



Metro

Los Angeles County
Metropolitan Transportation Authority

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JUNE 16, 2020

TO: BOARD OF DIRECTORS

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

SUBJECT: MOTION 47 RESPONSE AUTOMATIC CROSSING GATES
REQUEST FOR ADDITIONAL INFORMATION

ISSUE

In February 2020, a board report was provided in response to motion 47 (Attachment C) requesting for information on Metro's light rail gate down times for at-grade crossings. This board box is in response to Metro Board Directors Fasana and Bonin's requests for additional information regarding specific grade crossings, including gate down times at each grade crossing on the L (Gold) Line and E (Expo) Line.

DISCUSSION

Further analysis of all grade crossings on the L and E Lines was performed and a list of gate down times for each grade crossing is provided (Attachments A and B).

L (Gold) Line Grade Crossing Analysis

For the L (Gold) Line, there were three grade crossings with more than approximately 1% of the total gate down instances showing 3 to 5 minutes. They were:

- Mountain and Myrtle Crossings
 - Both grade crossings are in close proximity to the (L) Gold Line yard, so the activation of the gates is more frequent due to the trains entering and exiting the yard. Unnecessary mainline stops have been reduced to a minimum, however we continue to look for additional solutions.
- Ave. 45
 - A speed restriction of 30 mph was placed on Track 1 and 2 Northbound on the approach and through the grade crossing a few years ago, to address an issue at the time. Since the design speed is 45 mph, this results in the gates being down earlier than necessary with a longer gate down time. We are reviewing the reasons for restrictions now to allow for 45 mph northbound. Lifting the restriction is expected to reduce the gate down times.

E (Expo) Line Grade Crossing Analysis

For the E (EXPO) Line, there were three grade crossings with more than approximately 1% of the total gate down instances showing 3 to 5 minutes. They were:

- 26th St.
 - This grade crossing is near the 26th St. Station and E (EXPO) Line yard. The gates go down when all Southbound trains stop at the Station. Variable dwell times will result in longer gate down times. There is a Train-to-Wayside (TWC) system at the platform which allows the train operator to cancel the gate activation. Operators have been reminded to use the TWC System to provide optimum gate activation.
 - We will continue to review both the technical and operational aspects of the crossing.
- Stewart St.
 - The grade crossing is within the limits of the E (EXPO) Line yard, so the activation of the gates is more frequent due to the trains entering and exiting the yard.
 - Since September 2017, a manual 30 mph speed restriction has been implemented just north of this grade crossing. The speed was reduced from 45 mph to 30 mph due to the ground settling and causing a low spot on the track. This issue is currently being resolved. The lower speed results in the gates being down earlier than necessary with a longer gate down time. Until the settlement issue is resolved, we are in the process of modifying the train control design. A 35-mph speed command will be provided and the start of the gate activation will be modified for the new speed command. This is expected to reduce gate down times.
 - There is a Train Operator Relief Platform north of this grade crossing. Operators have been reminded to use the TWC System to optimize the crossing gates activation.
- 20th St.
 - This grade crossing will be reviewed to determine most likely cause and improvements potential improvements.
- Barrington Ave.
 - It should be noted that on November 14, 2019 the Metro Rail Operations Center (ROC) reported a single gate malfunction at this grade grade crossing. Metro received complaints of excessive gate down time. Metro staff found one gate down, while the other 7 gates at the grade crossing were up. There was a failure of the electronic controller board for that gate. The board was reset, and the gate operation was restored.

- This grade crossing will be reviewed continuously to find any ongoing issues that may be affecting gate down times regularly and potential improvements.

NEXT STEPS

As a follow up, Metro will perform further investigations to improve gate downtimes as described above. Another 6-month review of the A (Blue) Line grade crossings will be conducted since full service was restored on November 1, 2019.

ATTACHMENTS

- A – Gold Line Grade Crossings Gate Down Times
- B – Expo Line Grade Crossings Gate Down Times
- C – Motion 47 (September 26, 2019)
- D – Board Report (February 20, 2020)

GOLD LINE

Attachment A

SANTA CLARA CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	37078	99.64%
3:00 to 4:59	107	0.29%
5:00 to 9:59	22	0.06%
10:00 or more	5	0.01%
Total Instances	37212	

GOLD LINE GRADE CROSSING DOWNTIMES		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	1251580	99.57%
3:00 to 4:59	4450	0.35%
5:00 to 9:59	749	0.06%
10:00 or more	238	0.02%
Total Instances	1257017	

DALTON CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	41909	99.75%
3:00 to 4:59	87	0.21%
5:00 to 9:59	15	0.04%
10:00 or more	3	0.01%
Total Instances	42014	

PASADENA CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	39061	99.03%
3:00 to 4:59	328	0.83%
5:00 to 9:59	40	0.10%
10:00 or more	14	0.04%
Total Instances	39443	

AZUSA CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	39025	99.42%
3:00 to 4:59	193	0.49%
5:00 to 9:59	21	0.05%
10:00 or more	15	0.04%
Total Instances	39254	

HIGHLAND CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	41774	99.82%
3:00 to 4:59	46	0.11%
5:00 to 9:59	20	0.05%
10:00 or more	8	0.02%
Total Instances	41848	

SAN GABRIEL CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	42073	99.86%
3:00 to 4:59	31	0.07%
5:00 to 9:59	12	0.03%
10:00 or more	16	0.04%
Total Instances	42132	

VIRGINIA CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	40519	99.86%
3:00 to 4:59	32	0.08%
5:00 to 9:59	9	0.02%
10:00 or more	15	0.04%
Total Instances	40575	

BUENA VISTA CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	38531	99.32%
3:00 to 4:59	221	0.57%
5:00 to 9:59	28	0.07%
10:00 or more	13	0.03%
Total Instances	38793	

MOUNTAIN CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	38950	98.94%
3:00 to 4:59	403	1.02%
5:00 to 9:59	12	0.03%
10:00 or more	3	0.01%
Total Instances	39368	

CALIFORNIA (FOOTHILL) CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	36681	99.33%
3:00 to 4:59	228	0.62%
5:00 to 9:59	18	0.05%
10:00 or more	0	0.00%
Total Instances	36927	

MAGNOLIA CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	38298	99.82%
3:00 to 4:59	61	0.16%
5:00 to 9:59	5	0.01%
10:00 or more	2	0.01%
Total Instances	38366	

MAYFLOWER CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	38128	99.91%
3:00 to 4:59	27	0.07%
5:00 to 9:59	6	0.02%
10:00 or more	3	0.01%
Total Instances	38164	

S.MYRTLE CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	35066	98.83%
3:00 to 4:59	354	1.00%
5:00 to 9:59	54	0.15%
10:00 or more	8	0.02%
Total Instances	35482	

ARROYO VERDE CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	39454	99.93%
3:00 to 4:59	15	0.04%
5:00 to 9:59	7	0.02%
10:00 or more	4	0.01%
Total Instances	39480	

AVE 33 CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	38012	99.74%
3:00 to 4:59	51	0.13%
5:00 to 9:59	29	0.08%
10:00 or more	18	0.05%
Total Instances	38110	

AVE 45 CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	36265	98.55%
3:00 to 4:59	486	1.32%
5:00 to 9:59	40	0.11%
10:00 or more	8	0.02%
Total Instances	36799	

AVE 50 CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	38210	99.74%
3:00 to 4:59	89	0.23%
5:00 to 9:59	7	0.02%
10:00 or more	2	0.01%
Total Instances	38308	

AVE 59 CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	38208	99.72%
3:00 to 4:59	79	0.21%
5:00 to 9:59	24	0.06%
10:00 or more	4	0.01%
Total Instances	38315	

AVE 60 CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	38402	99.72%
3:00 to 4:59	80	0.21%
5:00 to 9:59	23	0.06%
10:00 or more	5	0.01%
Total Instances	38510	

AVE 61 CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	35992	99.16%
3:00 to 4:59	255	0.70%
5:00 to 9:59	43	0.12%
10:00 or more	7	0.02%
Total Instances	36297	

CALIFORNIA (Pasadena) CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	35647	99.30%
3:00 to 4:59	166	0.46%
5:00 to 9:59	66	0.18%
10:00 or more	18	0.05%
Total Instances	35897	

DEL MAR CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	34784	99.62%
3:00 to 4:59	108	0.31%
5:00 to 9:59	17	0.05%
10:00 or more	9	0.03%
Total Instances	34918	

EL CENTRO CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	38240	99.83%
3:00 to 4:59	42	0.11%
5:00 to 9:59	18	0.05%
10:00 or more	6	0.02%
Total Instances	38306	

FIGUEROA CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	35926	99.19%
3:00 to 4:59	242	0.67%
5:00 to 9:59	45	0.12%
10:00 or more	6	0.02%
Total Instances	36219	

FREMONT CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	37921	99.75%
3:00 to 4:59	65	0.17%
5:00 to 9:59	26	0.07%
10:00 or more	5	0.01%
Total Instances	38017	

FRENCH CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	38447	99.73%
3:00 to 4:59	59	0.15%
5:00 to 9:59	33	0.09%
10:00 or more	14	0.04%
Total Instances	38553	

GLENARM ST. CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	36263	99.75%
3:00 to 4:59	72	0.20%
5:00 to 9:59	16	0.04%
10:00 or more	2	0.01%
Total Instances	36353	

HOPE ST. CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	38586	99.92%
3:00 to 4:59	22	0.06%
5:00 to 9:59	6	0.02%
10:00 or more	2	0.01%
Total Instances	38616	

INDIANA CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	39170	99.96%
3:00 to 4:59	10	0.03%
5:00 to 9:59	3	0.01%
10:00 or more	3	0.01%
Total Instances	39186	

MISSION CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	34272	99.53%
3:00 to 4:59	137	0.40%
5:00 to 9:59	19	0.06%
10:00 or more	5	0.01%
Total Instances	34433	

ORANGE GROVE CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	37350	99.72%
3:00 to 4:59	78	0.21%
5:00 to 9:59	18	0.05%
10:00 or more	8	0.02%
Total Instances	37454	

PASADENA WEST CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	34550	99.20%
3:00 to 4:59	236	0.68%
5:00 to 9:59	36	0.10%
10:00 or more	7	0.02%
Total Instances	34829	

STATE ST. PED CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	38788	99.87%
3:00 to 4:59	40	0.10%
5:00 to 9:59	11	0.03%
10:00 or more	0	0.00%
Total Instances	38839	

EXPO LINE

Attachment B

ARLINGTON AVE. CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	39311	99.77%
3:00 to 4:59	77	0.20%
5:00 to 9:59	9	0.02%
10:00 or more	3	0.01%
Total Instances	39400	

E LINE (EXPO) GRADE CROSSING DOWNTIMES		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	587994	99.19%
3:00 to 4:59	3958	0.67%
5:00 to 9:59	757	0.13%
10:00 or more	69	0.01%
Total Instances	592778	

7TH AVE. CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	39601	99.65%
3:00 to 4:59	125	0.31%
5:00 to 9:59	11	0.03%
10:00 or more	4	0.01%
Total Instances	39741	

11TH AVE. CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	41420	99.95%
3:00 to 4:59	15	0.04%
5:00 to 9:59	1	0.00%
10:00 or more	5	0.01%
Total Instances	41441	

FARMDALE AVE. CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	43196	99.51%
3:00 to 4:59	190	0.44%
5:00 to 9:59	20	0.05%
10:00 or more	2	0.00%
Total Instances	43408	

BUCKINGHAM RD. CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	38575	99.84%
3:00 to 4:59	57	0.15%
5:00 to 9:59	3	0.01%
10:00 or more	1	0.00%
Total Instances	38636	

HAUSER BLVD. CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	39164	99.87%
3:00 to 4:59	27	0.07%
5:00 to 9:59	16	0.04%
10:00 or more	9	0.02%
Total Instances	39216	

BAGLEY AVE. CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	40466	99.97%
3:00 to 4:59	11	0.03%
5:00 to 9:59	1	0.00%
10:00 or more	0	0.00%
Total Instances	40478	

OVERLAND AVE. CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	36137	99.38%
3:00 to 4:59	187	0.51%
5:00 to 9:59	33	0.09%
10:00 or more	7	0.02%
Total Instances	36364	

WESTWOOD BLVD. CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	39019	99.73%
3:00 to 4:59	88	0.22%
5:00 to 9:59	12	0.03%
10:00 or more	6	0.02%
Total Instances	39125	

MILITARY AVE. CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	39968	99.79%
3:00 to 4:59	65	0.16%
5:00 to 9:59	12	0.03%
10:00 or more	6	0.01%
Total Instances	40051	

BARRINGTON AVE. CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	38762	98.97%
3:00 to 4:59	356	0.91%
5:00 to 9:59	39	0.10%
10:00 or more	9	0.02%
Total Instances	39166	

STEWART ST. CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	40269	98.57%
3:00 to 4:59	528	1.29%
5:00 to 9:59	56	0.14%
10:00 or more	1	0.00%
Total Instances	40854	

26TH ST. CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	34577	94.78%
3:00 to 4:59	1409	3.86%
5:00 to 9:59	480	1.32%
10:00 or more	14	
Total Instances	36480	

20TH ST. CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	38165	98.49%
3:00 to 4:59	540	1.39%
5:00 to 9:59	44	0.11%
10:00 or more	1	0.00%
Total Instances	38750	

17TH ST. CROSSING		
Downtime (minutes)	# of Instances	% of Total
0:00 to 2:59	39364	99.23%
3:00 to 4:59	283	0.71%
5:00 to 9:59	20	0.05%
10:00 or more	1	0.00%
Total Instances	39668	

Metro



Board Report

File #: 2019-0732, **File Type:** Motion / Motion Response

Agenda Number: 47.

**REGULAR BOARD MEETING
SEPTEMBER 26, 2019**

Motion by:

Fasana

Report on Automatic Crossing Gates

Every day, Metro's light rail trains cross numerous protected at-grade intersections. When trains approach these intersections, the automatic crossing gates move to the down position to protect motorists and pedestrians from passing trains.

Since Metro's rail lines have been in operation, the Board has not received data on gate down time for at-grade crossings.

SUBJECT: AUTOMATIC CROSSING GATES

APPROVE Motion by Fasana that Metro report back to the Operations Committee by January 2020 with a table for each rail line showing the number of occurrences gates have been down at each protected intersection for longer than 3 minutes, 5 minutes, and 10 minutes.

Metro**Board Report**

File #: 2019-0871, **File Type:** Informational Report**Agenda Number:** 19.

**OPERATIONS, SAFETY, AND CUSTOMER EXPERIENCE COMMITTEE
FEBRUARY 20, 2020****SUBJECT: MOTION 47 RESPONSE AUTOMATIC CROSSING GATES****ACTION: RECEIVE AND FILE****RECOMMENDATION**

RECEIVE AND FILE the motion response regarding Metro's light rail gate down time for at-grade crossings.

ISSUE

During the September 2019 regular board meeting, Motion 47 was brought forward by Board Director Fasana requesting an update Metro's light rail line automatic crossing gate down times at protected intersections for longer than 3 minutes, 5 minutes, and 10 minutes.

BACKGROUND

Metro's light rail system has a total of 75 highway grade crossings, all of which are located on the A Line (Blue), E Line (Expo), and L Line (Gold) Lines with 27, 15, and 33 grade crossings respectively.

The highway grade crossings have active traffic control devices which consist of bells, flashing lights, and gates to inform motorists of the presence of trains, either approaching or occupying a crossing. The warning system activates when an approaching train occupies a segment of track designated to provide a minimum advanced warning time and deactivates after the last train clears the roadway.

At highway traffic signalized intersections, the highway traffic controller is interconnected to the crossing signal system and is part of the traffic control system at the crossing. Traffic preemption is activated by an approaching train occupying a segment of track selected to provide the designed preemption time required to clear vehicular and pedestrian traffic in advance of the train approaching the roadway crossing. In most cases, preemption is activated in advance of the crossing warning system activation to result in less than 3-minute gate down times.

The primary reasons that gate down times exceed 3 minutes include equipment failures, broken gate arms, vehicle accidents at the crossings adjacent Union Pacific railroad operations, vandalism and multiple trains approaching the grade crossing concurrently, and trains entering and leaving rail yards close to the crossing.

First, the system is designed with a safety feature to prevent gate arms from pumping (going up and then down seconds later) and briefly releasing vehicular traffic during times when a grade crossing is

active by a train on track 1 and a train approaching on track 2 enters the preemption segment of track. For this situation, the crossing remains active and gates are held down until all approaching trains clear the roadway.

Second, Metro has implemented various practices and installed additional equipment to reduce extended down times for grade crossings, such as:

1. Installed motorman lights to provide train operators gate down indications to give train operators confidence to maintain their cab speed on approach to the grade crossing. Slower than normal trains can extend the gate down time
2. Installed gate raise push buttons, located in signal cases adjacent to the grade crossings, which allow for an active grade crossing to be de-activated for broken down trains, maintenance or equipment failure
3. Partnered with the cities to reduce preemptions time at grade crossings

Third, maintenance of the highway grade crossing system occurs regularly in accordance with Metro's procedures as well as requirements of the CPUC General Order 75C and FRA Title 49 part 234. Metro employees perform inspections and testing of the gate mechanisms (e.g., flashers, bells, grounds, batteries, control circuits and relays) on a monthly and quarterly basis.

DISCUSSION

An analysis of all grade crossing operations was done for the six-month period from May 1, 2019 to October 31, 2019, utilizing supervisory control and data acquisition system (SCADA) data. Grade crossing activity is considered normal if the duration of the crossing gates down time is less than 3 minutes. The information below shows the number of occurrences and percent of occurrences where gates have been down at each protected intersection for longer than 3 minutes, 5 minutes, and 10 minutes.

Grade Crossing Gate Down Time Occurrences - May 1, 2019 to October 31, 2019

Down Time	E Line (Expo)	L Line (Gold)	A Line (Blue)	All Lines
< 3 Min	587,994	1,251,580	280,490*	2,120,064
	99.19 %	99.57 %	98.86 %	99.37 %
3 to 5 Min	3,958	4,450	2,128	10,536
	0.69 %	0.35 %	0.75 %	0.49 %
5 to 10 Min	757	749	746	2,252
	0.13 %	0.06 %	0.26 %	0.11 %
>10 Min	69	238	347	654
	0.01 %	0.02 %	0.12 %	0.03 %
Total Events	592,778	1,257,017	283,711	2,133,506
Total Gates	15	33	27	75

*A Line grade crossing gate down times influenced by A Line closure during 2019.

The extended down times (between 3 and 10 minutes) were typically due to the following primary

reasons:

- 1) Multiple trains travelling through E Line (Expo), L Line (Gold), and A Line (Blue) crossings concurrently
- 2) Metro and Union Pacific trains travelling through the A Line (Blue) concurrently
- 3) Hi-rail vehicles going through crossing during maintenance activities or placing hi-rail vehicles on the rail line
- 4) Trains pulling in and out of the yard close to the crossings.

The more extended down times (longer than 10 minutes) were typically due to the following primary reasons:

- 1) Equipment Failures
- 2) Broken Gate Arms
- 3) Vehicle Accidents
- 4) Adjacent Union Pacific railroad operations
- 5) Vandalism

DETERMINATION OF SAFETY IMPACT

Reliable highway grade crossings will have a positive impact on the safety of our customers and employees.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

Recommendation supports the following Metro Strategic Plan Goal 2) Deliver outstanding trip experiences for all users of the transportation system.

NEXT STEPS

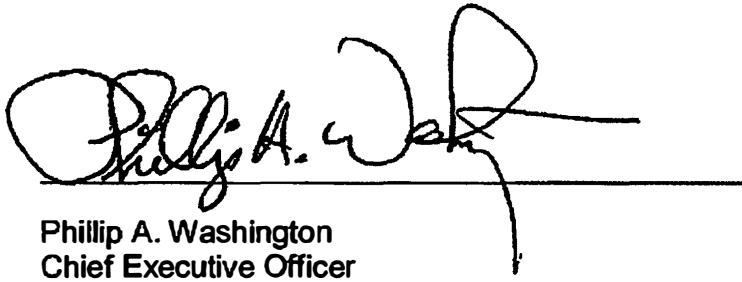
Staff will continue to monitor gate down times and equipment failures to identify problem crossings with excessive down times. Crossings with excessive down times will be studied and recommendations to reduce the gate down times will be proposed and implemented. Staff will also continue to work with the Cities where necessary, for modifications and improvements to the highway traffic control system.

ATTACHMENTS

Attachment A - Motion 47 Automatic Crossing Gates

Prepared by: Errol Taylor, Sr. Executive Officer, Maintenance & Engineering, (213) 922-3227
Leticia Solis, Interim Deputy Executive Officer, Wayside Systems Maintenance, (213) 613-2115
Marshall Epler, Deputy Executive Officer, Systems Engineering, (213) 617-6232

Reviewed by: James T. Gallagher, Chief Operations Officer, (213)418-3108



Phillip A. Washington
Chief Executive Officer