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JANUARY 27, 2020

TO: BOARD OF DIRECTORS

THROUGH: PHILLIP A. WASHINGTON *PAW*
CHIEF EXECUTIVE OFFICER

FROM: KENNETH L. HERNANDEZ *[Signature]*
CHIEF RISK, SAFETY & ASSET MANAGEMENT OFFICER

**SUBJECT: TRANSIT ASSET MANAGEMENT/STATE OF GOOD REPAIR
PERFORMANCE AND PROGRAM UPDATE**

ISSUE

The Federal Transit Administration (FTA) Transit Asset Management (TAM) rule took effect October 1, 2016 and includes requirements for public transit operators to report on asset performance and set targets each October for the next fiscal year. Transit Asset Management (TAM) is a business model that uses condition of assets to guide optimal prioritization of funding to keep transit networks in a State of Good Repair (SGR). Metro met the FTA 2018 requirements to complete the TAM Plan and Group TAM Plan. In October 2019, Metro reported performance measures for equipment, rolling stock, infrastructure and facilities and set performance targets for fiscal year 2020, as required by the FTA.

This update provides an overview of Metro's asset performance during FY19, the target goals for FY20, and recent and upcoming TAM program activities.

BACKGROUND

FTA TAM Requirements

The FTA established a National TAM System to improve transit asset management practices and to ensure that achieving and maintaining a state of good repair becomes, and remains, a top priority for transit providers. The final TAM rule was published on July 26, 2016 (Vol. 81 No. 143, 49 CFR Parts 625 and 63) and applies to all recipients

of federal chapter 53 funds. In October 2018, Metro met the FTA deadline for preparing its 2018 TAM Plan and completed the Group TAM Plan and the uniform performance targets were reported to the FTA through the National Transit Database (NTD). The TAM performance measures for FY19 and the new FY20 performance targets were also reported to the FTA's National Transit Database by October 31, 2019. For 2019 Metro completed a new FTA requirement to include a narrative report on the progress towards meeting the TAM targets which was submitted into the NTD. The focus in 2020 will be on preparation for the FTA Triennial Review which the auditors are requiring new information to evaluate TAM compliance.

Performance Measures and Targets

The FTA has established four top-level asset categories (rolling stock, facilities, infrastructure and equipment) and defined a Performance Measure for each of them. The Performance Measures for rolling stock and equipment are the percentage of assets in specified asset classes that have either met or exceeded their Useful Life Benchmark (ULB), which is defined as “the expected life cycle or the acceptable period of use in service for a capital asset, as determined by a transit provider.” Although there are other factors that Metro may use as part of the decision on when to retire an asset, such as mileage, age is the only factor used by the FTA for the rolling stock and equipment Performance Measures. The Performance Measure for the assets within the facilities category instead uses the asset condition as the determinant factor.

The TAM FY20 performance targets for rolling stock, equipment and facilities are based on the June 30, 2020 forecasted performance measure. The infrastructure performance targets were set at 80% of the FY19 actual performance measures, in consultation with the Metro Operations Department in an effort to reduce the number of long-term slow zones on the rail system.

Summary of Metro TAM Performance

The following provides the FTA Asset Class, summaries of final FY19 performance measure data and FY20 targets for the FTA defined four top-level asset categories:

Equipment: Percentage of non-revenue vehicles within an asset class that have met or exceeded their Useful Life Benchmark (ULB). See Table 1 and Attachment A for further details.

Table 1: Equipment TAM Performance Measures

FTA Asset Class	FY19 Performance Measure	FY20 Target
Automobiles and SUVs	26.00%	26.43%
Trucks and Other Rubber Tire Vehicles	28.48%	38.21%
Steel Wheel Vehicles	44.44%	25.00%

Rolling Stock: Percentage of revenue vehicles within an asset class that have met or exceeded their ULB. See Table 2 and Attachment B for further details.

Table 2: Rolling Stock TAM Performance Measures

FTA Asset Class	FY19 Performance Measure	FY20 Target
Bus	19.43%	15.36%
Articulated Bus	74.81%	75.24%
Light Rail Vehicles	0%	0% ^{1/}
Heavy Rail Vehicles	0%	0% ^{1/}

^{1/} Zero % railcars will be beyond 30-year design life at the end of FY20.

Infrastructure: Percentage of guideway directional route miles with performance restrictions (slow zones) by Heavy Rail and Light Rail. See Table 3 and Attachment C for further details.

Table 3: Guideway TAM Performance Measures

FTA Asset Class	FY19 Performance Measure	FY20 Target
Heavy Rail	0%	0%
Light Rail	2.80%	2.24%

Facilities: Percentage of facilities with a condition rating below 3.0 on the FTA Transit Economic Requirements Model (TERM) scale (1=Poor to 5=Excellent). See Table 4 and Attachment D for further details.

Table 4: Facilities TAM Performance Measures

FTA Asset Class	FY19 Performance Measure	FY20 Target
Passenger Facilities (stations & parking)	0%	0%
Administration & Maintenance Facilities	0%	0%

This report presents the Performance Measures that are reported to FTA through the NTD each October for the prior fiscal year. These performance measures are a starting point for prioritization of replacement and rehabilitation of Metro's assets. Actual prioritization is based on input from Operations Maintenance as there are many other considerations that are not represented in the FTA Performance Measures.

TAM Program Update

Metro's Enterprise Transit Asset Management (ETAM) department continues implementing the business processes to respond to the FTA by upgrading the asset inventory database and conducting condition assessments on initial asset categories. Metro's ETAM Department worked with asset stakeholders across the agency including Operations, Countywide Planning, Vendor and Contracts Management, Construction, Finance and ITS to make progress implementing a comprehensive asset management program. Accomplishments in FY19 include:

Condition Assessments

- Facilities condition assessments performed on Metro's maintenance/admin buildings, stations and passenger parking are in the third year of an initial three-year contract with 71 locations assessed during FY18, 67 locations assessed during FY19 and another 65 locations to be assessed in FY20. In FY19 there were no reportable facilities with an overall condition rating less than 3; the average rating over the first 2 years is 4. Based on these results, staff expects facilities assessed in FY20 will also be at or above an overall condition rating of 3. Assessments were based on rating criteria using FTA's 1-5 scale. Each year of the assessments includes a mix of facilities by type and age to provide a balanced "sampling" of Metro's facility portfolio. Any critical problems found during assessments resulted in generating trouble tickets being reported to Operations for action. The condition ratings were added to the asset inventory database and will be used for trend analysis.
- Rail Fleets - Building on the process developed for the 2017 Rail Vehicle Condition Assessment Study, an evaluation is ongoing to evaluate the data needs and capabilities of the Material and Maintenance Management System (M3) to support near term implementation of advanced Reliability Centered Maintenance (RCM) predictive techniques to improve reliability and availability of the rail fleets. The study will be completed in FY20.
- Structures Inspections - Phase II includes the inspection of 241 structures to assess and assign ratings to existing conditions of bridges, tunnels and retaining walls. The 7-year contract was executed on July 22, 2019 and inspections began on October 1, 2019.
- Fire, Life, & Safety Assessments of subway systems to review condition, performance information, conduct inspections and assign ratings to safety sensitive assets. The scope of work (SOW) was developed, proposals are being reviewed per the Request for Proposal (RFP) process and the contract is expected to be awarded in FY20.

Asset Inventory/Enterprise Asset Management (EAM) Update

- An upgrade of the TAM Database to a more robust system was completed. Testing and improvements will continue in FY20.
- An inventory of Metro's linear assets representing 242 miles of guideway and track with a \$5.5B replacement value has been defined in the asset inventory database. This listing includes: track, guideway, retaining walls, sound walls and fences. Defining attributes include exclusive/non-exclusive ROW, tangent, curve, ballasted, direct fixation, retained/non-retained fill or cut, elevated concrete or steel, at-grade and subway.
- Updates were made to rolling stock (bus, railcars), equipment (non-revenue), bus guideway and facility assets to reflect new and recently disposed assets.
- The asset inventory database now contains 26,557 records that represent 374,472 assets with an estimated current replacement cost of \$18.7B.
- ETAM is supporting the "Asset On-Boarding" initiative to develop a process for asset handover and onboarding of new, replaced or upgraded assets being transferred

from the team acquiring, constructing, or rehabilitating the assets to the teams maintaining the assets (Operations) and reporting on the assets (ETAM).

National Transit Database (NTD) Reporting

- ETAM prepared and submitted the required FY19 FTA forms into the National Transit Database by the required date of October 31, 2019:
 - A-15 Facilities Inventory report listing 390 reportable Metro facilities with the year each facility was built, current condition assessments and other information required by the FTA;
 - A-20 Transit Way Mileage report summarizing the amount of track, guideway, special trackwork, third-rail, OCS, train control, substations and substation equipment in various class and age categories;
 - A-30 Revenue Vehicle Inventory reports (5) summarizing the bus and rail rolling stock by year of manufacture, manufacturer and year of overhaul and providing the useful life and other information required by the FTA;
 - A-35 Service Vehicle Inventory report summarizing 1,420 service vehicles, in 246 groups, with the year of manufacture, useful life, estimated replacement costs and other information required by the FTA;
 - A-90 Performance Measure Targets report with the FY20 performance measure targets in 11 asset classifications.

TAM Plan

- Metro's 2018 TAM Plan Update was completed by the October 1, 2018 deadline and is in full compliance with the FTA TAM regulation that the plan is current within the last four years.
- Overall condition of the asset base is 3.90 with 83% of assets in adequate or better condition (based on value) and 17% in marginal to poor condition.
- The SGR funding needs (in current FY20 dollars) over the next 10 years are estimated at \$6.1B, \$10.6B over 20 years and \$24.6B over the next 40 years.
- The SGR backlog is estimated at \$2.5B as of June 30, 2019.
- Metro shared TAM performance data and coordinated with the Southern California Association of Governments (SCAG) on setting regional targets for the SCAG Regional Transportation Plan.
- Implementation continues with 25 action plans that specifically target improvements that address the FTA TAM requirements and generally accepted good practices in key TAM areas including condition assessments, inventory updates, SGR technical requirements for the new EAM (replacing M3), lifecycle planning, and data management.

Metro Sponsored Group TAM Plan

- Metro completed development of the FTA required Group TAM Plan for small transit providers receiving pass-through of federal grants from Metro by the October 1, 2018 deadline and remained unchanged.
- The participants included 34 small transit operators who receive FTA pass-through grants from Metro.

- Uniform targets were set for the Group and concurrence was received from all 34 participants.
- Data and targets from FY19 were used to report on the FY20 performance and unified targets to the FTA through the NTD in October 2019 as there were no significant changes to Group Plan participants and no new pass-through FTA grants to LA Metro subrecipients during FY19 impacting the asset inventory during FY19.

Operations Control

- Completed functional 52-year obsolescence review of the Bus and Rail Operations Control (BOC/ROC) needs to year 2070. The study addressed needs for the Measure M and R expansion projects as well as the potential to include the facility within the new Emergency Services Operations Control campus.

NEXT STEPS

Upcoming TAM activities for 2020 include:

- Prepare for the first FTA Triennial Review that includes TAM requirements;
- Provide input on development of SGR Capital Projects for FY21 Budget;
- Implement Advanced Maintenance Techniques including evaluation of M3 for RCM and provide support for pilot RCM project on P2550 LRVs;
- Continue Condition Assessments on Facilities, Structures and Systems;
- Support implementation of Metro's new EAM system; and
- Prepare for FY20 National Transit Database annual TAM reporting.

ATTACHMENTS

Attachment A - Equipment Performance Measures/Targets
Attachment B - Rolling Stock Performance Measures/Targets
Attachment C - Guideway TAM Performance Measures (PM)
Attachment D - Facilities TAM Performance Measures (PM)

Attachment A

Equipment Performance Measures/Targets

FTA Asset Class	Sub-Class	Vehicle Count ^{1/}	ULB ^{2/} (years)	Exceeded ULB ^{2/}	FY19 PM	FY20 Forecast ^{3/}	FY20 Target ^{4/}
Automobiles and SUVs	Gasoline Sedan	1	10	1	100%	100%	26.43%
	Hybrid Sedan	456	10	123	27%	27%	
	Electric Sedan	20	10	0	0%	0%	
	Total	477		124	26%	26%	
Trucks and Other Rubber Tire Vehicles	SUV	128	10	17	13%	24%	38.21%
	Hybrid SUV	90	10	38	42%	46%	
	Minivan	1	10	1	100%	100%	
	Van	248	10	73	29%	59%	
	Mini Pickup Truck	6	12	6	100%	100%	
	Pickup Truck (gasoline)	125	12	23	18%	23%	
	Utility Truck (gasoline)	22	15	0	0%	0%	
	Pickup Truck (diesel)	4	15	0	0%	0%	
	Truck, Large (diesel)	84	15	41	49%	47%	
	Truck, Large (hybrid)	1	15	0	0%	0%	
	Truck, Large, Utility	201	15	55	27%	27%	
	Motorhome ^{5/}	1	20	0	0%	0%	
	Construction Equipment	18	20	7	39%	35%	
	Railcar Mover (diesel)	1	20	1	100%	50%	
	Non-Revenue Bus	4	20	4	100%	100%	
Total	934		266	28%	38%		
Steel Wheel Vehicles	Ballast Regulator ^{6/}	1	20	0	0%	0%	25.00%
	Ballast Tamper ^{7/}	1	20	1	100%	50%	
	Rail Grinder ^{8/}	4	20	3	75%	50%	
	Railcar Mover (battery)	3	15	0	0%	0%	
	Total	9		4	44%	25%	

^{1/} Number of vehicles in-service on 6/30/2019.

^{2/} ULB: Useful Life Benchmark. The nominal ULB assumes that any required mid-life overhauls are performed.

^{3/} FY20 Forecast includes any vehicles expected to be retired or enter operation by 6/30/2020.

^{4/} Target is based on vehicles expected to be retired or new vehicles entering operation by 6/30/2020.

^{5/} Metro has one mobile command post that is constructed from a motorhome. It was acquired in 2014. It will not exceed its 20-year estimated useful life until 2034.

^{6/} A ballast regulator is used to shape and distribute the track ballast that supports the ties in rail tracks. Metro has one ballast regulator that was acquired in 2010.

^{7/} A ballast tamper is used to correct the alignment of the rails to make them parallel and level and to secure the ballast around the ties. Metro has one ballast tamper that was acquired in 1995.

^{8/} A rail grinder is used to re-profile the head of the running rail and remove irregularities from worn tracks to extend its life and to improve the ride of trains using the track. Metro has one Fairmont 3-unit rail grinder and one Harsco rail grinder. The Fairmont rail grinder was acquired in 1995. The Harsco rail grinder was acquired in 2016.

Equipment

The Final TAM Rule defines the performance measure for equipment as the percentage of non-revenue, support-service and maintenance vehicles that have either

met or exceeded their ULB. The reportable asset classes are defined as 1) automobiles and sport utility vehicles, 2) trucks and other rubber-tired equipment (self-powered and street legal only), including heavy construction equipment and 3) self-powered steel wheeled vehicles (i.e. railbound maintenance equipment).

The table lists the sub-classes within each FTA asset class. The vehicle count, the ULB and the number of vehicles with ages that meet or exceed the ULB on 6/30/19 are listed. The FY19 performance measure is calculated based on the number of vehicles that have met or exceeded the ULB and the number of vehicles in each class or sub-class. The FY20 forecast is a forecast based on the number of vehicles that will have met or exceeded the ULB by the end of FY20, adjusted by the number of planned asset retirements and acquisitions by the end of the fiscal year.

Attachment B

Rolling Stock Performance Measures/Targets

FTA Asset Class	Sub-Class	Vehicle Count ^{1/}	Useful Life Bench Mark ^{2/} (ULB years)	Exceeded ULB ^{2/}	FY19 PM	FY20 Forecast ^{3/}	FY20 Target ^{4/}
Bus	MB-1505	66	12	0	0%	0%	15.36%
	MB-3100	50	12	0	0%	0%	
	MB-3850	350	12	0	0%	0%	
	MB-4200 ^{5/}	6	12	0	0%	0%	
	MB-5000 ^{6/}	0	12	0	0%	N/A	
	MB-5300	196	12	196 ^{7/}	100%	100%	
	MB-5600	550	12	0	0%	0%	
	MB-7000	5	12	5 ^{7/}	100%	100%	
	MB-7300	25	12	25 ^{7/}	100%	100%	
	MB-7525	70	12	70	100%	100%	
	MB-7600	193	12	193 ^{7/}	100%	100%	
	MB-7980 ^{6/ 8/}	0	18 ^{8/}	0	0%	N/A	
	MB-8000 ^{8/}	99	18 ^{8/}	0	0%	0%	
	MB-8100 ^{8/}	260	18 ^{8/}	0	0%	0%	
	MB-8360 ^{8/}	41	18 ^{8/}	0	0%	0%	
	MB-8401 ^{8/}	91	18 ^{8/}	0	0%	0%	
	MB-8500 ^{8/}	150	18 ^{8/}	0	0%	0%	
MB-11001 ^{9/}	0	12	0	0%	N/A		
Total	2,152		489	19	15%		
Articulated Bus	MB-9200	198	12	198	100%	100%	75.24%
	MB-9400	95	12	93	98%	100%	
	MB-9495	1	12	0	0%	0%	
	MB-9500	95	12	0	0%	0%	
Total	389		291	75%	75%		
Light Rail Vehicles	P865 ^{5/}	0	30	0	0%	N/A	0%
	P2020	15	30	0	0%	0%	
	P2000	52	30	0	0%	0%	
	P2550	50	30	0	0%	0%	
	P3010	181	30	0	0%	0%	
Total	298		0	0%	0%		
Heavy Rail Vehicles	A650	104	30	0	0%	0%	0%
	Total	104		0	0%	0%	

^{1/} Number of vehicles in-service on 6/30/2019.

^{2/} ULB: Useful Life Benchmark. ULB assumes that any required mid-life overhauls are performed. FTA "Default ULB" for bus classes is 14 years and 31 years for railcar classes.

^{3/} Forecast includes procurements of any vehicles expected to enter operation by 6/30/2020.

^{4/} Target is based on rolling stock expected to be retired and new vehicles entering operation by 6/30/2020.

^{5/} Hybrid gasoline buses.

^{6/} This class was retired in FY19.

^{7/} The CNG tanks on all remaining buses have been replaced.

^{8/} Composition buses.

^{9/} Diesel fueled buses. Remaining fleet retired in FY19.

Rolling Stock

The Final TAM Rule defines the performance measure for rolling stock as the percentage of revenue vehicles within a particular asset class that have either met or exceeded their ULB. The reportable asset classes in Metro's asset inventory are standard buses, articulated buses, light rail vehicles and heavy rail vehicles. The FTA recognizes that age is not necessarily the most accurate performance measure available. However, age is a simple and widely-used performance measure for vehicles that can approximate the condition of rolling stock assets for capital investment planning. The FTA noted that transit providers will be able to account for variations in maintenance practices and operating conditions by adjusting the useful life benchmark for particular fleets of vehicles.

The table presents the FY19 performance measures for each of the four FTA rolling stock classes and the 28 sub-classes (i.e. fleets). The vehicle count, the ULB and the number of vehicles with ages that meet or exceed the ULB on 6/30/19 are listed. The FY19 performance measure is calculated based on the number of vehicles that have met or exceeded the ULB and the number in each class. The FY20 Forecast is based on the number of vehicles that will have met or exceeded the ULB by the end of FY20, adjusted by the number of planned asset retirements and acquisitions by the end of the fiscal year.

None of the railcars have reached their 30-year ULB. The remaining 54 of the Kinkisharyo P3010 light rail vehicles (LRV) are expected to be placed into service in FY20. There are six bus sub-classes that have exceeded the ULB entirely. However, Metro has contracted for 360 CNG buses and 105 ZEB buses. 229 CNG buses and 40 ZEB buses are expected to be delivered in FY20.

Metro is in the process of acquiring new P3010 light rail vehicles (LRV) and has completed retiring the P865 LRVs that were acquired for the start-up of the Metro Blue Line in 1990.

Attachment C

Guideway TAM Performance Measures (PM)

Asset Class	Jul	Aug	Sep	Oct	Nov	Dec	FY 19 Avg	FY20 Target
Heavy Rail (HR)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Jan	Feb	Mar	Apr	May	Jun		
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		

Asset Class	Jul	Aug	Sep	Oct	Nov	Dec	FY 19 Avg	FY20 Target
Light Rail (LR)	2.08%	4.98%	4.72%	1.06%	1.06%	2.99%	2.80%	2.24%
	Jan	Feb	Mar	Apr	May	Jun		
	3.77%	2.79%	2.99%	2.95%	2.64%	1.58%		

Infrastructure

The Final TAM Rule defines the performance measure for infrastructure (rail fixed guideway, track, signals, and systems) as the percentage of track segments with performance restrictions. Further guidance issued by the FTA defines this performance measure as the average percentage of revenue track, by mode, under a performance restriction (i.e. slow order) at 9 a.m. on the first Wednesday of each month. The FTA specifically chose mid-week at 9 a.m. as the measurement time to avoid inclusion of slow zones that are due to normal mid-day maintenance. This Performance Measure is intended to encompass track, guideway, signals, traction power and any other systems that may impact service delivery. The performance measure does not include storage or connector tracks along or at the end of the revenue tracks.

The slow zone calculations take into consideration an additional zone preceding and after each slow zone due to the flagging rules. This adds 0.38 mile for heavy rail and Metro Green Line and 0.25 mile for all other light rail to each actual slow zone. The performance measures above are calculated from the total monthly slow zone length divided by the total number of revenue track miles for each transit mode.

Combined Performance Restriction Length for each Track Segment (miles)

Track Segment	Jul	Aug	Sep	Oct	Nov	Dec
Long Beach (Blue)	1.30	5.60	6.28	-	-	-
Century/Torrance (Green)	-	0.68	-	-	-	-
Pasadena (Gold)	0.45	0.45	-	-	-	2.62
East Los Angeles (Gold)	-	-	-	-	-	0.70
Santa Monica (Expo)	1.82	1.82	1.82	1.82	1.82	1.82
A Tunnel (Red)	-	-	-	-	-	-
B Tunnel (Purple)	-	-	-	-	-	-

Track Segment	Jan	Feb	Mar	Apr	May	Jun	FY 19 Avg.
Long Beach (Blue)	-	-	-	0.31	0.31	-	1.15
Century/Torrance (Green)	0.29	-	-	2.24	1.16	-	0.36
Pasadena (Gold)	2.62	2.62	2.62	-	-	-	0.95
East Los Angeles (Gold)	0.70	-	-	-	-	-	0.12
Santa Monica (Expo)	2.87	2.17	2.52	2.52	3.07	2.72	2.23
A Tunnel (Red)	-	-	-	-	-	-	0.00
B Tunnel (Purple)	-	-	-	-	-	-	0.00

This table presents the total amount of slow-zones in place each month on each segment of Metro Rail.

Attachment D

Facilities TAM Performance Measures (PM)

Asset Class	FY19 PM	FY20 Target
Passenger Facilities (stations & parking)	0%	0%
Administration & Maintenance Facilities	0%	0%

Facilities

The Final TAM Rule defines the performance measure for facilities as the percentage of facilities within an asset class rated below condition 3 on the TERM scale. The Final TAM Rule defines the asset classes as 1) Maintenance and Administrative facilities for which Metro has direct capital responsibility and 2) Passenger stations (buildings) and Parking facilities for which Metro has direct capital responsibility. Further guidance issued by the FTA allows for the facility condition assessments to be conducted over a 4-year span to match a TAM plan horizon period.

Metro currently has engaged a contractor to conduct a multi-year facility condition assessment program in accordance with FTA guidance. Approximately 1/3 of Metro locations were completed by the end of FY18 with another 1/3 of Metro locations completed by the end of FY19. The final condition assessment ratings for the first 71 assessed locations and second 67 assessed locations averaged to a 4.0 SGR rating. Since similar findings are expected in the FY20 condition assessments, a FY20 target of 0% for both classes was adopted.