Exposition Metro Line Construction Authority

Exposition Corridor Transit Project Phase 2

Final Environmental Impact Report

Technical Background Report

FINAL

Operating and Maintenance Costs

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INTRODUCTION

Purpose of the Project

The purpose of the proposed Exposition Corridor Transit Project Phase 2 (Expo-2) is to improve public transit service and mobility in the Exposition Corridor between Culver City and Santa Monica, by extending the benefits of the Phase 1 Exposition Corridor Light Rail Project (currently under construction) beyond its currently planned terminus in Culver City to a terminus in Santa Monica.

Purpose of this Report

This report presents transit operating and maintenance (O&M) cost methodologies, operating plans, and cost estimates for the Exposition Corridor Transit Project Phase 2 ~~Draft~~ Final Environmental Impact Report (~~D~~FEIR). The Exposition Metro Line Construction Authority (Expo Authority) is the local lead agency in preparing the ~~D~~FEIR. The next step in the project development process will be the selection of a ~~Locally~~ Recommended Preferred Alternative ~~(LPA)~~.

This report presents the cost models and annual cost estimates to operate and maintain transit services for the project alignments and study alternatives evaluated as part of the ~~D~~FEIR. Cost estimates will be updated for the ~~LPA~~ Recommended Preferred Alternative during subsequent phases of the Expo-2 project. O&M costs include transit operator and mechanic's wages and fringe benefits, vehicle parts, station maintenance, and other expenses associated with the day-to-day expenses of operating and maintaining a transit system. Capital costs, which represent the cost of constructing transit projects and replacing assets (e.g., buildings, vehicles) are being estimated during other tasks of project.

In general, the steps of the O&M cost estimating process are:

1. Develop methodologies for estimating O&M costs;
2. Select cost models that take into account each transit mode and operator;
3. Calibrate the models for current year operations;
4. Generate operating plans and statistics for each study alternative; and
5. Calculate annual transit operating and maintenance costs for each study alternative.

This report documents all five steps of the O&M process for the Expo-2 alternatives. The following section provides proposed alignments, alternatives, and operating plans, followed by descriptions of the O&M cost models and the methodology for estimating O&M costs. Operating statistics and system characteristics derived from operating plans and assumptions are then discussed followed by, annual O&M cost estimates for each alternative (by mode and transit operator). Finally, an analysis of O&M cost differences among the alternatives is presented.

PROPOSED ALIGNMENTS, ALTERNATIVES, AND OPERATING PLANS

The Exposition Corridor Transit Project Phase 2 proposes to extend transit from the planned terminus of the Exposition Light Rail Transit Project Phase 1 (Expo-1) in the vicinity of

downtown Culver City to an end-of-the line station near 4th Street/Colorado Avenue in the City of Santa Monica over a distance of between 6.7-7.6 miles. A brief description of project alignments, alternatives, and operating plans are provided below. More detailed descriptions can be found in the document *Expo Phase II Operating Plans and Assumptions*, Connetics Transportation Group, ~~October 2008~~December 2009.

No Build Alternative

The No Build alternative includes existing services along with "committed" improvements – typically those in the annual element of the Transportation Improvement Program or local capital programs – together with minor transit service expansions and/or adjustments that reflect a continuation of existing service policies. Given that Metro plans to introduce several different transit corridor projects into the Federal Transit Administration (FTA) New Starts process over the next few years, the consensus of agency staff and project consultants was that the No Build alternative for all studies should, as much as is practical, contain identical service characteristics.

The resulting Unified No Build alternative concept therefore contains none of the projects soon to be applying for New Starts funding. This alternative will only include committed transportation improvements such as the completion of the Eastside segment of the Gold Line, an LAX People Mover, the 28-route Metro Rapid Bus Program, and Metro's planned future fleet mix of standard and articulated buses. Within the corridor, it also includes the completion of the Expo-1 LRT and modifications to proximate feeder routes to serve Expo-1 stations.

TSM/Baseline Alternative

The Transportation System Management (TSM) alternative enhances the No Build alternative and emphasizes transportation system upgrades. The TSM alternative is also considered the Baseline alternative for which comparisons are made for federal funding purposes. The TSM alternative involves three basic components: (1) addition of a rapid bus route connecting downtown Culver City with downtown Santa Monica; (2) associated service improvements on selected north-south routes to feed stations along the new rapid bus route; and (3) service improvements on selected routes connecting westside communities to the Expo-1 LRT terminus. The Expo-2 Rapid Bus would operate on headways of 5 minutes during the peak periods and 10 minutes during the midday.

Build Alternatives

The Build alternatives all include a capital investment in the corridor designed to efficiently transport riders west from the Expo-1 LRT terminus in Culver City, each by a different alignment. Each LRT route would operate on headways of 5 minutes during the peak periods and 10 minutes during the midday. Supporting bus service characteristics are identical to those defined under the TSM alternative except for minor routing adjustments to serve Expo-2 stations.

There are two primary right-of-way (ROW) alignments being considered. Two sub-alignments within the city of Santa Monica, using either Olympic Boulevard or Colorado Avenue, are under consideration for each of the primary alignments. A map of the proposed alignments is presented in **Figure 1**.

Figure 1: Map of the Proposed Alignments

LRT – Exposition ROW and Olympic Alignment

Exposition ROW and Olympic alternative provides about 6.6 miles of continuing service from the Expo-1 terminus in Culver City to 4th/Colorado in Santa Monica. From Culver City, the LRT would run in an exclusive railroad ROW for about 5.1 miles. The LRT alignment would divert from the Exposition ROW near Cloverfield and Olympic boulevards, where it would then operate along Olympic Boulevard and parallel to the I-10 for approximately 1.5 miles.

LRT – Exposition ROW and Colorado Alignment

The proposed operating plan for the 2030 LRT – Exposition ROW and Colorado alternative provides about 6.7 miles of continuing service from the Expo-1 terminus in Culver City to Main/Colorado in Santa Monica. From Culver City, the LRT would run in an exclusive railroad ROW for about 5.5 miles. The LRT alignment would divert from the Exposition ROW near 17th Street and Colorado Boulevard, where it would then operate along Colorado Avenue for approximately 1.2 miles.

LRT – Venice/Sepulveda and Olympic Alignment

The proposed operating plan for 2030 LRT – Venice/Sepulveda and Olympic provides about 7.5 miles of continuing service from Culver City to 4th/Colorado in Santa Monica. From the Expo-1

terminus, LRT would operate in dedicated lanes along Venice and Sepulveda boulevards for approximately 3.8 miles. It would then run in an exclusive railroad ROW for about 2.2 miles and then divert from the Exposition ROW near Cloverfield and Olympic boulevards, where it would operate along Olympic Boulevard parallel to the I-10 for approximately 1.5 miles.

LRT – Venice/Sepulveda and Colorado Alignment

The proposed operating plan for 2030 LRT – Venice/Sepulveda and Colorado provides about 7.6 miles of continuing service from Culver City to Main/Colorado in Santa Monica. From the Expo-1 terminus, LRT would operate in dedicated lanes along Venice and Sepulveda boulevards for approximately 3.8 miles. It would then run in an exclusive railroad ROW for about 2.6 miles and divert from the Exposition ROW near 17th Street and Colorado Avenue, where it would operate along Colorado Avenue for approximately 1.2 miles.

O&M COST METHODOLOGY

Two operating and maintenance (O&M) cost models were developed for the Expo-2 project: one for Metro and one for two municipal transit operators that also serve the corridor: Santa Monica Big Blue Bus and Culver CityBus. The municipal O&M model contains a separate submodel for each of the two transit operators.

Metro O&M Cost Model Methodology

The Metro O&M cost model was developed in a disaggregate, resource build-up format, consistent with the methodology specified by the Federal Transit Administration (FTA).[1] These guidelines specify that:

- Costs are computed by estimating labor and materials needed to provide a given level of service, and then unit costs are applied to the estimated future labor and material cost items;
- Costs are calculated based on operating characteristics for each mode (e.g., Blue Line train hours), rather than for all modes combined (e.g., systemwide passengers);
- Each reported labor and non-labor expense is calculated separately, which ensures that equations are mutually exclusive and cover all operating costs; and
- Almost all cost items are variable, meaning that cost estimates will change with projected changes in service.[2]

The basic structure of a resource build-up model is a series of line items representing specific labor or non-labor costs. Each line item is linked either directly or indirectly to an input variable (system characteristic/operating statistics) that reflects level of service or some other system attribute. *Direct* links are expenses that are logically and strongly influenced by one of the input

[1] While there have been subsequent updates, detailed guidance is provided in Federal Transit Administration. *Procedures and Technical Methods for Transit Project Planning* (Supplement). U.S. Department of Transportation, February 1993.

[2] Some executive management and administrative costs are assumed to be fixed as reflected by historical Metro data.

variables. For instance, it may be assumed that the cost of diesel fuel depends upon the number of bus hours operated. *Indirect* links are expenses that depend upon prior direct links. For example, the amount of operator fringe benefits may be a function of operator wages, which may be directly linked to the number of hours that trains (or buses) are in revenue service. In these examples, bus hours are assumed to directly "drive" the cost of diesel fuel; train hours are assumed to directly "drive" operator wages; and the amount of operator fringe benefits are calculated as a percentage of direct wages.

The basis for each cost model is the "Calibration System" which can be defined as the values of budgeted or actual operating expenses, and operating statistics for the base year (for the Expo-2 project, the calibration system was Metro's FY2007-08 Adopted Budget). Costs were calculated by comparing forecasts of system characteristics and operating statistics (input values) for each future Expo-2 transportation alternative against the calibration system, and then applying base year costs. It implicitly was assumed that base year rates of consumption and labor productivity would continue into the future.

Labor Cost Formulae

Labor costs are a function of the number of employees in each job class and average wages and fringe benefits.

The generalized equation for labor costs is of the form:

Annual Labor Cost	=	Value of Driving Variable	X	Labor Productivity Rate	X	Annual Cost per Employee

where:

Value of Driving Variable: The quantity of the input variable that most strongly influences a cost item. For example, the number of mechanics depends on the number of bus or car miles operated annually.

Labor Productivity Rate: The number of budgeted positions divided by the value of the driving variable for the calibration level of service. This factor implicitly accounts for local union rules, hiring and training of new employees, worker efficiency, and absenteeism.

Annual Cost per Employee: Average annual earnings which includes straight wages or salary, vacation, holiday and sick pay; plus fringe benefits, such as pension funds, social security, and medical insurance.

Non-Labor Cost Formulae

Non-labor costs include expense categories such as materials, utilities, and contract services.

The generalized equation for non-labor costs is of the form:

Annual Non-labor Cost	=	Total Base Cost	X	Base Driving Variable	X	Future Driving Variable

where:

Total Base Cost: Actual expense in the calibration year modeled.

Value of Driving Variables: The quantity of the input variable that most strongly influences a cost item. For example, the cost of light rail vehicle parts depends on the number of car miles and total cars. The Annual Non-labor Cost is based on the ratio of the Future Driving Variable to the Base Driving Variable multiplied by the Total Base Cost.

For Metro services, O&M costs were estimated using an O&M cost model calibrated to Metro's fiscal year (FY) 2007-08 Adopted Budget. The Metro O&M cost model was developed to estimate O&M costs for Metro's separate operating modes and rail lines: local/express bus, Bus Rapid Transit (BRT; Orange Line), light rail (Blue Line, Gold Line, Green Line) and heavy rail (Red/Purple Line), as well as for support department costs related to operations. The Metro O&M cost model estimates staffing requirements, labor costs, and non-labor expenses by transit mode/rail line and department within each mode. Overhead costs are also modeled and added to direct modal costs to arrive at total costs. The model uses system characteristics and operating statistics (e.g., peak vehicles, number of stations, passengers) to determine future costs. These system characteristics and operating statistics serve as input variables to the O&M cost model. As future operating plans change (e.g., new rail lines are constructed), costs change accordingly. The driving variables used in the Metro O&M cost model are presented in **Table 1**.

Table 1: Metro O&M Model Input Variables

Input Variable	Metro Bus	BRT[1]	Rail Modes[2]
Annual Boardings (Unlinked Passengers)	X	X	X
Routes	X	X	
Peak Vehicles	X	X	X
Active Fleet Vehicles	X	X	X
Articulated Buses	X		
Service Sectors	X		
Operating Divisions	X	X	X
Annual Revenue Bus/Car Miles	X	X	X
Annual Revenue Bus/Train Hours	X	X	X
Contract Service Hours	X		
Route Miles		X	X
Elevated Stations			X
At-Grade Stations			X
Subway Stations			X
Total Stations		X	X
Automated Operation[3]			X

NOTES:
1. Bus Rapid Transit (BRT) consists of the Orange Line.
2. Rail modes include Blue Line, Green Line and Gold Line Light Rail Transit (LRT); and Red/Purple Line Heavy Rail Transit (HRT).
3. Applies to Green Line only.

Articulated buses. The Metro O&M cost model accounts for the higher cost of operating articulated buses by applying an "artic premium" to certain labor and non-labor direct bus costs.

Metro planned to operate 282 single-articulated buses in FY2008. The artic premium is applied to future operating scenarios where greater than 282 articulated buses are assumed since the cost of the existing 282 buses is already in the 2008 base year cost.

The O&M cost model applies a 10% premium to specific bus O&M direct cost line items based on the proportion of articulated vehicles to the fleet. This premium is based on FY2000 budget data provided by King County Metro (Seattle) which has extensive articulated bus operating experience, as well as reviewing 2007 data from Metro. The No Build alternative assumes a base fleet of 500 articulated vehicles, which is the anticipated number of articulated vehicles assumed in developing Metro's Long Range Transportation Plan.

The artic premium was not applied to Orange Line BRT cost items. The BRT O&M costs are calculated separately from local/express bus costs and the costs for the specialized Orange Line vehicles are included in the BRT modal costs.

Municipal Operator O&M Cost Model Methodology

Separate O&M cost models were developed for two municipal operators, Culver CityBus and Santa Monica Big Blue Bus. The municipal O&M models are four-variable unit costs based on National Transit Database (NTD) categories.

These models utilize average FY2006 unit costs for the following key operating cost indicators (variables): revenue buses used in the peak period, revenue bus miles, revenue bus hours, as reported based on output from Metro's transportation demand model; and operating divisions (garages). The municipal O&M cost model are calibrated to 2006 NTD costs and operating statistics, the most recent year that NTD data are readily available. The driving variables used in the municipal operator O&M cost models are presented in **Table 2**.

Table 2: Municipal Operator O&M Model Input Variables

Input Variable	Culver CityBus	Santa Monica Big Blue Bus
Peak Vehicles	X	X
Annual Revenue Bus Miles	X	X
Annual Revenue Bus Hours	X	X
Operating Divisions (Garages)	X	X

The peak buses, bus miles, bus hours, and operating divisions generated for the future-year alternatives are multiplied by each operator's average unit cost for each NTD cost category to derive the cost of service for each alternative in 2006 dollars. To escalate municipal operator costs from FY 2006 to FY 2008 dollars, an escalation factor of 1.072 was used (i.e., 7.2 percent growth rate from 2006 to 2008). The escalation factor is based on data from the Bureau of Labor Statistics, Consumer Price Index for the Los Angeles area.

While the municipal operator O&M cost methodology does not correspond with preferred FTA guidelines, the calculations adequately estimated municipal operator bus costs for the ~~D~~FEIR. This exception to the FTA methodology was deemed acceptable because: municipal bus O&M costs are relatively small when compared to other costs for the project so they would have little

influence on the selection of the ~~LPA~~Recommended Preferred Alternative; and, municipal operator bus O&M costs would not be funded by Metro, so these costs would not affect the financial plan for the Expo-2 project.

OPERATING STATISTICS AND SYSTEM CHARACTERISTICS

In order to estimate O&M costs, it was first necessary to develop operating plans and requirements for each project alternative. For the Expo-2 DEIR, initial operating plans defined peak and base period headways, route lengths and route travel times of each transit mode for each project alternative for the year 2030. The assumptions for the initial operating plans were coded into Metro's countywide ridership forecasting model. Following the development of preliminary patronage forecasts, the initial operating plans were refined to reflect service levels necessary to accommodate the projected ridership.

This refinement to match service capacity to projected demand (deemed "equilibration") responds to FTA guidance to design future year service options that meet the forecasted passenger demand within the study area at a minimum, and ideally across the entire system. The No Build alternative was analyzed at the systemwide level and determined to have capacity sufficient to handle the peak hour passenger demand in 2030. As a result of this analysis, headways on a handful of routes within the study corridor were equilibrated in order to meet forecasted demand. Subsequent alternatives were similarly analyzed and equilibrated to respond to passenger demand within the corridor. Detailed descriptions of the operating plans by alternative along with the equilibration process can be found in the document *Expo Phase II Operating Plans and Assumptions*, Connetics Transportation Group, ~~October 2008~~December 2009.

Bus statistics are based on output from the countywide ridership forecasting model, which produces passenger volumes, headways, travel times and distances by route. These statistics are fed into an operating statistics model that calculates annual summary statistics (vehicle miles, vehicle hours, and peak vehicle counts) by operator and transit mode for Metro bus service and the municipal operators. The operating statistics model is calibrated to 2005 actual data.

Rail statistics used in the O&M cost models were determined from a combination of output from the countywide ridership forecasting model, engineering drawings, and use of an "operstat" worksheet. The operstat worksheet provides for each rail line the peak and total fleet size, annual revenue car-miles, and annual revenue train-hours based on headways, travel times and distances, and analysis of peak hour passenger loads to size train consists. The operstat worksheet is calibrated to 2008 actual data. Travel times are calculated using an algorithm that accounts for maximum speed, geometry, distance between stops, acceleration/deceleration near stops, dwell times at stops, and average delay expected at intersections.

The Expo-2 operating plans (operstat) and peak hour load analysis worksheets are provided in **Appendix A,** which contains analysis based on 2015 forecasts as well as 2030 forecasts. Year 2015 analysis was performed only to confirm fleet requirements but not to calculate 2015 operating costs. Operating plans (operstat) worksheets for existing Metro Rail lines based on 2030 forecasts are provided in **Appendix B**. Metro, Culver CityBus and Santa Monica Big Blue Bus operating statistics and O&M costs for each Expo-2 alternative (Year 2030) are provided in **Appendix C**.

OPERATING AND MAINTENANCE COST ESTIMATES

Previous sections of this report presented a brief description of the methodology used to estimate O&M costs and the operating plans associated with each Expo-2 project alternative. This section presents the O&M cost estimates for each Expo-2 alternative. The O&M cost models calculate costs for the entire transit system (e.g., bus, BRT, and rail). Therefore, the O&M cost associated with introducing the project alternative is calculated as the incremental O&M cost compared with either No Build alternative, or the TSM/Baseline alternative O&M cost. Estimated annual total and incremental O&M costs by operator and transit mode for each Expo-2 project alternative are presented in **Table 3**.

Total Annual O&M Costs

The total annual operating costs range from $1.300 billion for the No Build alternative to $1.327 billion for the LRT – Venice/Sepulveda and Colorado alignment alternative. The annual incremental O&M costs (i.e. the annual cost to operate the Expo-2 project for Metro and municipal operators) for the build alternatives compared to the No Build alternative range from $22.5 million for the LRT – Exposition ROW and Olympic alignment alternative to $26.9 million for the LRT – Venice/Sepulveda and Colorado alignment alternative. Thus, only $4.4 million annually separate the lowest costing build alternative from the highest costing in terms of annual operations and maintenance. The annual incremental O&M cost for the LRT – Exposition ROW and Colorado alignment alternative would be $23.8 million, and the LRT – Venice/Sepulveda and Olympic alignment alternative would cost $25.7 million annually.

The annual incremental costs for the build alternatives compared to the TSM/Baseline alternative would be even lower. Those costs range from $11.7 million for the LRT – Exposition ROW and Olympic alignment alternative to $16.0 for the LRT – Venice/Sepulveda and Colorado alignment alternative.

No Build Alternative O&M Costs

The annual O&M costs for the No Build alternative would be $1.300 billion. This alternative includes only "committed" improvements – typically those in the annual element of the Transportation Improvement Program or local capital programs – together with minor transit service expansions and/or adjustments that reflect a continuation of existing service policies.

TSM/Baseline Alternative O&M Costs

The annual O&M costs for the Transportation System Management/Baseline alternative would be $1.311 billion, an incremental increase of $10.9 million compared to the No Build alternative. Costs for Metro bus service would increase by $5.5 million annually, and costs for municipal operator bus service would increase by $5.3 million annually reflecting the increased ridership demand created by the addition of a rapid bus route connecting downtown Culver City with downtown Santa Monica; associated service improvements on selected north-south routes to feed stations along the new rapid bus route; and service improvements on selected routes connecting westside communities to the Expo-1 LRT terminus.

Table 3: 2030 Estimated Annual Total and Incremental O&M Costs

Mode[1]	No Build	Baseline	Expo LRT on ROW and Olympic	Expo LRT on ROW and Colorado	Expo LRT on Venice-Sepulveda and Olympic	Expo LRT on Venice-Sepulveda and Colorado
Metro						
Metro Bus	$860,560,000	$866,082,000	$860,807,000	$860,752,000	$860,850,000	$860,790,000
Orange Line BRT	$19,407,000	$19,406,000	$19,408,000	$19,408,000	$19,408,000	$19,408,000
Blue/Expo Line LRT	$100,940,000	$100,990,000	$117,540,000	$118,628,000	$118,107,000	$119,158,000
Green Line LRT	$45,853,000	$45,859,000	$45,819,000	$45,820,000	$45,803,000	$45,812,000
Gold Line LRT	$73,901,000	$73,903,000	$74,034,000	$74,030,000	$74,008,000	$74,006,000
Red/Purple Line HRT	$104,065,000	$104,063,000	$104,163,000	$104,158,000	$104,146,000	$104,144,000
Total Metro O&M Cost	**$1,204,726,000**	**$1,210,303,000**	**$1,221,771,000**	**$1,222,796,000**	**$1,222,322,000**	**$1,223,318,000**
Increment over No Build	**NA**	**$5,577,000**	**$17,045,000**	**$18,070,000**	**$17,596,000**	**$18,592,000**
Increment over Baseline	**NA**	**NA**	**$11,468,000**	**$12,493,000**	**$12,019,000**	**$13,015,000**
CULVER CITY BUS	**$23,529,000**	**$23,854,000**	**$23,854,000**	**$23,854,000**	**$25,442,000**	**$25,442,000**
Increment over No Build	**NA**	**$325,000**	**$325,000**	**$325,000**	**$1,913,000**	**$1,913,000**
Increment over Baseline	**NA**	**NA**	**$0**	**$0**	**$1,588,000**	**$1,588,000**
SANTA MONICA BIG BLUE BUS	**$71,849,000**	**$76,800,000**	**$77,010,000**	**$77,242,000**	**$77,994,000**	**$78,235,000**
Increment over No Build	**NA**	**$4,951,000**	**$5,161,000**	**$5,393,000**	**$6,145,000**	**$6,386,000**
Increment over Baseline	**NA**	**NA**	**$210,000**	**$442,000**	**$1,194,000**	**$1,435,000**
TOTAL						
Total O&M Costs	**$1,300,104,000**	**$1,310,957,000**	**$1,322,635,000**	**$1,323,892,000**	**$1,325,758,000**	**$1,326,995,000**
Increment over No Build	**NA**	**$10,853,000**	**$22,531,000**	**$23,788,000**	**$25,654,000**	**$26,891,000**
Increment over Baseline	**NA**	**NA**	**$11,678,000**	**$12,935,000**	**$14,801,000**	**$16,038,000**

NOTES: Costs in 2008 dollars

1. BRT: Bus Rapid Transit; LRT: Light Rail Transit; HRT: Heavy Rail Transit.

Build Alternative O&M Costs

LRT – Exposition ROW and Olympic Alignment

The annual O&M costs for the LRT – Exposition ROW and Olympic alignment alternative would be $1.323 billion, an incremental increase of $22.5 million compared to the No Build alternative. Annual operating and maintenance costs for Metro would increase by $17.0 million, mainly to operate the Expo-2 LRT line. Annual O&M costs for municipal operators would increase by $5.5 million, mainly to provide feeder and rapid bus service to the Expo-2 stations.

Incremental annual O&M costs for the LRT – Exposition ROW and Olympic alignment alternative compared to the TSM/Baseline alternative would be $11.7 million. Annual operating and maintenance costs for Metro would increase by $11.5 million to operate the Expo-2 LRT line, but there would also be a decrease in bus service because Metro would not need to operate the rapid bus service that would be part of the TSM/Baseline alternative. Annual O&M costs for municipal operators would increase by $0.2 million, mainly for Santa Monica Big Blue Bus to provide feeder and rapid bus service to the Expo-2 stations and meet increased ridership demand caused by the addition of the Expo-2 LRT line. Feeder bus service for Culver CityBus would be the same as for the TSM/Baseline alternative, so there would be no incremental cost increase.

LRT – Exposition ROW and Colorado Alignment

The annual O&M costs for the LRT – Exposition ROW and Colorado alignment alternative would be $1.324 billion, an incremental increase of $23.8 million compared to the No Build alternative. Annual operating and maintenance costs for Metro would increase by $18.1 million, mainly to operate the Expo-2 LRT line. Annual O&M costs for municipal operators would increase by $5.7 million, mainly to provide feeder and rapid bus service to the Expo-2 stations.

Incremental annual O&M costs for the LRT – Exposition ROW and Colorado alignment alternative compared to the TSM/Baseline alternative would be $12.9 million. Annual operating and maintenance costs for Metro would increase by $12.5 million to operate the Expo-2 LRT line, but there would also be a decrease in bus service because Metro would not need to operate the rapid bus service would be part of the TSM/Baseline alternative. Annual O&M costs for municipal operators would increase by $0.4 million, mainly for Santa Monica Big Blue Bus to provide feeder and rapid bus service to the Expo-2 stations and meet increased ridership demand caused by the addition of the Expo-2 LRT line. Feeder bus service for Culver CityBus would be the same as for the TSM/Baseline alternative, so there would be no incremental cost increase.

LRT – Venice/Sepulveda and Olympic Alignment

The annual O&M costs for the LRT – Venice/Sepulveda and Olympic alignment alternative would be $1.326 billion, an incremental increase of $25.7 million compared to the No Build alternative. Annual operating and maintenance costs for Metro would increase by $17.6 million, mainly to operate the Expo-2 LRT line. Annual O&M costs for municipal operators would increase by $8.1 million, mainly to provide feeder and rapid bus service to the Expo-2 stations.

Incremental annual O&M costs for the LRT – Venice/Sepulveda and Olympic alignment alternative compared to the TSM/Baseline alternative would be $14.8 million. Annual operating and maintenance costs for Metro would increase by $12.0 million to operate the Expo-2 LRT line, but there would also be a decrease in bus service because Metro would not need to operate the rapid bus service would be part of the TSM/Baseline alternative. Annual O&M costs for municipal operators would increase by $2.8 million, mainly for Santa Monica Big Blue Bus and Culver CityBus to provide feeder and rapid bus service to the Expo-2 stations and meet increased ridership demand due to the addition of the Expo-2 LRT line.

LRT – Venice/Sepulveda and Colorado Alignment

The annual O&M costs for the LRT – Venice/Sepulveda and Colorado alignment alternative would be $1.327 billion, an incremental increase of $26.9 million compared to the No Build alternative. Annual operating and maintenance costs for Metro would increase by $18.6 million, mainly to operate the Expo-2 LRT line. Annual O&M costs for municipal operators would increase by $8.3 million, mainly to provide feeder and rapid bus service to the Expo-2 stations.

Incremental annual O&M costs for the LRT – Venice/Sepulveda and Colorado alignment alternative compared to the TSM/Baseline alternative would be $16.0 million. Annual operating and maintenance costs for Metro would increase by $13.0 million to operate the Expo-2 LRT line, but there would also be a decrease in bus service because Metro would not need to operate the rapid bus service would be part of the TSM/Baseline alternative. Annual O&M costs for municipal operators would increase by $3.0 million, mainly for Santa Monica Big Blue Bus and Culver CityBus to provide feeder and rapid bus service to the Expo-2 stations and meet increased ridership demand due to the addition of the Expo-2 LRT line.

ANALYSIS OF O&M COST DIFFERENCES

An analysis was performed to compare the 2030 costs of the Expo-2 alignment alternatives and, more specifically, the impact on municipal operators in order to fully understand the O&M cost differences. 2030 O&M costs were evaluated in order to be consistent with operating plans and patronage forecasts developed for the Expo-2 study, and because Expo-2 would be a mature service at that time so the effects of service start-up, ridership patterns and habits, and other factors that can skew the costs of a new system would be absent.

2030 O&M Cost Comparison

In general, it would cost more to operate LRT service on Venice/Sepulveda compared to the Exposition ROW, and it would cost more to operate service along Colorado compared to Olympic. Service operated in the Exposition ROW, compared to Venice/Sepulveda, has a shorter distance resulting in shorter travel times and related higher ridership. Service operated on Olympic has slightly shorter distance and travel time compared to Colorado. Metro's incremental O&M costs compared to the No Build alternative are 2.9% to 3.4% higher when operating on the Venice/Sepulveda alignment compared to the Exposition ROW alignment.

In addition, the municipal operators would need to operate considerably more service when LRT is operating on Venice/Sepulveda compared to when LRT operates in the Exposition ROW, mainly by connecting municipal operator feeder and rapid bus service to the Expo-2 line and by increasing services to address bus ridership demand responding to the routing of the Expo-2 LRT line on Venice and Sepulveda. In general, the municipal operator's incremental O&M costs

compared to the No Build alternative are 45.1% to 46.9% higher when operating on the Venice/Sepulveda alignment compared to the Exposition ROW alignment.

Municipal Bus Operating Changes, 2005 to 2030

A final piece of analysis considers the increase in municipal bus O&M costs from existing conditions to the future year scenarios. While Metro may experience cost increases of a greater absolute value, Santa Monica Big Blue Bus and Culver CityBus show a growth in costs from 2005 to the 2030 No Build alternative of 41% and 71%, respectively. These dramatic increases can be traced to three primary factors.

First, increased future year congestion means it will cost somewhat more in the future to run the exact same service as it would today. Second, both municipal operators have planned service expansions, including the introduction of rapid bus service on various corridors. Lastly, future demand for municipal bus services will require that some route headways become more frequent to meet projected ridership levels.

Of these factors, service expansion has the greatest contribution, causing 73% of the O&M cost increases for Big Blue Bus and 52% for CityBus between 2005 and the 2030 No Build. Equilibration is the next greatest factor, responsible for 21% of the increase for Big Blue Bus and 40% for CityBus. Highway congestion is the least of these factors, accounting for only 6% and 8% of operating cost increases for Big Blue Bus and CityBus, respectively.

Table 4 and **Table 5** document the relative contributions of these factors to the operating statistics and costs of the two municipal operators. It is important to note that a majority of the expansion costs are attributable to new rapid bus services operating or planning to be operated on Sepulveda (CityBus) and Lincoln and Pico (Big Blue Bus) between 2005 and 2030. **Appendix D** charts the variation in performance data by route for each operator.

Table 4: Contributing Factors to 2030 Big Blue Bus O&M Costs

Santa Monica Big Blue Bus								
	Vehicles		Rev-Miles		Rev-Hours		O&M Cost ($08)	
2005 Existing System	204		4,946,875		450,589		$ 50,812,861	
INCREMENTAL CONTRIBUTION								
I. Highway Congestion	21	30%	0	0%	19,287	10%	$ 1,257,173	6%
II. Service Expansion	27	38%	1,520,958	80%	135,108	70%	$ 15,293,211	73%
III. Service Equilibration	23	32%	382,558	20%	37,395	19%	$ 4,486,078	21%
2030 No Build System	275		6,850,391		642,379		$ 71,849,324	

NOTES:

Highway Congestion - additional cost to run 2005 Existing service over 2030 highway network.

Service Expansion - additional cost to run new or modified services implemented or planned between 2005 and 2030.
Major additions/modifications: SM1 (Santa Monica), SM6 (Palms), SM10 (LA Express), SM Crosstown (14th/20th), SM Sunset (SMC), 703 (Lincoln Rapid), 707 (Pico Rapid).

Service Equilibration - additional cost to run service needed to meet projected 2030 demand.
Routes equilibrated: SM3 (Lincoln), SM7 (Pico), SM12 (Westwood), 703 (Lincoln Rapid).

Table 5: Contributing Factors to 2030 Culver CityBus O&M Costs

Culver CityBus	Vehicles		Rev-Miles		Rev-Hours		O&M Cost ($08)	
2005 Existing System	46		1,423,326		134,250		$ 13,735,169	
INCREMENTAL CONTRIBUTION								
I. Highway Congestion	6	14%	0	0%	5,140	6%	$ 764,612	8%
II. Service Expansion	13	31%	507,908	62%	43,396	54%	$ 5,101,439	52%
III. Service Equilibration	23	55%	308,608	38%	32,062	40%	$ 3,928,243	40%
2030 No Build System	88		2,239,842		214,848		$ 23,529,464	

NOTES:

Highway Congestion - additional cost to run 2005 Existing service over 2030 highway network.

Service Expansion - additional cost to run new or modified services implemented or planned between 2005 and 2030.

Major additions/modifications: CC4 (Jefferson), CC7 (Culver), CC8 (Playa Vista), 706 (Sepulveda Rapid).

Service Equilibration - additional cost to run service needed to meet projected 2030 demand.

Routes equilibrated: CC6 (Sepulveda), 706 (Sepulveda Rapid).

Appendix A

2015 & 2030 Expo Phase II Operating Plans and Peak Hour Load Analysis

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY
2015 EXPOSITION LINE SERVICE

From	To	Run Time (minutes)	Distance (miles)	Day	Headway Peak	Headway Base	Headway Eve	Headway E/L	Consist Peak	Consist Base	Consist Eve	Consist E/L	Vehicles Peak	Vehicles Total	Daily Car-Miles	Daily Train-Hrs	Annual Car-Miles	Annual Train-Hrs	Lay Over	Cycle Time	Daily Trains Peak	Daily Trains Base	Daily Trains Eve	Daily Trains E/L
PHASE 1:																								
NO BUILD AND TSM																								
7th/Flower	Venice/	26.7	9.1	M-F	5.0	10.0	20.0	15.0	1.0	1.0	1.0	1.0	13	16	2,436.2	155.0	618,800	39,370	11.6	65.0	13	7	4	5
	Robertson			Sat	15.0	12.0	0.0	20.0	1.0	1.0	0.0	1.0			1,500.0	102.5	76,500	5,230	18.6	72.0	5	6	0	4
				Sun	15.0	12.0	0.0	20.0	1.0	1.0	0.0	1.0			1,500.0	102.5	90,000	6,150	18.6	72.0	5	6	0	4
ESTIMATED TOTALS:													**13**	**16**	**5,436**	**360**	**785,300**	**50,750**			13	7	4	5
PHASE 1 + PHASE 2 ALTERNATIVES:																								
EXPO ROW - OLYMPIC																								
7th/Flower	Colorado/	44.9	15.7	M-F	5.0	10.0	20.0	15.0	1.5	1.5	1.5	1.0	30	36	6,178.0	224.0	1,569,200	56,900	10.3	100.0	20	10	5	7
	4th			Sat	15.0	12.0	0.0	20.0	1.0	1.0	0.0	1.0			2,586.3	157.1	131,900	8,010	18.3	108.0	8	9	0	6
				Sun	15.0	12.0	0.0	20.0	1.0	1.0	0.0	1.0			2,586.7	157.0	155,200	9,420	18.3	108.0	8	9	0	6
ESTIMATED TOTALS:													**30**	**36**	**11,351**	**538**	**1,856,300**	**74,330**			20	10	5	7
EXPO ROW - COLORADO																								
7th/Flower	Colorado/	46.2	15.8	M-F	5.0	10.0	20.0	15.0	1.5	1.5	1.5	1.0	32	39	6,225.2	243.0	1,581,200	61,720	12.6	105.0	21	11	6	7
	2nd			Sat	15.0	12.0	0.0	20.0	1.0	1.0	0.0	1.0			2,607.8	150.6	133,000	7,680	15.6	108.0	7	9	0	6
				Sun	15.0	12.0	0.0	20.0	1.0	1.0	0.0	1.0			2,606.7	150.5	156,400	9,030	15.6	108.0	7	9	0	6
ESTIMATED TOTALS:													**32**	**39**	**11,440**	**544**	**1,870,600**	**78,430**			21	11	6	7
VENICE/SEPULVEDA - OLYMPIC																								
7th/Flower	Colorado/	48.8	16.6	M-F	5.0	10.0	20.0	15.0	1.5	1.5	1.5	1.0	33	40	6,536.6	250.0	1,660,300	63,500	12.5	110.0	22	11	6	8
	4th			Sat	15.0	12.0	0.0	20.0	1.0	1.0	0.0	1.0			2,737.3	157.1	139,600	8,010	10.5	108.0	8	9	0	6
				Sun	15.0	12.0	0.0	20.0	1.0	1.0	0.0	1.0			2,736.7	157.0	164,200	9,420	10.5	108.0	8	9	0	6
ESTIMATED TOTALS:													**33**	**40**	**12,011**	**564**	**1,964,100**	**80,930**			22	11	6	8
VENICE/SEPULVEDA - COLORADO																								
7th/Flower	Colorado/	50.1	16.7	M-F	5.0	10.0	20.0	15.0	1.5	1.5	1.5	1.0	35	42	6,579.9	263.0	1,671,300	66,800	14.8	115.0	23	12	6	8
	2nd			Sat	15.0	12.0	0.0	20.0	1.0	1.0	0.0	1.0			2,754.9	165.1	140,500	8,420	19.8	120.0	8	10	0	6
				Sun	15.0	12.0	0.0	20.0	1.0	1.0	0.0	1.0			2,755.0	165.0	165,300	9,900	19.8	120.0	8	10	0	6
ESTIMATED TOTALS:													**35**	**42**	**12,090**	**593**	**1,977,100**	**85,120**			23	12	6	8

NOTES:
(1) Operating hours and service frequencies consistent with current Metro service (modeled after Blue Line with slightly shorter span of 4am to 1am).
(2) Year 2030 Phase 1 train consists based on EIR commitment.
(3) Year 2030 train consists sized through one hour maximum peak loads per LACMTA Expo Ph 2 runs July 2008. Uses MTA schedule standard (rounds up to nearest whole train).
(4) Distances, run time estimates obtained from CTG travel time worksheets updated 6/12/08.
(5) Layover from 10-15 minutes (never below 10 minutes).
(6) Calculated total fleet = peak vehicle requirement * 1.20 (20% spare ratio). Compare with Blue Line which uses 15% spare ratio.
(7) Does not include standby car (assumes use of Blue Line standby car).

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY
2030 EXPOSITION LINE SERVICE

From	To	Run Time (minutes)	Distance (miles)	Day	Headway Peak	Headway Base	Headway Eve	Headway E/L	Consist Peak	Consist Base	Consist Eve	Consist E/L	Vehicles Peak	Vehicles Total	Daily Car-Miles	Daily Train-Hrs	Annual Car-Miles	Annual Train-Hrs	Lay Over	Cycle Time	Daily Trains Peak	Daily Trains Base	Daily Trains Eve	Daily Trains E/L
PHASE 1:																								
NO BUILD AND TSM																								
7th/Flower	Venice/	26.7	9.1	M-F	5.0	10.0	20.0	15.0	2.0	2.0	2.0	1.0	26	32	4,726.8	155.0	1,200,600	39,370	11.6	65.0	13	7	4	5
	Robertson			Sat	15.0	12.0	0.0	20.0	1.0	2.0	0.0	1.0			2,227.5	102.5	113,600	5,230	18.6	72.0	5	6	0	4
				Sun	15.0	12.0	0.0	20.0	1.0	2.0	0.0	1.0			2,226.7	102.5	133,600	6,150	18.6	72.0	5	6	0	4
ESTIMATED TOTALS:													**26**	**32**	**9,181**	**360**	**1,447,800**	**50,750**			13	7	4	5
PHASE 1 + PHASE 2 ALTERNATIVES:																								
EXPO ROW - OLYMPIC																								
7th/Flower	Colorado/	44.9	15.7	M-F	5.0	10.0	20.0	15.0	2.0	2.0	2.0	1.0	40	48	8,153.5	224.0	2,071,000	56,900	10.3	100.0	20	10	5	7
	4th			Sat	15.0	12.0	0.0	20.0	1.0	2.0	0.0	1.0			3,841.2	157.1	195,900	8,010	18.3	108.0	8	9	0	6
				Sun	15.0	12.0	0.0	20.0	1.0	2.0	0.0	1.0			3,841.7	157.0	230,500	9,420	18.3	108.0	8	9	0	6
ESTIMATED TOTALS:													**40**	**48**	**15,836**	**538**	**2,497,400**	**74,330**			20	10	5	7
EXPO ROW - COLORADO																								
7th/Flower	Colorado/	46.2	15.8	M-F	5.0	10.0	20.0	15.0	2.0	2.0	2.0	1.0	42	51	8,216.1	243.0	2,086,900	61,720	12.6	105.0	21	11	6	7
	2nd			Sat	15.0	12.0	0.0	20.0	1.0	2.0	0.0	1.0			3,870.6	150.6	197,400	7,680	15.6	108.0	7	9	0	6
				Sun	15.0	12.0	0.0	20.0	1.0	2.0	0.0	1.0			3,871.7	150.5	232,300	9,030	15.6	108.0	7	9	0	6
ESTIMATED TOTALS:													**42**	**51**	**15,958**	**544**	**2,516,600**	**78,430**			21	11	6	7
VENICE/SEPULVEDA - OLYMPIC																								
7th/Flower	Colorado/	48.8	16.6	M-F	5.0	10.0	20.0	15.0	1.5	1.5	1.5	1.0	33	40	6,536.6	250.0	1,660,300	63,500	12.5	110.0	22	11	6	8
	4th			Sat	15.0	12.0	0.0	20.0	1.0	1.5	0.0	1.0			3,400.0	157.1	173,400	8,010	10.5	108.0	8	9	0	6
				Sun	15.0	12.0	0.0	20.0	1.0	1.5	0.0	1.0			3,401.7	157.0	204,100	9,420	10.5	108.0	8	9	0	6
ESTIMATED TOTALS:													**33**	**40**	**13,338**	**564**	**2,037,800**	**80,930**			22	11	6	8
VENICE/SEPULVEDA - COLORADO																								
7th/Flower	Colorado/	50.1	16.7	M-F	5.0	10.0	20.0	15.0	1.5	1.5	1.5	1.0	35	42	6,579.9	263.0	1,671,300	66,800	14.8	115.0	23	12	6	8
	2nd			Sat	15.0	12.0	0.0	20.0	1.0	1.5	0.0	1.0			3,423.5	165.1	174,600	8,420	19.8	120.0	8	10	0	6
				Sun	15.0	12.0	0.0	20.0	1.0	1.5	0.0	1.0			3,423.3	165.0	205,400	9,900	19.8	120.0	8	10	0	6
ESTIMATED TOTALS:													**35**	**42**	**13,427**	**593**	**2,051,300**	**85,120**			23	12	6	8

NOTES:
(1) Operating hours and service frequencies consistent with current Metro service (modeled after Blue Line with slightly shorter span of 4am to 1am).
(2) Year 2030 Phase 1 train consists based on EIR commitment.
(3) Year 2030 train consists sized through one hour maximum peak loads per LACMTA Expo Ph 2 runs July 2008. Uses MTA schedule standard (rounds up to nearest whole train).
(4) Distances, run time estimates obtained from CTG travel time worksheets updated 6/12/08.
(5) Layover from 10-15 minutes (never below 10 minutes).
(6) Calculated total fleet = peak vehicle requirement * 1.20 (20% spare ratio). Compare with Blue Line which uses 15% spare ratio.
(7) Does not include standby car (assumes use of Blue Line standby car).

METRO RAIL OPERATING STATISTICS MODEL

OPERATING ASSUMPTIONS	EXPO		
WKDYPEAKHR	5.0		6a-8:30a; 3p-5:30p
WKDYBASEHR	8.0		8:30a-3p; 5:30p-7p
WKDYEVEHR	6.0		7p-1a
WKDYELHR	2.0	21.0	4a-6a
SATPEAKHR	6.5		4:30a-10a; 6p-7p
SATBASEHR	8.0		10a-6p
SATELHR	5.5	20	7p-12:30a
SUNPEAKHR	6.5		4:30a-10a; 6p-7p
SUNBASEHR	8.0		10a-6p
SUNELHR	5.5	20	7p-12:30a
ANNUAL WEEKDAYS	254		
ANNUAL SATURDAYS	51		
ANNUAL SUNDAYS, HOL.	60	365	
ANNUALPEAK	1991.5		
ANNUALBASE	2920		
ANNUALEL	2134.5		

Updated based on July 2008 schedules
Model runs based on early July 2008 series

Train Consist Analysis
Updated runs (July-August 2008)

Load Standards

	Seated	Schedule Standard	Total Passengers	Crush Load Standard	Total Passengers
LRT	76	1.9	144	3.45	262
HRT	57	2.3	131	3.85	220
Metro Liner	66	1.2	79	1.5	99

Note: Bruce Shelburne provided rail load standards, 9/25/07 e-mail.
Ed Clifford confirmed Metro Liner schedule standard 10/5/07.

2030 Model runs (July 7-11, 2008 series)

RAIL LINE	PEAK HEADWAY	TRAINS/ HOUR	PEAK LOAD	PASSENGERS/ TRAIN	CARS/TRAIN SCHEDULE STD
No Build					
EXPO	5	12.0	1209	100.8	0.7
TSM					
EXPO	5	12.0	1301	108.4	0.8
Expo ROW via Olympic (LRT-1)					
EXPO	5	12.0	3159	263.3	1.8
Expo ROW via Colorado (LRT-5)					
EXPO	5	12.0	3123	260.3	1.8
Venice/Sepulveda via Olympic (LRT-2)					
EXPO	5	12.0	2822	235.2	1.6
Venice/Sepulveda via Colorado (LRT-6)					
EXPO	5	12.0	2785	232.1	1.6

Note: Calculated peak consists are rounded to wholes or halves to translate to practical operating concepts.
For LRT-1 and LRT-5, Expo consist recommended at 2.
For LRT-2 and LRT-6, Expo consist recommended at 1.5 (1-car trains alternating with 2-car trains).

2015 Model runs (August 7, 2008 series)

RAIL LINE	PEAK HEADWAY	TRAINS/ HOUR	PEAK LOAD	PASSENGERS/ TRAIN	CARS/TRAIN SCHEDULE STD
No Build					
EXPO	5	12.0	1048	87.3	0.6
TSM					
EXPO	5	12.0	1103	91.9	0.6
Expo ROW via Olympic (LRT-1)					
EXPO	5	12.0	2725	227.1	1.6
Expo ROW via Colorado (LRT-5)					
EXPO	5	12.0	2669	222.4	1.5
Venice/Sepulveda via Olympic (LRT-2)					
EXPO	5	12.0	2430	202.5	1.4
Venice/Sepulveda via Colorado (LRT-6)					
EXPO	5	12.0	2403	200.3	1.4

Note: Calculated peak consists are rounded to wholes or halves to translate to practical operating concepts.
For all Phase 2 alternatives, consists recommended at 1.5.

Exposition Line 2015 Peak Hour Loads for Expo Phase 2

Based on August 7, 2008 model runs

LRT-1 (Expo ROW via Olympic)

		--	---READ DOWN----		--	----REAI UP-----	
	NODE	ON	OFF	LOAD	ON	OFF	LOAD
7/F	20100	2082	0	0	0	862	862
PICO	20105	99	263	2082	58	128	932
23RD	20161	321	104	1918	131	224	1025
JEFF	20162	167	116	2135	156	136	1005
VERM	20163	185	187	2186	173	145	977
WEST	20164	240	78	2184	207	58	828
CREN	20165	332	125	2346	209	85	704
LA B	20166	266	113	2553	149	61	616
LA C	20167	124	136	2706	86	68	598
V/R	20169	294	346	2694	172	89	515
NAT	20170	176	93	2642	102	24	437
W/O	20171	132	797	2725	109	136	464
SEP	20172	111	695	2060	174	110	400
BUN	20173	79	315	1476	160	44	284
CLO	20174	33	324	1240	79	23	228
SMC	20175	35	462	949	85	31	174
4/C	20176	0	522	522	174	0	0

LRT-2 (Venice/Sepulveda via Olympic)

		--	---READ DOWN----		--	----REAI UP-----	
	NODE	ON	OFF	LOAD	ON	OFF	LOAD
7/F	20100	1919	0	0	0	850	850
PICO	20105	91	267	1919	59	132	923
23RD	20161	268	99	1743	132	217	1008
JEFF	20162	158	122	1912	157	134	985
VERM	20163	173	187	1948	174	143	954
WEST	20164	225	80	1934	207	56	803
CREN	20165	306	119	2079	207	82	678
LA B	20166	247	116	2266	149	60	589
LA C	20167	110	136	2397	86	70	573
V/R	20169	207	236	2371	141	57	489
OVER	20179	189	101	2342	91	57	455
V/S	20180	180	343	2430	113	82	424
N/S	20181	137	144	2267	86	47	385
SEP	20172	102	1046	2260	161	143	367
BUN	20173	67	264	1316	147	41	261
CLO	20174	32	303	1119	78	20	203
SMC	20175	39	451	848	79	26	150
4/C	20176	0	436	436	150	0	0

LRT-5 (Expo ROW via Colorado)

		--	---READ DOWN----		--	----REAI UP-----	
	NODE	ON	OFF	LOAD	ON	OFF	LOAD
7/F	20100	2071	0	0	0	864	864
PICO	20105	98	265	2071	58	129	935
23RD	20161	311	105	1904	131	220	1024
JEFF	20162	168	116	2110	155	137	1006
VERM	20163	184	184	2162	173	147	980
WEST	20164	238	81	2162	208	56	828
CREN	20165	331	122	2319	208	86	706
LA B	20166	264	112	2528	149	62	619
LA C	20167	124	137	2680	86	69	602
V/R	20169	293	362	2667	173	90	519
NAT	20170	171	100	2598	105	26	440
W/O	20171	131	791	2669	109	135	466
SEP	20172	103	696	2009	170	110	406
BUN	20173	74	322	1416	157	45	294
CLO	20174	31	326	1168	80	24	238
SMC	20186	53	469	873	127	39	150
C/MAIN	20187	0	457	457	150	0	0

LRT-6 (Venice/Sepulveda via Colorado)

		--	---READ DOWN----		--	----REAI UP-----	
	NODE	ON	OFF	LOAD	ON	OFF	LOAD
7/F	20100	1906	0	0	0	853	853
PICO	20105	91	265	1906	59	131	925
23RD	20161	255	101	1732	132	215	1008
JEFF	20162	158	122	1886	157	135	986
VERM	20163	172	186	1922	174	144	956
WEST	20164	223	81	1908	207	54	803
CREN	20165	303	121	2050	208	84	679
LA B	20166	245	113	2232	149	60	590
LA C	20167	109	143	2364	86	72	576
V/R	20169	207	228	2330	140	58	494
OVER	20179	194	100	2309	93	60	461
V/S	20180	178	358	2403	113	84	432
N/S	20181	136	138	2223	87	47	392
SEP	20172	96	1053	2221	161	141	372
BUN	20173	62	268	1264	143	39	268
CLO	20174	31	299	1058	79	22	211
SMC	20186	56	452	790	119	34	126
C/MAIN	20187	0	394	394	126	0	0

Exposition Line 2030 Peak Hour Loads for Expo Phase 2

July 2008 model runs

LRT-1 (Expo ROW via Olympic)

NODE	-- ON	---READ DOWN---- OFF	LOAD	-- ON	----REAL UP----- OFF	LOAD
7/F	2452	0	0	0	978	978
PICO	112	307	2452	67	138	1049
23RD	373	111	2257	150	259	1158
JEFF	192	138	2519	176	154	1136
VERM	215	220	2573	201	169	1104
WEST	275	89	2568	238	64	930
CREN	373	140	2754	234	93	789
LA B	300	128	2987	171	71	689
LA C	137	155	**3159**	98	72	663
V/R	315	415	3141	188	98	573
NAT	191	112	3041	114	28	487
W/O	150	891	3120	121	141	507
SEP	116	829	2379	187	118	438
BUN	84	356	1666	171	48	315
CLO	35	370	1394	88	25	252
SMC	38	513	1059	92	32	192
4/C	0	584	584	192	0	0

LRT-5 (Expo ROW via Colorado)

NODE	-- ON	---READ DOWN---- OFF	LOAD	-- ON	----REAL UP----- OFF	LOAD
7/F	2446	0	0	0	977	977
PICO	111	313	2446	67	140	1050
23RD	369	112	2244	150	260	1160
JEFF	190	142	2501	177	155	1138
VERM	212	220	2549	202	167	1103
WEST	274	89	2541	238	64	929
CREN	370	139	2726	235	95	789
LA B	298	132	2957	170	71	690
LA C	139	146	**3123**	97	72	665
V/R	314	451	3116	189	101	577
NAT	185	113	2979	118	26	485
W/O	148	893	3051	120	144	509
SEP	111	827	2306	187	120	442
BUN	75	358	1590	171	47	318
CLO	34	370	1307	87	27	258
SMC	55	516	971	135	40	163
C/MAIN	0	510	510	163	0	0

LRT-2 (Venice/Sepulveda via Olympic)

NODE	-- ON	---READ DOWN---- OFF	LOAD	-- ON	----REAL UP----- OFF	LOAD
7/F	2275	0	0	0	964	964
PICO	104	312	2275	68	143	1039
23RD	311	115	2067	152	252	1139
JEFF	181	135	2263	179	153	1113
VERM	201	222	2309	202	165	1076
WEST	258	91	2288	239	65	902
CREN	345	144	2455	235	92	759
LA B	281	129	2656	171	68	656
LA C	125	164	2808	97	75	634
V/R	232	268	2769	156	64	542
OVER	208	119	2733	100	62	504
V/S	188	449	**2822**	126	88	466
N/S	141	154	2561	94	52	424
SEP	110	1208	2548	179	155	400
BUN	71	287	1450	158	43	285
CLO	34	350	1234	86	23	222
SMC	40	476	918	87	27	162
4/C	0	482	482	162	0	0

LRT-6 (Venice/Sepulveda via Colorado)

NODE	-- ON	---READ DOWN---- OFF	LOAD	-- ON	----REAL UP----- OFF	LOAD
7/F	2256	0	0	0	970	970
PICO	104	310	2256	68	143	1045
23RD	297	113	2050	152	249	1142
JEFF	182	142	2234	178	151	1115
VERM	201	212	2274	202	168	1081
WEST	256	100	2263	239	60	902
CREN	344	135	2419	234	92	760
LA B	278	139	2628	172	68	656
LA C	125	161	2767	97	78	637
V/R	230	265	2731	156	66	547
OVER	208	119	2696	101	62	508
V/S	186	457	**2785**	126	91	473
N/S	140	154	2514	93	52	432
SEP	107	1212	2500	179	154	407
BUN	62	289	1395	157	42	292
CLO	33	347	1168	86	23	229
SMC	59	478	854	127	36	138
C/MAIN	0	435	435	138	0	0

Appendix B

2030 Metro Rail Operating Plans

2030 BLUE LINE SERVICE

From	To	Run Time (minutes)	Distance (miles)	Day	Headway Peak	Base	Eve	E/L	Consist Peak	Base	Eve	E/L	Vehicles Peak	Total	Daily Car-Miles	Daily Train-Hrs	Annual Car-Miles	Annual Train-Hrs	Lay Over	Cycle Time	Daily Trains Peak	Base	Eve	E/L
7th/Flower	Long Beach	55.0	21.4	M-F	10.0	10.0	20.0	15.0	3.0	3.0	3.0	2.0	36	42	13,365.0	214.0	3,394,700	54,360	11.0	121.0	12	12	6	8
				Sat	15.0	12.0	0.0	20.0	2.0	3.0	0.0	2.0			9,009.8	171.0	459,500	8,720	10.0	120.0	8	10	0	6
				Sun	15.0	12.0	0.0	20.0	3.0	3.0	0.0	2.0			10,120.0	171.0	607,200	10,260	10.0	120.0	8	10	0	6
7th/Flower	Willow	40.0	18.4	M-F	10.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	27	32	3,308.3	45.0	840,300	11,430	8.0	88.0	9	0	0	0
				Sat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0	0	0.0	80.0	0	0	0	0
				Sun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0	0	0.0	80.0	0	0	0	0
ESTIMATED TOTALS:													**63**	**74**	**35,803**	**601**	**5,301,700**	**84,770**			21	12	6	8
													Peak Vehicle Reserve		**3**	**3**								
													Total Assigned Vehicles		**66**	**77**								

NOTES:
(1) Operating hours and service frequencies consistent with current Metro service.
(2) Year 2030 train consists sized through one hour maximum peak loads per LACMTA Expo Ph 2 runs July 2008. Uses MTA schedule standard or existing consist, whatever is greater.
(3) Distances, run time estimates obtained from CTG travel time worksheets and reflect current scheduled times.
(4) Calculated total fleet = peak vehicle requirement * 1.15 (15% spare ratio) + reserve vehicles.
(5) Peak vehicles reserve based on one extra trainset.

METRO RAIL OPERATING STATISTICS MODEL

OPERATING ASSUMPTIONS:	BLUE		
WKDYPEAKHR	5.0		6a-8:30a; 3p-5:30p
WKDYBASEHR	8.0		8:30a-3p; 5:30p-7p
WKDYEVEHR	7.0		7p-2a
WKDYELHR	2.0	22.0	4a-6a
SATPEAKHR	6.5		4:30a-10a; 6p-7p
SATBASEHR	8.0		10a-6p
SATELHR	6.5	21	7p-1:30a
SUNPEAKHR	6.5		4:30a-10a; 6p-7p
SUNBASEHR	8.0		10a-6p
SUNELHR	6.5	21	7p-1:30a
ANNUAL WEEKDAYS	254		
ANNUAL SATURDAYS	51		
ANNUAL SUNDAYS, HOL.	60	365	
ANNUALPEAK	1991.5		
ANNUALBASE	2920		
ANNUALEL	2499.5		

Updated based on July 2008 schedules
Model runs based on early July 2008 series

2030 GREEN LINE SERVICE

From	To	Run Time (minutes)	Distance (miles)	Day	Headway Peak	Base	Eve	E/L	Consist Peak	Base	Eve	E/L	Vehicles Peak	Total	Daily Car-Miles	Daily Train-Hrs	Annual Car-Miles	Annual Train-Hrs	Lay Over	Cycle Time	Daily Trains Peak	Base	Eve	E/L
Norwalk	Marine Blvd	34.0	19.6	M-F	5.0	10.0	20.0	10.0	2.0	2.0	1.0	1.0	30	36	11,565.7	202.0	2,937,700	51,310	7.0	75.0	15	8	4	8
(I-605)				Sat	0.0	15.0	0.0	20.0	1.0	2.0	0.0	1.0			5,539.2	98.0	282,500	5,000	7.0	75.0	0	5	0	4
				Sun	0.0	15.0	0.0	20.0	1.0	2.0	0.0	1.0			5,538.3	98.0	332,300	5,880	7.0	75.0	0	5	0	4
ESTIMATED TOTALS:													**30**	**36**	**22,643**	**398**	**3,552,500**	**62,190**			15	8	4	8
									Peak Vehicle Reserve				**4**	**4**										
									Total Assigned Vehicles				**34**	**40**										

NOTES:
(1) Operating hours and service frequencies consistent with current Metro service.
(2) Year 2030 train consists sized through one hour maximum peak loads per LACMTA Expo Ph 2 runs July 2008. Uses MTA schedule standard or existing consist, whatever is greater.
(3) Distances, run time estimates obtained from CTG travel time worksheets.
(4) Calculated total fleet = peak vehicle requirement * 1.20 (20% spare ratio) + reserve vehicles.
(5) Peak vehicles reserve based on one extra trainset at each terminus.
(6) Minimum turnaround time assumed to be 2.0 minutes each end.

METRO RAIL OPERATING STATISTICS MODEL

OPERATING ASSUMPTIONS:	GREEN		
WKDYPEAKHR	8.0		5a-9a; 2p-6p
WKDYBASEHR	7.0		9a-2p; 6p-8p
WKDYEVEHR	4.5		8p-12:30a
WKDYELHR	1.0	20.5	4a-5a
SATPEAKHR	0.0		NA
SATBASEHR	16.0		4a-8p
SATELHR	4.5	20.5	8p-12:30a
SUNPEAKHR	0.0		NA
SUNBASEHR	16.0		4a-8p
SUNELHR	4.5	20.5	8p-12:30a
ANNUAL WEEKDAYS	254		
ANNUAL SATURDAYS	51		
ANNUAL SUNDAYS, HOL.	60	365	
ANNUALPEAK	2032		
ANNUALBASE	3554		
ANNUALEL	1642.5		

Updated based on July 2008 schedules
Model runs based on early July 2008 series

2030 GOLD LINE SERVICE

From	To	Run Time (minutes)	Distance (miles)	Day	Headway Peak	Base	Eve	E/L	Consist Peak	Base	Eve	E/L	Vehicles Peak	Total	Daily Car-Miles	Daily Train-Hrs	Annual Car-Miles	Annual Train-Hrs	Lay Over	Cycle Time	Daily Trains Peak	Base	Eve	E/L
Beverly/	Sierra Madre	47.9	19.5	M-F	5.0	10.0	15.0	20.0	2.0	2.0	2.0	1.0	44	53	10,136.2	254.5	2,574,600	64,640	14.2	110.0	22	11	8	6
Atlantic	Villa			Sat	15.0	10.0	0.0	20.0	1.0	2.0	0.0	1.0			5,976.5	176.1	304,800	8,980	14.2	110.0	8	11	0	6
				Sun	15.0	10.0	0.0	20.0	1.0	2.0	0.0	1.0			5,976.7	176.0	358,600	10,560	14.2	110.0	8	11	0	6
ESTIMATED TOTALS:													**44**	**53**	**22,089**	**607**	**3,238,000**	**84,180**			22	11	8	6
									Peak Vehicle Reserve				**2**	**2**										
									Total Assigned Vehicles				**46**	**55**										

NOTES:
(1) Operating hours and service frequencies consistent with current Metro service.
(2) Year 2030 train consists sized through one hour maximum peak loads per LACMTA Expo Ph 2 runs July 2008. Uses MTA schedule standard or existing consist, whatever is greater.
(3) Distances, run time estimates obtained from CTG travel time worksheets.
(4) Calculated total fleet = peak vehicle requirement * 1.20 (20% spare ratio) + reserve vehicles.
(5) Peak vehicles reserve based on one extra trainset.

METRO RAIL OPERATING STATISTICS MODEL

OPERATING ASSUMPTIONS	GOLD		
WKDYPEAKHR	5.5		6a-8:30a; 4p-7p
WKDYBASEHR	7.5		8:30a-4p
WKDYEVEHR	3.0		4a-6a; 7p-8p
WKDYELHR	4.5	20.5	8p-12:30a
SATPEAKHR	3.0		7a-9a; 7p-8p
SATBASEHR	10.0		9a-7p
SATELHR	7.0	20	4a-7a; 8p-12a
SUNPEAKHR	3.0		7a-9a; 7p-8p
SUNBASEHR	10.0		9a-7p
SUNELHR	7.0	20	4a-7a; 8p-12a
ANNUAL WEEKDAYS	254		
ANNUAL SATURDAYS	51		
ANNUAL SUNDAYS, HOL.	60	365	
ANNUALPEAK	1730		
ANNUALBASE	3015		
ANNUALEL	1539		

Updated based on July 2008 schedules
Model runs based on early July 2008 series

2030 RED/PURPLE LINE SERVICE

From	To	Run Time (minutes)	Distance (miles)	Day	Headway Peak	Base	Eve	E/L	Consist Peak	Base	Eve	E/L	Vehicles Peak	Total	Daily Car-Miles	Daily Train-Hrs	Annual Car-Miles	Annual Train-Hrs	Lay Over	Cycle Time	Daily Trains Peak	Base	Eve	E/L
Union Stn	Wilshire/ Western	13.0	5.1	M-F	10.0	10.0	15.0	25.0	4.0	4.0	4.0	4.0	16	19	4,385.8	73.9	1,114,000	18,770	14.0	40.0	4	4	3	2
				Sat	15.0	10.0	0.0	25.0	3.0	4.0	0.0	3.0			3,580.4	64.9	182,600	3,310	10.0	36.0	3	4	0	2
				Sun	15.0	10.0	0.0	25.0	3.0	4.0	0.0	3.0			3,580.0	64.8	214,800	3,890	10.0	36.0	3	4	0	2
Union Stn	N. Hollywood	29.5	14.7	M-F	5.0	10.0	15.0	20.0	5.0	4.0	4.0	4.0	70	81	20,344.9	180.0	5,167,600	45,720	11.0	70.0	14	7	5	4
				Sat	15.0	10.0	0.0	20.0	4.0	4.0	0.0	4.0			10,407.8	106.1	530,800	5,410	13.0	72.0	0	7	0	4
				Sun	15.0	10.0	0.0	20.0	4.0	4.0	0.0	4.0			10,408.3	106.0	624,500	6,360	13.0	72.0	0	7	0	4
ESTIMATED TOTALS:													**86**	**100**	**52,707**	**596**	**7,834,300**	**83,460**			18	11	8	6
									Peak Vehicle Reserve				**9**	**9**										
									Total Assigned Vehicles				**95**	**109**										

NOTES:
(1) Operating hours and service frequencies consistent with current Metro service.
(2) Year 2030 train consists sized through one hour maximum peak loads per LACMTA Expo Ph 2 runs July 2008. Uses MTA schedule standard or existing consist, whatever is greater.
(3) Distances, run time estimates obtained from CTG travel time worksheets and reflect current scheduled times.
(4) Calculated total fleet = peak vehicle requirement * 1.15 (15% spare ratio) + reserve vehicles.
(5) Peak vehicles reserve based on one extra trainset per line.

METRO RAIL OPERATING STATISTICS MODEL

OPERATING ASSUMPTIONS:	RED		
WKDYPEAKHR	7.0		6a-9a; 3p-7p
WKDYBASEHR	8.0		4a-6a; 9a-3p
WKDYEVEHR	2.0		7p-9p
WKDYELHR	4.0	21.0	9p-1a
SATPEAKHR	2.0		7p-9p
SATBASEHR	12.0		7a-7p
SATELHR	5.5	19.5	4:30a-7a; 9p-1a
SUNPEAKHR	2.0		7p-9p
SUNBASEHR	12.0		7a-7p
SUNELHR	5.5	19.5	4:30a-7a; 9p-1a
ANNUAL WEEKDAYS	254		
ANNUAL SATURDAYS	51		
ANNUAL SUNDAYS, HOL.	60	365	
ANNUALPEAK	2000		
ANNUALBASE	3364		
ANNUALEL	1118.5		

Updated based on February 2008 schedules
Model runs based on early July 2008 series

Appendix C

2030 Operating Statistics and O&M Costs

(Expo Line statistics and costs included with Blue Line)

Los Angeles County Metropolitan Transportation Authority
O&M Cost Model

SYSTEM CHARACTERISTICS & COST SUMMARY

No Build
Year 2030

(Expo Line statistics and costs included with Blue Line)

System Characteristic	Driving Variable	Input Value	Units	Annual Cost Total	Annual Cost Incremental	FTEs Total	Total Cost per Passenger	Total Cost per Bus/Car Mile	Total Cost per Bus/Train Hour
MTA BUS:				**$860,559,835**	($54,395,798)	6,418.5	$1.73	$10.68	$117.56
Annual Boardings (Unlinked Trips)	BUSPASS	498.8	million	Direct Operations:					
Total Routes	ROUTES	147		$756,966,425			$1.52	$9.39	$103.41
Peak Buses	PKBUS	1,973		Security:					
Active Fleet Buses	TOTBUS	2,367		$18,614,899			$0.04	$0.23	$2.54
Service Sectors	SECTOR	5		Indirect Operations:					
Operating Divisions	GARAGE	11		$84,978,512					
Annual Revenue Vehicle-Miles	BUSMILE	80.59	million	Direct + Security:			$0.17	$1.05	$11.61
Annual Revenue Vehicle-Hours	BUSHOUR	6.80	million	$775,581,324					
Contracted Service Hours	CONTHR	524.85	thousand				$1.55	$9.62	$105.95
Double-Articulated Buses	DBLARTICBUS	0		<-- Subset of Peak Buses					
Single-Articulated Buses	SNLARTICBUS	478		<-- Subset of Peak Buses					
ORANGE LINE:				**$19,406,534**	($2,190,771)	102.5	$3.24	$14.64	$236.78
Route Miles	NROUTEMILE	14.5		Direct Operations:					
Annual Boardings (Unlinked Trips)	NPASS	6.0	million	$11,789,921			$1.97	$8.89	$144
Total Routes	NROUTES	1		Security:					
Total Stations	NSTATION	14		$6,171,900			$1.03	$4.66	$75
Peak Vehicles	NPEAKBUS	21		Indirect Operations:					
Active Fleet Vehicles	NTOTALBUS	26		$1,444,713			$0.24	$1.09	$18
Operating Divisions	NDIVISION	1		Direct + Security:					
Annual Revenue Vehicle-Miles	NBUSMILE	1.33	million	$17,961,821			$3.00	$13.55	$219
Annual Revenue Vehicle-Hours	NBUSHOUR	81.96	thousand						
BLUE LINE:				**$100,940,228**	$33,939,339	533.0	$3.04	$14.96	$745
Route Miles	BROUTEMILE	29.0		Direct Operations:					
Annual Boardings (Unlinked Trips)	BPASS	33.2	million	$71,506,727			$2.15	$10.59	$528
Total Stations	BSTATION	29		Security:					
Elevated Stations	BAERIAL	5		$18,074,407			$0.54	$2.68	$133
At-Grade Stations	BATGRADE	23		Indirect Operations:					
Subway Stations	BSUBWAY	1		$11,359,094			$0.34	$1.68	$84
Peak Vehicles	BPEAKCAR	89		Direct + Security:					
Active Fleet Vehicles	BTOTALCAR	109		$89,581,134			$2.70	$13.27	$661
Operating Divisions	BDIVISION	2							
Annual Revenue Car Miles	BCARMILE	6.75	million						
Annual Revenue Train Hours	BTRAINHOUR	135.52	thousand						
GREEN LINE:	***Manual Operation***			**$45,852,858**	$6,056,794	276.0	$4.17	$12.91	$737
Route Miles	GROUTEMILE	19.6		Direct Operations:					
Annual Boardings (Unlinked Trips)	GPASS	11.0	million	$33,131,821			$3.01	$9.33	$533
Total Stations	GSTATION	14		Security:					
Elevated Stations	GAERIAL	14		$6,947,804			$0.63	$1.96	$112
At-Grade Stations	GATGRADE	0		Indirect Operations:					
Subway Stations	GSUBWAY	0		$5,773,233			$0.52	$1.63	$93
Peak Vehicles	GPEAKCAR	30		Direct + Security:					
Active Fleet Vehicles	GTOTALCAR	40		$40,079,625			$3.64	$11.28	$644
Operating Divisions	GDIVISION	1							
Annual Revenue Car Miles	GCARMILE	3.55	million						
Annual Revenue Train Hours	GTRAINHOUR	62.19	thousand						
GOLD LINE:				**$73,900,724**	$32,349,579	414.5	$4.25	$22.82	$878
Route Miles	OROUTEMILE	19.5		Direct Operations:					
Annual Boardings (Unlinked Trips)	OPASS	17.4	million	$47,101,878			$2.71	$14.55	$560
Total Stations	OSTATION	21		Security:					
Elevated Stations	OAERIAL	6		$15,435,067			$0.89	$4.77	$183
At-Grade Stations	OATGRADE	12		Indirect Operations:					
Subway Stations	OSUBWAY	3		$11,363,778			$0.65	$3.51	$135
Peak Vehicles	OPEAKCAR	44		Direct + Security:					
Active Fleet Vehicles	OTOTALCAR	55		$62,536,946			$3.60	$19.31	$743
Operating Divisions	ODIVISION	1							
Annual Revenue Car Miles	OCARMILE	3.24	million						
Annual Revenue Train Hours	OTRAINHOUR	84.18	thousand						
RED/PURPLE LINE:				**$104,064,930**	$14,804,411	547.0	$1.78	$13.28	$1,247
Route Miles	RROUTEMILE	15.9		Direct Operations:					
Annual Boardings (Unlinked Trips)	RPASS	58.5	million	$72,406,903			$1.24	$9.24	$868
Total Stations	RSTATION	16		Security:					
Elevated Stations	RAERIAL	0		$19,615,427			$0.34	$2.50	$235
At-Grade Stations	RATGRADE	0		Indirect Operations:					
Subway Stations	RSUBWAY	16		$12,042,600			$0.21	$1.54	$144
Peak Vehicles	RPEAKCAR	86		Direct + Security:					
Active Fleet Vehicles	RTOTALCAR	109		$92,022,330			$1.57	$11.75	$1,103
Operating Divisions	RDIVISION	1							
Annual Revenue Car Miles	RCARMILE	7.83	million						
Annual Revenue Train Hours	RTRAINHOUR	83.46	thousand						
TOTAL				**$1,204,725,108**	**$30,563,554**	**8,291.5**			

All costs in FY2008 dollars. Incremental cost compared against Calibration System alternative (Alt. 0).

Los Angeles County Metropolitan Transportation Authority
O&M Cost Model

SYSTEM CHARACTERISTICS & COST SUMMARY

Baseline
Year 2030

(Expo Line statistics and costs included with Blue Line)

System Characteristic	Driving Variable	Input Value	Units	Annual Cost Total	Annual Cost Incremental	FTEs Total	Total Cost per Passenger	Total Cost per Bus/Car Mile	Total Cost per Bus/Train Hour
MTA BUS:				**$866,082,462**	($48,873,171)	6,464.0	$1.73	$10.67	$117.38
Annual Boardings (Unlinked Trips)	BUSPASS	501.0	million	Direct Operations:					
Total Routes	ROUTES	148		$762,058,964			$1.52	$9.39	$103.28
Peak Buses	PKBUS	1,989		Security:					
Active Fleet Buses	TOTBUS	2,387		$18,720,383			$0.04	$0.23	$2.54
Service Sectors	SECTOR	5		Indirect Operations:					
Operating Divisions	GARAGE	11		$85,303,115					
Annual Revenue Vehicle-Miles	BUSMILE	81.19	million	Direct + Security:			$0.17	$1.05	$11.56
Annual Revenue Vehicle-Hours	BUSHOUR	6.85	million	$780,779,347					
Contracted Service Hours	CONTHR	529.03	thousand				$1.56	$9.62	$105.82
Double-Articulated Buses	DBLARTICBUS	0		<-- Subset of Peak Buses					
Single-Articulated Buses	SNLARTICBUS	495		<-- Subset of Peak Buses					
ORANGE LINE:				**$19,405,785**	($2,191,520)	102.5	$3.24	$14.64	$236.77
Route Miles	NROUTEMILE	14.5		Direct Operations:					
Annual Boardings (Unlinked Trips)	NPASS	6.0	million	$11,789,757			$1.97	$8.89	$144
Total Routes	NROUTES	1		Security:					
Total Stations	NSTATION	14		$6,171,900			$1.03	$4.66	$75
Peak Vehicles	NPEAKBUS	21		Indirect Operations:					
Active Fleet Vehicles	NTOTALBUS	26		$1,444,128			$0.24	$1.09	$18
Operating Divisions	NDIVISION	1		Direct + Security:					
Annual Revenue Vehicle-Miles	NBUSMILE	1.33	million	$17,961,657			$3.00	$13.55	$219
Annual Revenue Vehicle-Hours	NBUSHOUR	81.96	thousand						
BLUE LINE:				**$100,989,513**	$33,988,625	533.5	$3.01	$14.96	$745
Route Miles	BROUTEMILE	29.0		Direct Operations:					
Annual Boardings (Unlinked Trips)	BPASS	33.6	million	$71,521,469			$2.13	$10.60	$528
Total Stations	BSTATION	29		Security:					
Elevated Stations	BAERIAL	5		$18,074,407			$0.54	$2.68	$133
At-Grade Stations	BATGRADE	23		Indirect Operations:					
Subway Stations	BSUBWAY	1		$11,393,638			$0.34	$1.69	$84
Peak Vehicles	BPEAKCAR	89		Direct + Security:					
Active Fleet Vehicles	BTOTALCAR	109		$89,595,876			$2.67	$13.27	$661
Operating Divisions	BDIVISION	2							
Annual Revenue Car Miles	BCARMILE	6.75	million						
Annual Revenue Train Hours	BTRAINHOUR	135.52	thousand						
GREEN LINE:	***Manual Operation***			**$45,858,609**	$6,062,545	276.0	$4.16	$12.91	$737
Route Miles	GROUTEMILE	19.6		Direct Operations:					
Annual Boardings (Unlinked Trips)	GPASS	11.0	million	$33,133,863			$3.00	$9.33	$533
Total Stations	GSTATION	14		Security:					
Elevated Stations	GAERIAL	14		$6,947,804			$0.63	$1.96	$112
At-Grade Stations	GATGRADE	0		Indirect Operations:					
Subway Stations	GSUBWAY	0		$5,776,942			$0.52	$1.63	$93
Peak Vehicles	GPEAKCAR	30		Direct + Security:					
Active Fleet Vehicles	GTOTALCAR	40		$40,081,667			$3.63	$11.28	$645
Operating Divisions	GDIVISION	1							
Annual Revenue Car Miles	GCARMILE	3.55	million						
Annual Revenue Train Hours	GTRAINHOUR	62.19	thousand						
GOLD LINE:				**$73,903,242**	$32,352,098	414.5	$4.25	$22.82	$878
Route Miles	OROUTEMILE	19.5		Direct Operations:					
Annual Boardings (Unlinked Trips)	OPASS	17.4	million	$47,102,707			$2.71	$14.55	$560
Total Stations	OSTATION	21		Security:					
Elevated Stations	OAERIAL	6		$15,435,067			$0.89	$4.77	$183
At-Grade Stations	OATGRADE	12		Indirect Operations:					
Subway Stations	OSUBWAY	3		$11,365,468			$0.65	$3.51	$135
Peak Vehicles	OPEAKCAR	44		Direct + Security:					
Active Fleet Vehicles	OTOTALCAR	55		$62,537,774			$3.60	$19.31	$743
Operating Divisions	ODIVISION	1							
Annual Revenue Car Miles	OCARMILE	3.24	million						
Annual Revenue Train Hours	OTRAINHOUR	84.18	thousand						
RED/PURPLE LINE:				**$104,063,471**	$14,802,952	547.0	$1.78	$13.28	$1,247
Route Miles	RROUTEMILE	15.9		Direct Operations:					
Annual Boardings (Unlinked Trips)	RPASS	58.5	million	$72,406,215			$1.24	$9.24	$868
Total Stations	RSTATION	16		Security:					
Elevated Stations	RAERIAL	0		$19,615,427			$0.34	$2.50	$235
At-Grade Stations	RATGRADE	0		Indirect Operations:					
Subway Stations	RSUBWAY	16		$12,041,829			$0.21	$1.54	$144
Peak Vehicles	RPEAKCAR	86		Direct + Security:					
Active Fleet Vehicles	RTOTALCAR	109		$92,021,642			$1.57	$11.75	$1,103
Operating Divisions	RDIVISION	1							
Annual Revenue Car Miles	RCARMILE	7.83	million						
Annual Revenue Train Hours	RTRAINHOUR	83.46	thousand						
TOTAL				**$1,210,303,082**	**$36,141,528**	**8,337.5**			

All costs in FY2008 dollars. Incremental cost compared against Calibration System alternative (Alt. 0).

Los Angeles County Metropolitan Transportation Authority
O&M Cost Model

SYSTEM CHARACTERISTICS & COST SUMMARY

Expo LRT on ROW and Olympic
Year 2030

(Expo Line statistics and costs included with Blue Line)

System Characteristic	Driving Variable	Input Value	Units	Annual Cost Total	Annual Cost Incremental	FTEs Total	Total Cost per Passenger	Total Cost per Bus/Car Mile	Total Cost per Bus/Train Hour
MTA BUS:				**$860,807,168**	($54,148,466)	6,421.5	$1.74	$10.68	$117.52
Annual Boardings (Unlinked Trips)	BUSPASS	496.0	million	Direct Operations:					
Total Routes	ROUTES	147		$757,292,885			$1.53	$9.39	$103.39
Peak Buses	PKBUS	1,974		Security:					
Active Fleet Buses	TOTBUS	2,368		$18,618,559			$0.04	$0.23	$2.54
Service Sectors	SECTOR	5		Indirect Operations:					
Operating Divisions	GARAGE	11		$84,895,724					
Annual Revenue Vehicle-Miles	BUSMILE	80.62	million	Direct + Security:			$0.17	$1.05	$11.59
Annual Revenue Vehicle-Hours	BUSHOUR	6.80	million	$775,911,444					
Contracted Service Hours	CONTHR	525.19	thousand				$1.56	$9.62	$105.93
Double-Articulated Buses	DBLARTICBUS	0		<-- Subset of Peak Buses					
Single-Articulated Buses	SNLARTICBUS	478		<-- Subset of Peak Buses					
ORANGE LINE:				**$19,407,844**	($2,189,460)	102.5	$3.24	$14.64	$236.80
Route Miles	NROUTEMILE	14.5		Direct Operations:					
Annual Boardings (Unlinked Trips)	NPASS	6.0	million	$11,790,208			$1.97	$8.89	$144
Total Routes	NROUTES	1		Security:					
Total Stations	NSTATION	14		$6,171,900			$1.03	$4.66	$75
Peak Vehicles	NPEAKBUS	21		Indirect Operations:					
Active Fleet Vehicles	NTOTALBUS	26		$1,445,736			$0.24	$1.09	$18
Operating Divisions	NDIVISION	1		Direct + Security:					
Annual Revenue Vehicle-Miles	NBUSMILE	1.33	million	$17,962,108			$3.00	$13.55	$219
Annual Revenue Vehicle-Hours	NBUSHOUR	81.96	thousand						
BLUE LINE:				**$117,539,987**	$50,539,098	615.5	$2.72	$15.07	$739
Route Miles	BROUTEMILE	35.6		Direct Operations:					
Annual Boardings (Unlinked Trips)	BPASS	43.2	million	$82,656,476			$1.91	$10.60	$520
Total Stations	BSTATION	36		Security:					
Elevated Stations	BAERIAL	7		$21,678,321			$0.50	$2.78	$136
At-Grade Stations	BATGRADE	28		Indirect Operations:					
Subway Stations	BSUBWAY	1		$13,205,190			$0.31	$1.69	$83
Peak Vehicles	BPEAKCAR	103		Direct + Security:					
Active Fleet Vehicles	BTOTALCAR	125		$104,334,797			$2.41	$13.38	$656
Operating Divisions	BDIVISION	2							
Annual Revenue Car Miles	BCARMILE	7.80	million						
Annual Revenue Train Hours	BTRAINHOUR	159.10	thousand						
GREEN LINE:	***Manual Operation***			**$45,819,277**	$6,023,213	276.0	$4.22	$12.90	$737
Route Miles	GROUTEMILE	19.6		Direct Operations:					
Annual Boardings (Unlinked Trips)	GPASS	10.8	million	$33,120,321			$3.05	$9.32	$533
Total Stations	GSTATION	14		Security:					
Elevated Stations	GAERIAL	14		$6,947,804			$0.64	$1.96	$112
At-Grade Stations	GATGRADE	0		Indirect Operations:					
Subway Stations	GSUBWAY	0		$5,751,152			$0.53	$1.62	$92
Peak Vehicles	GPEAKCAR	30		Direct + Security:					
Active Fleet Vehicles	GTOTALCAR	40		$40,068,125			$3.69	$11.28	$644
Operating Divisions	GDIVISION	1							
Annual Revenue Car Miles	GCARMILE	3.55	million						
Annual Revenue Train Hours	GTRAINHOUR	62.19	thousand						
GOLD LINE:				**$74,033,794**	$32,482,649	415.0	$4.19	$22.86	$879
Route Miles	OROUTEMILE	19.5		Direct Operations:					
Annual Boardings (Unlinked Trips)	OPASS	17.7	million	$47,144,778			$2.67	$14.56	$560
Total Stations	OSTATION	21		Security:					
Elevated Stations	OAERIAL	6		$15,435,067			$0.87	$4.77	$183
At-Grade Stations	OATGRADE	12		Indirect Operations:					
Subway Stations	OSUBWAY	3		$11,453,949			$0.65	$3.54	$136
Peak Vehicles	OPEAKCAR	44		Direct + Security:					
Active Fleet Vehicles	OTOTALCAR	55		$62,579,845			$3.54	$19.33	$743
Operating Divisions	ODIVISION	1							
Annual Revenue Car Miles	OCARMILE	3.24	million						
Annual Revenue Train Hours	OTRAINHOUR	84.18	thousand						
RED/PURPLE LINE:				**$104,162,876**	$14,902,357	547.5	$1.76	$13.30	$1,248
Route Miles	RROUTEMILE	15.9		Direct Operations:					
Annual Boardings (Unlinked Trips)	RPASS	59.3	million	$72,451,337			$1.22	$9.25	$868
Total Stations	RSTATION	16		Security:					
Elevated Stations	RAERIAL	0		$19,615,427			$0.33	$2.50	$235
At-Grade Stations	RATGRADE	0		Indirect Operations:					
Subway Stations	RSUBWAY	16		$12,096,112			$0.20	$1.54	$145
Peak Vehicles	RPEAKCAR	86		Direct + Security:					
Active Fleet Vehicles	RTOTALCAR	109		$92,066,764			$1.55	$11.75	$1,103
Operating Divisions	RDIVISION	1							
Annual Revenue Car Miles	RCARMILE	7.83	million						
Annual Revenue Train Hours	RTRAINHOUR	83.46	thousand						
TOTAL				**$1,221,770,946**	**$47,609,392**	**8,378.0**			

All costs in FY2008 dollars. Incremental cost compared against Calibration System alternative (Alt. 0).

Los Angeles County Metropolitan Transportation Authority
O&M Cost Model

SYSTEM CHARACTERISTICS & COST SUMMARY

Expo LRT on ROW and Colorado
Year 2030

(Expo Line statistics and costs included with Blue Line)

System Characteristic	Driving Variable	Input Value	Units	Annual Cost Total	Annual Cost Incremental	FTEs Total	Total Cost per Passenger	Total Cost per Bus/Car Mile	Total Cost per Bus/Train Hour
MTA BUS:				**$860,752,431**	($54,203,202)	6,421.0	$1.73	$10.68	$117.53
Annual Boardings (Unlinked Trips)	BUSPASS	496.2	million	Direct Operations:					
Total Routes	ROUTES	147		$757,231,743			$1.53	$9.39	$103.39
Peak Buses	PKBUS	1,974		Security:					
Active Fleet Buses	TOTBUS	2,368		$18,618,559			$0.04	$0.23	$2.54
Service Sectors	SECTOR	5		Indirect Operations:					
Operating Divisions	GARAGE	11		$84,902,129					
Annual Revenue Vehicle-Miles	BUSMILE	80.62	million	Direct + Security:			$0.17	$1.05	$11.59
Annual Revenue Vehicle-Hours	BUSHOUR	6.80	million	$775,850,302					
Contracted Service Hours	CONTHR	525.12	thousand				$1.56	$9.62	$105.93
Double-Articulated Buses	DBLARTICBUS	0		<-- Subset of Peak Buses					
Single-Articulated Buses	SNLARTICBUS	478		<-- Subset of Peak Buses					
ORANGE LINE:				**$19,407,844**	($2,189,460)	102.5	$3.24	$14.64	$236.80
Route Miles	NROUTEMILE	14.5		Direct Operations:					
Annual Boardings (Unlinked Trips)	NPASS	6.0	million	$11,790,208			$1.97	$8.89	$144
Total Routes	NROUTES	1		Security:					
Total Stations	NSTATION	14		$6,171,900			$1.03	$4.66	$75
Peak Vehicles	NPEAKBUS	21		Indirect Operations:					
Active Fleet Vehicles	NTOTALBUS	26		$1,445,736			$0.24	$1.09	$18
Operating Divisions	NDIVISION	1		Direct + Security:					
Annual Revenue Vehicle-Miles	NBUSMILE	1.33	million	$17,962,108			$3.00	$13.55	$219
Annual Revenue Vehicle-Hours	NBUSHOUR	81.96	thousand						
BLUE LINE:				**$118,628,166**	$51,627,278	622.0	$2.75	$15.17	$727
Route Miles	BROUTEMILE	35.7		Direct Operations:					
Annual Boardings (Unlinked Trips)	BPASS	43.2	million	$83,575,475			$1.94	$10.69	$512
Total Stations	BSTATION	36		Security:					
Elevated Stations	BAERIAL	6		$21,775,385			$0.50	$2.79	$133
At-Grade Stations	BATGRADE	29		Indirect Operations:					
Subway Stations	BSUBWAY	1		$13,277,307			$0.31	$1.70	$81
Peak Vehicles	BPEAKCAR	105		Direct + Security:					
Active Fleet Vehicles	BTOTALCAR	128		$105,350,860			$2.44	$13.47	$646
Operating Divisions	BDIVISION	2							
Annual Revenue Car Miles	BCARMILE	7.82	million						
Annual Revenue Train Hours	BTRAINHOUR	163.20	thousand						
GREEN LINE:	***Manual Operation***			**$45,820,172**	$6,024,107	276.0	$4.22	$12.90	$737
Route Miles	GROUTEMILE	19.6		Direct Operations:					
Annual Boardings (Unlinked Trips)	GPASS	10.9	million	$33,120,638			$3.05	$9.32	$533
Total Stations	GSTATION	14		Security:					
Elevated Stations	GAERIAL	14		$6,947,804			$0.64	$1.96	$112
At-Grade Stations	GATGRADE	0		Indirect Operations:					
Subway Stations	GSUBWAY	0		$5,751,729			$0.53	$1.62	$92
Peak Vehicles	GPEAKCAR	30		Direct + Security:					
Active Fleet Vehicles	GTOTALCAR	40		$40,068,442			$3.69	$11.28	$644
Operating Divisions	GDIVISION	1							
Annual Revenue Car Miles	GCARMILE	3.55	million						
Annual Revenue Train Hours	GTRAINHOUR	62.19	thousand						
GOLD LINE:				**$74,029,817**	$32,478,672	415.0	$4.19	$22.86	$879
Route Miles	OROUTEMILE	19.5		Direct Operations:					
Annual Boardings (Unlinked Trips)	OPASS	17.7	million	$47,143,469			$2.67	$14.56	$560
Total Stations	OSTATION	21		Security:					
Elevated Stations	OAERIAL	6		$15,435,067			$0.87	$4.77	$183
At-Grade Stations	OATGRADE	12		Indirect Operations:					
Subway Stations	OSUBWAY	3		$11,451,281			$0.65	$3.54	$136
Peak Vehicles	OPEAKCAR	44		Direct + Security:					
Active Fleet Vehicles	OTOTALCAR	55		$62,578,536			$3.54	$19.33	$743
Operating Divisions	ODIVISION	1							
Annual Revenue Car Miles	OCARMILE	3.24	million						
Annual Revenue Train Hours	OTRAINHOUR	84.18	thousand						
RED/PURPLE LINE:				**$104,158,458**	$14,897,939	547.5	$1.76	$13.30	$1,248
Route Miles	RROUTEMILE	15.9		Direct Operations:					
Annual Boardings (Unlinked Trips)	RPASS	59.2	million	$72,449,254			$1.22	$9.25	$868
Total Stations	RSTATION	16		Security:					
Elevated Stations	RAERIAL	0		$19,615,427			$0.33	$2.50	$235
At-Grade Stations	RATGRADE	0		Indirect Operations:					
Subway Stations	RSUBWAY	16		$12,093,777			$0.20	$1.54	$145
Peak Vehicles	RPEAKCAR	86		Direct + Security:					
Active Fleet Vehicles	RTOTALCAR	109		$92,064,681			$1.55	$11.75	$1,103
Operating Divisions	RDIVISION	1							
Annual Revenue Car Miles	RCARMILE	7.83	million						
Annual Revenue Train Hours	RTRAINHOUR	83.46	thousand						
TOTAL				**$1,222,796,889**	**$48,635,335**	**8,384.0**			

All costs in FY2008 dollars. Incremental cost compared against Calibration System alternative (Alt. 0).

Los Angeles County Metropolitan Transportation Authority
O&M Cost Model

SYSTEM CHARACTERISTICS & COST SUMMARY

Expo LRT via Venice-Sepulveda and Olympic
Year 2030

(Expo Line statistics and costs included with Blue Line)

System Characteristic	Driving Variable	Input Value	Units	Annual Cost Total	Annual Cost Incremental	FTEs Total	Total Cost per Passenger	Total Cost per Bus/Car Mile	Total Cost per Bus/Train Hour
MTA BUS:				**$860,850,541**	($54,105,092)	6,421.5	$1.73	$10.68	$117.52
Annual Boardings (Unlinked Trips)	BUSPASS	497.0	million	Direct Operations:					
Total Routes	ROUTES	147		$757,301,580			$1.52	$9.39	$103.39
Peak Buses	PKBUS	1,974		Security:					
Active Fleet Buses	TOTBUS	2,368		$18,618,559			$0.04	$0.23	$2.54
Service Sectors	SECTOR	5		Indirect Operations:					
Operating Divisions	GARAGE	11		$84,930,403					
Annual Revenue Vehicle-Miles	BUSMILE	80.62	million	Direct + Security:			$0.17	$1.05	$11.59
Annual Revenue Vehicle-Hours	BUSHOUR	6.80	million	$775,920,139					
Contracted Service Hours	CONTHR	525.19	thousand				$1.56	$9.62	$105.93
Double-Articulated Buses	DBLARTICBUS	0		<-- Subset of Peak Buses					
Single-Articulated Buses	SNLARTICBUS	478		<-- Subset of Peak Buses					
ORANGE LINE:				**$19,407,844**	($2,189,460)	102.5	$3.24	$14.64	$236.80
Route Miles	NROUTEMILE	14.5		Direct Operations:					
Annual Boardings (Unlinked Trips)	NPASS	6.0	million	$11,790,208			$1.97	$8.89	$144
Total Routes	NROUTES	1		Security:					
Total Stations	NSTATION	14		$6,171,900			$1.03	$4.66	$75
Peak Vehicles	NPEAKBUS	21		Indirect Operations:					
Active Fleet Vehicles	NTOTALBUS	26		$1,445,736			$0.24	$1.09	$18
Operating Divisions	NDIVISION	1		Direct + Security:					
Annual Revenue Vehicle-Miles	NBUSMILE	1.33	million	$17,962,108			$3.00	$13.55	$219
Annual Revenue Vehicle-Hours	NBUSHOUR	81.96	thousand						
BLUE LINE:				**$118,106,665**	$51,105,776	613.0	$2.78	$16.09	$713
Route Miles	BROUTEMILE	36.5		Direct Operations:					
Annual Boardings (Unlinked Trips)	BPASS	42.6	million	$82,773,799			$1.95	$11.28	$500
Total Stations	BSTATION	37		Security:					
Elevated Stations	BAERIAL	9		$22,366,491			$0.53	$3.05	$135
At-Grade Stations	BATGRADE	27		Indirect Operations:					
Subway Stations	BSUBWAY	1		$12,966,375			$0.30	$1.77	$78
Peak Vehicles	BPEAKCAR	96		Direct + Security:					
Active Fleet Vehicles	BTOTALCAR	117		$105,140,290			$2.47	$14.33	$635
Operating Divisions	BDIVISION	2							
Annual Revenue Car Miles	BCARMILE	7.34	million						
Annual Revenue Train Hours	BTRAINHOUR	165.70	thousand						
GREEN LINE:	***Manual Operation***			**$45,803,109**	$6,007,045	276.0	$4.25	$12.89	$737
Route Miles	GROUTEMILE	19.6		Direct Operations:					
Annual Boardings (Unlinked Trips)	GPASS	10.8	million	$33,114,581			$3.08	$9.32	$532
Total Stations	GSTATION	14		Security:					
Elevated Stations	GAERIAL	14		$6,947,804			$0.65	$1.96	$112
At-Grade Stations	GATGRADE	0		Indirect Operations:					
Subway Stations	GSUBWAY	0		$5,740,725			$0.53	$1.62	$92
Peak Vehicles	GPEAKCAR	30		Direct + Security:					
Active Fleet Vehicles	GTOTALCAR	40		$40,062,385			$3.72	$11.28	$644
Operating Divisions	GDIVISION	1							
Annual Revenue Car Miles	GCARMILE	3.55	million						
Annual Revenue Train Hours	GTRAINHOUR	62.19	thousand						
GOLD LINE:				**$74,007,944**	$32,456,799	415.0	$4.20	$22.86	$879
Route Miles	OROUTEMILE	19.5		Direct Operations:					
Annual Boardings (Unlinked Trips)	OPASS	17.6	million	$47,136,273			$2.68	$14.56	$560
Total Stations	OSTATION	21		Security:					
Elevated Stations	OAERIAL	6		$15,435,067			$0.88	$4.77	$183
At-Grade Stations	OATGRADE	12		Indirect Operations:					
Subway Stations	OSUBWAY	3		$11,436,603			$0.65	$3.53	$136
Peak Vehicles	OPEAKCAR	44		Direct + Security:					
Active Fleet Vehicles	OTOTALCAR	55		$62,571,341			$3.55	$19.32	$743
Operating Divisions	ODIVISION	1							
Annual Revenue Car Miles	OCARMILE	3.24	million						
Annual Revenue Train Hours	OTRAINHOUR	84.18	thousand						
RED/PURPLE LINE:				**$104,145,814**	$14,885,295	547.5	$1.76	$13.29	$1,248
Route Miles	RROUTEMILE	15.9		Direct Operations:					
Annual Boardings (Unlinked Trips)	RPASS	59.1	million	$72,444,166			$1.22	$9.25	$868
Total Stations	RSTATION	16		Security:					
Elevated Stations	RAERIAL	0		$19,615,427			$0.33	$2.50	$235
At-Grade Stations	RATGRADE	0		Indirect Operations:					
Subway Stations	RSUBWAY	16		$12,086,221			$0.20	$1.54	$145
Peak Vehicles	RPEAKCAR	86		Direct + Security:					
Active Fleet Vehicles	RTOTALCAR	109		$92,059,593			$1.56	$11.75	$1,103
Operating Divisions	RDIVISION	1							
Annual Revenue Car Miles	RCARMILE	7.83	million						
Annual Revenue Train Hours	RTRAINHOUR	83.46	thousand						
TOTAL				**$1,222,321,918**	**$48,160,363**	**8,375.5**			

All costs in FY2008 dollars. Incremental cost compared against Calibration System alternative (Alt. 0).

Los Angeles County Metropolitan Transportation Authority
O&M Cost Model

SYSTEM CHARACTERISTICS & COST SUMMARY

Expo LRT via Venice-Sepulveda and Colorado
Year 2030

(Expo Line statistics and costs included with Blue Line)

System Characteristic	Driving Variable	Input Value	Units	Annual Cost Total	Annual Cost Incremental	FTEs Total	Total Cost per Passenger	Total Cost per Bus/Car Mile	Total Cost per Bus/Train Hour
MTA BUS:				**$860,790,188**	($54,165,445)	6,421.0	$1.73	$10.68	$117.53
Annual Boardings (Unlinked Trips)	BUSPASS	497.1	million	Direct Operations:					
Total Routes	ROUTES	147		$757,239,312			$1.52	$9.39	$103.39
Peak Buses	PKBUS	1,974		Security:					
Active Fleet Buses	TOTBUS	2,368		$18,618,559			$0.04	$0.23	$2.54
Service Sectors	SECTOR	5		Indirect Operations:					
Operating Divisions	GARAGE	11		$84,932,317					
Annual Revenue Vehicle-Miles	BUSMILE	80.62	million	Direct + Security:			$0.17	$1.05	$11.60
Annual Revenue Vehicle-Hours	BUSHOUR	6.80	million	$775,857,871					
Contracted Service Hours	CONTHR	525.12	thousand				$1.56	$9.62	$105.94
Double-Articulated Buses	DBLARTICBUS	0		<-- Subset of Peak Buses					
Single-Articulated Buses	SNLARTICBUS	478		<-- Subset of Peak Buses					
ORANGE LINE:				**$19,407,844**	($2,189,460)	102.5	$3.24	$14.64	$236.80
Route Miles	NROUTEMILE	14.5		Direct Operations:					
Annual Boardings (Unlinked Trips)	NPASS	6.0	million	$11,790,208			$1.97	$8.89	$144
Total Routes	NROUTES	1		Security:					
Total Stations	NSTATION	14		$6,171,900			$1.03	$4.66	$75
Peak Vehicles	NPEAKBUS	21		Indirect Operations:					
Active Fleet Vehicles	NTOTALBUS	26		$1,445,736			$0.24	$1.09	$18
Operating Divisions	NDIVISION	1		Direct + Security:					
Annual Revenue Vehicle-Miles	NBUSMILE	1.33	million	$17,962,108			$3.00	$13.55	$219
Annual Revenue Vehicle-Hours	NBUSHOUR	81.96	thousand						
BLUE LINE:				**$119,158,338**	$52,157,450	620.0	$2.80	$16.21	$701
Route Miles	BROUTEMILE	36.6		Direct Operations:					
Annual Boardings (Unlinked Trips)	BPASS	42.5	million	$83,660,245			$1.97	$11.38	$492
Total Stations	BSTATION	37		Security:					
Elevated Stations	BAERIAL	8		$22,464,046			$0.53	$3.06	$132
At-Grade Stations	BATGRADE	28		Indirect Operations:					
Subway Stations	BSUBWAY	1		$13,034,048			$0.31	$1.77	$77
Peak Vehicles	BPEAKCAR	98		Direct + Security:					
Active Fleet Vehicles	BTOTALCAR	119		$106,124,291			$2.50	$14.43	$625
Operating Divisions	BDIVISION	2							
Annual Revenue Car Miles	BCARMILE	7.35	million						
Annual Revenue Train Hours	BTRAINHOUR	169.89	thousand						
GREEN LINE:	***Manual Operation***			**$45,812,248**	$6,016,183	276.0	$4.24	$12.90	$737
Route Miles	GROUTEMILE	19.6		Direct Operations:					
Annual Boardings (Unlinked Trips)	GPASS	10.8	million	$33,117,825			$3.06	$9.32	$533
Total Stations	GSTATION	14		Security:					
Elevated Stations	GAERIAL	14		$6,947,804			$0.64	$1.96	$112
At-Grade Stations	GATGRADE	0		Indirect Operations:					
Subway Stations	GSUBWAY	0		$5,746,619			$0.53	$1.62	$92
Peak Vehicles	GPEAKCAR	30		Direct + Security:					
Active Fleet Vehicles	GTOTALCAR	40		$40,065,629			$3.71	$11.28	$644
Operating Divisions	GDIVISION	1							
Annual Revenue Car Miles	GCARMILE	3.55	million						
Annual Revenue Train Hours	GTRAINHOUR	62.19	thousand						
GOLD LINE:				**$74,005,558**	$32,454,413	415.0	$4.20	$22.86	$879
Route Miles	OROUTEMILE	19.5		Direct Operations:					
Annual Boardings (Unlinked Trips)	OPASS	17.6	million	$47,135,488			$2.68	$14.56	$560
Total Stations	OSTATION	21		Security:					
Elevated Stations	OAERIAL	6		$15,435,067			$0.88	$4.77	$183
At-Grade Stations	OATGRADE	12		Indirect Operations:					
Subway Stations	OSUBWAY	3		$11,435,002			$0.65	$3.53	$136
Peak Vehicles	OPEAKCAR	44		Direct + Security:					
Active Fleet Vehicles	OTOTALCAR	55		$62,570,556			$3.55	$19.32	$743
Operating Divisions	ODIVISION	1							
Annual Revenue Car Miles	OCARMILE	3.24	million						
Annual Revenue Train Hours	OTRAINHOUR	84.18	thousand						
RED/PURPLE LINE:				**$104,143,921**	$14,883,402	547.5	$1.76	$13.29	$1,248
Route Miles	RROUTEMILE	15.9		Direct Operations:					
Annual Boardings (Unlinked Trips)	RPASS	59.1	million	$72,443,273			$1.23	$9.25	$868
Total Stations	RSTATION	16		Security:					
Elevated Stations	RAERIAL	0		$19,615,427			$0.33	$2.50	$235
At-Grade Stations	RATGRADE	0		Indirect Operations:					
Subway Stations	RSUBWAY	16		$12,085,220			$0.20	$1.54	$145
Peak Vehicles	RPEAKCAR	86		Direct + Security:					
Active Fleet Vehicles	RTOTALCAR	109		$92,058,701			$1.56	$11.75	$1,103
Operating Divisions	RDIVISION	1							
Annual Revenue Car Miles	RCARMILE	7.83	million						
Annual Revenue Train Hours	RTRAINHOUR	83.46	thousand						
TOTAL				**$1,223,318,097**	**$49,156,542**	**8,382.0**			

All costs in FY2008 dollars. Incremental cost compared against Calibration System alternative (Alt. 0).

Municipal Operator
O&M Cost Models

	COMBINED CULVER CITY AND SANTA MONICA DATA					
	SCENARIO ADJUSTED INPUT					
	1	2	3	4	5	6
System Characteristics	No Build	Baseline	Expo ROW & Olympic	Venice-Sep & Olympic	Expo ROW & Colorado	Venice-Sep & Colorado
SYSTEM						
Forecast Fiscal Year	2030	2030	2030	2030	2030	2030
ALL BUS						
Peak Vehicles	304	312	309	321	309	321
Revenue Vehicle Miles	9,162,879	9,626,207	9,567,673	9,779,436	9,593,742	9,806,479
Maintenance Garages	2	2	2	2	2	2
Revenue Vehicle Hours	863,954	906,297	901,368	922,116	903,894	924,728
LOCAL						
Peak Vehicles	0	0	0	0	0	0
Revenue Vehicle Miles	0	0	0	0	0	0
Revenue Vehicle Hours	0	0	0	0	0	0
EXPRESS						
Peak Vehicles	0	0	0	0	0	0
Revenue Vehicle Miles	0	0	0	0	0	0
Revenue Vehicle Hours	0	0	0	0	0	0
TRANSITWAY						
Peak Vehicles	0	0	0	0	0	0
Revenue Vehicle Miles	0	0	0	0	0	0
Revenue Vehicle Hours	0	0	0	0	0	0
TOTAL O&M COSTS - 2006$	**$89,747,052**	**$93,856,813**	**$93,243,528**	**$95,642,410**	**$93,455,864**	**$95,862,224**
TOTAL O&M COSTS - 2008$	**$96,246,307**	**$100,653,687**	**$99,995,989**	**$102,568,592**	**$100,223,702**	**$102,804,324**
2006$						
Increment to No Build	N/A	N/A	($613,286)	$1,785,597	($400,949)	$2,005,410
Increment to Baseline	N/A	N/A	N/A	$2,398,882	$212,337	$2,618,696
2008$						
Increment to No Build	N/A	N/A	($657,698)	$1,914,905	($429,985)	$2,150,637
Increment to Baseline	N/A	N/A	N/A	$2,572,603	$227,713	$2,808,335
O&M COSTS (Rounded)						
2006$	$89,747,000	$93,857,000	$93,244,000	$95,642,000	$93,456,000	$95,862,000
2008$	$96,246,000	$100,654,000	$99,996,000	$102,569,000	$100,224,000	$102,804,000

Appendix D

Municipal Operating Statistics and O&M Costs Build-up from 2005 to 2030

Santa Monica Big Blue Bus

2005

Route ID	Route Description	Peak Headway	Peak Time	Peak Stops	Route Distance	Peak Vehicles	Total Vehicles	Peak Rev-Hrs	Peak Rev-Mis	Peak Speed	Offpeak Headway	Offpeak Time	Offpeak Stops	Route Distance	Offpeak Rev-Hrs	Offpeak Rev-Mis	Offpeak Speed	Total Rev-Hrs	Total Rev-Mis		O&M Cost
17080	5-OLYM/SAWTE-PICO/RIMPAU	30	32	24	7.5	2	3	2,952	33,212	14.1								2,952	33,212		
17081	3-IMPRL/AVIAT-UCLA	20	175	48	34.8	11	15	24,217	231,152	11.9	20	208	48	34.8	37,007	297,195	10.0	61,224	528,348		
17082	7-SUPER LIMITED	18	50	36	10.7	4	6	7,688	78,970	12.8								7,688	78,970		
17083	3-4TH/SNTMONC-IMPRL/AVIA	20	51	30	10.6	3	4	7,057	70,408	12.5	20	62	30	10.6	11,031	90,525	10.3	18,088	160,933		
17084	5-6TH/WLSHER-PICO/RIMPAU	20	104	35	23.2	7	10	14,392	154,101	13.4	30	112	35	23.2	13,285	132,087	12.4	27,676	286,188		
17085	7-4TH/BRODWY-PICO/RIMPAU	10	96	36	21.4	12	17	26,569	284,290	13.4	10	105	36	21.4	37,363	365,516	12.2	63,932	649,807		
17086	4-OLYMPC/WSTWD-OLYMPC/4T	30	72	23	16.4	3	4	6,642	72,622	13.7	30	84	23	16.4	9,963	93,372	11.7	16,606	165,994		
17087	8-4TH/WLSHIRE-HLGRD/SNST	15	94	26	19.6	8	11	17,344	173,585	12.5	15	113	26	19.6	26,806	223,181	10.4	44,150	396,767		
17088	9-COL/4TH-SUNST/MARQZ	30	59	12	11.4	3	4	5,443	50,481	11.6	30	96	12	11.4	11,387	64,905	7.1	16,830	115,386		
17089	11-20TH/MONTA-14TH/MONTA	30	42	12	9.2	2	3	3,875	40,739	13.1	30	50	12	9.2	5,931	52,379	11.0	9,805	93,119		
17090	12-HLGRD/SUNST-PICO/RIMP	26	106	29	21.4	5	7	11,283	109,342	12.1								11,283	109,342		
17091	13-WSTWD/PICO-PICO/RI	30	72	21	15.6	3	4	6,642	69,080	13.0								6,642	69,080		
17092	14-CNTNLA/CLVR-GETTY/SEP	12	91	24	17.4	10	14	20,988	192,627	11.5	30	102	24	17.4	12,098	99,065	10.2	33,086	291,692		
17105	12-SUPER LIMITED	20	34	19	6.4	2	3	4,705	42,511	11.3								4,705	42,511		
17106	2-WLGRV/VENIC-HLGRD/GALY	15	105	32	20.6	9	13	19,373	182,442	11.8	20	122	32	20.6	21,706	175,926	10.1	41,079	358,368		
17107	1-WNDWRD/MAIN-HLGRD/SNST	10	79	22	15.0	10	14	21,864	199,269	11.4	10	92	22	15.0	32,737	256,203	9.8	54,601	455,472		
17108	12-UCLA/PICO-ROBERTSON	36	82	21	16.0	3	4	6,304	59,043	11.7	15	95	21	16.0	22,536	182,189	10.1	28,840	241,231		
21056	EB 10-4TH/SMONICA-UNION	15	72	41	18.2	6	8	10,438	126,647	15.2	30	76	41	18.2	7,512	86,350	14.4	17,950	212,996		
21057	WB 10-UNION ST-4TH/SMONI	20	73	36	17.8	5	7	7,937	92,897	14.6	30	75	36	17.8	7,413	84,452	14.2	15,350	177,349		
21058	EB 10-MARINE/MAIN-UNI ST	60	82	45	20.0	2	3	2,972	34,793	14.6								2,972	34,793		
	UNCODED PM TRIPPERS					26	37														
Total						136	192											485,462	4,501,558		
Adj					1.066176	145	204	1.06438485									0.928165	450589	4946875	1.0989	$ 50,812,861

2005 + I. Highway Congestion

Route ID	Route Description	Peak Headway	Peak Time	Peak Stops	Route Distance	Peak Vehicles	Total Vehicles	Peak Rev-Hrs	Peak Rev-Mis	Peak Speed	Offpeak Headway	Offpeak Time	Offpeak Stops	Route Distance	Offpeak Rev-Hrs	Offpeak Rev-Mis	Offpeak Speed	Total Rev-Hrs	Total Rev-Mis		O&M Cost
17080	5-OLYM/SAWTE-PICO/RIMPAU	30	47	24	7.5	2	3	4360	33,212	9.5								4,360	33,212		
17081	3-IMPRL/AVIAT-UCLA	20	199	48	34.8	13	18	27538	231,152	10.5	20	201	48	34.8	35,762	297,195	10.4	63,300	528,348		
17082	7-SUPER LIMITED	18	58	36	10.7	4	6	8969	78,970	11.0								8,969	78,970		
17083	3-4TH/SNTMONC-IMPRL/AVIA	20	49	30	10.6	3	4	6781	70,408	13.0	20	60	30	10.6	10,660	90,525	10.6	17,440	160,933		
17084	5-6TH/WLSHER-PICO/RIMPAU	20	117	35	23.2	8	11	16192	154,101	11.9	30	118	35	23.2	13,996	132,087	11.8	30,188	286,188		
17085	7-4TH/BRODWY-PICO/RIMPAU	10	112	36	21.4	14	20	30997	284,290	11.5	10	106	36	21.4	37,719	365,516	12.1	68,716	649,807		
17086	4-OLYMPC/WSTWD-OLYMPC/4T	30	78	23	16.4	4	6	7171	72,622	12.7	30	86	23	16.4	10,233	93,372	11.4	17,404	165,994		
17087	8-4TH/WLSHIRE-HLGRD/SNST	15	106	26	19.6	9	13	19589	173,585	11.1	15	109	26	19.6	25,912	223,181	10.8	45,501	396,767		
17088	9-COL/4TH-SUNST/MARQZ	30	66	12	11.4	3	4	6089	50,481	10.4	30	56	12	11.4	6,642	64,905	12.2	12,731	115,386		
17089	11-20TH/MONTA-14TH/MONTA	30	44	12	9.2	2	3	4059	40,739	12.5	30	50	12	9.2	5,931	52,379	11.0	9,990	93,119		
17090	12-HLGRD/SUNST-PICO/RIMP	26	122	29	21.4	6	8	13017	109,342	10.5								13,017	109,342		
17091	13-WSTWD/PICO-PICO/RI	30	96	21	15.6	4	6	8856	69,080	9.8								8,856	69,080		
17092	14-CNTNLA/CLVR-GETTY/SEP	12	95	24	17.4	10	14	21995	192,627	10.9	30	94	24	17.4	11,113	99,065	11.1	33,108	291,692		
17105	12-SUPER LIMITED	20	46	19	6.4	3	4	6413	42,511	8.3								6,413	42,511		
17106	2-WLGRV/VENIC-HLGRD/GALY	15	121	32	20.6	10	14	22338	182,442	10.2	20	121	32	20.6	21,541	175,926	10.2	43,879	358,368		
17107	1-WNDWRD/MAIN-HLGRD/SNST	10	92	22	15.0	12	17	25584	199,269	9.7	10	90	22	15.0	31,963	256,203	10.0	57,548	455,472		
17108	12-UCLA/PICO-ROBERTSON	36	93	21	16.0	4	6	7153	59,043	10.3	15	92	21	16.0	21,866	182,189	10.4	29,019	241,231		
21056	EB 10-4TH/SMONICA-UNION	15	68	41	18.2	6	8	10438	126,647	16.2	30	74	41	18.2	7,326	86,350	14.7	17,764	212,996		
21057	WB 10-UNION ST-4TH/SMONI	20	94	36	17.8	5	7	7937	92,897	11.4	30	72	36	17.8	7,130	84,452	14.8	15,067	177,349		
21058	EB 10-MARINE/MAIN-UNI ST	60	84	45	20.0	2	3	2972	34,793	14.3								2,972	34,793		
	UNCODED PM TRIPPERS					26	37														
Total						150	211											506,241	4,501,558		
Adj					1.066176	160	225	1.06438485									0.928165	469,876	4,946,875	1.0989	$ 52,070,034

Santa Monica Big Blue Bus (continued)

2005 + I. Highway Congestion + II. Service Expansion

Route ID	Route Description	Peak Headway	Peak Time	Peak Stops	Route Distance	Peak Vehicles	Total Vehicles	Peak Rev-Hrs	Peak Rev-Mis	Peak Speed	Offpeak Headway	Offpeak Time	Offpeak Stops	Route Distance	Offpeak Rev-Hrs	Offpeak Rev-Mis	Offpeak Speed	Total Rev-Hrs	Total Rev-Mis		O&M Cost
17080	5WB-OLYM/SAWTE-PICO/RIMP	60	46	23	7.3	1	1	2,122	16,163	9.5								2,122	16,163		
17081	3-IMPRL/AVIAT-UCLA	15	199	49	34.8	17	20	36,717	308,203	10.5	30	201	49	34.8	23,841	198,130	10.4	60,558	506,333		
17083	3-4TH/SNTMONC-IMPRL/AVI	20	49	31	10.6	3	4	6,781	70,408	13.0								6,781	70,408		
17084	5-6TH/WLSHER-PICO/RIMPA	20	116	36	23.0	8	10	16,052	152,773	11.9	30	118	36	23.2	13,996	132,087	11.8	30,049	284,860		
17085	7-4TH/BRODWY-PICO/RIMPA	10	112	36	21.4	14	17	30,997	284,290	11.5	10	106	36	21.4	37,719	365,516	12.1	68,716	649,807		
17086	4-PICO/SAWT-OLYMPC/4	30	91	30	19.2	4	5	8,395	85,021	12.7	30	101	30	19.2	11,980	109,313	11.4	20,375	194,335		
17087	8-4TH/SMON-HLGRD/SNS	15	104	27	19.2	9	11	19,189	170,043	11.1	15	107	27	19.2	25,383	218,627	10.8	44,572	388,669		
17088	9-COL/4TH-SUNST/MARQZ	30	66	12	11.4	3	4	6,089	50,481	10.4	30	56	12	11.4	6,642	64,905	12.2	12,731	115,386		
17089	MB CRSSTWN-20TH/MONT-14T	15	22	14	4.6	2	2	4,059	40,739	12.5	15	25	14	4.6	5,931	52,379	11.0	9,990	93,119		
17090	12-HLGRD/SUNST-PICO/RIM	45	136	35	23.8	4	5	8,364	70,261	10.5								8,364	70,261		
17091	13-WSTWD/PICO-PICO/RI	30	48	21	7.8	2	2	4,428	34,540	9.8								4,428	34,540		
17092	14-JEFF/LINC-GETTY/SEP	12	114	28	20.8	12	14	26,292	230,266	10.9	30	112	28	20.8	13,285	118,423	11.1	39,577	348,689		
17105	12NB-SUPER LIMITED	15	42	21	5.8	4	5	7,749	51,367	8.3								7,749	51,367		
17106	2-WLGRV/VENIC-HLGRD/SNST	15	134	34	22.8	11	13	24,724	201,926	10.2	20	134	34	22.8	23,841	194,714	10.2	48,565	396,640		
17107	1-WNDWRD/MAIN-HLGRD/SNS	10	106	23	17.2	14	17	29,337	228,495	9.7	10	103	23	17.2	36,651	293,779	10.0	65,988	522,275		
17108	12-HILG/SNST-PICO/ROBERT	22.5	107	27	18.4	6	7	13,162	108,639	10.3	15	106	27	18.4	25,146	209,517	10.4	38,307	318,156		
17110	3-LAX - 4TH/SANTA MONIC										30	117	32	21.2	13,878	120,700	10.9	13,878	120,700		
17112	1-UCLA-SM BLVD-20TH-SMC	30	74	17	12.4	3	4	6,827	54,910	10.1	30	76	17	12.4	9,015	70,598	9.8	15,841	125,508		
17113	6WB-SMC-PALMS-VEN/ROB	30	54	26	8.5	3	4	4,982	37,640	9.4								4,982	37,640		
17114	6-SMC-PALMS-VEN/ROB										60	91	26	17.0	5,397	48,394	11.2	5,397	48,394		
17115	MB SUNSET (SMC CONNECTOR	15	44	10	7.8	4	5	8,118	69,080	10.6	15	42	10	7.8	9,963	88,817	11.1	18,082	157,897		
21056	EB 10-4TH/SMON-CHNTWN ST	15	72	46	19.4	6	7	10,438	134,997	16.2	30	79	46	19.4	7,809	92,043	14.7	18,247	227,040		
21057	WB 10-CHNTWN STN-4TH/SMO	15	100	41	19.0	9	11	14,497	132,213	11.4	30	77	41	19.0	7,611	90,146	14.8	22,108	222,359		
21058	EB 10-MARINE/MAIN-CHNTWN	60	88	48	20.9	2	2	3,189	36,359	14.3								3,189	36,359		
24033	703-Lincoln Bl. NB	15	65	15	10.4	6	7	10,280	78,948	9.6								10,280	78,948		
24034	703-Lincoln Bl. SB	15	44	15	10.4	4	5	6,959	78,948	14.2								6,959	78,948		
24039	730-(Super 7) Pico Bl.	10	50	16	13.0	7	8	11,861	148,028	15.6	10	54	16	13.0	17,080	197,371	14.4	28,941	345,400		
24040	730-(Super 7) Pico Bl.	10	73	17	13.0	9	11	17,317	148,028	10.7	10	56	17	13.0	17,713	197,371	13.9	35,030	345,400		
	UNCODED PM TRIPPERS					26	37														
Total						193	237											651,806	5,885,600		
Adj					1.066176	206	252	1.06298759									0.928165	604,984	6,467,833	1.0989	$ 67,363,246

2005 + I. Highway Congestion + II. Service Expansion + III. Service Equilibration (2030 NB)

Route ID	Route Description	Peak Headway	Peak Time	Peak Stops	Route Distance	Peak Vehicles	Total Vehicles	Peak Rev-Hrs	Peak Rev-Mis	Peak Speed	Offpeak Headway	Offpeak Time	Offpeak Stops	Route Distance	Offpeak Rev-Hrs	Offpeak Rev-Mis	Offpeak Speed	Total Rev-Hrs	Total Rev-Mis		O&M Cost
17080	5WB-OLYM/SAWTE-PICO/RIMP	60	46	23	7.3	1	1	2,122	16,163	9.5								2,122	16,163		
17081	3-IMPRL/AVIAT-UCLA	10	199	49	34.8	25	30	55,076	462,304	10.5	30	201	49	34.8	23,841	198,130	10.4	78,917	660,434		
17083	3-4TH/SNTMONC-IMPRL/AVI	12	49	31	10.6	5	6	11,301	117,347	13.0								11,301	117,347		
17084	5-6TH/WLSHER-PICO/RIMPA	20	116	36	23.0	8	10	16,052	152,773	11.9	30	118	36	23.2	13,996	132,087	11.8	30,049	284,860		
17085	7-4TH/BRODWY-PICO/RIMPA	8	112	36	21.4	19	23	41,330	379,054	11.5	10	106	36	21.4	37,719	365,516	12.1	79,049	744,570		
17086	4-PICO/SAWT-OLYMPC/4	30	91	30	19.2	4	5	8,395	85,021	12.7	30	101	30	19.2	11,980	109,313	11.4	20,375	194,335		
17087	8-4TH/SMON-HLGRD/SNS	15	104	27	19.2	9	11	19,189	170,043	11.1	15	107	27	19.2	25,383	218,627	10.8	44,572	388,669		
17088	9-COL/4TH-SUNST/MARQZ	30	66	12	11.4	3	4	6,089	50,481	10.4	30	56	12	11.4	6,642	64,905	12.2	12,731	115,386		
17089	MB CRSSTWN-20TH/MONT-14T	15	22	14	4.6	2	2	4,059	40,739	12.5	15	25	14	4.6	5,931	52,379	11.0	9,990	93,119		
17090	12-HLGRD/SUNST-PICO/RIM	45	136	35	23.8	4	5	8,364	70,261	10.5								8,364	70,261		
17091	13-WSTWD/PICO-PICO/RI	30	48	21	7.8	2	2	4,428	34,540	9.8								4,428	34,540		
17092	14-JEFF/LINC-GETTY/SEP	12	114	28	20.8	12	14	26,292	230,266	10.9	30	112	28	20.8	13,285	118,423	11.1	39,577	348,689		
17105	12NB-SUPER LIMITED	12	42	21	5.8	5	6	9,687	64,209	8.3								9,687	64,209		
17106	2-WLGRV/VENIC-HLGRD/SNST	15	134	34	22.8	11	13	24,724	201,926	10.2	20	134	34	22.8	23,841	194,714	10.2	48,565	396,640		
17107	1-WNDWRD/MAIN-HLGRD/SNS	10	106	23	17.2	14	17	29,337	228,495	9.7	10	103	23	17.2	36,651	293,779	10.0	65,988	522,275		
17108	12-HILG/SNST-PICO/ROBERT	23	107	27	18.4	6	7	13,162	108,639	10.3	15	106	27	18.4	25,146	209,517	10.4	38,307	318,156		
17110	3-LAX - 4TH/SANTA MONIC										30	117	32	21.2	13,878	120,700	10.9	13,878	120,700		
17112	1-UCLA-SM BLVD-20TH-SMC	30	74	17	12.4	3	4	6,827	54,910	10.1	30	76	17	12.4	9,015	70,598	9.8	15,841	125,508		
17113	6WB-SMC-PALMS-VEN/ROB	30	54	26	8.5	3	4	4,982	37,640	9.4								4,982	37,640		
17114	6-SMC-PALMS-VEN/ROB										60	91	26	17.0	5,397	48,394	11.2	5,397	48,394		
17115	MB SUNSET (SMC CONNECTOR	15	44	10	7.8	4	5	8,118	69,080	10.6	15	42	10	7.8	9,963	88,817	11.1	18,082	157,897		
21056	EB 10-4TH/SMON-CHNTWN ST	15	72	46	19.4	6	7	10,438	134,997	16.2	30	79	46	19.4	7,809	92,043	14.7	18,247	227,040		
21057	WB 10-CHNTWN STN-4TH/SMO	15	100	41	19.0	9	11	14,497	132,213	11.4	30	77	41	19.0	7,611	90,146	14.8	22,108	222,359		
21058	EB 10-MARINE/MAIN-CHNTWN	60	88	48	20.9	2	2	3,189	36,359	14.3								3,189	36,359		
24033	703-Lincoln Bl. NB	10	65	15	10.4	8	10	15,420	118,423	9.6								15,420	118,423		
24034	703-Lincoln Bl. SB	15	44	15	10.4	4	5	6,959	78,948	14.2								6,959	78,948		
24039	730-(Super 7) Pico Bl.	10	50	16	13.0	7	8	11,861	148,028	15.6	10	54	16	13.0	17,080	197,371	14.4	28,941	345,400		
24040	730-(Super 7) Pico Bl.	10	73	17	13.0	9	11	17,317	148,028	10.7	10	56	17	13.0	17,713	197,371	13.9	35,030	345,400		
	UNCODED PM TRIPPERS					26	37														
Total						211	259											692,095	6,233,719		
Adj					1.066176	225	275	1.06298759									0.928165	642,379	6,850,391	1.0989	$ 71,849,324

Culver CityBus

2005

Route ID	Route Description	Peak Headway	Peak Time	Peak Stops	Route Distance	Peak Vehicles	Total Vehicles	Peak Rev-Hrs	Peak Rev-Mis	Peak Speed	Offpeak Headway	Offpeak Time	Offpeak Stops	Route Distance	Offpeak Rev-Hrs	Offpeak Rev-Mis	Offpeak Speed	Total Rev-Hrs	Total Rev-Mis		O&M Cost
17010	1-WNDWRD/MAIN-WSHTN/FFAX	12	69	23	15.6	7	10	16,004	173,683	13.6	15	73	23	15.6	17,416	178,645	12.8	33,420	352,328		
17011	2-SEPL/GRN-WSHTN/LINCOLN	60	51	18	11.0	1	1	2,366	24,494	12.9	60	59	18	11.0	3,519	31,492	11.2	5,885	55,986		
17012	3-CENTURY CITY-CENTINELA	20	80	28	17.2	5	7	11,134	114,898	12.9	20	94	28	17.2	16,820	147,726	11.0	27,953	262,623		
17013	4-SEP/GRN-WASH/FAIRFAX	60	47	12	9.6	1	1	2,180	21,376	12.3	60	50	12	9.6	2,982	27,484	11.5	5,162	48,860		
17014	5-WSHTN/INGL-RODEO/LCIEN	60	47	13	9.2	1	1	2,180	20,486	11.7	60	51	13	9.2	3,042	26,339	10.8	5,222	46,824		
17015	6-AVIATION GL-HLGRD/SNSE	12	122	37	25.0	13	19	28,298	278,338	12.3	15	151	37	25.0	36,025	286,290	9.9	64,322	564,628		
Total						28	41											141,965	1,331,249		
Adj					1.142857	32	46	1.12195122									0.945653	134,250	1,423,326	1.0692	$ 13,735,169

2005 + I. Highway Congestion

Route ID	Route Description	Peak Headway	Peak Time	Peak Stops	Route Distance	Peak Vehicles	Total Vehicles	Peak Rev-Hrs	Peak Rev-Mis	Peak Speed	Offpeak Headway	Offpeak Time	Offpeak Stops	Route Distance	Offpeak Rev-Hrs	Offpeak Rev-Mis	Offpeak Speed	Total Rev-Hrs	Total Rev-Mis		
17010	1-WNDWRD/MAIN-WSHTN/FFAX	12	73	23	15.6	8	12	16,830	173,683	12.9	15	75	23	15.6	17,960	178,645	12.4	34,789	352,328		
17011	2-SEPL/GRN-WSHTN/LINCOLN	60	53	18	11.0	1	1	2,470	24,494	12.4	60	58	18	11.0	3,437	31,492	11.5	5,907	55,986		
17012	3-CENTURY CITY-CENTINELA	20	90	28	17.2	6	9	12,483	114,898	11.5	20	91	28	17.2	16,215	147,726	11.4	28,699	262,623		
17013	4-SEP/GRN-WASH/FAIRFAX	60	50	12	9.6	1	1	2,334	21,376	11.4	60	53	12	9.6	3,140	27,484	10.9	5,474	48,860		
17014	5-WSHTN/INGL-RODEO/LCIEN	60	48	13	9.2	1	1	2,205	20,486	11.6	60	51	13	9.2	3,042	26,339	10.8	5,247	46,824		
17015	6-AVIATION GL-HLGRD/SNSE	12	143	37	25.0	15	22	33,169	278,338	10.5	15	143	37	25.0	34,116	286,290	10.5	67,285	564,628		
Total						32	46											147,401	1,331,249		
Adj					1.142857	37	52	1.12195122									0.945653	139,390	1,423,326	1.0692	$ 14,499,782

2005 + I. Highway Congestion + II. Service Expansion

Route ID	Route Description	Peak Headway	Peak Time	Peak Stops	Route Distance	Peak Vehicles	Total Vehicles	Peak Rev-Hrs	Peak Rev-Mis	Peak Speed	Offpeak Headway	Offpeak Time	Offpeak Stops	Route Distance	Offpeak Rev-Hrs	Offpeak Rev-Mis	Offpeak Speed	Total Rev-Hrs	Total Rev-Mis		
17010	1-WNDWRD/MAIN-LA CIEN ST	12	80	28	17.2	9	11	18,556	191,496	12.9	15	83	28	17.2	19,802	196,968	12.4	38,358	388,464		
17011	2-SEPL/GRN-WSHTN/LINCOL	60	61	20	12.6	2	2	2,830	28,056	12.4	60	66	20	12.6	3,936	36,073	11.5	6,766	64,129		
17012	3-CENTURY CITY-JEFF/MESM	20	97	29	18.6	6	7	13,499	124,250	11.5	20	98	29	18.6	17,535	159,750	11.4	31,035	284,000		
17013	4-JEFF/LINC-WLA TC	30	65	17	12.4	3	4	6,031	55,222	11.4	30	68	17	12.4	8,112	71,000	10.9	14,142	126,222		
17014	5-WSHTN/INGL-RODEO/LCIE	90	62	17	12.0	1	1	1,917	17,814	11.6								1,917	17,814		
17015	6-AVIATION GL-HLGRD/SNS	20	143	37	25.0	9	11	19,901	167,003	10.5	30	143	37	25	17,058	143,145	10.5	36,959	310,148		
17109	7-CULVER Bl	40	57	17	10.6	2	2	3,966	35,405	11.2	40	60	17	10.6	5,368	45,520	10.6	9,334	80,925		
17111	8-PLAYA VISTA-LAX LTD	30	65	9	13.2	3	4	6,031	58,785	12.2	30	67	9	13.2	7,992	75,581	11.8	14,023	134,365		
24051	706-Sepulveda-GrnLn NB	12	67	20	11.6	7	8	13,320	110,699	10.4	20	56	20	11.6	8,907	88,559	12.4	22,227	199,258		
24052	706-Sepulveda-GrnLn SB	12	50	19	11.7	6	7	9,941	111,653	14.0	20	54	19	11.7	8,589	89,322	13.0	18,529	200,976		
Total						48	58											193,291	1,806,299		
Adj					1.142857	55	65	1.12195122									0.945653	182,786	1,931,234	1.0692	$ 19,601,220

2005 + I. Highway Congestion + II. Service Expansion + III. Service Equilibration (2030 NB)

Route ID	Route Description	Peak Headway	Peak Time	Peak Stops	Route Distance	Peak Vehicles	Total Vehicles	Peak Rev-Hrs	Peak Rev-Mis	Peak Speed	Offpeak Headway	Offpeak Time	Offpeak Stops	Route Distance	Offpeak Rev-Hrs	Offpeak Rev-Mis	Offpeak Speed	Total Rev-Hrs	Total Rev-Mis		
17010	1-WNDWRD/MAIN-LA CIEN ST	12	80	28	17.2	9	11	18,556	191,496	12.9	15	83	28	17.2	19,802	196,968	12.4	38,358	388,464		
17011	2-SEPL/GRN-WSHTN/LINCOL	60	61	20	12.6	2	2	2,830	28,056	12.4	60	66	20	12.6	3,936	36,073	11.5	6,766	64,129		
17012	3-CENTURY CITY-JEFF/MESM	20	97	29	18.6	6	7	13,499	124,250	11.5	20	98	29	18.6	17,535	159,750	11.4	31,035	284,000		
17013	4-JEFF/LINC-WLA TC	30	65	17	12.4	3	4	6,031	55,222	11.4	30	68	17	12.4	8,112	71,000	10.9	14,142	126,222		
17014	5-WSHTN/INGL-RODEO/LCIE	90	62	17	12.0	1	1	1,917	17,814	11.6								1,917	17,814		
17015	6-AVIATION GL-HLGRD/SNS	12	143	37	25.0	15	18	33,169	278,338	10.5	30	143	37	25.0	17,058	143,145	10.5	50,227	421,483		
17109	7-CULVER Bl	40	57	17	10.6	2	2	3,966	35,405	11.2	40	60	17	10.6	5,368	45,520	10.6	9,334	80,925		
17111	8-PLAYA VISTA-LAX LTD	30	65	9	13.2	3	4	6,031	58,785	12.2	30	67	9	13.2	7,992	75,581	11.8	14,023	134,365		
24051	706-Sepulveda-GrnLn NB	5	67	20	11.6	17	20	31,969	265,677	10.4	20	56	20	11.6	8,907	88,559	12.4	40,876	354,236		
24052	706-Sepulveda-GrnLn SB	10	50	19	11.7	7	8	11,929	133,984	14.0	20	54	19	11.7	8,589	89,322	13.0	20,517	223,306		
Total						65	78											227,195	2,094,943		
Adj					1.142857	74	87.512195	1.12195122									0.945653	214,848	2,239,842	1.0692	$ 23,529,464