Transportation Planning Capacity Building (TPCB) Peer Program

"Effective Practices in Title VI Transit Equity Analysis for Major Transit Service and Fare Changes"

A TPCB Peer Roundtable

Location:	Memphis, Tennessee
Date:	May 24, 2011
Host Agency:	American Public Transportation Association (APTA) Bus & Paratransit Conference
Peer Agencies:	Metro Transit (Metro), Minneapolis-St. Paul, Minnesota Metropolitan Atlanta Rapid Transit Authority (MARTA), Atlanta, Georgia Washington Metropolitan Area Transit Authority (WMATA), Washington, DC
Federal Agencies:	Federal Transit Administration (FTA) U. S. Department of Transportation (DOT), Volpe National Transportation Systems Center (Volpe Center)

U.S. Department of Transportation
Federal Highway Administration • Federal Transit Administration

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- Public outreach and involvement should be a core component of a meaningful Title VI transit equity analysis.
- The data gathered and analysis conducted for a transit equity report can benefit other aspects of a transit agency or planning agency's work.
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I. Introduction

This report summarizes key themes from a roundtable discussion on "Effective Practices in Title VI Transit Equity Analysis for Major Transit Service and Fare Changes" held in conjunction with the American Public Transportation Association (APTA) Bus and Paratransit Conference in Memphis, Tennessee on May 24, 2011.

The half-day roundtable involved representatives from the Federal Transit Administration (FTA), Metro Transit from Minneapolis-St. Paul, the Metropolitan Atlanta Rapid Transit Authority (MARTA), and Washington Metropolitan Area Transit Authority (WMATA), as well as 15 participants from local governments, transit agencies, universities, and advocacy organizations to discuss effective practices in Title VI transit equity analysis for major transit service and fare changes.

The event was sponsored by the Transportation Planning Capacity Building (TPCB) Program, which aims to advance the state of the practice in multimodal transportation planning nationwide. The TPCB Program is jointly funded by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA).

II. Background on Title VI and Transit Equity Analysis

FTA's mission includes ensuring non-discriminatory, equitable, accessible and safe public transportation, enhancing the social and economic quality of life for people with disabilities.

Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d) provides that "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal Financial assistance."

FTA issued Circular 4702.1A, with "Title VI and Title VI-Dependent Guidelines for Federal Transit Administration Recipients" on April 13, 2007.[1] This circular provides FTA's recipients and sub-recipients with guidance and instructions on how to implement U.S. DOT's Title VI regulations (49 CFR, Part 21). The Circular also contains guidance on how to integrate the U.S. DOT's Order on Environmental Justice (Order 6510.2) into their programs and activities, and articulates responsibilities for accommodating people with limited English proficiency (LEP) (70 FR 74087).

All FTA recipients who receive Urbanized Area Formula Program (5307) funds and are located in an urbanized area of 200,000 or more must perform a Title VI transit equity analysis whenever a major service or fare change is proposed, to prevent disparate impact and treatment of minority and low-income populations in their service area. Specifically, transit agencies must "evaluate significant system-wide service and fare changes and proposed improvements at the planning and programming stages to determine whether those changes have a discriminatory impact." Detailed guidance on conducting service and fare equity analyses is found in Chapter V of the Circular (noted above).

On March 8, 2011, FTA Administrator Peter Rogoff issued a "Dear Colleague" letter reminding FTA recipients and sub-recipients of the importance of fully complying with Title VI and all U.S. civil rights laws and regulations. In April 2011, FTA issued procedural guidance augmenting the Circular for conducting service and fare equity analyses (*see Appendix B*)[2]. In order to disseminate the new guidelines and assist recipients in understanding their Title VI obligations, FTA developed an online training module and is offering workshops and webinars throughout 2011.

[1] FTA published notice of revisions to the Title VI Circular in the *Federal Register* on Sept. 29, 2011. See www.fta.dot.gov/FTAInformationSessions for more information.

[2] These guidelines are also available online at http://www.fta.dot.gov/civilrights/title6/civil_rights_11704.html at the bottom of the page under "NEW."

Please see the FTA Office of Civil Rights website for dates of upcoming training events, or to join FTA's Title VI e-mail listserve.

III. Overview of the Transit Equity Roundtable

In response to the March 8th "Dear Colleague" letter and the release of FTA's new Title VI guidelines in April 2011, APTA organized a peer roundtable to discuss transit equity analysis with key FTA and transit agency staff around the country. APTA organized the event in conjunction with its annual Bus and Paratransit Conference in Memphis, TN. The roundtable was open to all conference attendees.

The goals of the transit equity roundtable were to:

- Provide an overview of FTA's Title VI requirements and expectations, in light of FTA's new guidelines on conducting equity analysis for major service and fare changes.
- Highlight notable practices and methodologies for how transit agencies may conduct a Title VI transit equity analysis of major service and fare changes.
- Demonstrate that there are various methods and approaches for conducting a rigorous and meaningful Title VI transit equity analysis.
- Provide planning staff from various transit agencies an opportunity to interact with and learn from one another's work, as well as to engage FTA's Office of Civil Rights staff to better understand and comply with new guidelines concerning Title VI transit equity analysis.

The roundtable was co-moderated by the Chair and Vice Chair of APTA's Environmental Justice/Title VI Subcommittee:

- **James P. Burke** Chair, APTA Environmental Justice/Title VI Subcommittee and Former Chief, Public Transit Division, City and County of Honolulu Department of Transportation
- **Patrisha Piras**, Vice chair, APTA Environmental Justice/Title VI Subcommittee and Principal/Director, Pat Piras Consulting

Roundtable panelists included the FTA Office of Civil Rights Team Lead for Title VI, Equal Employment Opportunity (EEO), and Disadvantaged Business Enterprise (DBE), as well as senior planning staff from transit agencies in Minneapolis, Atlanta, and Washington, DC:

- **Amber Ontiveros,** Title VI, EEO, DBE (TED) Team Leader, FTA Office of Civil Rights
- **Johnny Dunning** APTA Labor Relations Subcommittee/Senior Director of Transit System Planning, MARTA
- **Kristin Haldeman**, Manager, Access Planning & Policy Analysis, Office of Long Range Planning, WMATA
- **Jason Podany** Transit/GIS Planner, Metro Transit

The three peer agencies were invited to participate in the roundtable due to their rigorous analysis and notable practices, as identified by senior Civil Rights staff at FTA. The session ran for 3.5 hours and included a mix of presentations, question and answer, and facilitated dialogue.

IV. Key Themes

The peer roundtable opened with an overview of FTA's new Title VI transit equity analysis guidelines, released in April 2011. Then planning staff from transit agencies in Minneapolis, Atlanta, and Washington DC gave presentations to highlight their agency's methods and approach to Title VI transit equity analysis. Question and answer followed the presentations, as well as dialogue facilitated by the Chair and Vice-Chair of APTA's EJ Sub-Committee.

Several key themes stood out from the presentations and discussion:

- There is no "one-size-fits-all" approach for conducting a rigorous transit equity analysis.
- There are various sources and types of data that agencies may use to conduct a transit equity analysis.
- There are multiple tools and methods available for agencies to make a rigorous transit equity analysis.
- Public outreach and involvement should be a core component of a meaningful Title VI transit equity analysis.
- The data gathered and analysis conducted for a transit equity report can benefit other aspects of a transit agency or planning agency's work.
- Agencies may enhance their transit equity reports by integrating information and goals that go beyond a strict focus on Title VI.
- It is important to spend the time to define key terms carefully because they shape the resulting analysis.
- If the results of a Title VI analysis reveal a disparate impact, additional analysis and documentation is required.

There is no "one-size-fits-all" approach for conducting a rigorous transit equity analysis. There are various ways to approach a Title VI transit equity analysis. FTA's Title VI Circular outlines two options – Option A and Option B. Option A is to follow a predetermined methodology laid out in section V-4 of the Title VI Circular. Option B is for recipient agencies to design their own methodology and analysis tools.

Many agencies select Option B in order to tailor their methods to local needs and conditions, but both options are valid. Each agency should select an option and develop a methodology that works for its own context, resources, and needs. For smaller agencies with fewer staff and resources, following the steps articulated in Option A may be the most effective and economical approach to take. For larger agencies with more staff, access to more data and resources, and the capacity to develop their own data (e.g., rider surveys) and analysis methods, developing a detailed methodology and approach that is tailored to their specific data, resources, contexts and needs may be preferable.

There are various sources and types of data that agencies may use to conduct a transit equity analysis. Ideally a transit equity analysis draws on a variety of geographic and demographic data sources, but FTA's Title VI Circular does not specify that agencies use one kind of data or data source over another. Potential data sources include, but are not limited to:

- US Decennial Census / American Community Survey (ACS) for service area population demographic data.
- Transit boarding information from automated passenger counters (APCs) and farebox information.
- Transit agency geographic data (e.g., location of routes and stops), schedule, and level of service data to see which census tracks are served and at what level.

- Overlays of major activity centers and other non-discretionary destinations (e.g., hospitals, clinics, government/social agencies) to help designate LifeLine routes.
- Rider surveys to better understand rider origins and destinations (O&D).
- US Census Longitudinal Employer Household Dynamics data which links an individual's home Census Block with their work Census Block.
- Requested trips data generated by customers using Online Trip Planners to get an idea of where people come from and want to go.

MARTA, **Metro Transit**, and **WMATA** each use all of the data types listed above to prepare their Title VI transit equity analysis.

There are multiple tools and methods available for agencies to use in conducting a rigorous transit equity analysis. FTA does not require that agencies use one tool or method over another to perform their equity analysis. Some agencies will use a purely statistical analysis that relies on tables and spreadsheets, and demographic data from the Census. Other agencies with access to geographically referenced data will build geographic information systems (GIS) applications and use maps that visually depict changes to the routes and areas/demographics served. Geographic and statistical tools may be used separately or in combination, and the kind of data that agencies have will impact the methods and tools they are able to use. Though agencies have a choice in what type of methodology to develop and analytical tools to employ, FTA stresses that recipients need to make "apples to apples" comparisons in their analysis. This means that changes in transit headways should be compared to changes in headways, not service availability (and vice versa).

- **MARTA**, **WMATA**, and **Metro Transit** all use a combination of geographic and statistical tools and methods in their transit equity analyses.

Public outreach and involvement should be a core component of a meaningful Title VI transit equity analysis. At a minimum, agencies must involve the public in reviewing and refining its adopted policy to define a "major service change." Additional value may be gained by involving stakeholders and members of the public, especially those directly impacted by proposed changes, throughout the process.

- **MARTA** had a "learning moment" when it took a proposed route change out for public input after its 2010 equity analysis was conducted. As background, MARTA faced a $60 million budget shortfall in 2010 and had to develop a mix of internal cost savings, service reductions, and fare increases to address the shortfall. After the analysis was conducted, the agency proposed eliminating a route along a segment where there was alternate bus service a ¼ mile away, assuming that riders would be able to walk the extra ¼ mile to use the alternate service. Seniors and people with disabilities at the public input meeting explained that MARTA could not assume that they were capable of walking an extra ¼ mile due to the existence of hilly terrain in that area. Because of this qualitative input, MARTA chose not to eliminate the service.

- In the spring of 2010, **WMATA** developed a menu of options for closing a $189 million funding gap it faced and performed a detailed Title VI transit equity analysis to examine the potential impacts that would result from each. The options included service changes and fare adjustments on all three modes in the WMATA system. Since the menu of options was so broad, it even included some proposals that conflicted with one another, such as what would happen if WMATA reduced the mode transfer fee and what would happen if WMATA increased it? Staff gathered data on all the proposals and conducted an analysis showing the impacts of each on minority and low-income ridership, but waited to pull the analysis into a "package" until further guidance was given as to how the final budget proposal would be developed. This guidance was received when WMATA took all the options out to public hearings and conducted an online survey on its website, with the public overwhelmingly choosing a fare increase over service cuts. The survey provided

the public with background information on what each of the changes was and how it would impact riders, then solicited public opinion on which options WMATA should adopt. The WMATA Board then deliberated over the elements of the fare proposal, with staff analyzing Title VI impacts for each revised package.

The data gathered and analysis conducted for a transit equity report can benefit other aspects of a transit agency or planning agency's work. Peer agencies reported that the data gathered, tools/methods used, and analysis conducted for Title VI can have many positive spill-over effects on other aspects of their work. For example, equity analysis information could be used to improve future service plans or to provide documentation upfront that may help to streamline the National Environmental Policy Act (NEPA) review and documentation process for new services and projects. It could also be a tool for better engaging and understanding transit-dependent customers' needs. Used internally, equity analysis may help in developing inter-office partnerships that promote a "Title VI mindset" or culture throughout the agency. Examples cited by peers include:

- **WMATA** uses Title VI data and analysis tools in its service planning, as well as for corridor development studies. WMATA staff reported that "being able to estimate and know the impacts of new service makes our plans so much better."

  Metro Transit uses Title VI data and analysis tools for other parts of project planning that go beyond route planning.

- **At MARTA,** the Planning Department works closely with the Equal Employment Opportunity (EEO) program. This partnership has helped to create a "Title VI mindset" agency-wide.

- **WMATA** has an internal partnership between its Office of Civil Rights, Office of General Counsel, and Office of Long Range Planning that collaborates on the agency's Title VI matters.

Agencies may enhance their transit equity reports by integrating information and goals that go beyond a strict focus on Title VI. In addition to defining required terms such as "major service change" and "minority route," MARTA also adopted a set of Guiding Principles to help frame its Title VI Analysis. These principles were to:

- Preserve lifeline services.
- Preserve transit as a viable lifestyle choice.
- Maintain equity and connectivity.
- Consider impacts to paratransit service.

MARTA found using these principles to be a valuable tool for engaging the public to communicate the goals of the equity analysis, as well as an important reference to guide decisionmaking about which service and/or route change alternatives to implement once the Title VI analysis was complete.

It is important to spend the time to define key terms carefully because they shape the resulting analysis. How key terms are defined will impact the quality and results of an equity analysis, so it is important to consider options and develop meaningful terms. Some of the key terms that must be defined in a Title VI analysis are "major service change," "minority route," "low-income route", and "adverse impact."

FTA guidance requires that recipient transit agencies adopt a policy that defines what constitutes a "major service change" and that agencies involve the public in developing that definition (*see Appendix B*). Other key terms and concepts, such as what constitutes a "low-income route" or "low-income areas served by existing routes" are developed internally and may vary from agency to agency. Terms like "adverse impact" and "disproportionate impact" are also defined by agencies internally, and may vary.

- **Defining "Service Change:"** All three peer agencies define "major service change" as any service change that qualifies for a public hearing.
    - For **Metro Transit**, public hearings are required whenever there is a greater than 25% reduction in route miles for any set of routes being modified within a corridor, the abolishment of an existing transit route without replacement, and the restructuring of transit service throughout a sector as defined by Metro Transit.
    - For **WMATA**, public hearings are required for any fare or rate increase. For service changes, WMATA has a defined set of parameters for bus service changes that trigger a public hearing:
        - Revenue Miles – One or more reductions in a single year that represent a total reduction in that year of more than 20% of a line's scheduled revenue miles, or
        - Route Miles – One of more reductions in a single year that represent a total reduction in that year of more than 15% of a line's route miles, or
        - Span of Service – One or more reductions in a single year that represent a total reduction in that year of more than one hour in the hours of service on a line, or
        - Boardings – One or more eliminations of service in a year for more than 10% of a line's current riders.
    - For **MARTA**, public hearings are required for:
        - The establishment of a new bus route to include initial service alignment and headway parameters for that route.
        - A substantial geographical alteration: Addition or deletion of more than one and one-half (1.5) directional miles on a given bus route.
        - The elimination of any bus service not under "demonstration project" status.
        - A major modification which causes a 25 percent or greater reduction in the number of daily trips provided on a given bus route.
        - Implementation of a new bus service.
- **Defining "Low-Income" and "Minority" Route:** Directly defining "low-income routes" or "minority routes" is rare, because few agencies collect demographic data about their riders at the individual route level. Instead analysis tends to focus on identifying low-income and minority areas served by transit routes, and then analyzing whether service or fare changes lead to adverse or disproportionate impacts in those areas. Low-income and minority areas are typically defined using census blocks for minority data and census block groups for low-income (these are the smallest census divisions for which the data is available) that are served by the transit route in question.
    - The regional average of low-income residents in **Metro Transit's** service area is 6.8 percent and the regional average of minority residents in its service area is 17 percent. As such, Metro defines a "low-income area" as any census division it serves with more than 6.8 percent low-income residents and a "minority area" as any census division it serves with more than 17 percent minority residents. Use of Census division geographies vary depending on the analysis or project. Minority Census data is available down to the Block level and low-income data is available at the Blockgroup level.

- **WMATA** has collected demographic data on bus ridership through an on-board survey. It also collected income data on rail ridership from a passenger survey. For minority information about rail riders, WMATA used place of residence information gathered from its rail survey, and spatially joined (GIS) it with census data on minority status at the TAZ level. In this way, staff was able to apply demographics to trip-making patterns. WMATA used a similar approach with its paratransit data – joining place of residence data with actual trips.

- **Defining "Disproportionate Impact:" Metro Transit** uses the "4/5ths Rule" (also known as the "80 Percent Rule") to define "disproportionate impact." This is based on the standard used by the U.S. Department of Labor, U.S. Department of Justice, and U.S. Equal Opportunity Commission to identify violations of fair labor and hiring practices. Under the 4/5ths Rule, it is assumed that a minority group should have an employment rate of no less than 80 percent of a non-minority group. By this standard, the difference in levels of service or fare changes between minority and non-minority, or low-income and non-low-income should not be less than 4/5ths.

If the results of a Title VI analysis reveal a disparate impact, additional analysis and documentation is required. The key question that each transit agency must answer in its equity analysis is: "Do the resulting service and fare changes, based on your definitions, reveal a disparate impact on minority or low-income populations?" If the answer is "no," no further analysis is needed. If the answer is "yes," then further analysis is needed.

There are two conditions under which a disparate impact identified in the equity analysis may be allowed:

1. The change meets a substantial need that is in the public interest, or
2. The alternatives would have more severe adverse impacts than the preferred alternative.

If the change is determined to have a disparate impact but neither of the above tests are met, the transit agency must document how it plans to avoid, minimize, or mitigate those impacts on minority and low-income populations. Examples could include:

- Alignment or frequency changes to nearby routes or services to offer more convenience to affected area/s.
- Expansion of demand-responsive service to the affected area/s.
- Creation or expansion of a guaranteed ride home program to serve the affected area/s.
- Internal cost containment strategies or other budgetary actions to limit the impacts on riders.

V. About the Transportation Planning Capacity Building (TPCB) Program

The Transportation Planning Capacity Building (TPCB) Program is a joint venture of the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) that delivers products and services to provide information, training, and technical assistance to the transportation professionals responsible for planning for the capital, operating, and maintenance needs of our nation's surface transportation system. The TPCB Program website (www.planning.dot.gov) serves as a one-stop clearinghouse for state-of-the-practice transportation planning information and resources. This includes over 70 peer exchange reports covering a wide range of transportation planning topics.

The TPCB Peer Program advances the state of the practice in multi-modal transportation planning nationwide by organizing, facilitating, and documenting peer events to share noteworthy practices among state departments of transportation (DOTs), Metropolitan Planning Organizations (MPO), transit agencies, and local and Tribal transportation planning agencies. During peer events, transportation planning staff interact with one another to share information, accomplishments, and lessons learned from the field and help one another overcome shared transportation planning challenges.

VI. Appendix

A. Key Event Contacts

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B. FTA's Final Service and Fare Equity Analysis Guidelines, April 27, 2011

As indicated in FTA Circular 4702.1A ("Circular") and reinforced in the March 8, 2011 "Dear Colleague" letter, any FTA recipient whose service area contains 200,000 or more residents must conduct a Title VI transit equity analysis in the course of planning a major service change or any magnitude of fare change. Equity analyses are required regardless of whether proposed changes would be detrimental or beneficial to riders on the whole: a service expansion or fare decrease must be evaluated according to a similar process as a service reduction or fare increase. Financial exigencies and other special circumstances do not exempt recipients from the requirement to conduct equity analyses.

This questionnaire augments the guidance provided in the Circular concerning the structure and content of equity analyses. Careful, detailed analyses that follow one of the two processes outlined in Section V.4 of the Circular and respond to the considerations posed in this questionnaire will help FTA comply with Title VI by ensuring that its programs and services do not discriminate on the basis of race, color or national origin. Regardless of approach, FTA may reject equity analyses that do not address the key questions posed in Section V.4 of the Circular or that reflect unsound or incomplete analysis.

A. Major Service Change Policy

1. What is your agency's policy as to what constitutes a major service change? Does the policy specify quantitative thresholds in terms of both percentage and absolute changes? Also, does the policy specify the levels of public involvement for different magnitudes of service change?
2. How were the types of service changes contained in the policy chosen and corresponding thresholds set? How was the public engaged in the development of the policy?
3. How does your agency define "minority" (in aggregate) and "low-income"?
4. When does your agency deem a "disparate impact" to occur in the contexts of service reductions and expansions? In particular, what are your agency's policy thresholds (in terms of absolute numbers or proportions) for identifying disparate impacts? (Exhibits 2 and 3 of this questionnaire contain hypothetical thresholds, but these are not intended to serve as guidance.) Do the thresholds differ by mode?

B. Analysis Approach

1. What dataset(s) will you use in this analysis? What techniques and/or technologies were used to collect the data?
2. At what geographic levels will you assess disparate impacts? For instance, will you provide conclusions for your agency's entire service area, for individual lines that are proposed to be changed and/or at another level? Alternatively, will you be contrasting changes to lines that your agency has designated as "minority" and/or "low-income" against others? If so, indicate the factors used to characterize a route as "minority" or "low-income."[3]
3. At what geographic level (Census tract, block group, TAZ, etc.) will you be measuring minority and low-income concentrations? How will you define who is impacted by a change?
4. Within which population will you identify disparate impacts? For instance, will it be overall ridership or residents of your service area?
5. Will you follow Option A or Option B as outlined in Section V.4 of the Circular? In either case, provide a step-by-step description of the analytical methodology you will follow to determine whether the proposed changes would have a disparate impact on low-income and/or minority populations.

C. Considerations for a Service Equity Analysis

[3] The prior version of the Circular (Circular 4702.1, May 1988) defined a minority transit route as "a route that has at least 1/3 of its total route mileage in a census tract(s) or traffic analysis zone(s) with a percentage of minority population greater than the percentage of minority population in the transit service area."

1. As part of your analysis, detail the major service changes whose impacts you are analyzing. How do the changes qualify as major, as defined by your major service change policy, and thus require an equity analysis?
2. How would the proposed service changes impact low-income and minority populations at the geographic level(s) you identified in Section B of this questionnaire?
    - GIS maps of proposed changes overlaid upon demographic data, as detailed under Option A in Section V.4 of the Circular, offer a useful visual tool; see Exhibit 1 for an example.
    - Impacts associated with each type of route or service change – such as routing, service frequency, service hours and addition or elimination of routes – should also be presented in tabular format where possible, as shown in Exhibits 2 and 3.
    - Assessment of the impacts of service span changes should be based on existing ridership data where possible. See Exhibit 4 for an example.
    - In the case of a service improvement, accrual of benefits should be compared for minority, low-income and overall populations, ideally based on current ridership. Exhibit 5 provides an example of an analysis of benefits based on travel time changes.
    - If your agency operates multiple modes of service but the proposed major service changes would only affect one mode, an equity analysis should be performed at the modal level based on the proportions of low-income and minority ridership for each mode. See Exhibit 6 for an example.
3. If service is proposed to be reduced, what alternative services are available for minority and low-income populations that would be impacted by the service change? How would use of these alternatives affect riders' travel times and costs?
    - Alternatives could include other lines or services, potentially involving transfers and/or other modes, which connect affected riders with destinations that they commonly access.
4. If service is proposed to be reduced, what measures is your agency considering to mitigate, minimize and/or offset disparate impacts to minority and low-income populations? Which would be implemented prior or concurrent to the reduction?
    - Depending on the nature of impacts, service-related mitigation strategies could include alignment or frequency changes to nearby lines or services to offer more convenient access to affected areas, expansion of demand-response service in affected areas or implementation of a guaranteed ride home program.
    - Detail other budgetary actions your agency is taking to limit impacts to riders, such as internal cost-containment strategies.
    - Describe any plans your agency has developed to restore service as additional funds become available.
5. If service is proposed to be expanded but low-income and/or minority populations are not expected to benefit from the expansion, what other measures has your agency taken or does it intend to take throughout its service area to improve service to these populations?
6. What are your conclusions as to the impact of the proposed service changes on low-income and minority populations?
    - In the case of service reductions, if you determine that a disparate impact exists, how does the action meet a substantial need that is in the public interest? How would alternative strategies have more severe adverse effects than the preferred alternative?
    - In the event that your agency's program of service improvements and expansions is not expected to yield benefits for low-income or minority populations at least commensurate with those for other riders, what is your agency's rationale for this approach?

Exhibit 1. GIS map depicting proposed route changes and nearby minority and low-income concentrations.

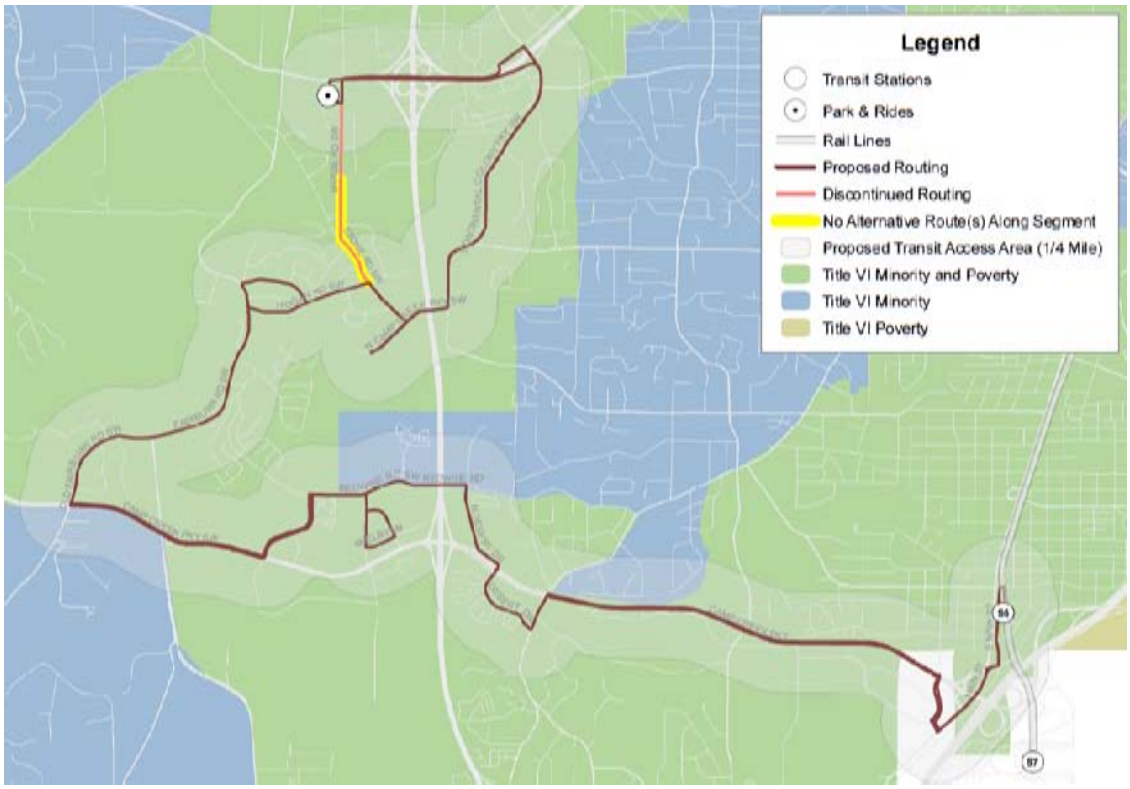


Exhibit 2. Analysis by type of service change.

Type of service change	Minority proportion of population		Low-income proportion of population	
	Tracts along lines	All tracts	Tracts along lines	All tracts
Routing	38.9%	34.3%	13.7%	12.2%
Headways	27.5%	34.3%	11.0%	12.2%
Route discontinuation	30.6%	34.3%	12.8%	12.2%

In the table above, an agency has analyzed the cumulative impacts of each type of proposed service change on low-income and minority populations in its service area. The analysis is based on tract-level Census demographic data and therefore does not reflect ridership directly. The agency considers a

disparate impact to occur when the concentration of minority or low-income populations affected by a type of service change exceeds the corresponding group's average concentration throughout the agency's service area by any percentage. (This is one example of a policy threshold for identifying a disparate impact; other examples in this questionnaire outline additional approaches.)

The agency determined the concentrations of impacted low-income and minority populations according to the following formulas:

> Minority proportion along lines = Minority population in tracts along affected lines ÷ Total population in the same set of tracts
>
> Low-income proportion along lines = Low-income population in tracts along affected lines ÷Total population in the same set of tracts

The average concentrations of minority and low-income populations throughout the entire service area were determined as follows:

> Minority proportion across all tracts = Total minority population in service area÷ Total service area population
>
> Low-income proportion across all tracts = Total low-income population in service area÷ Total service area population

Based on the agency's threshold for disparate impacts, the proposed routing changes would have disparate impacts on minority and low-income populations. Additionally, proposed route discontinuations would have a disparate impact on low-income populations.

Exhibit 3. Analysis of service level changes to routes defined as minority and non-minority.

Average headway (minutes)	Existing		Proposed		Absolute Change (minutes)		Percentage Change	
	Minority Routes	Non-Minority Routes	Minority Routes	Non-Minority Routes	Minority Routes	Non-Minority Routes	Minority Routes	Non-Minority Routes
Weekday Peak	23.5	22.7	23.8	22.9	0.3	0.2	1.3%	0.9%
Weekday Midday	25.9	27.5	27.2	28.3	1.3	0.8	5.0%	2.8%
Weekday Evening	28.4	31.0	31.5	33.4	3.1	2.4	10.9%	7.2%
Saturday	35.4	36.9	36.3	38.0	0.9	1.1	2.5%	3.0%
Sunday	42.2	45.2	44.7	46.4	2.5	1.2	5.9%	2.7%

In the table above, an agency has assessed how proposed service changes would affect average headways on routes that it has classified as "minority" and "non-minority." (See the list of definitions at the end of this questionnaire for more information on the use of such classifications.) Here, the proposed increases in headways are slightly greater for minority routes than non-minority routes during most service periods, although service on minority routes would remain slightly more frequent at most times.

The agency's determinations concerning disparate impacts would depend on its established policy thresholds. If the agency defines a disparate impact to occur when the difference in average headway changes between minority and non-minority routes exceeds five minutes or 10 percent, for instance, the proposed changes would not yield a disparate impact during any service period. The agency would also find no disparate impact if its sole criterion were that average headways on minority routes not be more

than five minutes greater during any service period than those on non-minority routes. On the other hand, if the agency considered any change that impacted average headways along minority routes more than those along non-minority routes to constitute a disparate impact, regardless of the resulting service levels, then the proposed headway changes would cause disparate impacts during all periods other than Saturdays.

Exhibit 4. Analysis of service span changes.

As in Examples 2 and 3, service span analyses may be based on impacts to riders of affected trips or through categorizations of routes as "minority" or "low-income." An example of each follows.

Impacts to riders of affected trips

Type of service change	Ridership on affected trips			Overall ridership	
	Total Boardings	% Minority	% Low-Income	% Minority	% Low-Income
Service span (reduction of entire trips)	24	62.5%	75.0%	73.7%	61.4%

Here, an agency that currently operates service into the late evening has proposed to discontinue all trips that begin after 10pm. In this example, the agency's ridership is now the basis of its analysis, not the populations of adjacent zones. Demographic data based on profiles of ridership is preferable for span of service analyses; population figures may be used if ridership data is unavailable.

As shown in the table above, the proposed span of service changes would heavily and disproportionately impact low-income riders: they account for a plurality of riders on the trips proposed for discontinuation and are more highly represented on these trips than they are among overall ridership. However, the ridership that would be affected by the service span change is fairly small, particularly if it is divided over a number of trips. The agency's policy thresholds, which should address both proportional differences and the magnitude of an impact, would determine whether these proposed changes would have a disparate impact.

The proposed span of service changes would affect minority ridership less significantly, both in terms of the number of affected riders and relative to this group's overall use of the system. Given that minorities account for the majority of riders, though, such observations do not automatically translate into a determination of no disparate impact for changes that would affect a proportion of minority riders smaller than that of the agency's overall ridership. A disproportionately high and adverse effect on minority and/or low-income populations may occur if one or both of these groups predominantly bears the adverse effects of a proposed change, regardless of the effect on non-minority or non-low income populations. Therefore, agencies whose ridership or service area population is largely minority and/or low-income should be careful to establish policy thresholds that do not mask disparate impacts.

Impacts by income classification of routes

Average span of service (hours)	Existing		Proposed		Absolute Change (hours)		Percentage Change	
	Low-Income Routes	Higher-Income Routes	Low-Income Routes	Higher-Income Routes	Low-Income Routes	Higher-Income Routes	Low-Income Routes	Higher-Income Routes
Weekday	16.6	16.2	16.1	16.1	-0.5	-0.1	-3.0%	-0.6%
Saturday	16.1	14.7	15.8	14.5	-0.3	-0.2	-1.9%	-1.4%
Sunday	14.8	13.2	13.9	12.9	-0.9	-0.3	-6.1%	-2.3%

In this case, an agency proposes to reduce spans of service on all days for both low-income and higher-income routes. As in Exhibit 2, the changes would impact low-income routes more heavily than higher-income routes on each day of service, but lower-income routes would still offer at least as great of an average span of service on each day. The agency's determination of disparate impacts would again depend on its policy thresholds, including consideration of the differences in service levels following the changes.

Exhibit 5. Analysis of benefits associated with a service improvement.

Average travel time by ridership group (minutes)	Existing bus service	New fixed-guideway	Change	
			Absolute (minutes)	Percentage
Minority	57.1	48.8	-8.3	-14.5%
Low-income	58.6	50.3	-8.3	-14.2%
Overall	62.1	53.8	-8.3	-13.4%

In this example, an agency has analyzed travel time changes associated with the replacement of a point-to-point express bus route with a fixed-guideway line that serves the same two points. Travel times were derived from current riders' origin and destination locations and routings. Given no intermediate stops, the absolute travel time savings for all groups of users are identical. For low-income and minority riders, the service improvement offers slightly greater proportional travel time savings than for overall ridership given lower average travel times initially. Even if minority and low-income riders did not benefit as much as others, the results would not necessarily constitute a disparate impact: not every service improvement can be expected to benefit low-income and minority populations uniformly with other groups. Rather, as indicated in Section A of this questionnaire, evaluations of who benefits from service improvements and by how much may occur at a broader (such as systemwide or sub-regional) level.

Exhibit 6. Analysis of changes by mode.

Mode	Minority proportion of ridership		Low-income proportion of ridership	
	This mode	System	This mode	System
Commuter rail	24.4%	52.6%	2.2%	38.0%
Heavy rail	42.5%	52.6%	26.7%	38.0%
Bus	60.9%	52.6%	47.8%	38.0%

In this example, an agency plans to implement a series of service changes to its heavy rail lines only; no other services would be directly affected. The proposed changes include span of service and headway adjustments on each heavy rail line on each day of service. Based on passenger survey data, the agency has developed a profile (see table above) of each mode's ridership as well as system averages for reference's sake.

Based on this analysis, the agency could conclude that implementing service changes solely to heavy rail service would not have a disparate impact insofar as heavy rail does not represent a majority of minority or low-income riders. However, the agency may also opt to analyze the proposed changes in greater detail, as impacts to low-income and minority populations may differ by line.

D. Considerations for a Fare Equity Analysis

1. As part of your analysis, detail the proposed fare changes whose impacts you are analyzing.
    - Changes can often be summarized in a table, as shown in Exhibit 7.
2. How would the proposed fare changes impact low-income and minority riders?
    - A profile of fare usage by group – low-income, minority and overall ridership – as shown in Exhibit 7 can provide a useful summary if such data is available.

- If the changes would only affect certain modes, the analysis should address whether focusing changes on those modes may lead to a disparate impact. An analysis similar to that presented in Exhibit 6 could be conducted in such a scenario.

3. What alternative fare payment options are available for people that would be impacted by the fare change, particularly low-income and minority riders? Are the media affordable to these groups and, if so, how did you determine this? Are the media readily available to these groups, with vendors located in areas that would be convenient to impacted populations? Are the alternatives that you are proposing discounted comparably to other options?
4. What measures is your agency considering to mitigate, minimize and/or offset disparate impacts on minority and low-income populations? Which would be implemented prior or concurrent to the reduction?
    - If your agency proposes to introduce a new fare medium, the affordability, availability and discount considerations discussed in the previous point apply.
    - If low-income riders would be impacted by a proposed fare increase, strategies could include providing discounts on pass sales to social-service agencies so that the agencies' clients can continue to obtain passes affordably.
    - The timing and amount of fare increases could be changed so as to be less burdensome. For instance, a fare increase scheduled to occur prior to the holiday season could be postponed until early in the following year. Staggered small fare increases may also be more palatable to riders than a single large increase.
    - Marketing of fare payment options to low-income and minority riders may also be considered in the event of a fare increase.
5. What are your conclusions as to the impact of the proposed fare changes on low-income and/or minority populations? If you determine that a disparate impact exists, how does the action meet a substantial need that is in the public interest? How would alternative strategies have more severe adverse effects than the preferred alternative?

Exhibit 7. Analysis of fare changes.

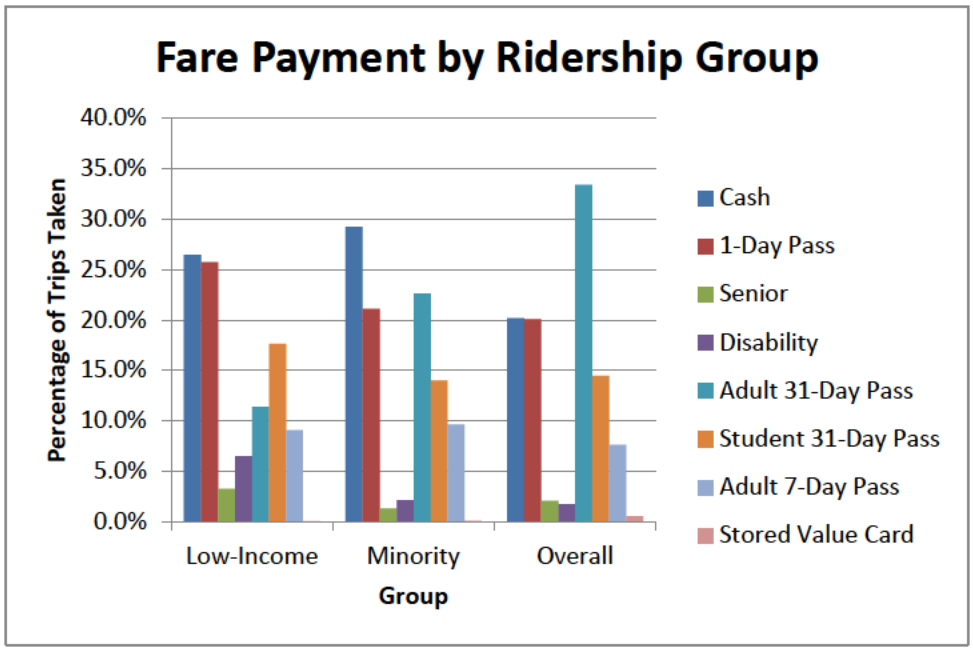
Count	**Cost**		**Change**		**Usage by Group**		
Fare type	**Existing**	**Proposed**	**Absolute**	**Percentage**	**Low-Income**	**Minority**	**Overall**
Cash	$1.50	$2.00	$0.50	33.3%	308,287	402,021	451,152
1-Day Pass	$4.50	$5.50	$1.00	22.2%	299,880	290,456	448,907
Senior	$0.50	$0.75	$0.25	50.0%	37,536	17,681	46,077
Disability	$0.50	$1.00	$0.50	100.0%	75,440	29,280	38,600
Adult 31-Day Pass	$57.00	$63.00	$6.00	10.5%	132,720	311,225	746,769
Student 31-Day Pass	$30.00	$35.00	$5.00	16.7%	205,708	192,661	323,150
Adult 7-Day Pass	$15.00	$17.00	$2.00	13.3%	105,831	132,135	170,300
10-Ride Card	$13.50	$18.00	$4.50	33.3%	184	780	11,400
Total					**1,165,586**	**1,376,239**	**2,236,355**

% of Total	**Cost**		**Change**		**Usage by Group**		
Fare type	**Existing**	**Proposed**	**Absolute**	**Percentage**	**Low-Income**	**Minority**	**Overall**
Cash	$1.50	$2.00	$0.50	33.3%	26.4%	29.2%	20.2%
1-Day Pass	$4.50	$5.50	$1.00	22.2%	25.7%	21.1%	20.1%
Senior	$0.50	$0.75	$0.25	50.0%	3.2%	1.3%	2.1%
Disability	$0.50	$1.00	$0.50	100.0%	6.5%	2.1%	1.7%
Adult 31-Day Pass	$57.00	$63.00	$6.00	10.5%	11.4%	22.6%	33.4%

Student 31-Day Pass	$30.00	$35.00	$5.00	16.7%	17.6%	14.0%	14.4%
Adult 7-Day Pass	$15.00	$17.00	$2.00	13.3%	9.1%	9.6%	7.6%
Stored Value Card	$13.50	$18.00	$4.50	33.3%	0.0%	0.1%	0.5%
Total					**100.0%**	**100.0%**	**100.0%**

Here, an agency has presented a fare increase proposal and determined fare median usage for low-income, minority and overall ridership from a rider survey. Although a price increase is proposed for all fare media, certain media used disproportionately by low-income and/or minority riders (such as cash fares, one-day passes and disability fares) are proposed for more substantial price increases than other media used more commonly by other riders (particularly the adult 31-day pass). While the changes appear to affect low-income and minority riders more adversely than other riders, the agency's ultimate determination of disparate impacts would depend on its policy thresholds, as in previous examples.

Charting fare payment by ridership group (as shown below) can be a useful early step in a fare equity analysis to understand how fare medium usage varies between low-income riders, minority riders and overall ridership. Comparing fare payment patterns for minority versus non-minority and low-income versus higher-income riders can yield even clearer depictions of differences that should be considered when developing fare change proposals.



Definitions

Data Sets

American Community Survey (ACS): The ACS, which has replaced the long-form of the decennial United States Census, provides estimates of total population as well as population by ethnicity and income level. ACS five-year estimates, currently available for the 2005-09 period, are available at small geographies appropriate to an equity analysis, namely the block group and tract levels.

See the description of Census data below for additional considerations.

Automatic passenger counter (APC): APCs provide counts of passengers getting on and off transit vehicles; APCs are commonly linked to automatic vehicle location (AVL) systems so that boardings and

alightings can be analyzed for each stop and by time of day. While APC data alone offers no demographic characteristics of individual riders, it can be useful for assessing localized impacts of a proposed service change on ridership.

Census: The United States Census provides a count of total population and population by ethnicity on a decennial basis (every ten years); the most recent Census occurred in 2010. The block group or tract level is most suitable for an equity analysis as these geographies tend to be fairly small, especially in densely developed areas. Data on population by income level is no longer collected as part of the decennial Census; income data from the 2000 Census or more recent estimates from the American Community Survey (see above) may be used instead.

Some jurisdictions may conduct their own supplemental or special censuses. Data from these censuses may be used as well.

While Census or ACS data can be useful for service equity analyses, population data should not be confused with ridership. Entire tracts or block groups may not correspond to areas from which a route draws riders, and many factors beyond population influence ridership. Ethnicity and income data collected through a passenger survey can also provide the basis for an equity analysis provided that the survey sample is representative of and appropriately scaled to overall ridership.

Farebox/faregate: Many transit agencies now use computerized fareboxes and faregates that record ridership and the types of fare media used. This data can be analyzed to establish a fare payment profile for overall ridership; ridership data collected through fareboxes and faregates can also be used to assess the impacts of eliminating certain trips or reducing hours of service.

Rider survey: Surveys of transit riders can yield useful demographic, travel pattern and fare-payment data that can be applied to equity analyses. While surveys typically only reach a sample of riders, results can be extrapolated to overall ridership through statistical analysis provided that segments of overall ridership were adequately represented. Data from a recent rider survey that included questions on ethnicity, income level, ridership patterns (such as common trips) and fare medium usage could be used to address most, if not all, considerations required in a fare or service equity analysis.

Service Planning Definitions

These terms may arise in the context of service standards or proposed fare or service changes.

Alignment: the routing of a transit line, which carries an associated length. For bus service, the extent of an alignment change can be expressed in terms of mileage or as a percentage of the alignment's length. A 25-percent alignment change to a line would correspond to 25 percent of the length of the current routing being adjusted or eliminated.

Average fare revenue: the amount of fare revenue that an agency collects per boarding on a line, for a mode or throughout a system. The average fare revenue may be significantly less than the advertised cash fare given discounts associated with transfers, passes and stored-value cards.

Cost per rider: the total cost of providing service divided by the number of passenger boardings. Cost per rider may be measured at the system level, incorporating all operating costs incurred by the agency; by mode, incorporating all costs associated with operation of that mode (but perhaps excluding administrative costs); or by line, based on assignment of certain categories of cost to each hour operated, mile traveled and/or vehicle used to provide service. Cost per rider may be used as a service standard; also see subsidy per rider (below).

Farebox recovery (ratio): the proportion of operating costs that are paid through passenger fares. Agencies often measure farebox recovery at the system level, by mode and by line; a minimum farebox recovery ratio may be specified as a service standard at the line level.

Fare medium: a means of paying a fare. Media vary by agency but often include cash, transfer cards, unlimited-ride passes (with daily, weekly and monthly passes especially common) and stored-value cards. Passes, which have fixed prices, offer greater discounts over cash fares with more frequent use; stored-value cards function similarly to cash but often provide a discount relative to the cash fare with each boarding.

Frequency: the number of trips operating in a certain period of time. Frequency should not be equated with headway but often is. (A service operating at 15-minute headways would have a frequency of four vehicles per hour – not a 15-minute frequency.)

Headway: the amount of time between vehicles traveling in the same direction on a given line or combination of lines. A shorter headway corresponds to a more frequent service.

Hours of service: the start and end times of a line's operation. The start time corresponds to the time at which the first trip of the day begins; the end time may correspond to the time at which the last trip of the day begins or ends. In many cases, a line's hours of service differ between weekdays, Saturdays and Sundays.

Linked trip: a trip from origin to destination, potentially involving travel on multiple transit vehicles. A linked trip may therefore consist of multiple unlinked trips (or passenger boardings).

Load factor: the ratio of passengers aboard a transit trip to the number of seats. Load factor thus measures capacity utilization and passenger comfort in a transit system. Transit agencies may set maximum load factors and apply them to individual trips, groups of trips (i.e., rush-hour vs. off-peak averages on a certain line) or lines to identify where additional capacity is needed. Agencies may vary maximum load factors by category of service; for instance, a load factor of 1.0 may be prescribed for a long-distance, premium-fare express route, while a load factor above 1.0 may be permitted for a local route with frequent stops and high passenger turnover. Agencies may similarly establish minimum load factors for the sake of identifying unproductive services or trips.

Minority/low-income transit route: a transit line that operates through areas with disproportionately high concentrations of minority or low-income populations for a significant portion of its alignment. "Disproportionately high" and "significant" are subject to definition by transit agencies. As an example, the prior version of the Circular (Circular 4702.1, May 1988) defined a minority transit route as "a route that has at least 1/3 of its total route mileage in a census tract(s) or traffic analysis zone(s) with a percentage of minority population greater than the percentage of minority population in the transit service area."

On-time performance: the percentage of transit vehicles reaching scheduled points along a route on-time. The definition of "on-time" can vary by agency: some agencies may consider trips that reach a scheduled point a few minutes late or early to be on-time, for instance, while others may exclude early departures from their definition of on-time. Some agencies measure on-time performance at each scheduled timepoint for each trip, while others may measure only the proportions of trips that depart their starting points or arrive at their ending points on time. On-time performance may analyzed at the timepoint, trip, line, mode or system levels to identify where schedules should be adjusted.

Passenger boarding (or unlinked trip): an instance of a passenger boarding a transit vehicle in revenue service. A passenger may board multiple transit vehicles (register multiple unlinked trips) in the course of completing a single linked trip (see above), as in the case of transferring between lines. Most transit agencies report ridership in terms of unlinked trips.

Productivity: the number of passengers that board a transit trip or line per unit of service operated (typically revenue hour or revenue mile). Many transit agencies set minimum productivity standards at the line level; agencies may also identify individual trips for elimination based on low productivity. Agencies may also identify lines or corridors for expansion based on high productivity.

Service hours: the total number of hours of service provided on a line during a given day. Service hours can be estimated by multiplying the number of one-way trips for a given line by the approximate end-to-end travel time of each trip. For instance, a line that operates 20 round trips per day, with each trip taking 45 minutes from end to end, would provide 30 daily service hours (20 round trips * 2 one-way trips per round trip * 45 minutes per trip = 1,800 minutes = 30 hours).

Span of service: the number of hours per day during which a line is in continuous operation, which often varies between weekdays, Saturdays and Sundays. For instance, a line that operates between 5:30am and 11:30pm would have an 18-hour span of service. A line that operates from 6:30am to 9:30am and 3:30pm to 6:30pm (with no midday service) would have a six-hour span.

Subsidy per boarding (or per rider): the cost per rider (see above) minus the average fare revenue. Unlike cost per boarding, subsidy per boarding provides an indication of an agency's net cost for each trip provided. (If the subsidy is negative, then the service is profitable.) Subsidy per boarding may be measured at the agency level, by mode or by line; in the context of service standards, lines are typically assessed against a maximum permissible subsidy per boarding.

Unlinked trip: see Passenger Boarding above.

Vehicle revenue hours: the total number of hours per day in which transit vehicles operate in revenue service (i.e., collecting fares) on a line or group of lines, for a mode or for a system. Revenue hours typically include layover or recovery time at the ends of trips.

Non-revenue travel, on the other hand, consists of trips on which transit vehicles are not in service and customers therefore not permitted. This often includes travel (sometimes referred to as "deadhead" trips) between a base and route terminus or between the termini of different routes.