SERVICE DATA REQUIREMENTS (FORM S-10 & MR-20)

Service Supplied

An overview of the data associated with service that is scheduled and operated by transit agencies

Service Consumed

A summary of data points regarding the amount of passenger usage of service

Service Operated

Definitions and requirements of peak service

Monthly Ridership Reporting (Form MR-20)

An explanation of data points required for monthly reporting on Form MR-20

Service Supplied

Transit agencies must report actual service data on services provided during the fiscal year. In the following sections, the NTD defines service data that agencies must provide on their Annual Reports.

Revenue Service

A transit vehicle is in revenue service when it is providing public transportation and is available to carry passengers. Non-public transportation activities, such as exclusive school bus service and charter service are not considered revenue service. Revenue service includes both fare and fare-free services.

Agencies that provide transit service report revenue service data, such as

- Actual revenue hours
- Actual revenue miles
- Unlinked Passenger Trips

Actual Vehicle Revenue, Passenger Car Revenue, and Train Revenue Hours and Miles

Actual Vehicle Revenue Hours (VRH) and VRM are figures that take into account the hours and miles vehicles travel while in revenue service. Revenue hours for conventional scheduled services include

- Running time
- Layover/recovery time

Running time is the time it takes a transit vehicle to travel from the beginning to the end of a transit route. A transit agency's passenger timetable typically shows the running times for trips it operates.

Usually, agencies schedule layover/recovery time at the end of each trip. Layover time typically ranges from 10 to 20 percent of the running time. Transit agencies use this time to provide the operator a break or to give the operator an opportunity to get service back on schedule if it was running late.

VRM and VRH exclude the miles and hours related to

- Deadhead time
- Operator training
- Maintenance testing

There are two different types of measures of VRH and VRM for rail service: train revenue hours/miles and passenger car revenue hours/miles.

For Demand Response (DR) service, the NTD uses a different definition of revenue service. For DR service, revenue time includes all travel time from the point of the first passenger pick-up to the last passenger drop-off, as long as the vehicle does not return to the dispatching point.

For Commuter Rail (CR) and Alaska Railroad (AR) modes, do not include locomotive miles and hours when reporting passenger car miles and hours.

Deadhead

When transit vehicles are deadheading, they operate closed-door and do not carry passengers. Deadhead includes

- Leaving or returning to the garage or yard facility to or from the starting or ending point of revenue service
- Changing routes
- When the driver does not have the duty to carry passengers

Deadhead does not include

- Revenue service
- Additional activities, such as
  - Charter service
  - School bus service
  - Operator training
  - Fueling
  - Maintenance testing

For fixed route services, deadhead includes the miles and hours when a vehicle is not available to the public and is traveling to its first publicly advertised stop.

For non-fixed route services, deadheading can involve travel from:

- The garage to the dispatching point
- The last passenger drop-off to the dispatching point
- The last passenger drop-off to the garage
- The dispatching point to the garage

The dispatching point is defined as the location where a driver receives his or her schedule to provide revenue service.

Deadhead does not include fueling or lunch breaks. Some transit agencies do not have fueling facilities at their maintenance facilities or parking lots. In these cases, drivers may fuel vehicles on the way back to the garage. Some operators travel to lunch between a drop off and the next pick up. Transit agencies should not report the time or miles drivers spend fueling vehicles or traveling to and from lunch.

The NTD only collects deadhead data from Full Reporters. Full Reporters do not report deadhead for vanpool (VP) or demand response-taxi (DT) services.

Actual Service Data

Actual service data are the statistics of the services actually provided during the fiscal year of the transit agency. Actual service data excludes scheduled service that did not occur (e.g., missed trips, service interruptions due to strikes, emergency shutdowns, etc.).

Agencies collect this data and report on an annual or monthly basis, depending on reporter type.

For agencies that operate Vanpools, there may be times when passengers fail to report data for VRM and VRH for certain trips. If this occurs, please contact the assigned NTD analyst.

Actual Vehicle Hours and Miles

Actual vehicle hours and miles are the hours and miles that vehicles travel while in revenue service plus deadhead hours. Actual vehicle hours and miles exclude the hours and miles from the following activities:

- Charter service
- School bus service
- Operator training
- Fueling and lunch breaks
- Maintenance testing

Transit agencies must collect and report actual service data for the fiscal year of the Annual Report. The NTD refers to actual annual service data as an agency's annual totals. Annual totals include all service that a transit agency actually provides during the year. Therefore, annual totals include both typical and atypical service.

All agencies must record actual miles and hours and revenue miles and hours. It is important for agencies to understand the differences between actual miles and hours and revenue miles and hours to ensure they do not mistakenly include incorrect data as revenue service. Full Reporters must provide both actual vehicle data and actual revenue service data.

Actual Passenger Car Hours and Miles

Actual passenger car hours and miles are the hours and miles that passenger cars travel while in revenue service and while deadheading. Actual passenger car hours and miles include the hours and miles during layover and recovery time but exclude the hours and miles from the following activities:

- Charter services
- Operator training
- Fueling
- Vehicle maintenance testing

Actual Train Hours and Miles

Actual train hours and miles are the hours and miles that trains travel while in revenue service plus deadhead hours. Actual train hours and miles include hours from layover and recovery time but exclude hours and miles from the following activities:

- Charter services
- Operator training
- Vehicle maintenance testing

The following exhibits provide common examples for each data type and show what activities agencies should include under revenue miles and hours.

Exhibit 34: Miles and Hours for Bus (MB, CB, RB) Services

Activity	Actual Vehicle Hours	Actual Vehicle Miles	Vehicle Revenue Hours	Vehicle Revenue Miles
Bus travels (deadheads) from dispatching point to start of a route.	Yes	Yes	No	No
Bus travels its route in scheduled revenue operation. Passengers board the vehicle.	Yes	Yes	Yes	Yes
Bus travels its route in scheduled revenue operation. No passengers board the vehicle.	Yes	Yes	Yes	Yes
Bus arrives at the end of a route, incurs layover. Passengers can board during layover.	Yes	N/A	Yes	N/A
Bus arrives at the end of a route, incurs layover. Passengers cannot board during layover.	Yes	N/A	Yes	N/A
Bus arrives at the end of the route, parks, and goes out of service. Resumes service in PM peak.	No	No	No	No
Bus arrives at the end of the route, travels (deadheads) to a storage lot, and parks.	Yes	Yes	No	No
Bus arrives at the end of the route, travels (deadheads) to another route to operate a scheduled trip. Passengers cannot board during deadhead.	Yes	Yes	No	No
Bus arrives at the end of the route, travels (deadheads) to the dispatching point.	Yes	Yes	No	No
Bus travels from the garage to another maintenance facility to perform routine maintenance.	No	No	No	No

Activity	Actual Vehicle Hours	Actual Vehicle Miles	Vehicle Revenue Hours	Vehicle Revenue Miles
Trip is terminated due to a collision with another vehicle, and the bus travels to a maintenance facility.	Yes	Yes	No	No
Bus travels from start to end of a route for training. Vehicle is not in service and does not board passengers.	No	No	No	No
Driver fuels the vehicle at a gas station.	No	N/A	No	N/A

Exhibit 35: Miles and Hours for Demand Response Services

Activity	Actual Vehicle Hours	Actual Vehicle Miles	Vehicle Revenue Hours	Vehicle Revenue Miles
Vehicle idles at the dispatching point.	No	N/A	No	N/A
Vehicle departs dispatching point to pick up a passenger.	Yes	Yes	No	No
Vehicle waits for a passenger at the pick-up point.	Yes	N/A	Yes	N/A
After a passenger drop-off, the vehicle departs to pick up another passenger with no passengers onboard.	Yes	Yes	Yes	Yes
Driver travels to a restaurant for lunch after the last passenger drop-off.	No	No	No	No
Driver eats his lunch at a restaurant.	No	N/A	No	N/A
Vehicle transports passengers from a community center to a shopping mall.	Yes	Yes	Yes	Yes
Vehicle returns to the dispatching point with no passengers onboard.	Yes	Yes	No	No

Activity	Actual Vehicle Hours	Actual Vehicle Miles	Vehicle Revenue Hours	Vehicle Revenue Miles
Vehicle waits at the shopping mall until it is time to bring passengers back to the community center.	Yes	N/A	Yes	N/A
Driver fuels the vehicle at a gas station.	No	N/A	No	N/A

Transit agencies must report accurate, true statistics for Vehicle Revenue Miles (i.e., no estimates). The following exhibit describes how an agency should collect these data.

Exhibit 36: Miles and Hours for Rail Services

Activity	Actual Vehicle Hours	Actual Vehicle Miles	Vehicle Revenue Hours	Vehicle Revenue Miles
Train travels (deadheads) from the yard to the station where the trip is scheduled to start.	Yes	Yes	No	No
Train departs from the yard and travels to an adjacent station. The transit agency states that the train is in revenue service; however, no passengers are allowed to board.	Yes	Yes	No	No
Train travels from beginning to end of the line carrying passengers.	Yes	Yes	Yes	Yes
Train completes trip, incurs layover time. Passengers cannot board during layover.	Yes	N/A	Yes	N/A
Train completes trip, lays over at a maintenance facility adjacent to the station. Passengers cannot board during layover.	Yes	Yes	Yes	Yes
Train completes trip, lays over. Passengers can board during layover.	Yes	N/A	Yes	N/A
Train departs from station A, breaks down at station B. Trip is terminated. Passengers alight at station B to board the next train. Trip operated from station A to station B.	Yes	Yes	Yes	Yes

Activity	Actual Vehicle Hours	Actual Vehicle Miles	Vehicle Revenue Hours	Vehicle Revenue Miles
Trip not operated beyond station B.	No	No	No	No
Train departs from station A, short turns at station B. Passengers alight at station B and board the next train. Trip operated from station A to station B.	Yes	Yes	Yes	Yes
Trip not operated beyond station B.	No	No	No	No
Train departs from station A, stops at station B, and then proceeds directly to the end of the line without any stops. Passengers onboard can only alight at Station B or at end station. Trip operated from station A to station B.	Yes	Yes	Yes	Yes
Trip operated nonstop beyond station B.	Yes	Yes	Yes	Yes
Train completes trip, deadheads to the end of another line for another trip.	Yes	Yes	No	No
In the transition from AM to midday service, the train parks at the end station and is out of service. Service will resume for PM peak.	No	N/A	No	N/A
In the transition from AM to midday service, the train travels (deadheads) to the yard.	Yes	Yes	No	No
Train travels for operators' training and no passengers are allowed to board.	No	No	No	No
Train travels from the yard to a maintenance facility.	No	No	No	No

Vehicles Available for Annual Maximum Service

Vehicles Available for Annual Maximum Service (VAMS) is the number of revenue vehicles a transit agency has available to meet its annual maximum service requirement. VAMS include:

- Spares (revenue vehicles used to accommodate routine maintenance and repair operations, and to replace vehicles in scheduled service that breakdown or are involved in accidents)
- Vehicles in or awaiting maintenance

Transit agencies should include vehicles undergoing routine maintenance in the VAMS total. However, if an agency rehabilitates a vehicle and the rehabilitation requires extensive time before the vehicle can reenter revenue service, agencies should not include the vehicle in the VAMS total.

VAMS excludes vehicles awaiting sale and emergency contingency vehicles. Emergency contingency vehicles are inactive revenue vehicles that have reached the end of their useful life. Rather than requiring agencies to dispose of the inactive vehicles, FTA allows them to retain the vehicles to be used in the event of local emergencies (floods, earthquakes, etc.). FTA allows for this exception only if the vehicles are a part of an FTA-approved emergency contingency plan.

Rail Mode Requirements

Transit agencies must report both passenger cars and locomotives for Commuter Rail (CR) modes. Agencies must report locomotives in VAMS, regardless if they carry passengers in revenue service.

Vehicles Operated in Annual Maximum Service

VOMS is the number of revenue vehicles an agency operates to meet the annual maximum service requirement. Agencies count their annual VOMS during the peak season of the year on the busiest day that they provide service. In most cases, this is the number of scheduled vehicles because most transit agencies have enough vehicles to operate the scheduled service. VOMS excludes atypical days or one-time special events for non-demand response modes.

Exhibit 37: VOMS and VAMS: Non-Rail Modes

Non-Rail Modes	Demand Response, Demand Response-Taxi, and Vanpool	All other non-rail modes
VOMS	The largest number of vehicles in revenue service at any one time during the reporting year (includes atypical service).	The largest number of operated (usually scheduled) revenue vehicles in service at any one time during the reporting year (excludes atypical service).
VAMS	The largest number of vehicles in revenue service at any one time during the reporting year (includes atypical service) and all spare vehicles available at this time.	The largest number of revenue vehicles in service at any one time during the reporting year (excludes atypical service) and all the spare vehicles available to provide both typical and atypical service.

Exhibit 38: VOMS and VAMS: Rail Modes

Rail Modes	Commuter Rail and Alaska Railroad	All other rail modes
VOMS	The largest number of passenger cars and locomotives operated (usually those scheduled for service) at any one time during the reporting year (excludes atypical service). Passenger cars and locomotives each count as a vehicle in this case.	The largest number of passenger cars (vehicles) operated (usually those scheduled for service) at any one time during the reporting year (excluding atypical service).

Rail Modes	Commuter Rail and Alaska Railroad	All other rail modes
VAMS	The largest number of passenger cars and locomotives operated (usually scheduled for service) at any one time during the reporting year (excludes atypical service) and the total number of spare passenger cars and locomotives available to provide typical and atypical service. Passenger cars and locomotives each count as a vehicle in this case.	The largest number of passenger cars (vehicles) operated (usually scheduled for service) at any one time during the reporting year (excluding atypical service) and all spare passenger cars available to provide typical and atypical service.

Scheduled Service

Scheduled service is the total service to be provided for picking up, transporting, and discharging passengers. Full Reporters provide these data using internal transit agency planning documents (e.g., run paddles and public timetables). Scheduled service does not consider service interruptions or special additional services.

Scheduled Vehicle Revenue Miles and Passenger Car Revenue Miles

Full Reporters calculate scheduled VRM based on their scheduled service. Scheduled VRM does not include

- Deadhead
- Operator training
- Maintenance testing
- School bus and charter services
- Service interruptions
- Special additional services

How to Report Scheduled Service

Full Reporters must provide average daily data for a weekday schedule, Saturday schedule, and Sunday schedule. Average daily data depends on whether services are fixed route or non-fixed route.

For non-fixed route and non-scheduled services (e.g., demand response (DR) and vanpool (VP)), the average daily totals cover days the mode and TOS actually operates, including typical and atypical service.

For scheduled, fixed route services, such as bus (MB), commuter bus (CB), bus rapid transit (RB), and rail modes, the average daily totals correspond to a typical day of service. The NTD does not allow agencies to report the following in fixed-route schedules in the average day totals:

- One-time or limited events such as game day football shuttles, extra holiday shopper service, or a visit to the city by the President of the United States
- Extra service agencies operate to meet demand, whether associated with a special event or not, or
- Severe inclement weather days such as hurricanes and snowstorms

The average daily schedule must cover the service that agencies operate on typical days (for fixed route services). Most transit agencies operate different schedules with seasonal variation, and agencies may add or delete certain routes during the year. The average daily schedules must account for the seasonal variation in service. Agencies must use a weighted average over the course of the year to report service that changes during the year.

A typical day is a day when a transit agency

- Operates its normal, regular schedule
- Does not provide extra service to meet demands for special events such as conventions, parades, or public celebrations
- Does not operate significantly reduced service because of unusually bad weather (e.g., snow storms, hurricanes, tornadoes, earthquakes) or major public disruptions (e.g., terrorism)

Often, transit agencies operate their Sunday schedule on holidays that fall on Monday through Saturday. Agencies should include the data for these holidays under the day for the schedule that they operate (e.g., if operating on a Sunday schedule for a holiday on a Tuesday, the data would be included under Sunday).

Atypical Service Day

Atypical service days occur when a transit agency does not operate its normal, regular schedule. Instead, the agency

- Provides extra service to meet demands for special events, such as conventions, parades, or public celebrations, or
- Operates significantly reduced service because of unusually bad weather (e.g., snowstorms, hurricanes, tornadoes, earthquakes) or major public disruptions (e.g., terrorism)

Full Reporters do not include atypical service in scheduled service data for non-demand response modes. Full Reporters must include atypical service data under Actual Annual Service Data totals for all service modes.

Exhibit 39: Computing Average Daily Schedule Data: Bus

Example 1: How do I compute the average weekday total of actual vehicle miles for MB service?

***Solution**: Determine the total actual vehicle miles for typical weekday operations and divide that number by the number of typical weekdays.*

	Typical Weekday Operation	Atypical Weekday Operation	Total
Total vehicle miles operated	6,993,520	562,330	7,555,850
Number of days	230	20	250

Average Weekday Total = Actual vehicle miles on typical weekdays / days that were typical weekdays = 6,993,520 / 230 = ***30,407***

**Atypical weekdays are excluded from the actual vehicle miles and the number of days used to determine the Average Weekday Total.*

Exhibit 40: Computing Average Daily Schedule Data: Demand Response

Example: How do I compute the average weekday total of actual vehicle miles for DR service?

***Solution:** Determine the total actual vehicle miles and divide by the total number of days operated.*

***Total vehicle miles operated:** 1,567,238*

***Total Number of days:** 250*

Average Weekday Total = Actual vehicle miles / days = 1,567,238 / 250 ***= 6,269***

Deviated Services

Agencies may provide deviated or point deviated fixed route services (see "Deviated Fixed Route Service" and "Point Deviation" below). Typically, agencies use deviated services to comply with the ADA requirements and provide complementary paratransit service.

Full Reporters should not include deviations in their total scheduled revenue miles. Therefore, actual Vehicle Revenue Miles typically exceed total scheduled Vehicle Revenue Miles.

Deviated Fixed Route

Deviated fixed route services operate buses along a fixed route, but the buses may depart from the route to go to a specific location. This may include traveling to residences, employment locations, schools, and shopping areas. The bus then returns to the route and continues to provide regular service. Buses usually travel up to three-quarters of a mile away from the route to comply with the ADA requirements.

Agencies must report all deviated fixed route services as Bus (MB). Note that because the deviations are unscheduled, Full Reporters must use the most direct path when reporting DRM.

Point Deviation

Point deviation services do not follow a specific route. Instead, the drivers stop at bus stops at scheduled times. The buses then travel to the necessary destinations until the next scheduled bus stop. Agencies also use this type of service to meet the ADA requirements.

Charter Service

Transit agencies may provide charter service to private clients. The client defines this service; the vehicle does not operate over a transit route on a regular schedule and it is not available to the public.

Charter service does not meet the definition of public transportation. Therefore, transit agencies must exclude charter service from their revenue service data.

Additional Full Reporter Requirement: Charter Service Hours

Full reporting transit agencies must report the total number of charter service hours they provided, including charter deadhead hours. These transit agencies report this value under a separate, charter service-specific total.

School Bus Service

School bus service is not open to the public. Instead, the service serves students exclusively. Transit agencies may not report school bus service data to the NTD.

School bus service does not include additional trips, called school trippers, that a transit agency may operate on an existing route to meet the daily or seasonal demands of traveling students. Agencies should report school trippers as part of revenue service.

Additional Full Reporter Requirement: School Bus Hours

Full reporting transit agencies must report the total number of school bus service hours they provided, including school bus deadhead hours. These transit agencies report this value under a separate, school bus service-specific total.

Service Consumed

Unlinked Passenger Trips

UPT is the number of boardings on public transportation vehicles during the fiscal year. Transit agencies must count passengers each time they board vehicles, no matter how many vehicles they use to travel from their origin to their destination. If a transit vehicle changes routes while passengers are onboard (interlining), transit agencies should not recount the passengers.

For demand response (DR) and demand response-taxi (DT) modes, transit agencies must include personal care attendants and companions in UPT counts as long as they are not employees of the transit agency. This includes attendants and companions that ride fare free.

For vanpool (VP) service, agencies must report the driver as a passenger and include the driver in UPT counts. In almost all cases, the vanpool driver is unpaid and is traveling for personal reasons (e.g., work commuting, shopping).

For ferryboat modes (FB), the NTD has specific reporting rules when other transportation modes utilize the FB service. These other transportation modes may be public transit modes such as VP, or they may be private vehicles, such as automobiles. Transit agencies must report UPT for each vehicle occupant of these other transportation modes (including the driver), whether the other transportation mode is public or private.

Additional Requirements for Full Reporters

Full Reporters must report both total UPT and UPT attributable to ADA requirements (e.g., complementary paratransit). The total UPT should include UPT attributable to ADA requirements and sponsored service UPT.

For rail transit agencies, there is a difference between UPT and passengers entering the agency through fare turnstiles. Typically, rail agencies allow passengers to transfer from one train to another train without exiting the rail system. In these agencies, the turnstile counts are always less than unlinked passenger counts because the turnstile counts do not include counts of passengers boarding multiple trains within the transit system.

ADA-Related Unlinked Passenger Trips

ADA UPT is the number of passenger boardings on public transportation vehicles for complementary paratransit services associated with or attributed to the ADA compliance requirements. Transit agencies should include personal care attendants and companions in this ADA UPT total.

Note: Transit agencies should make sure to include the ADA UPT in Total UPT as well. Transit agencies should not include ADA UPT under Sponsored UPT. ADA-related UPT should not include any sponsored services.

Transit agencies report ADA data based on their ADA definition (e.g., ¾ of a mile or above and beyond minimum ADA requirements).

Sponsored Service

Sponsored service is paid in whole or in part by a third party who, in many cases, handles trip arrangements. Common sponsored services include

- Medicaid
- Meals-On-Wheels
- Head Start
- The Arc of the United States
- Shelter workshops
- Independent living centers

The NTD considers these services as public transportation if they are part of a coordinated human services transportation plan and there is attempt to group rides. Local areas develop coordinated plans to identify transportation needs and assist individuals

with disabilities, older adults, and people with low incomes. Transit agencies must include sponsored UPT in their total regular UPT.

Passenger Miles Traveled

PMT is the sum of the distances each passenger traveled during the year.

For ferryboat modes (FB), the NTD has specific reporting rules when other transportation modes utilize the FB service. These other transportation modes may be other public transit modes such as VP, or they may be private vehicles, such as automobiles. Transit agencies must report PMT only once, because the other public or private vehicle is not moving under its own power while aboard the ferry service.

PMT for New Reporters

Transit agencies must collect and report PMT data using one of the methods described under the *Collecting Service Consumed Data* section below. However, a first-time reporter's fiscal year may have expired without collection of the correct data before it began reporting to the NTD. In this circumstance, first-year reporters may calculate PMT data using the following method:

- For Year 1, transit agencies may sample for one month to estimate one year of PMT data. If the agency operates demand response service, it may aggregate one month of PMT from its manifests to estimate the entire year.
- If Year 1 has expired, agencies may sample for one month in Year 2 and use this estimate to report Year 1 PMT.
- In Year 2, agencies must sample for all or a portion of the year to estimate Year 2 PMT data.
- By Year 3, agencies must collect a full year of data as described under Collection Service Consumed Data below. (From Year 3 forward, agencies may still have to sample PMT data if it is a mandatory sample year. See "Sampling Cycles" below.)

Collecting Service Consumed Data

Transit agencies must report actual data on the Annual Report for all service data except UPT and PMT. Only Full Reporters report PMT data to the NTD. For these two data points, agencies may provide an estimate but only if the actual values are not otherwise available. If an agency has the ability to collect true UPT or PMT data, it must report the actual data on the Annual Report.

Transit agencies may collect data during the year by using drivers' logs, scheduling software, automatic passenger counters (APCs), manual passenger counters, and

fareboxes. If a transit agency estimates UPT or PMT data, it must adhere to NTD requirements of estimation procedures, as described in the following sections.

100 Percent Counts of Unlinked Passenger Trips

Transit agencies must perform 100 percent counts of UPT to report these data. In these agencies, passengers are counted each time they board a transit vehicle.

Sometimes transit agencies performing 100 percent counts will miss passenger counts on some vehicle trips because of personnel problems or equipment failures. If these vehicle trips are 2 percent or less of the total, transit agencies may factor the data to account for the missing trips. However, if the vehicle trips with missing data exceed 2 percent of total trips, agencies must have a qualified statistician approve the factoring method.

Automatic Passenger Counters

Some transit agencies use APCs for collecting UPT and PMT data through sampling or a 100 percent count. The use of APCs for NTD reporting requires FTA approval. If a transit agency fails to obtain FTA approval, FTA may not accept the reported APC-derived data.

FTA must approve the following for agencies to report APC data:

- APC benchmarking plan for the first year
- APC maintenance plan every three years, beginning in 2019

The APC benchmarking plan and maintenance plans must include:

1. Validation of the APC data for UPT and PMT data against a *manual sample*:
    a. Agencies operating 30 or fewer active vehicles must sample at least 15 trips.
    b. Agencies with greater than 30 active vehicles should sample, at least, the larger of 15 trips or half of the number of APC equipped vehicles, up to 50 trips. These numbers represent the smallest acceptable sample. Agencies may perform larger samples at their discretion.
    c. The trips sampled for the manual sample do not need to be randomly selected and can be spread out over any period of time within the same year. The sample should include heavy ridership trips and at least one trip per vehicle type and APC model. For rail systems, a trip refers to one train equipped with the same APC model on all passenger cars. Agencies should not count multiple passenger cars on the same train as an individual trip, unless equipment differs across passenger cars.

2. A description of the agency's APC system
3. A description of agency's sampling procedures
4. A list of trips that were flagged and rejected from the sample with explanations for each. The explanation cannot be that the trip was rejected because it was different from the manual data.
5. The percentage of trips that do not have valid APC data over the course of a typical year, either because the APC malfunctioned, the data were corrupted, the data failed a validation check, or for any other reason.
6. Descriptions of the differences (if any) in the set of distances between stops (e.g., interstop distances) the agency used to calculate PMT using manual and APC data. Ideally, the agency will use the same set of distances for both calculations.
7. The following metrics, both of which must be less than 5%:
    a. Percent Difference of manual vs. APC UPT
    b. Percent Difference of manual vs. APC PMT

Manual counts can be made using data collection staff or on-board cameras. To ensure accurate counts FTA recommends using a data collector at each door on heavily loaded trips. APC data should be processed to correct for anomalies as it would be in the reporter's normal data collection process. The objective is to compare manually collected data with processed APC data and demonstrate that they are equivalent or that any differences are justifiable.

Transit agencies applying to use APC data must submit the benchmarking plan (and its results after implementation) to FTA for approval. If FTA rejects an agency's APC system, the agency should reexamine its APC data collection procedures, make any needed adjustments, perform any needed maintenance on the system, and retest. FTA expects the sampling process to take less than a month; this should allow agencies to retest before the end of the year, thus ensuring that an agency that encounters problems in its APC testing can nonetheless provide an uninterrupted set of data to NTD. Agencies must also submit the results of the triennial maintenance plans to FTA for approval.

Each mode and type of service must certify its APCs individually unless they share fleets.

If, at any time, an agency installs new and substantially different APC equipment, the APCs must be recertified.

Estimation Methods for Unlinked Passenger Trips and Passenger Miles Traveled

Only Full Reporters report PMT data.

If 100 percent counts of UPT or PMT are not available and reliable, agencies must estimate and report UPT, or PMT based on statistical sampling. FTA requirements for sampling UPT and PMT for all modes and types of service are:

- Minimum confidence of 95 percent
- Minimum precision level of ±10 percent

The required precision level (±10 percent) applies to the annual total data that an agency reports. For Full Reporters reporting data for average day schedules, the precision levels for an average day will be larger than ±10 percent if the sample size for the annual total was designed to meet ±10 percent exactly.

Transit agencies may use any data sampling technique that meets the 95 percent confidence and ±10 percent precision levels. Transit agencies may use different sampling techniques for each mode and TOS. If a transit agency samples, it must follow the sampling technique exactly. Agencies may oversample, as long as the oversampling is selected randomly. However, agencies must not collect a smaller sample than the chosen sampling plan prescribes. Additionally, agencies must not change the number of trips in the sample, except to randomly oversample, or the approaches for selecting trips that comprise the sample.

A transit agency may use one or more of the following sampling plans, each discussed below:

- FTA-approved sampling methods, and/or
- Alternative sampling techniques

Transit agencies must retain sampling documentation in their records for at least three years. In many cases, agencies need this information during their Triennial Review.

FTA-Approved Sampling Methods

To assist transit agencies with sampling, FTA has developed acceptable UPT and PMT sampling procedures for all modes. The NTD provides the NTD Sampling Manual, which includes definitions, sampling procedures, data recording procedures, annual report compilation, and sample selection information.

FTA issued the NTD Sampling Manual in 2009 to help transit agencies prepare sampling plans that are tailored to their operating environment. The manual covers the development of sampling plans for all modes. If data are not available for a particular mode, the manual provides default sampling templates. If data are available, then agencies may use customized sampling plans.

Alternative Sampling Methods

Transit agencies may use any other procedure to sample UPT or PMT data, as long as the procedure meets FTA confidence intervals and is approved by a qualified statistician. The NTD refers to sampling plans created by agencies or statisticians as alternative sampling methods.

A qualified statistician can ensure that a sampling plan meets FTA statistical sampling requirements. FTA does not prescribe specific statistician qualifications. Instead, transit agencies must ensure that statisticians are qualified. The statistician may be an in-house staff person with a working knowledge of, and an education or background in, statistics. The statistician also may be a hired consultant with appropriate qualifications.

FTA does not review or approve alternative sampling techniques. A qualified statistician must design the sampling technique to meet FTA confidence and precision levels.

Transit agencies must use this method to retain sampling documentation in their files. The documentation should include

- A description of the method that specifies the parameters used to estimate UPT (e.g., UPT per vehicle trip x number of vehicle trips operated) if a 100 percent count of UPT is not available or reliable, and PMT (e.g., PMT per vehicle trip x number of vehicle trips operated), and the rationale used to estimate the coefficient(s) of variation,
- A signed review of the technique by a qualified statistician, including a statement that the technique meets FTA confidence and precision levels, and
- A summary of the statistician's education and experience that indicates that the statistician is qualified

Sampling for Purchased Transportation Service

The NTD has developed additional reporting requirements for sampling PT services. The NTD establishes the following guiding sampling rules for PT services:

- PT sellers may use different sampling techniques than those used by a transit agency for DO service; and
- A transit agency may apply one sample method to cover all PT services for a specific mode, or each PT contractor (seller of service) may use a separate sampling method.

Sampling Cycles

FTA has set minimum one-year or three-year sampling cycles for transit agencies. The requirements are based on the TOS. For directly operated services, the requirements are further stratified by the size of the primary UZA and the number of VOMS directly operated across all modes.

Transit agencies must sample every year (one-year sampling cycle) if their services meet the following requirements:

- The agency directly operates the service;
- The agency serves a primary UZA with population of 500,000 more; and
- The agency has VOMS of 100 or more across all directly operated modes.

Agencies must sample annually if they do not have a 100 percent count of UPT.

Exhibit 41: Sampling Cycle Requirements

TOS	Primary UZA Population	Total VOMS for Modes	Mandatory Year	100% Count of UPT Required?
DO	≥ 500,000	≥ 100	Annually	No
DO	≥ 500,000	< 100	Triennially	Yes
DO	50,000 - 499,999	Any number	Triennially	Yes
PT	≥ 50,000	Any number	Triennially	Yes

Transit agencies are permitted to sample every three years (three-year sampling cycle) for a mode and TOS if

- The agency collects 100 percent counts of UPT every year for the mode and TOS; and
- One of the following conditions is met:
  - The agency directly operates all modes, and the total VOMS is less than 100;
  - The agency serves a primary UZA with population of less than 500,000; or
  - The TOS is purchased transportation.

If a transit agency wishes to sample every three years, it must collect sample data in FTA-defined mandatory years. **The next mandatory sampling year is Fiscal Year 2020.**

If a transit agency is a new Full Reporter, or if a transit agency starts a new mode or TOS, the agency must sample during the first report year, even if it is not a mandatory year.

Reporting in Non-Mandatory Sampling Years: PMT Data for Full Reporters

If a Full Reporter follows a three-year sampling cycle, it must estimate PMT data in a non-sampling year by multiplying the average trip length from the most recent mandatory year by the UPT for the current year. Full Reporters determine their average trip length (PMT/UPT) by mode and TOS during their mandatory sampling year for their average weekday schedule, average Saturday schedule (if applicable), average Sunday schedule (if applicable), and annual total.

Exhibit 42: Full Reporters: Using Average Trip Length to Estimate PMT Data

Example: A transit agency serves an urbanized area. The transit agency directly operates MB with 110 VOMS. What are the NTD reporting requirements for PMT data?

***Solution**: The agency must sample if it is unable to collect PMT data on all trips. Its sampling options are:*

- *Conduct a 100 percent count of UPT in the current year, and estimate PMT data using the average trip factors from the prior mandatory sampling year; or*
- *Use a statistically valid sampling method to estimate PMT every year.*

The transit agency reports MB data using average trip length statistics from the most recent mandatory sampling year to estimate annual total data. During the current year, the transit agency performs a 100 percent count of the UPT. Based on this data, the agency calculates PMT for the mandatory sampling year as follows:

	Weekday	Saturday	Sunday	Annual Total
PMT	50,000,000	7,000,000	3,000,000	60,000,000
UPT	10,000,000	2,000,000	750,000	12,750,000
Average trip length	5.0	3.5	4.0	4.71

In the mandatory sampling year, the agency reports 60,000,000 PMT and 12,750,000 UPT for the annual total.

Estimated average trip length = PMT / UPT

Estimated PMT = average trip length × UPT

In future years, the agency may use the sampled average trip length to calculate PMT data. The following exhibit shows how an agency may determine PMT for a non-sampling year following the mandatory sampling year described above:

	Weekday	Saturday	Sunday	Annual Total
UPT (current year)	10,500,000	2,100,000	800,000	13,400,000
Average trip length (from the earlier mandatory year)	5.0	3.5	4.0	4.71
PMT (estimate for current year)	52,500,000 (5.0 x 10,500,000)	7,350,000 (3.5 x 2,100,000)	3,200,000 (4.0 x 800,000)	63,114,000 (4.71 x 13,400,000)

*In this non-mandatory sampling year, the agency reports **63,114,000** PMT and **13,400,000** UPT.*

Service Operated

Days Operated

Full Reporters must provide the following data:

- Days Operated (days that service was actually operated)
- Days Not Operated Due to Strikes (days that service would normally have operated but was not due to a transit labor strike)
- Days Not Operated Due to Officially Declared Emergencies (days that service would normally have operated but was not due to an officially declared emergency)

Within each of these categories, Full Reporters must report the total number of days operated for the weekday schedule, Saturday schedule, and Sunday schedule service. Many transit agencies operate different schedules on weekdays, Saturdays, and Sundays. An agency must report the number of days it operated during each schedule.

Transit agencies must report holiday service under the day that most closely reflects the service. For example, if an agency operates the Sunday schedule on Christmas Day, it must indicate that this is an additional day of Sunday service (regardless of the day on which the holiday falls).

A partial day operated counts as a day operated. Days in which all service, all day is cancelled for the given mode are not days operated.

Days Not Operated Due to Officially Declared Emergencies

This is the number of days that a transit agency does not operate due to emergencies, such as

- Floods
- Snowstorms, or
- Tornadoes

A person in authority (usually the mayor, county head, or governor) must officially declare an emergency.

Days Not Operated Due to Strikes

Full Reporters must provide data for the number of days that they do not operate due to transit labor strikes.

Peak Periods

The period of time when agencies provide additional services to handle higher passenger volume is referred to as a “peak period.” Peak period service begins when an agency increases the number of vehicles it operates and ends when the agency reduces the number of vehicles it operates back to the normal level. If an agency operates the same number of vehicles all day, it does not have peak service. Peak periods are not the same as periods of increased fare rates based on time of day.

Full reporting agencies report Time Service Begins and Ends by the following periods:

- Average weekday schedule (whole day, weekday AM peak, weekday midday, and weekday PM peak, weekday other)
- Average Saturday schedule (whole day)
- Average Sunday schedule (whole day)

Time Service Begins

The NTD defines the time service begins as the time when the first revenue service vehicle leaves the garage or point of dispatch. Full Reporters report the beginning time for service on an average weekday by the weekday AM peak period, weekday midday period, weekday PM peak period, and for the day.

Time Service Ends

Time service ends is the time when the last revenue service vehicle returns to the garage or point of dispatch.

Average Weekday Time Periods

Full Reporters must report average weekday data using the following periods, if applicable:

- Weekday AM peak period
- Weekday midday period
- Weekday PM peak period
- Weekday other period

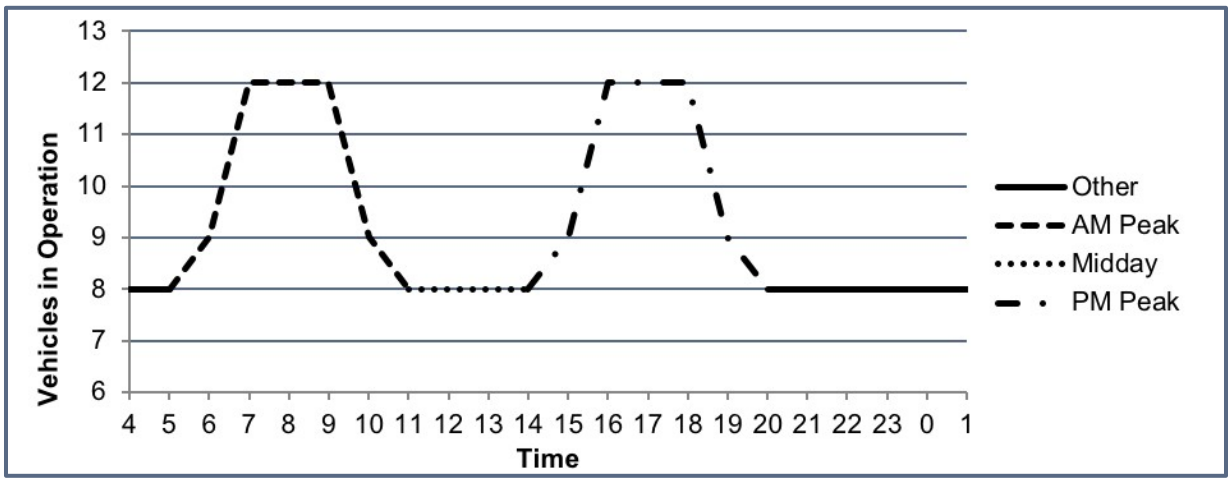
Full Reporters must provide data time service begins and ends except for the following modes: aerial tramway (TR), demand response (DR), jitney (JT), demand response-taxi (DT), and público (PB).

Exhibit 43: Full Reporters: Average Weekday Schedule Data

Average Weekday Data Item Breakdown by Time Period	Non-Rail Except Bus Modes and TB	Bus Modes and TB	Rail Modes
Time service begins	No	Yes	Yes
Time service ends	No	Yes	Yes
Vehicles in operation	No	Yes	N/A
Trains in operation	N/A	N/A	Yes
Passenger cars in operation	N/A	N/A	Yes

Exhibit 44: Classifying Vehicle Trips by Period

Example: An agency operates light rail (LR) service. The hours of operation for weekdays are from 4:00 AM to 1:00 AM. The following graph depicts the peak periods for the service:



Incidental Transit Service

Transit agencies provide incidental transit service, such as taxicabs or other vehicles, during times when existing transit services cannot meet passenger demand. These occurrences are infrequent; thus, the NTD refers to the alternate transit service as “incidental” to the regular mode.

Transit agencies may provide incidental transit service for

- Service interruptions (e.g., vehicle breakdown) when a replacement vehicle is not available. A taxicab or an agency van might be used for this incidental service;
- An accident on rail services. Delayed rail passengers are transported to their destination using special buses; or
- Demand Response overflow service using taxis

Transit agencies must report data associated with incidental transit service on the NTD Annual Report. Agencies must collect this data using the same reporting requirements as regular public transit services.

Directional Route Miles, Fixed Guideway, and High Intensity Busway

Directional Route Miles on form S-10 is sourced directly from the Reportable Segments (P-40) form on an agency's profile. Please see the "Introduction: General Service Data Requirements: Reportable Segments (P-40)" section of this manual for more information.

Monthly Ridership Reporting (Form MR-20)

Full Reporters must report Monthly Ridership data for each mode of public transportation service that the agency operates. This information provides FTA with monthly trends in ridership and service supplied throughout the year. Agencies are required to report on all modes reported on an agency's P-20 form based on the start and end dates for each mode.

The MR-20 form requires agencies to report the following data points:

- Unlinked Passenger Trips
- Actual Vehicle (Passenger Car) Revenue Hours
- Actual Vehicle (Passenger Car) Revenue Miles
- Vehicles Operated in Maximum Service

Please note, data fields for any given month will not appear until that month has ended.

Unlinked Passenger Trips

Please see the definition provided for Unlinked Passenger Trips above.

If the transit agency uses a sampling method, the total UPT for a specific month should be estimated using the sample data collected during the month and the same procedure that the transit agency uses to estimate annual UPT. This approach may not meet FTA's confidence and precision levels for annual data (+-10% precision for a 95% confidence level) but does meet FTA's requirements for reporting monthly data on the Ridership Activity form (MR-20).

If the transit agency changes its sampling procedure, it should revise its reported UPT for the current year and the prior year using the new methodology. The transit agency should contact their Validation analyst for assistance in reporting the revised estimates for the prior year.

Other estimation methods not necessarily based on sampling can also be used. For example, monthly farebox revenues can be used, provided that bias correction factors