

Service Monitoring Results: 2019 Review of Service Policies and Standards for FY2017 – FY2019

As required by Federal Transit Administration (FTA) Circular 4702.1B (Chapter IV-9, Section 6) agencies must monitor service, at least once every three years, and present the results to the Board of Directors for approval. This is a review of Metro’s compliance with specified service standards and policies under the requirement. The review covers the past three years from the last Title VI Program Update.

The following topics are addressed:

1. Service Availability
2. Classification of Services
3. Headway Standards
4. Loading Standards
5. On-Time Performance Standards
6. Passenger Amenities Standards
7. Vehicle Assignment Standards

All reviews assess whether Metro has complied with its policies and standards, and whether any non-compliance is biased toward minorities (disparate impact) or persons in Low-Income (disproportionate burden).

1. Service Availability

The adopted service availability standard is:

At least 99% of all Census tracts within Metro’s service area having at least 3 HH/acre and/or 4 jobs/acre shall be within one quarter mile of fixed route service (a bus stop or rail station).

Fixed route service provided by other operators may be used to meet this standard. The use of other operator services to meet this standard ensures maximum availability without unnecessary duplication of service.

Results: There are 1,892 tracts within Metro’s service area that meet the above thresholds of 3 HH/acre and/or 4 jobs/acre. Only 10 of these tracts are not within one-quarter mile of fixed route service. This is a service availability of 99.47%.

Service Area Demographics - Minorities

	Service Area	Tracts Not Served
Population	9,665,120	40,140

Minority Population	6,669,203	26,354
Minority Share	69.00%	65.66%

Service Area Demographics – Low-Income

	Service Area	Tracts Not Served
Population	9,813,599	39,494
Low-Income Population	1,647,760	5,093
Low-Income Share	16.79%	12.90%

Results: Both the minority share, and low-income share of the unserved tracts are less than the service area minority and Low-Income shares. Therefore, there is no disparate impact or disproportionate burden created by the unserved areas.

2. Classification of Services

The review of service policies and standards requires determination of Minority routes (and Low-Income routes) so that a comparison of compliance between Minority (or Low-Income) routes and all routes may be made. If the share of Minority routes meeting a standard is an absolute 5% or more less than the share of all routes meeting a standard, then a disparate impact on Minority routes has occurred. If the share of Low-Income routes meeting a standard is an absolute 5% or more less than the share of all routes meeting a standard, then a disproportionate burden on Low-Income routes has occurred.

FTA has defined a Minority route as having one-third or more of its revenue miles operated in census areas that exceed the service area minority share of population. By extension, a Low-Income route will have one-third or more of its revenue miles operated in census areas that exceed the service area low-income share of population.

Results: There are 141 fixed route bus lines operated by Metro. It was determined that 108 of these are Minority lines (76.60%), and 115 of these are Low-Income lines (81.56%). Both Heavy Rail lines are Minority and Low-Income lines. All four Light Rail lines are Minority lines and Low-Income lines.

These definitions were used to stratify compliance levels in the subsequent evaluations.

3. Headway Standards

Current service standards were last adopted in FY16. The adopted headway standards follow:

Rail Headway Standards

Mode	Peak Max. (in min)	Off-Peak Max (in min)
Heavy Rail	10	20

Light Rail	12	20
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Not to be exceeded for at least 90% of all hourly periods

Bus Headway Standards

Service Type	Peak Max. (in min)	Off-Peak Max (in min)
Local	60	60
Limited	30	60
Express	60	60
Shuttle	60	60
Rapid	20	30
BRT	12	30

Not to be exceeded for at least 90% of all hourly periods

Results: Compliance determination used service in effect as of June 23, 2019 which is the most recent service change program. All rail lines were in full compliance with the adopted standards for weekdays, Saturdays, Sundays and Holidays.

Weekday Headway Compliance - # of Bus Lines

	All Lines	Minority Lines Only	Low-Income Lines Only	All Compliance	Minority Compliance	Low-Income Compliance
Meets Standard	101	81	87	72.1%	75.7%	76.3%
Exceeds Standard	39	26	27			

Saturday Headway Compliance - # of Bus Lines

	All Lines	Minority Lines Only	Low-Income Lines Only	All Compliance	Minority Compliance	Low-Income Compliance
Meets Standard	78	60	66	70.9%	76.6%	77.6%
Exceeds Standard	32	22	24			

Sunday & Holiday Compliance - # of Bus Lines

	All Lines	Minority Lines Only	Low-Income Lines Only	All Compliance	Minority Compliance	Low-Income Compliance

Meets Standard	76	59	66	73.1%	75.7%	76.3%
Exceeds Standard	28	18	19			

Results: Minority and Low-Income bus lines exhibited higher rates of compliance with the headway standards than all lines together. Certain patterns of non-compliance were evident. Late evening and weekend services were most likely to exceed the base service standards. As service has been scheduled to demand, services with hourly or near hourly headways to begin with are now operating at wider than 60-minute headways. Rapid bus lines were frequently in non-compliance because the 30-minute base headway is a policy standard while those services have increasingly been scheduled to demand.

A systemwide restructuring study is nearing completion and is expected to change headway standards, and to significantly improve compliance.

4. Loading Standards

Current service standards were adopted in FY16. The adopted passenger loading standards follow:

Rail Passenger Loading Standards

Mode	Peak Passengers/Seat	Off-Peak Passengers/Seat
Heavy Rail	2.30	1.60
Light Rail	1.75	1.25

Not to be exceeded for at least 95% of all hourly periods

Bus Passenger Loading Standards

Service Frequency (in min)	Peak Passengers/Seat	Off-Peak Passengers/Seat
1-10	1.40	1.30
11-20	1.30	1.25
21-40	1.20	1.10
41-60	1.10	1.00
60+	1.00	0.75

Not to be exceeded for at least 95% of all hourly periods

Although a headway of greater than 60 minutes would be an exception to the headway standards a loading standard is provided for such services when they occur.

The rail system is only beginning to receive Automated Passenger Counters (APC's), and they are still being calibrated. Load monitoring can only be done on a sampling basis. Checkers ride randomly selected cars on randomly selected trips recording data

for Ons and Offs by station. Over a six-month sliding time frame this data is aggregated to build a profile of rail ridership, and is the primary source for ridership estimation by day type and line. While only one car is monitored on any given sample trip, whether or not that car meets the loading standard is a surrogate for whether trains are meeting the standard. Loading on the bus system is monitored every six months using quarterly APC data for max loads at time points. Since the most recent bus load standard evaluation was performed using January through March 2019 data, the samples collected from rail ride checks were compiled for the same three months.

Each rail ride check record was processed using Line # (determines mode and applicable # of seats), day type, trip start time (used to categorize weekday trips as peak or off peak), and max accumulated load (calculated from the observations in each check). A rail mode is assumed to comply with the loading standards if 95% of all monitored trips conform to the standards. Data is from the period January through March 2019 which is the same time frame used for bus monitoring.

Weekday Rail Load Standard Monitoring

	Peak			Base		
	# of Checks	Within Standard	% Compliance	# of Checks	Within Standard	% Compliance
Heavy Rail	1,454	42	97.1%	2,447	54	97.8%
Light Rail	1,024	29	97.2%	1,750	27	98.5%

Weekend Rail Load Standard Monitoring

	Saturday			Sundays & Holidays		
	# of Checks	Within Standard	% Compliance	# of Checks	Within Standard	% Compliance
Heavy Rail	670	6	99.1%	606	3	99.5%
Light Rail	646	18	97.1%	635	4	99.4%

Results: Both modes met the standard at least 95% of the time, and each line was in compliance at all times, as well.

Bus monitoring is more extensive as all buses are equipped with APC's, and data is available for all time points along each bus route for observed max loads by trip. Every six months the most recent quarterly data is evaluated to determine adherence with the adopted standards. The most recent evaluation used January through March 2019 data.

Bus Load Standard Monitoring

		Directional	
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Day Type	# of Lines	Hours Monitored	Exceptions
Weekdays	140	5,315	
Saturdays	110	4,315	1
Sundays/Holidays	104	4,058	1

Results: Line 16 Eastbound exceeded the standards between Midnight and 1am on Saturdays, and Line 53 Northbound exceeded the standards between 7am and 8am on Sundays. As only one directional hour exceeded the loading standard in each instance over 97% of the hours operated on each line on those days conformed to the standards. Therefore, all bus lines in the system were found to be in conformance with the adopted loading standards.

5. On-Time Performance Standards

The current on-time performance standards for the system define on-time as no more than one minute early or five minutes late when leaving a time point. In the currently adopted standard both rail and bus have the same objective: 80% on-time on at least 90% of lines at least 90% of the time.

Rail is currently monitored using NextTrain. Since bus is evaluated every six months using quarterly data this evaluation was performed on the same basis. Data for the months of January through March 2019 was compiled.

Weekday Rail On-Time Performance

Mode	# of Time Point Observations	# of On-Time Observations	On-Time Percentage
Heavy Rail	85,400	76,825	90.0%
Light Rail	353,029	259,004	73.4%

Saturday Rail On-Time Performance

Mode	# of Time Point Observations	# of On-Time Observations	On-Time Percentage
Heavy Rail	22,028	18,931	85.9%
Light Rail	72,256	54,084	74.9%

Sundays & Holidays Rail On-Time Performance

Mode	# of Time Point Observations	# of On-Time Observations	On-Time Percentage
Heavy Rail	46,270	41,999	90.8%
Light Rail	146,974	111,970	76.2%

Results: Heavy Rail consistently exceeds the 80% on-time objective largely because it operates entirely in a grade separated environment. Light Rail, except for the Green Line (which was 84.2% on-time on weekdays), operates with significant portions at grade. Even on weekends with somewhat lesser traffic conflicts light rail falls short of

the 80% objective. Since all rail lines were classified as Minority lines and Low-Income lines there is no disparate impact or disproportionate burden resulting from this finding.

On the bus side we also see on-time performance consistently short of the 80% objective. The following observations are based upon three months of data from January through March 2019.

Bus Weekday On-Time Performance

	All Lines	Minority Lines	Low-Income Lines
Avg On-Time %	72.62%	72.02%	72.20%
Lines Meeting Std	25	18	18
Lines Failing Std	112	85	93
% Meeting Std	18.25%	17.48%	16.22%

Bus Saturday On-Time Performance

	All Lines	Minority Lines	Low-Income Lines
Avg On-Time %	73.65%	73.12%	73.21%
Lines Meeting Std	21	11	12
Lines Failing Std	86	67	75
% Meeting Std	19.63%	14.10%	13.79%

Bus Sunday & Holiday On-Time Performance

	All Lines	Minority Lines	Low-Income Lines
Avg On-Time %	78.90%	78.62%	79.01%
Lines Meeting Std	46	30	35
Lines Failing Std	55	43	47
% Meeting Std	45.54%	41.10%	42.68%

Results: On any given day, non-Minority, non-Low-Income, Minority, and Low-Income bus lines exhibit similar on-time percentages. On Sundays and Holidays the average on-time percentage approaches the 80% objective. Except for Saturdays, the on-time share of Minority and Low-Income bus lines is within 5% of the share of all bus lines meeting the standard. On Saturdays we observe both a disparate impact on minority bus line users, and a disproportionate burden on Low-Income bus line users. The Saturday share of bus lines meeting the standard in each of these categories is more than 5% less than the overall compliance share. Of the lines meeting the on-time

standard on Saturdays that are not Minority or Low-Income, most operate in uncongested traffic corridors and about half of them are in the San Fernando Valley.

Metro has been undertaking a detailed evaluation of its entire bus system (termed NEXGEN) for the past two years with the objective of completely redefining routes and operating standards. As a part of this effort the most congested bus corridors (where bus speeds are most severely impacted) have been subjected to detailed field work and evaluation in order to identify traffic improvements such as bus-only lanes, queue jumps, stop relocation, etc. that would significantly improve bus speed, and reliability. A preliminary program of projects has been developed for the studied corridors. Metro will be working with the affected communities to agree on an implementation program and identify funding for its completion. The majority of the studied corridors are served by Minority and Low-Income bus lines.

6. Passenger Amenities Standards

A set of passenger amenities standards were incorporated in the FY16 update of Metro’s Service Policies. Those standards are presented here.

Heavy Rail Passenger Amenities Standards

Amenity	Allocation
Seating	At least 12 seats
Info Displays	At least 12
LED Displays	At least 8 Arrival/Departure screens
TVM’s	At least 2
Elevators	At least 2
Escalators	At least 4 (2 Up / 2 Down)
Trash Receptacles	At least 6

Applies to each station

Light Rail Passenger Amenities Standards

Amenity	Allocation
Shelters	At least 80 linear feet per bay
Seating	At least 10 seats
Info Displays	At least 10
TVM’s	At least 2
Elevators	At least 1 for elevated / underground
Trash Receptacles	At least 2

Applies to each station

Bus Passenger Amenities Standards

Amenity	Allocation
Shelters	At least 6 linear feet per bay
Seating	At least 3 seats per bay
Info Displays	At least 3
Elevators	At least 1 for multi-level terminals

Trash Receptacles	At least 1 per 3 bays / 2 minimum
Applies to off-street bus facilities serving 4 or more bus lines	

There are no standards for bus stops because apart from painting the curb Red and erecting bus stop signage, Metro has no jurisdiction over street sitting fixtures or other appurtenances. The latter are controlled by individual cities and often contracted to third parties who support their costs through advertising revenues.

Results: Since the last three-year monitoring when all applicable facilities were in full compliance with these standards, the El Monte bus terminal has been reconstructed in conformance with these standards. No new facilities have been added.

7. Vehicle Assignment Standards

Adopted vehicle assignment standards include:

Heavy Rail: Maintained at a single facility

Light Rail: Primarily assigned based on compatibility of vehicle controllers with rail line(s) served. Wherever possible, no more than two vehicle types at each facility.

Bus: Assigned to meet vehicle seating requirements for lines served from each facility.

While these standards are consistently applied we have historically looked at the average age of vehicles assigned to each facility to ensure that there are no extremes serving any specific area. This is most applicable to the bus system, but the data for rail is provided as well.

Heavy Rail – Vehicle Age by Facility

Model	# Active	Average Age (years)
Breda 650 Base	30	26.4
Breda 650 Option	74	20.6
	104	22.3

Light Rail – Vehicle Age by Facility

Facility	Model	# Active	Average Age (years)
Div 11 – Long Beach	Nippon Sharyo 2020	15	24.5
	Siemens 2000 GE/ATP	7	17.1
	Kinkisharyo P3010	54	1.6
		76	7.5
Div 14 – Santa Monica	Siemens 2000 GE/ATP	15	15.9
	Kinkisharyo P3010	56	1.1
		71	4.2
Div 21 – Los Angeles	AnseldoBreda2550Base	15	8.6
	Kinkisharyo P3010	3	2.0
		18	7.5
Div 22 - Lawndale	Siemens 2000 Base	24	17.9
	Kinkisharyo P3010	21	0.6
		45	9.8
Div 24 - Monrovia	AnseldoBreda2550Base	35	10.0
	Kinkisharyo P3010	43	1.3
		78	5.2

Results: A couple of constraints apply to the light rail assignments. The Siemens 2000 Base vehicles may only operate from Div 22 (Green Line) because their controller package is not compatible with other lines. The AnseldoBreda2550Base vehicles may not be operated from Div 22 as they are too heavy for the Green Line. Each facility's average vehicle age is between 4 and 10 years which is consistently young for vehicles that should have a 30-year life span.

Bus – Vehicle Age by Facility – Directly Operated

Division	32-foot	40-foot	45-foot	60-foot	# of Buses	Avg. Age
1		141	35	21	197	9.3
2		174			174	7.8
3		86	88		174	9.0
5		138	7	48	193	7.1
7		140	64	6	210	7.2
8		61	101	34	196	9.1
9		162	56		218	9.1
10		73	14	80	167	9.4
13		72		87	159	9.2
15		87	99	50	236	10.3
18		73	99	61	233	9.4
		1,207	563	387	2,157	8.9

Bus – Vehicle Age by Facility – Purchased

Division	32-foot	40-foot	45-foot	60-foot	# of Buses	Avg. Age
95	16	19	4		39	7.3
97	5	69			74	1.2
98	29	24	8		61	6.9
	50	112	12		174	4.5

Bus – Vehicle Age Summary

	32-foot	40-foot	45-foot	60-foot	# of Buses	Avg. Age
	50	1,319	575	387	2,331	8.6

Results: The only extreme average age is that of Division 97 operated by a contractor who recently had their older fleet replaced with new buses. This division serves seven bus lines of which six are Minority lines and five of which are Low-Income lines. With that knowledge there appears to be no basis for a finding of biased bus assignments based upon age.

In conclusion, the results of the service monitoring indicate that the adopted systemwide standards are set properly with the exception of a few. Based on the results, Metro staff will be making minor adjustments to the service standards and will present them for Board approval to be included in the 2019 Title VI Program Update to be submitted to FTA.