

Metro Facilities-Operations Staff Report

**Metro Bus Division
Capacity Assessment**

*Report on the Impact of Bus
Overcrowding at Bus Divisions*

May 2008



Los Angeles County
Metropolitan Transportation Authority

Metro



“In the Long Range Plan we have plans to construct two divisions... The question is really how do we provide quality service if we don’t have quality facilities? That is a big, big challenge. We realize it and we’re trying to work it out as best we can.”

Roger Snoble, Chief Executive Officer, April 29, 2008

Overview

Bus operating and maintenance facilities are one of the key components of our asset mix; however, we have not built a new bus division since 1984.¹ In addition, due to funding shortfalls, we have been forced to defer necessary capital investments at existing bus divisions. Generally, significant elements of our bus divisions are degrading into a state of under-investment, which leads to issues such as: aging facilities; obsolete technology and energy/power requirements; higher maintenance costs; no capability to expand facilities or fleets due to space and land constraints; deferred upgrades; and, site location issues. Bus divisions are critical for ensuring reliability of service as our fleet expands. Unfortunately, for various reasons, we have not invested in property acquisition as part of this expansion. It is evident that investing in bus Division capacity is a key factor in the success of future operations.

Current constraints on bus operations, especially lack of space, are at the root of many problems plaguing our bus divisions, including: poor circulation of buses, inadequate parking and building space, and the fact that most were designed for standard size buses (40-feet in length) than what we currently use (45- and 60-foot buses). In 2004, staff prepared the *Bus Strategic Assessment Report* that concluded that we had already reached a point of over-capacity. Armed with the results, Facilities-Operations investigated new options for new facilities to fix the bus division crunch. As discussed below, our divisions are operating approximately 249 buses, or 10%, above system wide parking design capacity. Some bus divisions are as much as 19 percent above capacity. Additional capacity will be required not only to meet future ridership demands but also our expansion with higher capacity buses. Facilities-Operations has proposed two new bus divisions – Union and LAX – which would only meet currently planned bus operations to FY 2011. We would still need to look for additional storage capacity to provide operational flexibility and maintain system wide reliability.

Bus Fleet

As of February 1, 2008, our active revenue fleet consisted of 2,549 buses, as shown in Table 1.

¹ Division 8 in Chatsworth was the last bus division built, which opened in 1984.



Table 1
Total Bus Fleet and Division Assignment

DIVISION	40-FT BUSES	45-FT BUSES	ARTICULATED BUSES	TOTAL
1	197	26	24	247
2	208	0	0	208
3	154	26	24	204
5	166	0	77	243
6	82	0	0	82
7	228	0	30	258
8	156	19	35	210
9	270	0	0	270
10	123	0	109	232
15	233	9	47	289
18	266	17	23	306
TOTAL	2,083	97	369	2,549

Safety First

*“More buses in the yard means more yard accidents for both maintenance and transportation.”
Hector Rojas, Division 6 Maintenance Manager*

Although the Service Performance Analysis department could not directly attribute accidents on bus divisions to overcrowding, it is safe to say that overcrowding plays a role as buses are tightly packed together in as many as 42 columns wide and 17 rows of buses deep at our bus divisions. Table 2 provides the number of accidents identified with street type as “yard/terminal.” The accident data for yards/terminals is provided for information only. For us to be able to significantly reduce accidents at all yards/terminals, relieving overcrowding at bus divisions is a major part of the solution.

*“Having the cash room at the beginning of the yard and buses backing up on the street while cash trucks are trying to back up to the cash house contributes to yard accidents. The vaulters have to work quicker to empty the cash boxes out of the buses. This issue cause possible workers comp problems.”
Donnel Harris, Division 2 Maintenance Manager*



Table 2
Bus Accidents Occurring in Yards/Terminals
January 1, 2005 through December 31, 2007

DIVISION	ACCIDENTS
1	35
2	12
3	5
5	21
6	10
7	32
8	14
9	30
10	44
15	20
18	21
TOTAL	244



Division 7 (West Hollywood) – Typical Inline Bus Parking Configuration Makes Most of Available Space



“If buses are parked in the wrong location, all buses in the lane have to be moved.”
Hector Rojas, Division 6 Maintenance Manager

Projected Annual Ridership

Below in Table 3 is a summary of our latest projected annual bus ridership (includes directly operated as well as contracted services) developed by Service Planning in August 2007. This projected annual bus ridership will soon be revised to reflect the July 2009 fare increase (this projection includes the previous fare increase in July 2007), and other proposed new bus services. Fluctuations in annual boardings are affected by a variety of factors including congestion, rail ridership and gas prices. Due to the recent trend of increasing gas prices, we expect to see sharp increases in projected annual ridership.

Table 3
Bus Annual Boardings (000)

FY09	FY10	FY11	FY12	FY13
406,079	391,756	394,881	398,495	405,249

Proposed Bus Fleet Acquisition

Over the next two fiscal years, we propose to purchase 260 45-foot buses to replace outdated 40-foot buses as shown in Table 4. Also, we recently received a grant to purchase 63 articulated buses to use on high occupancy toll lanes and plan to purchase 22 new articulated buses for use on the Orange Line Canoga extension. These 85 new buses would be deployed as soon as 2011 and are expansion buses, meaning that the fleet would grow larger by 85 buses further exacerbating the facility capacity problem.

Table 4
Near-Term Bus Acquisitions

FISCAL YEAR/ PROGRAM	NUMBER	TYPE
09	130	45-Foot
10	130	45-Foot
High-Occupancy Toll Lanes	63	60-Foot
Orange Line Canoga Extension	22	60-Foot

For comparison purposes, we convert “45-foot” and “Articulated 60-foot Buses” into “40-foot equivalents.” These new bus acquisitions over the next three years equate to 161 forty-foot equivalent buses. Beyond FY11, we have planned high capacity bus procurements, although type, size, and number procured has not yet been identified or presented to the Board. Table 5 shows three scenarios for longer term bus procurement. These alternatives assume no



expansion of the bus fleet, only replacement of the existing 40-foot bus fleet vehicles with either 45-foot buses, 60-foot buses or a combination of both. Even with no expansion in the long-term, additional bus capacity required for the longer higher-capacity buses will range from 261 to 651 additional parking spaces.

**Table 5
Long-Term Bus Acquisitions
(Replacement Only, No Expansion)**

BUS PROCUREMENT ALTERNATIVE	CURRENT 40-FT BUS FLEET	REPLACEMENT BUSES	40-FOOT EQUIVALENCY	ADDITIONAL BUS CAPACITY
100% 45-Foot	2,083	2,083	2,344	261
75% 45-Foot/ 25% 60-Foot	2,083	2,083	2,540	417
50% 45-Foot/ 50% 60-Foot	2,083	2,083	2,734	651

Bus Division Capacity

As of January 1, 2008, our bus division capacity was 2,498 buses, as shown in Table 6. All of our bus divisions were designed to operate with standard size buses of 40-feet in length. As shown in Table 5, we will eventually purchase only longer buses to maintain seat equivalency further exacerbating the operating capacity overage shown in Table 6.

**Table 6
Bus Division Capacity**

DIVISION	CURRENT DESIGN CAPACITY	CURRENT FLEET IN 40-FOOT EQUIVALENTS	OPERATING STORAGE DEFICIT	OPERATING CAPACITY OVERAGE
1	245	262	17	107 %
2	195	208	13	107 %
3	210	219	9	104 %
5	247	282	35	114 %
6	79	82	3	104 %
7	249	273	25	110 %
8	238	230	+8	97 %
9	235	270	35	115 %
10	259	287	28	111 %
15	262	314	52	120 %



DIVISION	CURRENT DESIGN CAPACITY	CURRENT FLEET IN 40-FOOT EQUIVALENTS	OPERATING STORAGE DEFICIT	OPERATING CAPACITY OVERAGE
18	280	320	40	114 %
TOTAL	2,498	2,747	249	110 %

Bus Division Capacity Issues

“Bus maintenance involves a high level of logistics during the process of servicing buses, performing preventive maintenance, repair work and major jobs. The Divisions were originally designed for a maximum capacity with an optimum operational efficiency. Division 10 physical capacity is about 250 buses. In reality, from a logistics point of view, the optimum operational size for a single division is around 200-220 buses because above that number the complexity of the processes necessary to accomplish the tasks assigned to the divisions can be performed with less productivity.”
 Frank Lonyai, Division 10 Maintenance Manager

Efficiency Impacts

The lack of capacity at the bus divisions impacts the efficiency of the fleet maintenance function such as: yard mobility, maintenance space, fueling and cleaning, to name a few. A good portion of a service attendant’s time is spent moving buses around the Division parking area, in queue waiting for washing, fueling, an available repair bay, or making repairs in make shift work areas. As shown in Table 7, this equates to costing approximately \$2.3 million per year.

“From my point of view, I feel Service Attendants waste man hours moving, staging and parking buses.”
 David Palm, Division 7 Maintenance Manager

Table 7
Additional Cost for Unnecessary Bus Movements at Overcrowded Bus Divisions

DIVISION	COST*
1	\$254,311
2	\$214,157
3	\$210,038
5	\$250,193
6	\$84,427
7	\$265,637
9	\$216,216
10	\$277,992
15	\$238,867



DIVISION	COST*
18	\$297,554
TOTAL	\$2,309,392

* Based on # of total buses, # of maintenance activities and # of employees.

Division staff is forced to constantly move buses around to perform regular jobs as buses are parked randomly and require additional time to find for rollout, maintenance or replacement unit for a road call.

“Parking buses is only a small part of the issue. My concerns are the shop size and facilities, we have 12 single bus bays and 4 double bus bays that equates to having room for 20 forty foot buses in the shop or 12 forty foot buses and 4 artics in the shop. Many of the mechanics have to work on the apron to effect repairs.”

Bruce Crum, Division 1 Assistant Maintenance Manager



Division 6 (Venice) – Variety of Operating Limitations and No Potential to Expand

Although Facilities-Operations has made strident efforts to upgrade the bus divisions to continue accepting articulated buses, it has been increasingly difficult to keep up with demand due to the influx of articulated buses and lack of available funding. Our guideline is a system wide ratio of articulated buses to available maintenance bays of 10 to 1. Table 8 shows the articulated buses per available maintenance bays at each of the bus divisions. We currently operate at a system wide ratio of buses to available maintenance bays of 16 to 1, well above the national design standard.



Table 8
Articulated Bus Fleet and Available Maintenance Bays

DIVISION	60-FOOT BUSES	MAINTENANCE BAYS 60 FOOT	BUSES PER MAINTENANCE BAY
1	24	2	12
2	0	0	0
3	24	0	0
5	77	5	15
6	0	0	0
7	30	1	30
8	35	2	18
9	0	2	0
10	109	6	18
15	47	2	24
18	23	4	6
TOTAL	369	24	16

Service Planning

Reduced garage capacity has a large impact on “deadhead” costs since buses are not always able to be stored in the yard nearest the route on which they are operated.² Many bus lines also operate out of more than one Division in an effort to minimize pull-in and pull-out times dependent upon where a bus may start or end on its bus route. Admittedly there are some workruns, on a particular bus line, that work out of a Division which fails to optimize this effort. This has increased the mileage that buses must travel before and after going into service.

In 1996, a court order required us to reduce overcrowding and implement additional services and as a result the number of directly operated peak buses has increased from 1,609 to 2,074. All bus divisions now garage more buses than their design capacity. Compliance with the court ordered New Service Plan expansion is measured by peak seats (one bus equivalent is 40 seats). The New Service Plan committed to an increase of 146 bus equivalents, or 5,840 seats over the number of seats operated as of June 2005 (the baseline for the Plan).

As a result we have become less efficient and unable to garage buses closest to their routes resulting in non-revenue hours increasing at a faster rate than total vehicle hours. Table 9 shows total vehicle hours have increased 22 percent while non-revenue hours have increased

² “Deadhead” costs are the costs incurred when an operator drives a bus from a garage at which it is housed, to the route on which it will provide service; no service to customers is provided during this operational procedure.



by 46 percent. In today's dollars, on a fully allocated cost basis, the annual cost of non-revenue vehicle hours has increased from \$3.6 to \$4.5million annually.

**Table 9
Service Changes and Deadhead Cost**

SERVICE CHANGE	NON-REVENUE VEHICLE HOURS (DEADHEAD)	REVENUE VEHICLE HOURS	TOTAL VEHICLE HOURS	NON-REVENUE HOURS TO TOTAL VEHICLE HOURS	ANNUAL COST OF DEADHEAD
6/30/96	1,657	18,679	20,336	8.1%	3,648,812
12/15/96*	1,668	18,604	20,272	8.2%	3,637,311
6/29/97	1,787	19,127	20,914	8.5%	3,752,575
12/14/97	1,738	18,974	20,711	8.4%	3,716,169
6/28/98	1,756	18,840	20,595	8.5%	3,695,320
12/27/98	1,596	18,537	20,133	7.9%	3,612,406
6/6/99	1,755	19,690	21,445	8.2%	3,847,816
12/5/99	1,850	20,304	22,154	8.4%	3,974,976
6/25/00	1,937	20,972	22,909	8.5%	4,110,444
12/17/00	1,940	20,946	22,886	8.5%	4,106,389
6/3/01	1,883	20,730	22,612	8.3%	4,057,262
12/30/01	1,992	21,145	23,137	8.6%	4,151,354
6/30/02	2,001	21,172	23,173	8.6%	4,157,903
12/15/02	2,010	21,461	23,471	8.6%	4,211,265
6/29/03	2,108	21,027	23,135	9.1%	4,151,139
2/1/04**	2,163	21,019	23,182	9.3%	4,159,518
6/27/04	2,230	21,358	23,588	9.5%	4,232,276
12/19/04	2,370	22,183	24,553	9.7%	4,405,460
6/26/05	2,302	21,889	24,190	9.5%	4,340,435
12/18/05	2,315	22,145	24,460	9.5%	4,388,719
6/25/06	2,389	22,303	24,693	9.7%	4,430,526
12/17/06***	2,379	22,685	25,064	9.5%	4,497,130
6/24/07	2,460	22,418	24,877	9.9%	4,463,702
12/16/07	2,426	22,421	24,847	9.8%	4,458,301
% Increase 1996 to 2007	46%	20%	22%	22%	22%

Source: Directly Operated 4-24 Report: June 1996 through December 2007

* Consent Decree Implemented

** December 2003 Service Change was delayed due to a work stoppage.

*** Consent Decree Expired



“The key to controlling deadhead is to increase bus parking capacity.”
Wayne Wassell, Service Planning, Transportation Planning Manager

HASTUS Scheduling Simulation

Using the current number of bus divisions and their current locations, an analysis was performed to determine how much savings we could achieve if there were no physical limitations in terms of bus parking capacity at each division, no restriction as to which lines could operate out of each division, and given the ability to maximize interlining. Given this scenario the analysis determined that we could reduce daily deadhead hours by 852. Using an annual factor we could potentially save 264,182 deadhead hours annually. In addition, the analysis shows a need for another centrally located bus division and additional capacity in the Westside. Facilities-Operations has planned to build another Downtown bus division and to relocate our smallest bus division in Venice to a larger location.

In support of Facilities-Operations assessment, Metro Service Planning & Development Department conducted a “No Restriction Division Capacity” simulation using Hastus 2007 scheduling software to determine where additional bus parking capacity was required. Service Planning took the data and converted the actual number of buses allocated to each division to their 40-foot equivalence. As shown in Table 10, the simulation indicated that we need additional capacity in Downtown and the Westside to accommodate South Bay and Westside Central bus lines.³

Table 10
HASTUS 2007 Simulation Results⁴

CENTRAL CORE DIVISIONS	OVER/(UNDER)	WESTSIDE CENTRAL/SOUTH BAY CORE DIVISIONS	OVER/(UNDER)
1	109	5	54
2	7	6	(30)
10	(32)	7	99
		18	19
NEW CAPACITY REQUIRED	84		141

³ Divisions 8 and 15 are located in the San Fernando Valley Service Sector and are self-contained. There were no significant capacity issues identified in this scenario. Divisions 3 and 9 in the San Gabriel Valley Service Sector are under capacity according to this scenario, but are not considered central core divisions.

⁴ Simulation was based on the December 2007 Service Change and on daily service only. Service Planning performed the simulation with the following assumptions: bus capacity was not limited at any division; bus types (40-, 45- or 60-foot) could be supported at any division; and, bus interlining could only be interlined between similar bus types (i.e. articulated buses could only be interlined between articulated bus lines. 40' and 45' buses could not be interlined on any articulated bus line).



In addition, given that scenario we could potentially save approximately 70 hours daily in deadhead. Using an annual factor, we could potentially save approximately 21,700 annual hours in reduced deadhead by building Union Division alone. This equates to a savings of approximately \$1,700,000 per year.

Operational Productivity Impacts

As shown in Table 6, our bus operations are currently 10 % over storage capacity. Except for Division 8, our bus divisions have buses assigned to them that are over the practical storage capacity for these facilities. Division 8 has capacity for only eight additional buses. However, moving buses from other divisions would add considerable non-revenue operating costs if these eight buses were housed and maintained at Division 8 and operated in other areas of the sector. Even with this exception, we have an operating storage deficit for 249 buses.

In addition, all our bus divisions are designed to operate 40-foot buses and most of which park these buses in tandem in as much as 42 columns 17 buses deep. We are converting these divisions to handle the longer buses and are fully cognizant of the critical constraints that this places on the managers of the bus divisions to operate an expanded fleet in these conditions. Our bus division managers agree that there is a higher cost to operate and maintain buses at an overcrowded division and that there is direct relation to productivity. Quantifying the productivity loss includes a variety of factors (# of employees, # of buses, # of maintenance activities, etc...) which affect daily operation. Our bus division Maintenance Managers were surveyed and the information provided was converted to a dollar amount that was relatively applied to each bus division based on the factors described above. Table 11 estimates the cost implications of operating overcrowded bus divisions on an annual basis. This is not necessarily money we would save but rather are the estimated costs of not running our operations efficiently. For example, instead of spending more time moving buses around the yard, more time could be spent on preventive maintenance.

Very conservatively speaking I can assume a minimum of 10 % productivity drop as a result of overcrowding at the division. This number could be actually much higher if management, supervision and technical staff would have grown proportionally with the fleet size. We're doing more with less.

Frank Lonyai, Division 10 Maintenance Manager

Table 11
Estimated Additional Cost per Additional Bus at Overcrowded Bus Divisions

DIVISION	EMPLOYEES	ANNUAL PRODUCTIVITY LOSS	# OF BUSES OVER	ANNUAL PRODUCTIVITY LOSS PER BUS
1	661	\$1,237,392	17	\$72,788
2	554	\$1,037,088	13	\$79,776
3	545	\$1,020,240	9	\$113,360



DIVISION	EMPLOYEES	ANNUAL PRODUCTIVITY LOSS	# OF BUSES OVER	ANNUAL PRODUCTIVITY LOSS PER BUS
5	594	\$1,111,968	35	\$31,771
6	154	\$288,288	3	\$96,096
7	647	\$1,211,184	25	\$48,447
9	665	\$1,244,880	35	\$35,568
10	677	\$1,267,344	28	\$45,262
15	700	\$1,310,400	52	\$25,200
18	792	\$1,482,624	40	\$37,066
TOTAL	5,989	\$11,211,408	257	\$43,624

In conclusion, we have no capacity system wide that could support the new buses anticipated over the next three years. Our current storage deficit of 249 buses is to meet 2008 ridership demands without consideration of longer term growth requirements. By 2011, we will acquire 161 additional 40-foot equivalent buses creating an operating storage need for 410 buses. As shown in Table 5, this may be exacerbated further by the fluid situation of bus procurement whereas it is unknown exactly which bus technologies would be procured beyond FY11, increasing the storage need by up to 651 buses even without expansion of the existing fleet.

Bus Division Improvements

A variety of bus division rehabilitation projects have been identified and funded as part of our Capital Improvement Program. These projects are being undertaken in order to keep the bus divisions in working order. For example, in FY08 our total Capital Program (CP) budget was \$645 million, of which \$35.6 million was allocated to bus division improvements or approximately 5.5%. As shown in Table 12, we have historically allocated 4.7% of our CP budget for bus division improvements, fluctuating between the low of 1.3% to the high of 8.7%. Recent allocations indicate an upward and much needed trend, but overall bus division improvements are still a proportionately small percentage of the budget.

Table 12
Capital Program for Bus Division Improvements
 (\$ in millions)

ELEMENT	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09	TOTAL
Capital Program	588	560	655	513	687	790	686	630	645	691	6,445
Bus Division Improvements	7.5	9.8	19.3	27.2	22.9	34.4	45.4	55.1	35.6	47.5	304.7
	1.3%	1.8%	2.9%	5.3%	3.3%	4.4%	6.6%	8.7%	5.5%	6.9%	4.7%



Bus Division Expansion Opportunities

Although the 2004 Bus Division Strategic Assessment Report found that we could modify the striped parking areas at each Division, this effort only added minimal spaces and contributed to further safety and access issues in the yard. More importantly, the report found that our division capacity in 2004 was insufficient to not only meet its current needs but that most of the divisions were landlocked to meet its future needs. The only other option available to expand the divisions is to build up by adding a second story parking deck. Of the 11 bus divisions, only five have the potential to expand with a bus parking structure, as shown in Table 13. It is important to note that we prefer not to operate bus divisions in excess of 300 buses due to efficiency and increased overhead issues.

Table 13
Bus Division Expansion

Table with 5 columns: DIVISION, POTENTIAL TO EXPAND?, APPROXIMATE NEW STORAGE SPACES, NOTES, ESTIMATE (2007 Costs). Rows 1-8 detailing expansion opportunities for various bus divisions.



DIVISION	POTENTIAL TO EXPAND?	APPROXIMATE NEW STORAGE SPACES	NOTES	ESTIMATE (2007 Costs)
			additional spaces.	
9	No	0	Recently reconstructed with new building with planned joint-development; in environmental process for parking areas.	N/A
10	Yes	100	Expansion considered up to 100 additional buses over operating principle. Not optimal and expansion would require eminent domain action of an adjacent property who is an unwilling seller. Expansion could also be upward with a two story parking structure.	\$80,000,000
15	No	0	Currently houses buses retired from fleet.	N/A
18	Yes	20	Expansion would be upward with a two story parking structure that could provide room for an additional 40 buses, if needed.	\$10,000,000

Necessary Bus Division Actions

Currently, we are completing the necessary projects required to service the longer articulated buses and have also initiated plans for two new bus divisions to support growth in bus services in Central and Westside service sectors: Union Division and LAX. Both of the proposed divisions are required to meet planned facility needs and are included in the 2008 Long Range Transportation Plan. As shown in Table 14, these two divisions would meet the required storage capacity for the proposed bus fleet in FY11. The Union Division would be constructed at the current site of Terminal 31 and MSSC, near Lyon and Cesar Chavez. It would have capacity for 125 standard buses and would be capable of supporting about 50 articulated buses. The LAX Division would be constructed on a 25 acre parcel near the intersection of La Cienega and 111th. This facility would support up to 200 standard buses and 100 articulated buses or it could be utilized 100% by articulated buses.



Table 14
Bus Division Assignment
2011 Scenario With and Without Proposed Bus Divisions

Table with 7 columns: 2011 PROPOSED BUS FLEET, 2011 DIVISION CAPACITY NO ACTION, FACILITY CAPACITY DEFICIT, 2011 DIVISION CAPACITY WITH UNION DIVISION (2010), FACILITY CAPACITY DEFICIT, 2011 DIVISION CAPACITY WITH LAX (2012), FACILITY CAPACITY SURPLUS. Values: 2,908, 2,498, 410, 2,698, 210, 2,998, 90.

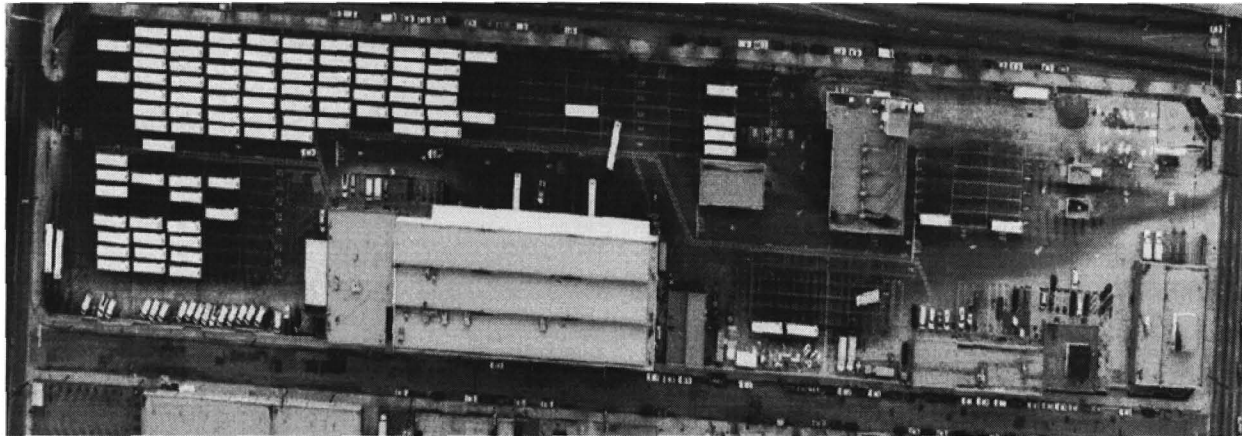
All of the expenses associated with operating transit start as soon as the bus leaves the garage, so it is advantageous to start revenue service as soon as practical when the bus leaves the division and have as few deadhead miles as possible. Increasing bus division capacity by construction of new bus divisions or expansion of existing bus divisions, if possible, would certainly reduce deadhead costs if divisions were located closer.

Of these two divisions, the Union Division is the top priority due to location, project readiness and cost considerations. The Union Division is in a more central location, which will reduce deadhead costs. The project is already in the environmental process and the property is owned by us thereby reducing site costs. Bringing the Union Division on line will begin to reduce the capacity issue. The LAX Division will allow the remainder of the current needs to be met and accommodate planned growth to the FY 2011. However, finding a suitable site in the Westside Service Sector has been difficult and leasing LAX Division is a feasible alternative but may eventually have to be replaced in the long term (only 50 year lease available).

In addition, Facilities-Operations is planning a Master Plan for Division 2 in an effort to increase capacity at this division.

Division 2 is a 100 year old facility that must be completely rebuilt from the ground up. We do not have the ability to move a 200 bus operation to an interim facility for the 2 years it takes to raze Division 2 and rebuild a new facility. Therefore, the Union Division is important, not only for system capacity expansion, but in the first two years of its operation to provide a facility to move all Division 2 operations until Division 2 can be rebuilt.

Alex Clifford, Gateway Cities Service Sector General Manager



Division 2 (Downtown adjacent to I-10) – Configuration and Landlocked Limit Capacity Options

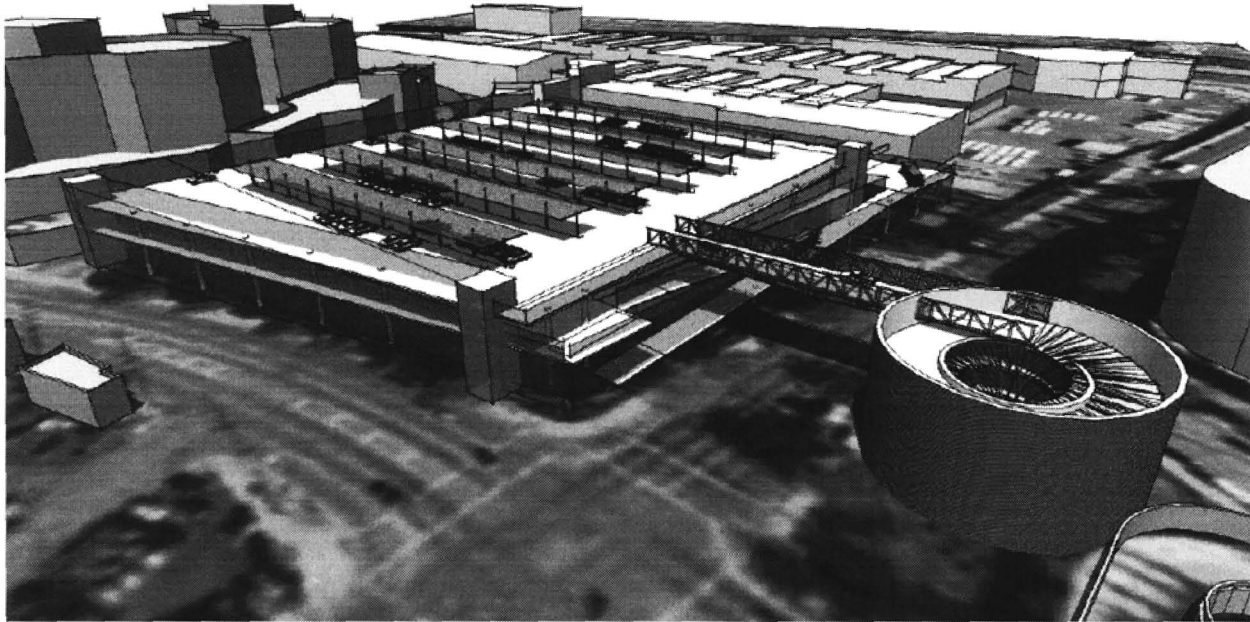
Next Steps

We have two alternatives to relieve overcrowding at our bus divisions: 1) expand existing bus divisions; or, 2) buy, preferably, or lease land to construct new bus divisions. As discussed above, the first option is difficult as existing bus divisions are landlocked and the only way is to build up with a multi-story parking structure. The latter is also difficult because large parcels of land in areas suitable for a bus division are not readily available. Both options, however, are controversial and expensive. Facilities-Operations has taken immediate steps to address bus division overcrowding and recommends the following funding commitments:

1. Fund the construction of Union Division for approximately \$89.9 million life of project costs as described in Table 15.

Table 15
Union Division
Life of Project Costs

UNION DIVISION	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13+	TOTAL
FORECAST	4,947,000	7,620,067	15,992,833	25,055,408	22,043,321	14,300,372	89,947,000



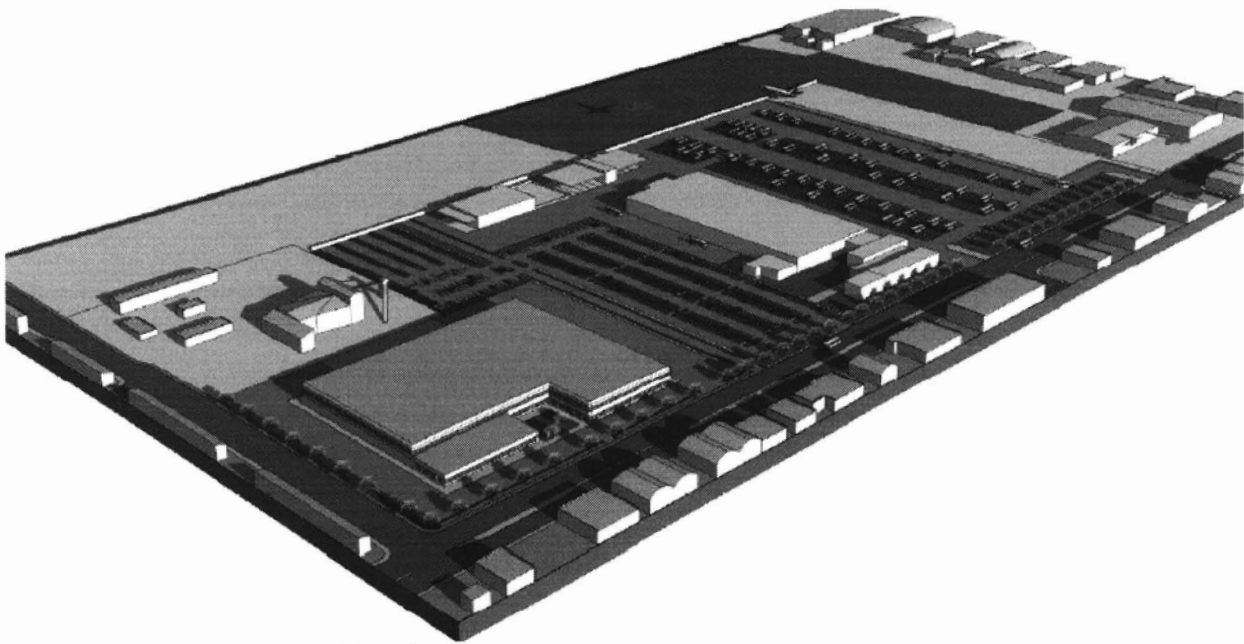
Union Division Conceptual Rendering

Recently, we were offered the opportunity to take advantage of \$213 million in congestion pricing funds by the federal government. But in order to take advantage of this funding, the Union Division would have to be built by December 31, 2010. Facilities-Operations staff analyzed various potential design and construction project delivery methods and determined that Union Division could be built by December 31, 2010 based on an expedited schedule. Hence, the funding schedule presented in Table 15 would be adjusted and condensed to be completed within the FY 11 budget cycle.

- 2. Fund the construction of the LAX Division and leasing of Los Angeles World Airport property for 50 years for approximately \$118.9 million life of project costs as described in Table 16.

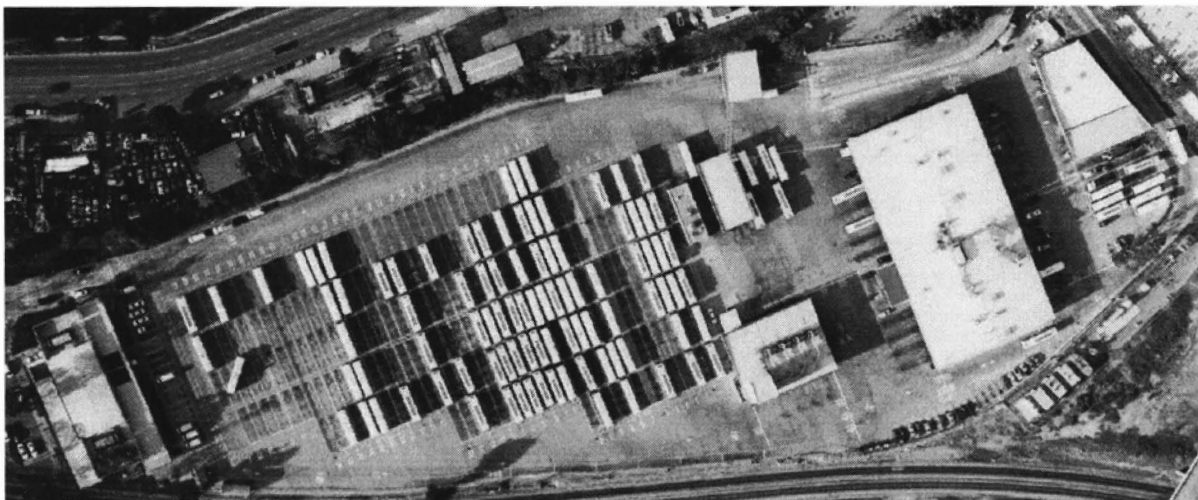
Table 16
LAX Division
Life of Project Costs

LAX DIVISION	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13+	TOTAL
FORECAST	326,716	648,284	22,204,148	26,573,618	50,729,161	18,468,073	118,950,000



LAX Division Conceptual Rendering

If LAX were not funded, Facilities-Operations would pursue expansions of Divisions 2, 5 and 18 (in that order). Although Division 10 has potential, it would involve an extensive eminent domain action with unknown costs. However, Division 2 would still be rebuilt not only to expand, but to modernize the 100 year old facility. The costs and potential drawbacks to constructing these expansion opportunities are referenced in Table 13.



Division 10 (Mission Road) – Offers Potential to Expand with Purchase/Eminent Domain of Adjacent Property or with Second Story Deck



Division 18 (Carson) – Although Landlocked, Offers Potential to Expand with a Second Story Deck



Division 5 (South Los Angeles) – Also Landlocked with Potential to Expand with a Second Story Deck



Operationally, it makes good cost-benefit sense to get the layout and the contents of a Division right in an effort to avoid accidents and to expend less manpower moving buses two or more times while trying to vault, wash and maintain them. Operationally, it makes better sense to lay out buses in the yard in the most efficient manner to meet rollout and to service the buses. Operationally, the potential benefits of new and rebuilt Divisions would not only result in annual cost savings but also would result in more efficient operations. That will in turn result in manpower hours saved being reinvested back into the operation, thereby resulting in cleaner buses and reduced road calls.

Carolyn Flowers, Chief Operations Officer

Conclusion

In summary, the three major factors which have significantly impacted our bus operations are insufficient bus division capacity, inadequate infrastructure investment and increased ridership growth. Construction of new or expansion of existing bus divisions would result in many operating efficiencies primarily by increasing bus capacity and keeping buses closer to their service routes. Although staff has pursued means to reduce deadhead costs, all our bus divisions are over capacity and there is little flexibility. Operating bus divisions at over-capacity also results in inefficiencies in maintenance that also impacts operating costs. Table 17 summarizes the potential savings in costs related to inefficient operations and productivity loss. Essentially, an efficient bus maintenance and operation program with sufficient bus capacity would potentially save \$ 15,220,800 on an annual basis.

**Table 17
Potential Annual Cost Avoidance**

ISSUE	AMOUNT
Inefficient Use of Staff	\$ 2,309,392
Deadhead	\$ 1,700,000
Productivity Loss	\$ 11,211,408
Potential Annual Cost Avoidance	\$ 15,220,800

Although our bus divisions have been historically underfunded, staff has prepared conceptual plans for two new bus divisions and preparing master plans for existing bus divisions in order to alleviate the capacity problem and accommodate our growing bus fleet. In addition, Facilities-Operations is planning to update the 2004 *Bus Division Strategic Assessment Report* to provide proper planning for future bus vehicle and facility needs. Also, as part of the update process, Facilities-Operations is planning to convene an APTA Peer Review Panel to advise, review and comment on the report.



These efforts would result in efficient construction and/or expansion of bus divisions that would relieve the capacity constraints we are currently experiencing and allow us to relocate routes to more efficient bus division locations. We must make these investments into additional bus capacity as soon as possible, so that we may meet the demands of future ridership and continue to improve the service we operate.

D13 Original Plan and Alternative Comparison

	Original D13 Plan	Recommendation/Alternative
Description	<ul style="list-style-type: none"> • Transfer D2 to D13 • Close D2 for 2 years for re-construction of new transportation building, new specialty maintenance bays, renovation of maintenance building, annex, fueling/cleaning building, off-site parking lot and new bus wash • Leave Central Cash Counting Facility (CCCCF) as is 	<ul style="list-style-type: none"> • #1 (Immediate) Ops will right-size system and identify system-wide line reallocations, considering D13 opening (<i>Rev Svc: December 2015</i>) • #2 (2015-2016) Ops will continue right-sizing the system and identify system-wide line reallocations, considering D2 potential future rehab plans, including moving Cash Counting and other functions to ideal locations • Revisit/refine Construction's D2 closure plans • Identify potential uses for any Divisions that may be underutilized (D10 for example) as part of system-wide line reallocation assessment considering possible expansions of OCI, CMF, & Non-Revenue Maintenance, possibility of having satellite division, storage for contingency vehicles, etc. • Ops will work with OMB to finalize a staffing plan for D13, inclusive of system-wide service and staffing reallocations for any locations identified as having the potential of being more efficient.
Pros	<ul style="list-style-type: none"> • Manageable and less complicated to move D2 to D13 as these divisions are comparable in staff number, assignments, fleet size, and number of routes • Less impact on budget 	<ul style="list-style-type: none"> • Allows Operations to address system-wide inefficiency issues and right-size the system immediately • Allows D2 to undergo construction identified as critical by Operations, which would ultimately increase efficiency as D2 continues to be a high demand Division, regardless of D13 opening • Opens discussion for Operations and Construction to address other construction concerns (D1 and Cash Counting)
Risks	<ul style="list-style-type: none"> • Allows D2, a high demand division, to be shut down for 2 years which will significant budget impacts and service impacts • If D13 opening does not align with Metro scheduled shake-up dates, a special shake up may be disruptive and costly • Does not address system-wide inefficiency issues or allows Metro to right-size the system immediately 	<ul style="list-style-type: none"> • Allows D2, a high demand division, to be considered for future rehab work which will have budget impacts • If current D13 opening dates do not align with Ops existing shake-up dates, may require a special shake-up or testing activities to be extended until D13 is ready to be occupied

Service Scheduling Analysis for Metro Operating Bus Divisions

(Model Number 2C)

Division	As of Today	Min-Bus Scenario	Difference	Region
1*	159	159	0	Downtown
2*	149	100	(49)	Downtown
3	159	147	(12)	Downtown
10**	165	74	(91)	Downtown
13	0	137	137	Downtown
Downtown Total	632	617	(15)	
9	212	140	(72)	East
East Total	212	140	(72)	
5	166	187	21	South
18	204	262	58	South
South Total	370	449	79	
8	168	146	(22)	Valley
15	194	176	(18)	Valley
Valley Total	362	322	(40)	
6	30	39	9	West
7	201	173	(28)	West
West Total	231	212	(19)	
Grand Total	1,807	1,740	(67)	21,645

*Restrictions for Divs 1 & 2 (Number of Buses Assigned & Constrained Bus Type)

** D13 pulls buses from D10 since D13 is three minutes closer to Union Station