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September 2020

# TRANSIT ASSET MANAGEMENT

## FTA Should Clarify Performance Data and Develop a Plan to Guide Future Program Improvements

# GAO Highlights

Highlights of [GAO-20-686](#), a report to the Committee on Banking, Housing, and Urban Affairs, U.S. Senate

## Why GAO Did This Study

In 2019, the Department of Transportation (DOT) reported a \$98 billion national backlog in deferred reinvestment needs for transit assets in 2014, affecting the quality of transit services. Transit asset management can help agencies make investment decisions that improve asset performance and reduce life cycle costs. In 2016, FTA issued a final rule for its TAM program that required transit agencies to develop TAM plans and report on their assets.

GAO was asked to review FTA's implementation of the TAM program. This report examines the extent to which: (1) transit agencies reported improvements as a result of the TAM program; (2) FTA established performance measures to assess asset condition and reported information on those measures; and (3) TAM requirements prepare transit agencies to manage assets over their life cycles. GAO conducted a generalizable web survey of officials representing urban transit agencies; reviewed FTA documents; evaluated the TAM program against leading practices for performance measures, program management, and transit asset management; and interviewed FTA officials.

## What GAO Recommends

GAO is making recommendations that FTA: (1) include the known limitations of TAM performance data in public reports, and (2) develop a plan to manage any future improvements to the TAM program. DOT concurred with the recommendations.

View [GAO-20-686](#). For more information, contact Andrew Von Ah at (202) 512-2834 or [vonaha@gao.gov](mailto:vonaha@gao.gov).

September 2020

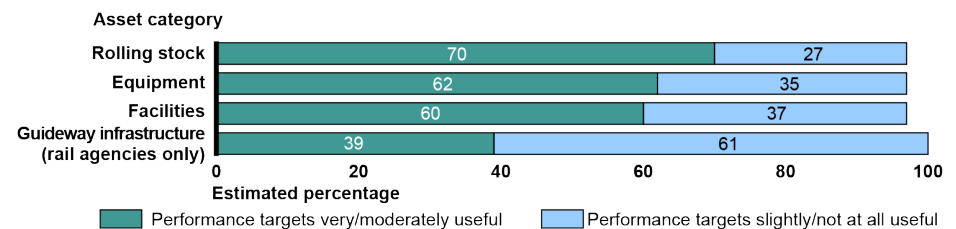
## TRANSIT ASSET MANAGEMENT

### FTA Should Clarify Performance Data and Develop a Plan to Guide Future Program Improvements

## What GAO Found

The Federal Transit Administration's (FTA) Transit Asset Management (TAM) program requires transit agencies receiving federal assistance to develop plans to manage their assets and meet other requirements. According to generalizable results from GAO's survey of urban transit agencies, most agencies made few changes or limited improvements to their existing procedures for inventorying or assessing the condition of assets to incorporate TAM requirements. TAM requirements also include reporting performance targets for four types of assets: rolling stock (like buses); equipment; facilities; and, for rail agencies, guideway infrastructure (like track). Transit agencies GAO surveyed found performance targets for most, but not all, assets to be useful for capital planning (see figure).

Urban Transit Agencies' Views on Performance Targets (Estimated Percentages)



Source: GAO analysis of transit agency responses to GAO survey. | GAO-20-686

Notes: Combined data for each asset category may not equal 100 percent as "do not know" responses are excluded. Estimates in this figure have a margin of error of +/- 10 percentage points or fewer, at the 95 percent confidence level.

Nonetheless, the targets for the four asset categories are based on performance measures that do not fully assess state of good repair, as defined by FTA standards, or cover all key performance dimensions contrary to leading practices GAO identified in prior work. For example, FTA's measures do not fully address whether an asset poses an unacceptable safety risk, one of FTA's standards. FTA has not reported this and other limitations of its TAM performance data. As a result, stakeholders may draw inaccurate conclusions on the condition of the nation's transit assets, potentially affecting policy decisions.

FTA's TAM requirements may not prepare transit agencies to manage transit assets over their life cycles. For example, contrary to FTA-sponsored research on leading transit asset management practices, FTA does not require transit agencies to develop investment scenarios, which hypothesize the effects of different funding levels on transit assets. While FTA officials told GAO they made this decision to minimize the burden on smaller agencies, leading practices provide tools for any size agency to adapt scenarios to its needs. FTA officials said that addressing GAO's findings and others that may result from FTA's own reviews of the TAM program would require a program rule change, which is a lengthy and costly process. Leading program management practices emphasize the importance of identifying areas for improvement and proactively planning for change. Such planning may be even more important when change requires a lengthy process; but FTA does not have such a plan. Having a plan to manage future improvements to the TAM program could help ensure intended program benefits are realized.

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### Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
AMPO	Association of Metropolitan Planning Organizations
APTA	American Public Transportation Association
CTAA	Community Transportation Association of America
DOT	Department of Transportation
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
MAP-21	Moving Ahead for Progress in the 21 <sup>st</sup> Century Act
MPO	Metropolitan Planning Organizations
NTD	National Transit Database
TAM	Transit Asset Management
TAM program	National Transit Asset Management System
TCRP	Transit Cooperative Research Program
TERM	Transit Economic Requirements Model

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September 30, 2020

The Honorable Mike Crapo  
Chairman  
The Honorable Sherrod Brown  
Ranking Member  
Committee on Banking, Housing, and Urban Affairs  
United States Senate

U.S. transit agencies provide transportation services to millions of passengers each year through a wide variety of capital assets, including buses, rail cars and track, stations, and other facilities. In 2019, the Department of Transportation (DOT) reported that based on 2014 data, 19 percent of transit vehicles were not in a state of good repair and there was a deferred reinvestment needs backlog of \$98 billion for transit assets.<sup>1</sup> The Moving Ahead for Progress in the 21st Century Act (MAP-21), enacted in 2012, established specific requirements to improve the safety, reliability, and performance of transit assets through a performance-based approach.<sup>2</sup> MAP-21 required that DOT establish a system to monitor and manage transit assets and develop performance measures to assess progress.

To implement this statute, DOT's Federal Transit Administration (FTA) issued a final rule in July 2016 establishing the National Transit Asset Management (TAM) System (TAM program). In general, FTA required transit agencies receiving federal public transportation financial assistance to prepare a TAM plan with differing requirements depending on the type and number of assets agencies maintain.<sup>3</sup> Transit agencies were required to prepare an initial TAM plan by October 2018 that

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<sup>1</sup> DOT, Federal Highway Administration, and Federal Transit Administration, *Status of the Nation's Highways, Bridges, and Transit Conditions and Performance (23rd Edition) Report to Congress* (Washington, D.C.: Nov. 21, 2019).

<sup>2</sup> Pub. L. No. 112-141, 126 Stat. 405 (2012).

<sup>3</sup> TAM regulations apply to all recipients and sub-recipients of federal financial assistance under 49 U.S.C. Chapter 53 (Public Transportation) that own, operate, or manage capital assets used for providing public transportation. 49 C.F.R. § 625.3. For the purposes of this report, when we discuss transit agencies, we are referring to those that receive federal public transportation financial assistance.

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included an inventory and condition assessment of capital assets and a prioritized list of investments to improve their state of good repair.

In prior work, we reported that transit agencies vary in their use of leading practices in asset management, including collecting asset condition and performance data and estimating investment needs.<sup>4</sup> According to the American Public Transportation Association (APTA), more than 900 transit providers in urban areas and 1,200 providers in rural areas received grant money from FTA in 2018.<sup>5</sup> FTA's TAM program set minimum asset management requirements for transit agencies nationwide.

You asked us to review FTA's implementation of this new program. This report examines the extent to which:

- transit agencies reported improvements to their asset management as a result of FTA's TAM program;
- FTA has established performance measures to assess asset condition and reported information on those measures; and
- FTA's TAM program requirements prepare transit agencies to manage transit assets over their life cycles.

To examine the extent to which transit agencies reported improvements in asset management as a result of the TAM program, we conducted two web-based surveys using 2017 data from FTA's National Transit Database (NTD) to identify and select respondents.<sup>6</sup> In our first survey—the urban transit agency survey—we selected all “Tier I” transit agencies

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<sup>4</sup> GAO, *Transit Asset Management: Additional Research on Capital Investment Effects Could Help Transit Agencies Optimize Funding*, [GAO-13-571](#) (Washington, D.C.: July 11, 2013).

<sup>5</sup> APTA, *2020 Public Transportation Factbook* (Washington, D.C.: March 2020). Urbanized areas are defined as areas with a population over 50,000 people. APTA uses data from FTA's National Transit Database for its Factbook.

<sup>6</sup> The NTD is a centralized source for information and statistics on the nation's transit systems managed by FTA. Recipients or beneficiaries of FTA grants report data to the database, and FTA submits annual NTD reports to Congress summarizing transit service and safety data. Based on interviews with DOT officials and analysis of the NTD data, we determined that the full sample frame of transit agency data was sufficiently reliable for our purposes.

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(151 total) and a stratified random sample of urban “Tier II” transit agencies (173 total).<sup>7</sup> Tier I agencies (which generally have more assets) must develop their own TAM plans; while Tier II agencies (which generally have fewer assets) have the option to either develop their own TAM plan, or participate in a group plan with other transit agencies. We did not include rural agencies in the scope of this survey because FTA officials told us that other agencies, including State DOTs, are responsible for reporting rural transit agency data in NTD, and they expected that rural agencies largely participate in group plans. Approximately 79 percent of our sample (256 respondents) completed our urban transit agency survey. The results of this survey can be generalized to the population of Tier I and Tier II transit agencies listed in FTA’s database that serve urban areas and are presented as estimates with 95 percent confidence intervals within plus or minus 10 percentage points, unless otherwise noted.

Our second survey focused on group plan sponsors, which are generally the state DOT or other designated or direct recipient of federal transit funding that prepares a TAM group plan covering at least one Tier II, urban or rural transit agency in a region. We selected all 68 group plan sponsors and approximately 85 percent (58 respondents) completed the survey. We conducted seven pretests before finalizing our two surveys, which primarily focused on the agencies’ experience with TAM program requirements and any challenges and benefits they experienced in meeting them. For more information on the methods and results of these web surveys see appendix II and the electronic supplement [GAO-20-687SP](#).

To examine the extent to which FTA has established performance measures to assess asset condition and reported information on those measures, we compared FTA’s performance measures against leading practices for transit asset management established by the DOT-

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<sup>7</sup> FTA defines Tier I transit agencies as those recipients that own, operate, or manage either rail transit, or more than 100 vehicles in revenue service during peak regular service hours across all fixed-route modes, or more than 100 vehicles in one non-fixed route mode. Tier II transit agencies are generally those that fall below the Tier I thresholds and do not operate rail. Sub-recipients of section 5311 funds (49 U.S.C. § 5311 – formula grants for rural areas) or any American Indian tribes are also classified as Tier II.



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sponsored Transit Cooperative Research Program (TCRP)<sup>8</sup> as well as leading practices for performance measures in our prior reports.<sup>9</sup> We also compared information FTA reported from the measures to key practices in transparently reporting data established in prior GAO reports.<sup>10</sup> We also reviewed survey responses relevant to FTA's performance measures. To assess the extent to which FTA's TAM program requirements prepare transit agencies to manage transit assets over their life cycles, we evaluated FTA's TAM program requirements against TCRP's leading practices in transit asset management and *The Standard for Program Management*.<sup>11</sup>

To examine all objectives, we reviewed relevant laws, regulations, and FTA documents on the implementation of the TAM program including the final rule and FTA's *TAM Guide*.<sup>12</sup> We also conducted interviews with FTA officials about how they developed program requirements, as well as with a nongeneralizable selection of external transit stakeholders who were knowledgeable about the program requirements. These transit stakeholders included the American Association of State Highway Transportation Officials (AASHTO), APTA, the Association of Metropolitan Planning Organizations (AMPO), and the Community Transportation Association of America (CTAA). We selected the stakeholders based on our interviews with FTA as well as a review of our past reports and current literature in the field.

We conducted this performance audit from April 2019 to September 2020 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain

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<sup>8</sup> TCRP, *Guidance for Developing a Transit Asset Management Plan*, Report 172 (2014). TCRP is an applied research program sponsored by FTA and managed by the Transportation Research Board, a division of the National Academies of Sciences, Engineering, and Medicine.

<sup>9</sup> The four leading practices used in this report reflect the four characteristics for effective performance measures discussed in GAO, *Executive Guide: Effectively Implementing the Government Performance and Results Act*, [GAO/GGD-96-118](#) (Washington, D.C.: June 1996) and *Tax Administration: IRS Needs To Further Refine Its Tax Filing Season Performance Measures*, [GAO-03-143](#) (Washington, D.C.: Nov. 22, 2002).

<sup>10</sup> GAO, *Open Data: Treasury Could Better Align USAspending.gov with Key Practices and Search Requirements*, [GAO-19-72](#) (Washington, D.C.: Dec. 13, 2018).

<sup>11</sup> Project Management Institute, Inc., *The Standard for Program Management*, Fourth Edition, (2017).

<sup>12</sup> FTA, *Transit Asset Management Guide: Focusing on the Management of Our Transit Investments*, Report no. 0098 (Washington, D.C.: November 2016).

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sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Additional information about our scope and methodology is provided in appendix II.

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## Background

U.S. transit agencies have a wide variety of capital assets to maintain, including buses, rail cars, rail guideways, stations, and other facilities and supporting assets. Without sufficient investment, a transit agency may find its capital assets becoming increasingly unreliable and difficult to maintain, and in extreme cases may suffer reductions in system reliability resulting in degraded passenger service. FTA administers federal transit programs and provides financial, technical, and other assistance, including grants that transit agencies can use to maintain, repair, and replace transit assets.

Transit asset management provides a set of tools and approaches for helping transit agencies manage their physical capital assets over their life cycles to achieve and sustain a state of good repair. FTA's 2016 final TAM rule defined transit asset management as the strategic and systematic practice of procuring, operating, inspecting, maintaining, rehabilitating, and replacing transit capital assets to manage the performance, risks, and costs over their life cycles for the purpose of providing safe, cost-effective, and reliable public transportation. In response to a MAP-21 requirement, FTA defined state of good repair as a condition in which a capital asset is able to operate at a full level of performance.

In general, FTA's final rule requires transit agencies and group sponsors to develop TAM plans with several requirements for managing transit assets. Specifically, Tier I transit agencies must prepare a TAM plan covering their assets. Tier II transit agencies may prepare their own TAM plan or participate in a group TAM plan, prepared by another entity such as a state DOT. TAM plans cover a horizon period of at least 4 years, and transit agencies and sponsors are required to update their TAM plans in their entirety at least every 4 years. FTA established nine required elements for these TAM plans. Four of these elements are universal requirements that must be included in Tier I, Tier II, and group plans. The remaining five requirements are for Tier I agencies only (See table 1).

**Table 1: Elements of a Transit Asset Management (TAM) Plan Required by the Federal Transit Administration (FTA)**

Element	Description of element
<b>Universal requirements for all TAM plans</b>	
Inventory of Capital Assets	A listing of capital assets that a provider owns, except equipment with an acquisition value under \$50,000 that is not a service vehicle. <sup>a</sup>
Condition Assessment	A condition rating of inventoried assets for which a transit provider has direct capital responsibility.
Decision Support Tools	A description of the analytical processes or decision support tools an agency uses to estimate capital investment needs and prioritize investments.
Investment Prioritization	A ranked list of capital projects and programs, including the year the transit agency intends to carry out the program or project.
<b>Requirements for Tier I agencies only<sup>b</sup></b>	
TAM and State of Good Repair Policy	Policy describing the transit agency's vision and executive-level direction to support TAM goals. Includes documented commitment to achieving state of good repair, defined TAM objectives, and assigned roles and responsibilities.
Implementation Strategy	A strategic plan that reflects the activities necessary to achieve identified goals in the TAM plan.
List of Key Annual Activities	Description of actions needed to implement the TAM plan for each year of the plan's horizon.
Identification of Resources	Identification of the resources needed to execute the TAM plan including staffing, financial resources, equipment, and software over the course of the plan.
Evaluation Plan	Plan for monitoring, updating, and evaluating the TAM plan, including timelines and milestones to track progress toward meeting asset management goals.

Source: GAO analysis of FTA TAM Guidance. GAO-20-686.

<sup>a</sup>See 49 C.F.R. § 625.25(b)(1) for additional information on inclusions and exclusions to the inventories.

<sup>b</sup>In general, Tier I agencies are defined by FTA as those which own, operate, or manage either rail transit or more than 100 vehicles in revenue service during peak regular service hours across all fixed route modes or in one non-fixed route mode.

In our prior work, we found that data-driven decision-making leads to better results, and that if agencies do not use performance measures and performance information to track progress toward goals, they may be at risk of failing to achieve their goals.<sup>13</sup> MAP-21 featured provisions for both DOT and its grantees to move toward a national performance-based approach for surface transportation. FTA's final rule established a single performance measure for each of four asset categories identified by

<sup>13</sup> GAO, *Managing for Results: Executive Branch Should More Fully Implement the GPRA Modernization Act to Address Pressing Governance Challenges*, [GAO-13-518](#) (Washington, D.C.: June 26, 2013).

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MAP-21 and required transit agencies to set performance targets for these measures annually in the NTD for the next fiscal year. For each measure, the transit agency determines the target for the projected performance of its assets in the next fiscal year. FTA regulations require agencies to set realistic targets that reflect anticipated resources.<sup>14</sup> In some cases, agencies may target a reduction in state of good repair performance, such as when rehabilitation and replacement efforts are not expected to keep pace with asset deterioration. These performance measures and annual targets by asset category are:

- **Rolling stock (age-based measure).** The annual target is the selected percentage of revenue vehicles within a particular asset class that have met or exceeded their useful life benchmark (the expected life cycle of a capital asset for a particular operating environment). For example, FTA defines the useful life of a bus to be 14 years, and if an agency uses that benchmark, it would set a target for the percentage of buses to meet or exceed 14 years in the next fiscal year.
- **Equipment (age-based measure).** The annual target is the selected percentage of non-revenue, support-service, and maintenance vehicles that have met or exceeded their useful life benchmark.
- **Facilities (overall condition rating measure).** The annual target is the selected percentage of facilities within a particular asset class with a condition rating below 3.0 on the FTA Transit Economic Requirements Model (TERM) scale where “1” = poor and “5” = excellent.<sup>15</sup>
- **Guideway infrastructure (measure of performance restrictions).** The annual target is the selected percentage of track segments with performance restrictions, also known as slow zones. Agencies are required to measure the extent of slow zones at 9:00 am on the first Wednesday of each month and report the average to NTD.<sup>16</sup> This

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<sup>14</sup> 49 C.F.R. § 625.45(a)(2).

<sup>15</sup> TERM is an analytical tool developed by FTA to forecast transit capital investment needs. The physical condition of all assets are measured using a numeric scale of “1 to 5” where “1” equates to components in need of immediate repair, “3” equates to moderately deteriorated components, and “5” equates to near new condition. See FTA, *TAM Facility Performance Measure Reporting Guidebook: Condition Assessment Calculation*, Version 1.2 (Washington, D.C.: March 2018).

<sup>16</sup> FTA, *TAM Infrastructure Performance Measure Reporting Guidebook: Performance Restriction (Slow Zone) Calculation* (Washington, D.C.: April 2017).

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measure only applies to Tier I agencies that operate rail and includes guideway, track, signals and systems for rail assets.

FTA monitors transit agency compliance with the TAM rule through its comprehensive oversight reviews.<sup>17</sup> Although FTA does not collect or review each transit agency's TAM plan, it relies on contractors to ensure that each urban transit agency has a plan that includes each of the required elements, among other things. Because the first TAM plans were required to be completed by October 2018 and the comprehensive reviews are conducted on a rolling basis every 3 years, FTA has not yet reported on agencies' compliance with the requirement. FTA also requires agencies and sponsors to share their TAM plan with state DOTs and metropolitan planning organizations (MPO) that provide funding for asset investments.

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## Most Transit Agencies Surveyed Made Limited Asset Management Improvements as a Result of the TAM Program, and Found Annual Reporting of Performance Targets of Limited Use

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<sup>17</sup> FTA conducts reviews (utilizing contractors), once every 3 years, of agencies that receive Urbanized Area Formula Program funds and state DOTs. These reviews examine whether the recipient adheres to requirements and allows the FTA contractors to provide technical assistance to agencies.

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## While Overall Improvement Was Limited, Tier I Agencies Reported More Improvements than Tier II Agencies in Implementing Universal TAM Plan Requirements

According to responses from our urban transit agency survey, most agencies made either few changes or experienced limited improvements to their asset management procedures as a result of implementing the four universal TAM requirements. Those requirements include conducting inventories and condition assessments of capital assets and prioritizing projects and listing decision support tools. Based on our survey, Tier I agencies experienced more improvements to their asset management practices than Tier II agencies as a result of implementing these TAM requirements.<sup>18</sup> Transit agencies also reported few challenges in implementing requirements, depending on the category of transit asset being addressed.

## Inventory and Condition Assessment of Transit Assets

Based on our survey, the majority of urban transit agencies had already established processes to inventory and assess the condition of transit assets—including rolling stock, equipment, facilities and guideway infrastructure assets—prior to the TAM program.<sup>19</sup> In the TAM program, FTA requires transit agencies to inventory all rolling stock (e.g., buses, railcars, and other revenue vehicles) and assess the condition of these assets by assigning a useful life benchmark age for each vehicle type and determining the percentage of those vehicles within that useful life each year. We estimate that 90 percent of transit agencies already had an established process in place to inventory rolling stock assets, and 79 percent of transit agencies had a process to assess their condition prior to implementing TAM requirements.<sup>20</sup> Further, based on our survey, the majority of transit agencies made minor or no changes to their procedures for conducting inventories and condition assessments to meet TAM requirements.

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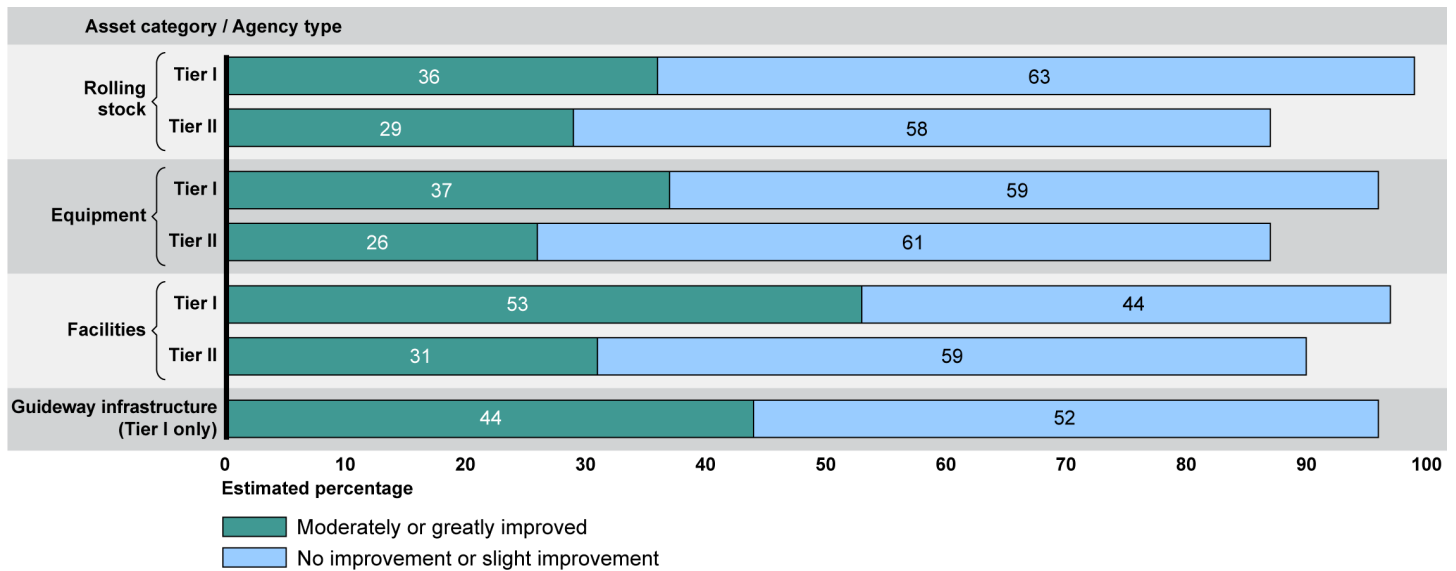
<sup>18</sup> As previously discussed, Tier II agencies may develop their own plan or participate in a group TAM plan with a sponsor. Results for the Tier II agencies include agencies that developed their own plans or were group plan participants.

<sup>19</sup> The guideway infrastructure reporting requirement applies only to Tier I agencies that operate rail. Tier II agencies that have non-rail guideway infrastructure, such as Bus Rapid Transit, do not have the same requirements and are not included.

<sup>20</sup> When discussing the results of the weighted urban transit survey, we use the language, “we estimate,” because our results are generalizable to the larger population of Tier I and Tier II transit agencies that serve urban areas, not just those that took the survey. All estimates in this report have a margin of +/- 10 percentage points or fewer at the 95 percent confidence level, unless otherwise noted. When discussing the group sponsor survey, we use language indicating that sponsors “reported” certain results as those results reflect 85 percent of all group plan sponsors who responded to our survey but are not weighted or generalizable to a larger population.

However, of the urban transit agencies that made changes to their condition assessments, more Tier I agencies experienced great or moderate improvements to their condition assessments than Tier II agencies, based on our survey. For example, we estimate about half (53 percent) of these Tier I agencies experienced great or moderate improvements to their condition assessments for facilities compared to 31 percent of Tier II agencies (see fig. 1).<sup>21</sup> Tier I transit agencies may have benefited more from this requirement because they are likely to have more facilities to manage than Tier II agencies. In a narrative response to our survey, one Tier I transit agency official described how these TAM requirements served to “shed a light” on facility condition, among other assets, and changed how the agency prioritized projects.

**Figure 1: Urban Transit Agency Views on Condition Assessment Improvements from Agencies That Made Changes to Meet Transit Asset Management Requirements (Estimated Percentages by Asset Category)**



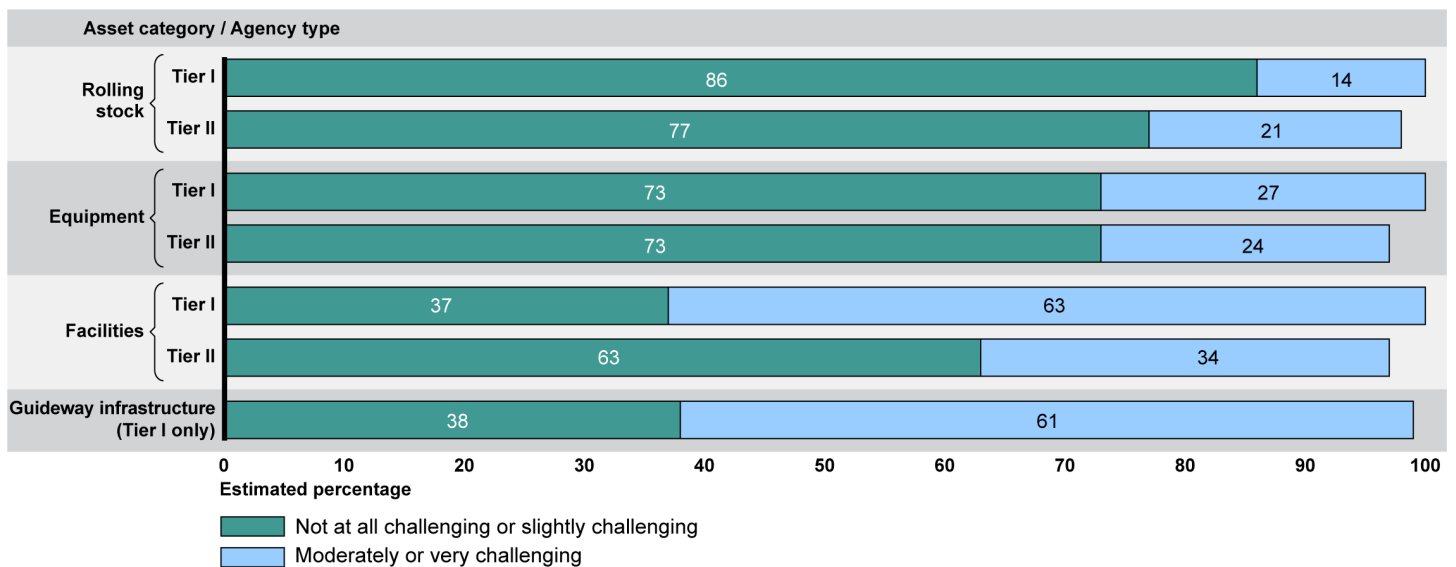
Source: GAO analysis of transit agency responses to GAO survey. | GAO-20-686

Notes: In general, Tier I agencies are defined by the Federal Transit Administration as those which own, operate, or manage either rail transit or more than 100 vehicles in revenue service during peak regular service hours across all fixed route modes or in one non-fixed route mode. Tier II transit agencies are generally those that fall below these thresholds and do not provide rail services. Agencies who reported they did not make changes to their condition assessments for each category are not included in this analysis. Percentages may not total 100 percent, as “did not know” responses were not included. Estimates in this figure have a margin of error of +/- 1Backgr percentage points or fewer, at the 95 percent confidence level.

<sup>21</sup> This analysis of survey results excludes those transit agencies that did not make a change to condition assessment procedures.

Based on our survey, urban transit agencies found assessing the condition of some assets more challenging than others. For example, most Tier I and Tier II agencies found the requirement to assess the condition of rolling stock and equipment assets to be not at all or slightly challenging (see fig. 2).<sup>22</sup> Prior to TAM, transit agencies were already required to report the age of their revenue vehicles to the NTD on an annual basis so this information would already be available to these transit agencies. Overall, the majority of Tier II transit agencies found the requirements for assessing the condition of each of the three asset categories they manage (rolling stock, equipment, and facilities) to be not at all or slightly challenging).

**Figure 2: Urban Transit Agency Views on the Level of Challenge in Assessing the Condition of Transit Assets (Estimated Percentages by Asset Category)**



Source: GAO analysis of transit agency responses to GAO survey. | GAO-20-686

Notes: In general, Tier I agencies are defined by the Federal Transit Administration as those which own, operate, or manage either rail transit or more than 100 vehicles in revenue service during peak regular service hours across all fixed route modes or in one non-fixed route mode. Tier II transit agencies are generally those that fall below these thresholds and do not provide rail services. Percentages may not total 100 percent, as “did not know” responses were not included. Estimates in this figure have a margin of error of +/- 14 percentage points or fewer, at the 95 percent confidence level.

<sup>22</sup> These results include all agencies regardless of whether or not they made changes to meet TAM requirements.



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Prioritized List of Projects and  
Decision Support Tools

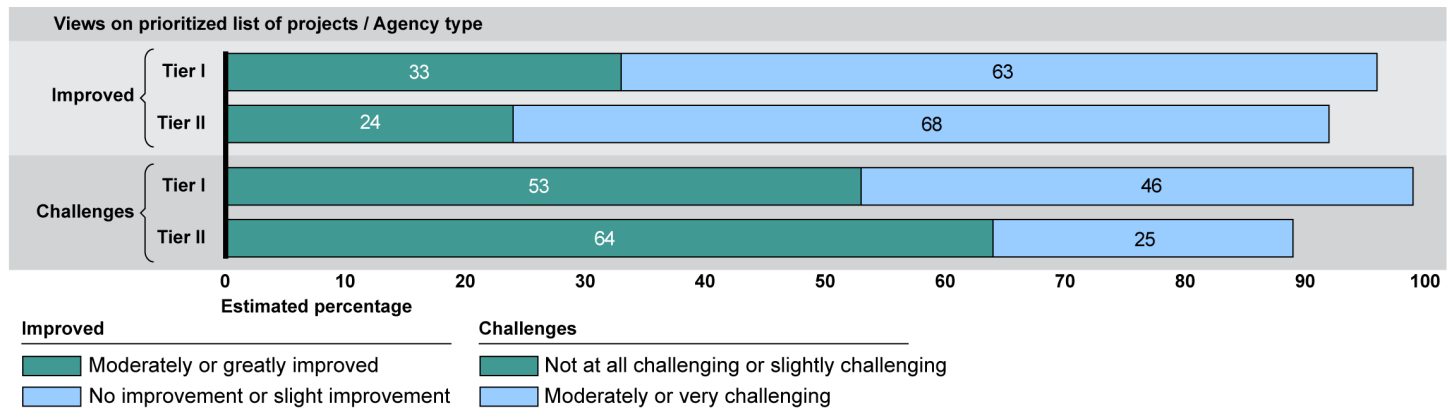
In contrast, about 60 percent of Tier I agencies found both the facilities and guideway infrastructure condition assessments to be moderately or very challenging (see fig. 2). Specifically, FTA requires transit agencies to assign a condition rating score of “1” through “5” for each of their facilities using FTA’s TERM scale, with a score of “3” or higher to be within a state of good repair. However, AASHTO members told us that applying this rating was a challenge due to the number of different building components, such as heating and ventilation and foundation that must be weighted into a single score. In a narrative survey response, a Tier I agency official noted that FTA’s process was challenging because it required breaking assets down into systems and subsystem components requiring more effort, inspections, and recordkeeping.

Urban transit agencies’ views varied on whether their prioritized lists of projects improved as a result of the TAM requirement and whether the process was challenging.<sup>23</sup> Overall, transit agencies experienced limited improvements in their ability to develop a prioritized list of projects. However, based on survey responses, we estimate that 33 percent of Tier I agencies and 24 percent of Tier II agencies found that implementing this requirement resulted in great or moderate improvements in their ability to develop a prioritized list of projects. In a narrative response to our survey, a Tier I agency official noted that developing the list of prioritized projects helped the agency identify the projects that were most needed. Tier I agencies also more frequently reported challenges in meeting this requirement than Tier II agencies. Specifically, about 46 percent of Tier I agencies found this requirement to be moderately or very challenging, compared to 25 percent of Tier II agencies (see fig. 3). For example, in comments submitted to FTA on the TAM final rule, a transit agency official stated that prioritized lists require time and resources both initially and on an ongoing basis. Because Tier I agencies are responsible for more assets, this challenge may be greater for them.

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<sup>23</sup> Survey results regarding prioritized list of projects and decision support tools include all urban transit agencies, not just those that made changes as a result of that requirement. We did not ask agencies whether they made changes to previous procedures based on these two requirements.

**Figure 3: Urban Transit Agency Views on Improvements to Prioritized Lists of Projects and Level of Challenge Meeting Requirement (Estimated Percentages by Tier)**



Source: GAO analysis of transit agency responses to GAO survey. | GAO-20-686

Notes: In general, Tier I agencies are defined by the Federal Transit Administration as those which own, operate, or manage either rail transit or more than 100 vehicles in revenue service during peak regular service hours across all fixed route modes or in one non-fixed route mode. Tier II transit agencies are generally those that fall below these thresholds and do not provide rail services. Percentages may not total 100 percent, as “did not know” responses were not included. Estimates in this figure have a margin of error of +/- 10 percentage points or fewer, at the 95 percent confidence level.

Similarly, urban transit agencies varied on the usefulness of describing decision support tools for capital planning purposes and whether the process was challenging. More Tier I agencies (52 percent) found the requirement to be very or moderately useful compared to Tier II agencies (28 percent).<sup>24</sup> Also, more Tier I agencies (41 percent) found the decision support tools requirements to be moderately or very challenging compared to Tier II agencies (26 percent). Because of their generally larger inventories, Tier I agencies, by definition, have more assets to prioritize and may require more tools for decision-making.

For more information on the challenges experienced by Tier I agencies and group sponsors, among other things, see additional survey results in appendix I and the electronic supplement [GAO-20-687SP](#).

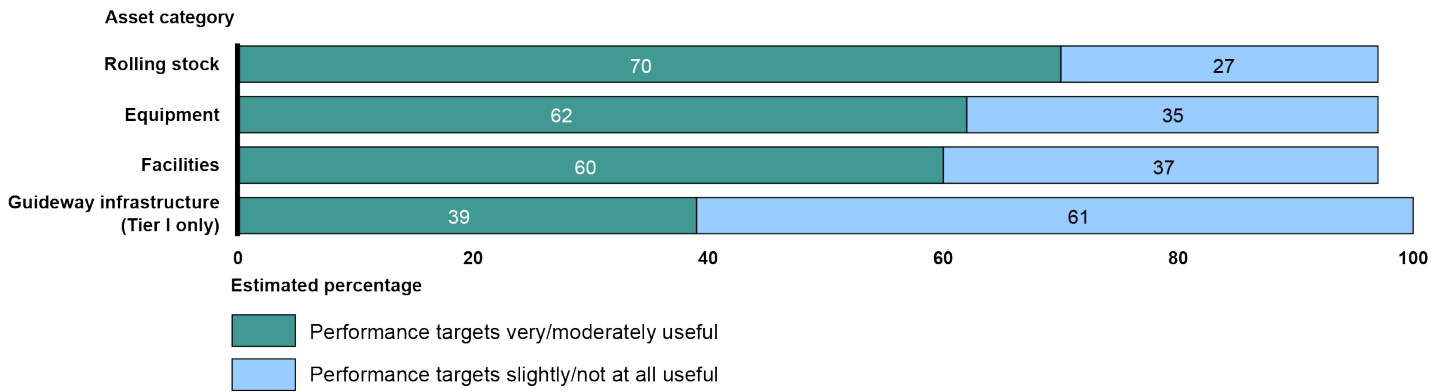
<sup>24</sup> Describing decision support tools involves identifying tools used to make capital planning decisions including computer-based software or spreadsheets.

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**Transit Agencies Found Most Performance Targets Useful for Capital Planning, but Annual Reporting Provided Limited Usefulness**

Based on our survey, the majority of urban transit agencies found most of FTA's performance measure targets to be useful for their capital planning purposes. For example, we estimate that 70 percent of transit agencies found the rolling stock target to be very or moderately useful, and about 60 percent of these agencies found the equipment and facilities targets to be similarly useful. However, 39 percent of Tier I agencies found the guideway infrastructure target to be very or moderately useful (see fig. 4). Further, in narrative responses to our survey, six transit agencies expressed concerns about the guideway infrastructure measure, on which the target is based. For example, one agency official wrote that many of the slow zones they recorded and reported have had little to do with state of good repair concerns.

**Figure 4: Urban Transit Agency Views on Usefulness of Performance Targets for Capital Planning (Estimated Percentage by Asset Category)**



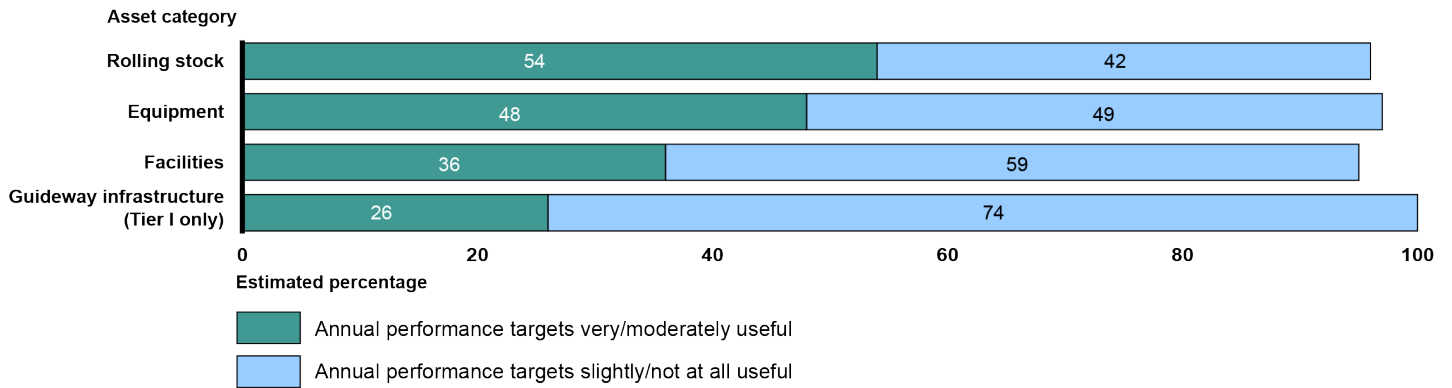
Source: GAO analysis of transit agency responses to GAO survey. | GAO-20-686

Notes: In general, Tier I agencies are defined by the Federal Transit Administration as those which own, operate, or manage either rail transit or more than 100 vehicles in revenue service during peak regular service hours across all fixed route modes or in one non-fixed route mode. Percentages may not total 100 percent, as “did not know” responses were not included. Estimates in this figure have a margin of error of +/- 10 percentage points or fewer, at the 95 percent confidence level.

Based on our survey results, we estimate that most transit agencies found establishing performance targets on an annual basis for facilities and guideway infrastructure slightly or not at all useful for their capital planning, while about half found establishing annual targets useful for rolling stock and equipment assets (see fig. 5). Additionally, in narrative responses to our survey, six transit agencies explained that performance targets should cover a longer period, such as 5 years. For example, one agency official wrote that annual performance targets are of limited value, particularly for long-lived assets such as facilities and guideway infrastructure, because they rarely experience much change within a one-year period. This official recommended setting targets 4 or 5 years ahead. FTA officials told us they agreed that annual performance targets may be of limited use to transit agencies’ capital planning, but added that they were mandated by statute to require annual targets.<sup>25</sup>

<sup>25</sup> 49 U.S.C. § 5326(c)(2).

**Figure 5: Urban Transit Agency Views on the Usefulness of Setting Annual Performance Targets for Capital Planning (Estimated Percentage by Asset Category)**



Source: GAO analysis of transit agency responses to GAO survey. | GAO-20-686

Notes: In general, Tier I agencies are defined by the Federal Transit Administration as those which own, operate, or manage either rail transit or more than 100 vehicles in revenue service during peak regular service hours across all fixed route modes or in one non-fixed route mode. Percentages may not total 100 percent, as “did not know” responses were not included. Estimates in this figure have a margin of error of +/- 14 percentage points or fewer, at the 95 percent confidence level. Rounding of data may result in minor differences between the figure’s and the electronic supplement’s results.

## FTA’s TAM Performance Measures Do Not Fully Assess the State of Good Repair of Transit Assets, and FTA Has Not Disclosed Data Limitations

### FTA’s TAM Performance Measures Do Not Fully Align with Leading Practices for Effective Measures

We found that FTA’s performance measures are not fully aligned with leading practices for effective performance measures and, therefore do not fully assess the state of good repair of the nation’s transit assets. As previously noted, FTA established a single performance measure for each asset category identified in MAP-21: asset age for rolling stock and equipment, a numerical rating of condition for facilities, and a measure for

the percentage of slow zones in an agency’s guideway infrastructure, such as rail track. In our prior work, we identified four leading practices for effective performance measures used by agencies that were successful in measuring their performance.<sup>26</sup> We found that FTA’s TAM performance measures fully align with one leading practice, but partially align with three other leading practices (see table 2). For example, FTA’s performance measures do not cover all the dimensions of performance for state of good repair, as defined by FTA, and consequently fall short of fully assessing the state of good repair of the nation’s transit assets.

**Table 2: Extent to Which the Federal Transit Administration’s (FTA) Transit Asset Management (TAM) Performance Measures Align with Leading Practices**

Leading practices for effective performance measures	Description of leading practice	Assessment of FTA’s TAM performance measures
Link to responsible programs	Effective performance measures should be linked directly to the offices that have responsibility for making programs work.	Fully aligned
Incentivize balance	Effective performance measures should take competing priorities into account and create incentives for managers to strike the difficult balance among competing demands.	Partially aligned
Cover all key performance dimensions	Effective performance measures should be limited to the vital few that cover all key performance dimensions.	Partially aligned
Assess progress toward goals	Effective performance measures should adequately show an organization’s progress toward achieving performance goals.	Partially aligned

Source: GAO assessment of FTA performance measures. | GAO-20-686

Notes: For the purposes of this report, “fully aligned” indicates that FTA requirements address a leading practice; “partially aligned” indicates that FTA requirements have limitations that affect implementation of a leading practice. For further information on these leading practices, see [GAO/GGD-96-118](#) and [GAO-03-143](#).

### Link to Responsible Programs

We found that FTA’s performance measures fully aligned with this practice because FTA linked its TAM performance measures to responsible programs across a transit agency’s organization and required each transit agency to assign an accountable executive who approves and oversees the agency’s TAM plan and its performance measures. We previously found that a clear connection between performance measures and program offices helps to reinforce accountability and ensure that managers keep in mind the outcomes their organization is trying to

<sup>26</sup> [GAO/GGD-96-118](#) and [GAO-03-143](#).

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achieve.<sup>27</sup> FTA required performance measures for key program areas within transit agencies, including measures for revenue service vehicles (such as buses and trains); non-revenue service vehicles (such as maintenance and service equipment); facilities used by passengers and maintenance staff; and track infrastructure for rail transit agencies. Performance targets for each applicable performance measure are to be approved by an accountable executive within each agency who has control or direction over human and capital resources and is ultimately responsible for ensuring that the TAM plan is developed and carried out, and approving annual targets for all required performance measures.

## Incentivize Balance

We found that FTA's performance measures partially align with this leading practice because FTA's performance measures incentivize transit agencies to consider competing priorities; however, FTA's single measure per asset category does not fully capture asset performance.<sup>28</sup> FTA established flexible performance measures for the TAM program that allow transit agency managers to balance competing agency priorities, such as asset rehabilitation, maintaining the needed level of service, and system expansion. We previously noted that agencies must balance their ideal performance measurement systems against real-world considerations, such as the cost and effort involved in gathering and analyzing data.<sup>29</sup> FTA's performance measures provide transit agencies flexibility to customize aspects of FTA's TAM performance measures to suit their specific operating conditions and help balance competing priorities. For example, rolling stock performance is measured by comparing an asset's age to its designated useful life benchmark. FTA provides a set of default benchmarks for a number of common asset types but also permits agencies to customize these benchmarks to reflect their specific experiences. FTA officials also told us that agencies may set less ambitious state of good repair performance targets as part of balancing other priorities not directly measured by the TAM program.

However, FTA's reliance on one performance measure per asset category may limit a transit agency's ability to take a balanced view of its state of good repair performance by focusing attention on a single measure that may not accurately capture asset performance. TCRP

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<sup>27</sup> [GAO/GGD-96-118](#).

<sup>28</sup> 49 C.F.R. § 625.17(c).

<sup>29</sup> [GAO/GGD-96-118](#).

reported in 2003 that transit performance measures should include a variety of measures that reflect a range of relevant issues while avoiding superfluous information and focus on the key drivers of performance.<sup>30</sup> Further, FTA sponsored TCRP research that resulted in guidance for TAM planning and meeting the requirements of MAP-21 (published in 2014). In this guidance, TCRP recommended that transit agencies of all sizes use a suite of performance measures for each asset category which together can capture the condition of transit assets to better measure state of good repair (see table 3).<sup>31</sup>

**Table 3: Federal Transit Administration (FTA) Performance Measures and Transit Cooperative Research Program (TCRP) Recommended Measures by Asset Categories**

Asset categories	FTA required performance measure	TCRP recommended performance measures
1. Rolling stock (e.g., train cars) 2. Equipment (non-revenue vehicles)	The percentage of vehicles that have either met or exceeded their useful life benchmark (age).	Backlog of investment needs
		Mean distance between failure
		Average accumulated mileage
		Hours of delay
3. Facilities (can include, for example, buildings, escalators, and other components of a facility)	The percentage of facilities with an overall rating below "3" on an FTA-defined scale ranging from "1" and "5." (Numerical rating, higher is better.)	Percentage of assets in good/fair/poor condition
		Backlog of investment needs
		Average age
4. Guideway infrastructure (rail fixed-guideway, track, signals, and systems)	The average percentage of slow zones (in mileage) that an agency has in place based on monthly samples from 9:00 AM on the first Wednesday of each month (slow zones).	Percentage of assets in good/fair/poor condition
		Backlog of investment needs
		Average age
		Hours of delay

Source: GAO analysis of FTA and TCRP information. | GAO-20-686

Based on our survey results, many transit agencies rated FTA's single performance measure for each asset category as less important to their agencies than other factors they considered when assessing the state of good repair of an asset. For example, we estimate that 53 percent of Tier I transit agencies rated FTA's slow zone performance measure as either

<sup>30</sup> TCRP, *A Guidebook for Developing a Transit Performance-Measurement System*, Report 88 (2003).

<sup>31</sup> TCRP Report 172.



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Cover All Key Performance Dimensions

very or moderately important for understanding the condition of rail infrastructure and guideway, a lower rating than all other factors we identified in our survey. In contrast, 83 percent rated visual inspection, which allows agencies to rate asset condition on a scale from excellent to poor, as very or moderately important, and 75 percent of these transit agencies rated age as very or moderately important.

FTA officials told us that they assigned a single performance measure to limit the burden this requirement may impose on small transit agencies. However, TCRP's leading practices are intended to be scalable for any sized agency and provide tools to support their use, which could help reduce administrative burden while still meeting the overall objectives of the program to achieve a state of good repair for the nation's transit assets.

We found that FTA's TAM performance measures partially align with this practice because FTA's single measure for each asset category does not fully reflect all of FTA's standards for assessing the state of good repair. In prior work, we found that effective measures should cover the key performance dimensions that will enable an organization to assess accomplishments, make decisions, realign processes, and assign accountability.<sup>32</sup> MAP-21 required that the TAM performance measures be based on FTA's state of good repair standards, and FTA's TAM rule states that an asset is in a state of good repair if it meets the following standards:<sup>33</sup>

- The asset is able to perform its designed function.
- The asset does not pose an identified unacceptable safety risk.
- The asset's life cycle investment needs have been met or recovered.<sup>34</sup>

However, not all of these standards are captured in FTA's single performance measure per asset category. For example, FTA's performance measure for rolling stock requires transit agencies to report the percentage of these assets that have met or exceeded a useful life benchmark age defined by the transit agency. However, AASHTO

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<sup>32</sup> [GAO/GGD-96-118](#).

<sup>33</sup> 49 U.S.C. § 5326(c)(1).

<sup>34</sup> 49 C.F.R. § 625.41.

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members told us that age is only the first question when it comes to understanding the condition of rolling stock and that operating mileage is necessary to understand whether the asset is performing its designed function. Further, FTA research noted that this type of measure does not indicate whether a vehicle is performing as designed or if it has been maintained to meet its life cycle investment needs.<sup>35</sup>

In addition, FTA's performance measures do not define or adequately capture data on whether an asset poses an unacceptable safety risk. FTA officials told us that only the slow zone measure for guideway infrastructure explicitly captures unacceptable safety concerns. However, AMPO officials and AASHTO members we interviewed, as well as two transit agencies responding to our survey told us this measure does not reflect the actual condition of rail infrastructure assets, in part, because agencies may implement slow zones for reasons other than an identified safety risk, such as traffic management.

FTA officials told us that while the TAM performance measures are related to state of good repair, they do not fully represent FTA's standards because addressing each was too granular of a goal for FTA to pursue, in part, due to the burden this might impose on small transit agencies. Officials told us they instead selected measures that provided a close approximation of the standards and that imposed minimal burden by using data that agencies already collected, when possible.

While FTA limited the burden on transit agencies, its decision not to align its performance measures with its own standards of state of good repair limits the usefulness of the information submitted by transit agencies because it cannot be used to determine reliably whether assets meet FTA's standards. This approach may result in data that could lead decision-makers to believe that asset performance is better or worse than it actually is, making it difficult for them to make effective, performance-based policy decisions.

## Assess Progress toward Goals

We found that FTA's performance measures partially align with this practice because FTA requires transit agencies to establish targets for each of the four measures, which may help FTA monitor trends in TAM performance data; however, the single measure is insufficient to assess the progress toward state of good repair. In prior work, we found that effective performance measures should show an organization's progress

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<sup>35</sup> FTA, *Defining State of Good Repair*, white paper (Washington, D.C.: 2013).

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toward achieving an intended level of performance or results. Where appropriate, performance goals and measures should have quantifiable, numerical targets or other measurable values so that comparisons can be easily made between projected performance and actual results.<sup>36</sup> As previously noted, in response to MAP-21,<sup>37</sup> FTA required transit agencies to set performance targets for each of the four measures annually.

However, FTA's TAM performance measures do not adequately assess progress toward the program's goal of improving the state of good repair because a single performance measure per asset category does not provide a balanced view that covers all key performance dimensions, as discussed above. In prior work, we found that for performance measures to indicate progress toward goals adequately, the measures need to appropriately represent the performance goals and sufficiently cover the key aspects of an agency's performance.<sup>38</sup> Because FTA's single performance measure for each asset category does not fully align with this and other leading practices for effective performance measures, FTA cannot measure progress toward achieving its state of good repair goal or fulfill the broader goal laid out in MAP-21 of establishing a strategic and systematic process for managing the nation's transit assets.

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## FTA Does Not Disclose the Limitations and Intended Uses of TAM Performance Data

We found that FTA's reporting of transit asset state of good repair data produced by its TAM performance measures differs significantly from other state of good repair data reported by DOT, and that FTA has not identified the limitations and intended uses of its TAM performance data. FTA communicates its data on TAM performance through its NTD summary fact sheets and by making the data publicly available on the NTD website. FTA also regularly reports on the condition of the nation's transit assets using different data through DOT's *Conditions and Performance Report to Congress*.<sup>39</sup> FTA's NTD summary and DOT's *Conditions and Performance Report* both make statements on the state of good repair of the nation's transit assets, but the data in these reports differ significantly. For example, FTA's summary of 2018 NTD data,

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<sup>36</sup> [GAO-03-143](#).

<sup>37</sup> Pub. L. No. 112-141, § 20019, 126 Stat. 405, 708 (2012) (codified at 49 U.S.C. § 5326(c)).

<sup>38</sup> GAO, *The Results Act: An Evaluator's Guide to Assessing Agency Annual Performance Plans*, [GAO/GGD-10.1.20](#) (Washington, D.C.: April 1998).

<sup>39</sup> DOT, *Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance*, Report to Congress, 23<sup>rd</sup> Edition (Washington, D.C.: Nov. 21, 2019).

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published in 2019, states that 96 percent of guideway infrastructure was in a state of good repair.<sup>40</sup> FTA based this conclusion on the TAM performance measure data on the percentage of track segments with “slow zones” as reported by Tier I agencies. In contrast, the 2019 *Conditions and Performance Report*, analyzing 2014 data, states that only 63 percent of guideway infrastructure elements were in a state of good repair.<sup>41</sup> Although these reports analyze different years and have differences in definitions, FTA does not provide information about how to interpret or use these differing data, which could be confusing to readers.

We previously found that providing information about a dataset—for example, known limitations of the data in that dataset—allows users to determine whether the database is suitable for their intended purpose and make informed decisions about whether and how to use the data.<sup>42</sup> In prior work, we also found that performance information can be more useful when significant data limitations and their implications for assessing performance are identified.<sup>43</sup> Without the transparent disclosure of data limitations, users may view, analyze, or use data without full knowledge of the extent to which the data are timely, complete, accurate, or comparable over time. This approach could lead users to draw inaccurate conclusions inadvertently from the data.

FTA does not note the limitations and intended use of TAM performance data in its annual NTD summary fact sheets as it does for the transit asset data in the *Conditions and Performance Report*. For example, FTA reported in its summary of 2018 NTD data that it would cost an estimated \$5.3 billion to replace the 13 percent of transit facilities not in a state of good repair according to the facilities performance measure. However, this cost may not reflect actual investment needs. For example, a facility may be rated below a “3” on FTA’s scale for various reasons, including widespread moderate wear or the poor condition of a critical component—such as a roof. Addressing these issues may impose different rehabilitation costs that could vary significantly from the costs of replacing a facility. These replacement costs are the basis for FTA’s

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<sup>40</sup> FTA, *TAM 2018 NTD Year 1 Summary: Overview* (December 2019).

<sup>41</sup> The TAM program defines guideway infrastructure as rail fixed-guideway, track, signals, and systems while the *Conditions and Performance Report* similarly defines guideway elements as tracks, ties, switches, ballasts, tunnels, and elevated structures.

<sup>42</sup> [GAO-19-72](#).

<sup>43</sup> [GAO/GGD/AIMD-99-69](#).

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estimated costs to bring an asset into a state of good repair. However, FTA does not explain these data limitations in its rehabilitation cost estimates, nor does FTA describe how its estimates should be used, or place these figures in context with other state of good repair reporting.

In contrast, FTA includes an appendix to the *Conditions and Performance Report* that discusses its methods and uses for the data reported and notes data limitations alongside the data tables in the report. Further, FTA uses the same terminology (in this case, state of good repair) in its NTD summary report as it does in the *Conditions and Performance Report* without providing context in the NTD summary report to help readers understand the differences in these data.<sup>44</sup>

FTA officials told us that Congress should rely on the *Conditions and Performance Report* to understand the cost of bringing the nation's transit assets into a state of good repair, rather than on FTA's reporting of state of good repair through the TAM measures. The officials told us they are working to incorporate TAM performance data into future editions of the *Conditions and Performance Report* to Congress. However, they had limited confidence in using TAM performance measure data to estimate the cost of bringing the nation's transit assets into a state of good repair because TAM relies on approximate measures that cannot produce data with sufficient precision.

However, the nuances of the different standards FTA uses to assess state of good repair may not be apparent to decision-makers, resulting in confusion. Without information on the limitations and intended uses of TAM performance data, readers may draw inaccurate conclusions on the condition and rehabilitation costs of transit assets, potentially undermining transit agency efforts to build support for investments. Similarly, in the absence of information putting FTA's TAM performance data in context with similar data reported in the *Conditions and Performance Report*, stakeholders may not know which data set they should use for their purposes, potentially affecting policy decisions.

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<sup>44</sup> In the *Conditions and Performance Report*, FTA assesses the condition of assets using life cycle decay curves in TERM. The TERM model rates the condition of assets on a "1" to "5" scale. For the *Conditions and Performance Report*, assets rated below "2.5" on this scale are considered not in a state of good repair.

## FTA’s Current TAM Requirements May Not Prepare Transit Agencies to Manage Transit Assets over Their Life Cycles, but Change Management Planning Could Help

### FTA’s TAM Program Does Not Fully Align with Leading Practices for Transit Asset Management

FTA’s TAM program requirements may not lead to management practices that address the life cycle issues of transit assets because they do not include all leading practices in transit asset management. FTA’s final rule was designed to help transit agencies manage assets over their life cycles, and FTA has sponsored research by the TCRP to develop tools for transit agencies to improve asset management and achieve a state of good repair.<sup>45</sup> By implementing best practices in transit asset management, a transit agency can make data-driven investment decisions that reduce the costs of maintaining its system over time, freeing up funds where possible to help improve service, according to TCRP. TCRP developed five steps for effective TAM planning and meeting the requirements of MAP-21 (see fig. 6).

**Figure 6: Steps for Developing a Transit Asset Management (TAM) Plan**



Source: Transit Cooperative Research Program Report 172. | GAO-20-686

<sup>45</sup> TCRP Report 172.

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While FTA's TAM program requires some of these steps, it does not require transit agencies to follow all five of them.<sup>46</sup> As discussed earlier, FTA's TAM program requires transit agencies to inventory assets and assess asset condition (covered in Steps 1 and 2), as part of requirements to develop a TAM plan (covered in Step 5). However, FTA does not require transit agencies to define investment scenarios (Step 3) and, therefore, does not require their finalization (Step 4).

According to TCRP, defining investment scenarios involves developing a number of "stories" about what will happen to the transit agency's assets, its level and quality of services, and to the system as a whole, based on funding and prioritization decisions. Further, TCRP notes that comparing these scenarios is a powerful tool for supporting investment decisions, particularly when a decision-maker must contend with significant uncertainty and investment objectives that are difficult to weigh against each other. The process of evaluating asset investment scenarios requires developing assumptions and simulating future conditions.

In Step 3, TCRP recommends developing at least four specific investment scenarios:

- Current funding levels: assumes that funding levels will stay the same as they are indefinitely.
- Maintaining current asset condition and performance: describes the funding required to maintain the status quo. As most transit agencies have a backlog of investment needs, maintaining current asset conditions is generally a less ambitious goal than achieving a state of good repair.
- Projected future funding for assets: illustrates the outcomes based on preferred funding level. Typically, this amount will lead to conditions and performance measures that fall above current conditions but below state of good repair.
- Achieving state of good repair: describes the replacement actions consistent with achieving a state of good repair, minimizing costs over time.

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<sup>46</sup> TCRP Report 172 outlines five overall steps, with 18 sub-steps to effective TAM planning. Considering that 2018 was the first year of FTA's TAM program, we focused on whether the five larger steps were required of transit agencies in at least some minimal way. We did not evaluate whether FTA fully met each of the sub-steps.

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Although FTA does not include these scenarios in TAM requirements, FTA highlights their benefits in its *TAM Guide*, stating that the investment scenarios can improve decision-making by providing key data to decision-makers.<sup>47</sup> Specifically, FTA states that the scenarios provide a common framework for all parties to discuss the effects of uncertainties, and a transparent consideration of trade-offs and their implications in the planning and budgeting process. Investment scenarios can be used by a transit agency to consider the effects of different levels of investment and budget allocations in order to allocate funding to its assets optimally, according to the *TAM Guide*.

FTA officials told us that they were already in the process of developing their final rule when the TCRP guidance came out and that they have no plans to revise current TAM requirements incorporating this guidance because they designed the requirements to minimize the burden on transit agencies, particularly smaller ones. However, TCRP states that its steps for effective TAM plans can be adapted for any size transit agency, including the steps to define and finalize investment scenarios. Further, TCRP provided a Transit Asset Prioritization Tool to help agencies run scenarios and interpret the output, such as when various vehicles would be replaced based on the assumptions for each scenario. The summary results produce key information for each scenario that is needed for informed decision-making such as the remaining backlog, passenger delays, and the mean distance between asset failures.

FTA states in the *TAM Guide* that “more mature” transit asset agencies may use scenario evaluations. When asked what FTA considered a mature transit asset agency to be, FTA officials told us that agencies self-determine whether they are mature enough to use scenarios, and FTA does not limit agencies’ options to try more advanced practices. FTA also stated in its *TAM Guide* that scenario planning is a “best practice” but that only a small minority of transit agencies use scenario planning. Without the requirement for agencies to use investment scenarios, many agencies may overlook this key tool and lack an effective process for making and communicating challenging investment decisions to stakeholders and the public.

Further, TCRP recommends a long-term perspective for transit asset management that considers an asset’s entire life cycle, but FTA’s requirements may not lead to this perspective. Specifically, when

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<sup>47</sup> FTA, *Transit Asset Management Guide*.



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developing asset investment scenarios in Step 3, TCRP states that agencies' scenarios should extend at least 10 and preferably 20 years into the future. FTA requires transit agencies to forecast investments in their TAM plans, but requires a minimum of a 4-year planning horizon that is substantially shorter than the intended life cycle of many transit assets, such as railcars or buses.

FTA's 4-year planning horizon minimum is shorter than those of its transportation asset management planning counterparts, which could present challenges when coordinating regional planning as required by MAP-21. The Federal Highway Administration (FHWA) noted in its report on long-term asset management that by its very nature, asset management assumes a long-term view requiring a long-term strategic approach.<sup>48</sup> Accordingly, FHWA requires state DOTs to develop asset management plans that include a financial plan covering at least a 10-year horizon period.<sup>49</sup> Further, MPOs are required by statute to use a 20-plus year planning horizon to develop a Metropolitan Transportation Plan that demonstrates how the metropolitan area will manage and operate a multi-modal transportation system including transit.<sup>50</sup> AMPO officials told us that the short nature of the TAM planning process does not lend itself to the process MPOs use for planning. They noted that most planning processes look out at least 10 years into the future, and as a result of TAM's shorter horizons, the current process involves more educated guesses and reconciliation of the different planning horizons of TAM and MPO planning.

FTA officials told us they set a 4-year planning horizon in order to match the planning cycles of the MPOs' Transportation Improvement Program and the Statewide Transportation Improvement Program where federal

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<sup>48</sup> FHWA, *Beyond the Short Term: Transportation Asset Management for Long-Term Sustainability, Accountability and Performance*. Pub. No. FHWA-IF-10-009.

<sup>49</sup> See 23 U.S.C. § 119(e); 23 C.F.R. §§ 515.9(d), 515.7(d).

<sup>50</sup> See, 49 U.S.C. § 5303(c), (i).

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funding decisions are made.<sup>51</sup> However, FTA could require the TAM plan to be updated every 4 years while still requiring longer planning horizons. In fact, every 4 years, state DOTs are to update their asset management plans and MPOs are to update their Metropolitan Transportation Plans and use them for Statewide Transportation Improvement Program coordination, yet they have a planning horizon of 10 and 20-plus years respectively.

By requiring only a minimum TAM plan horizon of 4 years, FTA is missing an opportunity to encourage transit agencies to consider fully their investment needs over the long-term and the considerable costs of replacing those assets over time. The shorter, minimum planning horizon may also not fully account for the investments needed to keep these assets in a state of good repair over their considerable life cycles. In addition, transit agencies planning 4 years in the future may not have the information needed to communicate the long-term needs of their local transit systems to their MPOs as they develop their long-term Metropolitan Transportation Plans and make decisions about future surface transportation projects.

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**FTA Lacks a Plan to Address Program Shortcomings and Enhance Long-Term Transit Asset Management**

We have identified several areas that could improve the TAM program particularly with respect to:

- FTA's limited TAM performance measures,
- a lack of funding scenario requirements for transit agencies, and
- an emphasis on short-term rather than long-term asset planning.

FTA officials told us that addressing these issues would require changes to its final rule issued in 2016, that such changes would be a lengthy and

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<sup>51</sup> Each state is required under 49 U.S.C. § 5304(g) to develop a statewide transportation improvement program covering a period of 4 years. This program is a staged, multi-year, statewide intermodal program of transportation projects, consistent with the statewide transportation plan and planning processes. The Statewide Transportation Improvement Program must, among other requirements, be developed in consultation with the MPOs, which are required to develop a Metropolitan Transportation Improvement Program, also covering a 4-year period (49 U.S.C. 5303(j)). The statewide transportation improvement program must be compatible with the Transportation Improvement Programs for the state's metropolitan areas.

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costly process for the agency, and that FTA had no immediate plans for changes considering that the TAM program is still new.

Leading program management practices emphasize the importance of change management planning that involves identifying areas for improvement and planning for change in a forward-looking, proactive manner. The Project Management Institute, Inc. has developed *The Standard for Program Management* that highlights the importance of plans including change management plans.<sup>52</sup> More specifically, change management asks program managers to consider ways that an organization can adapt to be able to exploit the benefits created by the program, by carefully analyzing the need for proposed change, the effects of change, and the approach or process for implementing and communicating change.

FTA officials told us that they have not established a plan to manage future program changes. Even so, FTA has taken important steps to begin to evaluate the effects of the TAM program. Specifically, DOT's Volpe Center is conducting an external evaluation of FTA's TAM program with the ultimate goal to identify the overall effects of the TAM final rule and associated requirements on the transit industry as a whole.<sup>53</sup> Volpe's plan for its evaluation includes conducting focus groups of transit agencies and analysis of FTA TAM data, with a final report planned for the fall of 2021. In addition, FTA is collecting data on transit agencies' compliance with the TAM requirements through its comprehensive oversight reviews, and FTA should have completed reviews with all covered transit agencies by 2021.

FTA officials told us that Volpe's evaluation is designed to track the effects of TAM implementation but not direct future programmatic changes. However, planning for future change is even more important when change requires a lengthy process to implement such as through a change in regulation, as with the TAM program. Without a plan for how FTA intends to analyze, implement, and communicate any future program improvements, FTA and its stakeholder transit agencies lack reasonable assurance that FTA has the tools in place to make program changes to ensure that the intended benefits of the TAM program are realized.

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<sup>52</sup> Project Management Institute, Inc., *The Standard for Program Management*, Fourth Edition, (2017).

<sup>53</sup> The Volpe Center is a research organization within DOT that supports the missions of DOT's administrations.

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Having such a plan would help FTA ensure that improvements identified by the Volpe evaluation, by the comprehensive oversight review process, and by our review are integrated into the TAM program as efficiently as possible for the long-term benefit of transit asset management.

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## Conclusions

FTA, through its TAM program, has taken an important step to help the nation's transit agencies use asset management practices to inform their investment decisions, and some agencies have improved their practices as a result of the program. However, FTA's efforts to minimize burden have resulted in several program shortcomings that come at the expense of important improvements to transit asset management. First, because FTA's performance measures are limited to a single measure per asset category, FTA cannot reliably use them to assess the condition of the nation's transit assets or measure progress toward achieving stated goals. Second, because FTA has not disclosed the limitations in its TAM performance measures data, and it has not placed this new data in context with similar DOT data, decision-makers lack clarity on how to use this information when making funding decisions. Third, the lack of an investment scenario requirement in the TAM plan may result in transit agencies making important investment decisions—such as whether an asset should be replaced or repaired—without considering varying assumptions that could help them optimally allocate resources. Finally, the 4-year nature of the TAM planning timeframe does not align with longer timeframes used by transportation planning counterparts. This lack of alignment could lead to coordination challenges and result in a process that does not fully address long-term transit investment needs.

Nonetheless, the TAM program is still new and FTA has ongoing efforts to identify other potential improvements. While it may not be practical to make a rule change at this early stage, developing a plan to manage program change now—that establishes a process for FTA to analyze, implement, and communicate future changes to the program—would position FTA to leverage fully the insights it is collecting through its ongoing program evaluation. Such a plan that addresses the issues we have identified would also build on the progress that FTA has made so far and help ensure that the program will achieve intended benefits for transit agencies, the public they serve, and taxpayers.

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## Recommendations for Executive Action

We are making two recommendations to the FTA:

The FTA Administrator should include the known limitations and intended uses of its TAM performance data in its public reports such as its annual

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NTD summary and other reports for decision-makers. This action should include clarifying the context of state of good repair data in TAM reports in relation to similar data in DOT's *Condition and Performance Report* and how they differ. (Recommendation 1)

The FTA Administrator should develop a plan for how FTA intends to analyze, implement, and communicate any identified TAM program improvements moving forward. The plan should describe how FTA intends to address:

- relying on a single performance measure per asset category,
- potential limited use of investment scenarios by transit agencies in making asset decisions, and
- shorter-term planning horizons than those used by other planning counterparts. (Recommendation 2)

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## Agency Comments

We sent a copy of this draft report to DOT for review and comment. The department provided a written response, which is reprinted in appendix III, and technical comments that we incorporated as appropriate in the report. The department concurred with both of our recommendations. It also described several actions taken to support improvement of the TAM program since October 2018, including publishing 2 guidebooks and conducting 15 webinars on implementing TAM.

In its concurrence with Recommendation 2, FTA noted that the current regulatory requirements for the TAM program are consistent with statutory requirements, and noted that Congress is considering legislation for a major surface transportation reauthorization that could change the applicable requirements. FTA stated that it would develop a plan for providing additional technical assistance to support transit providers that voluntarily choose to implement expanded performance measures, investment scenarios, and longer planning horizons. We believe that any plan for additional technical assistance could be beneficial to transit agencies, but that it should not replace an overall plan for how FTA intends to analyze, implement, and communicate any identified TAM program improvements moving forward. Such a plan would help ensure that improvements identified not only by our review, but also through FTA's comprehensive oversight review process and the Volpe evaluation are integrated into the TAM program as efficiently as possible for the long-term benefit of transit asset management.

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We are sending copies of this report to appropriate congressional committees and to the Secretary of Transportation. In addition, the report is available at no charge on the GAO website at <http://www.gao.gov>. If you or your staff have any questions about this report, please contact me at (202) 512-2834 or [Vonaha@gao.gov](mailto:Vonaha@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who contributed to this report are listed in appendix IV.

A handwritten signature in black ink, appearing to read "Andrew Von Ah". The signature is fluid and cursive, with a long horizontal stroke at the end.

Andrew Von Ah  
Director, Physical Infrastructure Issues

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# Appendix I: Additional Results from the Transit Asset Management (TAM) Program Surveys

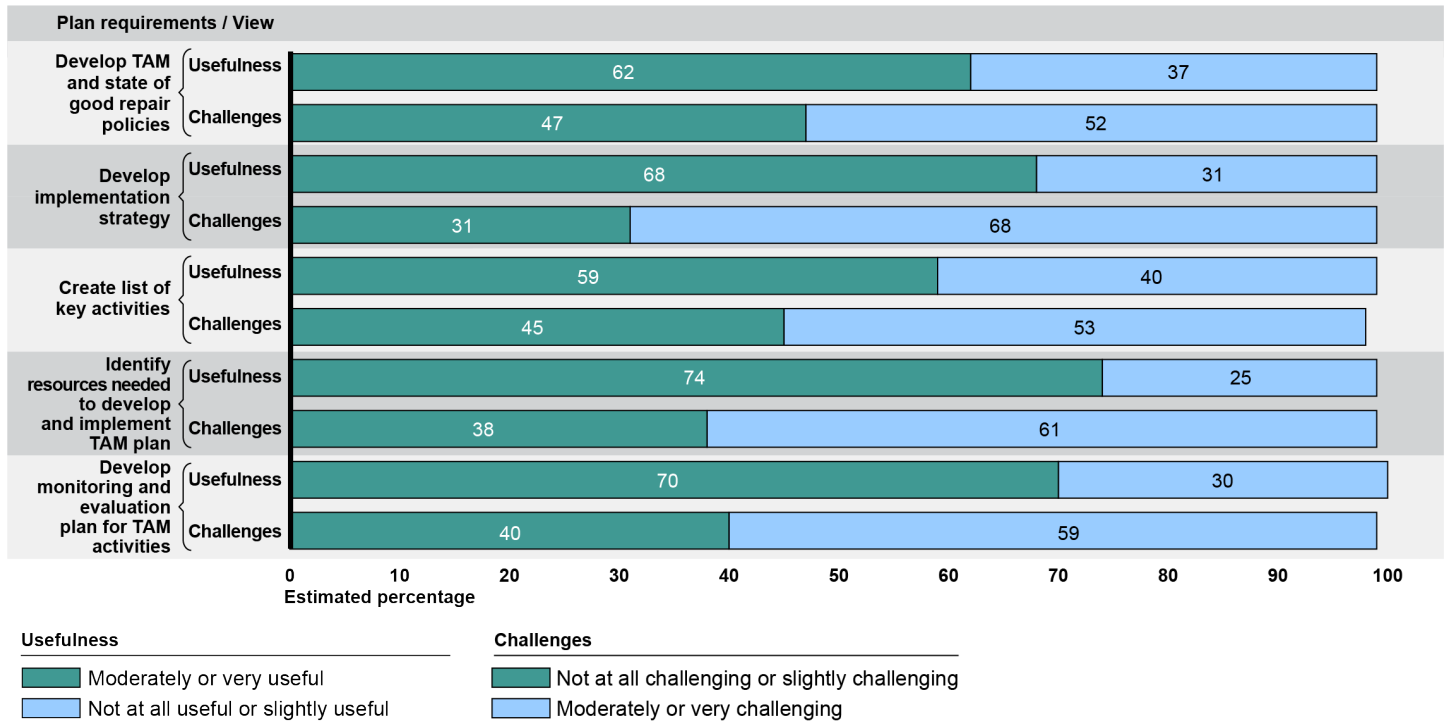
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Tier I Agencies and Group  
Plan Sponsors Reported  
Specific TAM  
Requirements Were  
Useful for Capital Planning  
but Challenging to  
Implement

Requirements Specific to Tier I  
Agencies

The Federal Transit Administration (FTA) established five TAM requirements that applied only to Tier I agencies (refer to table 1) and the majority of Tier I agencies found requirements specific to them to be both useful for their capital planning purposes, and challenging to implement, according to our survey. For example, we estimate that 68 percent of Tier I agencies indicated that developing an implementation strategy for their TAM efforts was either very or moderately useful for capital planning. However, the same percentage of these transit agencies also found this requirement to be moderately or very challenging (see fig. 7).

**Figure 7: Tier I Agency Views on the Usefulness and Level of Challenge Meeting Specific Transit Asset Management (TAM) Plan Requirements (Estimated Percentages)**



Source: GAO analysis of transit agency responses to GAO survey. | GAO-20-686

Notes: In general, Tier I agencies are defined by the Federal Transit Administration as those which own, operate, or manage either rail transit or more than 100 vehicles in revenue service during peak regular service hours across all fixed route modes or in one non-fixed route mode. Percentages may not total 100 percent, as “did not know” responses were not included. Estimates in this figure have a margin of error of +/- 10 percentage points or fewer, at the 95 percent confidence level. Rounding of data may result in minor differences between the figure’s and the electronic supplement’s results.

### Requirements Applicable to Group TAM Plan Sponsors

A majority of group TAM plan sponsors reported that most TAM requirements specific to them were challenging.<sup>1</sup> FTA established requirements specific to group TAM plan sponsors that focused on consolidating or coordinating the collection of asset inventories and other information across the transit agencies participating in the group TAM

<sup>1</sup> Group TAM plan sponsors coordinate with Tier II agencies participating in the plans to consolidate inventory lists and coordinate condition assessments. Responsibilities also include reporting data to FTA’s National Transit Database on behalf of the group participants, working with participants to use decision support tools, and analyzing and interpreting data submitted by the participants as well as generating a ranked list of prioritized projects for the entire group.

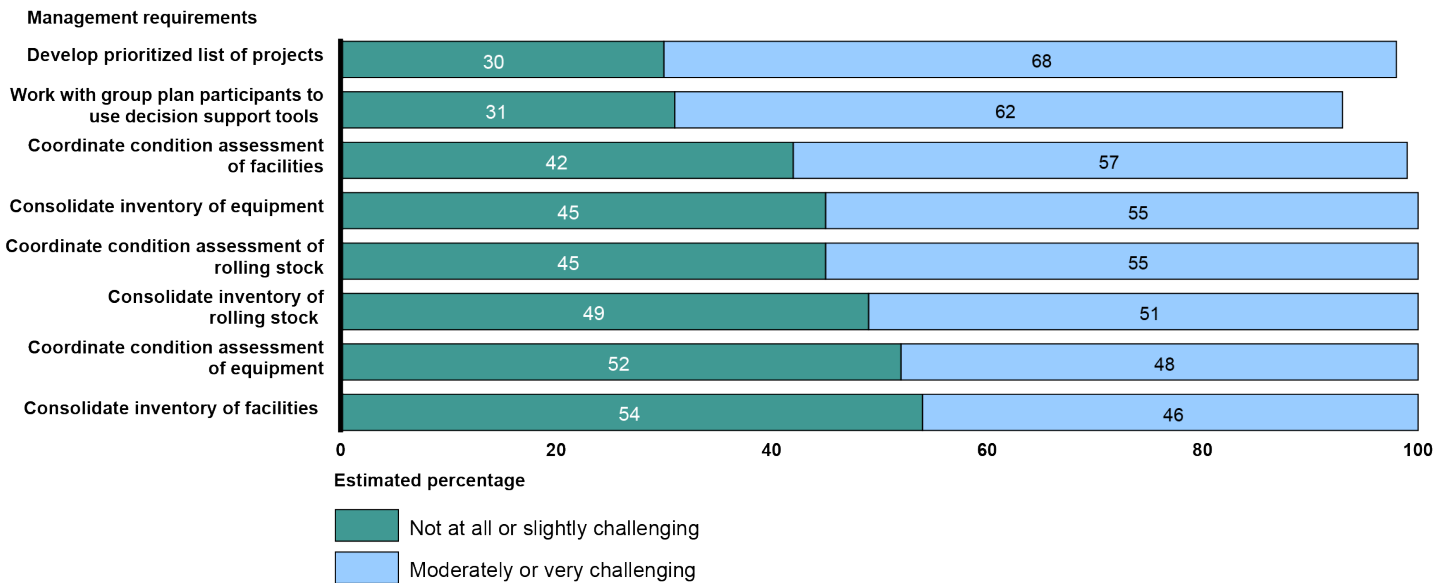


**Appendix I: Additional Results from the Transit Asset Management (TAM) Program Surveys**

plan. As described previously, Tier II agencies may develop their own plan or participate in a group TAM plan with a sponsor. Based on our survey results, we estimate that 46 percent of urban Tier II agencies participated in a group TAM plan and 54 percent completed their own TAM plan.

Based on our survey, 68 percent of group TAM plan sponsors found developing the prioritized list of projects for group TAM plan participants to be moderately or very challenging (see fig. 8). One group TAM plan sponsor noted in a narrative response to our survey that coordinating information among many participants has proved to be difficult. Another group plan sponsor told us that the process of prioritizing projects was cumbersome, so they used a consultant to develop a new, weighted process for prioritization.

**Figure 8: Percentage of Group Transit Asset Management (TAM) Plan Sponsors Reporting Challenges Meeting TAM Requirements**



Source: GAO analysis of group TAM plan sponsor responses to GAO survey. | GAO-20-686

Notes: Percentages may not total 100 percent, as “did not know” responses were not included. Percentages are based on the number of respondents who provided a valid response to the survey questions and does not include those respondents who indicated the question was “Not Applicable”. The number of respondents providing a valid response to these questions ranged from 48 to 56. Rounding of data may result in minor differences between the figure’s and the electronic supplement’s results.

In narrative responses to our survey, 22 officials described benefits of group plan requirements, including improved capital planning for transit assets. For example, one sponsor stated that the program enabled better use of capital funding for vehicle replacement for plan participants. Further, other group sponsors noted that TAM requirements allowed the group TAM sponsor to better understand which participant transit agencies needed either additional guidance or resources, including software to track agency data. In addition, an official from a Tier II agency noted that having the option of participating in a group plan was helpful as producing your own plan would require additional resources to hire a consultant.

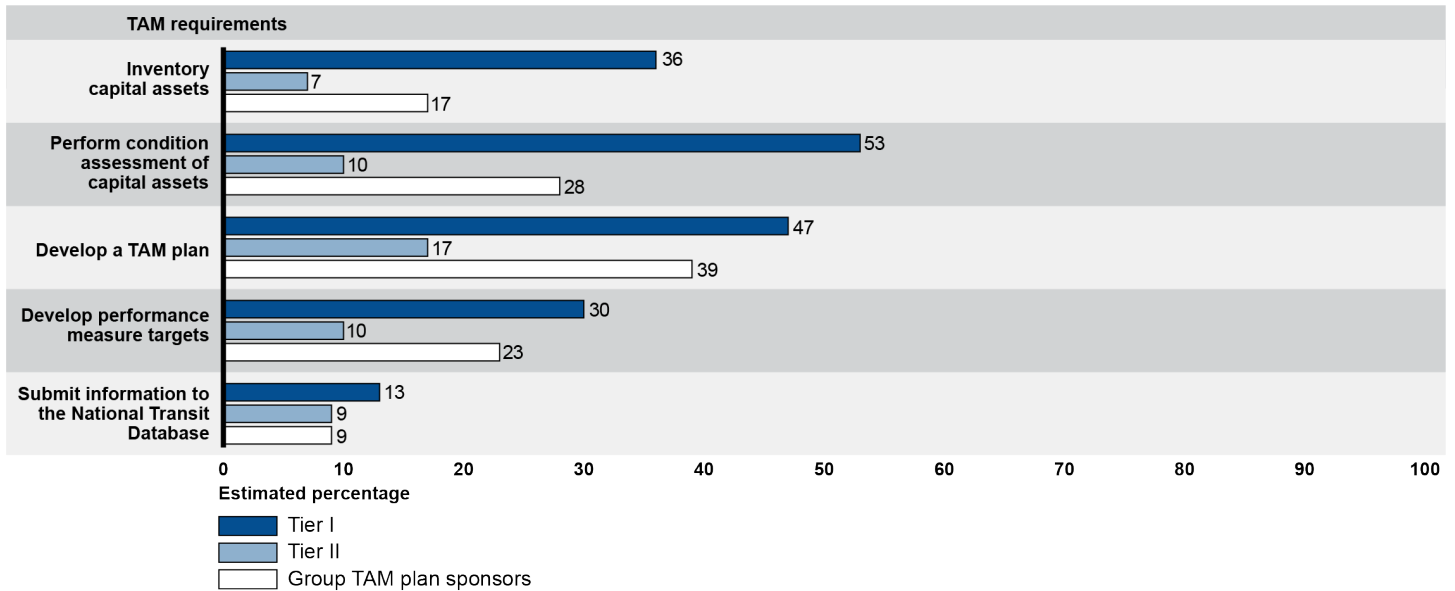
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**More Tier I Agencies Used  
Additional Resources to  
Meet TAM Requirements**

Based on our survey results, some transit agency officials and group TAM plan sponsors hired additional workers, contractors or consultants to help complete specific tasks and Tier I agencies used these additional workers the most. For example, we estimate 53 percent of Tier I agencies hired consultants, contractors or additional workers to perform condition assessments, compared to 10 percent of urban Tier II agencies. Additionally, 28 percent of group plan sponsors reported hiring consultants, contractors or additional workers to perform condition assessments as well (see fig. 9). Tier I agencies in general are larger and have more assets for which they are responsible, which requires larger amounts of data collection.

Appendix I: Additional Results from the Transit Asset Management (TAM) Program Surveys

Figure 9: Transit Asset Management (TAM) Officials Who Reported Hiring Consultants, Contractors, or Additional Workers to Complete TAM Requirements (Percentages by Respondent Type)



Source: GAO analysis of group TAM plan sponsor and transit agency responses to GAO survey. | GAO-20-686

Notes: In general, Tier I agencies are defined by the Federal Transit Administration as those which own, operate, or manage either rail transit or more than 100 vehicles in revenue service during peak regular service hours across all fixed route modes or in one non-fixed route mode. Tier II transit agencies are generally those that fall below these thresholds and do not provide rail services. Percentages may not total 100 percent, as “did not know” responses were not included. Estimates in this figure have a margin of error of +/- 10 percentage points or fewer, at the 95 percent confidence level. Percentages for the Group TAM plan sponsors are unweighted percentages of survey responses, not estimates to a broader population and based on the 56 or 58 group TAM plan respondents who provided a valid response to each question. Rounding of data may result in minor differences between the figure’s and the electronic supplement’s results.

For additional survey results, see [GAO-20-687SP](#), an electronic supplement to this report, which can be found on the GAO website.

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# Appendix II: Objectives, Scope, and Methodology

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Our objectives were to examine the extent to which: (1) transit agencies reported improvements to their asset management as a result of the Federal Transit Administration's (FTA) Transit Asset Management (TAM) program; (2) FTA has established performance measures to assess asset condition and reported information on those measures; and (3) FTA's TAM program requirements prepare transit agencies to manage transit assets over their life cycles.

## Urban Transit Agency and Group Plan Sponsor Surveys

To examine the extent to which transit agencies reported improvement to their asset management as a result of the TAM program, we conducted two web-based surveys including one survey of urban Tier I and Tier II transit agencies and another of group TAM plan sponsors.<sup>1</sup> We administered the surveys from October 2019 to January 2020. Results of these surveys and the survey instruments have been published in [GAO-20-687SP](#), an electronic supplement to this report, which can be found on the GAO website.

## Survey Population and Sample Design

To define the survey populations for the two web-based surveys, we primarily used fiscal year 2017 reporting data from FTA's National Transit Database (NTD) to identify eligible transit agencies and group TAM plan sponsors.<sup>2</sup> Based on interviews with DOT officials and analysis of the NTD data, we determined that the full sample frame of transit agency data was sufficiently reliable for our purposes.

We constructed the survey population of transit agencies for our surveys by identifying Tier I and Tier II agencies as well as group TAM plan sponsors in the NTD data. Tier I agencies (which generally have more assets) must develop their own TAM plans; while Tier II agencies (which generally have fewer assets) have the option to either develop their own

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<sup>1</sup> FTA defines Tier I transit agencies as those recipients that own, operate, or manage either rail transit, or more than 100 vehicles in revenue service during peak regular service hours across all fixed-route modes, or more than 100 vehicles in one non-fixed route mode. Tier II transit agencies are generally those that fall below the Tier I thresholds. Sub-recipients of section 5311 funds (49 U.S.C. § 5311 – formula grants for rural areas) or any American Indian tribes are also classified as Tier II. FTA identifies group TAM plan sponsors in the NTD as both group sponsors and state reporters. We also removed agencies in outlying U.S. territories.

<sup>2</sup> The NTD is a centralized source for information and statistics on the nation's transit systems managed by FTA. Recipients or beneficiaries of FTA grants report data to the database and FTA submits annual NTD reports to Congress summarizing transit service and safety data. We primarily used data from fiscal year 2017 reported by transit agencies as this was the most recently published data according to FTA officials. However, FTA provided unpublished 2018 data for extensions requested by agencies and we used this information as part of our stratified sample.

TAM plan, or participate in a group plan with other transit agencies. Also, group TAM plan sponsors are generally the state DOT or other designated, direct recipient of federal transit funding that prepares a TAM group plan covering at least one Tier II, urban or rural transit agency in a region. During our survey field period, we identified and excluded additional agencies that we determined were not in scope for our survey effort. For example, we excluded Tier I and Tier II agencies that did not receive public federal funding, did not provide transit services, or if two or more agencies were listed separately in the NTD and were not in a group plan but coordinated to develop a single TAM plan. We did not include rural agencies in the scope of this survey because FTA officials told us that other agencies, including State DOTs, are responsible for reporting rural transit agency data in NTD, and they expected that rural agencies largely participate in group plans. We also excluded group TAM plan sponsors that were listed in the NTD data but we later identified as not serving as a sponsor.

We determined there were 903 in-scope Tier I and Tier II transit agencies serving urban areas and 68 group TAM plan sponsors. For the urban transit agency survey, we selected a stratified random sample of 324 urban transit agencies. We stratified agencies into four strata based on Tier (I or II) and by extension status (received extension or no extension). We selected all 151 Tier I transit agencies with certainty and a sample of 173 in-scope Tier II transit agencies (see following sections for more discussion regarding stratified, weighted sample technique). For the group plan sponsor survey, we surveyed all 68 group plan sponsors.

#### Administration of Survey and Quality Assurance

We developed survey questions to obtain information about how agencies and group TAM plan sponsors met TAM requirements, including any improvements or benefits from the program, challenges they experienced meeting program requirements, and any suggestions to improve the program. Specifically, we asked about transit agency official views regarding the implementation of program requirements, including FTA's asset performance measures and any improvements to the quality of agency asset inventories and condition assessments as a result of the program. Prior to conducting these surveys, we conducted seven survey pretests with Tier I and Tier II transit agencies as well as group plan sponsors. We selected respondents that were required to meet TAM requirements and represented different parts of the country. We conducted these pretests to determine if the questions were burdensome, understandable, and measured what we intended, and to ensure we could identify an appropriate individual who was knowledgeable about TAM requirements to respond to the survey. Based on feedback from the

pretests and subsequent input from FTA, we modified survey questions as appropriate.

Prior to the start of our survey field period, we sent an initial email alerting agency contacts to the upcoming web-based survey. Approximately a week after the initial email was sent, the survey link was delivered to recipients via email message. Our email message described the purpose and topic of the survey, and to increase the accuracy of the survey, we encouraged the respondent to identify the best person in the organization to respond. To help increase our response rate, we also sent reminder emails and called agency officials after the survey was sent out.

#### Response Rates, Sampling Error, and Estimation

Based on the 78 percent weighted response rate to our urban transit agency survey and our analysis of the characteristics of the survey respondents, we determined that weighted estimates produced from this sample are generalizable to the population of urban transit agencies as reported to FTA's NTD by transit agencies in 2017.

For the urban transit agency survey, we received valid responses from 256 of the 324 in-scope sampled urban transit agencies, which represents an unweighted response rate of 79 percent for the urban transit agency survey. The weighted response rate, which accounts for differential response levels between strata, was 78 percent. For the group TAM plan sponsor survey, we received 58 valid responses from the 68 group TAM plan sponsors we surveyed, representing an 85 percent response rate. These survey results are presented as percentages in our report.

To produce the estimates from this survey for use in the report regarding urban transit agency responses, answers from each responding case were weighted in the analysis to account statistically for all the members of the population, including those who were not selected or did not respond to the survey. In addition, we conducted an analysis of our survey results to identify potential sources of nonresponse bias and found no statistically significant differences between estimates generated from respondents and non-respondents to known population values or in estimated response propensities when controlling for agency characteristics and multi-collinearity. Table 4 provides a description of the different stratified sample groups we identified, the population of those groups, the in-scope sample size or the number of the population we used as part of our sample, the number of responses we received, and the unweighted response rates.

**Table 4: Stratified Sample of Tier I and Tier II Urban Transit Agencies**

Description of stratified sample group	Population size	In-scope sample size	Number of responses	Unweighted response rate (percentage)
Urban – Tier 1 No Extension	139	139	110	79
Urban – Tier 1 Extension	12	12	10	83
Urban – Tier 2 No Extension	734	155	121	78
Urban – Tier 2 Extension	18	18	15	83
<b>Total</b>	<b>903</b>	<b>324</b>	<b>256</b>	

Source: GAO analysis of Federal Transit Administration information | GAO 20-686

Because our results from the urban transit agency survey are based on a sample and different samples could provide different estimates, we express our confidence in the precision of our particular sample’s results as a 95 percent confidence interval (for example, plus or minus 10 percentage points). We are 95 percent confident that each of the confidence intervals in this report include the true values in the study population. Unless we note otherwise, percentage estimates based on urban transit agencies have 95 percent confidence intervals of within plus or minus 10 percentage points. Confidence intervals for survey estimates are presented in our supplemental survey product ([GAO-20-687SP](#)).

**Non-Sampling Error**

In addition to the reported sampling errors, the practical difficulties of conducting any survey may introduce other types of errors, commonly referred to as non-sampling errors. For example, differences in how a particular question is interpreted, the sources of information available to respondents, or the types of people who do not respond can introduce unwanted variability into the survey results. We included steps in both the data collection and data analysis stages for the purpose of minimizing such non-sampling errors.

We took the following steps to increase the response rate and minimize non-sampling errors: developed the survey questionnaires so they align with the best available information regarding the TAM program, pre-tested the questionnaires with urban transit agencies and group plan sponsors, and conducted multiple follow-ups to identify the appropriate contact at organizations when emails were returned and encouraged responses to the survey, including phone calls to individual transit agencies.

**Methods for Other Objectives**

To examine the extent to which FTA has established performance measures to assess asset condition and reported information on these

measures, we compared FTA's performance measures against leading practices for transit asset management established by the DOT-sponsored Transit Cooperative Research Program (TCRP)<sup>3</sup> as well as leading practices for performance measures in prior GAO reports.<sup>4</sup> We also analyzed relevant data and written comments we collected from transit agencies through our survey. To examine the ways in which FTA communicates the performance measure data collected by the TAM program to the public and Congress, we reviewed FTA's summary of 2018 TAM data reported to the NTD, the 23rd edition of DOT's *Conditions and Performance Report to Congress* (2019), and TAM data hosted on FTA's NTD website. We compared FTA's efforts in reporting data against the most relevant leading practice for transparently reporting government data, and fully describing government data.<sup>5</sup> We selected this leading practice because it was the most relevant for assessing the clarity of FTA's asset performance reporting.

To examine the extent to which FTA's TAM program requirements prepare transit agencies to manage transit assets over their life cycles, we compared the requirements against leading practices for effective transit asset management planning established in TCRPs *Guidance for Developing a Transit Asset Management Plan*.<sup>6</sup> We also reviewed FTA's internal oversight documentation, the plan to evaluate the program developed and conducted by the Department of Transportation's (DOT) Volpe Center.<sup>7</sup> We compared this information against leading practices

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<sup>3</sup> TCRP, *Guidance for Developing a Transit Asset Management Plan*, Report 172 (2014). TCRP is an applied research program sponsored by FTA and managed by the Transportation Research Board, a division of the National Academies of Sciences, Engineering, and Medicine.

<sup>4</sup> The four leading practices used in this report reflect the four characteristics for successful performance measures discussed in GAO, *Executive Guide: Effectively Implementing the Government Performance and Results Act*, [GAO/GGD-96-118](#) (Washington, D.C.: June 1996); and *Tax Administration: IRS Needs To Further Refine Its Tax Filing Season Performance Measures*, [GAO-03-143](#) (Washington, D.C.: Nov. 22, 2002).

<sup>5</sup> GAO, *Open Data: Treasury Could Better Align USAspending.gov with Key Practices and Search Requirements*, [GAO-19-72](#) (Washington, D.C.: Dec. 13, 2018).

<sup>6</sup> TCRP, *Guidance for Developing a Transit Asset Management Plan*, Report 172 (2014).

<sup>7</sup> The John A. Volpe National Transportation Systems Center conducts transportation research for DOT administrations and other entities.



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identified in the Project Management Institute's *The Standard for Program Management*.<sup>8</sup>

To examine all objective questions, we reviewed relevant laws, regulations, and FTA documents, such as the *TAM Guide*, and the Fact Sheets for the Final Rule and State of Good Repair Grants, on the implementation of the TAM program. We also conducted interviews with FTA officials about how they developed program requirements, including performance measures, as well as with a nongeneralizable selection of external transit stakeholders who were knowledgeable about the program requirements. These transit stakeholders included the American Association of State Highway and Transportation Officials (AASHTO), the Association of Metropolitan Planning Organizations (AMPO), the American Public Transportation Association (APTA), and the Community Transportation Association of America (CTAA). We selected the stakeholders based on our interviews with FTA as well as a review of past GAO reports and current literature in the field.

We conducted this performance audit from April 2019 to September 2020 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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<sup>8</sup> Project Management Institute, Inc., *The Standard for Program Management* Fourth Edition, (2017).

# Appendix III: Comments from the Department of Transportation



**U.S. Department of  
Transportation**  
Office of the Secretary  
of Transportation

Assistant Secretary  
for Administration

1200 New Jersey Avenue, SE  
Washington, DC 20590

September 10, 2020

Andrew Von Ah  
Director, Physical Infrastructure Issues  
U.S. Government Accountability Office  
441 G Street NW  
Washington, DC 20548

Dear Mr. Von Ah:

The Federal Transit Administration's (FTA) Transit Asset Management (TAM) program rule requires transit providers to develop asset management plans and establish performance targets to improve the condition of their capital assets. All FTA recipients and sub-recipients that own, operate, or manage capital assets used for public transportation were required to have a TAM plan in place by October 1, 2018. The TAM program is scalable, with more rigorous requirements for larger operators while also minimizing the administrative and reporting burden on smaller transit providers.

FTA has taken several actions since the mandatory compliance date of October 1, 2018, to support continuous improvement of the TAM program, including the following:

- Published two guidebooks and conducted 15 webinars on implementing TAM;
- Developed numerous technical resources, including templates and decision support tools;
- Hosted annual roundtables that bring transit providers together for multi-day discussions of issues relating to TAM implementation; and
- Launched a new course through the National Transit Institute, *Enhancing Your TAM Program with Lifecycle Management*, which covers managing asset lifecycles and risk.

Upon review of GAO's draft report, FTA concurs with Recommendation 1 to identify the known limitations and intended uses of FTA's TAM performance data in FTA's public reports, and to clarify the context of state of good repair data in TAM reports in relation to similar data in DOT's *Conditions and Performance Report*.

FTA concurs with Recommendation 2 to develop a plan for how FTA intends to analyze, implement, and communicate any identified TAM program improvements moving forward, including how FTA intends to address: (1) relying on a single performance measure per asset category, (2) potential limited use of investment scenarios by transit agencies in making asset decisions, and (3) shorter-term planning horizons than those used by other planning counterparts.

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**Appendix III: Comments from the Department  
of Transportation**

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FTA believes the current regulatory requirements for the TAM program are consistent with statutory requirements, and notes that Congress is considering a major surface transportation reauthorization that could change the applicable requirements. However, transit providers may voluntarily implement more robust and sophisticated TAM practices beyond those necessary to comply with the rule. As an alternative action, FTA will develop a plan for providing additional technical assistance to support transit providers who voluntarily choose to implement: (1) an expanded list of performance measures beyond one per asset category, (2) investment scenarios that transit providers could use in making asset decisions, or (3) planning horizons for TAM plans that align with the long-term planning horizons of other planning counterparts.

We will provide a detailed response to each recommendation within 180 days of the final report's issuance. We appreciate the opportunity to respond to the GAO draft report. Please contact Madeline M. Chulumovich, Director, Audit Relations and Program Improvement, at (202) 366-6512 with any questions.

Sincerely,



Keith Washington  
Deputy Assistant Secretary for Administration

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# Appendix IV: GAO Contact and Staff Acknowledgments

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## GAO Contact

Andrew Von Ah, (202) 512-2834 or [Vonaha@gao.gov](mailto:Vonaha@gao.gov).

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## Staff Acknowledgments

In addition to the contact named above, Matt Barranca (Assistant Director); Amy Higgins (Analyst-in-Charge); James Ashley; Melissa Bodeau; Alice Feldesman; Geoff Hamilton; Benjamin T. Licht; Grant Mallie; Todd Schartung; Elizabeth Wood; and Chris Zakroff made key contributions to this report.

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Chuck Young, Managing Director, [youngc1@gao.gov](mailto:youngc1@gao.gov), (202) 512-4800, U.S. Government Accountability Office, 441 G Street NW, Room 7149, Washington, DC 20548

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## Strategic Planning and External Liaison

James-Christian Blockwood, Managing Director, [spel@gao.gov](mailto:spel@gao.gov), (202) 512-4707, U.S. Government Accountability Office, 441 G Street NW, Room 7814, Washington, DC 20548

