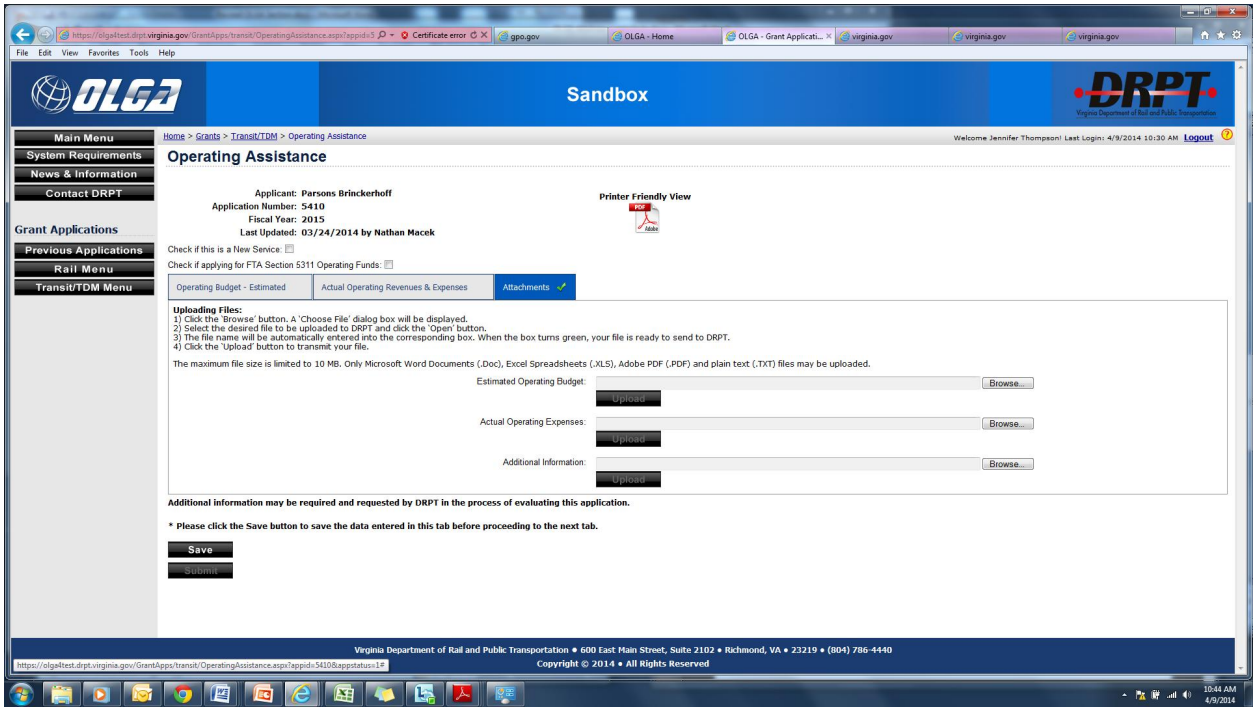
Recommended OLGA Updates: Additional Documents

- Create separate data definition document to be included in the "Operating Assistance" instructions
    - Data measure definitions should be consistent with NTD definitions whenever possible, and any differences between the DRPT and NTD definitions should be explained as applicable
- Provide a searchable "Frequently Asked Questions" document with troubleshooting tips

Another issue raised by local agencies is the desire to review their final Performance Data entries on the website before submitting to DRPT. This function would allow agencies potentially to spot data errors prior to certification. As the Performance Data section currently functions, there is no way to review the data as a whole before submitting them. (Once the data are submitted, they can be viewed as a .pdf formatted document but cannot be changed.) The Operating Assistance grant application, on the other hand, does allow an agency to view reported data as a .pdf document prior to submittal, as an agency enters and saves the data. If the sections remain separate a comparable function should be replicated in the Performance Data section to allow agencies to view reported data for performance measures before submission. The ability of agencies to review and compare data entries before submission may also be enhanced by providing the option of viewing/downloading the entered data in more than one format, e.g., in Excel as well as a .pdf document.

A related suggestion is to provide the ability for agencies to submit data spreadsheets as attachments to their submission. The Operating Assistance grants application website has a final page before submission that allows agencies to upload files that support the request for operating grant assistance (see "Additional Information" in Figure 2.3 below). This function could be used for agencies that want to upload operating expense data, and should be replicated in the Performance Data section (if it were to remain a separate section of OLGA for reporting annual data) for agencies that want to upload supporting documentation related to other measures in the allocation formula. (Also see the next area of recommendations regarding additional documentation that must be appended to data submissions which follows below.)

Figure 2.3 Upload "Additional Information" Attachments



Recommended OLGA Updates: Final Data Review

- Allow agencies to view their reported performance data in OLGA before submission and certification
- Create page in Performance Data section (if it were to remain a separate section) that allows agencies to upload documents relevant to the performance data submission

The last issue related to OLGA is the agencies' ability to compare data year-to-year to spot variances between the data currently submitted and data submitted in the past. In the Operating Assistance application section, the platform compares estimated and actual data (for the same fiscal year) and flags variances between the two of greater than 10 percent. This function should be updated to add the past year's data, and to flag variances between past year and current year data for each line item beyond a 5 percent threshold for each line item of operating expense, and 10 percent threshold for operating revenue.

This function also should be replicated in the Performance Data section of OLGA (if it were to remain a separate section for reporting annual data) to include a view of the past year's data as an additional column to current year data reported in the "Annual Summary Report." The "Monthly Summary Report" can be updated to include an additional row that shows what the agency reported each month for ridership. Additionally a flag should be included to highlight variances of 10 percent or greater from the previous year for ridership, fare revenue, operating revenue, revenue miles, and revenue hours.

Variances of greater than the 5 percent or 10 percent thresholds noted above would require that supporting documentation be uploaded to explain the difference, as part of the Operating Assistance application section or in the Performance Data section as appropriate.

Recommended OLGA Updates: Comparing Data and Explaining Variances

- Update the Operating Assistance section to:
  - Include view of the past year's data for operating expense
  - Include flag for variances between past year and current year data of 5 percent or greater for any operating expense line item, and 10 percent for operating revenue
  - Provide an explanation field and require a supporting explanation for any variance that exceeds the 5 or 10 percent thresholds, respectively
  - Provide a supporting documentation field for every measure, allowing the agencies to explain any variances in data from the previous year if they choose to, regardless of whether the variance exceeds the 5 or 10 percent thresholds

- Update the Performance Data section (if it were to remain a separate section for reporting annual data) to:
  - Include view of the past year's data for all measures in the Annual Summary Report and past year's monthly data for ridership in the Monthly Summary Report
  - Include flag for variance between past year and current year data of 10 percent or greater for core measures
  - Provide an explanation field for every measure, allowing agencies to explain any variances in data from the previous year, regardless of whether the variance exceeds the threshold. Make explanation mandatory for variances of 10 percent or greater for all measures

2.4.4 State Technical Assistance

Additional state assistance should complement data collection standards by encouraging agencies to maintain the tools and techniques mandated in the standards. The following are recommended actions for DRPT to provide assistance to agencies, either through direct aid by or facilitating information exchanges among agencies.

Recommendations for Technical Assistance:

- Host annual meeting for industry best practices/required policies
  - Could be track or workshop during annual Virginia Transit Association meeting
  - Attendees to include transit data managers and/or senior management

- Host data summits, regional information exchanges

- Include data collection technology on state contract product order lists
  - Provide different technical options to assist agencies with a range of capabilities

- Create a pilot program, consistently funded at the highest state matching level (Tier 1), to assist agencies to acquire more advanced technologies (equipment and/or software) for required data collection purposes and assess the value of these technologies, including the resources needed and other implications. without having first to commit to a systemwide acquisition.

- Provide dedicated staff member to answer data collection related inquiries during reporting process

2.5 Next Steps

The consultant team will continue to work with DRPT to create the detailed data collection standards and accountability policy based on the agreed upon recommendations from the previous section. The accountability policy will include a checklist of the collection and verification methods, as well as certification language and acknowledgement of penalties.

Chapter 3: Sizing Transit Systems

This chapter summarizes the findings of a Transit Agency Working Group discussion of measures for allocating new operating formula funding to transit agencies by size and the relative weighting of measures applied in the formula. The Working Group met in Richmond on December 16, 2013, to review the literature findings presented by Parsons Brinckerhoff and provide recommendations for this task.

Based on the Working Group's discussion, no measure(s) were identified as better indicators of system size than those currently being applied, ridership and operating cost. Therefore, the Working Group recommends to TSDAC that the current size-weight portion applied to allocate new operating formula funding remain unchanged.

A high-level qualitative review of the potential sizing metrics is provided as Appendix 3A. This appendix documents consultant findings and working group comments on potential sizing measures.

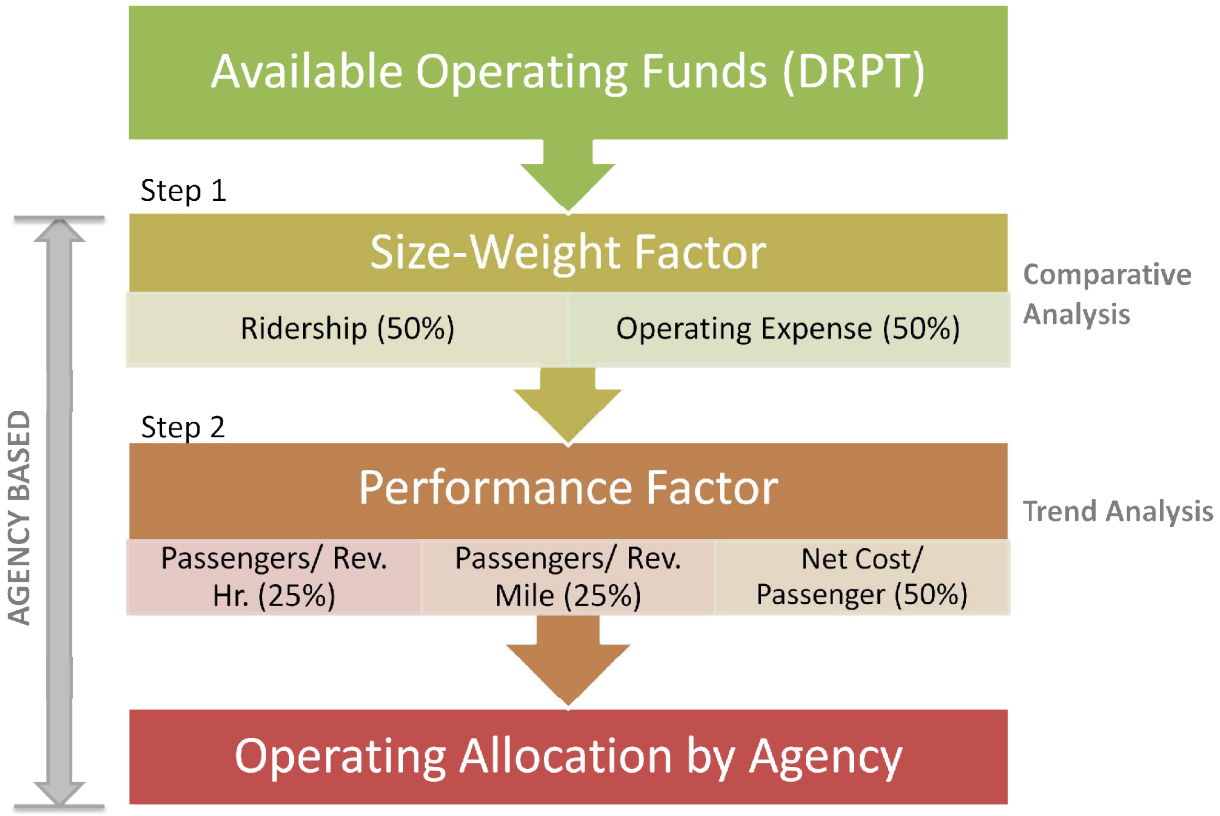
3.1 Background

During 2013, TSDAC and DRPT developed the first phase of a performance-based model for allocating operating assistance funding above $160 million annually, summarized in Figure 3.1. Funding is divided proportionally among agencies based on a size-weight factor, which is weighted 50% based on ridership (unlinked passenger trips) and 50% based on operating expenses (most recent audited operating cost available, net of depreciation, projects funded in other DRPT programs, and non-transit related expenses). Allocations are then adjusted based on a trend analysis of the agency's own performance factors relative to statewide average. This formula was recommended by TSDAC and was a result of lengthy deliberations, which took account of the diversity of transit systems within the Commonwealth. This approach was approved by resolution of the CTB on October 17, 2013.

It is important to note that in the current model, while performance factors can edge allocations to a given agency upward or downward, as a practical matter, the size-weight factor has a much larger bearing on the total amount of funding received by agencies.

The first phase of funding under this approach was a mid-year performance-based operating assistance allocation for FY 2014. The second phase includes a full-year performance-based operating assistance allocation for FY 2015. The funding allocation method for the third phase (FY 2016 and beyond) will be determined based on the outcome of Working Group input to the SB 1140 Performance Based Funding Allocation study, subject to review by TSDAC and approval of the CTB. Stakeholders have asked TSDAC to entertain the possibility of applying a sizing metric encompassing more than just operating cost and ridership. They reasoned that other measures which address the issues of how much service is actually provided (e.g., revenue hours, revenue miles) and/or how much service should be provided based on the character of the service area (e.g., population, population density, service area size, transit dependent population, etc.) should be included in the allocation formula.

Figure 3.1 Phase I and II Operating Funding Allocation Model



3.2 Working Group Deliberations and Recommendation

The Working Group addressed this issue at its December 13, 2013 meeting, with follow-up discussion on January 28, 2014. Parsons Brinckerhoff presented a high-level qualitative review of the potential sizing metrics, a summary of which is provided in Appendix 3A.

Following this presentation, Working Group members noted that the size-weight factor was designed to address the reality that even if performance is similar, the share of state assistance received by agencies should take account of the scale of the operations. For example, the relative performance of a small rural agency and a large urban agency may be similar, but state funding should be higher for the larger operation. A funding allocation approach that does not account for the relative size of the transit agency—in terms of operating cost, ridership, or another measure—could result in disproportionate funding to agencies.

There was a strong desire to keep operating cost as part of the formula. Working Group members agreed that the current formula does not create a perverse incentive to drive up operating costs to receive a higher state operating subsidy, as the increase in state funding will always be less than the cost increase required to earn the additional subsidy.

Several other potential size-weight factors were reviewed with the Working Group (documented in Appendix 3A), but no measure(s) were identified as better indicators of system size than those currently

being applied. The Working Group noted that selecting operating cost and ridership as size-weight factors was a painstaking compromise in earlier work undertaken by the SJR 297 Advisory Committee and TSDAC, and sought to second those findings.

Therefore, ***the Working Group recommends to TSDAC that the current Size-Weight portion of the operating allocation formula remain unchanged***.

In addition, some members of the Working Group noted that in the future, a third factor may need to be included for sizing systems aimed at supporting transportation for transit dependent populations. Such a factor would enable increased funding assistance to economically-impacted communities that have little prospect of supporting increased operating expenses or enhancing ridership on services to transit-dependent residents.

Related to this recommendation, the Working Group called for DRPT to develop clear definitions and standards for collecting and reporting data, and to clearly communicate adopted formulas, definitions, and standards to grantees. This guidance is addressed in Chapter 2 of this report.

This recommendation shall not preclude DRPT from reconsidering sizing formula factors should future needs arise, particularly in response to any changes in operating funding allocation goals. Indeed, SB 1140 requires that funding allocation measures and their relative weight shall be re-evaluated every three years, which provides an opportunity for revising sizing and performance factors again in the future.

Chapter 4: Exceptional Performance

This chapter describes the Transit Agency Working Group's consideration of means of incorporating Exceptional Performance into Virginia's performance-based transit operating funding allocation formula.

The fundamental premise of performance-based funding allocation is to provide a financial incentive for transit operators to improve performance year-over-year. Under the performance-based operating funding allocation formula, a given agency's performance trends over a three-year period are measured against statewide average trends and agency's operating grant is increased or reduced based on whether the agency performs better or worse than average. However, agencies that perform poorly and have significant room to grow may exhibit high year-over-year improvement in performance, thus driving statewide average growth rates upward. In contrast, agencies that are already performing exceptionally, and have a relatively small window for improvements over time, may end up being penalized when compared against such high average growth rates. TSDAC wanted to investigate if the application of the current operating allocation formula was resulting in such a penalty for exceptional performers. Additionally, in case such a bias against exceptional performers was found to exist in the current formula allocation, TSDAC directed DRPT to consider including a measure that would instead identify and reward exceptional performers. This chapter summarizes the findings of the Transit Agency Working Group's deliberations and recommendations for including an Exceptional Performance measure in the performance-based operating funding allocation formula.

Several approaches for measuring and rewarding Exceptional Performance were presented and discussed with the Working Group. ***The Working Group recommends against implementing an Exceptional Performance measure as part of the performance-based operating funding allocation formula. The group further recommends that DRPT re-evaluate this measure in the future along with any potential updates to the operating assistance formula as a potential allocation method if new funding to support transit programs becomes available.***

4.1 Overview

The Working Group discussed the Exceptional Performance measure over the course of two meetings, February 20, 2014 and March 14, 2014. This section summarizes the key topics discussed during these meetings as they relate to Exceptional Performance as well as the main findings from these discussions.

The key topics addressed through presentations and exhibits included:

- Goals of the Exceptional Performance Incentive
- Structure of the Potential Incentive Program
- Review of Potential Exceptional Performance Measures
- Exceptional Performance Analysis of Quantitative Measures including:
  - Statewide performance ranking
  - Nationwide peer analysis

The main findings from the Working Group meetings are as follows:

- The goal of the Exceptional Performance measure should be to prevent exceptionally performing agencies from being penalized, not additionally rewarding agencies for performance. The current performance-based operating assistance allocation formula already includes an incentive tied to year-over-year performance improvement, and the purpose of an Exceptional Performance measure should not be to duplicate that same incentive.

- A formula-based approach was recommended as the preferred approach, should this measure be implemented. Under this approach, DRPT would establish a uniform definition of Exceptional Performance and consistently evaluate the performance of all transit agencies in the Commonwealth based on the three most recent year's data.

- The same performance metrics that are currently used in the operating assistance allocation formula should be utilized to determine Exceptional Performance.

- Because of several issues associated with establishing and measuring Exceptional Performance, the Working Group advised against implementing this measure. DRPT could consider this measure in the future along with any potential updates to the operating assistance allocation formula or if new funding to support transit programs becomes available.

Sections 4.2 and 4.3 summarize the Working Group deliberations leading up to and including the main findings and final recommendation regarding the Exceptional Performance measure.

4.2 Working Group Deliberations

This section summarizes the analysis presented and discussed during the Working Group meetings as it relates to the Exceptional Performance incentive measure. Additional details of this analysis are included as appendices.

4.2.1 Goals of the Exceptional Performance Incentive

The TSDAC considerations that led to the evaluation of an Exceptional Performance measure were presented to the Working Group for discussion and input. The two main considerations are as follows:

- **Limited opportunity for exceptional performers to show improvement over time**: Since exceptional performers have a smaller window to improve, they may be unfairly penalized for exhibiting slower year-over-year performance growth compared to poor performers that have a greater window for improvement or for declining over the period even when the relative performance is high. The statewide average performance trend, against which all agencies are measured in the existing operating assistance allocation formula, may be high because of agencies that exhibit significant improvement. But agencies exhibiting below average performance growth are not necessarily all poor performers.

- **A short time horizon for performance appraisal**: Some transit agencies expressed concerns that the three-year rolling average is a relatively short window for assessing performance trends. Temporary shocks due to factors outside an agency's control can affect its performance and ultimately its funding allocation. The Exceptional Performance measure can potentially take a more nuanced approach to performance evaluation by accounting for a longer time horizon.

Virginia transit agencies also identified issues related to the implementation of the Exceptional Performance measure during interviews conducted for this study. One issue is how to determine a benchmark threshold for measuring exceptional performance. One approach is to compare agencies to peers, but this was identified as a significant barrier to determining Exceptional Performance. Peer grouping was explored in detail during SJR 297 analysis, and based on the findings of that study, both DRPT and TSDAC agreed that it was not an ideal method of comparing and evaluating performance as the diversity among transit systems in the Commonwealth is very high.[4] Additionally, agencies such as the Washington Metropolitan Area Transit Authority (WMATA) and Virginia Railway Express (VRE) that operate significant rail service do not have any peers within the Commonwealth. Hence, this method was precluded from this analysis.

Discussions with the Working Group further narrowed down the scope of this measure. It was recommended that the ***goal of the Exceptional Performance measure should be to prevent exceptionally performing agencies from being penalized, not additionally rewarding agencies for performance.*** The current performance-based operating assistance allocation formula already includes an incentive tied to year-over-year performance improvement, and the purpose of an Exceptional Performance measure should not be to duplicate that same incentive.

4.2.2 Structure of the Potential Incentive Program

The Working Group discussed and qualitatively analyzed potential structures for an Exceptional Performance incentive program. The discussions largely indicated that, if implemented, the Exceptional Performance measure should be structured as a pilot program that may eventually be rolled into the performance-based transit operating funding allocation formula. The group believed that this would allow DRPT to learn from the initial years of implementation whether the measure was successful and resulting in intended performance impacts before incorporating any changes into the existing operating allocation formula. The following questions were addressed by the Working Group:

- Should Exceptional Performance be implemented as a discretionary or formula-based program?
- What level of effort should be expected from agencies and DRPT to annually determine eligibility for this measure?
- Are there other potential structures? If so, what are they and what are their relative pros and cons?

Two alternate constructs of an Exceptional Performance incentive measure were presented and discussed with the Working Group. These were:

- **Discretionary program approach**: This approach would allow agencies to demonstrate exceptional performance based on state-established guidelines and analytical methods. This approach would allow agencies to apply and compete for dedicated funding on discretionary basis.

- **Formula-Based program approach**: This approach would require DRPT to establish guidelines for quantitative methods (such as performance thresholds or statistical and other measures), obtain performance data from individual agencies, and determine which are exceptional performers and hence eligible for this incentive. The formula could use a percentile (e.g., agencies that are above 90th percentile statewide) or employ an absolute measure (e.g., Passengers per Vehicle Revenue Hour greater than a predefined threshold) to define exceptional performance.

[4] Performance-Based Funding Distribution for Public Transportation, Senate Document 11, *Commonwealth of Virginia*, 2012

The Working Group agreed that determining exceptional performance would likely be a highly data-driven analytical process that would require significant staff resources. A formula-based approach could be more resource-intensive but would provide a transparent and replicable process to determine eligibility on an annual basis. A discretionary approach on the other hand would put the onus of determining eligibility on the transit agency and would not allow for the same consistency, transparency, and rigor.

The Working Group agreed that a ***formula-based approach was the preferred approach, should this measure be implemented. Under this approach, DRPT would define and measure Exceptional Performance in a consistent manner for all transit agencies in the Commonwealth.***

4.2.3 Review of Potential Exceptional Performance Measures

A first step towards determining exceptional performance involves identifying appropriate metrics to measure performance. A literature review of performance measures was presented to the Working Group to assist in identifying appropriate metrics for the Exceptional Performance measure. This was a high-level qualitative review which included potential performance measure categories and example measures (more detail is provided in Appendix 4A). The Working Group agreed that since the Exceptional Performance measure was attempting to remedy any inequities in performance measurement based on the current operating funding allocation formula, ***the same performance metrics that are currently used in the performance-based operating funding allocation formula should be utilized to evaluate exceptional performance as well.***

These performance metrics are:

- Passengers per Vehicle Revenue Hour
- Passengers per Vehicle Revenue Mile
- Net Cost per Passenger

4.2.4 Exceptional Performance Analysis

Parsons Brinckerhoff examined two approaches for quantitatively analyzing exceptional performance, namely statewide performance ranking and nationwide peer analysis. Test case scenarios for both approaches were quantitatively analyzed and presented the Working Group. This section details this analysis and related Working Group discussions and recommendations.

4.2.4.1 Statewide Performance Ranking

This approach evaluates exceptional performance on the basis of aggregate statewide performance by all agencies across Virginia. Parsons Brinckerhoff evaluated a hypothetical case allocating $50 million in state funds according to the current operating assistance allocation method. Actual performance data for fiscal year (FY) 2011 through FY 2013 submitted by transit agencies for FY15 operating funding grant allocations were applied as inputs. The analysis was conducted as follows.

- **Step 1. Identify agencies penalized under the current performance-based operating funding allocation formula.** This step involved identifying all transit agencies with performance gains in the FY 2011 thru FY 2013 period that were lower than the statewide average for each performance metric. The “Trend Factor” calculated as part of the operating assistance allocation formula was used to identify these agencies. For each performance metric, a Trend Factor greater than 1.0 indicated that the agency trended better than the statewide average performance and consequently received a performance-based funding increase under the current formula. Conversely, a Trend Factor less than 1.0 indicated that the agency lagged the statewide average performance and therefore received less

money. For purposes of this analysis, only these latter agencies were considered to be penalized by the existing performance-based funding allocation method. Metrics highlighted in red and yellow in Table 4.1 have a trend factor of less than 1.0.

- **Step 2. Isolate agencies exhibiting significant declining performance trends from those that are only moderately declining.** The premise for this distinction is that agencies with significant declining trends have either not reached or have declined from their maximum performance frontier indicating that they have significant potential to improve. As such, these agencies did not fit the definition of exceptional performers as envisioned by TSDAC. For this illustrative analysis, a Trend Factor between 0.95 and 1.00 for a given metric was assumed to distinguish agencies with moderate declining trends from those with significant declining trends. These metrics are highlighted in yellow in Table 4.1.

- **Step 3. Determine which of the agencies exhibiting moderate performance decline with regard to a given metric also exhibit exceptional performance in that metric.** For each metric, agencies with moderate declining trends were isolated and each agency's performance was compared to the performance distribution of all transit agencies in the Commonwealth. For this illustrative analysis, if an agency's average performance between FY 2011 and FY 2013 was greater than an assumed 90th percentile of the statewide average performance distribution, then that agency was considered exceptional in that metric. Notably, WMATA and VRE were excluded from the calculation of the 90th percentile since they were the only two agencies with significant rail service (and therefore, significantly different performance metrics) compared to other agencies, who largely operated bus and paratransit services, and are already the top two performers in the state. However, for lack of a better figure, their performance was still measured against the 90th percentile of the average performance distribution calculated for all other agencies in the Commonwealth.

- **Step 4. Make trend factor adjustments to neutralize the penalty for exceptional performers.** For agencies identified in Step 3 as exceptional performers, their Trend Factor for the respective metric was manually changed to 1.0 to neutralize the penalty that is calculated by the existing performance-based operating funding allocation formula. With the manually-specified Trend Factor of 1.0, the dollar allocation for these agencies was no longer reduced in proportion to the marginal decline in a given performance metric.

- **Step 5.Recalculate the operating assistance funding allocation.** After the required manual adjustments, the trend factors of all transit agencies were adjusted through a normalization step and the normalized factors were applied to calculate the dollar allocation of the hypothetical state grant of $50 million. The normalized trend factors are labeled "Modified Trend Factor" in Table 4.1.

Each agency's dollar allocation of the $50 million state grant was calculated three ways, 1) using the size-weight factor only, 2) the original trend factors, and 3) the Modified Trend Factors. This funding comparison for each transit agency was presented to the Working Group for discussion.

Table 4.1 Modified Trend Factors for Agencies with Moderate Performance Decline and Exceptional Performance

Legend

	Performance Trend Between 0.95 and 1.00 "**MODERATE DECLINE**"		Exceptional Performance and Moderate Decline
	Performance Trend Below 0.95 "**SIGNIFICANT DECLINE**"		Exceptional Performance and Improvement or Significant Decline

Exceptional Peformance Criterion (Input)*-->	90 th percentile		
Values	25.96	2.22	$ 2.16

#	Recipient	Passengers per Revenue Hour					Passengers per Revenue Mile					Net Cost Per Passenger					Exceptional Performer?			Modified Trend Factor		
		2011	2012	2013	Average	Trend Factor	2011	2012	2013	Average	Trend Factor	2011	2012	2013	Average	Trend Factor	Pass./ Rev. Hr.	Pass./ Rev. Mile	Net Cost/ Pass.	Pass./ Rev. Hr.	Pass./ Rev. Mile	Net Cost/ Pass.
1	WMATA Modes Together (Systemwide)	49.48	51.17	47.32	49.32	0.997	3.25	3.30	3.04	3.20	0.993	1.47	1.47	1.65	1.53	1.004	Yes	Yes	Yes	1.00	1.00	1.00
2	VRE	72.54	72.46	68.40	71.13	0.99	2.32	2.31	2.19	2.27	1.00	5.61	5.66	5.65	5.64	1.06	Yes	Yes	No	1.00	1.00	1.06
3	Hampton Roads Transit	16.56	17.99	18.36	17.63	1.07	1.19	1.32	1.39	1.30	1.11	3.56	3.99	3.85	3.80	1.02	No	No	No	1.07	1.11	1.02
4	GRTC	17.11	17.44	15.38	16.64	0.97	1.26	1.27	1.10	1.21	0.96	2.58	2.67	3.30	2.85	0.94	No	No	No	0.97	0.96	0.94
5	Fairfax County	18.36	18.66	17.21	18.08	0.99	1.25	1.26	1.12	1.21	0.97	4.49	4.93	5.36	4.93	0.97	No	No	No	0.99	0.97	0.97
6	City of Alexandria Office of Transit Services and Programs	25.64	25.24	25.26	25.38	1.01	2.93	2.89	2.86	2.89	1.02	2.11	1.99	2.22	2.11	1.04	No	Yes	Yes	1.01	1.02	1.04
7	PRTC	20.37	20.84	19.81	20.34	1.01	1.08	1.08	1.02	1.06	1.00	4.46	4.59	5.58	4.88	0.95	No	No	No	1.01	1.00	0.95
8	Arlington County	18.59	18.78	18.54	18.64	1.02	1.67	1.76	1.90	1.78	1.10	3.32	2.93	2.90	3.05	1.14	No	No	No	1.02	1.10	1.14
9	Loudoun County Office of Transportation Services	25.46	26.23	25.69	25.79	1.02	0.75	0.77	0.76	0.76	1.03	2.12	2.49	3.13	2.58	0.88	No	No	No	1.02	1.03	0.88
10	Greater Roanoke Transit Company	16.14	16.38	17.17	16.56	1.05	1.09	1.07	1.11	1.09	1.04	2.48	2.58	2.63	2.56	1.03	No	No	No	1.05	1.04	1.03
11	Charlottesville Area Transit	26.03	28.81	27.06	27.30	1.04	2.44	2.70	2.56	2.57	1.05	2.31	2.14	2.36	2.27	1.05	Yes	Yes	No	1.04	1.05	1.05
12	Blacksburg Transit	36.84	36.81	37.47	37.04	1.03	3.87	3.84	3.89	3.87	1.03	0.77	0.80	0.84	0.80	1.02	Yes	Yes	Yes	1.03	1.03	1.02
13	Greater Lynchburg Transit Company	29.47	24.09	24.37	25.97	0.94	2.55	1.96	2.23	2.24	0.99	1.59	2.25	2.20	2.01	0.88	Yes	Yes	Yes	0.94	1.00	0.88
14	Williamsburg Area Transit Authority	29.61	29.56	27.45	28.87	0.98	2.12	2.02	1.89	2.01	0.97	2.02	2.18	2.25	2.15	1.01	Yes	No	Yes	1.00	0.97	1.01
15	City of Harrisonburg Dept. of Public Transportation	33.56	38.13	41.04	37.57	1.13	3.51	3.89	4.13	3.85	1.11	0.71	0.72	0.70	0.71	1.07	Yes	Yes	Yes	1.13	1.11	1.07
16	City of Fairfax	26.34	25.24	25.18	25.59	1.00	2.08	1.87	1.92	1.96	0.99	2.51	2.61	2.82	2.64	1.00	No	No	No	1.00	0.99	1.00
17	City of Petersburg	14.37	16.28	10.26	13.64	0.89	1.58	1.57	1.14	1.43	0.88	3.74	4.16	3.36	3.76	1.10	No	No	No	0.89	0.88	1.10
18	City of Radford	-	8.53	10.94	9.74	1.18	-	0.80	1.12	0.96	1.25	-	4.48	3.25	3.86	1.21	No	No	No	1.18	1.25	1.21
19	City of Winchester	6.42	7.64	7.40	7.16	1.10	0.60	0.63	0.65	0.63	1.07	5.41	5.71	6.43	5.85	0.98	No	No	No	1.10	1.07	0.98
20	VRT Loudoun (without uza measures)	-	9.46	12.92	11.19	1.23	-	0.40	0.55	0.48	1.22	-	6.66	7.70	7.18	0.98	No	No	No	1.23	1.22	0.98
21	Loudoun County	-	9.46	12.92	11.19	1.23	-	0.40	0.55	0.48	1.22	-	6.66	7.70	7.18	0.98	No	No	No	1.23	1.22	0.98
22	Town of Leesburg	-	9.46	12.92	11.19	1.23	-	0.40	0.55	0.48	1.22	-	6.66	7.70	7.18	0.98	No	No	No	1.23	1.22	0.98
23	Central Shenandoah PDC	-	11.21	11.75	11.48	1.06	-	0.69	0.73	0.71	1.07	-	4.58	4.91	4.74	1.01	No	No	No	1.06	1.07	1.01
24	VRT Staunton (without uza measures)	-	11.21	11.75	11.48	1.06	-	0.69	0.73	0.71	1.07	-	4.58	4.91	4.74	1.01	No	No	No	1.06	1.07	1.01
25	VRT-Culpeper	-	6.26	5.03	5.64	0.93	-	0.31	0.32	0.32	1.06	-	9.40	12.66	11.03	0.90	No	No	No	0.93	1.06	0.90
26	FRED	9.76	10.18	10.20	10.05	1.04	0.68	0.66	0.69	0.67	1.04	5.83	5.53	5.72	5.70	1.07	No	No	No	1.04	1.04	1.07
27	JAUNT	2.38	2.61	2.28	2.42	1.00	0.14	0.13	0.12	0.13	0.94	17.40	13.17	17.22	15.93	1.04	No	No	No	1.00	0.94	1.04
28	Bay Aging	2.34	2.26	2.18	2.26	0.98	0.10	0.10	0.10	0.10	1.02	14.72	15.54	16.32	15.52	1.01	No	No	No	0.98	1.02	1.01
29	District Three Public Transit	4.19	3.76	8.16	5.37	1.60	0.33	0.30	0.63	0.42	1.57	7.81	8.09	8.83	8.25	1.00	No	No	No	1.60	1.57	1.00
30	AASC / Four County Transit	2.72	3.04	3.52	3.09	1.16	0.12	0.15	0.17	0.15	1.19	10.65	11.08	10.84	10.86	1.05	No	No	No	1.16	1.19	1.05
31	RADAR	2.97	3.44	2.48	2.96	0.95	0.17	0.21	0.15	0.18	0.98	13.15	11.74	15.03	13.30	0.98	No	No	No	0.95	0.98	0.98
32	Danville Transit System	10.87	10.26	10.47	10.53	1.00	0.68	0.61	0.63	0.64	0.99	3.66	3.75	4.03	3.82	1.01	No	No	No	1.00	0.99	1.01
33	Mountain Empire Older Citizens, Inc.	1.10	1.06	1.12	1.09	1.03	0.06	0.06	0.07	0.06	1.05	25.47	24.96	22.97	24.47	1.12	No	No	No	1.03	1.05	1.12
34	Farmville Area Bus	8.69	10.43	10.05	9.73	1.10	0.55	0.63	0.59	0.59	1.07	5.25	4.54	4.85	4.88	1.10	No	No	No	1.10	1.07	1.10
35	City of Bristol Virginia	8.83	10.72	10.06	9.87	1.09	0.80	0.98	0.73	0.84	1.01	5.95	5.29	4.18	5.14	1.26	No	No	No	1.09	1.01	1.26
36	Greene County Transit, Inc.	3.23	3.41	3.52	3.39	1.06	0.20	0.19	0.20	0.19	1.04	9.93	9.59	10.03	9.85	1.06	No	No	No	1.06	1.04	1.06
37	City of Suffolk	-	8.23	8.01	8.12	1.02	-	0.57	0.50	0.53	0.96	-	8.75	8.76	8.76	1.05	No	No	No	1.02	0.96	1.05
38	Pulaski Area Transit	5.46	5.85	5.91	5.74	1.06	0.45	0.43	0.43	0.44	1.00	4.08	4.23	5.32	4.54	0.93	No	No	No	1.06	1.00	0.93
39	Blackstone Area Bus	2.84	3.29	3.04	3.06	1.06	0.11	0.11	0.10	0.11	1.02	9.06	8.62	8.93	8.87	1.07	No	No	No	1.06	1.02	1.07
40	Lake Area	3.47	2.92	2.55	2.98	0.88	0.24	0.22	0.22	0.23	0.98	7.05	8.41	9.43	8.30	0.92	No	No	No	0.88	0.98	0.92
41	STAR Transit	6.03	6.00	6.04	6.02	1.02	0.20	0.21	0.22	0.21	1.07	7.83	6.57	7.77	7.39	1.06	No	No	No	1.02	1.07	1.06
42	Town of Bluefield-Graham Transit	4.24	5.01	5.11	4.79	1.12	0.28	0.33	0.34	0.32	1.13	7.45	7.07	6.93	7.15	1.10	No	No	No	1.12	1.13	1.10
43	Town of Altavista	-	6.72	5.98	6.35	0.97	-	0.42	0.37	0.40	0.97	-	4.11	4.45	4.28	1.01	No	No	No	0.97	0.97	1.01
44	Town of Chincoteague	14.11	12.30	11.41	12.61	0.92	0.97	0.83	0.78	0.86	0.93	4.07	4.51	4.67	4.41	0.99	No	No	No	0.92	0.93	0.99
Statewide Average		**39.40**	**40.36**	**37.88**	39.21		2.61	2.64	2.48	**2.58**		**$ 1.75**	**$ 1.80**	**$ 1.98**	1.84							
Agencies with Trend Factor Between 0.95 and 1.00						**9**					**13**					**8**						
Agencies with Performance Trend Below Statewide Average						**14**					**16**					**14**						

**Note: The percentile is calculated across all Virginia agencies excluding WMATA and VRE*

Table 4.2 Funding Comparison between Applying Original and Modified Trend Factors

Legend

Exceptional Performance and Moderate Decline

Exceptional Performance Criterion* 90th percentile

#	Recipient	ORIGINAL FACTORS							MODIFIED FACTORS								
		Passengers/ Revenue Hour		Passengers/ Revenue Mile		Net Cost/ Passenger		Total Funding	Passengers/ Revenue Hour		Passengers/ Revenue Mile		Net Cost/ Passenger		Total Funding with Modified Factors	% Difference Between Original and Modified Factor Funding	$ Difference Between Original and Modified Factor Funding
		Normalized Size-Performance Weight	Funding Allocation	Normalized Size-Performance Weight	Funding Allocation	Normalized Size-Performance Weight	Funding Allocation		Normalized Size-Performance Weight	Funding Allocation	Normalized Size-Performance Weight	Funding Allocation	Normalized Size-Performance Weight	Funding Allocation			
1	WMATA Modes Together (Systemwide)	0.5349	$ 6,686,640	0.5319	$ 6,648,172	0.5413	$ 13,532,808	$ 26,867,621	0.5352	$ 6,690,299	0.5333	$ 6,666,811	0.5413	$ 13,532,808	$ 26,889,919	0.08%	$22,298.49
2	VRE	0.0487	$ 609,224	0.0490	$ 611,881	0.0524	$ 1,308,784	$ 2,529,889	0.0491	$ 613,842	0.0489	$ 611,687	0.0524	$ 1,308,784	$ 2,534,313	0.17%	$4,423.96
3	Hampton Roads Transit	0.1125	$ 1,405,652	0.1164	$ 1,454,396	0.1069	$ 2,673,190	$ 5,533,239	0.1122	$ 1,402,749	0.1159	$ 1,448,835	0.1069	$ 2,673,190	$ 5,524,774	-0.15%	($8,464.90)
4	GRTC	0.0481	$ 600,728	0.0475	$ 593,903	0.0469	$ 1,172,098	$ 2,366,729	0.0480	$ 599,487	0.0473	$ 591,632	0.0469	$ 1,172,098	$ 2,363,217	-0.15%	($3,511.86)
5	Fairfax County	0.0717	$ 896,177	0.0704	$ 879,583	0.0710	$ 1,774,586	$ 3,550,346	0.0715	$ 894,326	0.0701	$ 876,219	0.0710	$ 1,774,586	$ 3,545,131	-0.15%	($5,214.53)
6	City of Alexandria Office of Transit Services and Programs	0.0203	$ 253,836	0.0203	$ 253,711	0.0209	$ 521,592	$ 1,029,140	0.0203	$ 253,312	0.0202	$ 252,741	0.0209	$ 521,592	$ 1,027,645	-0.15%	($1,494.48)
7	PRTC	0.0267	$ 333,729	0.0265	$ 330,895	0.0254	$ 634,102	$ 1,298,726	0.0266	$ 333,039	0.0264	$ 329,630	0.0254	$ 634,102	$ 1,296,771	-0.15%	($1,954.64)
8	Arlington County	0.0145	$ 181,438	0.0156	$ 194,725	0.0163	$ 407,054	$ 783,217	0.0145	$ 181,063	0.0155	$ 193,981	0.0163	$ 407,054	$ 782,097	-0.14%	($1,119.38)
9	Loudoun County Office of Transportation Services	0.0109	$ 135,727	0.0109	$ 136,848	0.0093	$ 233,254	$ 505,829	0.0108	$ 135,447	0.0109	$ 136,324	0.0093	$ 233,254	$ 505,025	-0.16%	($803.64)
10	Greater Roanoke Transit Company	0.0128	$ 159,407	0.0125	$ 156,436	0.0125	$ 313,618	$ 629,460	0.0127	$ 159,077	0.0125	$ 155,838	0.0125	$ 313,618	$ 628,533	-0.15%	($927.46)
11	Charlottesville Area Transit	0.0110	$ 137,587	0.0111	$ 138,877	0.0112	$ 279,057	$ 555,521	0.0110	$ 137,303	0.0111	$ 138,346	0.0112	$ 279,057	$ 554,705	-0.15%	($815.24)
12	Blacksburg Transit	0.0136	$ 170,209	0.0136	$ 170,143	0.0135	$ 338,293	$ 678,645	0.0136	$ 169,858	0.0136	$ 169,493	0.0135	$ 338,293	$ 677,643	-0.15%	($1,002.19)
13	Greater Lynchburg Transit Company	0.0095	$ 119,062	0.0100	$ 125,122	0.0090	$ 225,459	$ 469,643	0.0095	$ 118,816	0.0101	$ 126,235	0.0090	$ 225,459	$ 470,510	0.18%	$866.96
14	Williamsburg Area Transit Authority	0.0107	$ 134,031	0.0106	$ 132,099	0.0110	$ 276,167	$ 542,296	0.0109	$ 136,226	0.0105	$ 131,594	0.0110	$ 276,167	$ 543,987	0.31%	$1,690.65
15	City of Harrisonburg Dept. of Public Transportation	0.0110	$ 137,558	0.0108	$ 135,532	0.0105	$ 263,312	$ 536,402	0.0110	$ 137,274	0.0108	$ 135,014	0.0105	$ 263,312	$ 535,600	-0.15%	($802.39)
16	City of Fairfax	0.0041	$ 51,725	0.0041	$ 51,303	0.0042	$ 104,432	$ 207,460	0.0041	$ 51,618	0.0041	$ 51,107	0.0042	$ 104,432	$ 207,157	-0.15%	($303.02)
17	City of Petersburg	0.0028	$ 34,697	0.0027	$ 34,215	0.0035	$ 86,434	$ 155,346	0.0028	$ 34,625	0.0027	$ 34,084	0.0035	$ 86,434	$ 155,143	-0.13%	($202.50)
18	City of Radford	0.0018	$ 23,045	0.0019	$ 24,253	0.0019	$ 47,257	$ 94,555	0.0018	$ 22,998	0.0019	$ 24,160	0.0019	$ 47,257	$ 94,414	-0.15%	($140.34)
19	City of Winchester	0.0010	$ 12,591	0.0010	$ 12,316	0.0009	$ 22,526	$ 47,434	0.0010	$ 12,565	0.0010	$ 12,269	0.0009	$ 22,526	$ 47,361	-0.15%	($73.10)
20	VRT Loudoun (without uza measures)	0.0014	$ 17,559	0.0014	$ 17,484	0.0011	$ 28,107	$ 63,150	0.0014	$ 17,523	0.0014	$ 17,417	0.0011	$ 28,107	$ 63,047	-0.16%	($103.13)
21	Loudoun County	0.0044	$ 55,311	0.0044	$ 55,075	0.0035	$ 88,536	$ 198,922	0.0044	$ 55,196	0.0044	$ 54,865	0.0035	$ 88,536	$ 198,597	-0.16%	($324.85)
22	Town of Leesburg	0.0012	$ 14,925	0.0012	$ 14,862	0.0010	$ 23,891	$ 53,677	0.0012	$ 14,894	0.0012	$ 14,805	0.0010	$ 23,891	$ 53,590	-0.16%	($87.66)
23	Central Shenandoah PDC	0.0014	$ 17,083	0.0014	$ 17,234	0.0013	$ 32,925	$ 67,241	0.0014	$ 17,048	0.0014	$ 17,168	0.0013	$ 32,925	$ 67,140	-0.15%	($101.18)
24	VRT Staunton (without uza measures)	0.0011	$ 13,422	0.0011	$ 13,541	0.0010	$ 25,869	$ 52,832	0.0011	$ 13,395	0.0011	$ 13,489	0.0010	$ 25,869	$ 52,753	-0.15%	($79.50)
25	VRT-Culpeper	0.0013	$ 15,918	0.0015	$ 18,209	0.0012	$ 31,071	$ 65,198	0.0013	$ 15,885	0.0015	$ 18,139	0.0012	$ 31,071	$ 65,096	-0.16%	($102.51)
26	FRED	0.0038	$ 46,955	0.0037	$ 46,623	0.0039	$ 97,273	$ 190,852	0.0037	$ 46,858	0.0037	$ 46,445	0.0039	$ 97,273	$ 190,577	-0.14%	($275.27)
27	JAUNT	0.0039	$ 49,185	0.0037	$ 46,265	0.0041	$ 102,808	$ 198,258	0.0039	$ 49,083	0.0037	$ 46,088	0.0041	$ 102,808	$ 197,980	-0.14%	($278.51)
28	Bay Aging	0.0021	$ 25,841	0.0021	$ 26,705	0.0021	$ 53,244	$ 105,789	0.0021	$ 25,787	0.0021	$ 26,602	0.0021	$ 53,244	$ 105,634	-0.15%	($155.49)
29	District Three Public Transit	0.0024	$ 30,281	0.0024	$ 29,833	0.0015	$ 38,168	$ 98,283	0.0024	$ 30,219	0.0024	$ 29,719	0.0015	$ 38,168	$ 98,106	-0.18%	($176.63)
30	AASC / Four County Transit	0.0016	$ 20,443	0.0017	$ 20,803	0.0015	$ 37,176	$ 78,423	0.0016	$ 20,401	0.0017	$ 20,724	0.0015	$ 37,176	$ 78,301	-0.16%	($121.78)
31	RADAR	0.0013	$ 15,985	0.0013	$ 16,454	0.0013	$ 33,269	$ 65,708	0.0013	$ 15,952	0.0013	$ 16,391	0.0013	$ 33,269	$ 65,612	-0.15%	($95.94)
32	Danville Transit System	0.0017	$ 21,397	0.0017	$ 21,140	0.0017	$ 43,425	$ 85,961	0.0017	$ 21,352	0.0017	$ 21,059	0.0017	$ 43,425	$ 85,836	-0.15%	($125.03)
33	Mountain Empire Older Citizens, Inc.	0.0012	$ 14,768	0.0012	$ 14,940	0.0013	$ 32,076	$ 61,783	0.0012	$ 14,737	0.0012	$ 14,883	0.0013	$ 32,076	$ 61,696	-0.14%	($87.63)
34	Farmville Area Bus	0.0008	$ 9,939	0.0008	$ 9,671	0.0008	$ 20,073	$ 39,683	0.0008	$ 9,919	0.0008	$ 9,634	0.0008	$ 20,073	$ 39,626	-0.14%	($57.51)
35	City of Bristol Virginia	0.0006	$ 7,168	0.0005	$ 6,595	0.0007	$ 16,652	$ 30,415	0.0006	$ 7,153	0.0005	$ 6,570	0.0007	$ 16,652	$ 30,375	-0.13%	($40.02)
36	Greene County Transit, Inc.	0.0006	$ 7,758	0.0006	$ 7,540	0.0006	$ 15,511	$ 30,809	0.0006	$ 7,742	0.0006	$ 7,511	0.0006	$ 15,511	$ 30,764	-0.15%	($44.86)
37	City of Suffolk	0.0005	$ 6,293	0.0005	$ 5,927	0.0005	$ 13,024	$ 25,244	0.0005	$ 6,280	0.0005	$ 5,904	0.0005	$ 13,024	$ 25,208	-0.14%	($35.66)
38	Pulaski Area Transit	0.0006	$ 7,021	0.0005	$ 6,630	0.0005	$ 12,368	$ 26,018	0.0006	$ 7,006	0.0005	$ 6,604	0.0005	$ 12,368	$ 25,978	-0.15%	($39.85)
39	Blackstone Area Bus	0.0004	$ 4,644	0.0004	$ 4,484	0.0004	$ 9,453	$ 18,581	0.0004	$ 4,634	0.0004	$ 4,467	0.0004	$ 9,453	$ 18,554	-0.14%	($26.74)
40	Lake Area	0.0001	$ 1,162	0.0001	$ 1,300	0.0001	$ 2,445	$ 4,907	0.0001	$ 1,159	0.0001	$ 1,295	0.0001	$ 2,445	$ 4,899	-0.15%	($7.37)
41	STAR Transit	0.0007	$ 8,250	0.0007	$ 8,631	0.0007	$ 17,173	$ 34,054	0.0007	$ 8,233	0.0007	$ 8,598	0.0007	$ 17,173	$ 34,004	-0.15%	($50.04)
42	Town of Bluefield-Graham Transit	0.0003	$ 3,496	0.0003	$ 3,515	0.0003	$ 6,918	$ 13,929	0.0003	$ 3,489	0.0003	$ 3,502	0.0003	$ 6,918	$ 13,909	-0.15%	($20.66)
43	Town of Altavista	0.0001	$ 1,162	0.0001	$ 1,152	0.0001	$ 2,422	$ 4,736	0.0001	$ 1,160	0.0001	$ 1,147	0.0001	$ 2,422	$ 4,729	-0.14%	($6.80)
44	Town of Chincoteague	0.0001	$ 971	0.0001	$ 977	0.0001	$ 2,101	$ 4,048	0.0001	$ 969	0.0001	$ 973	0.0001	$ 2,101	$ 4,043	-0.14%	($5.74)
	Statewide Total		$ 12,500,000		$ 12,500,000		$ 25,000,000	$ 50,000,000		$ 12,500,000		$ 12,500,000		$ 25,000,000	$ 50,000,000		

**Note: The percentile is calculated across all Virginia agencies excluding WMATA and VRE*

Notable conclusions drawn from this illustrative analysis were:

- Four out of a total of 44 transit systems in the Commonwealth were identified as being penalized due to moderate performance declines yet exhibiting exceptional performance in either one or two performance categories. No system was penalized in all three performance categories.

- The average difference in funding allocation between applying the original and modified performance trend factors for each transit agency was -0.12 percent. The difference for most transit agencies was as little as a few hundred dollars.

- In dollar terms, the maximum difference in funding allocation for the hypothetical $50 million distribution between applying the original and modified trend factors was $22,298 for WMATA. This is 0.08 percent of WMATA's funding allocation using the original trend factors (refer to Table 4.2).

The Working Group agreed that, while using modified trend factors to allocate state funds was a straightforward methodology, this approach had no significant impact on the dollar amounts to justify its use as a decision-making tool and/or provide an effective incentive for agencies to make management and operational changes to improve performance. The Working Group also indicated that this approach was undesirable because it relied on statewide averages as a basis for comparison, effectively comparing performance across dissimilar systems. Furthermore, this approach would require creating an exception for WMATA and VRE since both systems included significant rail operations which placed their performance metrics in a different range from the rest of the transit systems in the Commonwealth. While WMATA and VRE were not included in the statewide ranking, their performance was measured against the average performance distribution calculated for all other agencies in the Commonwealth. This creates an incongruity for which there is no simple workaround.

The Working Group does not believe that the Exceptional Performance measure is unsuitable simply because it may impact only a very small number of transit systems as the illustrative analysis demonstrated. However, given a variety of issues, including the subjectivity involved in defining exceptional performance, the complexities of the analysis, and the DRPT staff resources required to perform the analysis, ***the Working Group advised against implementing the Exceptional Performance measure using the statewide performance ranking approach.***

4.2.4.2 Nationwide Peer Analysis

Parsons Brinckerhoff researched a second approach involving a more detailed peer analysis using peers for individual transit agencies. The approach compares the performance of each individual transit agency to its closest peer agencies from across the country.

The nationwide peer analysis was conducted for one representative rail agency and one representative bus/paratransit agency in the Commonwealth: Virginia Railway Express (VRE) and Greater Richmond Transit Company (GRTC). Peer selection for each agency was based on the Florida Transportation Information System's (FTIS) module, which utilizes National Transit Database (NTD) data on agency attributes and performance. The peer grouping philosophy and methodology employed by FTIS, including detailed description of all the measures used to select peer systems, are explained in the Transit Cooperative Research Program (TCRP) Report 141.[5] The FTIS software uses a "likeness score" to quantify how similar other transit systems across the country are to the target system with respect to

[5] A Methodology for Performance Measurement and Peer Comparison in the Public Transportation Industry, TCRP 141. *Transportation Research Board*, 2010, p. 86-96.

certain factors, including service and urban area characteristics. The lower an agency's likeness score, the higher its proximity to the target agency. The likeness score of an agency to itself is zero, indicating complete likeness.

The factors used to determine peer likeness could be a combination of mode-screening factors, service area characteristics (e.g., Operating Budget, Total Vehicle Miles Operated, etc.), and/or urban area characteristics (e.g., Urban Area Population, Population Density, etc.) These factors could vary based on whether the agency was being treated as one whole system or whether a certain mode within the agency was being isolated to identify its peers.

A sample peer grouping of two agencies was conducted using both an agency-based and mode-based approach. The resulting analysis tables obtained from FTIS are presented in Appendix 4B. The key takeaways from this analysis were:

- There were significant differences in the selection of peer agencies using agency-based or mode-based approaches. This was true even in the case of VRE, where the agency operated a single mode. Using the agency-based approach the FTIS software shortlisted a number of agencies with no commuter rail service operation as peers to VRE.

- The likeness scores of the top ten peers varied significantly depending upon the target agency and the mode. As there are many more bus systems across the country than rail systems, the pool of comparable systems for bus agencies or modes was higher and hence the likeness scores were lower.

The Working Group agreed that, while this process presents the possibility of a technically accurate method for evaluating performance among "like" or peer systems only, it involves a great degree of subjectivity. Transit agencies need to be analyzed separately and uniquely depending upon whether an agency-based or mode-based peer comparison is more suitable, with each method resulting in the selection of a different set of peers. Additionally, changes in service and/or addition of new modes can potentially change the mix of peer systems, thereby further complicating the analysis across multiple years. Even when making the best educated assumptions, there may still be a significant amount of subjectivity involved in selecting the peer agencies. In practice, such a subjective and elaborate process will impose a significant workload on DRPT staff and create risks that outweigh any benefits from implementing an Exceptional Performance measure. In light of the above, the Working Group advised against implementing the Exceptional Performance measure using the nationwide peer analysis approach.

The nationwide peer analysis approach, although more technically accurate, involves a great degree of subjectivity. Transit agencies must be analyzed separately and uniquely depending upon whether an agency-based or mode-based peer comparison is more suitable, with each method resulting in the selection of a different set of peers. Additionally, changes in service and/or the addition of a new mode can potentially change the mix of peer systems, thereby further complicating the analysis across multiple years. Even when making the most educated assumptions, there could still be a significant amount of subjectivity involved in selecting the peer agencies. In practice, the qualitative input involved with making several individualized assumptions will impose a significant workload on DRPT staff and create risks resulting from potential inconsistencies and inaccuracies in assumptions that outweigh any benefits from implementing an Exceptional Performance measure. Given these issues, ***the Working Group advised against implementing the Exceptional Performance measure using the nationwide peer analysis approach***.

4.3 Recommendations

The Working Group advised against implementing the Exceptional Performance measure given the complexity and intensity of data and resources required, as well as the relative insignificance of the change in funding allocations resulting from either allocation method. DRPT may re-evaluate this or other measures in the future along with any potential updates to the operating assistance funding formula, or if new funding to support transit programs becomes available.

Chapter 5: Congestion Mitigation

This chapter describes the Transit Agency Working Group's consideration of state funding to address congestion mitigation through Virginia's transit operating funding program.

One of DRPT's primary goals for transit service in the Commonwealth is to facilitate mobility, a goal that is directly impacted by roadway and transit congestion levels. Although federal funding programs address congestion mitigation, there are currently no such state programs in Virginia. On July 1, 2013, TSDAC requested consideration for providing competitive grant opportunities to fund special services or programs that would mitigate congestion. TSDAC also directed DRPT to study and consider the viability of adding a program that would reward agencies for providing transit service that mitigated congestion. This chapter summarizes the findings of the Transit Agency Working Group's deliberations and recommendations for addressing Congestion Mitigation program through the performance-based transit funding as part of the operating funding allocation formula or as a separate discretionary program.

The Working Group recommends against implementing a Congestion Mitigation measure as part of the operating assistance allocation formula as well as one that would require new funding or a carve out from the existing formula. The Working Group instead recommends the establishment of a discretionary pilot grant program to provide targeted assistance for transit congestion mitigation needs. The pilot program would function as part of the existing Demonstration Project Assistance program. This program may serve as a model to determine the effectiveness of providing targeted state funding for this purpose, to inform any review of a broader program at a later time.

5.1 Overview

The Working Group discussed the Congestion Mitigation program over the course of four meetings held on December 16, 2013, January 28, 2014, February 20, 2014, and March 14, 2014. This section summarizes the key topics discussed during these meetings as they relate to the Congestion Mitigation program as well as the key takeaways from these discussions.

The key topics addressed through presentations and exhibits included:

- Goal of the Potential Congestion Mitigation Program
- Definition of Congestion Mitigation
- Structure of the Potential Congestion Mitigation Program
- Review of Potential Congestion Mitigation Measures

The main findings from the Working Group discussions are as follows:

- The goal of the Congestion Mitigation program should be to provide transit service that improves mobility where transit is congested. Though improving transit service in corridors where roadway conditions are congested was discussed, this objective was ultimately dismissed by the Working Group in favor of a limited program focused on mitigating transit congestion only.

- The Working Group defined the congestion to be addressed through the program as transit services where passenger demand exceeds available capacity at the route level.

- A discretionary grant program is recommended as the preferred approach. Potential transit service (operating costs) funded through the program could include improved service along existing corridors, supplements to existing service, new transit service, and user-side subsidies. The pilot program would function as part of the existing Demonstration Project Assistance Program.

Section 5.2 outlines the important features of the recommended Congestion Mitigation Discretionary pilot program. Sections 5.3 and 5.4 summarize the Working Group deliberations leading up to and including the main findings and final recommendation regarding this measure.

5.2 Recommendation: Congestion Mitigation Discretionary Pilot Program

5.2.1 Description

The Congestion Mitigation Discretionary pilot program would be integrated into the existing Demonstration Project Assistance program. Similar to the Demonstration program, the Congestion Mitigation program would be a flexible and broadly defined program. However, the Congestion Mitigation program would provide targeted funding for operating cost of transit services designed to mitigate transit congestion. Examples of projects funded under this program could include, but are not limited to, the following:

- Improved service along existing corridors including additional peak vehicles, reduced headways, and improved reliability
- Parallel or tripper service to supplement existing service
- Additional service to address park-and-ride lot demand, including feeder service
- User-side subsidies to incentivize passengers to choose less congested transit routes

5.2.2 Eligible Recipients

Eligible grant recipients include congestion mitigation services sponsored by the following entities, which include all of Virginia's local transit agencies:

- Local and State Governments
- Transportation District Commissions
- Public Service Corporations
- TDM/Commuter Assistance Agencies

5.2.3 Eligible Expenses

Consistent with the existing Demonstration Project Assistance program, direct operating costs (wages, fuel, supplies, maintenance, and purchased services) associated with the proposed transit service and/or user side subsidies shall be eligible expenses for this program. Any necessary capital investments associated with the proposed transit service would be funded through the state's capital grant allocation program or through other federal, state, or local sources. If acquisition of capital assets is required to implement the program, a capital funding request would accompany the operating application. Both requests will be evaluated at the same time, but will be funded from different sources, with receipt of

capital grant funding contingent on the award of a Congestion Mitigation program grant for operating expenses.

5.2.4 Match Ratio and Limits of Funding

As a result of House Bill (HB) 2313, Demonstration projects are funded with 80 percent state and 20 percent local match contributions. The Congestion Mitigation program would be funded at the maximum state ratios. This allows consistency with the Demonstration program funding, offers the ability to spread funds further, and ensures that agencies are invested in the success of the project.

Fare revenue may be used as part of the 20 percent local match, along with other local operating funding identified to support the project. State funding is from the Special Projects account of the Mass Transit Trust Fund, which includes funding for DRPT's Demonstration Assistance, Technical Assistance, and Intern programs.

The existing Demonstration program allows for a maximum grant duration of one year. The Congestion Mitigation program, however, would allow for a maximum grant duration of two consecutive years, to allow funded projects to become established prior to the expiration of state money. DRPT would want to see a commitment to continuing the service in the agency's six year operating plan after the expiration of the initial funding.

5.2.5 Application

A grant application would describe one Congestion Mitigation grant program proposal, including operating and any capital elements. Capital expenses would be funded through the state's capital grant allocation program or through other federal, state, or local sources. Capital grant funding would be contingent on the award of a Congestion Mitigation program grant for operating expenses. Congestion Mitigation grant applications would include the elements summarized below:

- **Program Justification**: Provide background of the proposed program, including the location and description of the area to be served. Include quantitative measures to identify and describe transit congestion in the corridor to be served.

  Quantitative measures describing existing transit congestion may include (but are not limited to) the following:

  - **Peak-Hour Passenger Boardings:** Demonstrates the extent to which transit service is currently utilized
  - **Trip Level Ridership:** Demonstrates existing demand if service were available
  - **Load Factor (Passenger by Seat):** Demonstrates the extent to which transit vehicles are operating at or above seat capacity
  - **Standing Passenger Area (Space [m2] per Passenger):** Demonstrates the extent to which transit vehicles are accommodating standing passengers
  - **Park-and-Ride Lot Demand vs. Capacity:** Demonstrates the extent to which a park-and-ride lot is at or over capacity
  - **Transit Stop Crowding – Dwell Times:** Demonstrates the extent to which transit stops are at, or over capacity
  - **Passenger Left Behind at Stops/Stations:** Demonstrates the extent to which transit service is operating over capacity, resulting in missed passenger boardings
  - **Wait Times:** Demonstrates the level of transit service provided

- **Person Through-put by Route or Corridor:** Demonstrates the level of route-specific or corridor-wide congestion

- **Planning:** Document that sufficient planning has been conducted to execute the project. Planning should address operating characteristics and capital needs.

- **Project Scope:** Explain how the proposed service change will address transit congestion

- **Project Plan:** Prepare and provide plan detailing the expected impact of the service change, including any forecasted ridership impacts

- **Project Readiness:** Summarize the ability to use operating funds within the fiscal years for which funding is requires. Provide detailed schedules and funding information for any capital investments needed prior to the implementation of the service change. Include sources of local match for the Congestion Mitigation program and long-term funding following program completion (if applicable)

- **Technical Capacity:** Identify the project management team and describe their ability to execute the project

- **Project Budget:** Summarize the ability to execute the project scope within the proposed project budget and demonstrate that sufficient consideration has been given to ongoing operating and maintenance costs

- **Project Schedule:** Summarize the ability to execute the project scope within the anticipated project schedule

- **Monitoring and Evaluation Plan:** Summarize the approach to measuring performance and evaluating the results of the project

5.2.6 Evaluation Criteria

Grant applications are proposed to be ranked according to the following criteria:

- The extent to which the proposed service change is expected to address transit congestion
- The completeness and quality of the proposal
- The estimated total capital and operating costs
- Project readiness
- Ridership and/or auto trips reduced
- Identified and committed local funding

The grant program will favor applicants who commit to locally funding projects after state funding assistance has expired. Selection would be based on available annual funding for the top-ranked proposals. DRPT will include the recommended applications and allocation in the Draft Six Year Improvement Program (SYIP). The CTB approves the release of the Draft SYIP to the public for comment and, following receipt of public comment, the CTB approves the final SYIP.

In order to ensure that local matching funds will be available for all applications recommended by DRPT for funding, a certification from the Chief Executive Officer of the entity applying for funding must be submitted to DRPT in May prior to the development of the Final SYIP. DRPT will provide future guidance on the form of the certification.

5.2.7 Monitoring and Evaluation Plan

The applicant would be required to periodically document and report to DRPT, project ridership and other relevant performance measures to gauge the success of the project and the overall grant program. In addition, the extent of local funding support would be monitored. The success of the project and program would be tracked for at least two years beyond completion of the program, providing baseline data to evaluate continuation of the pilot program.

5.3 Working Group Deliberations

This section summarizes the analysis presented and discussed during the Working Group meetings as it relates to the Congestion Mitigation program. Additional details of this analysis are included as appendices

5.3.1 Goals of the Congestion Mitigation Program

The Working Group determined that addressing congestion mitigation was an important goal for the SB 1140 Performance Based Funding Allocation study since improving mobility and providing access to transit are DRPT priorities. The federal Congestion Mitigation and Air Quality (CMAQ) program provides funding to address congestion (particularly as it impacts air quality). However, no state programs currently address this objective.

The Working Group agreed that the goal of the Congestion Mitigation program should be to provide transit service that improves mobility where transit is congested.

The Working Group considered whether the Congestion Mitigation program should address transit service offered in congested roadways in addition to transit congestion mitigation. This was partially in response to the legislative intent behind recent General Assembly actions providing for additional transportation funding to address congestion needs throughout the state. However, Working Group members voiced concerns about including roadway congestion measures to determine transit operating funding, stating that the funding program should be based solely on transit congestion. Members of the Working Group stated that measuring the impact of transit on roadway congestion would be too difficult given the significant number of unknown factors in roadway corridor congestion.

5.3.2 Definition of Congestion to be Mitigated

For the purpose of this task, the Working Group defined congestion as transit passenger demand exceeding available capacity at the route level. The working group considered whether to address vehicular congestion at the corridor, intersection, region, or agency service area-level. Ultimately, Working Group members concluded that there were too many variables for transit service to affect vehicular congestion, so the focus of the program should be on transit congestion. Channeling funding to address transit congestion needs in a particular corridor would provide targeted funding to address congestion issues directly, rather than thinly spreading funding across multiple agencies.

5.3.3 Structure of the Potential Congestion Mitigation Program

The Working Group discussed and qualitatively analyzed potential structures for the Congestion Mitigation program. The discussions largely indicated that, if implemented, the program should be structured as a pilot program that could become a mainstream DRPT grant program. Changes to the existing performance-based transit operating funding allocation formula to address this objective were not deemed appropriate, as that would not permit funds to be targeted to specific needs.

The working group considered whether the Congestion Mitigation program should be implemented as a discretionary or formula-based program, as well as the level of effort that should be expected from agencies and DRPT to determine eligibility for this program on an annual basis.

Two alternate Congestion Mitigation program concepts were discussed with the Working Group. These included:

- **Discretionary program approach:** This approach would allow agencies to request funding to address transit congestion needs based on state-established guidelines and analytical methods. The approach would allow agencies to apply and compete for dedicated funding on a discretionary basis.

- **Formula-Based program approach:** This approach would require DRPT to establish guidelines for quantitative methods (such as performance thresholds or statistical and other measures), obtain performance data from individual agencies, and determine which agencies are eligible for funding from this program.

The Working Group ultimately determined that a pilot discretionary program would be more favorable since it would allow participation of all interested transit agencies in the Commonwealth. The Working Group also agreed that implementing a formula-based approach would likely be a highly data-driven and analytical process that would require significant staff resources. The following considerations were also discussed with the Working Group in determining the preferred program structure:

- **Applicable Agencies:** The Working Group acknowledged that a Congestion Mitigation program would likely impact certain systems more than others. Introducing a congestion mitigation requirement in the operating assistance formula would likely benefit big transit agencies in urban, highly dense populations while burdening smaller agencies in rural, uncongested conditions. Some members of the Working Group stated that this measure might be redundant with other measures already included in the operating assistance formula since the delay caused by congestion increases agency operating costs, which therefore impacts grant awards. However, the Working Group reasoned that any de facto operating assistance earned this way does not address the intended policy objective.

- **Incorporation into Operating Assistance Formula**: The Working Group considered awarding bonus points for congestion mitigation as part of the operating assistance formula, providing additional funding to systems (or routes) operating in congested conditions. Under this scenario, rural systems would not receive any bonus points. Some members of the Working Group expressed concerns about carving out funds from the operating assistance funding allocation for a congestion relief bonus fund. Working Group members were generally open to considering this option if new funding became available. The Working Group concluded that congestion mitigation would not be a useful measure to incorporate into the operating assistance formula.

- **Data Availability and Consistency:** Congestion data presently collected on a regional and statewide basis were presented to the Working Group and are documented in Appendix 5A. The Working Group requested that all agencies in the Commonwealth be eligible for congestion mitigation program funding. However, applying congestion data collected only by the largest metropolitan areas in the state would effectively limit the agencies eligible for program funding. Only two data sources are available on a statewide basis: the American Community Survey (ACS) and the National Transit Database (NTD). Neither of these sources includes adequate performance measures for congestion mitigation, especially at the route or corridor level. The Working Group agreed, based on limited data

availability, that implementing a discretionary pilot program was the only viable option as this time. Any other option, such as the population threshold implementation strategy also documented in Appendix 5A, would limit the application of this program to those areas that were currently collecting congestion mitigation data.

- **Complexity versus Transparency:** The operating assistance formula requires a delicate balance between complexity and transparency. The formula may utilize a number of measures in varying weights to incorporate a range of desirable outcomes. Doing so, however, will most probably complicate the formula so that it can no longer be explained to or easily understood by the public. The Working Group ultimately favored the discretionary program approach since it would allow DRPT to test targeted support for this objective before enlarging the program or possibly integrating it into the operating assistance formula.

Following the decision to move forward with a discretionary pilot program, a number of topics related to the nature and details of such a program were next presented and discussed with the Working Group. These included:

- **Integration with the Demonstration Project Assistance Program:** The Congestion Mitigation discretionary pilot program was originally presented as a stand-alone operating assistance program. However, the availability of funding for a pilot program dictated that it be integrated with the Demonstration Project Assistance program the Working Group requested that it be integrated with the Demonstration Project Assistance program since the Demonstration program already supports operating costs and could be easily directed to address congestion mitigation needs. Similar to the Demonstration program, the Congestion Mitigation program would also be flexible to fund creative approaches that address congestion needs. In addition, many of the application and grant administration features of the Congestion Mitigation discretionary grant program may be readily modeled after this existing program.

- **Eligible Projects:** The Congestion Mitigation program would support fixed-route transit services targeted at mitigating congestion. Working Group members described a number of approaches for which state funding could address this objective. These included service to address increasing peak-period demand, improving bus reliability in congested corridors, increasing transit capacity, and providing additional feeder service. The Working Group also requested that user-side subsidies be included as an eligible project under this program. Many times, user-side subsidies such as taxi vouchers or reduced fares can efficiently achieve similar objectives at lower expense.

  Parsons Brinckerhoff estimated that a typical project applying for funding under this program could cost approximately $750,000. This is the estimated cost to provide additional peak-hour bus service with 15 minute headways along a 10-mile urban corridor for an agency with an average cost structure typical of large urban agencies in the Commonwealth. The 80 percent state share for this illustrative project would be $600,000.

- **Farebox Recovery:** Higher farebox recovery ratios provide an incentive for agencies to continue the proposed service after funding from the Congestion Mitigation program is depleted. To avoid penalizing successful services, the Working Group decided that eligible program expenses will include total, rather than net, operating costs. Under this arrangement, fare revenues can be used as part of the local match, along with other operating revenues specific to the proposed project

- **Funding Prioritization:** The Working Group agreed that the highest ranking grant applications should be fully funded, as funds permit, since agencies are likely to require full funding to implement any program. An alternative approach, spreading a thin layer of funding to many programs, would likely result in few programs having the necessary total funding to be implemented.

- **Grant Duration:** Members considered the maximum duration of state funding for any grant funded program. An initial proposal allowed agencies to request funding for an unspecified number of years with the understanding that total funding would decrease over time. Later drafts reduced grant duration to a maximum of two years. Members of the Working Group reasoned that a two-year assistance program would be adequate given the two-year lag between start of service and the receipt of operating assistance calculated on the basis of the operating cost and ridership associated with that service[6]. In addition, two years provides agencies enough time to develop a long-term operating funding plan, possibly by engaging a local funding partner for continued support. However, some members of the Working Group questioned whether DRPT could realistically expect agencies to commit to funding a project two years in advance.

  A related issue is the lead time required for agencies to deliver new service, especially if the purchase of capital assets is required to deliver new service. For instance, the procurement of new buses typically takes between 12 and 18 months. This time should be accounted for when requesting operating funding since funds would not be needed until the capital assets are delivered.

5.3.4 Qualitative Measures of Congestion Mitigation

A literature review of potential measures was presented to the Working Group to assist in identifying the appropriate measures for the Congestion Mitigation program. This high-level qualitative review included potential performance measure categories and examples. The Working Group agreed that agencies should include the following optional measures, as applicable, in their applications for the discretionary pilot program. Specific measures, data sources, and the general advantages and limitations of each data source are summarized below. Additional measures that were researched are documented in Appendix 5A.

5.3.4.1 Transit Congestion Measures:

The potential transit Level of Service (LOS) measures were listed in the discretionary pilot program description as a general guideline for agencies to reference when determining which types of data and performance measures help support a competitive application. Transit congestion measures were broadly divided into the three categories detailed below:

- **Productivity**:
  - Average Weekday Boardings per Revenue Hour
  - Average Weekday Boardings per Trip
  - Average Boardings per Revenue Mile
  - Average Annual Boardings per Route Mile

[6] DRPT's current practice is to provide startup operating assistance for transit agencies' expansion transit services during the first two years of service based on the budgeted operating expenses and projected ridership. In year 3, startup service become eligible for formula operating assistance funding from DRPT based on the service provided during the first two years of operation. In the case of the Congestion Mitigation Grant Program, funded services are not anticipated to receive startup operating assistance during the first two years of service, as the Congestion Mitigation Grant Program funding will be at the maximum state participation rate. However, Congestion Mitigation Grant Program funded service will transition to normal state operating assistance in year 3 of service.

- Passenger Miles per Revenue Mile

  Advantages: Most data is already collected. May need to parse out corridor-/route-level data to make the case for congestion

  Limitations: Need to determine a benchmark to evaluate congestion, e.g., how many Boardings or Revenue Miles indicate congestion for each mode/vehicle type? It does not indicate latent demand. Average weekday and other productivity measures look at ridership for the whole route and not a specific congested section or bottleneck

- **In-Vehicle Crowding:**
  - Load Factor (Passengers per seat)
  - Standing Passenger Area (space [m^2] per passenger)

  Advantages: Provides a clear picture of in-vehicle congestion on system/route

  Limitations: May impose a data collection burden if data is not already collected

- **Others:**
  - Park-and-ride Lot Demand Exceeding Capacity
  - Bus Stop Crowding – Dwell Time
  - Wait Times
  - Person Through-put by Route or Corridor

  Advantages: Accommodate different types of congestion experienced over the transit system

  Limitations: More difficult to measure and quantify than in-vehicle or general corridor congestion

5.3.4.2 Roadway Congestion Measures

The Working Group considered whether to list both transit and roadway congestion performance measures as optional measures in the discretionary pilot program guidance. However, the Working Group did not support the optional inclusion of roadway measures stating that transit operation on congested roadways should not be a qualifying factor for congestion mitigation funding. Additional research on roadway congestion measures in the Commonwealth presented to the Working Group is documented in Appendix 5A.

5.4 Recommendations

The Working Group recommends against implementing a Congestion Mitigation measure as part of the operating assistance allocation formula. The Working Group further recommends the establishment of a discretionary pilot grant program to provide targeted assistance for transit congestion mitigation needs. The pilot program would function as part of the existing Demonstration Project Assistance program. This program may serve as a model to determine the effectiveness of providing targeted state funding for this purpose, to inform any review of a broader program at a later time.

Chapter 6: Transit Dependent Objectives

This chapter describes the Transit Agency Working Group's consideration of state funding to address the needs of Virginians dependent on transit services for their mobility.

Servicing transit dependent populations by introducing new or expanding current service to underserved persons is a priority for DRPT. Although there are federal programs that address transit dependent populations, there are currently no such state programs in Virginia. On July 1, 2013, TSDAC requested that DRPT consider the introduction of competitive grant opportunities to fund special services or programs that would better serve the needs of transit dependent individuals. TSDAC also directed DRPT to study the viability of adding a program that would provide funding to transit agencies servicing transit dependent populations. This chapter summarizes the findings of the Transit Agency Working Group's deliberations and recommendations for including a Transit Dependent program as part of the performance-based operating funding allocation formula or as a separate discretionary program.

The Working Group recommends against incorporating a Transit Dependent measure into the performance-based operating funding allocation formula as well as one that would require new funding or a carve out from the existing formula. Instead, the Working Group recommends the establishment of a pilot discretionary grant program to provide targeted assistance for transit dependent needs. This pilot program would function as part of the existing Demonstration Project Assistance program. This program may serve as a model to determine the effectiveness of providing targeted state funding for this purpose, to inform any review of a broader program at a later time.

6.1 Overview

The Working Group discussed Transit Dependent objectives over the course of four meetings, on December 16, 2013, January 28, 2014, February 20, 2014, and March 14, 2014. This section presents the topics discussed during these meetings as they relate to the Transit Dependent program as well as the key takeaways from these discussions.

The key topics addressed through presentations and exhibits included:

- Goal of the Potential Transit Dependent Program
- Definitions of Transit Dependent Individuals
- Structure of the Potential Transit Dependent Program
- Review of Potential Transit Dependent Measures
- Consistency with Federal Title VI and Environmental Justice Requirements

The main findings from the Working Group discussions are as follows:

- The goal of the Transit Dependent program should be to improve access and mobility for transit-dependent individuals.

- The Working Group defined individuals who are transit dependent as those who identify with one or more of the following characteristics:
  - Zero-vehicle household
  - Disability
  - Below 50 percent of median family income level
  - Elderly (over 65 years of age) and youth (below driving age)

  In addition, any program should consider the impacts on Title VI protected classes, including race, color, and national origin.

- A discretionary-based grant program was recommended to address Transit Dependent objectives. Potential programs would include improved transit service for transit dependent individuals, new service in areas without existing transit service, or user-side subsidies such as a fare reduction or taxi voucher program. The pilot program would function as part of the existing Demonstration Project Assistance program.

- Title VI and Environmental Justice requirements would not create a barrier to implementing the discretionary pilot program. Agencies should structure transit service standards and policies to exclude temporary pilot programs from consideration.

Section 6.2 outlines the important features of the recommended Transit Dependent Discretionary Pilot Program. Sections 6.3 and 6.4 summarize the Working Group deliberations leading up to and including the main findings and final recommendation regarding this measure.

6.2 Recommendation: Transit Dependent Discretionary Pilot Program

This section describes the Transit Dependent Discretionary pilot program recommended by the Transit Agency Working Group.

6.2.1 Description

The Transit Dependent Discretionary pilot program would be integrated into the existing Demonstration Project Assistance program. Similar to the Demonstration program, the Transit Dependent program would be a flexible and broadly defined program. However, the Transit Dependent program would provide targeted funding for the operating cost of transit programs designed to better serve populations identified as transit dependent. Examples of programs funded under this program could include, but are not limited to, the following:

- Improved transit service for transit dependent individuals, including service to vital community activity centers
- New transit service in underserved areas or areas without existing transit service
- User-side subsidies such as fare reduction or taxi vouchers for transit dependent individuals

6.2.2 Eligible Recipients

Eligible grant recipients include transit dependent programs sponsored by the following entities, which include all of Virginia's local transit agencies:

- Local and State Governments
- Transportation District Commissions
- Public Service Corporations
- TDM/Commuter Assistance Agencies

6.2.3 Eligible Expenses

Consistent with the existing Demonstration program, direct operating costs (wages, fuel, supplies, maintenance, and purchased services) associated with the proposed transit service and/or user-side transit subsidies shall be eligible expenses for this program. Any necessary capital investments associated with the proposed transit service would be funded through the state's capital grant allocation program or through other federal, state, or local sources. The capital request would accompany the operating application. Both requests would be evaluated at the same time, but will be funded from different sources, with receipt of capital grant funding contingent on the award of a Transit Dependent pilot program grant for operating expenses.

6.2.4 Match Ratio and Limits of Funding

As a result of HB 2313, Demonstration projects are funded with 80 percent state and 20 percent local match contributions. The Transit Dependent pilot program would be funded at the same matching ratios. This allows consistency with the Demonstration program funding, offers the ability to spread funds further, and ensures that agencies are invested in the success of the project/program.

Fare revenue may be used as part of the 20 percent local match, along with other operating revenues identified to support the proposed program. State funding is from the Special Projects account of the Mass Transit Trust Fund, which includes funding for DRPT's Demonstration Assistance, Technical Assistance, and Intern programs.

The existing Demonstration program allows for a maximum grant duration of one year. The Transit Dependent program, however, would allow for a maximum grant duration of two consecutive years, to allow funded programs to become established prior to the expiration of state money.

6.2.5 Application

A grant application would describe one Transit Dependent program proposal, including operating and any capital elements. Capital expenses would be funded through the state's capital grant allocation program or through other federal, state, or local sources. Capital grant funding would be contingent on the award of a Transit Dependent program grant for operating expenses. Transit Dependent grant applications would include the elements summarized below:

- **Program Justification**: Provide background of the proposed program, including the location and description of the area to be served. Include quantitative measures to identify and describe the transit dependent population to be served. If applicable, compare to similar measures for the agency's full service area or the region

  Quantitative measures describing transit dependent populations should include one or more of the following. Priority will be given to proposed programs that serve multiple categories of transit dependent persons as defined below:

  - <u>Zero Vehicle Household:</u> Demonstrates the extent to which the population has household access to a vehicle. Measures include:

    - Percent of households without a vehicle
        1. Percent of persons taking transit to work

  - Disability: Demonstrates the extent to which the population is physically, mentally, or emotionally unable to use a vehicle.
    - Percent of persons having difficulty performing errands alone because of a physical, mental, or emotional condition

  - Low Income: Demonstrates the extent to which the population is financially restricted from owning a personal vehicle.
    - Percent of persons with total income below 50 percent of median family income level

  - Age: Demonstrates the extent to which the population is unable to drive due to age restrictions
    - Percent of persons over the age of 65
    - Percent of persons below the driving age

  - Other Measures: Demonstrate the extent to which the population is transit dependent
    - Residential population without transit service (especially in areas without existing transit service)
    - Number of passenger trips for transit dependent persons
    - Transit service level per capita

- **Planning**: Document that sufficient planning has been conducted to execute the program

- **Program Scope**: Explain how the proposed service change will address transit dependent needs

- **Program Plan**: Prepare and provide a plan detailing expected impact of the program, including any service changes or forecasted ridership impacts

- **Readiness**: Summarize the ability to use operating funds within the fiscal years for which funding is requested. Provide detailed schedules and funding information for any capital investments needed prior to the implementation of the program. Include sources of local match for the Transit Dependent program and long-term funding following program completion (if applicable)

- **Technical Capacity**: Identify the program management team and describe their ability to execute the program

- **Budget**: Summarize the ability to execute the program scope within the proposed budget and demonstrate that sufficient consideration has been given to ongoing operating and maintenance costs

- **Schedule**: Summarize the ability to execute the program scope within the anticipated schedule

- **Monitoring and Evaluation Plan**: Summarize the approach to measuring performance and evaluating the results of the program

6.2.6 Evaluation Criteria

Grant applications are proposed to be ranked according to the following criteria:

- The extent to which the proposed program is expected to address transit dependent needs

- The completeness and quality of the proposal
- The estimated total capital and operating costs
- Program readiness
- Identified and committed local funding

The grant program would favor applicants who commit to locally funding programs after state funding assistance has expired. Selection would be based on available annual funding for the top-ranked proposals. DRPT will include the recommended applications and allocation in the Draft Six Year Improvement Program (SYIP). The CTB approves the release of the Draft SYIP to the public for comment and, following receipt of public comment, the CTB approves the final SYIP.

In order to ensure that local matching funds will be available for all applications recommended by DRPT for funding, a certification from the Chief Executive Officer of the entity applying for funding must be submitted to DRPT in May prior to the development of the Final SYIP. DRPT will provide future guidance on the form of the certification.

6.2.7 Monitoring and Evaluation Plan

The applicant would be required to periodically document and report to DRPT program ridership and other relevant performance measures to gauge the success of individual grant-funded programs and the overall discretionary program. In addition, the extent of local funding support would be monitored. Success of the project/program would be tracked for at least two years beyond its completion, providing baseline data to evaluate continuation of the Transit Dependent pilot grant program.

6.3 Working Group Deliberations

This section summarizes the analysis presented and discussed during the Working Group meetings as it relates to the Transit Dependent Discretionary pilot program. Additional details of this analysis are included as appendices.

6.3.1 Goal of the Potential Transit Dependent Program

The Working Group determined that addressing transit dependent needs was an important goal for the Performance-Based Funding Allocation Study since improving access to transit and introducing new transit service in underserved areas of the Commonwealth are DRPT priorities. Federal programs, including the Section 5310 Enhanced Mobility of Seniors and Individuals with Disabilities and Section 5311(b)(3) Rural Transit Assistance Program (RTAP) provide funding aimed at addressing transit dependent objectives. However, no state programs currently address this objective. The Working Group acknowledged that this task should address services that have a public service goal, such as serving a vital activity center like a hospital.

6.3.2 Definition of Transit Dependent Persons

For the purpose of the task, the Working Group defined transit dependent as those who identify with one or more of the following:

- Zero-vehicle household
- Disability
- Below 50 percent of median family income level
- Elderly (over 65 years of age) and youth (below driving age)

- Other criteria

In addition, any program should consider the impacts on Title VI protected classes, including race, color, and national origin.

The Working Group initial considered percentage of persons under the poverty level as a definition. However, the Working Group later changed the measure to percentage of persons under the median family income level, a practice common for distributing affordable housing aid.

6.3.3 Structure of the Potential Transit Dependent Grant Program

The Working Group discussed and qualitatively analyzed potential structures for the Transit Dependent program. The discussions largely indicated that, if implemented, the program should be structured as a pilot program that could become a mainstream DRPT grant program. The working group considered whether the Transit Dependent program be implemented as a discretionary or formula-based program, as well as the level of effort that would be expected from agencies and DRPT to determine eligibility for this program on an annual basis.

Two alternate Transit Dependent program concepts were discussed with the Working Group. These included:

- **Discretionary program approach**: This approach would allow agencies to request funding to address needs of transit dependent individuals in their communities based on state-established guidelines and analytical methods. This approach would allow agencies to apply and compete for dedicated funding on a discretionary basis.

- **Formula-based program approach**: This approach would require DRPT to establish guidelines for quantitative methods (such as performance thresholds or statistical and other measures), obtain performance data from individual agencies, and determine which agencies are eligible for funding from this program.

There was some support within the Working Group to add a Transit Dependent measure to the performance-based operating funding allocation formula to enable DRPT to reward agencies that provide targeted service to transit dependent individuals. Other members of the Working Group supported a discretionary approach that would enable any agency to apply to for targeted funding. The Working Group ultimately favored the discretionary approach since it would allow DRPT to test targeted support for this objective before integrating it into the performance-based operating funding allocation formula. The Working Group also disagreed with the idea of geographically targeting distressed communities since that would contradict the program's objective of serving transit dependent populations irrespective of the affluence of a region.

Following the decision to move forward with a discretionary pilot program, a number of topics related to the nature and details of such a program were next presented and discussed with the Working Group. These included:

- **Integration with the Demonstration Project Assistance Program:** The Transit Dependent discretionary pilot program was originally presented as a stand-alone operating assistance program. However, the availability of funding for a pilot program dictated that it be integrated with the Demonstration Project Assistance program since the Demonstration program already supports operating programs and could be easily directed to address transit dependent needs. Similar to the

Demonstration program, the Transit Dependent pilot program would also be flexible to fund creative approaches that address transit dependent needs. In addition, many of the application and grant administration features of the Transit Dependent discretionary program may be readily modeled after the existing Demonstration program.

- **Eligible Programs:** Working Group members described a number of approaches for which state funding could address transit dependent objectives. These included targeted new transit service or improved transit service in underserved areas, providing service to vital community activity centers (such as a hospital), establishing new transit systems, and user-side subsidies (e.g., taxi vouchers or reduced fare programs) .Members agreed that services eligible to apply for the Transit Dependent program should include both demand response and fixed-route transit service.

- **Farebox Recovery:** Higher farebox recovery ratios provide an incentive for agencies to continue the proposed service after funding from the Transit Dependent program is depleted. To avoid penalizing successful services, the Working Group decided that eligible program expenses will include total, rather than net, operating costs. Under this arrangement, fare revenues can be used as part of the local match, along with other operating revenues specific to the proposed program.

- **Funding Prioritization:** The Working Group agreed that the highest ranking grant applications should be fully funded, as funds permit, since agencies are likely to require full funding to implement any program. An alternative approach, spreading a thin layer of funding to many programs, would likely result in few programs having the necessary total funding to be implemented.

- **Grant Duration:** Members considered the maximum duration of state funding for any grant-funded program. An initial proposal allowed agencies to request funding for an unspecified number of years with the understanding that total funding would decrease over time. Later drafts reduced grant duration to a maximum of two years of operating funding. Members of the Working Group reasoned that a two-year assistance program would be adequate given the two-year lag between start of service and the receipt of operating assistance calculated on the basis of the operating cost and ridership associated with that service[7]. In addition, two years provides agencies enough time to develop a long-term operating funding plan, possibly by engaging a local funding partner for continued support. However, some members of the Working Group questioned whether DRPT could realistically expect agencies to commit to funding a program two years in advance.

  A related issue is the lead time required for agencies to deliver new service, especially if the purchase of capital assets is required to deliver such service. For instance, the procurement of new buses typically takes between 12 and 18 months. This time should be accounted for when requesting operating funding since funds would not be needed until the capital assets are delivered.

6.3.4 Qualitative Measures of Transit Dependent Needs

A literature review of potential measures of transit dependent needs was presented to the Working Group to assist them in identifying the appropriate measures for the Transit Dependent program. This high-level

[7] DRPT's current practice is to provide startup operating assistance for transit agencies' expansion transit services during the first two years of service based on the budgeted operating expenses and projected ridership. In year 3, startup service become eligible for formula operating assistance funding from DRPT based on the service provided during the first two years of operation. In the case of the Transit Dependent Grant Program, funded services are not anticipated to receive startup operating assistance during the first two years of service, as the Transit Dependent Grant Program funding will be at the maximum state participation rate. However, Transit Dependent Grant Program funded service will transition to normal state operating assistance in year 3 of service.

qualitative review included potential performance measure categories and examples. Investigation focused on two data sources available on a statewide basis: National Transit Database (NTD) and American Community Survey (ACS) census data.

The Working Group agreed that agencies should include the following optional measures, as applicable, in their applications for the discretionary pilot program**.** Specific measures, data sources, and the general advantages and limitations of each data source are summarized below. Additional measures that were researched are documented in Appendix 6A.

- **Zero-Vehicle Household (ACS):** Demonstrates the extent to which the population has household access to a vehicle. Measures include:
  - Percent of households without a vehicle
  - Percent of households without a vehicle
  - Percent of persons taking transit to work

    Advantages: Data already collected down to the individual census tract

    Limitations: Provides the percentage of zero-vehicle households but not necessarily the percentage of zero-vehicle individuals. Measure includes transit users who are dependent by choice, and may not be fitting beneficiaries of targeted grant funding. May impose a data collection burden if data is not already collected, calculated, and analyzed for the targeted area

- **Disability (ACS):** Demonstrates the extent to which the population is physically, mentally, or emotionally unable to use a vehicle. Measures include:
  - Percent of persons identifying as deaf or having serious difficulty hearing
  - Percent of persons identifying as blind or having serious difficulty seeing even when wearing glasses
  - Percent of persons having difficulty doing errands alone because of a physical, mental, or emotional condition
  - Percent of persons having difficulty concentrating, remembering, or making decisions because of a physical, mental, or emotional condition
  - Percent of persons having serious difficulty walking or climbing stairs
  - Percent of persons having serious difficulty dressing or bathing

    Advantages: Data already collected down to the individual census tract

    Limitations: Measures all disabilities so may not accurately represent transit dependent disabled population. May impose a data collection burden if data is not already collected, calculated, and analyzed for the targeted area

- **Low Income (ACS):** Demonstrates the extent to which the population is financially restricted from owning a personal vehicle.
  - Percent of persons with total income below 50 percent of median family income level

    Advantages: Data already collected down to the individual census tract

    Limitations: Measures all persons below defined income level regardless of their actual transit dependent status. Does not account for federal poverty status. May impose a data collection burden if data is not already collected, calculated, and analyzed for the targeted area

- **Age (ACS):** Demonstrates the extent to which the population is unable to drive due to age restrictions. Measures include:
  - Percent of persons over the age of 65
  - Percent of persons below the driving age

    Advantages: Data already collected down to the individual census tract

    Limitations: Measures all persons below or above a defined age range regardless of actual transit dependent status. May impose a data collection burden if data is not already collected, calculated, and analyzed for the targeted area

- **Others (Combination of ACS and NTD):** Demonstrates the extent to which the population is transit dependent. Measures include:
  - Number of passenger trips for transit dependent persons
  - Transit service level per capita

    Advantages: Data applied in the 2030 VTrans Update, Virginia's statewide multimodal long-range transportation plan

    Limitations: Requires further analysis and combination of two data sets. May impose a data collection burden if data is not already collected, calculated, and analyzed for the targeted area

6.3.5 Title VI and Environmental Justice Review

The Working Group questioned the impact of the Transit Dependent program should operating funding no longer be provided to support a transit dependent service, requiring its discontinuation. The Working Group requested additional information on the impacts of Title VI on a potential discretionary pilot program. Parsons Brinckerhoff analyzed Title VI of the federal Civil Rights Act of 1967 and Environmental Justice guidelines and determined that these requirements should not pose a barrier to providing new services aimed at addressing fulfillment of transit dependent outcomes. The Working Group confirmed the findings and concluded that DRPT and transit agency grantees would be compliant with Title VI as long as service was aligned with the service standards and policies of the successful applicant and there was a rationale for making service and rate changes. The Working Group determined that agencies could structure their service standards to exclude a pilot program from Title VI requirements. DRPT could provide advisory guidance on both the Title VI and Environmental Justice programs to help grantees navigate these requirements. Agencies could then include necessary provisions in their Title VI plans. Additional information on Title VI and Environmental Justice is documented in Appendix 6B.

6.4 Recommendations

The Working Group recommends against incorporating a Transit Dependent measure into the performance-based operating funding allocation formula. Instead, the Working Group recommends the establishment of a pilot discretionary grant program to provide targeted assistance for transit dependent needs. This pilot program would function as part of the existing Demonstration Project Assistance program. The recommended Transit Dependent program may serve as a model to determine the effectiveness of providing targeted state funding for this purpose, to inform any review of a broader program at a later time.

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Appendix 6A: Review of Potential Transit Dependent Measures 6A-1
Appendix 6B: Title VI and Environmental Justice Review 6B-1

Appendix 2A: Research Guides

This Appendix contains the research guides used to gather local agency information on data practices, specifically:

- Blank survey in the Survey Monkey format
- Local agency interview guide matrix

The interview guide matrix was used to frame the discussions with the 13 local agencies interviewed as part of the data collection task. The interview questions were created based on agency responses to the survey.

Introduction

Please briefly answer the questions below, limiting your response to 3 sentences for open-ended questions. If you like, you can submit supporting documentation separately (see question 46). The "Agency" refers to the transit operator. "Data" refers to the quantitative measure used for internal and external reporting.

***1. Agency Name**

2. If the Agency has a chief data manager (responsible for data entered into OLGA), please provide his/her name and contact information.

3. How many staff members does the Agency have that are dedicated to data management? If a staff member works half time on data management, please enter 0.5.

Data Collection - Ridership

For questions 6 through 22, please provide specific measurement and collection methodology for the following data categories. Please limit your answers to open-ended questions to 3 sentences. If the measurement, tracking, and verification methods are the same for multiple types of data, please answer with "see __ above." If you like, you can submit relevant supporting documentation separately (see question 46).

4. How does the Agency collect ridership data? Check all those that apply.

- ☐ Automatic Passenger Counters
- ☐ Electronic Registering Fareboxes
- ☐ Manual click-counter
- ☐ Manual entry in log

Other (please specify)

5. How does the Agency assemble ridership data to report systemwide numbers? What, if any, post-processing steps are involved from the point of data collection to reporting to DRPT (e.g., ridership information is collected by route, and then aggregated to calculate total monthly ridership count)?

6. How are the data stored and tracked over time by the Agency (i.e., via Microsoft Excel, online database, etc.)?

7. How are the data checked and verified?

Data Collection - Operating & Maintenance Expenses

For questions 6 through 22, please provide specific measurement and collection methodology for the following data categories. Please limit your answers to open-ended questions to 3 sentences. If the measurement, tracking, and verification methods are the same for multiple types of data, please answer with "see __ above." If you like, you can submit relevant supporting documentation separately (see question 46).

8. How are operating and maintenance expense data collected?

9. How are the data stored and tracked over time by the Agency (i.e., via Microsoft Excel, online data, etc.)?

10. How are the data checked and verified?

Data Collection - Fare Revenue

For questions 6 through 22, please provide specific measurement and collection methodology for the following data categories. Please limit your answers to open-ended questions to 3 sentences. If the measurement, tracking, and verification methods are the same for multiple types of data, please answer with "see __ above." If you like, you can submit relevant supporting documentation separately (see question 46).

11. How are fare revenue data collected?

12. How are the data stored and tracked over time by the Agency (i.e., via Microsoft Excel, online data, etc.)?

13. How are the data checked and verified?

Data Collection - Other Operating Revenues (e.g. leases, advertising, etc.)

For questions 6 through 22, please provide specific measurement and collection methodology for the following data categories. Please limit your answers to open-ended questions to 3 sentences. If the measurement, tracking, and verification methods are the same for multiple types of data, please answer with "see __ above." If you like, you can submit relevant supporting documentation separately (see question 46).

14. How are other operating revenue data collected?

15. How are the data stored and tracked over time by the Agency (i.e., via Microsoft Excel, online data, etc.)?

16. How are the data checked and verified?

Data Collection - Revenue Miles

For questions 6 through 22, please provide specific measurement and collection methodology for the following data categories. Please limit your answers to open-ended questions to 3 sentences. If the measurement, tracking, and verification methods are the same for multiple types of data, please answer with "see __ above." If you like, you can submit relevant supporting documentation separately (see question 46).

17. How are revenue miles data collected?

18. How are the data stored and tracked over time by the Agency (i.e., via Microsoft Excel, online data, etc.)?

19. How are the data checked and verified?

Data Collection - Revenue Hours

For questions 6 through 22, please provide specific measurement and collection methodology for the following data categories. Please limit your answers to open-ended questions to 3 sentences. If the measurement, tracking, and verification methods are the same for multiple types of data, please answer with "see __ above." If you like, you can submit relevant supporting documentation separately (see question 46).

20. How are revenue hours data collected?

21. How are the data stored and tracked over time by the Agency (i.e., via Microsoft Excel, online data, etc.)?

22. How are the data checked and verified?

Data Collection - General Questions

Please briefly answer the questions below, limiting your response to 3 sentences for open-ended questions. If you like, you can submit supporting documentation separately (see question 46).

23. Has the Agency faced any of the following challenges with collecting data? Click all that apply.

- ☐ Lack of data availability
- ☐ Accuracy issues
- ☐ Staff Shortage
- ☐ Lack of funding availability for data collection
- ☐ Lack of technical resources
- ☐ Reporting software issues

Other (please specify)

24. If "Accuracy issues" was chosen in the question above, please describe the challenges to accurately collecting data.

25. Does the Agency collect data on performance measures not requested by DRPT?

○ Yes ○ No

26. If yes, for what purpose are they used? Check all that apply.

- ☐ Stakeholder accountability
- ☐ Internal performance measure tracking
- ☐ External reporting (Name entities to which reported, e.g., Agency's Board of Directors, City Council, County Boards, other agencies; See question 27)
- ☐ Other purposes (please specify)

27. If the Agency uses data on performance measures for external reporting (see question 26), name the entities below. (Skip if not applicable).

28. Are there types of data that the Agency does not currently collect that it would find useful?

- Yes
- No

29. If yes, briefly describe.

30. Does the Agency collect and measure data from which it is possible to distinguish the number of specific rider populations (e.g., transit-dependent riders, commuters, local service riders, rural vs. urban populations served)?

- Yes
- No

31. Does the Agency collect data that could measure transit service's effect on congestion mitigation?

- Yes
- No

32. If yes, what type of data, and how might the data be used to measure the effect on congestion?

33. Does the Agency adhere to any industry standard or benchmark for data collection, measurement, and reporting?

- Yes
- No

34. If yes, briefly describe.

Data Reporting

Please briefly answer the questions below, limiting your response to 3 sentences for open-ended questions. If you like, you can submit supporting documentation separately (see question 46).

35. Is the Agency able to report data to DPRT (through OLGA) on time per DRPT's deadlines?

- Yes
- No

36. If no, briefly describe why not.

37. Does the Agency report ridership data to other entities? Please provide the name of entities/agencies.

38. Is ridership data reported to others reconciled with data reported to DRPT? If so, how and by whom?

39. Has the Agency experienced difficulty with DRPT validating its data?

- Yes
- No

40. If yes, briefly describe.

41. What data, if any, does DRPT require the Agency to report (through OLGA) that the Agency otherwise would not collect? Please briefly describe.

On Line Grant Administration (OLGA)

42. On a scale from 1-5, with 1 being “easy, very few issues” and 5 being “difficult, lots of issues” please rate the Agency’s experiences with OLGA.

	1	2	3	4	5
Overall experience	○	○	○	○	○
Grant application	○	○	○	○	○
Grantee Handbook Explanation of Requirements	○	○	○	○	○
Development and execution of grant agreements	○	○	○	○	○
Certification of local matching funds	○	○	○	○	○
Grant administration and closeout	○	○	○	○	○
Operating data submission	○	○	○	○	○
Expense data submission	○	○	○	○	○

Current and Future Technical Needs

Please briefly answer the questions below, limiting your response to 3 sentences for open-ended questions. If you like, you can submit supporting documentation separately (see question 46).

43. If lack of technical resources is one of the challenges faced by the Agency, what are the specific issues faced? Check all that apply.

- [ ] Lack of system training
- [ ] Lack of funding for technical resources
- [ ] Lack of staff with relevant experience

Other (please specify)

44. Has the Agency implemented any of the changes recommended in the statewide ITS plan?

- ○ Yes
- ○ No

45. If yes, briefly describe.

Miscellaneous

46. Please share any additional thoughts regarding the Agency's data collection process, and benefits and challenges concerning the collection and reporting of data. If you would like to submit relevant supporting documentation, please send via e-mail to thompsonja1@pbworld.com. [OPTIONAL]

	DRAFT INTERVIEW QUESTIONS	*Large Regional*		*Large Urban*			*Small Urban or College Town*				*Rural*			*Small Rural*
		WMATA (NVTC)	HRT (Hampton Roads)	ART (Arlington)	Loudoun County	PRTC	Blacksburg	Lynchburg	WATA	Winchester	District Three	JAUNT	RADAR	Blackstone
	Data Collection - Electronic													
1	In your survey, you reported that you use both manual and electronic data collection methods for ridership. How are these methods combined to compile ridership data?	●	●		●		●	●						
2	How have electronic methods made collecting data more efficient? And accurate? If not, please explain.	●	●	●	●	●	●	●	●			●		
3	What, if any, operational and/or maintenance issues have you encountered using electronic data collection methods?	●		●	●	●	●	●	●			●		
4	Are there labor requirements that go along with the adoption of electronic data collection methods (i.e., training staff; hiring additional staff to analyze, organize, track data)?	●	●	●	●	●	●	●	●			●		
5	Are there major variances in data from vehicles that are equipped with an APC versus those that are not? If so, how do you present the data when reporting to DRPT or other entities?		●											
6	In your survey you mentioned malfunctioning APC equipment. What is the nature of the malfunctions?		●											
7	Is APC equipment maintained or calibrated to manufacturer's standards? If not, why not?		●											
	Data Collection - Manual													
8	Do you provide manual data collection training to drivers/operators? If so, what is covered in the training? How is it delivered?	●	●		●		●	●		●	●		●	●
9	Have you considered introducing electronic data collection methods? What are some of the issues that have prevented you from using this technology?									●	●			●
	Data Challenges													
10	Can you describe in greater detail the data availability and staffing issues reported in the survey?		●		●		●			●		●		
11	Can you describe in greater detail the "data latency" issue you reported in the survey related to data accuracy?	●												
12	What additional technical resources are needed by the Agency that are prohibited by a lack of funding?			●	●					●				
13	What relevant experience/training would help staff address technology issues?								●	●			●	●
14	What is the nature of the Agency's difficulty with reporting to DRPT on time?													
15	What is the nature of the "reporting software issues" you reported experiencing in the survey?			●		●						●		
16	How does implementing a new system affected the data collection process? (i.e., increased or decreased errors, increased quantity or quality of data, etc.)								●			●		
17	What difficulties have you encountered breaking out demand response data from other public transportation data ?						●							
18	How much time do you think should you be allotted between end of the agency's fiscal year and reporting of data to DRPT?	●	●	●	●	●	●	●	●	●	●	●	●	●
	Data Standards and Definitions													
19	Are DRPT's standards and definitions for reporting clear? If not, why not?	●	●	●	●	●	●	●	●	●	●	●	●	●
20	Are there any differences between the data reported to DRPT and NTD/ FTA for measures required by both (e.g. ridership, operating costs and the performance measures- revenue mile and revenue hour)? If yes, what is the cause of these differences?	●	●	●	●	●	●	●	●	●	●	●	●	●
21	If you do not use NTD/FTA definitions, what influenced how you define ridership? What is your definition? Has that definition been consistent year-to-year?												●	
22	Do different data definitions between FTA and DRPT cause large variances in data?						●							
23	Can you describe your verification/validation process for processing and reporting data?	●	●	●	●	●	●	●	●	●	●	●	●	●
	Other Performance Measures													
24	What, if any, metrics do you use to measure transit dependent populations?	●	●	●	●	●	●	●	●	●	●	●	●	●
25	What, if any, metrics do you use to measure congestion mitigation?	●	●	●	●	●	●	●	●	●	●	●	●	●
26	What, in your mind, are the key factors that illustrate an agency that performs exceptionally?	●	●	●	●	●	●	●	●	●	●	●	●	●
	OLGA													
27	In what ways can OLGA be improved as a reporting tool?	●	●		●	●	●		●	●	●	●	●	●
28	Would it be helpful to you to be able to use OLGA for your own analysis purposes, i.e., by being able to access and manipulate the data entered into it?	●	●	●	●	●	●	●	●	●	●	●	●	●

	DRAFT INTERVIEW QUESTIONS	*Large Regional*		*Large Urban*			*Small Urban or College Town*				*Rural*			*Small Rural*
		WMATA (NVTC)	HRT (Hampton Roads)	ART (Arlington)	Loudoun County	PRTC	Blacksburg	Lynchburg	WATA	Winchester	District Three	JAUNT	RADAR	Blackstone
29	Can you describe in greater the issues the Agency has encountered with OLGA related to the ***Grantee Handbook Explanation of Requirements***? Are the issues related to OLGA as a tool or to rules/requirements related to OLGA?			●	●	●					●		●	
30	Can you describe in greater detail the nature of the Agency's challenges with ***submitting operating and expense data*** in OLGA? Are the issues related to OLGA as a tool or to rules/requirements related to OLGA?				●	●	●		●	●	●			
31	Can you describe in greater detail the issues the Agency has encountered with OLGA related to ***certification of local matching fund***s? Are the issues related to OLGA as a tool or to rules/requirements related to OLGA?											●		
32	Can you describe in further detail your positive experience with the OGLA reporting tool?							●						
33	Can you describe in greater detail the discrepancies between the data thatare entered into OLGA by your Agency and the data output received by DRPT? How does the Agency deal with this issue?													●
	Future Improvements & Needs													
34	Do you have any plans to implement changes to your data collection practices in the short term (1-3 years) or long-term (5+ years)?	●	●	●			●	●		●	●			●
35	Why did you decide to implement recommendations from the Statewide ITS Plan? How is the process of implementing the improvements going?				●	●			●			●	●	
36	What do you hope to gain from implementing the Statewide ITS recommendations?				●	●			●			●	●	
37	Are there any technical assistance or technical resources that may help the agency with data collection practices in the future?	●	●	●	●	●	●	●	●	●	●	●	●	●
	Agency-Specific Questions													
38	Can you describe in greater detail how HB 2313 has affected validation of your data with DRPT?		●											
39	Can you describe in greater detail HRT's funding model for operations that "prohibits [the] ability to expand data collection effort and staff"?		●											
40	What "technical" resources has ART put in place over the years that has improved data collection accuracy? What has been the measurable effect on accuracy?			●										
41	Can you describe in greater detail how "ridership by service type" measures trip and air pollution reduction (related to measurement of congestion mitigation)?					●								
42	How has the Agency been handling the tight deadlines between annual audit and end of FY for DPRT reporting?					●								
43	Can you describe in greater detail how your ITS plan is "more advanced" than the current ITS architecture and Statewide ITS plan?						●							
44	How does the Director of Transportation identify "questionable data" in the driver manifests?												●	
45	When did you implement RouteMatch into your system? How has it contributed to increased efficiency with data collection?												●	
46	How does the nature of the service provided affect the process of compiling ridership numbers, as well as the data itself?				●									
47	How has the introduction of electronic data collection resources increased the quantity and quality of data you've received? What has been the effect on data reported to DRPT via OLGA?							●				●		
48	How does the diversity of services you provide (ADA, fixed route, demand response) affect the agency's data collection process?											●		
49	What, if any, data-related challenges does your agency experience? (unanswered in the survey)										●			
50	How has increased connection to other public trasnportation service providers affected ridership numbers? Has it made collecting data more complex?											●		
	Total Number of Questions per Agency	16	19	14	20	18	19	15	14	14	13	19	16	12

Appendix 2B: Results of Data Collection Research

This Appendix contains a summary of the survey results, specifically:

- Summary of results of the Survey Monkey survey administered to local transit agencies

- Summary of the best practice interviews conducted with the following entities:
    - Staff from National Transit Database
    - Kansas DOT
    - New York DOT
    - North Carolina DOT
    - Ohio DOT
    - Ohio DOT
    - Pennsylvania DOT

Survey of local Virginia Agencies

The survey (see Appendix I) consisted of five sections:

- Data collection methods for metrics used in the operating fund model
- General data collection issues
- Data reporting
- Experience with OLGA
- Current and future technical needs

I. Data Collection Methods for Operating Grant Formula Metrics

The current formula utilizes six core measures to determine an agency's operating grant. The first two, ridership and operating expense, are used to measure the size of the agency. The remaining four, fare revenue, other operating revenue, revenue miles and revenue hours, are used to calculate the performance-based component of the formula. The first section of the survey asks the same three questions for each metric to understand how each agency collects, tracks, and verifies its data.[8] The questions are:

- *How are [core measure] data collected?*
- *How are the data stored and tracked over time by the Agency (i.e., via Microsoft Excel, online data, etc.)?*
- *How are the data checked and verified?*

The results for collection method, processing method (the method by which the agency turns the raw data into reported data), and verification method for each measure are reported below.

[8] The only exception is ridership. There, a choice of five collection tools (automatic passenger counters; electronic registering fareboxes;, manual click-counter; manual entry in log; other, please specify) was given. A follow-up question for ridership asked how and with what frequency data are aggregated before arriving at final (reported) monthly and annual ridership numbers.

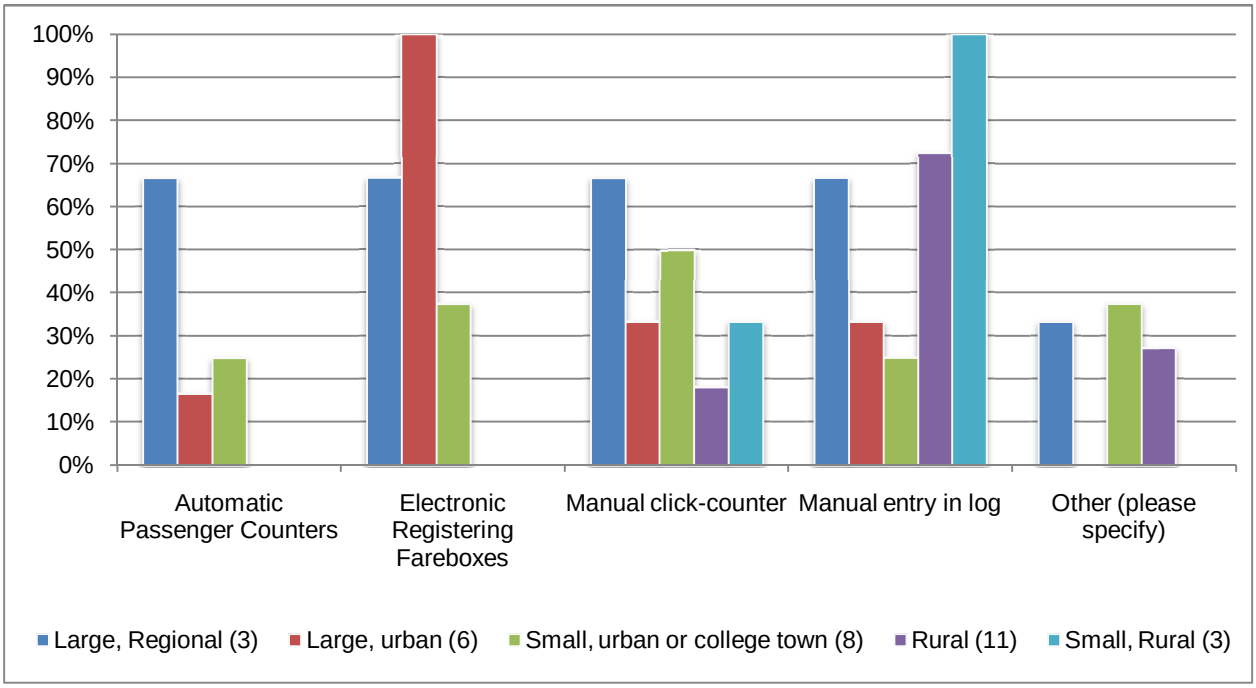
A. Ridership

Collection Method

The figure below (Figure 2B.1) captures the types of ridership collection methods used by local agencies. Agencies were categorized based on the categories in the Senate Document No. 11 report.[9] Large regional agencies were found to use a combination of electronic and manual methods to collect ridership data. Large urban agencies all use ERFs, with a few also using APCs and manual methods. Among small, urban or college town agencies the methods used are more varied, with about a third of the agencies using electronic methods and the remainder employing a manual tool. Both rural and small rural agencies only use manual methods to collect ridership data.

The chart on the following page primarily illustrates ridership methods for agencies that offer fixed-route service. For agencies that offer demand response service, a different type of electronic method is used, and that was specified by agencies in the "Other" category. Demand response agencies that use electronic methods use a mobile data terminal (MDT) to sync scheduling software with real time activity. The specific answers to the response included Route Match, Para Plan, and Trapeze software.

Figure 2B.1 Ridership Data Collection Methods[10]



Processing and Verification Methods

The processing method, the method by which agencies turn raw ridership data into numbers reported to DRPT, varies across all agencies. The software used to process and track the data is similar across all agencies except for one. Similarly to processing methods, verification methods vary by agency. The results, broken down by category are show in Table 2B.1 and Table 2B.2.

[9] Senate Document No. 11, "Performance-Based Funding Distribution for Public Transportation," p. 34.
[10] Number in parentheses refers to number of agencies that fall within the agency categorization.

Table 2B.1 Ridership Processing Methods

Agency Type	Processing Techniques	# of Agencies
Large, Regional	Assemble by route and mode (frequency unspecified)	3
Large, Urban	Fare box software data is extracted and then assembled by route and fare type (frequency unspecified)	4
	Fare box software data is extracted daily and then assembled by route and fare type	1
	Electronic fare box reports are reconciled with operator logs from click counters (commuter bus)	1 (same agency different mode)
	Operator creates reports from operator click counters (local bus)	1 (same agency different mode)
Small, Urban, College Town	Staff aggregates data from methods	1
	Aggregated by routes and entered into WMATA monthly reports	1
	Collected by route daily for both fixed route and paratransit	1
	Fare box software data is extracted and then assembled by route	2
	Aggregated by route, stop and shift from operator logs	2
	Fare box software data is extracted and then assembled by route and passenger type	1
Rural	Ridership counts processed daily and aggregated for monthly reports	5
	Ridership counts processed and aggregated for monthly reports (frequency unspecified)	1
	Ridership counts processed by route/driver/vehicle and aggregated for monthly reports (frequency unspecified)	3
	Ridership collected by route and ridership broken down based on fare	1
	Trips come from electronic scheduling system	1
	Invoices are tallied	1
Small, Rural	Driver log sheets are tallied daily and aggregated monthly for counts	1
	Driver ridership counts entered into database for monthly counts	1
	Entry logs crosschecked with revenue on weekly basis	1

Table 2B.2 Ridership Verification Methods

Agency Type	Verification Techniques	# of Agencies
Large, Regional	Data monitored by analyst, compared to historical data	2
	Manual logs compared to contractor database to confirm data entry accuracy; count is checked against random, on-board NTD counts as well as annual survey boarding counts	1
Large, Urban	Random ride checks used to verify farebox data	2
	Paratransit verified through call center and Trapeze	1
	Oversight by staff for anomalies	4
Small, Urban, College Town	Fare counts verified with APC data	1
	Paratransit count verified with RouteMatch	1
	Cashbox data verified with "sales and use transactions"	1
	Driver sheets are checked daily and verified with historical trends	1
	Oversight by staff for anomalies	3
	Ridership data cross checked with revenue counts	1
Rural	Ridership data cross checked with revenue counts	1
	Oversight by staff for anomalies	3
	Monthly reports are run for anomalies	1
	Cross check manual data with electronic scheduling software	1
	Passenger logs matched to “deposit slips”	1
	Dispatcher crosschecks ridership category totals with driver counts	1
	“Verified by the driver that collects it “	1
	“Reports are added daily and then totaled at the end of each month for each driver and shift”	1
Small, Rural	Drivers count verified with fare collected	2
	“Once the tally sheets are verified the data is entered into Microsoft Excel”	1

The verification methods for ridership can be broken into two major categories: 1) staff review/oversight for anomalies, and 2) comparison between two sources of data. The majority of agencies fall into the first category of employing oversight or review for anomalies as a verification method.

B. Operating Expense

Collection and Processing Methods

Seventy-eight percent of agencies use an accounting system or financial software to collect and keep track of expenses. The remaining agencies stated that they collect operating expenses via contractor invoices, but also use accounting systems to track those invoices. The software may be external and housed in the local government agency that manages the transit agency's expenses (such as a municipality), or internal to the transit agency and managed through a system like Oracle's PeopleSoft or Intuit Quickbooks.

Verification Method

All of the agencies verify the data through a financial audit before it is sent to DRPT. Some agencies also mention staff reviews of the data periodically (unspecified throughout the year).

C. Fare Revenue

Collection and Processing Methods

Collection methods for fare revenue and ridership overlap, because a lot of agencies, particularly those using electronic methods, use passenger counts obtained from electronically registering fareboxes or other fare media. Forty percent of agencies use manual counting of fares as a collection method, mostly small and rural agencies. Fifty percent of agencies use ERFs to collect fares, and 10% (3 agencies) use a combination of pre-payment and paying on board to collect fares. To process the fare counts, all the agencies use Excel or accounting software to keep track of the fare collected.

Verification Method

The most reported verification method used for fare revenue is multiple counting of fare numbers by either by one or multiple staff members within the agency. Four agencies stated that they verify fare revenue data by comparing it with ridership data.

D. Other Operating Revenue

Collection and Processing Methods

Like operating expense, other operating revenue is collected via accounting software, specifically through invoices. The revenue is also tracked through accounting software or Excel.

Verification Method

The verification methods reported most are cross-checking the accounts receivable and invoices with the other operating revenue totals present in the accounting system, and having the number verified during the annual audit.

E. Revenue Miles & Hours

Collection and Processing Methods

Revenue miles and hours are collected, processed and verified similarly. The collection methods are using either routing/scheduling software or AVL systems for agencies that use electronic collection methods, and driver logs for agencies that use manual collection methods. For both measures, figures are tracked via Excel, Microsoft Word, or other databases. Two agencies mentioned using hard copies, but only in addition to electronic databases.

Verification Method

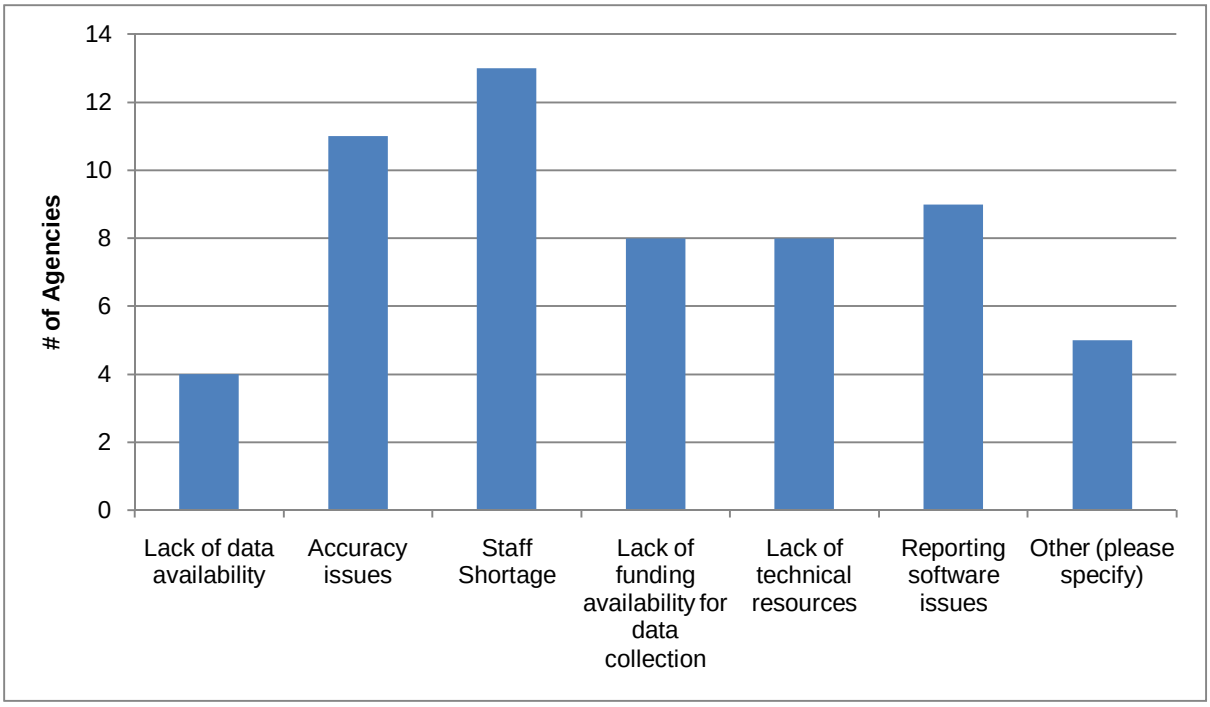
Revenue miles and hours are verified in a few ways: by a staff member "review" (unspecified as with what), cross-checking revenue miles with maintenance mileage logs or odometers, or cross-checking revenue miles and hours with scheduling software.

II. General Data Collection Issues

Data Challenges

The survey asked agencies to report if they have experienced any challenges related to data collection. The results are presented in Chart 2 below. Of the 5 "Other" responses reported, 4 were agencies reporting that they had no issues, and 1 agency reported that definition differences between FTA and DRPT (unspecified) were a challenge.

Figure 2B.2 Data Challenges Reported by Agencies



A follow-up question to the data challenges questions asked agencies to specify the "accuracy issues" reported in the above chart. The accuracy issues reported included:

- Operator error
- Lack of staff training
- Equipment error
- Human error that is always present in manual collection (both with drivers and entry errors)

Other Performance Measures

To assist with other tasks in this project, the survey asked agencies to report if they collect performance measures for other entities, and specifically about exceptional performance, congestion mitigation, and service to transit dependent populations measures.

Seventy percent of agencies reported that they collect performance measures for use outside of DRPT. The majority of agencies reported that the performance measures are used for internal tracking and external reporting, mostly to NTD. The use of performance measures was not isolated to larger agencies. The only category of agencies that does not collect performance measures for use outside of DRPT is small-rural.

Thirty-one percent of agencies said they measure the demographics of their ridership population. Only fifteen percent of agencies reported that they measure congestion mitigation. Of those that do, the reported measure is related to the air quality measure required for Metropolitan Washington Area Council of Governments reporting.

III. Data Reporting

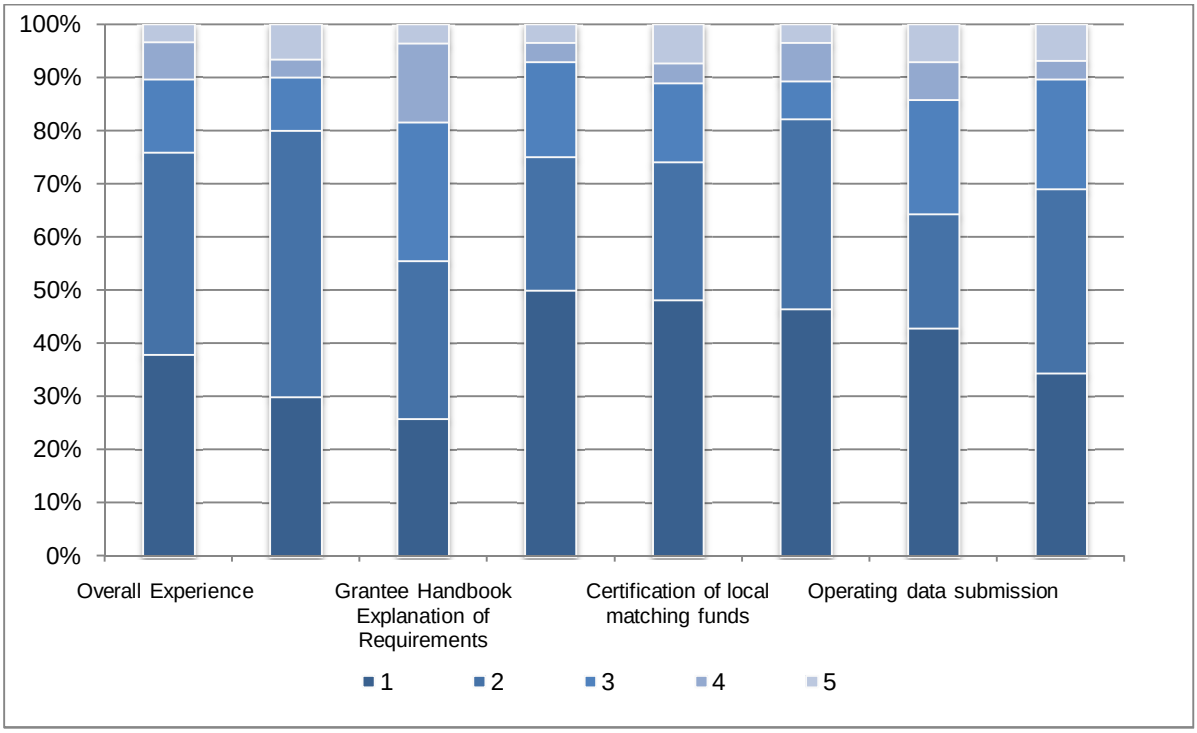
The data reporting questions ask about agencies' ability to report data on time and any difficulties with DRPT validating the agencies' data. Only 5 agencies responded that they experienced issues with validation. Two of those agencies attributed the issues to discrepancies between what the agencies submit to OLGA and what DRPT receives. One agency attributed the validation issue to "an IT issue that has been corrected," another attributed it to agency difficulty in separating Section 5310 and Section 5311 riders, and another agency attributed their validation issues to the introduction of performance measures, and unclear definitions of those measures. Only 2 agencies responded that they have trouble submitting data to DRPT on time. Those agencies pointed to a tight timeline between the DRPT annual reporting deadline and when they receive audited financial data.

The survey included a question on other entities to which agencies must report. The most common types of entities reported to are local municipal bodies, MPOs, transportation boards, and FTA via NTD.

IV. On-Line Grant Administration (OLGA)

The survey asked agencies to rate their experience with OLGA on a scale from 1-5, with 1 being "easy, very few issues," and 5 being "difficult, lots of issues." The results of the survey are reflected in Chart 3 below. As shown on the chart, agencies have most difficulty with the Grantee Handbook Explanation of Requirements. Overall, approximately 90 percent of agencies had neutral or little problem with OLGA.

Figure 2B.3 Agency experience with OLGA

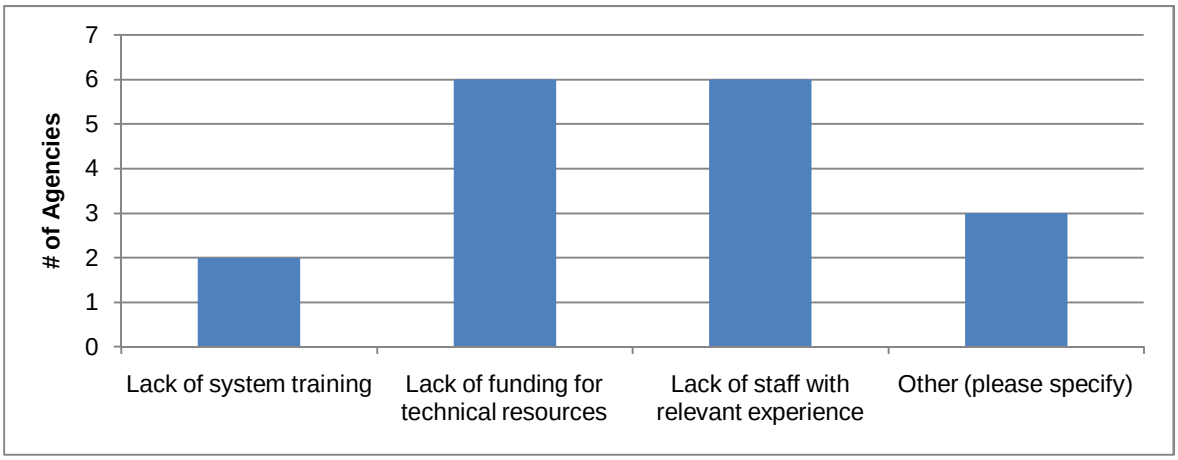


V. Current and Future Technical Needs

The survey asked questions about agencies' technology needs and agencies' use of the current statewide Intelligent Transportation System (ITS) Plan. The survey asked how many agencies implemented the improvements recommended in the most recent statewide ITS plan. Five agencies answered that they did.

The survey also asked agencies to choose from among several challenges related to technical resources. Thirteen agencies responded that they experience some lack of technical resources. The breakdown of the types of technical issues is shown in Chart 4.

Figure 2B.4 Specific Technical Resource Issues



The majority of agencies experience issues with lack of funding and lack of staff with experience. The larger agencies responded more to lack of funding, while the smaller agencies pointed to staff as the issue. The three "Other" comments were "staff time constraints," "hard to procure technology" for a small agency, and onerous maintenance upkeep needed for electronic fareboxes.

Best Practice Interviews

The consultant team conducted interviews with other states and staff at the National Transit Database (NTD) to glean best practices and lessons learned regarding implementing data collection practices for agencies with varying resources and needs. NTD provided useful technical guidance for how agencies collect and report data. The NTD interview produced the following findings.

NTD Data Definitions

"Ridership Activity" defined as:

- Unlinked Passenger Trips (UPT)
- Vehicle Revenue Hours (VRH), Vehicle Revenue Miles (VRM) and Vehicle Operating Miles (VOMS)
- Collected by mode and type of service
    - Frequency: monthly and annually

"Service consumed" defined as:

- UPT ("boardings") and Passenger Miles Traveled (PMT)
    - For UPT, 100% counts if available and reliable
- Collection Methods: APCs, fare box counts, manual counts, other automated systems
- Use of APCs for NTD reporting requires prior FTA approval; in 1st year APCs must be run parallel to traditional manual sampling; then calibrated and validated annually thereafter
- If some vehicle trips missed because of personnel or equipment problems, can "factor up" data if 2% or less of total; if greater than 2%, qualified statistician must approve methodology for factoring up
- UPT and PMT can be estimated
- Statistical sampling procedure prescribed by FTA/NTD for urban systems
- Minimum confidence of 95 percent and minimum precision level of ±10 percent (for annual counts)
    - Chose from 3 NTD-approved sampling procedures, or alternative technique approved by a qualified statistician
    - FTA C 2710.4A Revenue Based Sampling Procedures for Obtaining Fixed Route Bus (MB) Operating Data as required under the Section 15 Reporting System is another alternative technique if reviewed by statistician
    - Farebox revenues – provided correction factor for "free" trips, or "when large number of intra-modal transfers skews trips-revenues relationship"
- In addition, sampling on a fixed 3-year cycle is mandated for all agencies
- UPT methodology (100% counts, sampling) is prescribed for urban systems, but not for rural.
    - Rural reporting began under SAFETEA-LU (2006); recognizing the increased burden to states, FTA did not impose the same accuracy standards for UPT data, but requested that agencies provide the best data possible.

National Transit Database Background

- Has evolved over 30 years' existence
  - original model assumed stand-alone transit authority; NTD adjusted to reflect industry of multiple organizational/governance models for public transportation
- Recently contracted for adjusting definitions and online reporting system (ORS) change
- $3.5M/annual Operations Center, with analysts assigned to each transit agency "reporter"
- No performance metrics (except Small Transit Intensive Cities (STIC)); try to capture needs
  - Do not measure traffic congestion, or service to transit dependent populations
- STIC Program (1.5% of 5307) for small urban systems (50K-200K pop.)
  - Rewards for performance measured against averages calculated for larger (200K-1M pop.) systems
  - 6 factors:
    - Vehicle revenue miles per capita
    - Vehicle revenue hours per capita
    - Passengers per capita
    - Passenger miles traveled per vehicle revenue mile
    - Passenger miles traveled per vehicle revenue hour
    - Passenger miles traveled per capita
- Reporting category definitions driven by Uniform System of Accounts
  - Reporting categories/measures are derived from farebox
  - Guidance on sampling and verification methods, e.g., ride along/ride checking
  - Sampling only needed for some measures, i.e., passenger miles to get average passenger trip length (15% sample, boarding/ existing points; guidance requires rotating among routes, times)
    - 2 years ago provided model in Excel spreadsheets for sample size
  - In next ORS revision:
    - Examples of new definitions: how to break out costs among bus, commuter bus, BRT
    - Likely to provide guidance on incorporating APC data for validation, specifically for some measures, e.g., average passenger trip length
- Existing NTD provides option for reduced reporting requirements for smaller agencies
  - Eliminates eligibility for 3 STIC categories; state data requirements may discourage use
- Reporting deadlines staggered - 3 groups per year
  - Audited data submissions due 4 months following end of FY (in October, January, and April)
  - NTD has goal of reconciling issues and anomalies with agencies within 3 months of submission
  - Average of 3 iterations of data correction between NTD and agency
  - Must close-out by July; FTA apportionment in August

National Transit Database Background (continued):

- Multiple "tiers" of verification/validation
  - Automated checks pre-submission
    - System compares with past reports, industry normal range for each data point
    - Calculates system ratios, e.g., average speed, and compares to norm for type of system
    - Raises validation flags
    - Reporters must respond/explain or correct error
    - CEO/GM certifies initial submission
  - NTD analyst reviews submittals
    - Reviews responses/explanations to flags
    - Creates new flags and follows-up with agency reporter
    - Up to 6 iterations may follow (sometimes only 1)
    - In revised System of Accounts may require CEO/GM to re-certify revisions
- NTD provides various types of technical assistance to agencies
  - Analyst assigned to every reporter
    - 1-on-1 screen sharing; walkthroughs
    - Can work with computer unskilled
    - Also works with paper-records-only agencies
  - On-site training
  - Manuals; PowerPoint presentations
  - Webinars, e.g., "Sampling Technical Assistance Package"
  - Regional NTI 2-day training on how to report
    - Next NTI trainings this year in Springfield, IL and New Jersey
    - Virginia can request a future NTI training in the state

The state interviews focused on learning about their current (or recent) funding allocation formulas, and understanding the challenges of collecting accurate data from local agencies. An overview of each state interview is below.

Kansas

Kansas currently has a transit operation funding program has been in place since 2010 with the introduction of the $10 million annual T-WORKS program. The program is split into two funding streams, 59% of funding to the urban program, and 41% to the rural program which is comprised of 85 Section 5311 agencies. (In addition, 59 5310 agencies receive $4,000 each.)

The urban program funding is allocated to five metropolitan agencies: Wichita, Topeka, Johnson County, Kansas City, and Lawrence. The metropolitan area of Manhattan is in the process of becoming the sixth agency to receive urban program funding. The urban formula is based on a 3-year rolling average of data using the following metrics:

- Service area population 40%
- Annual ridership 40%
- Revenue miles 20%

The rural program allocation is based on past year funding with escalation to account for cost increases. The level of cost increase, and thus overall allocation, is a subjective process between the transit agency and its KDOT program administrator.

In 2012, KDOT began roll out the TRACK (Transportation for Regionally Accessible Communities) performance measurement system for Section 5311 agencies. The following metrics are included in the TRACK score:

- Safety
- Customer Satisfaction
- Fiscal Efficiency
- Customer and Operations Information
- Regional Accessibility (if applicable)

The full TRACK scorecard is in Appendix III. Implementation of the scorecard for rural agency funding is expected to begin in December 2014, when KDOT has collected two years' of data. Staff report that they may incorporate TRACK metrics into the urban allocation formula in the future, but there are no immediate plans.

KDOT has primarily been focused on verifying rural agency data collection practices. KDOT staff verifies the accuracy of rural agency data by reviewing for anomalies. Kansas has an implicit accountability policy through state policy for funding. KDOT has imposed penalties in the past for agencies reporting inaccurate data or consistently late reporting.

KDOT offers training and technical assistance to agencies through a variety of options. KDOT hosts an annual data summit that includes data collection training. The program administrators also meet with agencies several times a year to answer questions and provide training for data collection where needed. Through a process of regionalization, the state is helping rural agencies consolidate resources towards more efficient use of resources, one of which is data collection. The state used ARRA funds to construct more cell towers in rural areas, and procure dispatching software for rural agencies, and is also working toward a unified ticket system among Johnson County and Kansas City systems in the Kansas City metropolitan area.

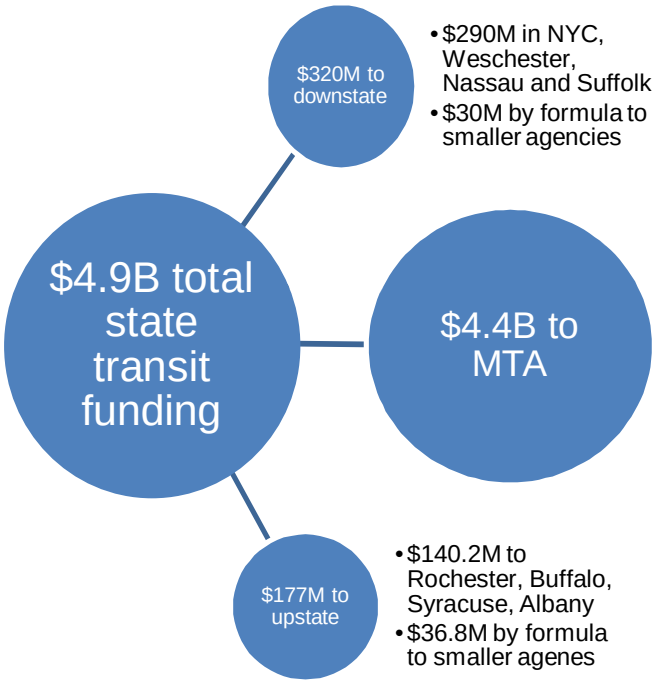
New York

New York State DOT (NYSDOT) currently employs two separate operations funding allocation formulas for larger and smaller systems. Given the huge discrepancy in the size and pace of growth of large and small systems, the state started to allocate funding for larger systems as line items in the annual state budget in the early 1990s. Smaller agencies are allocated funding based on the following formula:

- Ridership: $0.405/passenger
- Passenger vehicle miles: $0.69/passenger mile

The larger agencies allocated by state budget include the Metropolitan Transportation Authority (MTA) in the New York City metropolitan area, other downstate agencies in New York City, Westchester, Nassau, and Suffolk Counties, and regional authorities in Buffalo, Albany, Rochester, and Syracuse. The breakdown of the most recent allocation of $4.9 billion is illustrated below:

Figure 2B.5 NYSDOT State Transit Funding Allocation



All agencies submit data quarterly, 90 days following the previous quarter. For larger agencies whose funding is determined in the state budget, NYSDOT reviews each category's escalation to confirm the increase is warranted. For example, a 6% increase in labors costs reported by an agency may not be determined to warrant a commensurate increase in state funding (increases in specific line items may be capped at set amounts for purposes of state funding). Funds are awarded quarterly, along with an annual distribution that allocates remaining budget funds.

To verify data, NYSDOT runs "exception reports" each quarter to flag data anomalies. The state also conducts an audit program for agencies that have a history of submitting inaccurate data, late reports, or reports with missing information. Those audits occur approximately every three years. NYSDOT has rescinded funding as a result of inaccurate data reporting.

In addition to frequent one-on-one technical assistance, the state also holds a data summit at the state capital to review data standards and processes for verification and reporting.

North Carolina

North Carolina DOT (NCDOT) allocated operating and administrative funds to 5311 agencies based on the federal allocation model. NCDOT uses data reported to benchmark local agency performance statewide, although it does not use the metrics to allocate funding.

The benchmark measures used are illustrated in Table 3 below. The goals of the benchmarking process are to provide a peer comparison tool for agencies, improve efficiency and effectiveness of service, create minimum standards for performance as requested by the state Board of Transportation and legislature, and in the future link benchmarking to funding to reward performance.

Table 2B.3 North Carolina DOT Benchmark Measures

Benchmark Measure	Fixed Route	Urban Demand Response/ADA	Rural Demand Response
Passengers trips/vehicle mile	X	X	X
Passengers trips/vehicle hour	X	X	X
Cost/passenger trip	X	X	X
Cost/vehicle mile	X	X	X
Cost/vehicle hour	X	X	X
Vehicle miles/vehicle	X	X	X
Passenger trips/driver FTE	X	X	X
Accidents/100,000 vehicle miles	X	X	X
Revenue miles between failures	X	X	X
Recovery ratio	X		
No shows as a percent of passenger trips		X	X

Local agencies submit data to NCDOT via an OPSTATS (Operating Statistics) report, an Excel workbook designed for tracking data. The workbook includes pre-formulated models that ensure consistency in how agencies calculate data totals. Agencies report data quarterly, and NCDOT aggregates quarterly reported data to create annual totals. NCDOT contracts with the Institute for Transportation Research and Education (ITRE) at North Carolina State University to assist them in compiling annual transit data.

To verify data reported, the state employs a compliance review to check an agency's current report against historical data to determine if variances in data are reasonable. If agencies are found to be non-compliant with federal or state reporting guidelines, the state will implement penalties that may result in a loss of funding.

NCDOT offers technical assistance in a range of venues. The state holds an annual conference on federal and state grant application guidelines, and hosts a peer exchange for agencies to share best practices on data collection and technology. The state offers one-on-one assistance at the request of the local agency. ITRE also hosts webinars for new transit directors on technology topics related to transit operations, including data collection. The state also provides funding to procure routing software for rural agencies that meet a minimum trip threshold.

Ohio

Ohio DOT has collected performance measurement data for approximately 40 years. State funding for transportation has decreased over time, from $43 million in 2000 to $7 million in the most recent allocation. The allocation model for state funding varies based on the size and types of service offered by the local agency.

Due to the decrease in overall state funding for transit, funding for rural agencies is no longer based on a formula but on the past year's allocation. In the most recent allocation, $3 million was distributed to 61 rural agencies. Data for the formula are still collected, and used as a tool to compare agencies against one another. The formula is:

- Trips per hour 20%
- Cost per mile 20%

- Number of public transportation trips 30%
- Cost per trip 15%
- Subsidy per trip 15%

Agencies servicing disabled/elderly passengers receive reimbursement of the subsidy they provide to those passengers. The subsidy is calculated as the difference between lowest fare and full fare multiplied by number of passengers receiving the discount. The agencies split a $1 million allocation pool.

Three million dollars in capital funding is allocated to 27 urban agencies based on a model that combines size-weight factors and performance measures. The formula is:

- Data measures 50%
    - Ridership
    - Service miles
    - Farebox revenue
- Performance measures 50%
    - Cost/hr
    - Passengers/mile
    - Farebox recovery rate

The state sends annual reports to all agencies for their own use as a performance comparison tool. The impetus behind the program was to encourage smaller systems to evaluate their performance and consider ways to improve. The performance measures are also used to show overall transit performance to the legislature , and to make the case for continued funding of public transportation.

Ohio employs different data verification processes for larger and smaller systems. Large systems fill out a certification form that confirms that the agency and state agree on the reported data before they are used to allocate funding. The state and agency go through a review of the data for anomalies before “signing-off” on the certification form. Smaller systems are required to send data to the state on a quarterly basis, allowing the state to provide more oversight. The state verifies data by looking through driver manifests and scheduling software. All agencies are subject to an accountability policy that is embedded in the funding contract between the state and each agency.

The state conducts a technical review of agencies every three years. Agency reviews are triggered when the state finds frequent anomalies in data, the agency changes data managers, and when the state receives late invoices or observes mistakes that are not resolved over time. The review is comprised of state staff working one-on-one with an agency, or the state engaging a consultant to assist the agency with data collection or processing issues.

Pennsylvania

Pennsylvania had been funding transit agencies (through 14 different programs) since 1987. Act 44 (2007-09) consolidated programs into capital, operating, and programs of statewide significance, creating an Operating Assistance Fund distributed to 37 urban fixed route systems. The current funding level is $866 million. Seventy non-fixed route systems across the state receive no state operating funds. Programs of statewide significance received $50 million per year, which includes the following programs: persons with disabilities outside Philadelphia and Pittsburgh; matching funds for JARC, Welfare to Work; intercity rail and intercity bus; technical assistance and demonstration projects; rail safety and transit security.

The distribution formula was developed as a collaborative process between PennDOT and the transit agencies. The formula includes a “base” level that prevents funding from going below the level received in previous programs. For example, Philadelphia (SEPTA) and Pittsburg (Port Authority) have received 70% of total funding, so their new distribution cannot go below that level. The distribution formula is:

- Total Passengers 25%
- Senior premium (sr. trips/total trips) 10%
- Total revenue vehicle hours 35%
- Total revenue vehicle miles 30%

PennDOT has conducted research into data collection policy and best practices for local agencies. The state engaged a consultant to document how data are collected, compiled, and reported at each agency. The study found that there is still a lot of manual data collection, mostly by drivers logging information on paper. Manual collection is the primary method for collecting information on senior passengers. Eventually the Director of Bureau of Public Transportation would like to move all agencies to using electronic registering fareboxes. PennDOT staff considered recognizing and/or rewarding exceptional performance 8 years ago, but was unable to develop measures.

The process for reporting data to PennDOT is to submit quarterly and annual data through that state’s dotGrants system. Through dotGrants, agencies can submit grant applications, invoices, and execute agreements. The state mandated the use of Excel spreadsheets for maintaining data and uploading information to dotGrants. It also mandates that annual audited data be submitted 180 days after the end of the agency’s fiscal year. The state publishes an annual performance report with profiles of every agency, showing 3 to 4 year data trends.

The state verifies reported data by checking dotGrant data against the Excel spreadsheets, which are submitted annually by the agencies. Staff also checks data against NTD annually. If anomalies arise, PennDOT analysts clarify with agencies to either correct or explain issues.

In addition to routine verification processes, PennDOT also performs randomly-selected compliance reviews once a month, and individual agency reviews quarterly. The state has a detailed “Certification of Data” document that outlines specific procedures for verifying each metric reported, and requires agency CEOs to “sign-off” on the document, detailing the verification methods employed by the agency prior to reporting to the state. PennDOT has revoked funding from agencies when patterns of unsubstantiated data are found.

PennDOT offers varying types of technical assistance to agencies. The state provides the pre-formulated Excel spreadsheets, assistance with electronic data extraction (i.e., from ERF software), best practice information and industry reports. PennDOT conducts performance reviews with all agencies on a 3-year cycle to discuss organizational development and capacity building in the agency. The agency offers training, at the agency board level to discuss high-level goals and objectives, and overall agency training on a range of operational issues not limited to data collection.

Appendix 2C: Relevant State Agency Materials

This Appendix contains materials in use by state agencies related to data practices, specifically:

- Kansas DOT TRACK Scorecard
- Pennsylvania Certification and Verification Document

The TRACK scorecard and Pennsylvania certification document are referenced in the data practices chapter and Appendix 2B.

TRACK

Transportation *for* Regionally Accessible Communities *in* Kansas
2012 Scorecard

Safety

⇨ Preventive Maintenance	8.0
⇨ Inspection Deficiencies per Vehicle	7.0
⇨ Preventable Accident Rate	7.0
⇨ Operators Eligible	3.0
Total	**30.0**

Customer Satisfaction

⇨ Customer Satisfaction	7.0
⇨ On-time Performance	7.0
⇨ Distance Between Failures	7.0
⇨ % of Population Served	9.0
Total	**30.0**

Fiscal Efficiency

⇨ Cost Recovery	10.0
⇨ Cost per Mile	8.0
⇨ Customers per Mile	5.0
⇨ Contracted Service Revenue per Mile	2.0
Total	**30.0**

Customer and Operations Information

⇨ Trip Purpose	3.0
⇨ Customer Demographics	4.0
⇨ Reported Fuel Cost	3.0
Total	**10.0**

Overall Total	**100.0**

Regional Accessibility

If you offer regional service, please provide the following information.

⇨ Cost per Mile for Regional Routes	
⇨ Regional Miles/Total Miles	

TRACK Scorecard Metric Definitions

Safety

- **Preventive Maintenance**: The percentage of preventive maintenance OEM items completed within the manufacturer-recommended mileage interval. (this does not include pre-trip inspections)
  Calculation: (# of Preventive Maintenance items Performed Within Manufacturer-Recommended Mileage Interval)/(Total # of Preventive Maintenance items performed)
- **Inspection Deficiencies per Vehicle**: The average number of deficiencies cited by KDOT inspectors for each inspected vehicle.
  Calculation: (Total # of Deficiencies Cited in All Inspected Vehicles)/(Total # of Annual State Vehicle Inspections)
- **Preventable Accident Rate:** The number of accidents rated as preventable.
  Calculation: # of Accidents Rated as Preventable
- **Operators Eligible**: The percentage of bus operators in compliance with KDOT physical examination requirements.
  Calculation: (# of Bus Operators Who Passed Their Most Recent Physical and Whose Physical Deadline is Not Past Due)/(Total # of Bus Operators)

Customer Satisfaction

- **Customer Satisfaction**: The percentage of customers responding to a customer satisfaction survey expressing a satisfaction level of 8 or higher on a scale of 1 to 10.
  Calculation: (# of Survey Respondents Expressing Satisfaction Level of 8, 9, or 10)/(Total # of Survey Respondents)
- **Demand Response On-time Performance**: The percentage of scheduled time point encounters in which the actual pick-up time is within fifteen minutes (early or late) of the scheduled pick-up time. For those providers with fixed route and demand response service, KDOT will work with you to weight the two calculations.
  Calculation: (# of Time Point Encounters within fifteen Minutes of Scheduled Time)/(Total # of Time Point Encounters)
- **Fixed Route On-time Performance**: The percentage of scheduled time point encounters in which the actual arrival/departure time is within five minutes (early or late) of the scheduled arrival/departure time.
  Calculation: (# of Time Point Encounters within Five Minutes of Scheduled Time)/(Total # of Time Point Encounters)
- **Distance Between Failures**: The average # of system miles between each bus failure. A bus failure is an unexpected/unplanned event that renders a bus unavailable for service.
  Calculation: (Total Miles Driven)/(Total # of Bus Failures)
- **Percent of Population Served**: Percent of total population within service area that has access to service
  Calculation: _____

Fiscal Efficiency

- **Cost Recovery**: The percentage of total operating expenses recovered by customer-generated and service contract generated revenue.
  Calculation: (Total Customer Generated Revenue + Total service contract Revenue)/(Total Operating Expenses)
- **Cost per Mile**: The average cost of operating each mile of service.
  Calculation: (Total Operating Expenses)/(Total Miles Driven)
- **Customers Per Mile**: The average number of customer trips per mile driven.
  Calculation: (Total Customer Trips)/(Total Miles Driven)
- **Contracted Service Revenue Per Mile**: The average amount of subsidy revenue generated by each mile of service.
  Calculation: (Total Subsidy Revenue)/(Total Miles Driven)

Customer and Operations Information (Points assigned upon submission)

- **Trip Purpose**: The total number of customer trips categorized as: Work related, Education related, Medical Related, or Other
- **Customer Demographics**: The total number of customer trips categorized as: Senior, Disabled, or Other
- **Reported Fuel Cost**: The average fuel cost at time of report (used for statistical normalization over time)

PENNSYLVANIA PUBLIC TRANSPORTATION
QUALITY CONTROL AND DATA VERIFICATION

December 2013

Agencies/CEOs who report and certify that data is accurate have the means to perform quality/accuracy checks of data used to calculate Act 44 grant awards. PennDOT expects agency management/CEOs to audit and reconcile any "red flag" issues before certifying and submitting these statistics in the Final Audited Legacy Budget/dotGrants. Failure to do so may result in substantial financial penalties including the refund of excess grant funds.

CEOs are certifying to data that is reported in dotGrant Legacy Budgets. To assure the accuracy of the data, the agency should have procedures in place to test and analyze data for quality/accuracy prior to submission/certification. Please use the space below to indicate which quality control activities your agency performed for each of the data elements. Following the checklist is a series of routine, "common sense" and "rule-of-thumb" tests that can be performed on data before it is certified as accurate by management. You may use these to answer the "Method(s) used for validation" question.

☐Total Passengers
Method(s) used for validation: _____

_____

☐Senior Passengers
Method(s) used for validation:_____

_____

☐Revenue Vehicle Hours
Method(s) used for validation: _____

_____

☐Revenue Vehicle Miles
Method(s) used for validation:_____

_____

TOTAL PASSENGERS

Total passenger counts come from both fare-paying and non-fare paying passengers.

Methods for verifying total passengers include:

- **Compare farebox data with automated passenger counts**
- **Compare farebox data with video recordings**
- **Compare farebox data with ride checks performed by supervisors**
- **Compare farebox revenue and passenger counts for average fare calculation**
  When the average effective fare is less than 66% of the full boarding fare, management should look at individual routes, runs and drivers to see if there is a systemic reason for this as it is **atypical** to have effective fares lower than 66% of the full boarding fare.

Checks must be completed on **at least two vehicles in revenue service** for each fixed-route mode for the **entire span of two randomly selected weekdays for the month**.

Senior (Lottery/Free Transit) Passengers
Because no cash or media (tickets) transfers between senior passengers and the farebox, senior ridership farebox reporting does not have an automated means of verification. However, there are logic checks that can be performed to target a review of reported senior ridership based on outlier or exception analysis.

Methods for verifying senior passengers include:

- **Compare senior passenger trips to total passenger trips**. If total senior ridership accounts for **more than 20%** of a system's total ridership in a given month, it raises a "red flag" indicating an additional level of scrutiny is required. Management should summarize data for that month for each route and bus; divide the number of reported seniors by total ridership; and, then sort each of the three reports in descending order by the percentage of seniors reported. Logic and/or ride checks should be performed for outlier routes (i.e., highest percentage of seniors reported) to make sure the total number of passenger trips reported in the data is consistent with field observation.
- **Compare senior passenger trips to fare-paying passenger trips**. If a driver carries **a disproportionate number of senior trips compared to fare paying trips**, senior ridership reported by the driver should be further reviewed. Management can:
    - analyze data for that month by driver/by route
    - divide the number of reported seniors by total ridership for each driver/route
    - sort the report in descending order by the percentage of seniors reported by driver and by route

  Drivers who consistently report the number of seniors double what the average driver does merit a video log review—compare the video log of passenger boardings to farebox reports for that same driver/route/time period. While it is sometimes difficult to determine who is a senior from the video logs, the total number of boardings reported through the farebox should match what is observed in the video logs. If not, management should take appropriate action with the drivers, including retraining and potentially disciplinary action.

The same logic checks used for senior passenger review should be applied to other classes of passengers who do not pay boarding fares such as free downtown circulators, children under 6 or university students. See page 4 for information on verifying transfers.

REVENUE SERVICE

Revenue Vehicle Hours (RVH) and Revenue Vehicle Miles (RVM) can be calculated based on scheduled service. Exceptions occur for systems that operate trains that vary in terms of the number of passenger cars and for bus systems that have poor on-time performance (i.e. running late often).

REVENUE VEHICLE HOURS (RVH)

- Compare reported RVH to scheduled RVH. RVH should always be less than total vehicle hours and total driver hours for non-rail modes. Subtract deadhead, mechanical breakdowns, service disruptions and unused extraboard driver hours from total revenue hours for RVH.

- For paratransit modes, if passengers/RVH is less than 1.0, it is a "red flag" suggesting that paratransit RVH is likely too large or not being calculated correctly.
- **"Bottom up" approach – Tally actual revenue hours for each route, for each day of the week. Take into account schedule variations.**
- **"Top down" approach – Estimate revenue hours based on actual odometer readings for each vehicle in service, less exception "non-revenue" hours.**

Method for verifying RVH:

- **Management reviews staff work for accuracy**

REVENUE VEHICLE MILES (RVM)

- **Compare reported RVM to scheduled RVM for the year for each mode.** RVM should always be less than total vehicle miles. Subtract deadhead, charter, school bus, mechanical breakdowns, service disruptions and non-revenue driver training miles from total vehicle miles to equal RVM.
- For paratransit modes, if passengers/RVM is less than 1.0, it is a "red flag" suggesting that paratransit RVM is likely too large or not being calculated correctly.
- **"Bottom up" approach – Tally actual revenue hours for each route, for each day of the week. Take into account schedule variations.**
- **"Top down" approach – Estimate revenue hours based on actual odometer readings for each vehicle in service, less exception "non-revenue" hours.**

Method for verifying RVM:

- **Management reviews staff work for accuracy**

CHECKS AND REVIEWS THAT CAN BE USED TO FACILITATE THE ANALYSIS BY AGENCY MANAGEMENT OF OTHER STATISTICS

REPORTING SYSTEM CROSS-CHECKS

Some agencies use both GFI and Avail systems. Avail permits easy access to GFI databases for live queries and reporting on data stored in the GFI database. However, the key field mapping between the two systems must be the same so that reporting can be verified (rather than using just one of the systems to generate management reports). Any time either software system is updated or new fare policies/media are put in place, a thorough consistency check between the systems must be completed. Subsequently, a quarterly spot check and comparison should be made between ridership and revenues by fare type between the GFI and Avail reporting systems to ensure that ridership definitions are consistent and that all rider categories are being reported accurately by both systems.

FARE-PAYING PASSENGERS

Fare paying passengers are readily reconciled against fares collected. When the amount of in-vehicle fares collected varies by more than 5% from what is reported from the farebox twice in one month, a special audit is required. If farebox revenues are mixed prior to counting (thereby making it impossible to verify the source of the discrepancy) 10% of all vehicles in revenue service must be surveyed either by review of video (preferred) or ride checks.

TRANSFER PASSENGERS

Transfer passengers are those passengers that pay a reduced (or no) fare to switch vehicles to complete a one-way trip. Report the transfer trip on the vehicle on which the transfer is used, NOT on the vehicle which issues the transfer. Some transfers may be issued, but not used. Management should treat and record the number of transfers issued and redeemed as if they are actual cash by making sure that the number of transfers issued and collected are accurate.

Routes, drivers and busses should be checked **at least** monthly to ensure that reported transfers are reasonable given the service provided. A simple logic check is to calculate the number of transfers collected vs. transfers issued system-wide. **If the number of transfers collected exceeds the number issued in any given day, there is a problem with the data that requires further verification by reviewing information by route and by driver.**

Another "red flag" is raised when the number of transfers collected **exceeds 50%** of the fare paying passengers eligible to receive transfers. In this instance, management should perform a targeted review of individual routes and drivers with the highest numbers of reported transfers to ensure total boardings are equal to what is reported in APC or video logs. **Comparisons with on-board survey results can shed some light on how expected transfers compare with reported transfers as well.**

NOTE: All definitions of data factors are consistent with NTD.

QUESTIONS – Call your assigned project coordinator in the Bureau of Public Transportation

Appendix 3A: Analysis of Sizing Measures

For this review, potential transit agency sizing measures were identified from the literature and a list was prepared for qualitative analysis and discussion with the Working Group. Sizing metrics sometimes referred to as "Descriptive Measures"[11] provide context about a transit agency's scale of operations based on either the market being served or the type and intensity of service provided. These are typically used in peer grouping agencies or as screening tools to ensure that performance is being compared among "like" agencies. The four categories in which sizing metrics can be broadly organized include urban area characteristics, service area characteristics, transit service characteristics, and delivered service quality measures.

Specific metrics within these categories were discussed and qualitatively analyzed for presentation to the Working Group, relative to TSDAC goals to equitably distribute funding based on effectiveness and efficiency. Table 3A.1 summarizes the metrics reviewed and the rating of each metric (in terms of Good, Average, or Poor) based on relevance to TSDAC goals, the required data collection effort, and the consistency of definition across agencies of different types and sizes. These ratings were based on an assessment of metrics derived from the literature review as well as feedback received from the Working Group members regarding issues specific to Commonwealth transit systems. The "Overall Score" is based on the lowest score received by each metric among the aspects analyzed.

Table 3A.1 Qualitative Rating of Sizing Measures (Good, Average, Poor)

Category	Metric	Data source	Relevance to TSDAC Goals	Ease of Data Collection	Consistency of Definition	Overall Score
Urban Area Characteristics	*Urban Area Population*	Census	**A**	**G**	**G**	**A**
	Urban Area Size	Census	**A**	**G**	**G**	**A**
	Urban Area Population Density	Census	**A**	**G**	**G**	**A**
	Urban Area Population Growth Rate	Census	**A**	**G**	**G**	**A**
Service Area Characteristics	*Service Area Population*	Agency	**G**	**A**	**P**	**P**
	Service Area Size	Agency	**G**	**A**	**P**	**P**
	Service Area Type	Agency	**A**	**A**	**A**	**A**
Transit Service Characteristics	*Annual Vehicle Revenue Miles Operated*	Agency	**G**	**G**	**A**	**A**
	Annual Vehicle Revenue Hours Operated	Agency	**G**	**G**	**A**	**A**
	Miles of Track	Agency	**A**	**G**	**P**	**P**
	Number of Stations	Agency	**A**	**G**	**P**	**P**
	Percent of Service Operated as Fixed Route	Agency	**A**	**G**	**P**	**P**
	Peak Vehicles	Agency	**G**	**G**	**G**	**G**
	Peak Vehicle Seats	Agency	**A**	**P**	**P**	**P**
	Seat Miles	Agency	**A**	**P**	**P**	**P**

[11] TCRP141, *A Methodology for Performance Measurement and Peer Comparison in Public Transportation Industry*, Transportation Research Board 2010.

Category	Metric	Data source	Relevance to TSDAC Goals	Ease of Data Collection	Consistency of Definition	Overall Score
Delivered Service Quality Measures	*Service Span*	Agency	**A**	**A**	**P**	**P**
	Average System Peak Headway	Agency	**A**	**A**	**P**	**P**
	Revenue Miles per Urban Square Miles	Agency	**A**	**G**	**P**	**P**
	Revenue Miles (Hours) per Capita	Agency	**A**	**G**	**P**	**P**

The narrative below summarizes the findings of this review and the recommendations of the Working Group with regard to metrics in each of the categories defined above.

Urban Area Characteristics: Urban area characteristics measure population characteristics, geographic size and demographic characteristics. These measures were found to be average indicators of system size. While the data required for these measures is easily collected from standardized sources such as the Census Bureau or the American Community Survey (ACS), they are not universally applicable to all transit systems within the Commonwealth, due to the following factors:

- *Correlation with Transit Ridership:* Urban area characteristics are highly correlated with transit ridership, a measure that is already applied to allocate operating funding. An urban region of high population, geographic size, density, or growth rate is also likely to have high transit ridership. However, unlike ridership, urban characteristics measures are indirect indicators of size, providing only an estimate of demand for transit without providing an indication of the amount of service provided or user market served.

- *Variation among Statewide Transit Systems:* Urban area measures may be largely inapplicable or an unreasonable measure of size for rural transit systems or in instances in which the transit systems serves a relatively small share of the transit dependent population (such as in the case of ADA or paratransit.)

- *Data Skew Resulting from Activity Centers:* The population of activity centers like universities is likely to skew urban population and density measures, regardless of whether the target population is being served by the transit system.

Service Area Characteristics: Service area characteristics measure a transit agency's size, population, or type of service area. These measures were found to be average to poor indicators of system size. While they are better indicators of the market being served than urban area characteristics, lack of standardized methods of collecting this data can lead to inconsistencies rendering these measures unreliable, due to the following factors:

- *Lack of Standard Procedures of Data Collection:* Geographic Information System (GIS) mapping of transit service provided within the service area could help delineate service area size and population for each system. However, agencies usually follow different methods to calculate service area, which could potentially lead to data inconsistencies.

- *Service Area Definition:* Transit systems will likely define service area differently. For example, there are likely to be different measures of what a service area is for fixed-route transit compared to paratransit providers. This complicates the standardization of procedures for measuring service area.

- *Overlapping Service Area:* It would be difficult to estimate service area for agencies serving overlapping service areas, such as in Northern Virginia where several local bus services and the Washington Metropolitan Area Transit Authority (WMATA) bus and rail systems serve the same localities.

Transit Service Characteristics: Transit service characteristics quantify service output, such as vehicle miles traveled. These measures were examined and found to be generally average to poor indicators of transit system size. However one metric in this category, Peak Vehicles (or number of vehicles in peak service), was identified by DRPT as a good measure for peer grouping systems by relative size during the SJR 297 analysis.[12] Other measures in this category were found to be either incomplete indicators of size or difficult to measure, due to the following factors:

- *Annual Revenue Vehicle Miles and Annual Revenue Vehicle Hours* traveled indicate separate and complimentary aspects of system output and are only indirect indicators of size of demand or service. Each of these measures, by itself, is not an appropriate indicator of system size and needs to be complemented by the other to provide complete data.

  Neither measure accounts for ridership, either. For example, a bus system serving few passengers in a sparsely populated area may log as many (or more) vehicle miles as a system serving many passengers in a small, densely populated area. A hybrid indicator, such as Passengers per Vehicle Revenue Mile (or per Vehicle Revenue Hour) may be used to overcome this shortcoming; however, such a measure would be an indicator of system effectiveness, not size.

- *Measures involving Transit System Assets* such as miles of track, number of stations, number of stops etc., are generally mode-specific and difficult to apply given that systems in the Commonwealth span various modes, ranging from WMATA to very small agencies in rural areas providing only paratransit service.

- *Peak Vehicles* is a good indicator of system size. It was used in the SJR 297 peer-grouping analysis and was found to be a good indicator for categorizing systems by relative size.

- *Peak Vehicle Seats and Seat Miles* are difficult to measure with significant error margins. These are also difficult to measure consistently across agencies because of varying (or absent) data collection practices.

Delivered Service Quality Characteristics: Delivered service quality measures were found to be poor indicators of system size, due to the following factors:

- *Service Span*—a time measure of the availability of transit service provided—requires consistent guidelines for measuring the services provided by transit systems. This could prove challenging given the diversity of transit systems across the Commonwealth. In addition, the manual process of estimating service span is likely to be resource intensive, putting an unreasonable burden of data

[12] Senate Document No. 11, *Performance Based Funding Distribution for Public Transportation (SJR 297, 2011)*

collection on smaller transit system. It would also be cumbersome to update in case of service changes.

- *Average System Peak Headway* can provide a measure of system intensity, but falls short as a measure for making cross-modal comparisons. It is also highly correlated with ridership (shorter headways indicating greater demand) which is already being used as a direct measure of size in the current formula.

- *Revenue Miles* (Revenue Miles per Urban Square Miles or Revenue Miles per Capita) have similar shortcomings as discussed in previous sections under Annual Revenue Vehicle Miles (Hours) as well as urban area characteristic measures. These measures do not translate well across different geographies (given differing demand for and characteristics of service in rural versus urban areas) or different modes (paratransit versus bus versus rail).

Appendix 4A: Review of Potential Exceptional Performance Measures

Table 4A.1 summarizes the performance metrics analyzed as part of the literature review and the rating of each metric (in terms of Good, Average, or Poor) based on its relevance to TSDAC goals, the required data collection effort, and the consistency of definition across agencies of different types and sizes. Based on feedback from the Working Group, only productivity and service quality related measures were analyzed in this format. The Working Group did not consider cost and efficiency measures appropriate in the context of Exceptional Performance. The "Overall Score" is based on the lowest score received by each metric among the aspects analyzed.

Table 4A.1 Qualitative Rating of Performance Measures (Good, Average, Poor)

Category	Metric	Data source	Relevance to TSDAC Goals	Ease of Data Collection	Consistency of Definition	Overall Score
Productivity	*Passengers per Vehicle Revenue Hour*	*NTD*	**A**	**G**	**G**	**A**
	Passengers per Vehicle Revenue Mile	*NTD*	**A**	**G**	**G**	**A**
	Passenger Mile per Vehicle Revenue Mile	*NTD*	**A**	**G**	**G**	**A**
Perceived Service Quality	*Average System Speed*	Agency	**P**	**A**	**A**	**P**
	On-Time Performance	Agency	**A**	**P**	**P**	**P**
	Excess Wait time	Agency	**A**	**G**	**G**	**A**
	Customer Complaints/ Satisfaction Surveys / Secret Rider Surveys	Agency	**A**	**G**	**G**	**A**
	Passenger Load Factor	Agency	**A**	**G**	**G**	**A**
Other/ Agency Suggested	*Park and Ride Lot Occupancy/ Bus Occupancy*	Agency	**A**	**A**	**A**	**A**
	Load Factor during Peak Periods	Agency	**A**	**A**	**A**	**A**
	Increase in Ridership	Agency	**A**	**A**	**A**	**A**

Appendix 4B: TCRP Peer Selection

The tables in this Appendix present the results of the TCRP Peer Selection process using the FTIS module for two representative examples of VRE and GRTC, both at the agency level, as well as for specific modes within each system. The top 10 “like” systems in each case are highlighted (light blue) as comparable peer systems. All other systems compared by the module are shaded dark gray. The tables provide individual Likeness Score for each of the characteristics used to compare systems as well as the Total Likeness Score.

Virginia Railway Express (VRE) Peers

TCRP Pre-set Peer Selection Process

					SCREENING FACTORS						PEER-GROUPING FACTORS (SERVICE AREA CHARACTERISTICS)									
NTD ID	Agency Name	Location	State	Total Likeness Score	Rail	Likeness Score	Rail Only	Likeness Score	Heavy Rail	Likeness Score	Total Vehicle Miles Operated	Likeness Score	Total Operating Budget	Likeness Score	Percent Service Demand Response	Likeness Score	Percent Service Purchased	Likeness Score	Service Area Type	Likeness Score
3073	Virginia Railway Express	Alexandria	VA	0.0	Yes	0.0	Yes	0.0	No	0.0	1,923,979	0.0	$57,461,301	0.0	0	0.0	0	0.0	5	0.0
5104	Northern Indiana Commuter Transportation District	Chesterton	IN	0.5	Yes	0.0	Yes	0.0	No	0.0	3,450,855	0.8	$39,198,932	0.5	0	0.0	0	0.0	5	0.0
9209	Valley Metro Rail, Inc.	Phoenix	AZ	0.7	Yes	0.0	Yes	0.0	No	0.0	2,405,140	0.3	$31,020,108	0.9	0	0.0	0	0.0	0	-1.0
9151	Southern California Regional Rail Authority dba: Metrolink	Los Angeles	CA	1.2	Yes	0.0	Yes	0.0	No	0.0	10,252,813	4.3	$161,020,631	1.8	0	0.0	0	0.0	5	0.0
40	Central Puget Sound Regional Transit Authority	Seattle	WA	1.2	Yes	0.0	Yes	0.0	No	0.0	15,667,652	7.1	$175,166,744	2.0	0	0.0	0.2	1.0	5	0.0
1102	Connecticut Department of Transportation	Newington	CT	1.4	Yes	0.0	Yes	0.0	No	0.0	1,297,027	0.5	$27,648,619	1.1	0	0.0	0.73	3.7	4	4.0
2075	Port Authority Transit Corporation	Lindenwold	NJ	1.8	Yes	0.0	Yes	0.0	Yes	20.0	4,286,012	1.2	$43,770,418	0.3	0	0.0	0	0.0	5	0.0
2099	Staten Island Rapid Transit Operating Authority, dba: MTA Staten Islan	Staten Island	NY	2.2	Yes	0.0	Yes	0.0	Yes	20.0	2,428,235	0.3	$33,112,333	0.7	0	0.0	0	0.0	6	2.0
9182	Altamont Commuter Express	Stockton	CA	2.2	Yes	0.0	Yes	0.0	No	0.0	786,034	1.4	$11,732,070	3.9	0	0.0	0	0.0	5	0.0
4077	South Florida Regional Transportation Authority	Pompano Beach	FL	2.2	Yes	0.0	No	20.0	No	0.0	3,508,836	0.8	$54,746,746	0.0	0	0.0	1	5.0	5	0.0
6111	Rio Metro Regional Transit District	Albuquerque	NM	2.6	Yes	0.0	No	20.0	No	0.0	1,477,994	0.3	$24,813,589	1.3	1	2.0	0	0.0	0	-1.0
5118	Northeast Illinois Regional Commuter Railroad Corporation dba: Metra	Chicago	IL	2.6	Yes	0.0	Yes	0.0	No	0.0	42,895,967	21.3	$596,040,975	9.4	0	0.0	0	0.0	5	0.0
9134	Peninsula Corridor Joint Powers Board dba: Caltrain	San Carlos	CA	2.7	Yes	0.0	No	20.0	No	0.0	7,526,044	2.9	$96,521,643	0.7	0	0.0	1	5.0	5	0.0
9030	North County Transit District	Oceanside	CA	2.7	Yes	0.0	No	20.0	No	0.0	8,222,892	3.3	$71,930,026	0.3	0.18	0.4	1	5.0	5	0.0
4159	Regional Transportation Authority	Nashville	TN	2.9	Yes	0.0	No	20.0	No	0.0	1,166,441	0.6	$6,367,452	8.0	0	0.0	0.12	0.6	0	-1.0
2004	Niagara Frontier Transportation Authority	Buffalo	NY	2.9	Yes	0.0	No	20.0	No	0.0	11,429,854	4.9	$122,871,470	1.1	0.2	0.4	0	0.0	7	3.0
9019	Sacramento Regional Transit District	Sacramento	CA	2.9	Yes	0.0	No	20.0	No	0.0	9,286,350	3.8	$122,123,197	1.1	0	0.0	0	0.0	4	4.0
4008	Charlotte Area Transit System	Charlotte	NC	3.1	Yes	0.0	No	20.0	No	0.0	16,047,879	7.3	$101,948,946	0.8	0.2	0.4	0	0.0	2	4.0
3080	Arlington Transit - Arlington County	Arlington	VA	3.3	No	20.0	No	20.0	No	0.0	1,398,802	0.4	$10,593,196	4.4	0.23	0.5	0.73	3.6	0	-3.0
3070	Potomac and Rappahannock Transportation Commission	Woodbridge	VA	3.3	No	20.0	No	20.0	No	0.0	3,080,485	0.6	$25,931,402	1.2	0	0.0	0.93	4.6	5	0.0
2190	Port Imperial Ferry Corporation dba NY Waterway	Weehawken	NJ	3.4	No	20.0	No	20.0	No	0.0	1,032,703	0.9	$32,161,812	0.8	0	0.0	0	0.0	0	-1.0
5027	Metro Transit	Minneapolis	MN	3.4	Yes	0.0	No	20.0	No	0.0	25,289,783	12.1	$284,697,538	4.0	0	0.0	0	0.0	3	5.0
2149	Rockland Coaches, Inc.	Westwood	NJ	3.6	No	20.0	No	20.0	No	0.0	3,394,900	0.8	$20,870,543	1.8	0	0.0	0	0.0	5	0.0
2163	Lakeland Bus Lines, Inc.	Dover	NJ	3.6	No	20.0	No	20.0	No	0.0	2,799,234	0.5	$18,434,499	2.1	0	0.0	0	0.0	5	0.0
2161	DeCamp Bus Lines	Montclair	NJ	3.6	No	20.0	No	20.0	No	0.0	1,690,854	0.1	$15,376,681	2.7	0	0.0	0	0.0	5	0.0
2128	Suburban Transit Corporation	New Brunswick	NJ	3.6	No	20.0	No	20.0	No	0.0	5,740,743	2.0	$27,356,316	1.1	0	0.0	0	0.0	5	0.0
6033	Central Arkansas Transit Authority	North Little Rock	AR	3.6	Yes	0.0	No	20.0	No	0.0	3,020,698	0.6	$14,756,973	2.9	0.32	0.6	0	0.0	3	5.0
3081	Loudoun County Commuter Bus Service - Office of Transportation Servi	Leesburg	VA	3.6	No	20.0	No	20.0	No	0.0	1,574,511	0.2	$8,659,266	5.6	0	0.0	1	5.0	5	0.0
2122	Academy Lines, Inc.	Hoboken	NJ	3.7	No	20.0	No	20.0	No	0.0	8,008,208	3.2	$32,543,739	0.8	0	0.0	0	0.0	5	0.0
2126	Hudson Transit Lines, Inc.	Mahwah	NJ	3.7	No	20.0	No	20.0	No	0.0	8,829,308	3.6	$45,301,539	0.3	0	0.0	0	0.0	5	0.0
3071	City of Alexandria	Alexandria	VA	3.7	No	20.0	No	20.0	No	0.0	1,695,256	0.1	$14,273,774	3.0	0	0.0	0.39	1.9	6	6.0
2169	Trans-Bridge Lines, Inc.	Bethlehem	PA	3.7	No	20.0	No	20.0	No	0.0	3,788,309	1.0	$14,121,656	3.1	0	0.0	0	0.0	5	0.0
24	Clark County Public Transportation Benefit Area Authority	Vancouver	WA	3.7	No	20.0	No	20.0	No	0.0	5,277,274	1.7	$37,824,498	0.5	0.3	0.6	0	0.0	5	0.0
3085	Prince George's County Transit	Largo	MD	3.7	No	20.0	No	20.0	No	0.0	2,720,511	0.4	$25,582,055	1.2	0.38	0.8	0.62	3.1	6	6.0
4019	Transit Authority of Northern Kentucky	Fort Wright	KY	3.7	No	20.0	No	20.0	No	0.0	3,743,537	0.9	$19,652,395	1.9	0.21	0.4	0	0.0	5	0.0
9013	Santa Clara Valley Transportation Authority	San Jose	CA	3.7	Yes	0.0	No	20.0	No	0.0	23,525,498	11.2	$289,279,147	4.0	0.38	0.8	0.4	2.0	2	4.0
5	Everett Transit	Everett	WA	3.7	No	20.0	No	20.0	No	0.0	2,016,754	0.0	$18,329,845	2.1	0.31	0.6	0	0.0	6	2.0
9026	San Diego Metropolitan Transit System	San Diego	CA	3.7	Yes	0.0	No	20.0	No	0.0	26,892,428	13.0	$201,136,596	2.5	0.24	0.5	0.63	3.1	4	4.0
2166	Orange-Newark-Elizabeth, Inc.	Elizabeth	NJ	3.7	No	20.0	No	20.0	No	0.0	1,861,301	0.0	$14,858,774	2.9	0	0.0	0	0.0	6	2.0
1117	Plymouth & Brockton Street Railway Company	Plymouth	MA	3.8	No	20.0	No	20.0	No	0.0	1,267,860	0.5	$5,886,408	8.8	0	0.0	0	0.0	0	-1.0

Virginia Railway Express (VRE) Peers

TCRP Pre-set Peer Selection Process

PEER-GROUPING FACTORS (URBAN AREA CHARACTERISTICS)

NTD ID	Agency Name	Location	State	Total Likeness Score	Urban Area Population	Likeness Score	Population Density	Likeness Score	State Capital	Likeness Score	Percent College Students	Likeness Score	Population Growth Rate	Likeness Score	Percent Low Income	Likeness Score	Annual Delay (hours) per Traveler	Likeness Score	Freeway Lane-Miles per Capita (000)	Likeness Score	Distance	Likeness Score
3073	Virginia Railway Express	Alexandria	VA	0.0	4,394,693	0.0	3,799	0.0	No	0.0	50	0.0	11.71	0.0	8.9	0.0	67	0.0	0.51	0.0	0	0.0
5104	Northern Indiana Commuter Transportation District	Chesterton	IN	0.5	8,328,675	0.9	3,923	0.0	No	0.0	34.7	0.4	0.25	2.3	15.3	0.7	51	0.3	0.42	0.2	600	1.2
9209	Valley Metro Rail, Inc.	Phoenix	AZ	0.7	3,085,237	0.4	3,861	0.0	Yes	1.0	28.2	0.8	6.13	1.1	19.3	1.2	35	0.9	0.56	0.1	1967	3.9
9151	Southern California Regional Rail Authority dba: Metrolink	Los Angeles	CA	1.2	12,100,715	1.8	7,255	0.9	No	0.0	29.8	0.7	2.64	1.8	17.6	1.0	61	0.1	0.48	0.0	2285	4.6
40	Central Puget Sound Regional Transit Authority	Seattle	WA	1.2	3,013,056	0.5	3,160	0.2	No	0.0	38.6	0.3	11.09	0.1	12.2	0.4	48	0.4	0.77	0.5	2316	4.6
1102	Connecticut Department of Transportation	Newington	CT	1.4	882,656	4.0	1,881	1.0	No	0.0	33.7	0.5	3.65	1.6	13.4	0.5	38	0.8	1.08	1.1	306	0.6
2075	Port Authority Transit Corporation	Lindenwold	NJ	1.8	5,286,518	0.2	2,938	0.3	No	0.0	33	0.5	2.67	1.8	14.4	0.6	48	0.4	0.51	0.0	127	0.3
2099	Staten Island Rapid Transit Operating Authority, dba: MTA Staten Islan	Staten Island	NY	2.2	18,277,920	3.2	5,452	0.4	No	0.0	35.8	0.4	2.69	1.8	14.7	0.7	59	0.1	0.42	0.2	212	0.4
9182	Altamont Commuter Express	Stockton	CA	2.2	356,869	11.3	4,803	0.3	No	0.0	15.7	2.2	13.87	0.4	24.2	1.7	12	4.6	0.62	0.2	2368	4.7
4077	South Florida Regional Transportation Authority	Pompano Beach	FL	2.2	5,373,163	0.2	4,814	0.3	No	0.0	27.9	0.8	9.23	0.5	18	1.0	47	0.4	0.42	0.2	897	1.8
6111	Rio Metro Regional Transit District	Albuquerque	NM	2.6	708,613	5.2	3,165	0.2	No	0.0	30.7	0.6	18.46	1.3	19.9	1.2	29	1.3	0.55	0.1	1640	3.3
5118	Northeast Illinois Regional Commuter Railroad Corporation dba: Metra	Chicago	IL	2.6	8,328,675	0.9	3,923	0.0	No	0.0	34.7	0.4	0.25	2.3	15.3	0.7	51	0.3	0.42	0.2	599.96	1.2
9134	Peninsula Corridor Joint Powers Board dba: Caltrain	San Carlos	CA	2.7	3,327,818	0.3	6,319	0.7	No	0.0	44.5	0.1	3.07	1.7	12.5	0.4	61	0.1	0.76	0.5	2,424.06	4.9
9030	North County Transit District	Oceanside	CA	2.7	2,819,868	0.6	3,605	0.1	No	0.0	33.5	0.5	5.44	1.3	15.8	0.8	37	0.8	0.7	0.4	2,259.15	4.5
4159	Regional Transportation Authority	Nashville	TN	2.9	812,083	4.4	1,885	1.0	Yes	1.0	35.2	0.4	8.29	0.7	16.9	0.9	47	0.4	1.33	1.6	556.82	1.1
2004	Niagara Frontier Transportation Authority	Buffalo	NY	2.9	937,848	3.7	2,558	0.5	No	0.0	29.3	0.7	-3.98	3.1	15.8	0.8	33	1.0	0.87	0.7	291.2	0.6
9019	Sacramento Regional Transit District	Sacramento	CA	2.9	1,494,048	1.9	4,049	0.1	Yes	1.0	27.6	0.8	7.22	0.9	17.9	1.0	32	1.1	0.56	0.1	2,357.78	4.7
4008	Charlotte Area Transit System	Charlotte	NC	3.1	961,812	3.6	2,212	0.7	No	0.0	38.6	0.3	26.73	3.0	17.8	1.0	40	0.7	1.02	1.0	325.03	0.7
3080	Arlington Transit - Arlington County	Arlington	VA	3.3	4,394,693	0.0	3,799	0.0	No	0.0	50	0.0	11.71	0.0	8.9	0.0	67	0.0	0.51	0.0	0	0.0
3070	Potomac and Rappahannock Transportation Commission	Woodbridge	VA	3.3	4,394,693	0.0	3,799	0.0	No	0.0	50	0.0	11.71	0.0	8.9	0.0	67	0.0	0.51	0.0	0	0.0
2190	Port Imperial Ferry Corporation dba NY Waterway	Weehawken	NJ	3.4	18,277,920	3.2	5,452	0.4	No	0.0	35.8	0.4	2.69	1.8	14.7	0.7	59	0.1	0.42	0.2	211.75	0.4
5027	Metro Transit	Minneapolis	MN	3.4	2,469,454	0.8	2,762	0.4	No	0.0	40.2	0.2	3.39	1.7	12.4	0.4	34	1.0	0.83	0.6	926.91	1.9
2149	Rockland Coaches, Inc.	Westwood	NJ	3.6	18,277,920	3.2	5,452	0.4	No	0.0	35.8	0.4	2.69	1.8	14.7	0.7	59	0.1	0.42	0.2	211.75	0.4
2163	Lakeland Bus Lines, Inc.	Dover	NJ	3.6	18,277,920	3.2	5,452	0.4	No	0.0	35.8	0.4	2.69	1.8	14.7	0.7	59	0.1	0.42	0.2	211.75	0.4
2161	DeCamp Bus Lines	Montclair	NJ	3.6	18,277,920	3.2	5,452	0.4	No	0.0	35.8	0.4	2.69	1.8	14.7	0.7	59	0.1	0.42	0.2	211.75	0.4
2128	Suburban Transit Corporation	New Brunswick	NJ	3.6	18,277,920	3.2	5,452	0.4	No	0.0	35.8	0.4	2.69	1.8	14.7	0.7	59	0.1	0.42	0.2	211.75	0.4
6033	Central Arkansas Transit Authority	North Little Rock	AR	3.6	367,678	11.0	1,788	1.1	No	0.0	29.2	0.7	2.04	1.9	16.6	0.9	26	1.6	1.83	2.6	884.84	1.8
3081	Loudoun County Commuter Bus Service - Office of Transportation Servi	Leesburg	VA	3.6	4,394,693	0.0	3,799	0.0	No	0.0	50	0.0	11.71	0.0	8.9	0.0	67	0.0	0.51	0.0	0	0.0
2122	Academy Lines, Inc.	Hoboken	NJ	3.7	18,277,920	3.2	5,452	0.4	No	0.0	35.8	0.4	2.69	1.8	14.7	0.7	59	0.1	0.42	0.2	211.75	0.4
2126	Hudson Transit Lines, Inc.	Mahwah	NJ	3.7	18,277,920	3.2	5,452	0.4	No	0.0	35.8	0.4	2.69	1.8	14.7	0.7	59	0.1	0.42	0.2	211.75	0.4
3071	City of Alexandria	Alexandria	VA	3.7	4,394,693	0.0	3,799	0.0	No	0.0	50	0.0	11.71	0.0	8.9	0.0	67	0.0	0.51	0.0	0	0.0
2169	Trans-Bridge Lines, Inc.	Bethlehem	PA	3.7	18,277,920	3.2	5,452	0.4	No	0.0	35.8	0.4	2.69	1.8	14.7	0.7	59	0.1	0.42	0.2	211.75	0.4
24	Clark County Public Transportation Benefit Area Authority	Vancouver	WA	3.7	1,824,124	1.4	3,849	0.0	No	0.0	35.9	0.4	15.22	0.7	15.7	0.8	44	0.5	0.53	0.0	2,342.34	4.7
3085	Prince George's County Transit	Largo	MD	3.7	4,394,693	0.0	3,799	0.0	No	0.0	50	0.0	11.71	0.0	8.9	0.0	67	0.0	0.51	0.0	0	0.0
4019	Transit Authority of Northern Kentucky	Fort Wright	KY	3.7	1,527,580	1.9	2,274	0.7	No	0.0	32	0.6	1.62	2.0	15.1	0.7	37	0.8	0.89	0.8	392.67	0.8
9013	Santa Clara Valley Transportation Authority	San Jose	CA	3.7	1,622,367	1.7	6,237	0.6	No	0.0	45.5	0.1	5.46	1.2	10.4	0.2	39	0.7	0.55	0.1	2,414.41	4.8
5	Everett Transit	Everett	WA	3.7	3,013,056	0.5	3,160	0.2	No	0.0	38.6	0.3	11.09	0.1	12.2	0.4	48	0.4	0.77	0.5	2,315.95	4.6
9026	San Diego Metropolitan Transit System	San Diego	CA	3.7	2,819,868	0.6	3,605	0.1	No	0.0	33.5	0.5	5.44	1.3	15.8	0.8	37	0.8	0.7	0.4	2,259.15	4.5
2166	Orange-Newark-Elizabeth, Inc.	Elizabeth	NJ	3.7	18,277,920	3.2	5,452	0.4	No	0.0	35.8	0.4	2.69	1.8	14.7	0.7	59	0.1	0.42	0.2	211.75	0.4
1117	Plymouth & Brockton Street Railway Company	Plymouth	MA	3.8	4,147,162	0.1	2,389	0.6	No	0.0	42.7	0.2	2.84	1.8	11.1	0.2	53	0.3	0.7	0.4	397.51	0.8

Virginia Railway Express (VRE) Commuter Rail Peers

TCRP Pre-set Peer Selection Process

PEER-GROUPING FACTORS (SERVICE AREA CHARACTERISTICS)

PEER-GROUPING FACTORS (URBAN AREA CHARACTERISTICS)

NTD ID	Agency Name	Location	State	Total Likeness Score	Total Vehicle Miles Operated	Likeness Score	Total Operating Budget	Likeness Score	Percent Service Purchased	Likeness Score	Service Area Type	Likeness Score	Urban Area Population	Likeness Score	Population Density	Likeness Score	State Capital	Likeness Score	Percent College Students	Likeness Score	Population Growth Rate	Likeness Score	Percent Low Income	Likeness Score	Annual Delay (hours) per Traveler	Likeness Score	Freeway Lane-Miles per Capita (000)	Likeness Score
3073	Virginia Railway Express	Alexandria	VA	0.0	1923979	0.0	$ 57,461,301	0.0	0	0.0	5	0.0	4394693	0.0	3,799	0.0	No	0.0	50	0.0	11.71	0.0	9	0.0	67	0.0	0.51	0.0
40	Central Puget Sound Regional Transit Authority	Seattle	WA	0.4	1498423	0.3	$ 31,681,964	0.8	0	1.0	5	0.0	3013056	0.5	3,160	0.2	No	0.0	38.6	0.3	11.09	0.1	12	0.4	48	0.4	0.77	0.5
5104	Northern Indiana Commuter Transportation District	Chesterton	IN	0.5	3450855	0.8	$ 39,198,932	0.5	0	0.0	5	0.0	8328675	0.9	3,923	0.0	No	0.0	34.7	0.4	0.25	2.3	15	0.7	51	0.3	0.42	0.2
4077	South Florida Regional Transportation Authority	Pompano Beach	FL	0.8	2879940	0.5	$ 51,718,986	0.1	1	5.0	5	0.0	5373163	0.2	4,814	0.3	No	0.0	27.9	0.8	9.23	0.5	18	1.0	47	0.4	0.42	0.2
6056	Dallas Area Rapid Transit	Dallas	TX	0.8	1142577	0.7	$ 27,240,675	1.1	0	1.1	4	4.0	4599251	0.0	3,269	0.2	No	0.0	30.1	0.7	10.94	0.2	18	1.0	45	0.5	0.79	0.6
6111	Rio Metro Regional Transit District	Albuquerque	NM	0.9	1382782	0.4	$ 24,228,643	1.4	0	0.0	0	-1.0	708613	5.2	3,165	0.2	No	0.0	30.7	0.6	18.46	1.3	20	1.2	29	1.3	0.55	0.1
9134	Peninsula Corridor Joint Powers Board dba: Caltrain	San Carlos	CA	1.0	6484270	2.4	$ 92,227,280	0.6	1	5.0	5	0.0	3327818	0.3	6,319	0.7	No	0.0	44.5	0.1	3.07	1.7	13	0.4	61	0.1	0.76	0.5
9030	North County Transit District	Oceanside	CA	1.0	1322123	0.5	$ 15,850,637	2.6	1	5.0	5	0.0	2819868	0.6	3,605	0.1	No	0.0	33.5	0.5	5.44	1.3	16	0.8	37	0.8	0.7	0.4
9151	Southern California Regional Rail Authority dba: Metrolink	Los Angeles	CA	1.0	10252813	4.3	$ 161,020,631	1.8	0	0.0	5	0.0	12100715	1.8	7,255	0.9	No	0.0	29.8	0.7	2.64	1.8	18	1.0	61	0.1	0.48	0.0
8001	Utah Transit Authority	Salt Lake City	UT	1.2	1925334	0.0	$ 20,517,540	1.8	0	0.3	2	4.0	960538	3.6	4,164	0.1	Yes	1.0	29.5	0.7	8.21	0.7	15	0.6	30	1.2	0.64	0.3
3034	Maryland Transit Administration	Baltimore	MD	1.2	5398457	1.8	$ 92,903,640	0.6	0	2.3	2	4.0	2082557	1.1	2,512	0.5	No	0.0	33.4	0.5	0.24	2.3	15	0.7	41	0.6	0.75	0.5
5027	Metro Transit	Minneapolis	MN	1.3	537307	2.6	$ 15,957,385	2.6	0	0.0	$3	5.0	2469454	0.8	2,762	0.4	No	0.0	40.2	0.2	3.39	1.7	12	0.4	34	1.0	0.83	0.6
1102	Connecticut Department of Transportation	Newington	CT	1.6	1108903	0.7	$ 25,870,538	1.2	1	3.7	$4	4.0	882656	4.0	1,881	1.0	No	0.0	33.7	0.5	3.65	1.6	13	0.5	38	0.8	1.08	1.1
3019	Southeastern Pennsylvania Transportation Authority	Philadelphia	PA	1.7	17799728	8.3	$ 238,669,815	3.2	0	1.1	$4	4.0	5286518	0.2	2,938	0.3	No	0.0	33	0.5	2.67	1.8	14	0.6	48	0.4	0.51	0.0
1003	Massachusetts Bay Transportation Authority	Boston	MA	2.2	22869602	10.9	$ 301,557,532	4.2	0	2.4	$2	4.0	4147162	0.1	2,389	0.6	Yes	1.0	42.7	0.2	2.84	1.8	11	0.2	53	0.3	0.7	0.4
9182	Altamont Commuter Express	Stockton	CA	2.2	786034	1.4	$ 11,732,070	3.9	0	0.0	$5	0.0	356869	11.3	4,803	0.3	No	0.0	15.7	2.2	13.87	0.4	24	1.7	12	4.6	0.62	0.2
4159	Regional Transportation Authority	Nashville	TN	2.8	205168	8.4	$ 3,693,851	14.6	0	0.6	$0	-1.0	812083	4.4	1,885	1.0	Yes	1.0	35.2	0.4	8.29	0.7	17	0.9	47	0.4	1.33	1.6
5118	Northeast Illinois Regional Commuter Railroad Corporation dba: Metr	Chicago	IL	3.0	42895967	21.3	$ 596,040,975	9.4	0	0.0	$5	0.0	8328675	0.9	3,923	0.0	No	0.0	34.7	0.4	0.25	2.3	15	0.7	51	0.3	0.42	0.2
2078	Metro-North Commuter Railroad Company, dba: MTA Metro-North R	New York	NY	4.3	58115268	29.2	$ 910,491,999	14.8	0	0.1	$5	0.0	18277920	3.2	5,452	0.4	No	0.0	35.8	0.4	2.69	1.8	15	0.7	59	0.1	0.42	0.2
2100	MTA Long Island Rail Road	Jamaica	NY	4.6	61970870	31.2	$ 1,069,768,165	17.6	0	0.0	$5	0.0	18277920	3.2	5,452	0.4	No	0.0	35.8	0.4	2.69	1.8	15	0.7	59	0.1	0.42	0.2
2080	New Jersey Transit Corporation	Newark	NJ	4.8	63010330	31.8	$ 838,957,195	13.6	0	1.5	$2	4.0	18277920	3.2	5,452	0.4	No	0.0	35.8	0.4	2.69	1.8	15	0.7	59	0.1	0.42	0.2
1115	Northern New England Passenger Rail Authority	Portland	ME	8.9	1881407	0.0	$ 14,550,475	2.9	0	0.0	$8	100.0	4147162	0.1	2,389	0.6	No	0.0	42.7	0.2	2.84	1.8	11	0.2	53	0.3	0.7	0.4
3057	Pennsylvania Department of Transportation	Harrisburg	PA	8.9	2191454	0.1	$ 17,875,128	2.2	0	0.0	$8	100.0	5286518	0.2	2,938	0.3	Yes	1.0	33	0.5	2.67	1.8	14	0.6	48	0.4	0.51	0.0
6007	Fort Worth Transportation Authority	Fort Worth	TX	84.4	0	1000.0	$ 10,104,985	4.7	0	1.2	$4	4.0	4599251	0.0	3,269	0.2	No	0.0	30.1	0.7	10.94	0.2	18	1.0	45	0.5	0.79	0.6
3075	Delaware Transit Corporation	Dover	DE	85.0	0	1000.0	$ 4,819,558	10.9	0	0.3	$2	4.0	5286518	0.2	2,938	0.3	Yes	1.0	33	0.5	2.67	1.8	14	0.6	48	0.4	0.51	0.0
6101	Denton County Transportation Authority	Lewisville	TX	169.5	139126	12.8	$ 7,848,267	6.3	0	0.0	$5	0.0	378947	10.6	3,116	0.2	No	0.0	44	0.1	26.39	2.9	13	0.5	0	1000.0	0	1000.0

Greater Richmond Transit Company (GRTC) Peers

TCRP Pre-set Peer Selection Process

					SCREENING FACTORS						PEER-GROUPING FACTORS (SERVICE AREA CHARACTERISTICS)									
NTD ID	Agency Name	Location	State	Total Likeness Score	Rail	Likeness Score	Rail Only	Likeness Score	Heavy Rail	Likeness Score	Urban Area Population	Likeness Score	Total Vehicle Miles Operated	Likeness Score	Total Operating Budget	Likeness Score	Population Density	Likeness Score	Service Area Type	Likeness Score
3006	Greater Richmond Transit Company	Richmond	VA	0.0	No	0.0	No	0.0	No	0.0	898,202	0.0	$11,319,872	0.0	46464440	0.0	2056	0.0	4	0.0
5050	Indianapolis and Marion County Public Transportation	Indianapolis	IN	0.4	No	0.0	No	0.0	No	0.0	1,292,590	0.4	$9,409,129	0.2	53003967	0.1	2338	0.1	3	2.0
4027	Pinellas Suncoast Transit Authority	St. Petersburg	FL	0.4	No	0.0	No	0.0	No	0.0	2,163,686	1.4	$11,430,704	0.0	56705696	0.2	3169	0.5	4	0.0
3083	Transportation District Commission of Hampton Roads, dba: Hampton	Hampton	VA	0.5	No	0.0	No	0.0	No	0.0	1,447,582	0.6	$14,682,361	0.3	74961390	0.6	2748	0.3	4	0.0
4040	Jacksonville Transportation Authority	Jacksonville	FL	0.5	No	0.0	No	0.0	No	0.0	945,064	0.1	$13,235,708	0.2	78126387	0.7	2302	0.1	3	2.0
5016	Central Ohio Transit Authority	Columbus	OH	0.5	No	0.0	No	0.0	No	0.0	1,226,871	0.4	$12,391,488	0.1	92836172	1.0	3085	0.5	3	2.0
4004	Metropolitan Transit Authority	Nashville	TN	0.6	No	0.0	No	0.0	No	0.0	812,083	0.1	$7,263,871	0.6	50314935	0.1	1885	0.1	2	4.0
5012	Southwest Ohio Regional Transit Authority	Cincinnati	OH	0.6	No	0.0	No	0.0	No	0.0	1,527,580	0.7	$10,513,904	0.1	82990991	0.8	2274	0.1	4	0.0
4041	Hillsborough Area Regional Transit Authority	Tampa	FL	0.6	No	0.0	No	0.0	No	0.0	2,163,686	1.4	$9,045,028	0.3	63864179	0.4	3169	0.5	4	0.0
3010	Lehigh and Northampton Transportation Authority	Allentown	PA	0.6	No	0.0	No	0.0	No	0.0	625,255	0.4	$6,658,192	0.7	29759872	0.6	2160	0.1	3	2.0
5005	Metro Transit System	Madison	WI	0.6	No	0.0	No	0.0	No	0.0	350,318	1.6	$6,457,208	0.8	48850937	0.1	1558	0.3	3	2.0
4087	Durham Area Transit Authority	Durham	NC	0.7	No	0.0	No	0.0	No	0.0	320,155	1.8	$3,971,942	1.8	19825813	1.3	2042	0.0	4	0.0
5008	Milwaukee County Transit System	Milwaukee	WI	0.7	No	0.0	No	0.0	No	0.0	1,330,926	0.5	$19,428,750	0.7	160309512	2.5	2733	0.3	4	0.0
1048	Connecticut Department of Transportation - CTTRANSIT - Hartford Divi	Hartford	CT	0.7	No	0.0	No	0.0	No	0.0	882,656	0.0	$6,459,786	0.8	59923475	0.3	1881	0.1	7	3.0
1050	Greater Bridgeport Transit Authority	Bridgeport	CT	0.7	No	0.0	No	0.0	No	0.0	920,323	0.0	$2,774,513	3.1	20437914	1.3	1978	0.0	4	0.0
2002	Capital District Transportation Authority	Albany	NY	0.7	No	0.0	No	0.0	No	0.0	584,552	0.5	$8,648,793	0.3	74170905	0.6	2057	0.0	2	4.0
4046	Sarasota County Area Transit	Sarasota	FL	0.7	No	0.0	No	0.0	No	0.0	584,240	0.5	$4,007,634	1.8	19182460	1.4	2161	0.1	4	0.0
5033	Interurban Transit Partnership	Grand Rapids	MI	0.8	No	0.0	No	0.0	No	0.0	552,315	0.6	$7,791,668	0.5	37305731	0.2	2147	0.0	7	3.0
1001	Rhode Island Public Transit Authority	Providence	RI	0.8	No	0.0	No	0.0	No	0.0	1,173,207	0.3	$12,855,798	0.1	108636501	1.3	2330	0.1	7	3.0
4110	Charleston Area Regional Transportation Authority	Charleston	SC	0.8	No	0.0	No	0.0	No	0.0	468,414	0.9	$3,523,158	2.2	16876202	1.8	2029	0.0	3	2.0
2113	Regional Transit Service, Inc. and Lift Line, Inc.	Rochester	NY	0.8	No	0.0	No	0.0	No	0.0	693,364	0.3	$6,629,939	0.7	63043073	0.4	2350	0.1	3	2.0
5017	Greater Dayton Regional Transit Authority	Dayton	OH	0.8	No	0.0	No	0.0	No	0.0	684,122	0.3	$8,239,586	0.4	54594782	0.2	2114	0.0	3	2.0
4003	Memphis Area Transit Authority	Memphis	TN	0.8	No	0.0	No	0.0	No	0.0	969,962	0.1	$8,272,008	0.4	54587799	0.2	2426	0.2	3	2.0
7002	Transit Authority of Omaha	Omaha	NE	0.8	No	0.0	No	0.0	No	0.0	663,662	0.4	$4,865,378	1.3	25637318	0.8	2931	0.4	3	2.0
6007	Fort Worth Transportation Authority	Fort Worth	TX	0.9	No	0.0	No	0.0	No	0.0	4,599,251	4.1	$7,195,614	0.6	58016529	0.2	3269	0.6	4	0.0
6017	Central Oklahoma Transportation and Parking Authority	Oklahoma City	OK	0.9	No	0.0	No	0.0	No	0.0	814,368	0.1	$3,012,070	2.8	21594342	1.2	2526	0.2	3	2.0
7005	Kansas City Area Transportation Authority	Kansas City	MO	0.9	No	0.0	No	0.0	No	0.0	1,422,441	0.6	$12,272,326	0.1	80420061	0.7	2434	0.2	2	4.0
1008	Pioneer Valley Transit Authority	Springfield	MA	0.9	No	0.0	No	0.0	No	0.0	582,637	0.5	$7,084,867	0.6	34911912	0.3	1886	0.1	3	2.0
5022	Toledo Area Regional Transit Authority	Toledo	OH	0.9	No	0.0	No	0.0	No	0.0	484,066	0.9	$4,474,007	1.5	26163809	0.8	2393	0.2	4	0.0
6006	Mass Transit Department - City of El Paso	El Paso	TX	0.9	No	0.0	No	0.0	No	0.0	725,195	0.2	$9,048,031	0.3	54023278	0.2	3310	0.6	3	2.0
9033	City of Tucson	Tucson	AZ	0.9	No	0.0	No	0.0	No	0.0	763,934	0.2	$11,318,394	0.0	66900877	0.4	2622	0.3	3	2.0
6018	Metropolitan Tulsa Transit Authority	Tulsa	OK	1.0	No	0.0	No	0.0	No	0.0	579,414	0.6	$3,612,587	2.1	16711858	1.8	2217	0.1	3	2.0
4093	Greensboro Transit Authority	Greensboro	NC	1.0	No	0.0	No	0.0	No	0.0	288,463	2.1	$3,631,122	2.1	20882969	1.2	2129	0.0	3	2.0
6019	City of Albuquerque Transit Department	Albuquerque	NM	1.0	No	0.0	No	0.0	No	0.0	708,613	0.3	$7,131,604	0.6	42810314	0.1	3165	0.5	3	2.0
4035	Central Florida Regional Transportation Authority	Orlando	FL	1.0	No	0.0	No	0.0	No	0.0	1,321,169	0.5	$24,583,550	1.2	109692028	1.4	2915	0.4	2	4.0
4002	Knoxville Area Transit	Knoxville	TN	1.0	No	0.0	No	0.0	No	0.0	473,403	0.9	$2,886,324	2.9	18998455	1.4	1394	0.5	3	2.0
4173	Piedmont Authority for Regional Transportation	Greensboro	NC	1.0	No	0.0	No	0.0	No	0.0	288,463	2.1	$2,823,786	3.0	7842033	4.9	2129	0.0	0	-1.0
5010	METRO Regional Transit Authority	Akron	OH	1.0	No	0.0	No	0.0	No	0.0	555,146	0.6	$4,460,467	1.5	38390590	0.2	1804	0.1	2	4.0
2	Spokane Transit Authority	Spokane	WA	1.0	No	0.0	No	0.0	No	0.0	363,829	1.5	$9,069,707	0.2	55630922	0.2	2542	0.2	7	3.0
6048	Capital Metropolitan Transportation Authority	Austin	TX	1.0	No	0.0	No	0.0	No	0.0	1,065,536	0.2	$19,560,324	0.7	153098076	2.3	3350	0.6	7	3.0
9027	Fresno Area Express	Fresno	CA	1.0	No	0.0	No	0.0	No	0.0	612,128	0.5	$5,085,318	1.2	44536676	0.0	4417	1.1	3	2.0
4029	Broward County Transit Division	Pompano Beach	FL	1.0	No	0.0	No	0.0	No	0.0	5,373,163	5.0	$20,318,797	0.8	116781518	1.5	4814	1.3	4	0.0
4037	Board of County Commissioners, Palm Beach County, PalmTran, Inc.	West Palm Beach	FL	1.0	No	0.0	No	0.0	No	0.0	5,373,163	5.0	$15,573,433	0.4	74441778	0.6	4814	1.3	4	0.0
4042	Birmingham-Jefferson County Transit Authority	Birmingham	AL	1.0	No	0.0	No	0.0	No	0.0	649,604	0.4	$3,772,957	2.0	23607398	1.0	1657	0.2	3	2.0
5119	City of Detroit Department of Transportation	Detroit	MI	1.0	No	0.0	No	0.0	No	0.0	3,674,952	3.1	$15,824,884	0.4	155004084	2.3	2913	0.4	4	0.0

Greater Richmond Transit Company (GRTC) Peers

TCRP Pre-set Peer Selection Process

PEER-GROUPING FACTORS (URBAN AREA CHARACTERISTICS)

NTD ID	Agency Name	Location	State	Total Likeness Score	State Capital	Likeness Score	Percent College Students	Likeness Score	Population Growth Rate	Likeness Score	Percent Low Income	Likeness Score	Annual Delay (hours) per Traveler	Likeness Score	Freeway Lane-Miles per Capita (000)	Likeness Score	Percent Service Demand Response	Likeness Score	Percent Service Purchased	Likeness Score	Distance	Likeness Score
3006	Greater Richmond Transit Company	Richmond	VA	0.0	Yes	0.0	33.8	0.0	9.69	0.0	14.1	0.0	29	0.0	1.23	0.0	0	0.0	0.37	0.0	0	0.0
5050	Indianapolis and Marion County Public Transportation	Indianapolis	IN	0.4	Yes	0.0	31.4	0.1	6.04	0.7	16.2	0.1	41	0.0	0.84	0.0	0	0.0	0.35	0.1	495.43	1.0
4027	Pinellas Suncoast Transit Authority	St. Petersburg	FL	0.4	No	1.0	35.2	0.0	4.21	1.1	12.7	0.1	38	0.0	0.47	0.0	0	0.0	0.49	0.6	129.76	0.3
3083	Transportation District Commission of Hampton Roads, dba: Hampton	Hampton	VA	0.5	No	1.0	28.4	0.2	3.81	1.2	12.1	0.2	43	0.0	0.66	0.0	0	0.1	0.23	0.7	73.01	0.2
4040	Jacksonville Transportation Authority	Jacksonville	FL	0.5	No	1.0	27.2	0.2	7.11	0.5	16.1	0.1	30	0.0	0.99	0.0	0	0.0	0.41	0.2	552.91	1.1
5016	Central Ohio Transit Authority	Columbus	OH	0.5	Yes	0.0	36.7	0.1	8.27	0.3	17.9	0.3	40	0.0	0.9	0.0	0	0.2	0.21	0.8	344.11	0.7
4004	Metropolitan Transit Authority	Nashville	TN	0.6	Yes	0.0	35.2	0.0	8.29	0.3	16.9	0.2	47	0.0	1.33	0.0	0	0.0	0.34	0.2	519.96	1.0
5012	Southwest Ohio Regional Transit Authority	Cincinnati	OH	0.6	No	1.0	32	0.1	1.62	1.6	15.1	0.1	37	0.0	0.89	0.0	0	0.4	0.14	1.1	397.08	0.8
4041	Hillsborough Area Regional Transit Authority	Tampa	FL	0.6	No	1.0	35.2	0.0	4.21	1.1	12.7	0.1	38	0.0	0.47	0.0	0	0.3	0	1.9	129.76	0.3
3010	Lehigh and Northampton Transportation Authority	Allentown	PA	0.6	No	1.0	26	0.3	8.47	0.2	13.4	0.1	30	0.0	0.72	0.0	1	0.5	0.59	1.1	245.07	0.5
5005	Metro Transit System	Madison	WI	0.6	Yes	0.0	48.8	0.4	6.31	0.7	16.6	0.2	20	0.0	0.82	0.0	0	0.2	0.35	0.1	736.32	1.5
4087	Durham Area Transit Authority	Durham	NC	0.7	No	1.0	48.6	0.4	11.24	0.3	22.1	0.6	23	0.0	3.12	0.0	0.48	0.3	0.3	0.3	132.03	0.3
5008	Milwaukee County Transit System	Milwaukee	WI	0.7	No	1.0	31.5	0.1	1.68	1.6	17	0.2	28	0.0	0.63	0.0	0.38	0.1	0.38	0.0	679.74	1.4
1048	Connecticut Department of Transportation - CTTRANSIT - Hartford Divi	Hartford	CT	0.7	Yes	0.0	33.7	0.0	3.65	1.2	13.4	0.1	38	0.0	1.08	0.0	0.00	0.7	0	1.9	387.84	0.8
1050	Greater Bridgeport Transit Authority	Bridgeport	CT	0.7	No	1.0	42.4	0.3	3.54	1.2	9.3	0.5	42	0.0	0.75	0.0	0.27	0.1	0.27	0.5	341.21	0.7
2002	Capital District Transportation Authority	Albany	NY	0.7	Yes	0.0	35.4	0.0	4.58	1.0	13.7	0.0	31	0.0	1.29	0.0	0.12	0.4	0.18	1.0	412.46	0.8
4046	Sarasota County Area Transit	Sarasota	FL	0.7	No	1.0	26.6	0.3	4.47	1.0	14	0.0	21	0.0	0.31	0.0	0.51	0.4	0.24	0.7	762.68	1.5
5033	Interurban Transit Partnership	Grand Rapids	MI	0.8	No	1.0	30.8	0.1	2.46	1.4	16.4	0.2	24	0.0	0.95	0.0	0.54	0.4	0.5	0.6	574.37	1.2
1001	Rhode Island Public Transit Authority	Providence	RI	0.8	Yes	0.0	28.9	0.2	-0.11	2.0	15	0.1	30	0.0	0.91	0.0	0.33	0.0	0.1	1.4	438.95	0.9
4110	Charleston Area Regional Transportation Authority	Charleston	SC	0.8	No	1.0	32	0.1	10.63	0.2	18.4	0.3	30	0.0	0.57	0.0	0.21	0.2	0.43	0.3	348.48	0.7
2113	Regional Transit Service, Inc. and Lift Line, Inc.	Rochester	NY	0.8	No	1.0	35.3	0.0	-0.15	2.0	17.9	0.3	28	0.0	0.87	0.0	0.15	0.4	0	1.9	392.31	0.8
5017	Greater Dayton Regional Transit Authority	Dayton	OH	0.8	No	1.0	26.3	0.3	-2.75	2.5	18.6	0.3	24	0.0	1	0.0	0.45	0.3	0	1.9	394.75	0.8
4003	Memphis Area Transit Authority	Memphis	TN	0.8	No	1.0	26	0.3	-0.22	2.0	21.5	0.5	38	0.0	0.69	0.0	0.26	0.1	0	1.9	712.73	1.4
7002	Transit Authority of Omaha	Omaha	NE	0.8	No	1.0	32.3	0.0	5.91	0.8	14.4	0.0	24	0.0	0.67	0.0	0.13	0.4	0.19	0.9	1023.13	2.1
6007	Fort Worth Transportation Authority	Fort Worth	TX	0.9	No	1.0	30.1	0.1	10.94	0.2	17.7	0.3	45	0.0	0.79	0.0	0.35	0.0	0.24	0.7	1147.05	2.3
6017	Central Oklahoma Transportation and Parking Authority	Oklahoma City	OK	0.9	Yes	0.0	27.5	0.2	9.02	0.1	18.4	0.3	38	0.0	1.13	0.0	0.26	0.1	0.14	1.2	1121.75	2.2
7005	Kansas City Area Transportation Authority	Kansas City	MO	0.9	No	1.0	34.3	0.0	4.46	1.0	15.3	0.1	27	0.0	1.47	0.0	0.28	0.1	0.23	0.7	934.26	1.9
1008	Pioneer Valley Transit Authority	Springfield	MA	0.9	No	1.0	26.2	0.3	1.57	1.6	15.2	0.1	28	0.0	0.88	0.0	0.44	0.2	1	3.1	411.59	0.8
5022	Toledo Area Regional Transit Authority	Toledo	OH	0.9	No	1.0	23.9	0.4	-3.77	2.7	22.5	0.6	26	0.0	0.81	0.0	0.34	0.0	0	1.9	435.64	0.9
6006	Mass Transit Department - City of El Paso	El Paso	TX	0.9	No	1.0	19	0.8	7.47	0.4	26.1	0.9	32	0.0	0.71	0.0	0.26	0.1	0.11	1.3	1685.47	3.4
9033	City of Tucson	Tucson	AZ	0.9	No	1.0	29.1	0.2	6.04	0.7	23	0.6	38	0.0	0.34	0.0	0.37	0.1	0	1.9	1922.93	3.9
6018	Metropolitan Tulsa Transit Authority	Tulsa	OK	1.0	No	1.0	28.7	0.2	3.78	1.2	16.7	0.2	32	0.0	1.54	0.0	0.43	0.2	0.46	0.4	1024.34	2.1
4093	Greensboro Transit Authority	Greensboro	NC	1.0	No	1.0	35.5	0.1	7.68	0.4	19.5	0.4	27	0.0	1.99	0.0	0.44	0.2	0.77	2.0	162.72	0.3
6019	City of Albuquerque Transit Department	Albuquerque	NM	1.0	No	1.0	30.7	0.1	18.46	1.8	19.9	0.4	29	0.0	0.55	0.0	0.29	0.1	0	1.9	1626.56	3.3
4035	Central Florida Regional Transportation Authority	Orlando	FL	1.0	No	1.0	30.2	0.1	14.15	0.9	17.5	0.2	45	0.0	0.78	0.0	0.46	0.3	0.54	0.8	654.04	1.3
4002	Knoxville Area Transit	Knoxville	TN	1.0	No	1.0	32	0.1	12.76	0.6	14.5	0.0	37	0.0	0.79	0.0	0.24	0.2	0	1.9	377.38	0.8
4173	Piedmont Authority for Regional Transportation	Greensboro	NC	1.0	No	1.0	35.5	0.1	7.68	0.4	19.5	0.4	27	0.0	1.99	0.0	0.00	0.7	0.43	0.3	162.72	0.3
5010	METRO Regional Transit Authority	Akron	OH	1.0	No	1.0	25.9	0.3	-2.64	2.5	19.4	0.4	23	0.0	0.88	0.0	0.43	0.2	0.22	0.8	328.15	0.7
2	Spokane Transit Authority	Spokane	WA	1.0	No	1.0	28.1	0.2	8.65	0.2	16	0.1	23	0.0	0.7	0.0	0.46	0.3	0.13	1.2	2122.25	4.2
6048	Capital Metropolitan Transportation Authority	Austin	TX	1.0	Yes	0.0	42.8	0.3	18.14	1.7	17.7	0.3	44	0.0	0.89	0.0	0.27	0.1	0.51	0.7	1261	2.5
9027	Fresno Area Express	Fresno	CA	1.0	No	1.0	21	0.6	10.31	0.1	26.9	0.9	15	0.0	0.46	0.0	0.33	0.0	0.33	0.2	2312.96	4.6
4029	Broward County Transit Division	Pompano Beach	FL	1.0	No	1.0	27.9	0.2	9.23	0.1	18	0.3	47	0.0	0.42	0.0	0.46	0.3	0.46	0.5	798.49	1.6
4037	Board of County Commissioners, Palm Beach County, PalmTran, Inc.	West Palm Beach	FL	1.0	No	1.0	27.9	0.2	9.23	0.1	18	0.3	47	0.0	0.42	0.0	0.64	0.6	0.64	1.3	798.49	1.6
4042	Birmingham-Jefferson County Transit Authority	Birmingham	AL	1.0	No	1.0	32.4	0.0	-2.11	2.4	18.2	0.3	35	0.0	1.25	0.0	0.28	0.1	0	1.9	593	1.2
5119	City of Detroit Department of Transportation	Detroit	MI	1.0	No	1.0	27.6	0.2	-5.85	3.1	19.3	0.4	40	0.0	0.59	0.0	0.01	0.6	0.38	0.0	460.93	0.9

Greater Richmond Transit Company (GRTC)- Motorbus Peers

TCRP Pre-set Peer Selection Process

					SCREENING FACTORS						PEER-GROUPING FACTORS (SERVICE AREA CHARACTERISTICS)									
NTD ID	Agency Name	Location	State	Total Likeness Score	Rail	Likeness Score	Rail Only	Likeness Score	Heavy Rail	Likeness Score	Urban Area Population	Likeness Score	Total Vehicle Miles Operated	Likeness Score	Total Operating Budget	Likeness Score	Population Density	Likeness Score	Service Area Type	Likeness Score
3006	Greater Richmond Transit Company	Richmond	VA	0.00	No	0.0	No	0.0	No	0.0	898,202	0.0	$4,739,603	0.0	37588748	0.0	2056	0.0	4	0.0
5050	Indianapolis and Marion County Public Transportation	Indianapolis	IN	0.44	No	0.0	No	0.0	No	0.0	1,292,590	0.4	$6,678,115	0.4	45189753	0.2	2338	0.1	3	2.0
4004	Metropolitan Transit Authority	Nashville	TN	0.51	No	0.0	No	0.0	No	0.0	812,083	0.1	$4,610,901	0.0	35232727	0.1	1885	0.1	2	4.0
4027	Pinellas Suncoast Transit Authority	St. Petersburg	FL	0.52	No	0.0	No	0.0	No	0.0	2,163,686	1.4	$8,796,952	0.9	50648033	0.3	3169	0.5	4	0.0
3083	Transportation District Commission of Hampton Roads, dba: Hampton R	Hampton	VA	0.54	No	0.0	No	0.0	No	0.0	1,447,582	0.6	$10,790,246	1.3	63294653	0.7	2748	0.3	4	0.0
1050	Greater Bridgeport Transit Authority	Bridgeport	CT	0.55	No	0.0	No	0.0	No	0.0	920,323	0.0	$2,270,383	1.1	17626022	1.1	1978	0.0	4	0.0
4040	Jacksonville Transportation Authority	Jacksonville	FL	0.57	No	0.0	No	0.0	No	0.0	945,064	0.1	$8,943,495	0.9	58107498	0.5	2302	0.1	3	2.0
5005	Metro Transit System	Madison	WI	0.59	No	0.0	No	0.0	No	0.0	350,318	1.6	$4,818,879	0.0	42090315	0.1	1558	0.3	3	2.0
4087	Durham Area Transit Authority	Durham	NC	0.60	No	0.0	No	0.0	No	0.0	320,155	1.8	$2,623,682	0.8	15762847	1.4	2042	0.0	4	0.0
5016	Central Ohio Transit Authority	Columbus	OH	0.62	No	0.0	No	0.0	No	0.0	1,226,871	0.4	$9,388,064	1.0	84005229	1.2	3085	0.5	3	2.0
4041	Hillsborough Area Regional Transit Authority	Tampa	FL	0.65	No	0.0	No	0.0	No	0.0	2,163,686	1.4	$7,660,741	0.6	57552928	0.5	3169	0.5	4	0.0
5012	Southwest Ohio Regional Transit Authority	Cincinnati	OH	0.65	No	0.0	No	0.0	No	0.0	1,527,580	0.7	$9,178,341	0.9	76195976	1.0	2274	0.1	4	0.0
4110	Charleston Area Regional Transportation Authority	Charleston	SC	0.66	No	0.0	No	0.0	No	0.0	468,414	0.9	$2,909,657	0.6	14302877	1.6	2029	0.0	3	2.0
3010	Lehigh and Northampton Transportation Authority	Allentown	PA	0.67	No	0.0	No	0.0	No	0.0	625,255	0.4	$2,550,016	0.9	18938399	1.0	2160	0.1	3	2.0
4046	Sarasota County Area Transit	Sarasota	FL	0.68	No	0.0	No	0.0	No	0.0	584,240	0.5	$2,755,411	0.7	12777454	1.9	2161	0.1	4	0.0
6017	Central Oklahoma Transportation and Parking Authority	Oklahoma City	OK	0.71	No	0.0	No	0.0	No	0.0	814,368	0.1	$2,493,849	0.9	17854491	1.1	2526	0.2	3	2.0
1048	Connecticut Department of Transportation - CTTRANSIT - Hartford Divisi	Hartford	CT	0.72	No	0.0	No	0.0	No	0.0	882,656	0.0	$6,459,786	0.4	59923475	0.6	1881	0.1	7	3.0
7002	Transit Authority of Omaha	Omaha	NE	0.73	No	0.0	No	0.0	No	0.0	663,662	0.4	$3,976,764	0.2	23006966	0.6	2931	0.4	3	2.0
1056	Connecticut Department of Transportation - CTTRANSIT Stamford Divisi	Hartford	CT	0.74	No	0.0	No	0.0	No	0.0	920,323	0.0	$1,526,012	2.1	14630503	1.6	1978	0.0	4	0.0
2002	Capital District Transportation Authority	Albany	NY	0.75	No	0.0	No	0.0	No	0.0	584,552	0.5	$7,177,726	0.5	62932755	0.7	2057	0.0	2	4.0
5033	Interurban Transit Partnership	Grand Rapids	MI	0.75	No	0.0	No	0.0	No	0.0	552,315	0.6	$4,441,248	0.1	27865308	0.3	2147	0.0	7	3.0
2113	Regional Transit Service, Inc. and Lift Line, Inc.	Rochester	NY	0.78	No	0.0	No	0.0	No	0.0	693,364	0.3	$5,186,194	0.1	56923868	0.5	2350	0.1	3	2.0
5017	Greater Dayton Regional Transit Authority	Dayton	OH	0.79	No	0.0	No	0.0	No	0.0	684,122	0.3	$5,029,242	0.1	33392429	0.1	2114	0.0	3	2.0
6007	Fort Worth Transportation Authority	Fort Worth	TX	0.81	No	0.0	No	0.0	No	0.0	4,599,251	4.1	$4,101,498	0.2	31490888	0.2	3269	0.6	4	0.0
4003	Memphis Area Transit Authority	Memphis	TN	0.83	No	0.0	No	0.0	No	0.0	969,962	0.1	$6,001,317	0.3	43410309	0.2	2426	0.2	3	2.0
4173	Piedmont Authority for Regional Transportation	Greensboro	NC	0.83	No	0.0	No	0.0	No	0.0	288,463	2.1	$1,986,863	1.4	7133111	4.3	2129	0.0	0	-1.0
5022	Toledo Area Regional Transit Authority	Toledo	OH	0.83	No	0.0	No	0.0	No	0.0	484,066	0.9	$2,885,309	0.6	19770384	0.9	2393	0.2	4	0.0
1001	Rhode Island Public Transit Authority	Providence	RI	0.84	No	0.0	No	0.0	No	0.0	1,173,207	0.3	$8,417,792	0.8	90532368	1.4	2330	0.1	7	3.0
4002	Knoxville Area Transit	Knoxville	TN	0.84	No	0.0	No	0.0	No	0.0	473,403	0.9	$2,408,291	1.0	16992743	1.2	1394	0.5	3	2.0
5008	Milwaukee County Transit System	Milwaukee	WI	0.84	No	0.0	No	0.0	No	0.0	1,330,926	0.5	$15,291,631	2.2	138015142	2.7	2733	0.3	4	0.0
1008	Pioneer Valley Transit Authority	Springfield	MA	0.86	No	0.0	No	0.0	No	0.0	582,637	0.5	$4,193,180	0.1	26734817	0.4	1886	0.1	3	2.0
6018	Metropolitan Tulsa Transit Authority	Tulsa	OK	0.9	No	0.0	No	0.0	No	0.0	579,414	0.6	$2,457,653	0.9	12595687	2.0	2217	0.1	3	2.0
1057	Norwalk Transit District	Norwalk	CT	0.92	No	0.0	No	0.0	No	0.0	920,323	0.0	$1,074,524	3.4	9126968	3.1	1978	0.0	4	0.0
7005	Kansas City Area Transportation Authority	Kansas City	MO	0.92	No	0.0	No	0.0	No	0.0	1,422,441	0.6	$7,819,840	0.6	68202542	0.8	2434	0.2	2	4.0
4042	Birmingham-Jefferson County Transit Authority	Birmingham	AL	0.93	No	0.0	No	0.0	No	0.0	649,604	0.4	$2,661,618	0.8	19675087	0.9	1657	0.2	3	2.0
4093	Greensboro Transit Authority	Greensboro	NC	0.94	No	0.0	No	0.0	No	0.0	288,463	2.1	$2,186,895	1.2	14562322	1.6	2129	0.0	3	2.0
5010	METRO Regional Transit Authority	Akron	OH	0.95	No	0.0	No	0.0	No	0.0	555,146	0.6	$2,998,578	0.6	30772666	0.2	1804	0.1	2	4.0
6006	Mass Transit Department - City of El Paso	El Paso	TX	0.95	No	0.0	No	0.0	No	0.0	725,195	0.2	$7,098,488	0.5	45209497	0.2	3310	0.6	3	2.0
6019	City of Albuquerque Transit Department	Albuquerque	NM	0.95	No	0.0	No	0.0	No	0.0	708,613	0.3	$5,216,204	0.1	35426132	0.1	3165	0.5	3	2.0
9027	Fresno Area Express	Fresno	CA	0.95	No	0.0	No	0.0	No	0.0	612,128	0.5	$3,893,426	0.2	38693929	0.0	4417	1.1	3	2.0
6022	Capital Area Transit System	Baton Rouge	LA	0.96	No	0.0	No	0.0	No	0.0	519,528	0.7	$1,540,957	2.1	11302970	2.3	1851	0.1	7	3.0
9033	City of Tucson	Tucson	AZ	0.99	No	0.0	No	0.0	No	0.0	763,934	0.2	$7,985,511	0.7	53296412	0.4	2622	0.3	3	2.0
2	Spokane Transit Authority	Spokane	WA	1.02	No	0.0	No	0.0	No	0.0	363,829	1.5	$5,539,541	0.2	43296209	0.2	2542	0.2	7	3.0
4037	Board of County Commissioners, Palm Beach County, PalmTran, Inc.	West Palm Beach	FL	1.02	No	0.0	No	0.0	No	0.0	5,373,163	5.0	$6,974,987	0.5	48853682	0.3	4814	1.3	4	0.0
6051	Corpus Christi Regional Transportation Authority	Corpus Christi	TX	1.02	No	0.0	No	0.0	No	0.0	318,561	1.8	$2,897,202	0.6	18262737	1.1	2888	0.4	7	3.0
4019	Transit Authority of Northern Kentucky	Fort Wright	KY	1.03	No	0.0	No	0.0	No	0.0	1,527,580	0.7	$2,878,651	0.6	16711136	1.2	2274	0.1	5	4.0
1014	Worcester Regional Transit Authority	Worcester	MA	1.04	No	0.0	No	0.0	No	0.0	448,821	1.0	$1,508,065	2.1	15481873	1.4	1793	0.1	2	4.0

Greater Richmond Transit Company (GRTC)- Motorbus Peers

TCRP Pre-set Peer Selection Process

PEER-GROUPING FACTORS (URBAN AREA CHARACTERISTICS)

NTD ID	Agency Name	Location	State	Total Likeness Score	State Capital	Likeness Score	Percent College Students	Likeness Score	Population Growth Rate	Likeness Score	Percent Low Income	Likeness Score	Annual Delay (hours) per Traveler	Likeness Score	Freeway Lane-Miles per Capita (000)	Likeness Score	Percent Service Demand Response	Likeness Score	Percent Service Purchased	Likeness Score	Distance	Likeness Score
3006	Greater Richmond Transit Company	Richmond	VA	0.00	Yes	0.0	33.8	0.0	9.69	0.0	14.1	0.0	29	0.0	1.23	0.0	0	0.0	0.37	0.0	0	0.0
5050	Indianapolis and Marion County Public Transportation	Indianapolis	IN	0.44	Yes	0.0	31.4	0.1	6.04	0.7	16.2	0.1	41	0.0	0.84	0.0	0	0.0	0.35	0.1	495.43	1.0
4004	Metropolitan Transit Authority	Nashville	TN	0.51	Yes	0.0	35.2	0.0	8.29	0.3	16.9	0.2	47	0.0	1.33	0.0	0	0.0	0.34	0.2	519.96	1.0
4027	Pinellas Suncoast Transit Authority	St. Petersburg	FL	0.52	No	1.0	35.2	0.0	4.21	1.1	12.7	0.1	38	0.0	0.47	0.0	0	0.0	0.49	0.6	129.76	0.3
3083	Transportation District Commission of Hampton Roads, dba: Hampton R	Hampton	VA	0.54	No	1.0	28.4	0.2	3.81	1.2	12.1	0.2	43	0.0	0.66	0.0	0	0.1	0.23	0.7	73.01	0.2
1050	Greater Bridgeport Transit Authority	Bridgeport	CT	0.55	No	1.0	42.4	0.3	3.54	1.2	9.3	0.5	42	0.0	0.75	0.0	0	0.1	0.27	0.5	341.21	0.7
4040	Jacksonville Transportation Authority	Jacksonville	FL	0.57	No	1.0	27.2	0.2	7.11	0.5	16.1	0.1	30	0.0	0.99	0.0	0	0.0	0.41	0.2	552.91	1.1
5005	Metro Transit System	Madison	WI	0.59	Yes	0.0	48.8	0.4	6.31	0.7	16.6	0.2	20	0.0	0.82	0.0	0	0.2	0.35	0.1	736.32	1.5
4087	Durham Area Transit Authority	Durham	NC	0.60	No	1.0	48.6	0.4	11.24	0.3	22.1	0.6	23	0.0	3.12	0.0	0	0.3	0.3	0.3	132.03	0.3
5016	Central Ohio Transit Authority	Columbus	OH	0.62	Yes	0.0	36.7	0.1	8.27	0.3	17.9	0.3	40	0.0	0.9	0.0	0	0.2	0.21	0.8	344.11	0.7
4041	Hillsborough Area Regional Transit Authority	Tampa	FL	0.65	No	1.0	35.2	0.0	4.21	1.1	12.7	0.1	38	0.0	0.47	0.0	0	0.3	0	1.9	129.76	0.3
5012	Southwest Ohio Regional Transit Authority	Cincinnati	OH	0.65	No	1.0	32	0.1	1.62	1.6	15.1	0.1	37	0.0	0.89	0.0	0.14	0.4	0.14	1.1	397.08	0.8
4110	Charleston Area Regional Transportation Authority	Charleston	SC	0.66	No	1.0	32	0.1	10.63	0.2	18.4	0.3	30	0.0	0.57	0.0	0.21	0.2	0.43	0.3	348.48	0.7
3010	Lehigh and Northampton Transportation Authority	Allentown	PA	0.67	No	1.0	26	0.3	8.47	0.2	13.4	0.1	30	0.0	0.72	0.0	0.59	0.5	0.59	1.1	245.07	0.5
4046	Sarasota County Area Transit	Sarasota	FL	0.68	No	1.0	26.6	0.3	4.47	1.0	14	0.0	21	0.0	0.31	0.0	0.51	0.4	0.24	0.7	762.68	1.5
6017	Central Oklahoma Transportation and Parking Authority	Oklahoma City	OK	0.71	Yes	0.0	27.5	0.2	9.02	0.1	18.4	0.3	38	0.0	1.13	0.0	0.26	0.1	0.14	1.2	1121.75	2.2
1048	Connecticut Department of Transportation - CTTRANSIT - Hartford Divisi	Hartford	CT	0.72	Yes	0.0	33.7	0.0	3.65	1.2	13.4	0.1	38	0.0	1.08	0.0	0.00	0.7	0	1.9	387.84	0.8
7002	Transit Authority of Omaha	Omaha	NE	0.73	No	1.0	32.3	0.0	5.91	0.8	14.4	0.0	24	0.0	0.67	0.0	0.13	0.4	0.19	0.9	1023.13	2.1
1056	Connecticut Department of Transportation - CTTRANSIT Stamford Divisi	Hartford	CT	0.74	Yes	0.0	42.4	0.3	3.54	1.2	9.3	0.5	42	0.0	0.75	0.0	0	0.7	0	1.9	341.21	0.7
2002	Capital District Transportation Authority	Albany	NY	0.75	Yes	0.0	35.4	0.0	4.58	1.0	13.7	0.0	31	0.0	1.29	0.0	0.12	0.4	0.18	1.0	412.46	0.8
5033	Interurban Transit Partnership	Grand Rapids	MI	0.75	No	1.0	30.8	0.1	2.46	1.4	16.4	0.2	24	0.0	0.95	0.0	0.54	0.4	0.5	0.6	574.37	1.2
2113	Regional Transit Service, Inc. and Lift Line, Inc.	Rochester	NY	0.78	No	1.0	35.3	0.0	-0.15	2.0	17.9	0.3	28	0.0	0.87	0.0	0.15	0.4	0	1.9	392.31	0.8
5017	Greater Dayton Regional Transit Authority	Dayton	OH	0.79	No	1.0	26.3	0.3	-2.75	2.5	18.6	0.3	24	0.0	1	0.0	0.45	0.3	0	1.9	394.75	0.8
6007	Fort Worth Transportation Authority	Fort Worth	TX	0.81	No	1.0	30.1	0.1	10.94	0.2	17.7	0.3	45	0.0	0.79	0.0	0.35	0.0	0.24	0.7	1147.05	2.3
4003	Memphis Area Transit Authority	Memphis	TN	0.83	No	1.0	26	0.3	-0.22	2.0	21.5	0.5	38	0.0	0.69	0.0	0.26	0.1	0	1.9	712.73	1.4
4173	Piedmont Authority for Regional Transportation	Greensboro	NC	0.83	No	1.0	35.5	0.1	7.68	0.4	19.5	0.4	27	0.0	1.99	0.0	0	0.7	0.43	0.3	162.72	0.3
5022	Toledo Area Regional Transit Authority	Toledo	OH	0.83	No	1.0	23.9	0.4	-3.77	2.7	22.5	0.6	26	0.0	0.81	0.0	0.34	0.0	0	1.9	435.64	0.9
1001	Rhode Island Public Transit Authority	Providence	RI	0.84	Yes	0.0	28.9	0.2	-0.11	2.0	15	0.1	30	0.0	0.91	0.0	0.33	0.0	0.1	1.4	438.95	0.9
4002	Knoxville Area Transit	Knoxville	TN	0.84	No	1.0	32	0.1	12.76	0.6	14.5	0.0	37	0.0	0.79	0.0	0.24	0.2	0	1.9	377.38	0.8
5008	Milwaukee County Transit System	Milwaukee	WI	0.84	No	1.0	31.5	0.1	1.68	1.6	17	0.2	28	0.0	0.63	0.0	0.38	0.1	0.38	0.0	679.74	1.4
1008	Pioneer Valley Transit Authority	Springfield	MA	0.86	No	1.0	26.2	0.3	1.57	1.6	15.2	0.1	28	0.0	0.88	0.0	0.44	0.2	1	3.1	411.59	0.8
6018	Metropolitan Tulsa Transit Authority	Tulsa	OK	0.9	No	1.0	28.7	0.2	3.78	1.2	16.7	0.2	32	0.0	1.54	0.0	0.43	0.2	0.46	0.4	1024.34	2.1
1057	Norwalk Transit District	Norwalk	CT	0.92	No	1.0	42.4	0.3	3.54	1.2	9.3	0.5	42	0.0	0.75	0.0	0.46	0.3	0.27	0.5	341.21	0.7
7005	Kansas City Area Transportation Authority	Kansas City	MO	0.92	No	1.0	34.3	0.0	4.46	1.0	15.3	0.1	27	0.0	1.47	0.0	0.28	0.1	0.23	0.7	934.26	1.9
4042	Birmingham-Jefferson County Transit Authority	Birmingham	AL	0.93	No	1.0	32.4	0.0	-2.11	2.4	18.2	0.3	35	0.0	1.25	0.0	0.28	0.1	0	1.9	593	1.2
4093	Greensboro Transit Authority	Greensboro	NC	0.94	No	1.0	35.5	0.1	7.68	0.4	19.5	0.4	27	0.0	1.99	0.0	0.44	0.2	0.77	2.0	162.72	0.3
5010	METRO Regional Transit Authority	Akron	OH	0.95	No	1.0	25.9	0.3	-2.64	2.5	19.4	0.4	23	0.0	0.88	0.0	0.43	0.2	0.22	0.8	328.15	0.7
6006	Mass Transit Department - City of El Paso	El Paso	TX	0.95	No	1.0	19	0.8	7.47	0.4	26.1	0.9	32	0.0	0.71	0.0	0.26	0.1	0.11	1.3	1685.47	3.4
6019	City of Albuquerque Transit Department	Albuquerque	NM	0.95	No	1.0	30.7	0.1	18.46	1.8	19.9	0.4	29	0.0	0.55	0.0	0.29	0.1	0	1.9	1626.56	3.3
9027	Fresno Area Express	Fresno	CA	0.95	No	1.0	21	0.6	10.31	0.1	26.9	0.9	15	0.0	0.46	0.0	0.33	0.0	0.33	0.2	2312.96	4.6
6022	Capital Area Transit System	Baton Rouge	LA	0.96	Yes	0.0	31.5	0.1	8.46	0.2	19.3	0.4	42	0.0	0.54	0.0	0.25	0.2	0.25	0.6	916.78	1.8
9033	City of Tucson	Tucson	AZ	0.99	No	1.0	29.1	0.2	6.04	0.7	23	0.6	38	0.0	0.34	0.0	0.37	0.1	0	1.9	1922.93	3.9
2	Spokane Transit Authority	Spokane	WA	1.02	No	1.0	28.1	0.2	8.65	0.2	16	0.1	23	0.0	0.7	0.0	0.46	0.3	0.13	1.2	2122.25	4.2
4037	Board of County Commissioners, Palm Beach County, PalmTran, Inc.	West Palm Beach	FL	1.02	No	1.0	27.9	0.2	9.23	0.1	18	0.3	47	0.0	0.42	0.0	0.64	0.6	0.64	1.3	798.49	1.6
6051	Corpus Christi Regional Transportation Authority	Corpus Christi	TX	1.02	No	1.0	21.2	0.6	8.38	0.3	19.4	0.4	14	0.0	1	0.0	0.32	0.0	0.45	0.4	1338.3	2.7
4019	Transit Authority of Northern Kentucky	Fort Wright	KY	1.03	No	1.0	32	0.1	1.62	1.6	15.1	0.1	37	0.0	0.89	0.0	0.21	0.2	0	1.9	397.08	0.8
1014	Worcester Regional Transit Authority	Worcester	MA	1.04	No	1.0	34.3	0.0	4.41	1.1	12.4	0.1	33	0.0	1.22	0.0	0.48	0.3	0.43	0.3	445.3	0.9

Appendix 5A: Congestion Mitigation Research

This Appendix contains a summary of the literature review on congestion mitigation in the Commonwealth, specifically:

- Short-list of potential congestion mitigation measures
- Summary of two relevant congestion mitigation programs
- Summary of regional data sources in the Commonwealth for congestion mitigation
- Review of additional data sources in the Commonwealth for congestion mitigation

Short-List of Potential Congestion Mitigation Performance Measures

Parsons Brinkerhoff developed a short-list of the following potential congestion mitigation measures for initial presentation to the Working Group:

- Percentage of residents in transit supportive areas
- Annual delay per traveler
- Freeway lane miles per capita
- Number of automobile trips eliminated
- Change in automobile vehicle-miles traveled

The Working Group dismissed percentage of transit supportive areas and other possible land use measures since they are relatively poor measures of congestion mitigation and only take into account the minimum thresholds of service provisions.

Relevant Congestion Mitigation Programs

Parsons Brinckerhoff reviewed two transit funding programs that apply congestion mitigation performance measures:

- **Northern Virginia:** The Virginia Department of Transportation (VDOT) program requires intensive data collection and the use of travel demand modeling and simulation in order to applying congestion mitigation performance measures to evaluate significant capital transportation projects in Northern Virginia. Under the new program, highway and transit Measures of Effectiveness (MOE) are developed through project peer reviews. The program requires quantification of the MOEs identified for analysis and a significant level of effort to prioritize and assess each project.

  The Working Group determined that the program provided helpful background on new approaches in the Commonwealth but was ultimately dismissed as an option given the extensive data collection burden on agencies if DRPT attempted a similar statewide approach.

- **Toronto, Canada:** Metrolinx in Toronto is in the process of updating metrics for evaluating transit capital extension projects. Metrolinx is considering travel time savings and on-time performance (reliability).

Similar to the VDOT program, the Working Group determined that the Metrolinx program provided helpful on approaches to transit funding for congestion mitigation but was ultimately dismissed from further consideration given that the program was primarily designed for capital transit projects.

After reviewing the short-list of potential congestion measures and transit funding programs, the Working Group determined that congestion mitigation was an important goal of the study and requested further information on available data in the Commonwealth. The subsequent review of available data is documented below.

Regional Data Sources

Additional research conducted for the Working Group focused specifically on congestion-related data sources available in the Commonwealth on a statewide or regional basis. The Working Group suggested incorporating the underlying data requirements under the Moving Ahead for Progress in the 21st Century Act (MAP-21) to allocate funds for congestion mitigation in the Commonwealth. The requirements, including collection and documentation of congestion data, currently apply to four areas of the Commonwealth. This section summarizes the congestion mitigation performance measures that overlap in three of the four areas. The performance measures do not consistently address transit congestion, instead focusing on roadway congestion mitigation in each area. Background research on MAP-21 congestion mitigation requirements is detailed below.

MAP-21

MAP-21 designates areas with a population greater than 200,000 as Transportation Management Areas (TMAs). TMAs are required to develop and implement a Congestion Management Process (CMP) that must be updated every two years at a minimum. A CMP is a systematic and regionally accepted approach for managing congestion that provides information on transportation system performance and that assesses alternative congestion management strategies.[13]

The process includes the following:

- Development of congestion management objectives
- Establishment of measures of multimodal transportation system performance
- Collection of data system performance monitoring in order to define the extent and duration of congestion and determine the cause of congestion
- Identification of congestion management strategies
- Implementation activities, including identification of an implementation schedule and possible funding sources for each strategy
- Evaluation of the effectiveness of implemented strategies

Using CMPs as a threshold for a potential Congestion Mitigation program would limit the burden of data collection and would directly target the most populated, and most congested, areas of the Commonwealth. Identifying performance measures similar to each of the CMPs would allow the Congestion Mitigation program to use data that is already being collected by the most congested regions of the Commonwealth.

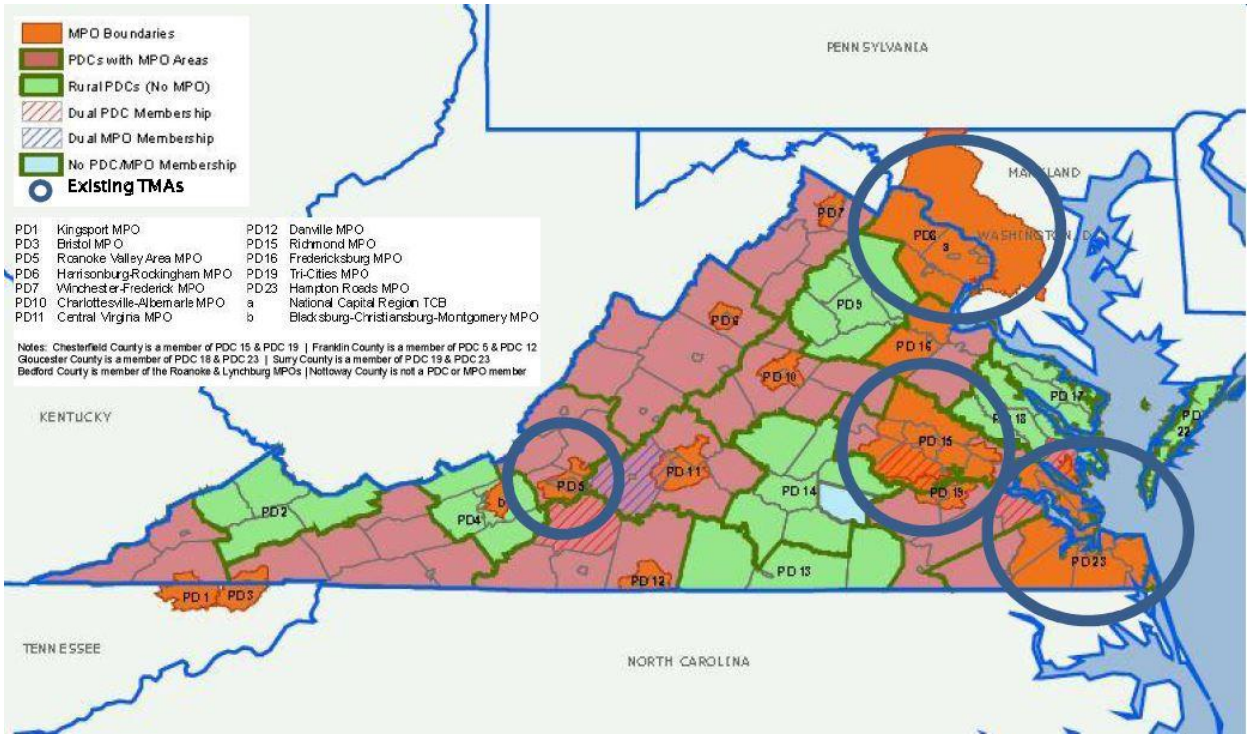
[13] FHWA, *Congestion Management Process: A Guidebook*, April 2011.

Transportation Management Areas (TMAs)

The Commonwealth of Virginia includes the following four TMAs, circled in blue in Figure 5A.1:

- Roanoke Valley
- Richmond
- Hampton Roads
- National Capital

Figure 5A.1 Existing TMAs in the Commonwealth of Virginia



Although a CMP is required for all TMAs, there is no specific methodology for its implementation. As a result, each TMA in the Commonwealth has approached its CMP differently. For instance, Roanoke Valley just recently became a TMA according to 2010 Census data. As required by MAP-21, the new TMA submitted its first CMP in January 2014. The Roanoke Valley CMP analyzed congestion primarily through Google traffic and public input surveys, an approach unique to the Roanoke Valley CMP. The remaining three CMPs present similarities to one another in terms of data sources and performance measures, detailed below.

Similar TMA Performance Measures

The Richmond, Hampton Roads, and National Capital CMPs each measure and report the following congestion mitigation performance measures:

- Annual Hours of Delay per Traveler
- Travel Time Index
- Annual Delay Increase if Public Transportation Service where Discontinued
- Level of Service

- Congestion Hours per Day
- Average Travel Time

The 2012 Texas Transportation Institute (TTI) Annual Urban Mobility Study reported the following measures for the Richmond, Hampton Roads, and National Capital TMAs:

- Annual Hours of Delay per Traveler
- Travel Time Index
- Annual Delay Increased if Public Transportation Service where Discontinued

The Working Group ultimately dismissed the TMA concept and requested research on a implementing a strategy that took into account available congestion data and allowed for the participation by all transit agencies in the Commonwealth, spurring development of the ultimate congestion mitigation recommendation of the Working Group. Additional research conducted in support of this recommendation is detailed in the section below, along with background on available data sources for both roadway and transit congestion performance measures.

Additional Data Sources in the Commonwealth

Two sources were identified that provide immediately available statewide data, the American Community Survey (ACS) Census Tract Level Data and the National Transit Database (NTD). However, neither of the statewide sources currently provides adequate congestion performance measures.

The following data sources were identified that are available on a regional basis:

- **FHWA's Transportation Technology Innovation and Demonstration (TTID) Program:** The TTID program was enabled by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFTEA-LU) to advance deployment of intelligent transportation infrastructure. The program is mentioned briefly in the National Capital CMP. The TTID provides vehicle volume information and is only available on major corridors and arterials. Vehicle speeds collected by the Vehicle Probe project and volumes offered by the TTID program are integrated in the National Capital CMP to provide critical performance measures such as person- or vehicle- delay, Vehicle Miles Traveled (VMT).

- **I-95 Vehicle Probe Project**: The I-95 Vehicle Probe Project provides comprehensive and continuous travel time information on freeways and arterials using probe technology. There are 7,000 centerline freeway miles and more than 20,000 freeway and arterial miles in all, including continuous coverage of the I-95 corridor from New Jersey to Florida.

- **Skycomp Aerial Surveys:** Skycomp is an aerial freeway monitoring program using aerial photography surveys. The National Capital Region's freeway monitoring program has been traditionally based on this. The region is monitored once every 3 years, most recently in 2011. Data is collected during AM and PM peak periods for four good weather days. This data is generally less accurate than INRIX and VDOT data.

- **INRIX:** INRIX is private traffic data collection firm that records real-time speed data, as well as historical and predictive traffic information, for over 260,000 miles of freeways and arterials throughout the nation's 100 largest metropolitan areas and most of the nation's entire limited-access roadway network. In Hampton Roads, INRIX data is available on over 1,100 miles of roadway,

including all freeways and most principal and minor arterials. VDOT has purchased real-time and archived travel time and speed data from INRIX. Access to this data is provided to various organizations throughout the Commonwealth — including Hampton Roads — through the Regional Integrated Transportation Information System (RITIS). The TTI report also uses the INRIX data source, among others, to evaluate congestion mitigation annually in the United States.

- **VDOT Traffic Data:** VDOT Traffic Data is collected from sensors in or along streets and highways and other sources. Using this data, one can estimate the average number of vehicles that traveled each road segment, daily vehicle miles traveled for specific groups of facilities, and vehicle types. The data is included on major corridors and arterials and is limited at the rural level. This data can be used to calculate Level of Service (LOS) and Congested Hours per Day.

Roadway LOS Research: Prior to excluding roadway congestion from consideration, the Working Group favored LOS over all other roadway congestion performance measures on the short-list of available data sources. Additional research on roadway LOS in the Commonwealth was presented to the Working Group for consideration.

VDOT collects and estimates annual average daily traffic (AADT) in the Commonwealth at the corridor level, which can be accessed through the Virginia Traffic Monitoring System (TMS) database. VDOT also maintains capacity information, such as number of lanes, at the corridor level, which can be accessed through the Virginia Statewide Planning System (SPS) database. Using these two data sources, the volume over capacity (v/c) ratio can be calculated to determine corridor-level LOS. The peak hour can be estimated using the K factor. LOS definitions according to the 2010 Highway Capacity Manual are shown in Table 5A.1.

Table 5A.1 2010 Highway Capacity Manual LOS Description

LOS	Description	Congestion Level	
A	*Free traffic flow with low volumes and high speeds. Speeds controlled by driver desires, speed limits, and physical roadway conditions. Vehicles almost completely unimpeded in their ability to maneuver within the traffic stream.*	*Low*	
B	*Stable traffic flow, with operating speeds remaining near free flow. Drivers still have reasonable freedom to maneuver with only slight restrictions within the traffic stream.*	*Low*	
C	*Stable flow, but with higher volumes, more closely controlled speed and maneuverability that is noticeably restricted.*	*Moderate*	
D	*Approaching unstable flow with tolerable operating speeds maintained, but considerably effected by changes in operating conditions. Freedom to maneuver within the traffic stream is more noticeably limited.*	*Moderate*	

LOS	Description	Congestion Level	
E	*Unstable flow with low speed and momentary stoppages. Operations are at capacity with no usable gaps within the traffic stream.*	*Severe*	
F	*Forced flow with low speed. Traffic volumes exceed capacity and stoppage for long periods is possible.*	*Severe*	

Given the limited and inconsistent available congestion data for all transit agencies in the Commonwealth, the Working Group determined that performance measures should be suggested and not required within a discretionary program application. The Working Group also determined that the goal of the task should be focused on transit congestion mitigation, requesting that roadway congestion be dropped from further consideration.

Appendix 6A: Review of Potential Transit Dependent Measures

General background on transit dependent needs in the Commonwealth was presented to the Working Group for consideration. The following potential transit dependent measures were discussed:

- Percent of households in service area without vehicles
- Percent of population too young to drive
- Percent of population in service area at poverty level
- Percent of elderly/disabled population in service area
- Percent of households' income used for transit

Data Sources: Some data is only available on an individual agency-basis, including on-board survey data and Geographic Information Systems (GIS). Only two sources were identified with immediate statewide availability: American Community Survey (ACS) and the National Transit Database (NTD).

ACS data is accurate to the individual census tract, but must be aggregated over a 5-year collection period to be statistically valid in rural areas. NTD data, on the other hand, only includes agencies required to report that are recipients or beneficiaries of grants from the Federal Transit Administration (FTA).

Table 6A.1 summarizes the performance metrics analyzed as part of the literature review and the rating of each metric (in terms of Good, Average, or Poor) based on its relevance to TSDAC goals, the required data collection effort, and the consistency of definition across agencies of different types and sizes. The "Overall Score" is based on the lowest score received by each metric among the aspects analyzed.

Table 6A.1 Qualitative Rating of Performance Measures (Good, Average, Poor)

Category	Metric	Data source	Relevance to TSDAC Goals	Ease of Data Collection	Consistency of Definition	Overall Score
Demographic Percent within Service Area	*Percent of Households in Service Area without a Vehicle*	Census (ACS)	Must be combined to include transit dependent definition Single – P Combined – G	**G**	**G**	**G**
	Percent of Persons in Service Area not Taking Car, Truck, Van, or Motorcycle to Work Last Week (Bus or Trolley, Bus, Streetcar, or Trolley Car, Subway or Elevated, Other Methods)	Census (ACS)		**G**	**A**	**A**
	Percent of Persons in Service Area Having Difficulty Doing Errands Alone because of a Physical, Mental, or Emotional Condition	Census (ACS)		**G**	**G**	**G**
	Percent of Persons in Service Area with Total Income in the Past 12	Census (ACS)		**A**	**A**	**A**

Category	Metric	Data source	Relevance to TSDAC Goals	Ease of Data Collection	Consistency of Definition	Overall Score
	Months Being under the Poverty Level					
	Percent of Persons in Service Area under Driving Age and Elderly	Census (ACS)		**A**	**A**	**A**
Public Transit	*Number of Passenger Trips for Transit Dependent*	NTD and Census (ACS)	**A**	**A**	**A**	**A**
	Transit Service Level per Capita	NTD and Census (ACS)	**A**	**A**	**A**	**A**

Appendix 6B: Title VI and Environmental Justice Review

Title VI of the Civil Rights Act of 1964 is a federal statute that prohibits discrimination by recipient of federal financial assistance on the basis of race, color, and national origin. Environmental Justice (EJ) Executive Order 12898 requires agencies to identify and address disproportionately high and adverse health or environmental effects on minority populations and low-income persons. These policies have complementary, but distinct objectives.

The objective of Title VI is to:

- Ensure the level and quality of transit service is provided in a nondiscriminatory manner
- Promote full and fair participation in public transit decision-making without regard to race, color, or national origin
- Ensure meaningful access to transit-related programs and activities by persons with limited English proficiency (LEP)

Title VI requires that all transit agencies receiving federal funds, including state and local agencies, comply with the following requirements:

- Provide Title VI assurances
- Develop Title VI program
- Notify beneficiaries of Title VI protection
- Develop Title VI complaint procedures and forms
- Record and report investigations, complaints, lawsuits
- Prepare public participation plan, including LEP outreach
- Provide for minority representation in governance
- Assist and monitor sub-recipients
- Apply Title VI equity analysis to locate facilities
- Provide additional information upon request

In addition, fixed-route transit service providers must meet the following Title VI requirements as summarized in Table 6B.1.

Table 6B.1 Title VI Fixed-Route Transit Service Requirements

Requirement	Fixed-Route Transit Providers	Fixed-Route Transit Providers Operating 50 or More Peak Vehicles Located in UZA with Population of 200,000 or more
Set systemwide standards and policies	Required	Required
Collect and report data	Not required	Required: Service profile maps/charts, Survey data of demographics, travel patterns
Evaluate service and fare equity changes	Not required	Required
Monitor transit service	Not required	Required

Title VI service standards require that:

- "No person or group of persons shall be discriminated against with regard to the routing, scheduling, or quality of service of transportation service furnished as a part of the project on the basis of race, color, or national origin."

- "Frequency of service, age and quality of vehicles assigned to routes, quality of stations serving different routes, and location of routes may not be determined on the basis of race, color, or national origin."

Service standards required of fixed-route transit agencies with greater than 50 peak vehicles and UZAs with populations greater than 200,000 include vehicle load by mode (ratio of passengers to total seats per vehicle), vehicle headway by mode, on-time performance, and service availability (general distribution of routes within service area). Service policies include distribution of transit amenities and vehicle assignment by mode.

When evaluating service and changes, Title VI requires a development of written procedures to determine any discriminatory impacts of major service and fare changes. A threshold must be defined for major service changes and disparate impacts. The impact on persons in protected classes must be proportional to persons not in protected classes. This includes race, color, and national origin monitored for disparate impact. Low income riders are not considered a protected class for Title VI, but a disproportionate burden may be reviewed for EJ compliance. Alternatives must be examined to minimize disparate impacts. If service changes occur, the analysis must be redone. The equity analysis is reviewed and approved by a Board.

Agencies may need to review the impact of service and fare changes on protected classes if grant-funded services cannot be sustained after state funds expire. This requirement only applies to larger agencies and is defined by agency thresholds for major service changes and disparate impact. If there is no disparate impact, the service may be changed. If there is a disparate impact, an analysis must be completed on alternate service plans in order to mitigate impact on protected classes and low-income individuals.

Additional state requirements under Title VI include the following:

- Comply with Title VI general requirements
- Comply with Title VI in state transit planning and program administration activities
- Prepare maps comparing distribution of state and federal funds to minority populations
- Analyze disparate impacts of fund distribution on basis of race, color, or national origin
- Describe planning process and fund distribution procedures and engagement of minority populations

Parsons Brinkerhoff determined that targeted funding programs could help the Commonwealth improve service to Title VI protected classes, low income persons, and other transit dependent populations. Additional analysis of service and fare impacts may be required by some agencies depending on the scope of the changes. Title VI does not preclude targeted funding programs—or the future elimination of such programs, should future funding be insufficient—as long as the required analysis is completed.