

**LOS ANGELES METRO
ORANGE LINE EXTENSION
Transitional Analysis**

TASK 4B: CAPITAL COST ESTIMATES

Prepared for
Los Angeles County Transportation Commission
818 West Seventh Street, Los Angeles, CA 90017

Prepared by
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in association with
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June 1990

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Capital Cost Estimates

Methodology

Capital cost estimates for the Metro Rail extension alternatives are based on unit costs derived from actual bids received on the first phase (MOS-1) of Metro Rail and from real estate estimates developed by LACTC staff. These unit costs were validated by comparison with the budget estimates for MOS-2 included in the recently approved full funding agreement with UMTA.

The unit costs derived from Metro Rail bids are the result of an evaluation by the Southern California Rapid Transit District (SCRTD) and the Metro Rail Transit Consultants (MRTC) cost estimating staffs, and were prepared following a work breakdown structure common to the rapid transit industry. The work breakdown structure provides a checklist to ensure that the total scope of the project is covered.

These unit costs are shown in Table 1, and are self-explanatory, except as noted below.

- Since SCRTD used 1985 as the base year for capital costs, the unit costs derived by MRTC/SCRTD were inflated to 1990 using the ratio of the **Means Construction Index** for January 1990 (213.4) to the average for 1985 (189.1). Accordingly, SCRTD's unit costs were inflated by a factor of 1.13.
- For vehicle costs, the unit cost of \$1.4 million was used, based on the bid received by SCRTD for MOS-1 in 1988. This unit cost was derived based on the option in the contract for 42 additional cars for a total cost of \$58 million. If this option is not exercised, the unit costs of the vehicles would vary from that assumed in these estimates depending on the size of a new order. However, the project reserve allowance (25%) should cover such variation.
- Unit costs for guideway construction are based on twin-bore (two tracks) tunnels. Guideway costs include all site preparation and concrete work, tunnel liners, vent shafts, walkways, cable tray supports, special structures, and utility relocation.
- Station unit costs are based on cut and cover construction for a 450 foot long center platform with two mezzanines. Including ancillary rooms at the ends of the platform, the box for the station would be 560 to 590 feet long. Station costs include all site preparation and concrete work, surface road reconstruction, special structures, and utility relocation.

- SCRTD's estimates for train control, communications and traction power are lump sum. To derive unit costs for these items, formulae were developed using regression analysis to determine the correlation between driving variables (e.g. route length) and the corresponding cost of system-wide equipment, as originally estimated for each segment by RTD. The regression analysis for train control costs was based on two independent variables -- route feet (RF) and stations (STA). The cost equation is as follows:

$$\text{Train control} = \$8,067,000 + \$218 * \text{RF} + \$512,000 * \text{STA}$$

The regression analysis for traction power costs was also based on RF and STA. The cost equation is as follows:

$$\text{Traction power} = \$295 * \text{RF} + \$302,000 * \text{STA}$$

The adjusted unit costs were then applied to the appropriate quantities (e.g. miles of guideway construction by type, stations by type, etc.) in the alternative alignments. The quantities for the four selected alternatives are listed in Table 2.

Allowances for testing and operations mobilization (2.5%) and owners insurance (8%) were added to the construction and equipment procurement costs. The allowances, expressed as percentages of construction and procurement costs, are also based on LACTC's and SCRTD's experience.

Right-of-way costs are then added (see discussion of methodology below).

An allowance for project services was then added to the total of all previous items. This allowance of 25% includes design, construction management, and agency staff.

Finally, a project reserve or contingency allowance (25%) was applied to the sum of all cost items above.

Real Estate Costs

Real estate estimates for the west-side alternatives were developed by LACTC staff based on the following:

Estimates for the five proposed Metro Rail alignment alternatives were derived from estimates of (1) Land Value, (2) Property Improvements, and (3) Relocation and Goodwill Costs. An amount of approximately ten percent of the land value was added for legal, escrow, title and appraisal costs.

- **LAND VALUE:** This valuation estimate was obtained through the use of comparable sales of vacant residential and commercial properties sold during 1988 and 1989. The comparable sales were obtained through the use of the **DAMAR** computer system.
- **PROPERTY IMPROVEMENTS:** This estimate was obtained through the use of the **Marshall and Swift** reference guide for valuation. A property depreciation, ranging from five percent to fifty percent, was deducted for the applicable property improvements depending upon projected remainder of life of the improvements.
- **RELOCATION AND GOODWILL:** This estimate was made from a visual inspection of the subject property and through professional judgement, and estimate was made based upon the number of tenants and type of business operations that are involved.

Valuations were prepared for off-street and corresponding in-street station locations for each specific site. Property required for off-street locations would be more extensive, but could produce significant return on investment through joint development. In addition to parking facilities, the property required for in-street stations would include acquisitions for entrances, emergency exits, and ventilation shafts which protrude beyond the street right-of-way.

Real estate costs incorporated in the capital cost estimates reflect in-street station and line construction, where applicable. Real estate costs do not reflect value capture.

The eastside alternatives assume all-subway construction for both the First Street and the Whittier Boulevard alignments, except for the last 1.2 miles of both alignments which would be in the I-5 right of way. Real estate estimates for the east-side alternatives were prepared in 1988 by the Sinclair/Tudor Group. These estimates were factored to 1990 at a rate of

4% per year. In addition, since the 1988 study did not include the station at I-5/Garfield, an allowance of \$10 million was added for that station.

Capital Costs of Alternatives

For the five west-side alternatives, capital cost estimates were prepared based on the unit costs discussed above and the quantity take-offs from the alignments developed in this study. The west-side alternatives range in costs from about \$1 billion for the Santa Monica Alternative to \$1.3 billion for the Pico-Short Alternative. Both figures are in uninflated, 1990 dollars.

Table 2 lists the quantities for various types of construction for the western extension alternatives, along with the estimated number of vehicles (see operating plans in Appendix A of this report). Table 3 lists the resulting estimates of facility and equipment costs. Table 4 shows the summary of facility, system, and overhead costs for the western alternatives, along with the combined costs. All capital cost estimates are in 1990 dollars.

For the east-side alternatives, capital cost estimates were prepared by applying the unit costs discussed above to the quantities calculated in 1988 by the Sinclair/Tudor Group. The east-side alternatives range from \$940 to \$970 million, in uninflated, 1990 dollars.

For the purposes of the cost-effectiveness analysis, capital costs were calculated for the Wilshire Alternative combined with the First Street Alternative, and for the Pico-Long combined with Whittier Boulevard. These two combination alternatives provide a range of patronage and cost estimates for bracketing the cost-effectiveness indices.

Table 5 lists the quantities for various types of construction, along with the estimated number of vehicles (see operating plans in Appendix B). Table 6 lists the resulting estimates of facility and equipment costs. Table 7 shows the summary of facility, system, and overhead costs for each of the east/west combination alternatives, along with the combined costs. All capital cost estimates are in 1990 dollars.

Prepared by Manuel Padron & Associates
July 10, 1990

Metro Rail Extension Transitional Analysis

Table 1. Capital Costs -- Unit Cost List

Item	Code	Unit Cost (\$1990)	Unit
Guideway Costs			
Tunnel Construction	1	\$5,700	RF
Tunnel Construction (mountains)	2	\$9,000	RF
C&C w/pocket track (shallow)	3	\$14,100	RF
C&C w/crossover (deep)	4	\$30,500	RF
Transition (subway/aerial)	5	\$5,700	RF
C&C 2-track (shallow)	6	\$14,100	RF
Aerial Guideway Construction	10	\$4,400	RF
Aerial Pocket Track	11	\$0	Each
Aerial Tailtracks (2)	12	\$2,260,000	Each
Station Costs			
Subway Station in C&C (560')	20	\$31,010,000	Each
Subway Station in C&C (590')	21	\$32,670,000	Each
Subway Station (over/under w/turnout)	23	\$84,750,000	Each
Aerial Station	30	\$10,170,000	Each
Aerial (with X-over)	31	\$4,600	LF
Systemwide Equipment Costs			
Trackwork (incl. special work)	50	\$450	RF
Escalator/Elevator	51	\$2,750,000	Station
Signs/Graphics	52	\$288,000	Station
Fans/Air Handling/UPS	53	\$2,150,000	Station (sub)
Train Control	54	(1)	RF & Station
Traction Power	55	(2)	RF & Station
Vehicles	56	\$1,400,000	Each
Communications	57	(3)	RF & Station
Fare Collection	58	\$1,330,000	Station
Other Costs			
Testing & Ops. Mobilization	TEST	2.50% of Total Capital	
Insurance	INSUR	8.00% of Total Capital	
Right-of-Way		INPUT	
Proj. Service (Design, CM, Agency)	SERV	25.00% of Total Capital incl ROW	
Contingency (Project Reserve)	CONT	25.00% of all above	

Notes:

(1) Train Control Cost = \$8,067,000 + (\$218 * RF) + (\$512,000 * STA)

(2) Traction Power Cost = (\$295 * RF) + (\$990,000 * STA)

(3) Communications Cost = (\$206 * RF) + (\$302,000 * STA)

(4) 1985 unit costs inflated to 1990 dollars using 13% increase in Engineering Construction Index, 1985-1990.

Metro Rail Extension Transitional Analysis

Table 2. Calculation of Facility Costs -- Input Quantities

Item	Western Extension Alternatives				
	Wilshire	Pico Long	Pico Short	Santa Monica	Olympic
Distances in Route Foot Feet (RF):					
Tunnel Construction	27,200	43,410	45,110	36,090	42,810
Tunnel Construction (mountain)	0	0	0	0	0
C&C w/Crossover (deep)	410	410	410	410	410
Transition (subway/aerial)	2,100	0	0	0	0
C&C 2-Track (shallow)	1,100	0	0	0	0
Aerial Guideway Construction	9,920	0	0	0	0
Subway Station in C&C (560')	0	0	0	0	0
Subway Station in C&C (590')	5	7	7	5	7
Aerial Station	2	0	0	0	0
Total RF	44,860	47,950	49,650	39,450	47,350
Total Stations	7	7	7	5	7
Add'l. Vehicles	46	46	46	49	46
Total Miles	8.50	9.08	9.40	7.47	8.97

**Metro Rail Extension
Transitional Analysis**

**Table 3. Calculation of Facility & Systems Costs
(1990 Dollars)**

Item	Western Extension Alternatives				Olympic
	Wilshire	Pico Long	Pico Short	Santa Monica	
Facilities					
Tunnel Construction	\$155,040,000	\$247,437,000	\$257,127,000	\$205,713,000	\$244,017,999
Tunnel Construction (mtn.)	\$0	\$0	\$0	\$0	\$0
C&C w/Crossover (deep)	\$12,505,000	\$12,505,000	\$12,505,000	\$12,505,000	\$12,505,000
Transition (subway/aerial)	\$11,970,000	\$0	\$0	\$0	\$0
C&C 2-Track (shallow)	\$15,510,000	\$0	\$0	\$0	\$0
Aerial Guideway Constr.	\$43,648,000	\$0	\$0	\$0	\$0
Subway Sta. in C&C (560')	\$0	\$0	\$0	\$0	\$0
Subway Sta. in C&C (590')	\$163,350,000	\$228,690,000	\$228,690,000	\$163,350,000	\$228,690,000
Aerial Station	\$20,340,000	\$0	\$0	\$0	\$0
Guideway Cost	\$238,673,000	\$259,942,000	\$269,632,000	\$218,218,000	\$256,522,999
Station Cost	\$183,690,000	\$228,690,000	\$228,690,000	\$163,350,000	\$228,690,000
Total Facilities Cost	\$422,363,000	\$488,632,000	\$498,322,000	\$381,568,000	\$485,212,999
Systems					
Trackwork	\$20,187,000	\$21,577,500	\$22,342,500	\$17,752,500	\$21,307,500
Escalator/Elevator	\$19,250,000	\$19,250,000	\$19,250,000	\$13,750,000	\$19,250,000
Signs/Graphics	\$2,016,000	\$2,016,000	\$2,016,000	\$1,440,000	\$2,016,000
Fans/Air Handling	\$10,750,000	\$15,050,000	\$15,050,000	\$10,750,000	\$15,050,000
Train Control	\$21,430,480	\$22,104,100	\$22,474,700	\$19,227,100	\$21,973,300
Traction Power	\$20,163,700	\$21,075,250	\$21,576,750	\$16,587,750	\$20,898,250
Communications	\$11,355,160	\$11,991,700	\$12,341,900	\$9,636,700	\$11,868,100
Fare Collection	\$9,310,000	\$9,310,000	\$9,310,000	\$6,650,000	\$9,310,000
Auxiliary Vehicles	\$0	\$0	\$0	\$0	\$0
Misc. Equipment	\$1,700,000	\$1,700,000	\$1,700,000	\$1,700,000	\$1,700,000
Add. Yard Track	\$1,720,000	\$1,720,000	\$1,720,000	\$1,720,000	\$1,720,000
Total Systems Cost	\$117,882,340	\$125,794,550	\$127,781,850	\$99,214,050	\$125,093,150

Metro Rail Extension Transitional Analysis

Table 4. Capital Costs for Metro Rail MOS-4 Extensions

	Western Extension Alternatives				
	Wilshire	Pico Long	Pico Short	Santa Monica	Olympic
Facilities: Guideways	\$238,673,000	\$259,942,000	\$269,632,000	\$218,218,000	\$256,522,000
Stations	\$183,690,000	\$228,690,000	\$228,690,000	\$163,350,000	\$228,690,000
Total	\$422,363,000	\$488,632,000	\$498,322,000	\$381,568,000	\$485,212,000
Systems	\$117,882,340	\$125,794,550	\$127,781,850	\$99,214,050	\$125,093,150
Vehicles	\$64,400,000	\$64,400,000	\$64,400,000	\$68,600,000	\$64,400,000
Subtotal	\$604,645,340	\$678,826,550	\$690,503,850	\$549,382,050	\$674,705,150
Test & Oper. Mobiliz. (2.5%)	\$15,116,134	\$16,970,664	\$17,262,596	\$13,734,551	\$16,867,629
Owners Insur. (8%)	\$48,371,627	\$54,306,124	\$55,240,308	\$43,950,564	\$53,976,412
Right-of-Way	\$53,663,741	\$40,108,156	\$51,269,421	\$35,863,311	\$51,776,551
Subtotal	\$721,796,842	\$790,211,494	\$814,276,175	\$642,930,476	\$797,325,742
Project Service (25%)	\$180,449,210	\$197,552,873	\$203,569,044	\$160,732,619	\$199,331,435
Subtotal	\$902,246,052	\$987,764,367	\$1,017,845,219	\$803,663,095	\$996,657,177
Project Reserve (25%)	\$225,561,513	\$246,941,092	\$254,461,305	\$200,915,774	\$249,164,294
TOTAL COST	\$1,127,807,565	\$1,234,705,459	\$1,272,306,524	\$1,004,578,869	\$1,245,821,471
Miles	8.50	9.08	9.40	7.47	8.97
COST PER MILE (\$mil.)	\$133	\$136	\$135	\$134	\$139

NOTES:

(1) 1985 unit costs inflated to 1990 dollars.

(2) ROW cost for western extensions estimated by LACTC (memo from J. Wiley to J. Sowell, 2/12/90).

Metro Rail Extension Transitional Analysis

Table 5. Facility Cost Input Quantities

Item	Extension Alternatives			
	Western		Eastern	
	Wilshire	Pico Long	First St.	Whittier
Distances in Route Foot Feet (RF):				
Tunnel Construction	27,200	43,410	26,860	26,213
Tunnel Construction (mountain)	0	0	2,500	2,500
C&C w/Crossover (deep)	410	410	1,580	1,580
Transition (subway/aerial)	2,100	0	0	0
C&C 2-Track (shallow)	1,100	0	700	0
Aerial Guideway Construction	9,920	0	6,200	6,200
Subway Station in C&C (560')	0	0	3	3
Subway Station in C&C (590')	5	7	0	0
Aerial Station	2	0	1	1
Total RF	44,860	47,950	40,110	38,763
Total Stations	7	7	4	4
Add'l. Vehicles	46	46	35	35
Total Miles	8.50	9.08	7.60	7.34

Prepared by Manuel Padron & Associates

18-Apr-90
MRTACAP2

Metro Rail Extension Transitional Analysis

**Table 6. Facility & Systems Costs
(1990 Dollars)**

Item	Extension Alternatives			
	Western		Eastern	
	Wilshire	Pico Long	First St.	Whittier
Facilities				
Tunnel Construction	\$155,040,000	\$247,437,000	\$153,102,000	\$149,414,100
Tunnel Construction (mountain)	\$0	\$0	\$22,500,000	\$22,500,000
C&C w/Crossover (deep)	\$12,505,000	\$12,505,000	\$48,190,000	\$48,190,000
Transition (subway/aerial)	\$11,970,000	\$0	\$0	\$0
C&C 2-Track (shallow)	\$15,510,000	\$0	\$9,870,000	\$0
Aerial Guideway Construction	\$43,648,000	\$0	\$27,280,000	\$27,280,000
Subway Station in C&C (560')	\$0	\$0	\$93,030,000	\$93,030,000
Subway Station in C&C (590')	\$163,350,000	\$228,690,000	\$0	\$0
Aerial Station	\$20,340,000	\$0	\$10,170,000	\$10,170,000
Guideway Cost	\$238,673,000	\$259,942,000	\$260,942,000	\$247,384,100
Station Cost	\$183,690,000	\$228,690,000	\$103,200,000	\$103,200,000
Total Facilities Cost	\$422,363,000	\$488,632,000	\$364,142,000	\$350,584,100
Systems				
Trackwork	\$20,187,000	\$21,577,500	\$18,049,500	\$17,443,350
Escalator/Elevator	\$19,250,000	\$19,250,000	\$11,000,000	\$11,000,000
Signs/Graphics	\$2,016,000	\$2,016,000	\$1,152,000	\$1,152,000
Fans/Air Handling	\$10,750,000	\$15,050,000	\$6,450,000	\$6,450,000
Train Control	\$21,430,480	\$22,104,100	\$18,858,980	\$18,565,334
Traction Power	\$20,163,700	\$21,075,250	\$15,792,450	\$15,395,085
Communications	\$11,355,160	\$11,991,700	\$9,470,660	\$9,193,178
Fare Collection	\$9,310,000	\$9,310,000	\$5,320,000	\$5,320,000
Auxiliary Vehicles	\$0	\$0	\$0	\$0
Misc. Equipment	\$1,700,000	\$1,700,000	\$1,700,000	\$1,700,000
Add. Yard Track	\$1,720,000	\$1,720,000	\$1,720,000	\$1,720,000
Total Systems Cost	\$117,882,340	\$125,794,550	\$89,513,590	\$87,938,947

Orange Line Extension Transitional Analysis

Table 7. Capital Costs

	Extension Alternatives			
	Western		Eastern	
	Wilshire	Pico Long	First St.	Whittier
Facilities: Guideways	\$238,673,000	\$259,942,000	\$260,942,000	\$247,384,100
Stations	\$183,690,000	\$228,690,000	\$103,200,000	\$103,200,000
Total	\$422,363,000	\$488,632,000	\$364,142,000	\$350,584,100
Systems	\$117,882,340	\$125,794,550	\$89,513,590	\$87,938,947
Vehicles	\$64,400,000	\$64,400,000	\$49,000,000	\$49,000,000
Subtotal	\$604,645,340	\$678,826,550	\$502,655,590	\$487,523,047
Test & Oper. Mobiliz. (2.5%)	\$15,116,134	\$16,970,664	\$12,566,390	\$12,188,076
Owners Insurance (8%)	\$48,371,627	\$54,306,124	\$40,212,447	\$39,001,844
Right-of-Way	\$53,663,741	\$40,108,156	\$65,035,053	\$62,784,243
Subtotal	\$721,796,842	\$790,211,494	\$620,469,480	\$601,497,210
Project Service (25%)	\$180,449,210	\$197,552,873	\$155,117,370	\$150,374,303
Subtotal	\$902,246,052	\$987,764,367	\$775,586,850	\$751,871,513
Project Reserve (25%)	\$225,561,513	\$246,941,092	\$193,896,712	\$187,967,878
TOTAL COST	\$1,127,807,565	\$1,234,705,459	\$969,483,562	\$939,839,391
Miles	8.50	9.08	7.60	7.34
COST PER MILE (\$million)	\$133	\$136	\$128	\$128

Wilshire/First Combination \$2,097,291,127

Pico/Whittier Combination \$2,174,544,850

NOTES:

(1) 1985 unit costs inflated to 1990 dollars.

(2) ROW cost for western extensions estimated by LACTC (memo from J. Wiley to J. Sowell, 2/12/90); ROW cost for eastern extensions estimated by Sinclair/Tudor (July 1988), inflated by 4.0% annual inflation rate for two years to 1990 dollars; plus \$10 million for I-5/Garfield Station.

Metro Rail Extension
Transitional Analysis

Appendix A: Red Line Operating Plans — MOS-3 & Western Extensions
Year 2010

Rte	From	To	Run Time (min)	Dist (mi)	Headway			Consist			Vehicles		Annual		Patronage		
					Pk	Base	E/L	Pk	Base	E/L	Pk	Total	Car-Mi (MM)	Tr-Hr (M)	AM Pk MLP	Load Factor	Max Load Point
Pico Short Alignment															PICO LONG PATR		
1	N. Hollyw'd	Union Sta.	27.97	14.53	5.0	10.0	10.0	6	4	2	84	97	5.73	59.85	8285	1.92	Hol/High
2	Westwood	Union Sta.	27.63	14.23	5.0	10.0	10.0	4	4	2	56	65	4.76	59.85	5056	1.76	Century City
Totals											140	162	10.49	119.70	9892	1.37	Alvarado
Trunk Line Averages					2.5	5.0	5.0										
Olympic Boulevard Alignment															OLYMP 701Z PATR FACTORED		
1	N. Hollyw'd	Union Sta.	27.72	14.53	5.0	10.0	10.0	6	4	2	84	97	5.73	59.85	8246	1.91	Hol/High
2	Westwood	Union Sta.	27.25	13.98	5.0	10.0	10.0	4	4	2	56	65	4.67	59.85	4875	1.69	Century City
Totals											140	162	10.40	119.70	9654	1.37	Alvarado
Trunk Line Averages					2.5	5.0	5.0										
Santa Monica Alignment															SM 701Z PATR NOT FACTORED		
1	N. Hollyw'd	Union Sta.	27.72	14.53	5.0	10.0	10.0	5	4	2	70	81	5.29	59.85	7704	2.14	Hol/High
2	Westwood	Union Sta.	31.23	17.20	5.0	10.0	10.0	4	4	2	64	74	5.75	68.40	4569	1.59	Hol/High
3	Wilsh/West.	Union Sta.	12.48	5.07	10.0	10.0	10.0	2	4	2	8	9	1.24	29.20	517	0.72	Century City
Totals											142	165	12.28	157.45	8707	1.21	Alvarado
Trunk Line Averages					2.5	5.0	5.0										

NOTES:

- MOS-2 patronage for 2010 from SCRTD; TSM network for Metro Rail Transitional Analysis, 1205 zones. Western extension forecasts by SCRTD for 701 zones, March 1990; extrapolated to 1205 zones by MPA.
- North Hollywood to Union Station distance based on CORE Study plan & profile drawings. Travel time estimated by SCRTD (11/4/88).
- Western extension distance based on plan drawings by Bechtel, Fall 1989.
- Travel times estimated by MPA run time model.
- System includes SFV Line plus Blue & Green Lines, including Coast, Glendale, & Exposition Park.

Metro Rail Extension
Transitional Analysis

Appendix A: Red Line Operating Plans — MOS-3 & Western Extensions
Year 2010

Rte	From	To	Run Time (min)	Dist (mi)	Headway			Consist			Vehicles		Annual		Patronage			
					Pk	Base	E/L	Pk	Base	E/L	Pk	Total	Car-Mi (MM)	Tr-Hr (M)	AM Pk MLP	Load Factor	Max Load Point	
TSM Alternative (LPA)																		
1	N. Hollyw'd	Union Sta.	27.97	14.53	5.0	10.0	10.0	6	4	2	84	97	5.73	59.85	8943	2.07	Hol/High	
2	Wilsh/West	Union Sta.	12.12	5.07	10.0	10.0	20.0	4	4	2	16	19	1.20	22.85	1624	1.13	Normandie	
Totals											100	116	6.92	82.70	7888	1.37	Alvarado	
Trunk Line Averages					3.3	5.0	6.7											
Wilshire Alignment																		
1	N. Hollyw'd	Union Sta.	27.72	14.53	5.0	10.0	10.0	6	4	2	84	97	5.73	59.85	8285	1.92	Hol/High	
2	Westwood	Union Sta.	26.53	13.37	5.0	10.0	10.0	4	4	2	56	65	4.47	59.85	5056	1.76	Century City	
Totals											140	162	10.20	119.70	9892	1.37	Alvarado	
Trunk Line Averages					2.5	5.0	5.0											
Pico Long Alignment																		
1	N. Hollyw'd	Union Sta.	27.72	14.53	5.0	10.0	10.0	6	4	2	84	97	5.73	59.85	7838	1.81	Hol/High	
2	Westwood	Union Sta.	27.52	14.05	5.0	10.0	10.0	4	4	2	56	65	4.70	59.85	5029	1.75	Fairfax	
Totals											140	162	10.43	119.70	6497	1.32	Alvarado	
Trunk Line Averages					2.5	5.0	5.0											

NOTES:

- MOS-2 patronage for 2010 from SCRTD; TSM network for Metro Rail Transitional Analysis, 1205 zones. Western extension forecasts by SCRTD for 701 zones, March 1990; extrapolated to 1205 zones by MPA.
- North Hollywood to Union Station distance based on CORE Study plan & profile drawings. Travel time estimated by SCRTD (11/4/88).
- Western extension distance based on plan drawings by Bechtel, Fall 1989.
- Travel times estimated by MPA run time model.
- System includes SFV Line plus Blue & Green Lines, including Coast, Glendale, & Exposition Park.