7.0 COMPARATIVE ANALYSIS OF ALTERNATIVES

7.1 Introduction

This chapter presents the comparative analysis of the five build alternatives, plus No Build and Transportation System Management (TSM), carried forward from the initial screening process (see Chapter 2.0, Alternatives Considered for Early Scoping for a discussion of this process). The initial screening (Step 1, Screening Evaluation) evaluated a broad set of alternatives covering a range of alignment and modal alternatives. This evaluation reduced the initial set of 17 alternatives to five build alternatives, plus the No Build and TSM. The other alternatives considered in this evaluation were eliminated from further consideration due to their inability to meet the project's goals and objectives.

The alternatives remaining from the Step 1 Screening Evaluation and carried forward into the next step include:

- Bus Rapid Transit (Alternative 17);
- Wilshire Subway (Alternatives 1 and 14);
- Combined Wilshire/West Hollywood Subway (Alternatives 11 and 16); and
- No Build and TSM.

These alternatives were then evaluated on a more detailed level (Step 2, Detailed Evaluation). This analysis was conducted at a conceptual engineering level of detail, and relied on more specific performance measures as well as Federal Transit Administration (FTA) guidance to support the Metro staff recommendation of the alternatives to carry forward.

The analysis, the results of the analysis, and the recommendations are presented in this chapter.

7.2 Approach

Step 2 of the Evaluation Framework was used to evaluate the remaining alternatives during this analysis. This involved evaluating the alternatives on a conceptual engineering level and applying the established goals and objectives for this project to each alternative. Seven goals were identified for the Westside Extension Transit Corridor. These include (refer to ***Analysis Methodology Report, Task 2.5***):

Goal A – Mobility Improvement: The primary purpose of the project is to improve public transit service and mobility in the Westside Extension Transit Corridor. To evaluate the goal of Mobility Improvement, the analysis will examine how well each alternative improves the ability of residents and employees to reach desired destinations through the provision of high quality, convenient, and reliable east-west transit service throughout the Corridor.

Goal B – Transit Supportive Land Use Policies and Conditions: A major aspect of this goal is to locate transit alignments and stations in areas with existing land uses conducive to transit use or in those areas which have the greatest potential to develop transit supportive land uses.

Goal C – Cost-Effectiveness: This goal ensures that both the capital and operating costs of the project are commensurate with its benefits.

Goal D – Project Feasibility: The fourth goal is that the project be financially feasible, in other words, that funds for the construction and operation of the alternative be readily available in the sense that they do not place undue burdens on the sources of those funds. This goal also includes minimizing the risk associated with project construction.

Goal E – Equity: This goal evaluates project solutions based on how well costs and benefits are distributed fairly across different population groups with particular emphasis on serving transit dependent communities.

Goal F – Environmental Considerations: The sixth goal, Environmental Benefits, is to develop solutions which minimize impacts to environmental resources and communities within the study area.

Goal G – Public Acceptance: This goal aims to develop solutions that are acceptable to a reasonable portion of the public with special emphasis on residents and businesses within the study area.

Specific criteria and measures were developed for each goal as a means of assessing whether an alternative meets the goal. A comparative analysis among the alternatives was then conducted to determine how well each one performs against the others.

The results of this Step 2 analysis using these goals and objectives, and the specific evaluation criteria and performance measures developed for each goal, are provided in the following sections.

7.3 Mobility Improvement (Effectiveness)

This goal is intended to improve the ability of residents and employees to reach desired destinations through the provision of high quality, convenient, and reliable east-west transit service through the corridor.

Objectives for mobility improvement include:

- Reduce transit travel times
- Improve trip reliability
- Provide sufficient transit capacity to meet the transit demand in 2030 and beyond (expandability)
- Maximize potential transit ridership
- Enhance linkages to the transportation system as well as major trip attractors/generators within the corridor

7.3.1 Transit Travel Time Reduction

The reduction in transit travel times is measured through the calculation of travel time savings for each alternative. The measures used to calculate travel time savings include: (a) peak period travel times between major origin-destination (OD) pairs (in minutes; min); and b) average end-to-end transit operating speeds (miles per hour [mph]).

Table 7-1 below shows the comparison of peak period travel times among the alternatives. As seen in Table 7-1, the Combined Heavy Rail Transit (HRT) Subway has more instances of faster peak period travel times between major OD pairs than the other alternatives. The Wilshire Boulevard HRT Subway group of alternatives has the second most instances of faster peak period travel times between major OD pairs. The at-grade Bus Rapid Transit (BRT) alternative has the most instances of slower peak period travel times.

Table 7-1. Peak Period Travel Times (minutes) between Major Origin-Destination Pairs

PERFORMANCE MEASURES				ALTERNATIVES							
							BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	Today	No Build	TSM	17	1	14	11	16
A	1	a	**Transit Peak Period Travel Time (AM Peak) (minutes) – Between Del Mar Station (Gold Line) and:**								
			Century City	80	92	92	80	48	53	48	53
			Santa Monica/San Vicente (WeHo)	72	83	83	64	60	65	55	55
			Wilshire/Beverly (BH)	78	90	90	65	46	51	46	51
			Wilshire/Westwood (UCLA)	82	94	94	75	50	55	50	55
			4th/Wilshire (Santa Monica)	112	129	129	91	57	62	57	62
			Transit Peak Period Travel Time (AM Peak) (minutes) – Between Pershing Square Station (Red Line) and:								
			Century City	48	55	55	47	20	25	20	25
			Santa Monica/San Vicente (WeHo)	49	56	56	37	35	40	28	28
			Wilshire/Beverly (BH)	42	48	48	35	18	23	18	23
			Wilshire/Westwood (UCLA)	54	62	62	45	23	28	23	28
			4th/Wilshire (Santa Monica)	70	81	81	65	29	34	29	34
			Transit Peak Period Travel Time (AM Peak) (minutes) – Between Florence Station (Blue Line) and:								
			Century City	60	69	69	74	41	46	41	46
			Santa Monica/San Vicente (WeHo)	69	79	79	57	53	58	47	47
			Wilshire/Beverly (BH)	64	74	74	56	39	44	39	44
			Wilshire/Westwood (UCLA)	76	87	87	66	44	49	44	49
			4th/Wilshire (Santa Monica)	99	114	114	86	50	55	50	55
			Transit Peak Period Travel Time (AM Peak) (minutes) - Between Reseda Station (Orange Line) and:								
			Century City	72	83	83	66	66	71	45	45
			Santa Monica/San Vicente (WeHo)	83	95	95	57	77	82	41	41
			Wilshire/Beverly (BH)	80	92	92	71	64	69	58	58
			Wilshire/Westwood (UCLA)	59	68	68	71	68	73	47	47
			4th/Wilshire (Santa Monica)	97	112	112	86	75	80	54	54

Table 7-1. Peak Period Travel Times (minutes) between Major Origin-Destination Pairs **(continued)**

PERFORMANCE MEASURES				ALTERNATIVES							
							BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	Today	No Build	TSM	17	1	14	11	16
			Transit Peak Period Travel Time (AM Peak) (minutes) - Between Covina Station (Metrolink) and:								
			Century City	94	108	108	92	67	72	67	72
			Santa Monica/San Vicente (WeHo)	99	114	114	87	79	84	69	69
			Wilshire/Beverly (BH)	98	113	113	82	65	70	65	70
			Wilshire/Westwood (UCLA)	99	114	114	93	69	74	69	74
			4th/Wilshire (Santa Monica)	119	137	137	108	76	81	76	81
			Transit Peak Period Travel Time (AM Peak) (minutes) - Between Wilshire/Western Station (Purple Line) and:								
			Century City	35	40	40	34	10	15	10	15
			Santa Monica/San Vicente (WeHo)	30	35	35	30	22	27	17	22
			Wilshire/Beverly (BH)	23	26	26	19	8	13	8	13
			Wilshire/Westwood (UCLA)	36	41	41	31	13	18	13	18
			4th/Wilshire (Santa Monica)	51	59	59	47	19	24	19	24
			Transit Peak Period Travel Time (AM Peak) (minutes) - Between North Hollywood Station (Red Line) and:								
			Century City	58	67	67	35	39	44	26	26
			Santa Monica/San Vicente (WeHo)	51	59	59	26	51	56	18	18
			Wilshire/Beverly (BH)	49	56	56	45	37	42	25	25
			Wilshire/Westwood (UCLA)	61	70	70	43	42	47	29	29
			4th/Wilshire (Santa Monica)	77	89	89	55	48	53	35	35

As seen in Figure 7-1 and Table 7-2, the Wilshire Boulevard HRT and the Combined HRT along Wilshire Boulevard with no deviation (Alternatives 1 and 11) have the fastest average end-to-end transit operating speeds at 32 mph. Alternatives 14 and 16 between Union Station/Downtown and 4th/Wilshire in Santa Monica take approximately five more minutes. The at-grade BRT alternative is the slowest at 16 mph.

7.3.2 Trip Reliability Improvement

Trip reliability improvement is another objective of mobility improvement. The measures used to evaluate trip reliability improvement include: (a) the percentage of the transit alignment operating in mixed flow traffic by type of operation; and (b) the number of transfers between major OD pairs.

Trip time reliability describes how much the travel time for a particular trip may vary from day to day. This variability is due in most part to the levels of congestion on the route, with high levels of congestion generally making trip times more variable. An additional factor in reliability is transfers, which are typically assumed to decrease transit reliability.

Figure 7-1. Average End-to-End Transit Operating Speeds (mph)
between Union Station (Downtown) and 4th/Wilshire (Santa Monica)

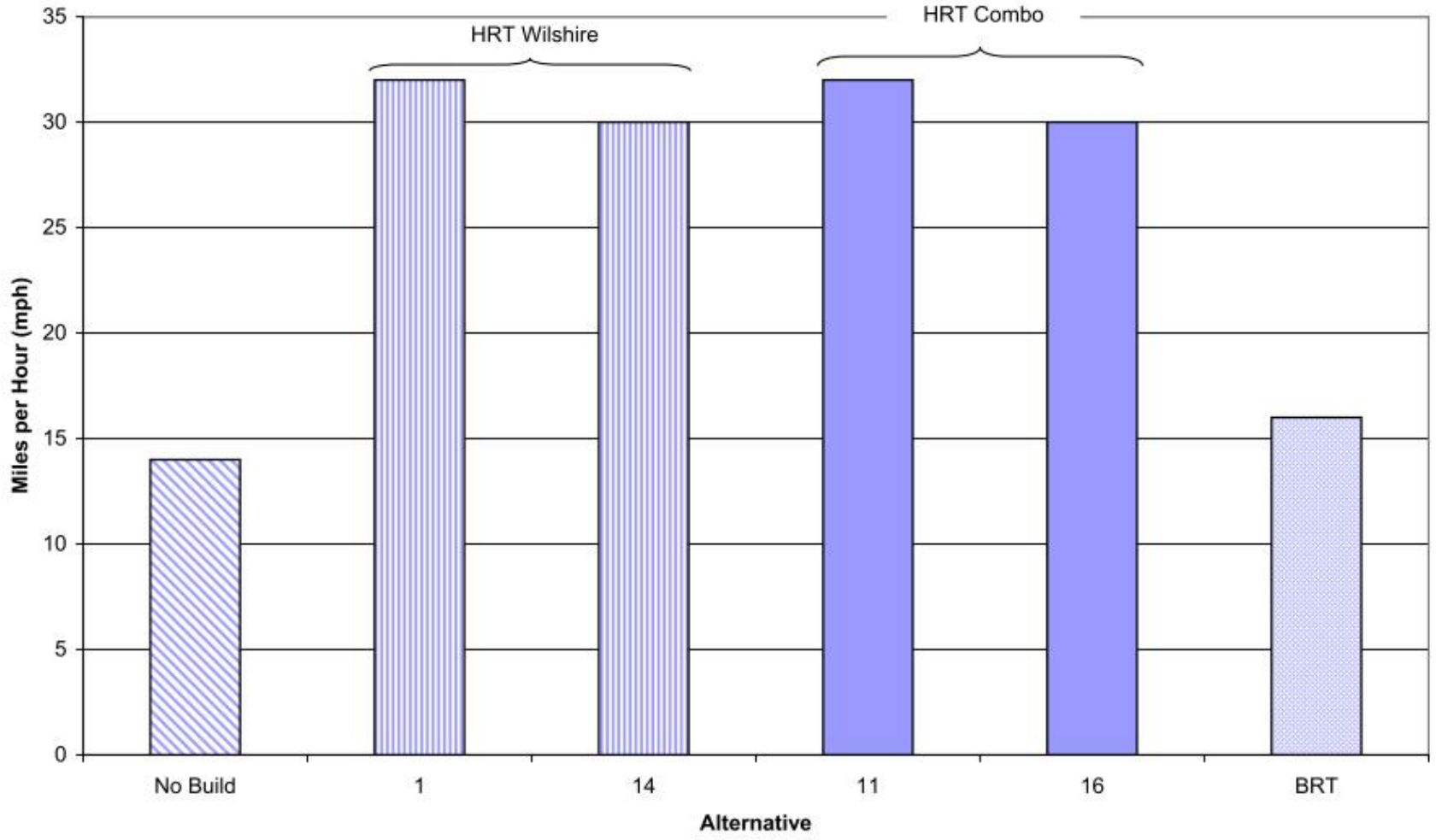


Table 7-2. Average End-to-End Transit Operating Speeds (mph)

PERFORMANCE MEASURES				ALTERNATIVES							
							BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	Today	No Build	TSM	17	1	14	11	16
A	1	b	Avg end to end transit operating speed in mph (Between Union Station/Downtown and 4th/Wilshire, SM)	14	12	12	16	32	30	32	30

Note: Some alternatives (11, 16) require transfer(s) to travel between Union Station and Santa Monica

As seen in Table 7-3, the percentage of transit alignment operating in mixed flow traffic was analyzed by type of operation. Types of operation include completely grade separated (continuity of the transit alignment over or under a cross street), transit pre-emption (signal timing at intersections is interrupted to accommodate transit vehicles), transit priority (signal phasing is adjusted to give priority to transit vehicles without interrupting the overall traffic signal timing plan), or no transit priority (transit vehicles are treated the same as all the other traffic). The percentage of transit alignment operating in mixed flow traffic by operation type is zero in the HRT alternatives because they are all grade-separated. Thus, it is inferred that these alternatives have higher transit reliability than that of the at-grade BRT alternative, which operates in 100 percent mixed-flow traffic but in a dedicated curb lane. Higher transit reliability means that the effectiveness and efficiency of the facility is maximized due to on-time performance.

Table 7-3. Percentage of Transit Alignment Operating in Mixed Flow Traffic

PERFORMANCE MEASURES				ALTERNATIVES						
						BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	No Build	TSM	17	1	14	11	16
A	2	a	% of transit alignment operating in mixed flow traffic by operation type	100	100	100	0	0	0 (transfer)	0 (transfer)

As seen in Table 7-4, the Combined HRT Subway alternative has somewhat fewer instances of transfers based on the selected OD pairs.

Table 7-4. Number of Transfers between Select Origin-Destination Pairs

PERFORMANCE MEASURES				ALTERNATIVES							
							BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	Today	No Build	TSM	17	1	14	11	16
A	2	b	**Transfers Required (AM Peak) - Between Del Mar Station (Gold Line) and :**								
			Century City	1	1	1	1	1		1	
			Santa Monica/San Vicente (WeHo)	1	1	1	2	2		2	
			Wilshire/Beverly (BH)	1	1	1	2	1		1	
			Wilshire/Westwood (UCLA)	1	1	1	2	1		1	
			4th/Wilshire (Santa Monica)	1	1	1	2	1		1	
			Transfers Required (AM Peak) - Between Pershing Square Station (Red Line) and :								
			Century City	0	0	0	1	0		0	
			Santa Monica/San Vicente (WeHo)	0	0	0	1	1		1	
			Wilshire/Beverly (BH)	0	0	0	0	0		0	
			Wilshire/Westwood (UCLA)	0	0	0	0	0		0	
			4th/Wilshire (Santa Monica)	0	0	0	0	0		0	
			Transfers Required (AM Peak) - Between Florence Station (Blue Line) and :								
			Century City	1	1	1	2	1		1	
			Santa Monica/San Vicente (WeHo)	1	1	1	2	2		2	
			Wilshire/Beverly (BH)	1	1	1	1	1		1	
			Wilshire/Westwood (UCLA)	1	1	1	1	1		1	
			4th/Wilshire (Santa Monica)	1	1	1	1	1		1	
			Transfers Required (AM Peak) - Between Reseda Station (Orange Line) and:								
			Century City	1	1	1	2	2		1	
			Santa Monica/San Vicente (WeHo)	2	2	2	2	3		1	
			Wilshire/Beverly (BH)	2	2	2	3	2		1	
			Wilshire/Westwood (UCLA)	1	1	1	2	2		1	
			4th/Wilshire (Santa Monica)	2	2	2	2	2		1	
			Transfers Required (AM Peak) - Between Covina Station (Metrolink) and:								
			Century City	1	1	1	2	1		1	
			Santa Monica/San Vicente (WeHo)	1	1	1	2	2		2	
			Wilshire/Beverly (BH)	1	1	1	2	1		1	
			Wilshire/Westwood (UCLA)	2	2	2	2	1		1	
			4th/Wilshire (Santa Monica)	2	2	2	2	1		1	

Table 7-4. Number of Transfers between Select Origin-Destination Pairs (continued)

PERFORMANCE MEASURES				ALTERNATIVES							
							BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	Today	No Build	TSM	17	1	14	11	16
			Transfers Required (AM Peak) - Between Wilshire/Western Station (Purple Line) and:								
			Century City	1	1	1	1	0		0	
			Santa Monica/San Vicente (WeHo)	1	1	1	1	1		1	
			Wilshire/Beverly (BH)	0	0	0	0	0		0	
			Wilshire/Westwood (UCLA)	0	0	0	0	0		0	
			4th/Wilshire (Santa Monica)	0	0	0	0	0		1	
			Transfers Required (AM Peak) - Between North Hollywood Station (Red Line) and:								
			Century City	1	1	1	1	1		1	
			Santa Monica/San Vicente (WeHo)	1	1	1	1	2		1	
			Wilshire/Beverly (BH)	1	1	1	2	1		1	
			Wilshire/Westwood (UCLA)	1	1	1	1	1		1	
			4th/Wilshire (Santa Monica)	1	1	1	1	1		1	

7.3.3 Expandability

Providing sufficient transit capacity to meet the transit demand of 2030 and beyond is another objective of mobility improvement. Transit capacity is the criteria used to address this objective. The measures used to evaluate expandability include: (a) (maximum) capacity of new east-west transit service (e.g., transit vehicle capacity - maximum person throughput per hour); and (b) assessing the potential for expandability beyond 2030 (e.g., station facility capacity limitations; on-street lane capacity limitations; mode/technology/alignment conducive to future system expansion).

Table 7-5 provides typical transit capacity by mode.

Table 7-5. Typical Transit Capacity by Mode

Transit Mode	Capacity (passengers per hour, one direction)
HRT	18,000
Light Rail Transit (LRT)	9,000
Monorail	9,000
BRT	3,000

As seen in Figure 7-2 and Table 7-6, the greatest estimated (maximum) capacity of new east-west transit service is among the Wilshire HRT Subway and the Combined HRT Subway groups of alternatives. The estimated capacity for these groups of alternatives is 18,000 passengers per hour in one direction. These alternatives also have the potential for expandability beyond 2030, depending on future system expansion and routing needs.

Table 7-6. Provide Sufficient Transit Capacity

PERFORMANCE MEASURES				ALTERNATIVES							
Goal	Objective	Measure	Criteria	Today	No Build	TSM	BRT	Wilshire HRT		Combined HRT	
							17	1	14	11	16
A	3	a	Estimated maximum capacity (in thousands) of new EW transit service (Passengers per hour) (Assuming 18 trains per hour or 30 buses per hour)	N.A	3	3	3	18	18	18	18
A	3	b	Potential for capacity expansion beyond 2030	L	L	L	Md	H	H	H	H

* L = Low; M = Medium; Md = Moderate; H = High

The BRT has the least estimated capacity with 3,000 passengers per hour in one direction and a moderate potential for future expandability. The maximum future capacity of a BRT system is 6,000 passengers per hour per direction (based on headways of one bus per minute).

7.3.4 Transit Ridership Maximization

Maximizing potential transit ridership is another objective of mobility improvement. Ridership is the criteria used to address this objective. Measures used to evaluate transit ridership maximization include: (a) the number of residents/population density within 1/2 mile of proposed alignment; (b) the number of jobs/employment density within 1/2 mile of proposed alignment; (c) the ability of the transit service to reach transit-dependent populations; and (d) the ability of transit services to provide competitive speeds to the automobile for key origin-destination pairs (average peak period speeds). Table 7-7, Figure 7-3, Figure 7-4, and Figure 7-5 illustrate the forecasted ridership for each alternative by showing the change in daily transit trips as compared to the No Build alternative, the change in urban rail boardings as compared to the No Build alternative, and the number of "new stations" urban rail boardings.

Table 7-7. Transit Ridership

PERFORMANCE MEASURES	ALTERNATIVES						
			BRT	Wilshire HRT		Combined HRT	
Criteria	No Build	TSM	17	1	14	11	16
Daily New Transit Trips (Change from No Build) in thousands	N.A.	1.7	13.8	39.3	37.0	47.8	44.9
Change in Urban Rail Boardings (Change from No Build) in thousands	N.A.	-0.8	13.3	95.5	88.3	117.0	109.0
"New Stations" Urban Rail Boardings in thousands	0	0	0	61.5	59.9	80.0	77.1

Figure 7-2. Estimated Maximum Capacity of New EW Transit Service
Assuming 18 trains per hour or 30 buses per hour

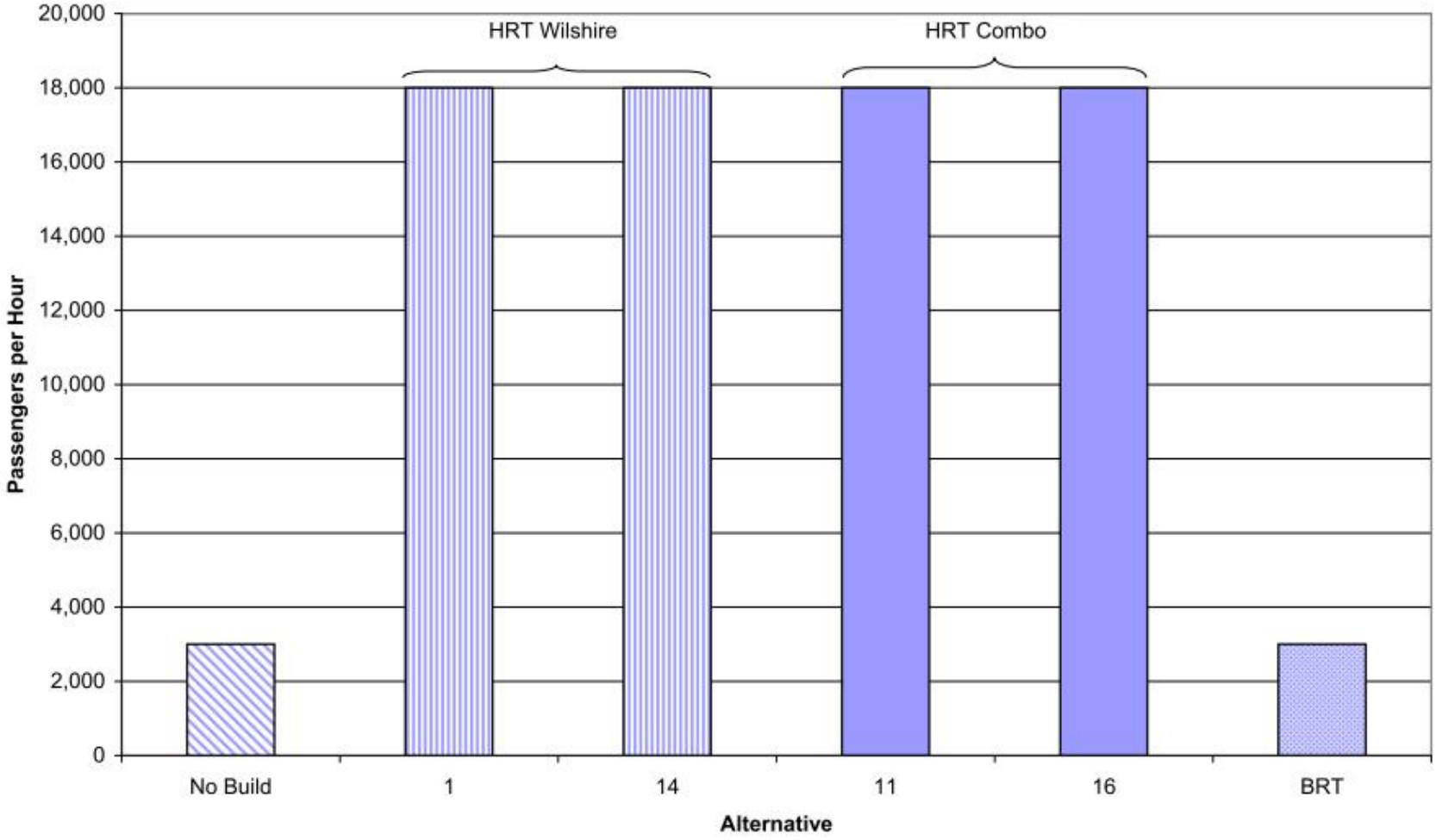


Figure 7-3. Daily New Transit Trips (As compared to No Build)

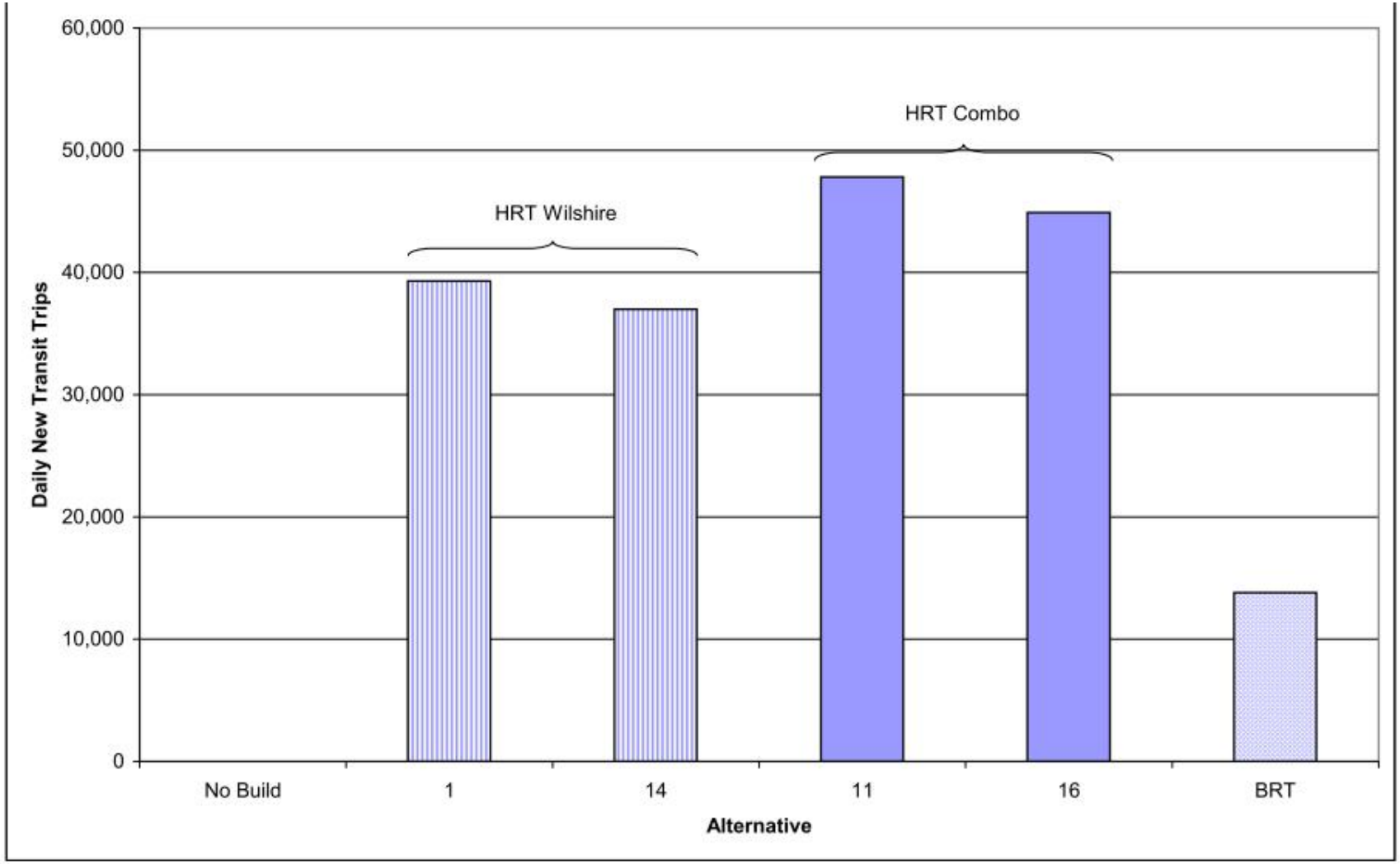


Figure 7-4. Change in Urban Rail Boardings (As compared to No Build)

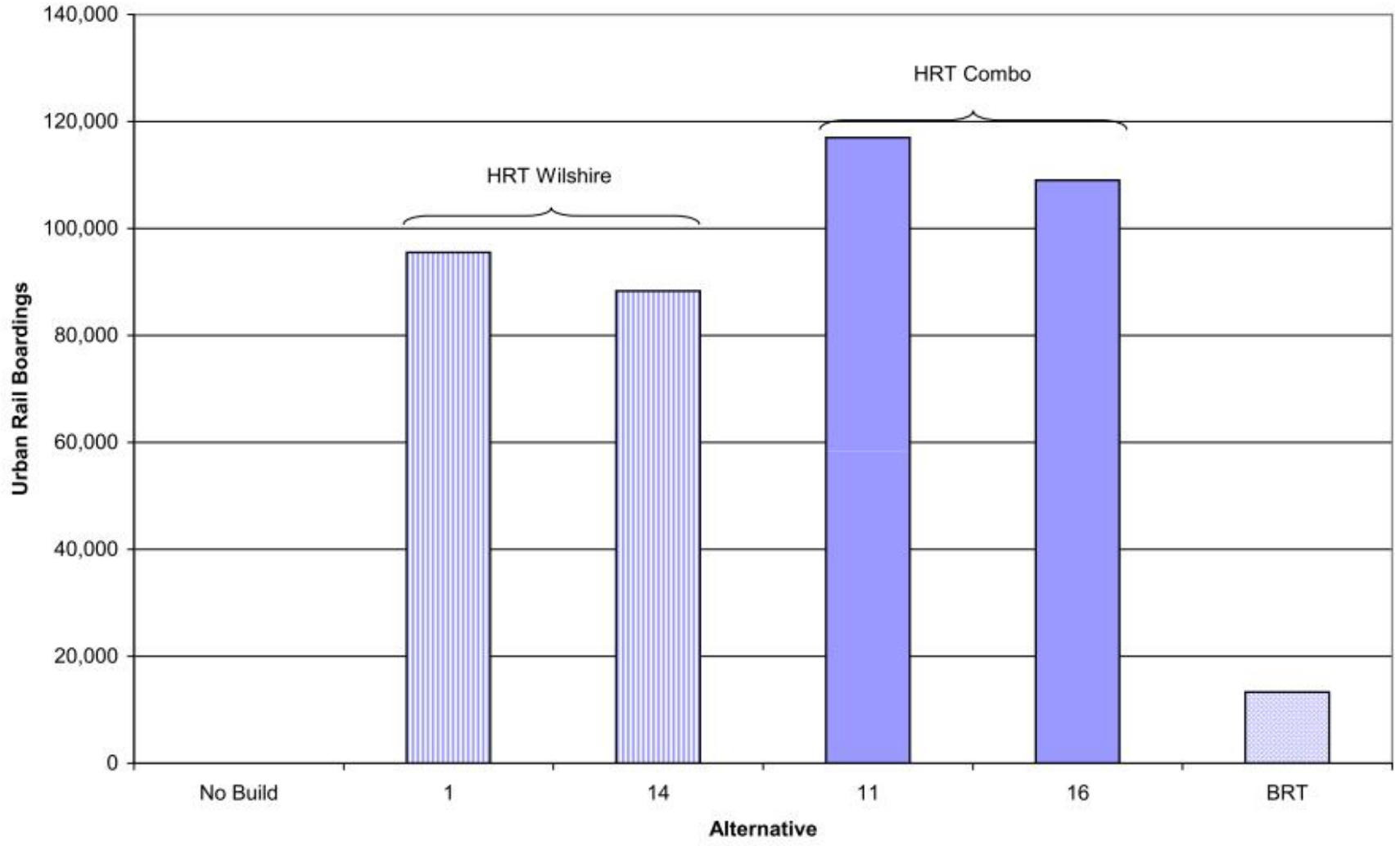
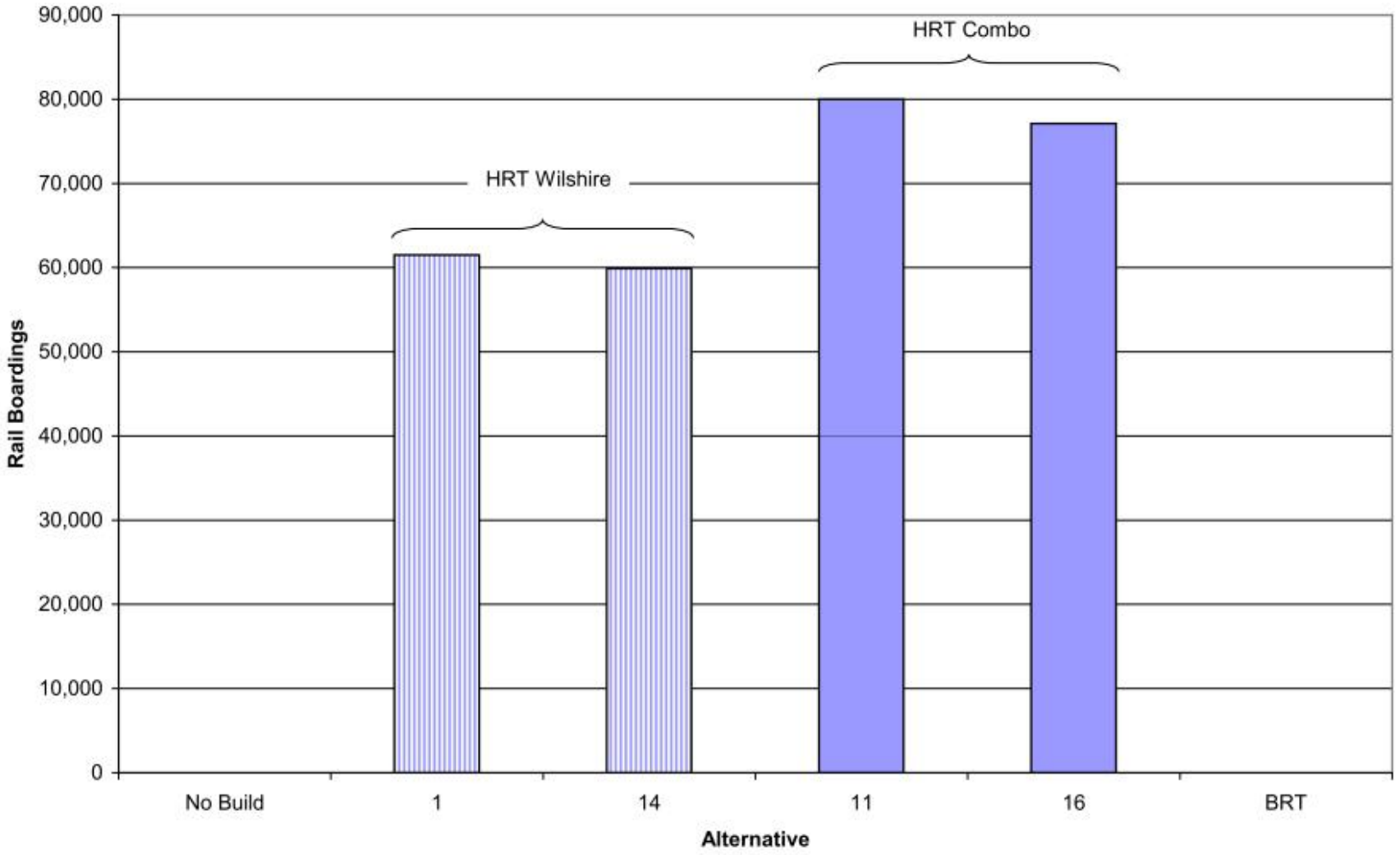


Figure 7-5. "New Stations" Urban Rail Boardings



7.3.4.1 Population

Population and population density are measures to evaluate the ability of an alternative to maximize transit ridership; the closer an alternative is to population centers and higher population densities, the more an alternative has the opportunity to attract and maximize ridership.

The Westside Extension Study Area is one of the densest areas in Los Angeles County. Population forecasts for the study area show an increase in population density within a 1/2 mile of the proposed alignments. By the year 2030, the population of Los Angeles County is projected to increase by roughly 22 percent. Population within the Study Area is projected to increase by 11 percent.

Population concentrated within a 1/2 mile of the proposed alternatives makes up a significant share of density within the Study Area as a whole. The population density of the Study Area in 2005 was roughly 13,300 persons per square mile; that number is projected to increase to almost 14,700 by the year 2030. In comparison, projections for the year 2030, suggest that population densities within a 1/2 mile of proposed alternatives range between 13,800 and 18,500 residents per square mile. This suggests that the alternatives under evaluation will capture some of the highest population densities within the Study Area, if not the county as a whole.

By the year 2030, the Wilshire HRT alternatives (Alternatives 1 and 14) would capture the highest levels of population densities (over 18,000 and 17,900 people per square mile, respectively). The Combined HRT alternatives (Alternatives 11 and 16) would both capture 17,700 persons per square mile. The one BRT alternative under evaluation (Alternative 17) would capture the lowest level of population density within the Study Area. Table 7-8, Figure 7-6, and Figure 7-7 provide a comparison of current and projected population and population density for each alternative under evaluation within the PSA. Figure 7-8 illustrates the link between population and employment density and ridership.

Table 7-8. Population and Population Density within ½ Mile of the Alignment

PERFORMANCE MEASURES				ALTERNATIVES						
						BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	No Build	TSM	17	1	14	11	16
A	4	a	**Population/Pop density within1/2 mile of each alignment (in thousands)**							
			2005/6 Population within 1/2 mile of Alignment	N.A.	N.A	305	195	204	275	277
			2030 Population within 1/2 mile of Alignment	N.A.	N.A	336	216	225	303	302
			2005/6 Average Population Density per Square Mile within 1/2 mile of Alignment	N.A.	N.A	12.5	16.5	16.2	16.1	16.3
			2030 Average Population Density per Square Mile within 1/2 mile of Alignment	N.A.	N.A	13.8	18.3	17.9	17.7	17.7

Figure 7-6. 2005/06 and 2030 Population within ½ mile of Alignment

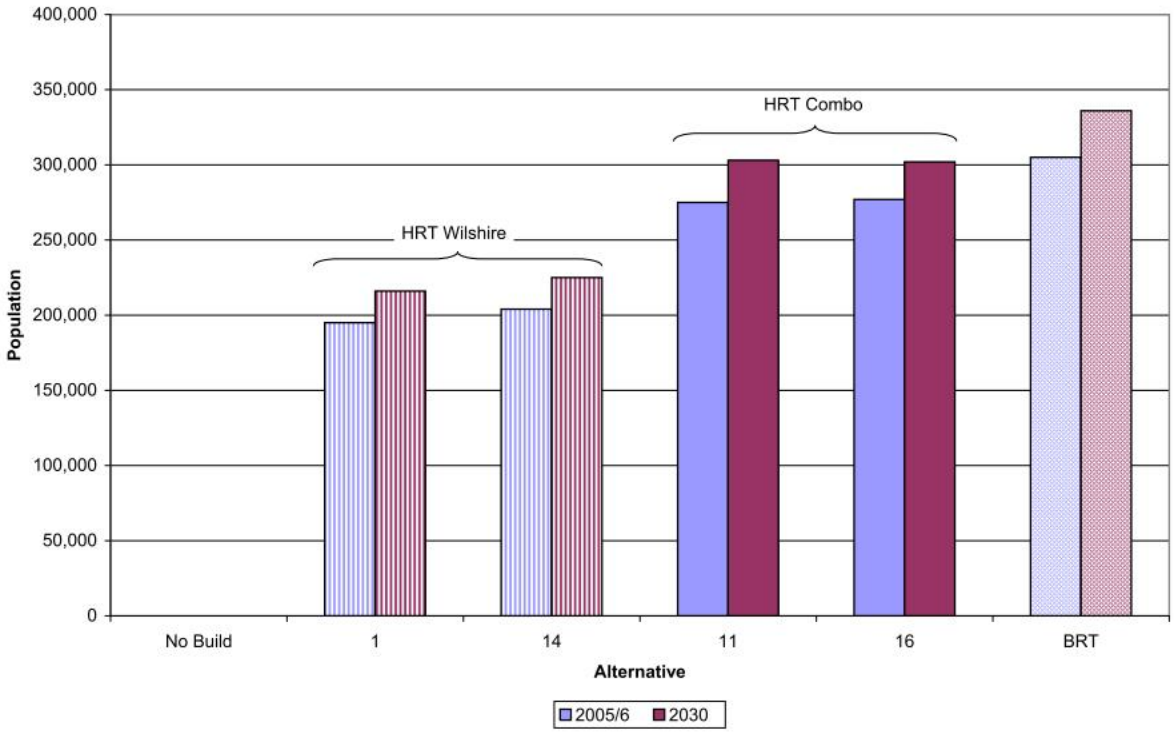


Figure 7-7. 2005/06 and 2030 Average Population Density per Square Mile within ½ Mile of the Alignment

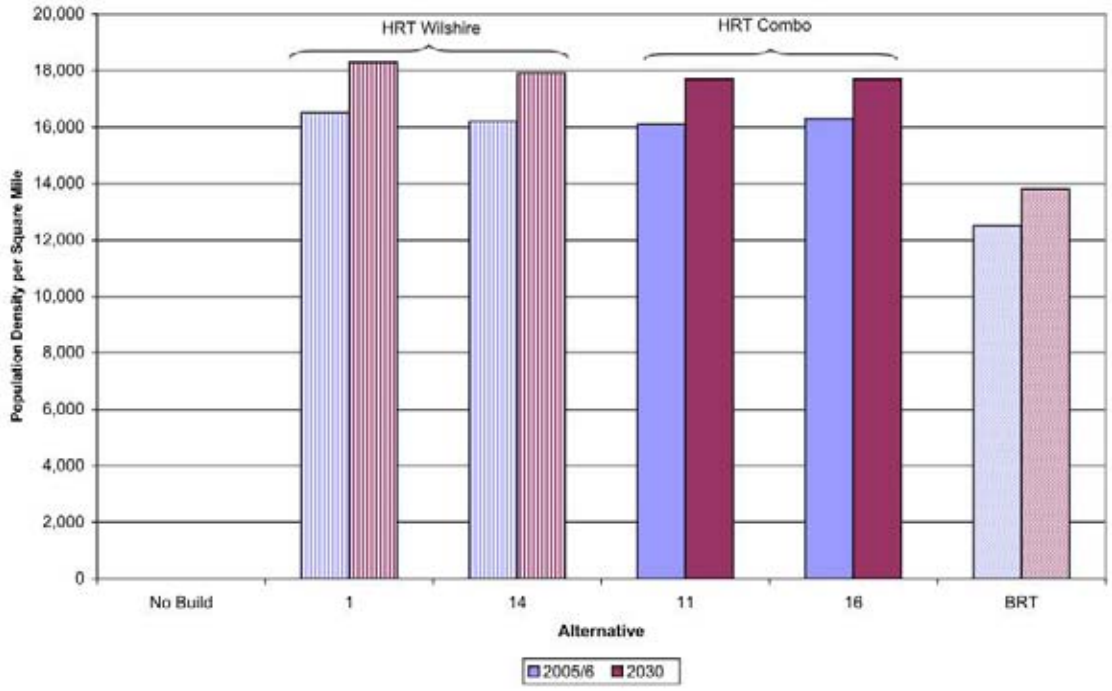
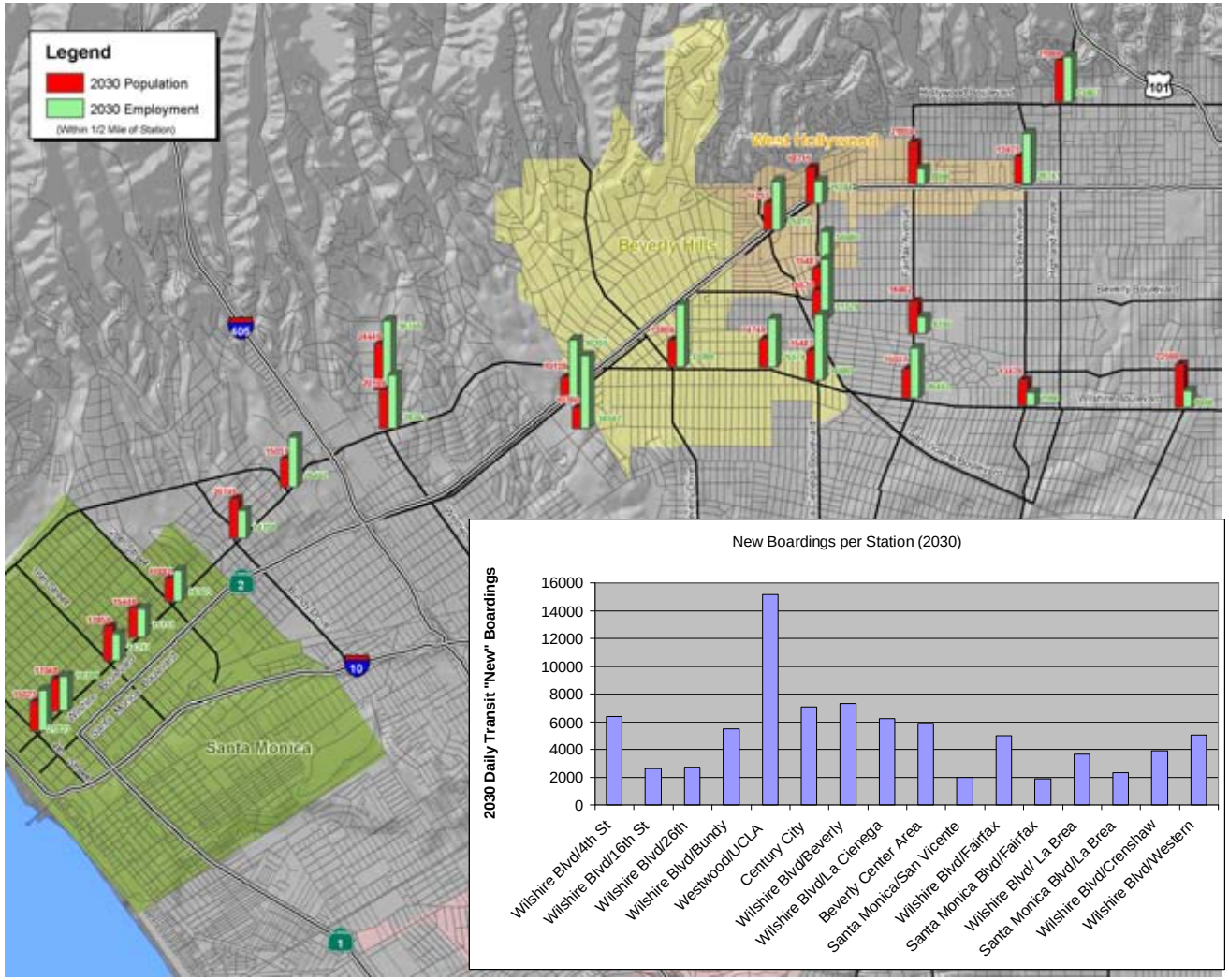


Figure 7-8. Population and Employment Densities Drive Ridership



7.3.4.2 Employment

Employment and employment density are additional measures to evaluate the ability of an alternative to maximize transit ridership; the closer an alternative is to employment centers and higher employment densities, the more an alternative has the opportunity to attract and maximize ridership.

The Westside Extension Study Area captures a significant share of regional employment. There are a number of employment centers within the Study Area, specifically near Mid-Wilshire, Hollywood, Century City, Westwood, and Santa Monica. In 2005, the number of employees in the study area constituted 10 percent of all employment within L.A. County. By the year 2030, the Study Area will grow to include approximately 82,000 additional employees.

Over the next 25 years employment density is projected to grow in the Study Area. In 2005, employment density within the study area was about 12,600 employees per square mile. By 2030, this number is expected to increase to almost 14,800. The Wilshire HRT and the Combined HRT Alternatives are projected to capture the highest levels of employment density, with over 21,000 employees per square mile for Alternatives 1 and 14, and around 20,000 employees per square mile for Alternatives 11 and 16 (see Table 7-9, Figure 7-9, and Figure 7-10). The BRT Alternative (Alternative 17) captures the least amount, with 15,900 employees per square mile.

Table 7-9. Employment and Employment Density within ½ Mile of the Alignment

PERFORMANCE MEASURES				ALTERNATIVES						
Goal	Objective	Measure	Criteria	No Build	TSM	BRT	Wilshire HRT		Combined HRT	
						17*	1	14	11	16
A	4	b	**Employment/Employment Density within 1/2 mile of Each Alignment (in thousands)**							
			2005/6 Employment within 1/2 mile of Alignment	N.A.	N.A	332	221	235	293	293
			2030 Employment within 1/2 mile of Alignment	N.A.	N.A	387	258	274	342	334
			2005/6 Average Employment Density per Square Mile within 1/2 mile of Alignment	N.A.	N.A	13.6	18.7	18.7	17.1	17.2
			2030 Average Employment Density per Square Mile within 1/2 mile of Alignment	N.A.	N.A	15.9	21.9	21.8	20.0	19.7

* Removes 2 lanes of traffic

Figure 7-9. 2005/06 and 2030 Employment within ½ Mile of Alignment

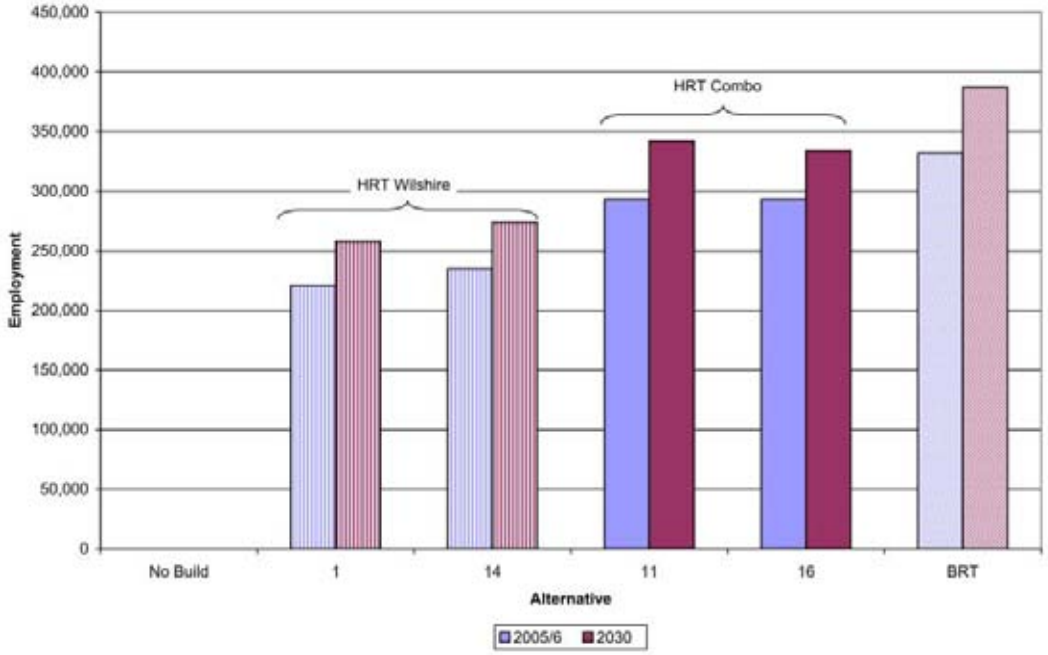
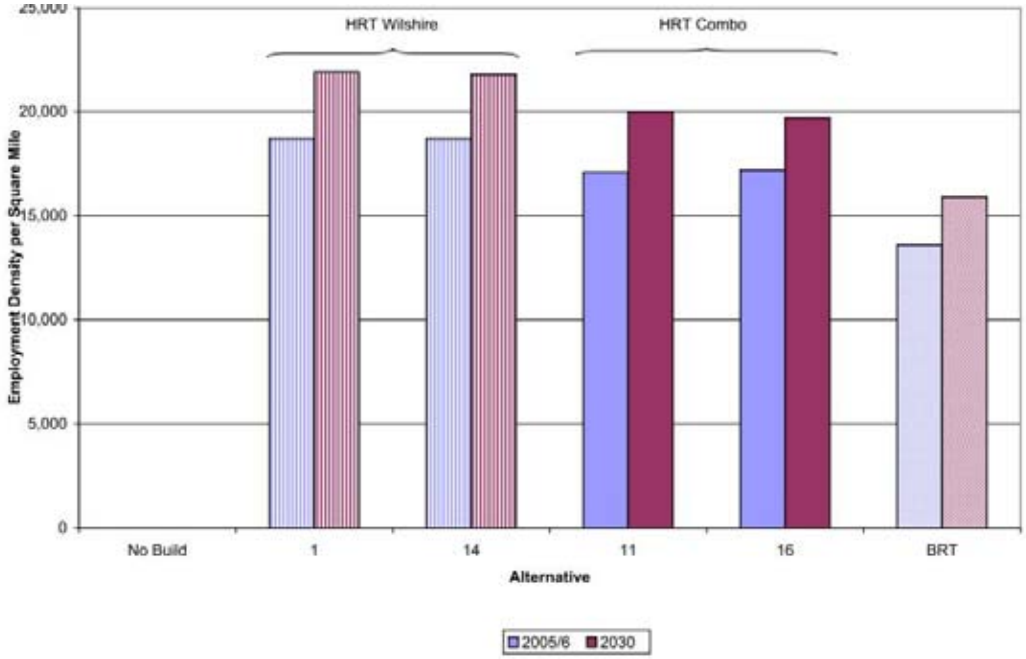


Figure 7-10. 2005/06 and 2030 Average Employment Density per Square Mile within ½ Mile of Alignment



7.3.4.3 Transit Dependent Populations

The location of transit-dependent populations is another measure of the potential for transit ridership to be maximized; the closer an alternative is to those individuals who are dependent upon transit, the more an alternative has the opportunity to attract those riders and maximize overall transit ridership.

The following series of maps illustrates characteristics associated with transit dependent populations including: age distribution, low income households, individuals who report using public transportation to work, and the number of vehicles per household.

Figure 7-11 and Figure 7-12: Age Distribution- the young and elderly generally do not drive personal vehicles and, therefore, rely more on public transit. The following maps illustrate the concentration of residents (Figure 7-11) under the age of 18 and (Figure 7-12) over the age of 65.

Figure 7-13 and Figure 7-14: Low Income Households- lower income households are more likely to rely on public transportation as a primary mode of transportation. (Figure 7-13) 2005 and (Figure 7-14) 2030. See also Table 7-10.

Table 7-10. Number of Low Income Households within ½ Mile of Alternatives *

PERFORMANCE MEASURES				ALTERNATIVES						
						BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	No Build	TSM	17	1	14	11	16
A	4	c	Number of low income HH within 1/2 mile of each alternative (in thousands)	39.8	39.8	39.8	18.7	18.6	25.9	26.0

*Total number of households identified as low income by US Census Bureau, Federal Poverty Status

Figure 7-15: Public Transportation Commuters- the census identifies individuals who report using public transportation as their primary mode of transportation to work.

Table 7-11 and Figure 7-16: Zero Car Households- the census provides data on households that report not owning a vehicle. These households are more likely to rely on public transportation as their primary mode of travel.

Table 7-11. Competitive Speeds

PERFORMANCE MEASURES				ALTERNATIVES						
						BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	No Build	TSM	17	1	14	11	16
A	4	d	Ability for transit to be competitive with the auto in speed for key OD pairs	C	C	C	S	S	S	S

** C = Comparable Speed to Auto, Transfers Req.; S = Much Higher Speed than Auto,

Figure 7-11. Age Distribution - Age 18 and Under (2000 Census)

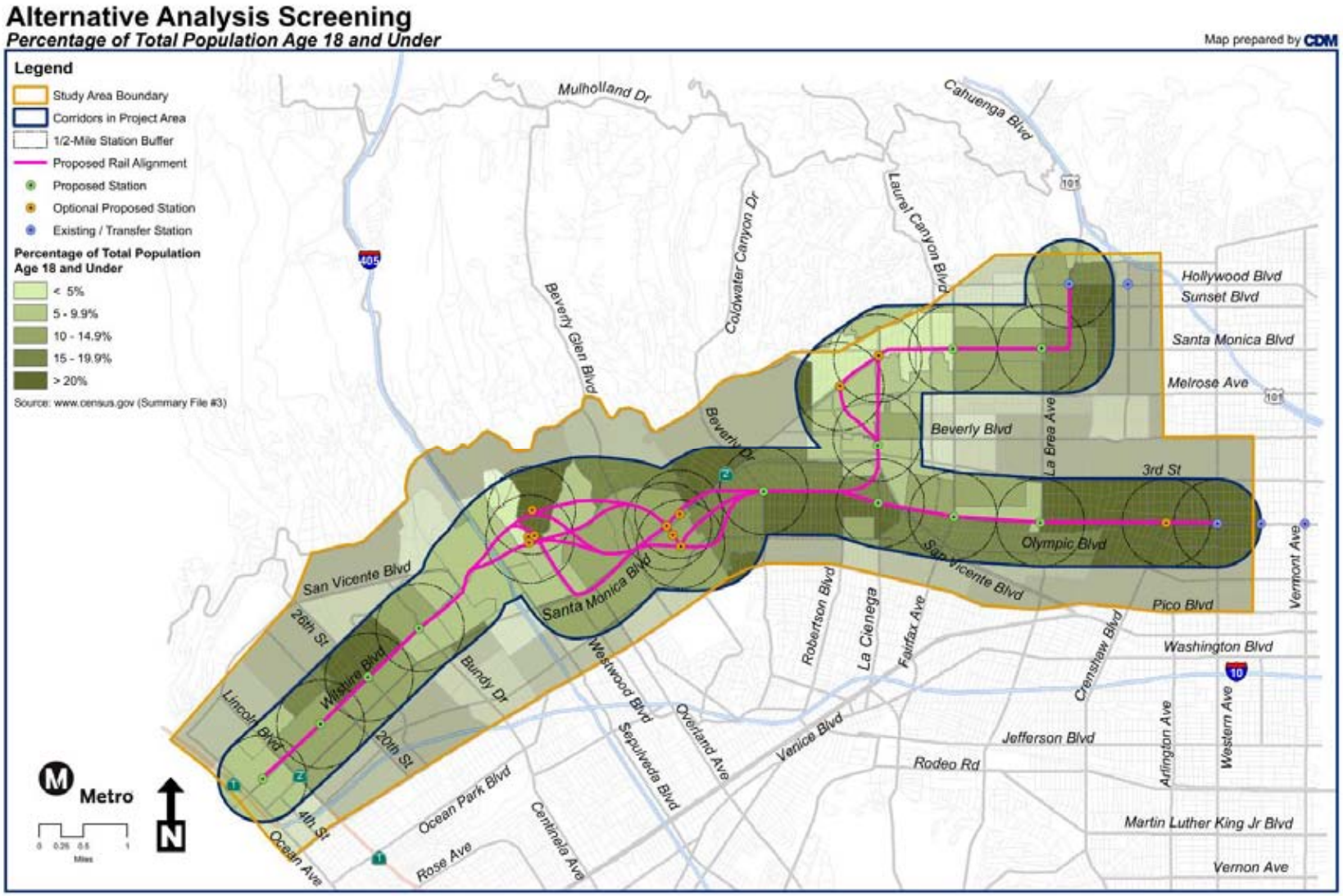


Figure 7-12. Age Distribution - Age 65 and Older (2000 Census)

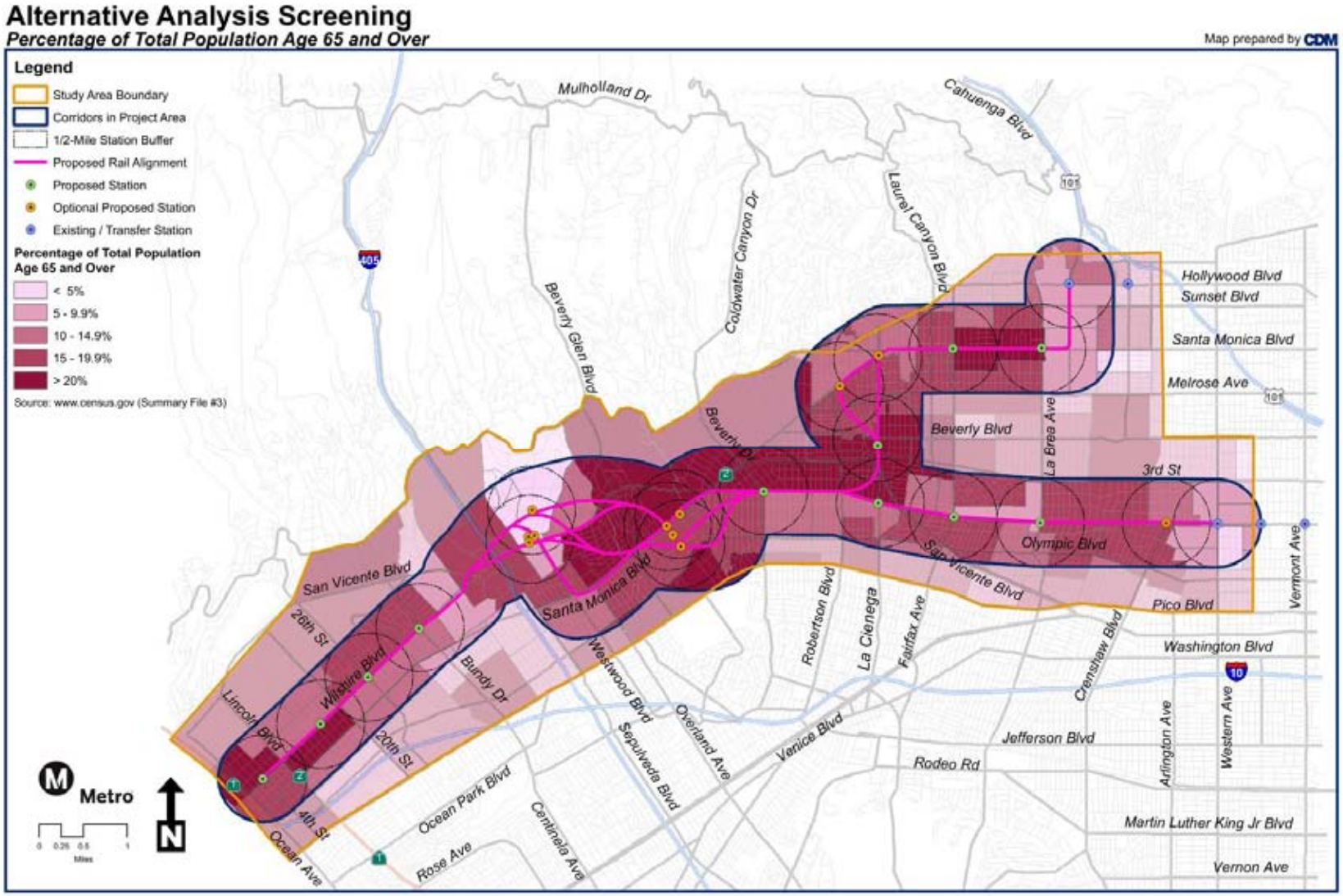


Figure 7-13. 2005 Low Income Households

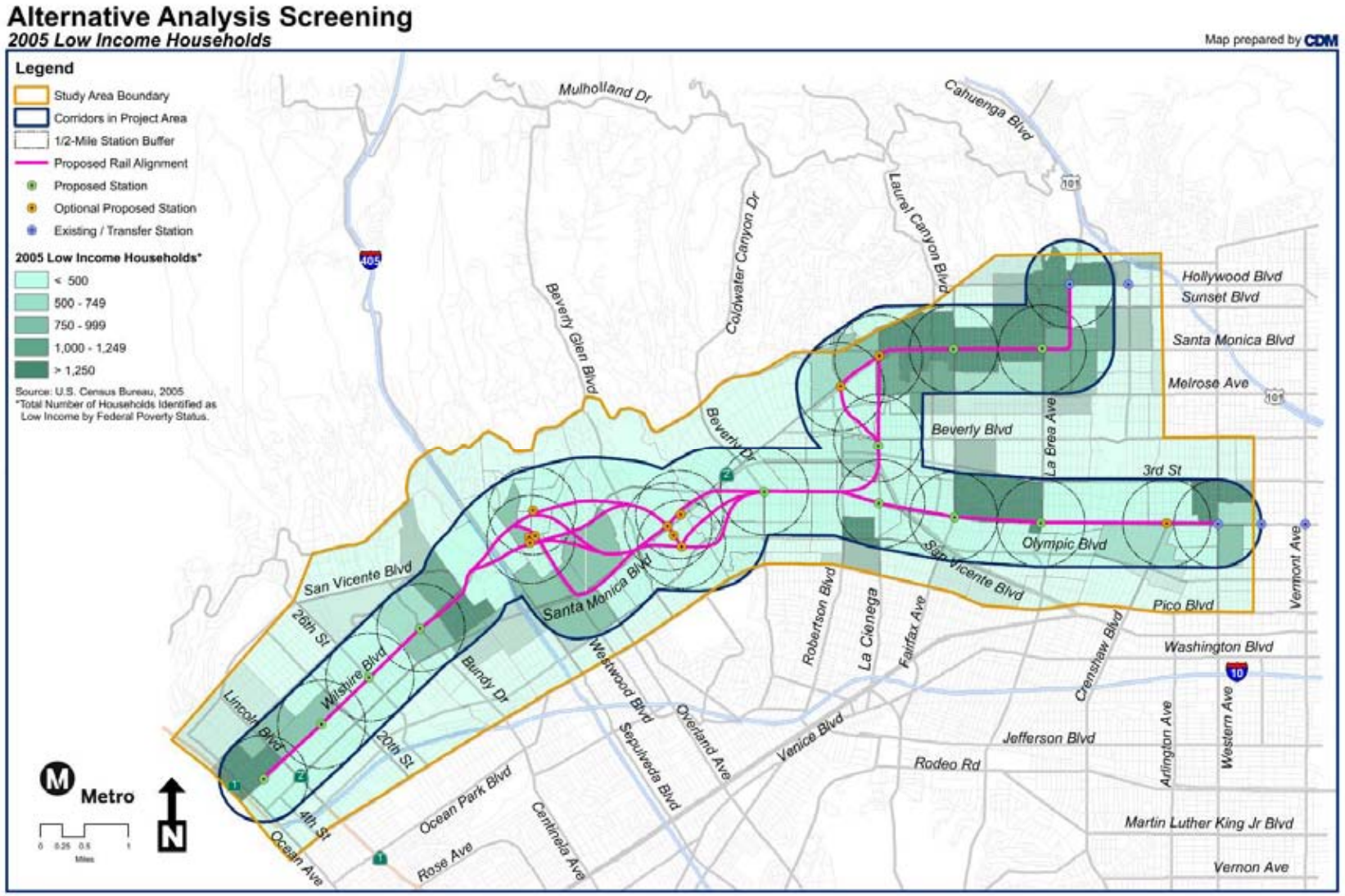


Figure 7-14. 2030 Low Income Households

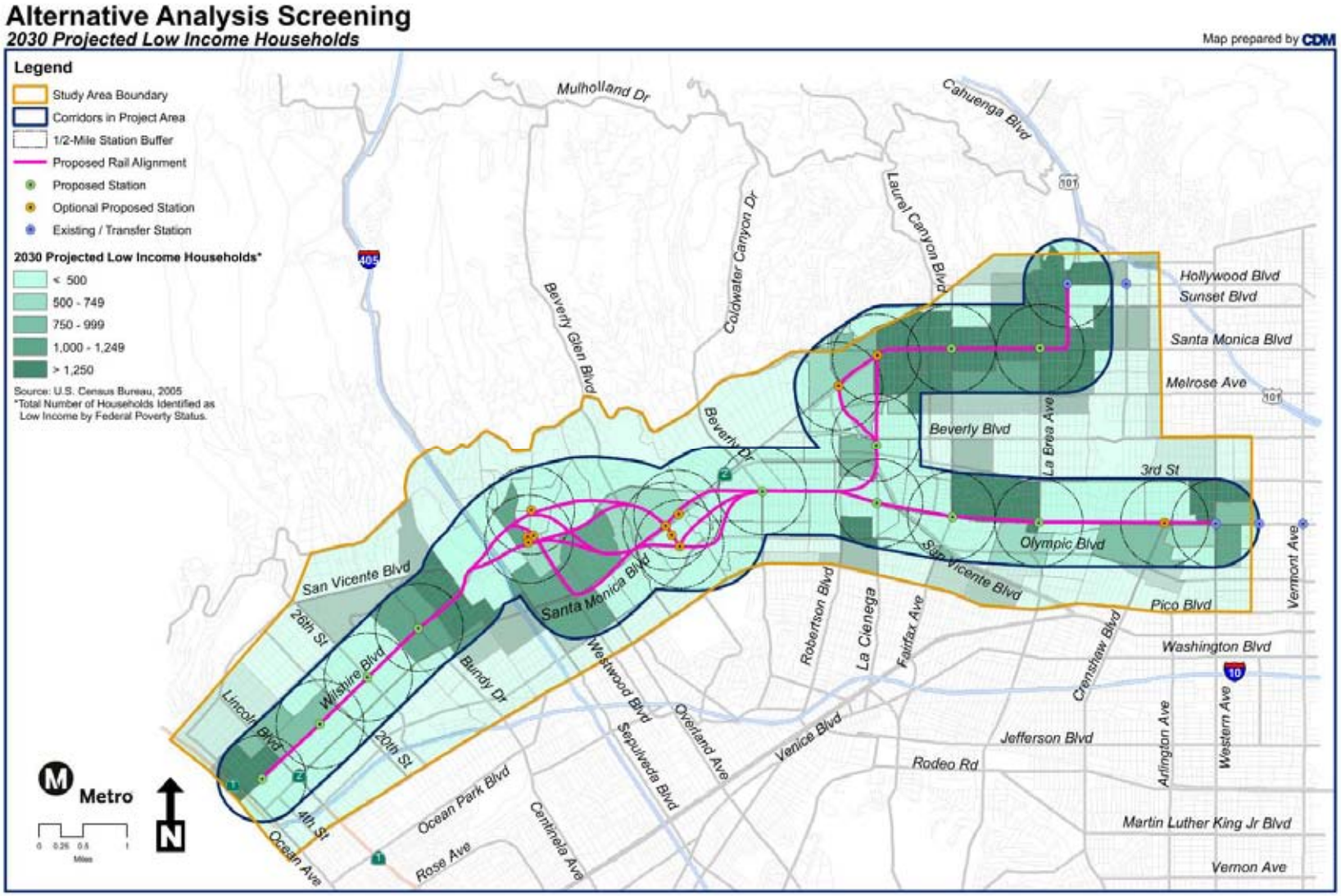


Figure 7-15. Public Transportation Commuter (2000 Census)

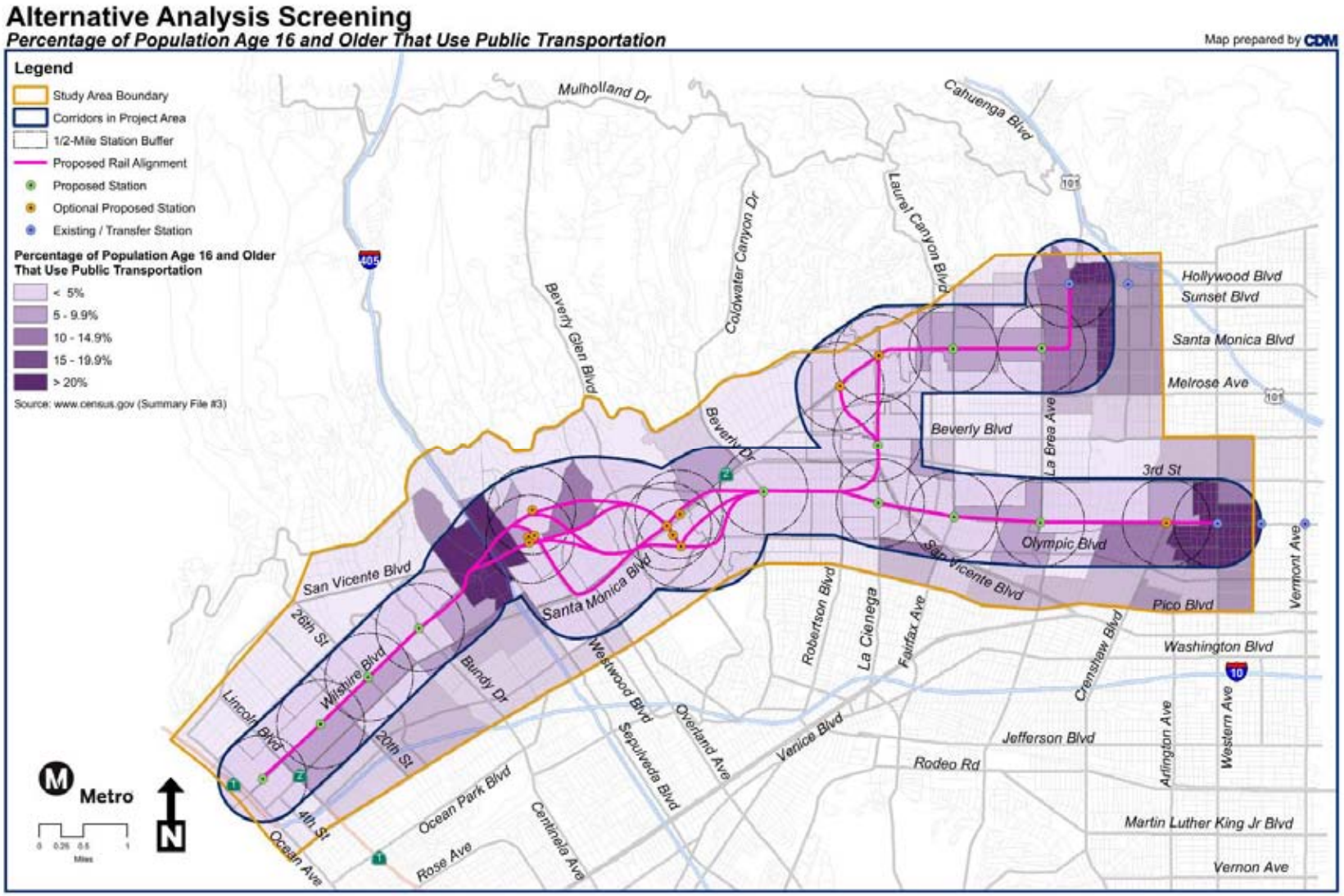
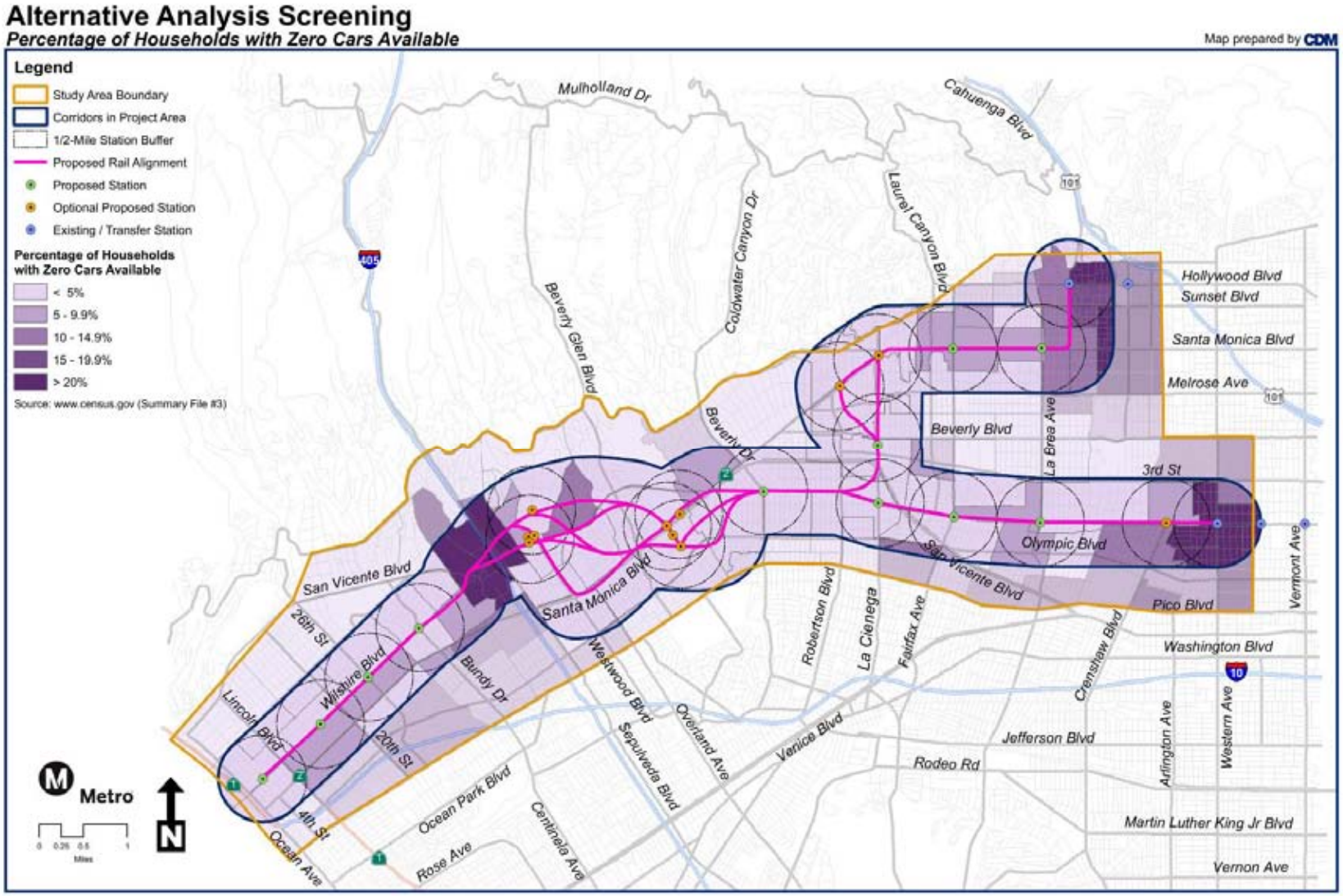


Figure 7-16. Zero Car Households (2000 Census)



7.3.4.4 Competitive Speeds

Transit speeds that are competitive with the automobile is another measure of the potential for transit ridership to be maximized; if the average speed traveling by transit is higher than that traveling by automobile, then transit has the potential to be a more attractive option and ridership has the potential to be maximized. As previously shown in Figure 7-1, average operating speeds is affected by transfers, horizontal alignment, and mode. Therefore, differences among alternatives would be expected.

Auto travel speeds were calculated for 2030 AM peak period using the Metro Travel Demand Model. As Table 7-11 indicates, the Wilshire HRT Alternatives (Alternatives 1 and 14) and the Combined HRT Alternatives (Alternatives 11 and 16) had much higher speeds than the automobile. The BRT Alternative, and the No Build and TSM Alternatives had comparable speeds with the automobile for westbound and eastbound speeds for specified origin-destination points.

7.3.5 Enhance Linkages to Transportation System

Enhancing linkages to the transportation system, as well as linkages to major trip attractors and generators within the corridor, is another objective of mobility improvement. System connectivity is the criteria used to address this objective. Measures used to evaluate linkages to the transportation system include: (a) the extension of existing Metro service (e.g., one seat ride); (b) the number of direct connections (within 1/8 mile walk) to designated transfer points/transit nodes (Metro Red or Purple Lines, major north-south bus routes); (c) the number of transfers required to access regional rail service (Metrolink, Amtrak); and (d) the number of direct connections (within 1/8 mile walk) to key activity centers within the corridor study area.

As shown in Table 7-12, the Wilshire Boulevard HRT Subway Alternatives (Alternatives 1 and 14) and Combined HRT Alternative 16 have a high ability of one seat service through the corridor. One seat service occurs when a transit rider can go from their origin to their destination without a transfer. The Combined HRT Alternative 11 and the BRT Alternative have a medium ability of one seat service through the corridor.

Table 7-12. Enhancing Linkages and Major Trip Attractors/Generators Within the Corridor

PERFORMANCE MEASURES				ALTERNATIVES						
						BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	No Build	TSM	17	1	14	11	16
A	5	a	Ability of alts to continue a one seat ride	L	L	M	H	H	M	H
A	5	b	Number of direct connections within 1/8 mile walk to other lines, NS bus routes, etc	12	12	12	7	8	10	11
A	5	c	Number of transfers required to access regional rail - Metrolink, Amtrak	2	2	2	1	1	1	1
A	5	d	Number of direct connections to key activity centers within 1/8 mile walk	10	10	10	7	9	10	12

* L = Low; M = Medium; Md = Moderate; H = High

With twelve connections, the BRT alternative has the highest number of direct connections within, 1/8 mile walk, to other designated transit nodes and key activity centers, as shown in Table 7-12 and Figure 7-17. The Combined HRT Subway alternative has the second highest number of direct transit node connections and key activity centers.

The Combined HRT Subway groups of alternatives require the least number of transfers to access Metrolink commuter rail and Amtrak intercity rail service. The at-grade BRT alternative requires the most number of transfers to access regional rail service, as shown in Table 7-12.

7.4 Transit Supportive Land Use Policies and Conditions

This goal is intended to evaluate the extent to which an alternative is in areas with existing or future transit supportive land use polices and conditions.

Objectives for this goal include:

- Provide transit service to areas with transit supportive land uses and policies; and
- Integrate with local redevelopment plans and policies.

These objectives, and the criteria developed to measure them, are discussed below.

7.4.1 Transit Supportive Land Uses and Policies

Transit supportive land uses is a criteria used to address this objective. This criterion is measured by analyzing the number of existing high density / mixed use activity centers within 1/2 mile of the proposed alignment (e.g., universities, major retail centers, employment hubs).

Mixed Use Activity Centers

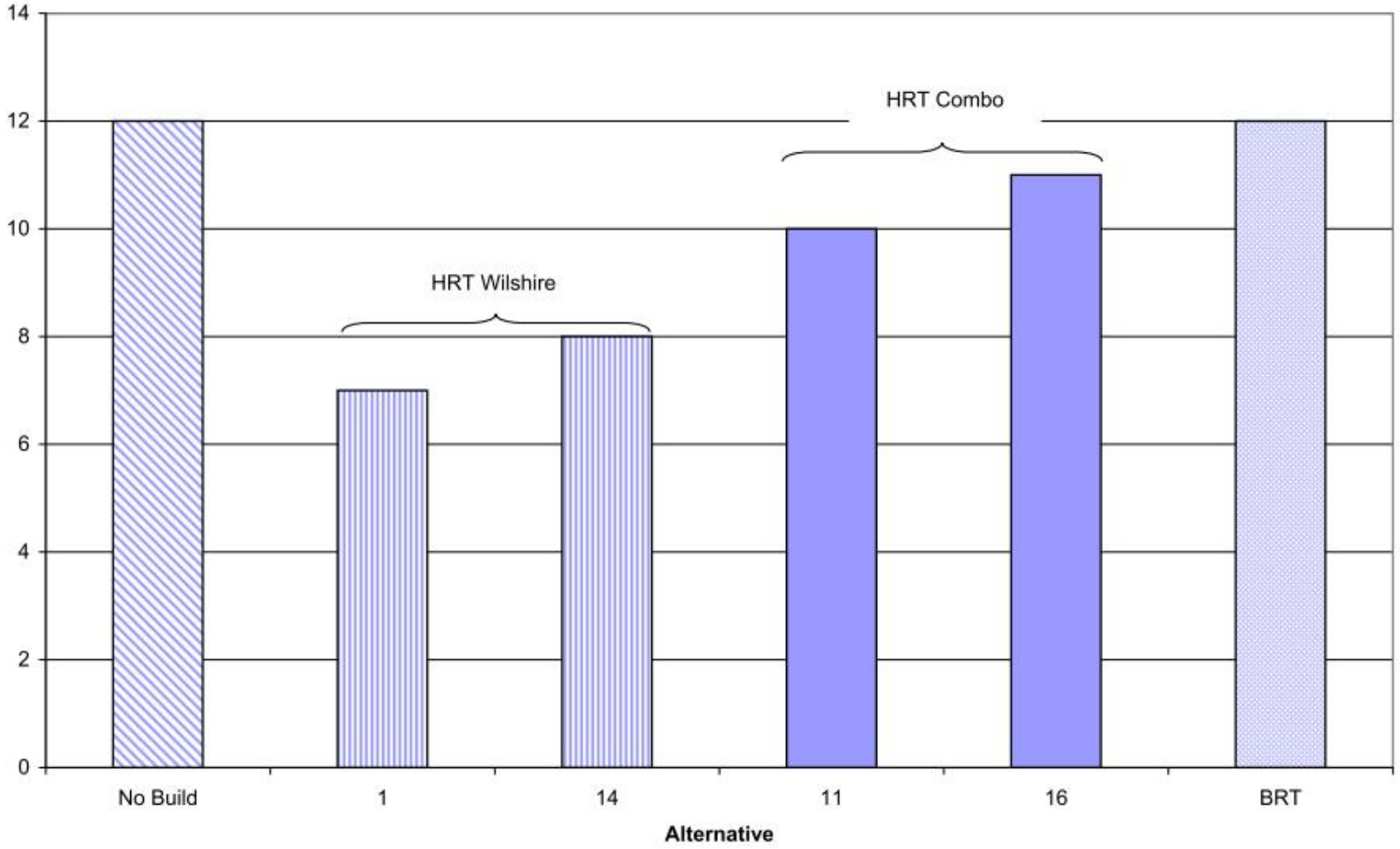
Mixed use activity centers create a focal point for activity and visual interest. These areas provide an opportunity for people to walk and interact. Activity centers feature a mixture of land uses all in proximity, including higher density residential condominiums, townhomes and apartments, and retail uses to allow for pedestrian travel. They physically connect to adjacent neighborhoods and to parks and open space, and they often include internal public spaces. As shown in Table 7-13, the Combined HRT Subway group of alternatives has the greatest number of existing high density mixed use activity centers with 14 to 17 within a 1/2 mile walk. The Wilshire Boulevard HRT Subway group of alternatives has the lowest number of existing high density mixed use activity centers with 9 to 12 high density mixed use activity centers.

Table 7-13. Number of High Density Mixed Use Activity Centers Within ½ Mile of Each Alignment

PERFORMANCE MEASURES				ALTERNATIVES						
						BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	No Build	TSM	17	1	14	11	16
B	1	a	Number of high density mixed use activity centers within 1/2 mile of each alignment	17	17	17	9	12	14	17

Note: Mixed Use Activity Centers are feature a mixture of land uses such as residential and commercial, and typically provide retail uses that encourage pedestrian travel.

Figure 7-17. Number of Direct Connections within 1/8 mile walk to other lines, NS Bus Routes, etc.



Transit Oriented Development

Cities within the Study Area maintain specific Transit Oriented Development (TOD) provisions or are receptive to TOD provisions as defined in their general plans, community plans or specific plans (see Chapter 5.0 Land Use). There are two City of Los Angeles Community Redevelopment Agency (CRA) Redevelopment Areas served by the proposed grade-separated alternatives, the Wilshire Center/Koreatown area and the Hollywood area. The Redevelopment Plans set forth an array of goals promoting business retention and expansion, attracting new businesses and developing public improvements. Key aspects of these plans related to TOD include pedestrian and transit improvements, urban design guidelines encouraging economic development, and expanding housing.

The Wilshire Center/Koreatown Recovery Redevelopment Project Area encompasses 1,207 acres and is generally bounded by Fifth Street on the north, 12th Street on the south, Hoover Street on the east, and Eastern Avenue and Wilton Place on the west. It also includes the Vermont Avenue Corridor to the Hollywood Freeway and Western Avenue to Melrose Avenue. The 1,107-acre Hollywood Redevelopment Project is generally bounded by Franklin Avenue on the north, Serrano Avenue on the east, Santa Monica Boulevard and Fountain Avenue on the south and La Brea Avenue on the west. The grade separated alternatives would serve these areas. Both areas are currently partially served by high capacity public transit via the Metro Red and Purple Lines, and have demonstrated transit oriented development adjacent to transit stations.

7.4.2 Integrate with Local Redevelopment Plans and Policies

This objective is measured through the criterion of economic benefit. The measure used to evaluate the economic benefit is analyzing the number of "high opportunity areas" for redevelopment within 1/2 mile of the proposed alignment.

High opportunity areas are defined as locations where major commercial activity and mixed uses occur. For the Westside Extension Transit Corridor, the following areas were identified as high opportunity areas for new development or redevelopment that can be supported by mass transit:

- the Hollywood area including Highland Avenue from Hollywood to Santa Monica Boulevards;
- the area in close proximity to Santa Monica and San Vicente Boulevards;
- the area in close proximity to Fairfax Avenue and 3rd Street (the Grove);
- the area in proximity to Wilshire Boulevard and Western Avenue;
- the Civic uses at Wilshire Boulevard and Fairfax Avenue;
- Century City in proximity to Avenue of the Stars and Constellation Boulevard;
- the area in proximity to Westwood and Santa Monica Boulevards;
- Westwood at Wilshire and Westwood Boulevards;
- Downtown Santa Monica; and
- Beverly Center Area.

Table 7-14 shows a comparison of the redevelopment areas along each alternative.

Table 7-14. Number of High Opportunity Areas for Redevelopment Within ½ Mile of Each Alignment

PERFORMANCE MEASURES				ALTERNATIVES						
						BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	No Build	TSM	17	1	14	11	16
B	2	a	Number of high opportunity areas for redevelopment within 1/2 mile of each alignment	N.A.	N.A.	N.A.	W	W	W & H	W & H

Note: All Cities within Study Area maintain specific TOD provisions or are receptive to TOD provisions as defined in their general plans, community plans or specific plans
** W: City of Los Angeles CRA Redevelopment Area in Wilshire Center/Koreatown; H: City of Los Angeles CRA Redevelopment Area in Hollywood

7.5 Cost Effectiveness

This goal is to evaluate whether the costs of the alternative, both capital and operating, are commensurate with its benefits. The objective for this goal is to provide solutions with benefits commensurate with their costs. Measures used to evaluate cost-effectiveness include: (a) capital cost; (b) estimated capital cost per (route) mile; (c) Metro system operations and maintenance costs; and (d) estimated annualized cost per hour of transit system user benefit.

As shown in Table 7-15, Figure 7-19, and Figure 7-20, the Combined HRT Subway groups of alternatives has the highest capital cost; the BRT alternative has the lowest capital cost. Figure 7-21 illustrates the cost-effectiveness of the alternatives; the blue overlay indicates the range of cost-effectiveness necessary to compete for federal funds. Cost-effectiveness is calculated by dividing the transit system project cost by the transit system user benefits. The FTA New Starts program evaluates projects across the country using the cost-effectiveness measure. Figure 7-22 illustrates the transit user benefits in daily hours.

The cost-effectiveness of the proposed alternatives is particularly critical when applying for FTA New Starts funding. Figure 7-18 illustrates where Alternative 1 and Alternative 11 currently stand in comparison with current FTA standards. In general, projects advancing into the FTA PE phase of project development must achieve a cost-effectiveness measure of below $25 per hour of travel time savings. Alternative 1 is currently measured at $34, and Alternative 11 is currently measured at $43. The cost-effectiveness of each alternative is expected to be reduced in the next phase of evaluation based on lower construction costs and refined ridership projections.

Figure 7-18. Cost Effectiveness

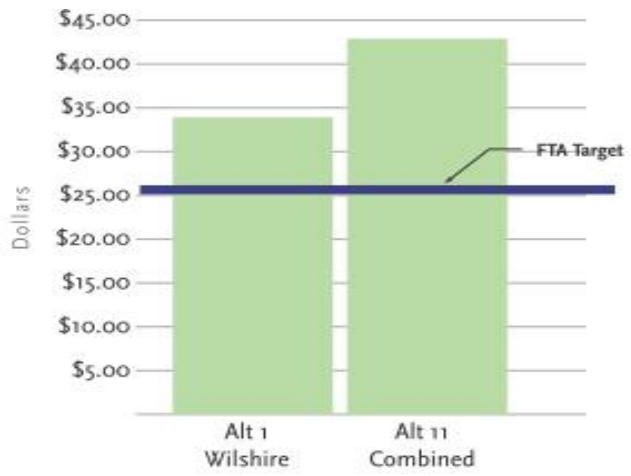


Table 7-15. Cost-Effectiveness

PERFORMANCE MEASURES				ALTERNATIVES						
Goal	Objective	Measure	Criteria	No Build	TSM	BRT	Wilshire HRT		Combined HRT	
						17	1	14	11	16
C	1	a	Order of Magnitude Capital Cost ($ Billions, 2008)	$0.00	$0.134	$1.082	$6.063	$6.997	$9.057	$9.448
C	1	a	Order of Magnitude Capital Cost (10 years) ($ Billions, YOE)	$0.00	$0.172	$1.387	$7.771	$8.968	$11.610	$12.111
C	1	b	Capital Cost Per Route Miles ($ Millions, 2008)	$0	N.A.	$34	$475	$489	$509	$507
C	1	b	Capital Cost Per Route Miles ($ Millions, YOE)	$0	N.A.	$44	$609	$627	$652	$650
C	1	c	Order of Magnitude Annual O&M Cost ($ Millions, 2008)	$1,363	$1,378	$1,369	$1,459	$1,473	$1,518	$1,530
C	1	d	Daily Hour of Transit User Benefit compared to No Build	N.A.	1,700	13,800	39,300	37,000	47,800	44,900
C	1	d	Cost per hour of transit system user benefits for selected representative alternatives compared to No Build (CEI)	N.A.	$53	$17	$34	$44	$43	$51

Figure 7-19. Capital Cost ($ Billions, 2008)

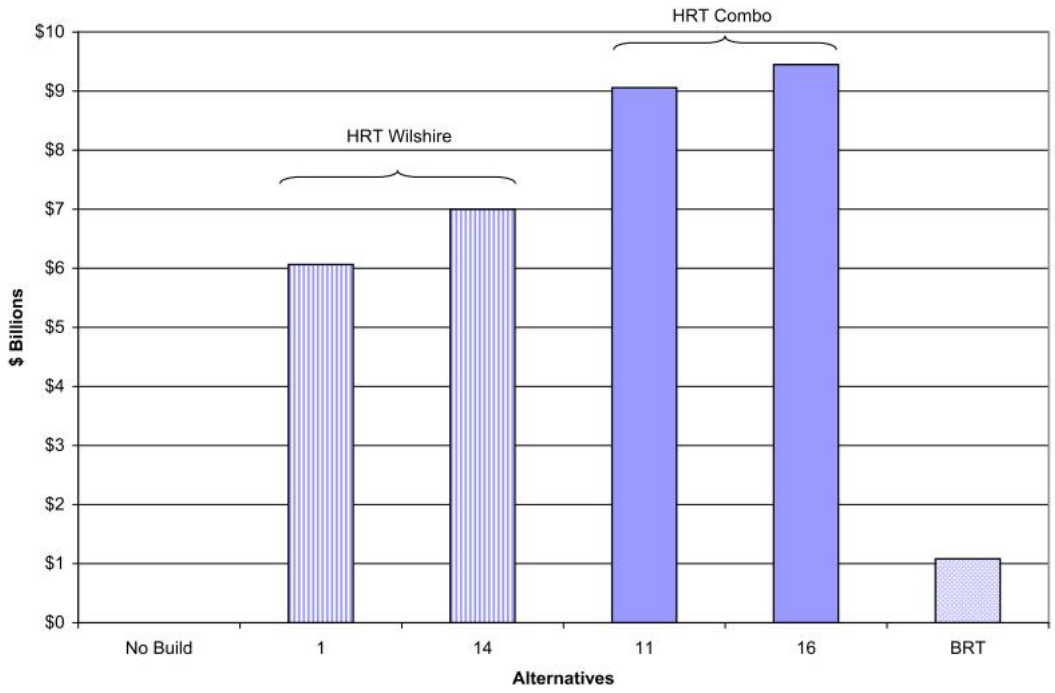


Figure 7-20. Capital Cost ($ Billions, YOE)

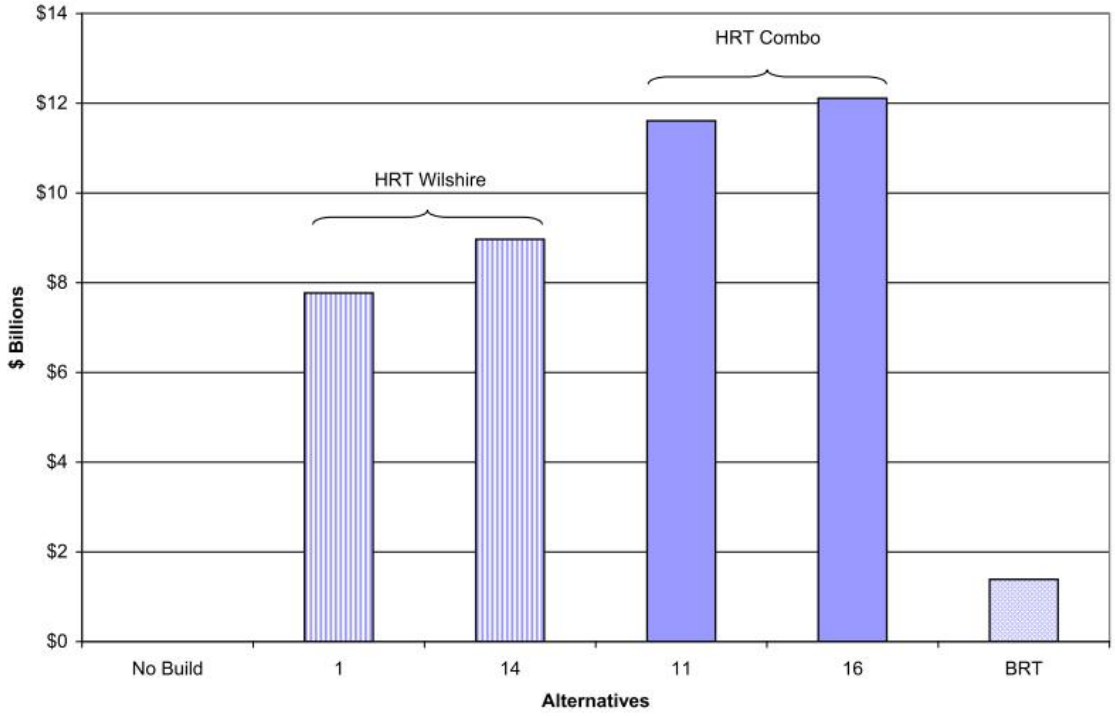


Figure 7-21. Cost-Effectiveness (Compared to No Build) in $ per Hour

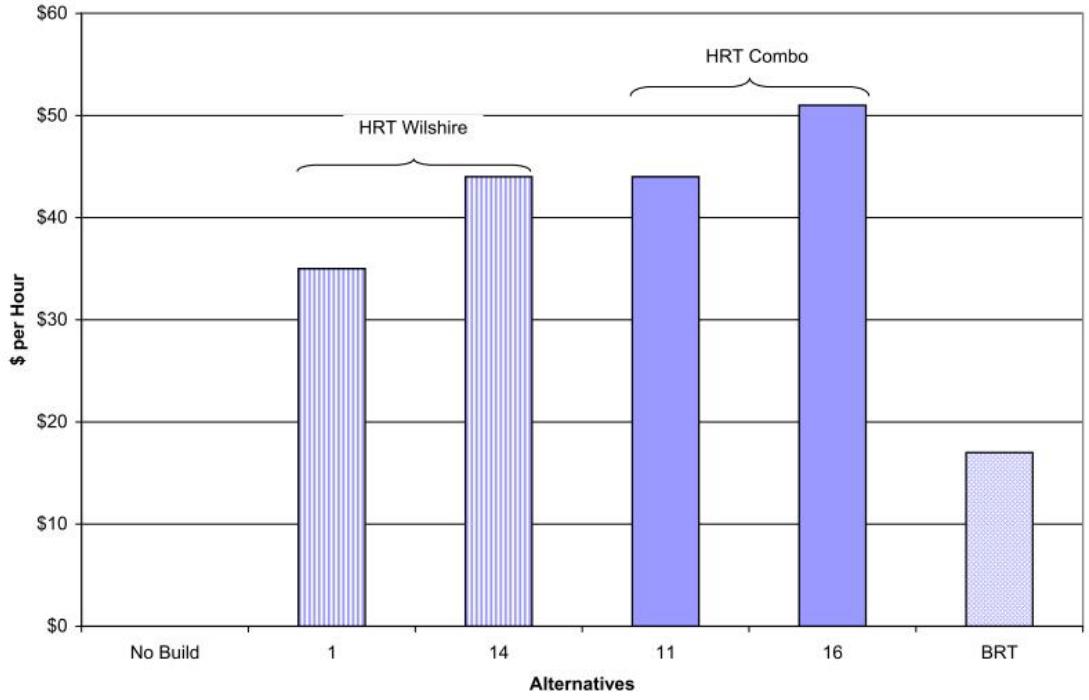
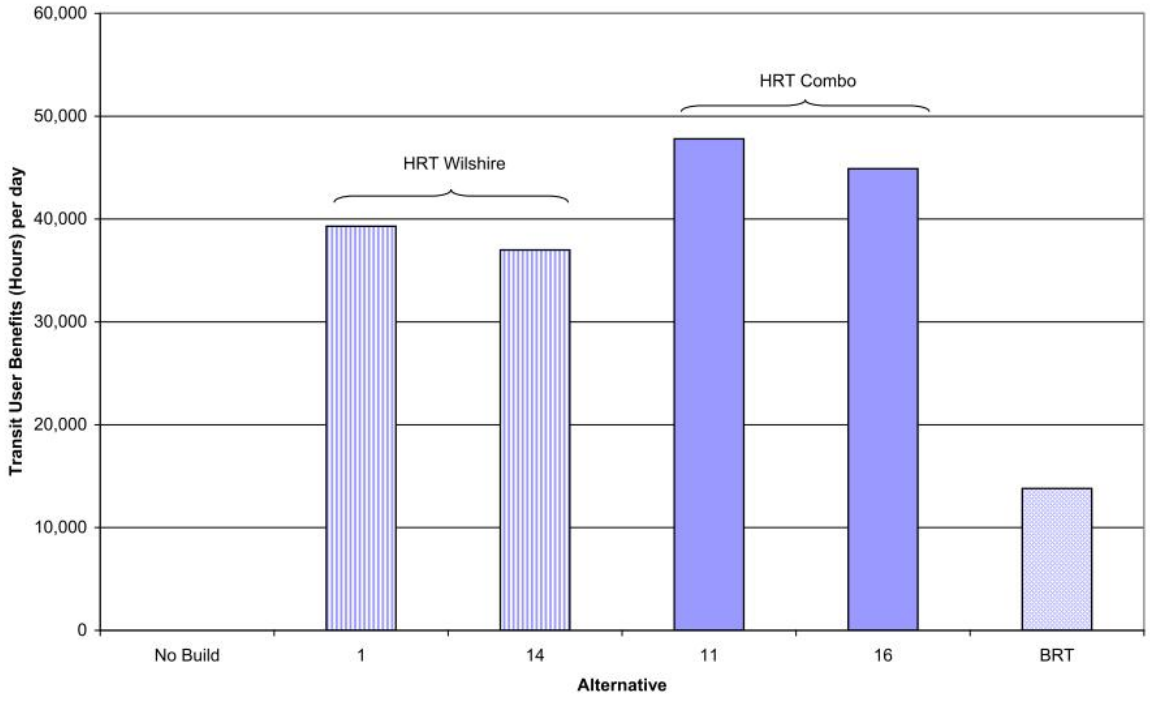


Figure 7-22. Transit User Benefits (Daily Hours)



7.6 Project Feasibility

This goal is to provide transportation solutions that are financially feasible. Measures used to evaluate project feasibility include: (a) assessment of the relative eligibility of the alternative for Federal New Starts Funding; and (b) level of consistency with the goals of Metro's Long Range Transportation Plan and Board financial direction.

As seen in Table 7-16 below, the BRT has a relatively high eligibility opportunity for New Starts funding. Both the Wilshire Boulevard HRT Subway and the Combined HRT Subway groups of alternatives have relatively medium eligibility opportunities for New Starts funding. Only the at-grade BRT alternative is consistent with the Metro's Long Range Transportation Plan (LRTP) and financial direction. None of the HRT alternatives are currently included in the 2001 LRTP Constrained Financial Plan or the baseline 2008 Draft LRTP. Since Measure R passed, adding a ½ cent sales tax for LA County transportation, it is anticipated that this project will be added to Metro's LRTP.

Table 7-16. Financial Feasibility

PERFORMANCE MEASURES				ALTERNATIVES						
Goal	Objective	Measure	Criteria	No Build	TSM	BRT	Wilshire HRT		Combined HRT	
						17	1	14	11	16
D	1	a	Relative eligibility of alts for new starts funding*	L	L	H**	M	M	M	L
D	1	b	Consistency with Metro's LRTP and financial direction***	C	C	C	C ****	C ****	C ****	C ****

* L = Low; M = Medium; H = High; VH= Very High
**If traffic lanes must be replaced, then increase to Medium.
*** C = Consistent; N = No
**** Assumes that LRTP will be amended to include projects in voter-approved Measure R

7.7 Equity

This goal is to ensure costs and benefits are distributed fairly across different population groups, with particular emphasis on serving transit dependent communities. The objectives to evaluate this goal include:

- Improve transit service available to transit dependent communities, especially access to job opportunities; and
- Provide solutions that distribute both economic and environmental costs and benefits fairly across different population groups.

These are discussed below.

7.7.1 Transit Dependents Mobility Improved

One of the objectives of equity is to improve transit services available to transit dependent communities; especially access to job opportunities is one of the objectives of equity. Mobility for Transit Dependents is a criterion used to address this objective. A measure used to evaluate mobility for transit dependents assesses the number of low income households within 1/2 mile of proposed alignment (existing and future). Figure 7-23 illustrates the households that report not owning a vehicle in the 2000 census (Zero Car Households).

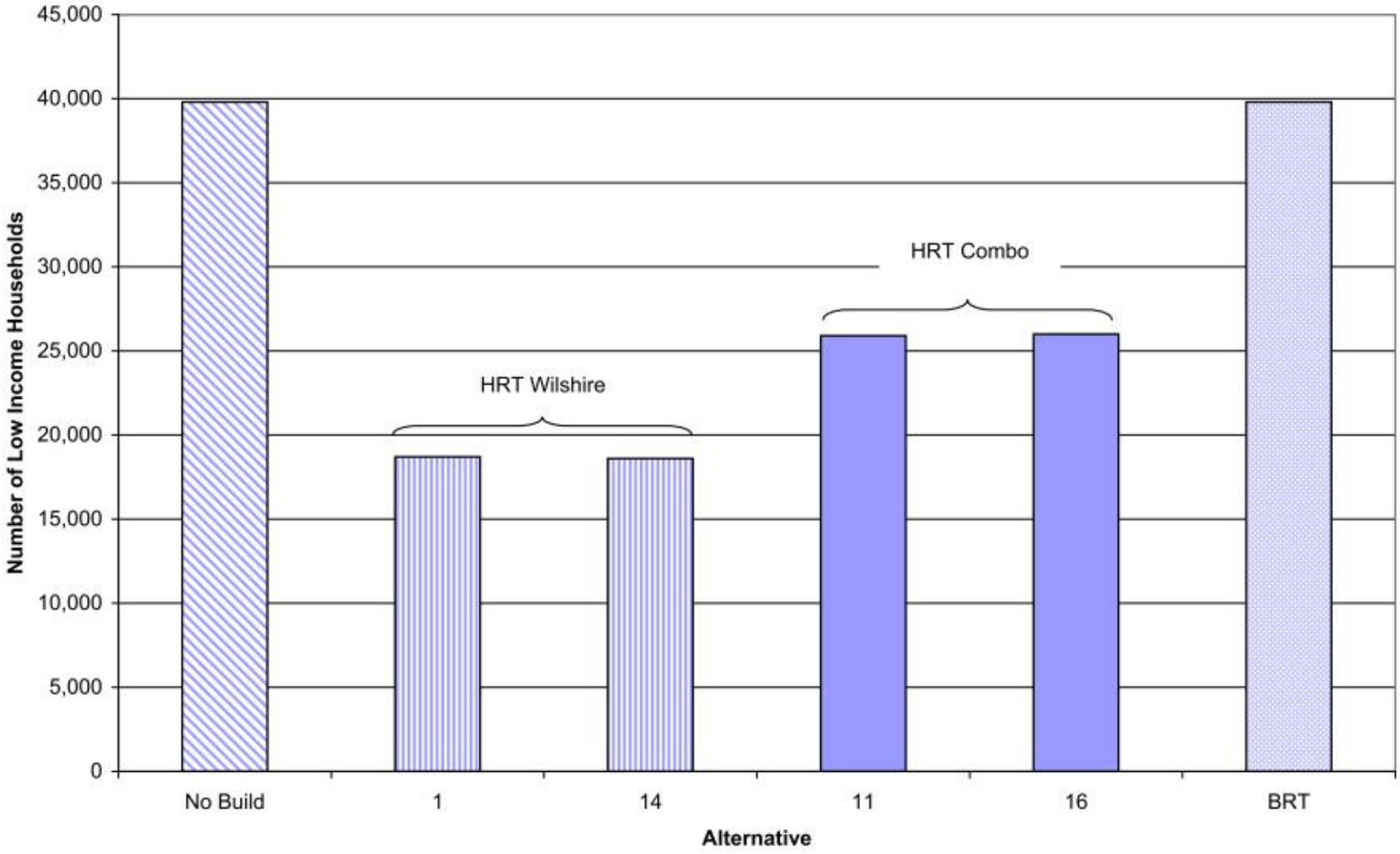
As shown in Table 7-17 below, the alternatives with the highest number of current low income households (HH) within 1/2 mile of each alternative are the Combined HRT Subway alternatives with approximately 26,000 households.

Table 7-17. Equity

PERFORMANCE MEASURES				ALTERNATIVES						
						BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	No Build	TSM	17	1	14	11	16
E	1	a	Number of low income HH within 1/2 mile of each alternative (in thousands)	39.8	39.8	39.8	18.7	18.6	25.9	26.0
E	2	a	**Local jurisdiction/communities directly impacted - displacements, construction**							
				City of SM	City of SM	City of SM	City of SM	City of SM	City of SM	City of SM
				City of BH	City of BH	City of BH	City of BH	City of BH	City of BH	City of BH
				City of WH	City of WH	City of WH	City of LA (7)	City of LA (8)	City of WH	City of WH
				City of LA (8)	City of LA (8)	City of LA (8)	LAC	LAC	City of LA (8)	City of LA (9)
				LAC	LAC	LAC			LAC	LAC
			Total jurisdictions/ communities	12	12	12	10	11	12	13
E	2	b	**Number of residents within 1/2 mile by ethnic group/minority populations**							
E	2	b	Black	15,123	15,123	15,123	9,836	9,781	11,390	11,279
E	2	b	Amer Indian/Eskimo	1,030	1,030	1,030	521	554	720	694
E	2	b	Asian	47,951	47,951	47,951	35,528	35,358	38,356	38,620
E	2	b	Hawaiian/Pacific Islander	354	354	354	208	210	249	241
E	2	b	Other-Non-Hispanic	1,201	1,201	1,201	750	690	862	807
E	2	b	2+Races Non-Hispanic	13,180	13,180	13,180	7,977	7,713	9,679	9,450
E	2	b	Hispanic	47,041	47,041	47,041	21,837	22,012	27,021	27,048

* Removes two lanes of traffic
Abbreviations: City of SM =City of Santa Monica; City of BH = City of Beverly Hills; City of WH = City of West Hollywood; City of LA = City of Los Angeles; LAC = Los Angeles County.

Figure 7-23. Number of Low Income Households within ½ Mile of Alignment, present



7.7.2 Equitable Distribution of Costs and Benefits

A second objective is to provide solutions that distribute both economic and environmental costs and benefits fairly across different population groups. Equity is a criterion used to address this objective. Measures used to evaluate the economic benefit include: (a) direct impacts (e.g., potential displacements, amount of construction impacts) categorized by local jurisdiction / community; and (b) the number of residents within 1/2 mile walking distance of proposed alternative by major ethnic groups/minority populations.

Local jurisdiction/communities directly impacted by displacements or construction include the City of Santa Monica, City of Beverly Hills, City of West Hollywood, City of Los Angeles, and Los Angeles County. Table 7-17 shows which jurisdiction / community correspond with the appropriate alternative. Additionally, the table also indicates the population distribution for major ethnic groups / minority populations in each alternative.

7.8 Environmental Considerations (Impacts)

The goal of environmental considerations (impacts) is to develop solutions which protect environmental resources and communities within the study area.

Objectives for environmental considerations include:

- Minimize the displacement of homes and businesses.
- Minimize impacts to the traffic and circulation system.
- Minimize impacts to the character of the community.
- Provide for the safety and security of pedestrians and transit users.
- Minimize impacts on sensitive and protected environmental resources.
- Reduce, not add to, tailpipe emissions / non-renewable fuel consumption.

7.8.1 Minimize Home and Business Displacement

Right-of-way (ROW) impacts is a criterion used to address minimizing the displacement of homes and businesses. A measure used to evaluate ROW impacts is to estimate the level of right-of-way impact based on the proposed footprint of the alternatives.

As shown in Figure 7-24 and Table 7-18, the BRT (Alternative 17) has the greatest estimated ROW impact with 1,335,000 square feet of the alternative. The Combined HRT Subway group of alternatives has the next greatest estimated ROW impact based on proposed alternative footprint of between 550,000 and 570,000 square feet. The Wilshire Boulevard HRT Subway group of alternatives requires between 420,000 and 480,000 square feet.

7.8.2 Minimize Traffic and Circulation System Impacts

Traffic and Circulation is a criterion used to address how to minimize impacts to the traffic and circulation system. Measures used to evaluate these impacts include: (a) the lane-miles of traffic lanes removed or impacted; and (b) the lane-miles of parking lanes removed.

Figure 7-24. Estimated Right of Way Impact Based on Proposed Alternative Footprint

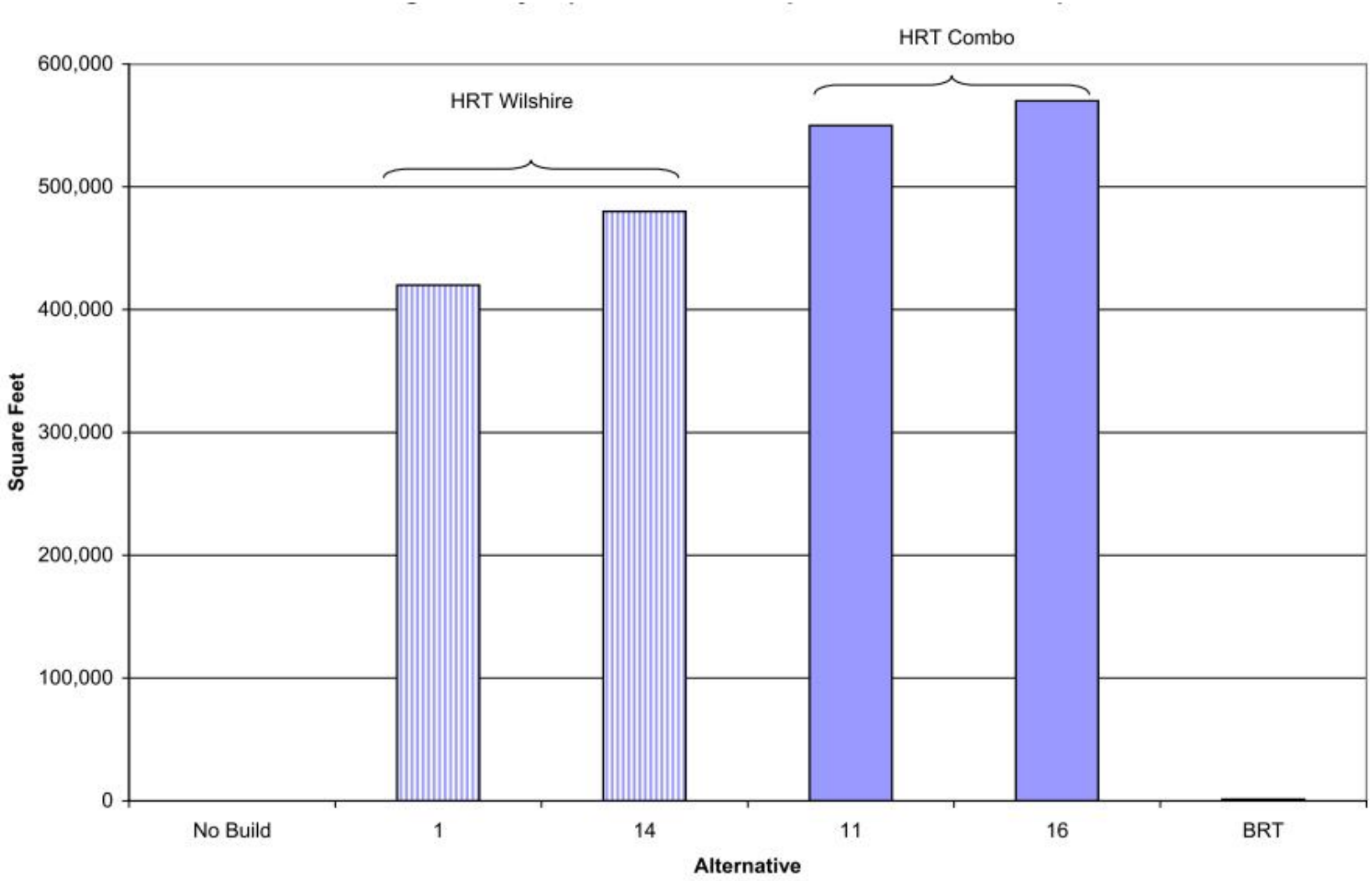


Table 7-18. Estimated ROW Impact

PERFORMANCE MEASURES				ALTERNATIVES						
						BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	No Build	TSM	17	1	14	11	16
F	1	a	Estimated ROW impact based on proposed alt footprint (thousands of square feet)	None	Mn	1,335	420	480	550	570

Mn = Minimal

Lane Miles of Traffic Lanes Impacted

Assumptions for minimizing impacts to the traffic and circulation system using lane-miles traffic lane removal or impacts as a measure include post construction evaluation.

Assumptions were developed to calculate the potential impact to traffic lanes. The Wilshire HRT and Combined HRT Alternatives do not take any lane miles of parking or travel lanes. Therefore, the assumptions below are applied only to the BRT Alternative. The assumptions include that the BRT would impact the following:

- 2 travel lanes between the intersections of Wilshire/Western and Wilshire/Barrington (9.2 mi) on Wilshire Boulevard
- 2 travel or parking lanes between the intersections of Wilshire/Barrington and Wilshire/4th (4.1 mi) on Wilshire Boulevard
- 2 travel or parking lanes between the intersections of Hollywood/Highland and Santa Monica/Highland (0.75 mi) on Highland Avenue
- 2 travel or parking lanes between the intersections of Santa Monica/Highland and Santa Monica/4th (7.6 mi) on Santa Monica Boulevard
- 2 travel or parking lanes between the intersections of Santa Monica/Westwood and Wilshire/Westwood (0.75 mi) on Westwood Boulevard

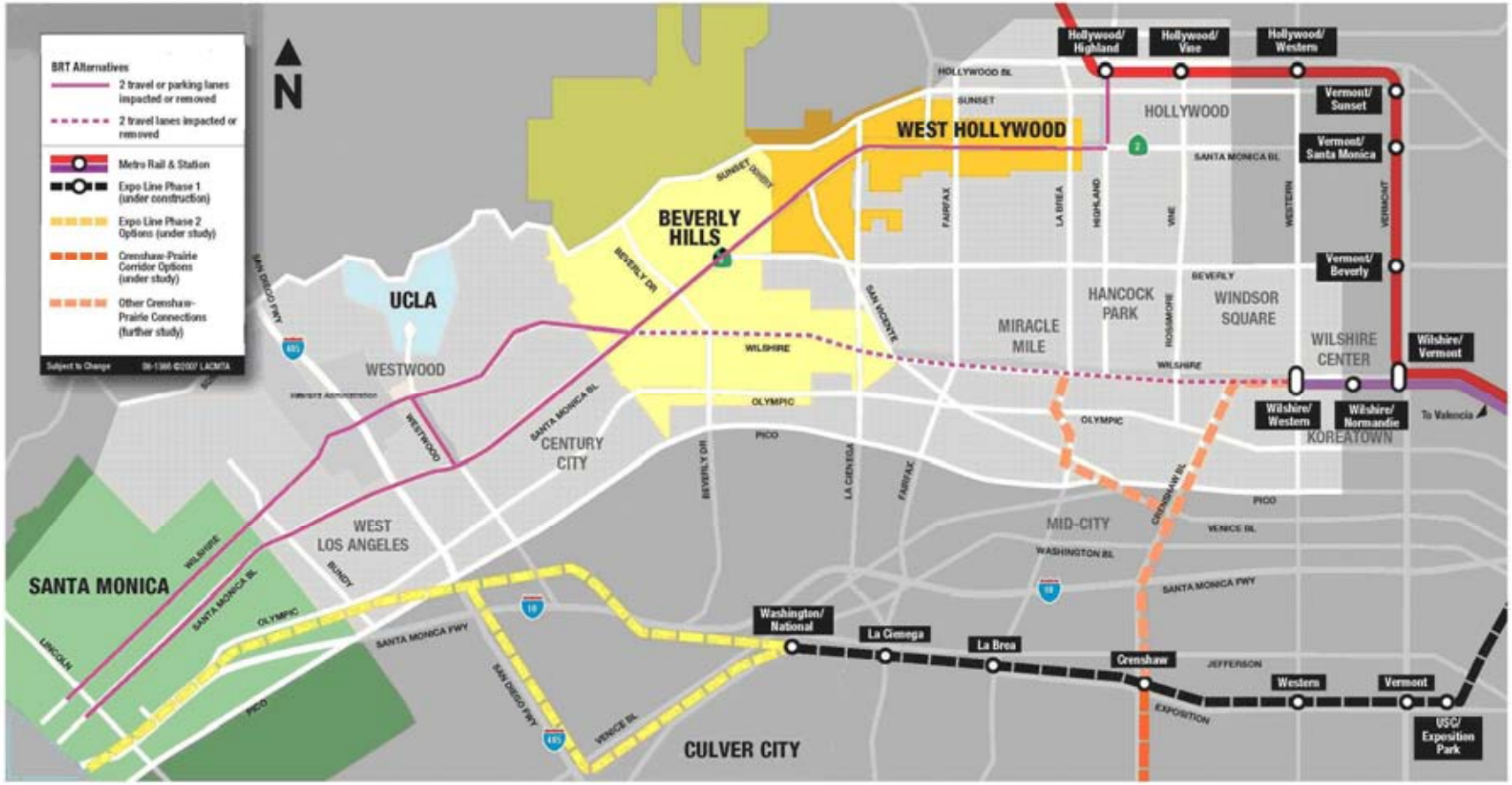
As shown in Table 7-19 and Figure 7-25, the BRT has the greatest impact to traffic lanes. The Combined HRT Subway and Wilshire HRT alternatives have no traffic lanes impact after construction.

Table 7-19. Impacts to Traffic Circulation in Lane Miles

PERFORMANCE MEASURES				ALTERNATIVES						
						BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	No Build	TSM	17	1	14	11	16
F	2	a	Lane miles of traffic lanes removed or impacted	0	0	44.8	0	0	0	0
F	2	b	Lane miles of parking lanes removed or impacted	0	0	26.4	0	0	0	0

* Removes two lanes of traffic

Figure 7-25. Impact to Traffic Lanes by BRT Alignments



Lane Miles of Parking Lanes Impacted

Assumptions were developed to calculate the potential impact to parking lanes. The Wilshire HRT and Combined HRT Alternatives do not take lane miles. Therefore, the assumptions below are applied only to the BRT Alternative. The assumptions include that the BRT would impact the following:

- 2 travel or parking lanes between the intersections of Wilshire/Barrington and Wilshire/4th (4.1 mi)
- 2 travel or parking lanes between the intersections of Hollywood/Highland and Santa Monica/Highland (0.75 mi)
- 2 travel or parking lanes between the intersections of Santa Monica/Highland and Santa Monica/4th (7.6 mi)
- 2 travel or parking lanes between the intersections of Santa Monica/Westwood and Wilshire/Westwood (0.75 mi)

As shown in Table 7-19, the BRT has the greatest impact to parking lanes. There is no impact to parking lanes with the Wilshire HRT Subway and the Combined HRT Subway groups of alternatives.

7.8.3 Minimize Community Character Impacts

Visual / Noise and Vibration is a criterion used to address how to minimize impacts to the character of the community. Measures used to evaluate these impacts include: (a) estimating the level of visual impact to the surrounding neighborhoods / community; and (b) estimating the level of potential noise and vibration impact.

Visual Impacts

As shown in Table 7-20, there is low visual impact to the surrounding neighborhoods and community in the at-grade BRT alternative. Moderate levels of visual impacts exist in the Wilshire Boulevard HRT Subway and Combined HRT Subway groups of alternatives. Visual impacts for underground alternatives include stations and associated structures.

Table 7-20. Estimated Visual and Noise Impacts

PERFORMANCE MEASURES				ALTERNATIVES						
						BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	No Build	TSM	17	1	14	11	16
F	3	a	Estimated level of visual impacts to surrounding neighborhoods	None	None	L	Md	Md	Md	Md
F	3	b	Potential noise & vibration impact - Operational Impacts	0	0	0	0	0	0	0

** L = Low; Mn = Minimal, Md = Moderate; H = High, VH = Very High
*** Total amount of acreage, 2 hospitals and 5 schools

Noise and Vibration Impacts

A determination of a noise impact for this project was based on the criteria defined in the FTA guidance manual *Transit Noise and Vibration Impact Assessment* (FTA Report DOT-T-95-16, April 1995). The FTA noise impact criteria are founded on well-documented research on community reaction to noise and are based on change in noise exposure using a sliding scale. Although more transit noise was allowed in neighborhoods with high levels of existing noise, smaller increases in total noise exposure were allowed with increasing levels of existing noise. The FTA Noise Impact Criteria group noise sensitive land uses into the following three categories:

- Category 1: Buildings or parks, where quiet is an essential element of their purpose.
- Category 2: Residences and buildings where people normally sleep. This includes residences, hospitals, and hotels where nighttime sensitivity is assumed to be of utmost importance.
- Category 3: Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, churches and active parks.

Day-Night Sound Level (DNL)[1] was used to characterize noise exposure for residential areas (Category 2). For other noise sensitive land uses, such as outdoor amphitheaters and school buildings (Categories 1 and 3), the maximum 1-hour L_{eq} during the facility's operating period was used.

There would be no airborne noise and a minimal amount of vibration due to operation of the subway portions of the line on noise sensitive land uses in the area of the project proposed alignments. While the vibration is expected to be felt in only the most noise sensitive land uses located adjacent to the selected right of way, there is the potential for some buildings, such as concert halls, recording studios and theaters, which are very sensitive to vibration, and which fall outside of the three noise sensitive categories, to exist along one or more of the proposed routes.

As shown in Table 7-20, there are no potential noise and vibration operational impacts in the BRT, the Combined HRT, or the Wilshire HRT Alternatives.

7.8.4 Pedestrian and Transit Users Safety and Security

Safety and Security is a criterion used to address how to provide for the safety and security of pedestrians and transit users. Measures used to evaluate these impacts include: (a) the ability to provide emergency exits and evacuation; and (b) the extent of new vehicular/transit or pedestrian/transit conflicts associated with rights-of-way that are not fully protected.

[1] DNL: Day-Night Sound Level: based on sound levels measured in relative intensity of sound, or decibels (dB), on the "A" weighted scale (dBA). The "A" weighted scale most closely approximates the response characteristics of the human ear to sound. The higher the number on the scale, the louder is the sound. DNL represents noise exposure events over a 24-hour period. To account for human sensitivity to noise between the hours of 10 p.m. and 7 a.m., noise events occurring during these hours receive a "penalty" when the DNL is calculated. Each nighttime event is measured as if ten daytime events occurred.

Emergency Exits and Evacuation

As shown in Table 7-21, the ability to provide for emergency exits and evacuation is moderate in the Wilshire Boulevard HRT Subway and Combined HRT Subway groups of alternatives. The ability to provide for emergency exits and evacuation is not applicable in the at-grade BRT alternative.

Table 7-21. Emergency Exits and Evacuation

PERFORMANCE MEASURES				ALTERNATIVES						
Goal	Objective	Measure	Criteria	No Build	TSM	BRT	Wilshire HRT		Combined HRT	
						17	1	14	11	16
F	4	a	Ability to provide for emergency exits and evacuation	N.A.	N.A.	N.A.	Md	Md	Md	Md

* L = Low; Mn = Minimal; Md = Moderate; H = High; VH = Very High

Extent of Conflicts with Right-of-Way

As shown in Table 7-22, the extent of new vehicular/transit or pedestrian/transit conflicts associated with right-of-way that is not fully protected is low in all of the alternatives except for the at-grade BRT alternative. In this alternative, the extent is low to moderate.

Table 7-22. Vehicle/Transit/Pedestrian Conflicts

PERFORMANCE MEASURES				ALTERNATIVES						
Goal	Objective	Measure	Criteria	No Build	TSM	BRT	Wilshire HRT		Combined HRT	
						17	1	14	11	16
F	4	b	Extent of vehicle/transit/ pedestrian conflicts that are not fully protected	Md	Md	L-M	L	L	L	L

* Removes two lanes of traffic
** L = Low; Mn = Minimal; Md = Moderate; H = High; VH = Very High

7.8.5 Minimize Impacts on Sensitive and Protected Environmental Resources

Natural and Cultural Resources is a criterion used to address how to minimize impacts on sensitive and protected environmental resources. A measure used to evaluate these impacts is to estimate the number of cultural or natural resources directly impacted by implementation/operation of the proposed alternative (e.g., cemeteries, schools, parks and recreational facilities, known historic or archaeological resources, water resources).

On December 20, 2007 URS staff archaeologist (Laurie Solis, M.A.) conducted an archaeological sites inventory search at the South Central Coastal Information Center at California State University Fullerton, for the presence of known archaeological resources identified along the proposed project alignments, as well as within 500 feet of the proposed alignments. For historic resources (structures), a thorough search of the City of Los Angeles Historic-Cultural Monument List from the City of Los Angeles, Department of City Planning, the National Register of Historic Places (for individual structures and districts), and the California Register of Historical Resources, was conducted to identify the number of listed historic properties and districts along the proposed alignments. For

public parks, recreation areas, refuges, and historic sites (also known as Section 4(f) properties[2]) and properties containing human remains, the above sources were utilized, as well as the most recent Thomas Guide maps for the proposed alternatives. For paleontological resources, the USGS Dibblee, Los Angeles and Hollywood quadrangle, which illustrate the known subsurface stratum and their potential to yield fossil deposits, were utilized.

Section 106 (6 United States Code [USC] 470s) of the National Historic Preservation Act requires Federal agencies to take into account the effects of their undertakings on historic properties (including cultural and natural resources) and afford stakeholders the opportunity to comment on such undertakings.

While all alternatives would have some impacts to cultural and natural resources (Section 106[3]), Alternative 11 would have the greatest impact. These impacts would include, but are not limited to, impact to historic structures through noise and vibration impacts during construction, as well as destabilization from underground excavation; disturbance to known and as yet unknown archaeological resources of a historic and prehistoric age; paleontological impacts to Pleistocene age terrestrial deposits, especially that excavation which will traverse along Wilshire Boulevard within the Miracle Mile section of the City; and disturbance to human remains including those without formal burials, especially the proposed routes which are in the vicinity of the Los Angeles National Cemetery and Westwood Memorial Park in Westwood. As alternatives are studied further, alternatives will be designed to avoid these burial grounds.

In addition, there may be a number of historic period structures that have not undergone formal evaluation for historic significance. In order to assess this, formal evaluation would need to be undertaken, which may increase the number of historic properties affected by the project.

The estimated number of cultural or natural resources directly impacted for each grouping of alternatives is shown below in Table 7-23 Figure 7-26.

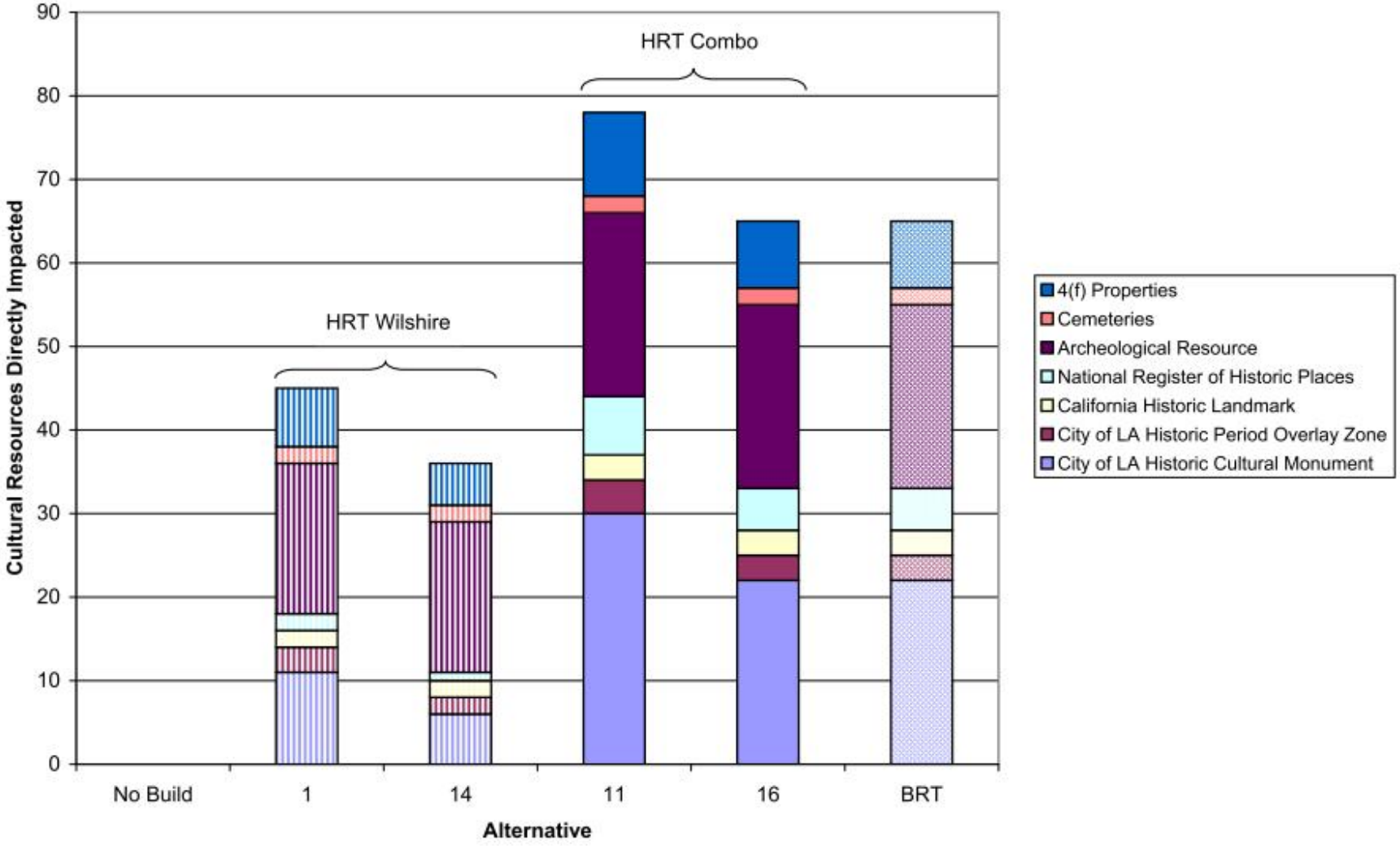
Table 7-23. Impacts on Sensitive and Protected Environmental Resources

PERFORMANCE MEASURES				ALTERNATIVES						
							Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	No Build	TSM	BRT 17	1	14	11	16
F	5	a	Estimated Number of Cultural or Natural Resources Directly Impacted	N.A.	N.A.	65	45	36	78	65
F	5	a	City of LA Historic Cultural Monument (HCM)	N.A.	N.A.	22	11	6	30	22
F	5	a	City of LA Historic Period Overlay Zone (HPOZ)	N.A.	N.A.	3	3	2	4	3
F	5	a	California Historic Landmark (CaHL)	N.A.	N.A.	3	2	2	3	3
F	5	a	National Register of Historic Places (NRHP)	N.A.	N.A.	5	2	1	7	5
F	5	a	Archeological Resource (AR)	N.A.	N.A.	22	18	18	22	22

* Removes two lanes of traffic

[2] Section 4(f) of the Department of Transportation Act, as amended, 49 U.S.C. 303
[3] Section 106 of the National Historic Preservation Act, as amended, 6 U.S.C. 470s

Figure 7-26. Estimated Number of Cultural Resources Directly Impacted



7.8.6 Reduce Tailpipe Emissions/Non-Renewable Fuel Consumption

Air Quality/Sustainability is a criterion used to address how to reduce tailpipe emissions/non-renewable fuel consumption. A screening measure used to evaluate these impacts is to estimate the reduction in vehicle miles traveled (VMT) in the study area based on selected representative alternatives.

Vehicle miles traveled is a common measurement used in evaluating transportation programs. An increase in VMT in the city generally indicates a heavy reliance on motor vehicles. This reliance on motor vehicles can worsen air quality, contribute to water and soil pollution, and reflect increased road congestion. Generally, traffic traveling at slower speeds, caused by congestion, emits greater levels of pollutants per mile driven.

As shown in Table 7-24 and Figure 7-27, the estimated Daily 2030 daily reduction in VMT (Study Area) compared to No Build is greatest in the Combined HRT Subway and the Wilshire Boulevard HRT Subway group of alternatives follows.

Table 7-24. 2030 Estimated Reduction in VMT

PERFORMANCE MEASURES				ALTERNATIVES						
Goal	Objective	Measure	Criteria	No Build	TSM	BRT	Wilshire HRT		Combined HRT	
						17	1	14	11	16
F	6	a	Estimated Daily 2030 Daily Reduction in VMT (Study Area) Compared to No Build (in thousands)	N.A.	6	23	61	55	73	71

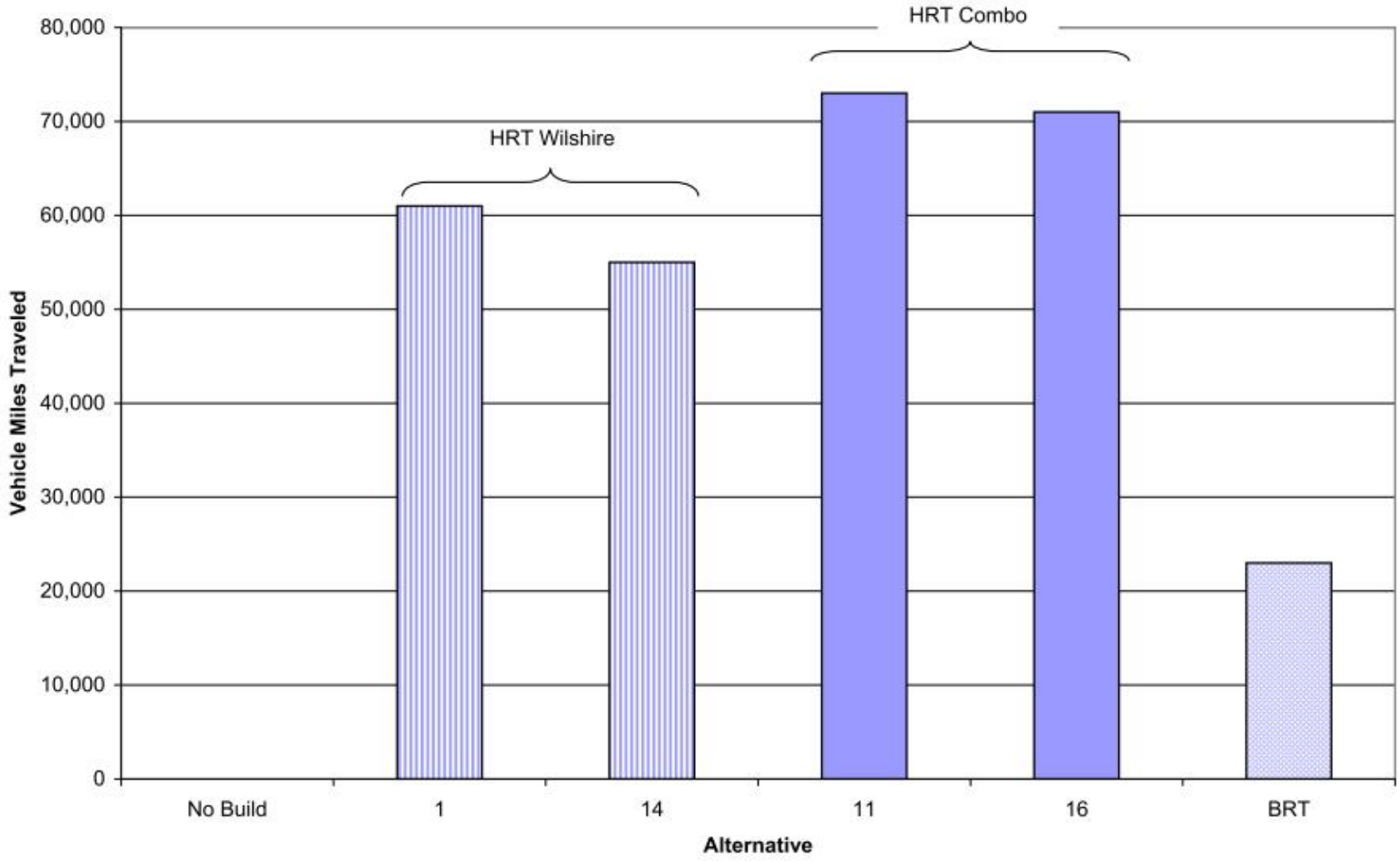
* Removes two lanes of traffic

7.9 Community Involvement Response

Over the past 30 years tremendous population and employment growth, worsening congestion, changing land uses and traffic patterns, as well as Metro's challenge to meet transit demand, have led to the need to improve mobility in the Westside Corridor. Against this background, in the fall of 2007 the Metro Board of Directors authorized an Alternatives Analysis Study for the Westside Extension Transit Corridor to look at ways to address the region's growing mobility challenges. The study considered various modes, including BRT with dedicated bus lanes, as well as at-grade, below-grade, and above-grade rail options, and at least two alignments respectively along Wilshire and Santa Monica Boulevards.

This chapter of the Alternatives Analysis study recaps the early scoping process and ongoing community outreach utilized during the Westside Extension Transit Corridor Study. It provides documentation of the scoping process, an archive of public scoping and community meetings as well as comments received as input to the development of alternatives for further study. In short, this chapter documents how the public involvement effort informed the development and refinement of the alternatives recommended for further study during the environmental process.

Figure 7-27. Estimated Daily Reduction in VMT (Region) Compared to No Build



The Metro Westside Extension study enjoyed considerable stakeholder interest and support over the approximately 12-month Alternatives Analysis Study. The community outreach effort successfully raised awareness about the study, engaged stakeholders on an ongoing basis and, most importantly, garnered public input at key decision points that demonstrated widespread consensus about the study recommendations that require Board approval in order to move forward into the environmental process.

Recognizing the size and diversity of the study area, Metro employed a thorough yet creative approach to ensuring an inclusive and transparent outreach effort. Elements of this outreach program included though were not limited to:

- Public meetings, including one series of early public and agency scoping meetings, and three series of public update meetings (17 meetings in total) at key study milestones
- Targeted stakeholder meetings to address specialized issues and localized concerns
- Multi-lingual outreach to include Korean, Russian, Farsi and Spanish-speaking stakeholders
- Multi-tiered meeting notifications including direct mail, print and broadcast media, advertisements, internet based distribution via e-mail and onboard Metro buses and trains
- Employment of "new" media tolls such as blogs, social networks and other internet or web-based tools to involve a wider audience in the decision-making process

Through the early scoping process, the project team learned that the overwhelming majority of stakeholders supported the need for a transit improvement in the Westside Extension Transit Corridor study area, with a Wilshire Boulevard subway identified as the most favored route and mode. While the Santa Monica alignment also received noticeable support, many stakeholders suggested that Metro consider a project that would include both a Wilshire Boulevard and a Santa Monica Boulevard alignment. In many cases, where the public was in favor of both these alignments, most thought that the Wilshire alternative should take precedence. Limited backing was voiced for aerial/monorail, light rail or bus rapid transit modes.

After completion of the early scoping meetings, Metro conducted three subsequent series of community meetings to keep stakeholders informed of the project's progress at each decision-making milestone. At these subsequent public update meetings, Metro consistently heard from stakeholders that their preferred mode of transit is a subway, with over 90 percent of comments received favoring a Wilshire alignment.

7.10 Summary Matrix of Key Comparative Measures

The results of the detailed analysis, using the goals, objectives, specific evaluation criteria, and performance measures developed for this project, are presented in Table 7-25.

Table 7-25. Summary Matrix

PERFORMANCE MEASURES				ALTERNATIVES							
							BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	Today	No Build	TSM	17	1	14	11	16
Peak Period Travel Times (minutes) between Major Origin-Destination Pairs											
A	1	a	**Transit Peak Period Travel Time (AM Peak) (minutes) – Between Del Mar Station (Gold Line) and:**								
			Century City	80	92	92	80	48	53	48	53
			Santa Monica/San Vicente (WeHo)	72	83	83	64	60	65	55	55
			Wilshire/Beverly (BH)	78	90	90	65	46	51	46	51
			Wilshire/Westwood (UCLA)	82	94	94	75	50	55	50	55
			4th/Wilshire (Santa Monica)	112	129	129	91	57	62	57	62
			Transit Peak Period Travel Time (AM Peak) (minutes) – Between Pershing Square Station (Red Line) and:								
			Century City	48	55	55	47	20	25	20	25
			Santa Monica/San Vicente (WeHo)	49	56	56	37	35	40	28	28
			Wilshire/Beverly (BH)	42	48	48	35	18	23	18	23
			Wilshire/Westwood (UCLA)	54	62	62	45	23	28	23	28
			4th/Wilshire (Santa Monica)	70	81	81	65	29	34	29	34
			Transit Peak Period Travel Time (AM Peak) (minutes) – Between Florence Station (Blue Line) and:								
			Century City	60	69	69	74	41	46	41	46
			Santa Monica/San Vicente (WeHo)	69	79	79	57	53	58	47	47
			Wilshire/Beverly (BH)	64	74	74	56	39	44	39	44
			Wilshire/Westwood (UCLA)	76	87	87	66	44	49	44	49
			4th/Wilshire (Santa Monica)	99	114	114	86	50	55	50	55
			Transit Peak Period Travel Time (AM Peak) (minutes) - Between Reseda Station (Orange Line) and:								
			Century City	72	83	83	66	66	71	45	45
			Santa Monica/San Vicente (WeHo)	83	95	95	57	77	82	41	41
			Wilshire/Beverly (BH)	80	92	92	71	64	69	58	58
			Wilshire/Westwood (UCLA)	59	68	68	71	68	73	47	47
			4th/Wilshire (Santa Monica)	97	112	112	86	75	80	54	54
A	1	a	**Transit Peak Period Travel Time (AM Peak) (minutes) - Between Covina Station (Metrolink) and:**								
			Century City	94	108	108	92	67	72	67	72
			Santa Monica/San Vicente (WeHo)	99	114	114	87	79	84	69	69
			Wilshire/Beverly (BH)	98	113	113	82	65	70	65	70
			Wilshire/Westwood (UCLA)	99	114	114	93	69	74	69	74
			4th/Wilshire (Santa Monica)	119	137	137	108	76	81	76	81

Table 7-25. Summary Matrix (continued)

PERFORMANCE MEASURES				ALTERNATIVES							
Goal	Objective	Measure	Criteria	Today	No Build	TSM	BRT	Wilshire HRT		Combined HRT	
							17	1	14	11	16
			Transit Peak Period Travel Time (AM Peak) (minutes) - Between Wilshire/Western Station (Purple Line) and:								
			Century City	35	40	40	34	10	15	10	15
			Santa Monica/San Vicente (WeHo)	30	35	35	30	22	27	17	22
			Wilshire/Beverly (BH)	23	26	26	19	8	13	8	13
			Wilshire/Westwood (UCLA)	36	41	41	31	13	18	13	18
			4th/Wilshire (Santa Monica)	51	59	59	47	19	24	19	24
			Transit Peak Period Travel Time (AM Peak) (minutes) - Between North Hollywood Station (Red Line) and:								
			Century City	58	67	67	35	39	44	26	26
			Santa Monica/San Vicente (WeHo)	51	59	59	26	51	56	18	18
			Wilshire/Beverly (BH)	49	56	56	45	37	42	25	25
			Wilshire/Westwood (UCLA)	61	70	70	43	42	47	29	29
			4th/Wilshire (Santa Monica)	77	89	89	55	48	53	35	35
Average End-to-End Transit Operating Speeds (mph)											
A	1	b	Avg end to end transit operating speed in mph (Between Union Station/Downtown and 4th/Wilshire, SM)	14	12	12	16	32	30	32	30
Note: Some alternatives (11, 16) require transfer(s) to travel between Union Station and Santa Monica											
Percentage of Transit Alignment Operating in Mixed Flow Traffic											
A	2	a	% of transit alignment operating in mixed flow traffic by operation type	NA	100	100	100	0	0	0	0
* Removes 2 lanes of traffic											

Table 7-25. Summary Matrix (continued)

PERFORMANCE MEASURES				ALTERNATIVES							
Goal	Objective	Measure	Criteria	Today	No Build	TSM	BRT	Wilshire HRT		Combined HRT	
							17	1	14	11	16
Number of Transfers between Select Origin-Destination Pairs											
A	2	b	**Transfers Required (AM Peak) - Between Del Mar Station (Gold Line) and :**								
			Century City	1	1	1	1	1		1	
			Santa Monica/San Vicente (WeHo)	1	1	1	2	2		2	
			Wilshire/Beverly (BH)	1	1	1	2	1		1	
			Wilshire/Westwood (UCLA)	1	1	1	2	1		1	
			4th/Wilshire (Santa Monica)	1	1	1	2	1		1	
			Transfers Required (AM Peak) - Between Pershing Square Station (Red Line) and :								
			Century City	0	0	0	1	0		0	
			Santa Monica/San Vicente (WeHo)	0	0	0	1	1		1	
			Wilshire/Beverly (BH)	0	0	0	0	0		0	
			Wilshire/Westwood (UCLA)	0	0	0	0	0		0	
			4th/Wilshire (Santa Monica)	0	0	0	0	0		0	
			Transfers Required (AM Peak) - Between Florence Station (Blue Line) and :								
			Century City	1	1	1	2	1		1	
			Santa Monica/San Vicente (WeHo)	1	1	1	2	2		2	
			Wilshire/Beverly (BH)	1	1	1	1	1		1	
			Wilshire/Westwood (UCLA)	1	1	1	1	1		1	
			4th/Wilshire (Santa Monica)	1	1	1	1	1		1	
			Transfers Required (AM Peak) - Between Reseda Station (Orange Line) and:								
			Century City	1	1	1	2	2		1	
			Santa Monica/San Vicente (WeHo)	2	2	2	2	3		1	
			Wilshire/Beverly (BH)	2	2	2	3	2		1	
			Wilshire/Westwood (UCLA)	1	1	1	2	2		1	
			4th/Wilshire (Santa Monica)	2	2	2	2	2		1	
			Transfers Required (AM Peak) - Between Covina Station (Metrolink) and:								
			Century City	1	1	1	2	1		1	
			Santa Monica/San Vicente (WeHo)	1	1	1	2	2		2	
			Wilshire/Beverly (BH)	1	1	1	2	1		1	
			Wilshire/Westwood (UCLA)	2	2	2	2	1		1	
			4th/Wilshire (Santa Monica)	2	2	2	2	1		1	

Table 7-25. Summary Matrix (continued)

PERFORMANCE MEASURES				ALTERNATIVES							
Goal	Objective	Measure	Criteria	Today	No Build	TSM	BRT	Wilshire HRT		Combined HRT	
							17	1	14	11	16
A	2	b	**Transit Peak Period Travel Time (AM Peak) - Between Wilshire/Western Station (Purple Line) and:**								
			Century City	1	1	1	1	0		0	
			Santa Monica/San Vicente (WeHo)	1	1	1	1	1		1	
			Wilshire/Beverly (BH)	0	0	0	0	0		0	
			Wilshire/Westwood (UCLA)	0	0	0	0	0		0	
			4th/Wilshire (Santa Monica)	0	0	0	0	0		0	
			Transfers Required (AM Peak) - Between North Hollywood Station (Red Line) and:								
			Century City	1	1	1	1	1		1	
			Santa Monica/San Vicente (WeHo)	1	1	1	1	2		1	
			Wilshire/Beverly (BH)	1	1	1	2	1		1	
			Wilshire/Westwood (UCLA)	1	1	1	1	1		1	
			4th/Wilshire (Santa Monica)	1	1	1	1	1		1	
Provide Sufficient Transit Capacity											
A	3	a	Estimated maximum capacity (in thousands) of new EW transit service (Passengers per hour) (Assuming 18 trains per hour or 30 buses per hour)	N.A	3	3	3	18	18	18	18
A	3	b	Potential for capacity expansion beyond 2030	L	L	L	Md	H	H	H	H
* L = Low; M = Medium; Md = Moderate; H = High											
Transit Ridership											
			Daily New Transit Trips (Change from No Build) in thousands		N.A.	1.9	13.8	39.3	37.0	47.8	44.9
			Change in Urban Rail Boardings (Change from No Build) in thousands		N.A.	-0.8	13.3	95.5	88.3	117.0	109.0
			"New Stations" Urban Rail Boardings in thousands		0	0	0	61.5	59.9	80.0	77.1
Population and Population Density within ½ Mile of the Alignment											
A	4	a	Population/Pop density within 1/2 mile of each alignment (in thousands)								
			2030 Population within 1/2 mile of Alignment		N.A.	N.A	336	216	225	303	302
			2005/6 Average Population Density per Square Mile within 1/2 mile of Alignment		N.A.	N.A	12.5	16.5	16.2	16.1	16.3
			2030 Average Population Density per Square Mile within 1/2 mile of Alignment		N.A.	N.A	13.8	18.3	17.9	17.7	17.7

Table 7-25. Summary Matrix (continued)

PERFORMANCE MEASURES				ALTERNATIVES							
							BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	Today	No Build	TSM	17	1	14	11	16
Employment and Employment Density within ½ Mile of the Alignment											
A	4	b	**Employment/Employment Density within 1/2 mile of Each Alignment (in thousands)**								
			2005/6 Employment within 1/2 mile of Alignment		N.A.	N.A	332	221	235	293	293
			2030 Employment within 1/2 mile of Alignment		N.A.	N.A	387	258	274	342	334
			2005/6 Average Employment Density per Square Mile within 1/2 mile of Alignment		N.A.	N.A	13.6	18.7	18.7	17.1	17.2
			2030 Average Employment Density per Square Mile within 1/2 mile of Alignment		N.A.	N.A	15.9	21.9	21.8	20.0	19.7
* Removes 2 lanes of traffic											
Transit Dependent Populations											
A	4	c	Number of low income HH within 1/2 mile of each alignment – present (in thousands)		39.8	39.8	39.8	18.7	18.6	25.9	26.0
Competitive Speeds											
A	4	d	Ability for transit to be competitive with the auto in speed for key OD pairs		C	C	C	S	S	T	T
** C = Comparable Speed to Auto, Transfers Req.; S = Much Higher Speed than Auto, No Transfer; T = Much Higher Speed than Auto, Transfers Req.											
Enhancing Linkages and Major Trip Attractors/Generators Within the Corridor											
A	5	a	Ability of alts to continue a one seat ride		L	L	M	H	H	M	H
A	5	b	Number of direct connections within 1/8 mile walk to other lines, NS bus routes, etc		12	12	12	7	8	10	11
A	5	c	Number of transfers required to access regional rail - Metrolink, Amtrak		2	2	2	1	1	1	1
A	5	d	Number of direct connections to key activity centers within 1/8 mile walk		10	10	10	7	9	10	12
* L = Low; M = Medium; Md = Moderate; H = High											
Number of High Density Mixed Use Activity Centers Within ½ Mile of Each Alignment											
B	1	a	Number of high density mixed use activity centers within 1/2 mile of each alignment		17	17	17	9	12	14	17
Note: Mixed Use Activity Centers are feature a mixture of land uses such as residential and commercial, and typically provide retail uses that encourage pedestrian travel.											

Table 7-25. Summary Matrix (continued)

PERFORMANCE MEASURES				ALTERNATIVES							
							BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	Today	No Build	TSM	17	1	14	11	16
Number of High Opportunity Areas for Redevelopment Within ½ Mile of Each Alignment											
B	2	a	Number of high opportunity areas for redevelopment within 1/2 mile of each alignment		N.A.	N.A.	N.A.	W	W	W H	W'H
Note: All Cities within Study Area maintain specific TOD provisions or are receptive to TOD provisions as defined in their general plans, community plans or specific plans ** W: City of Los Angeles CRA Redevelopment Area in Wilshire Center/Koreatown; H: City of Los Angeles CRA Redevelopment Area in Hollywood											
Cost-Effectiveness											
C	1	a	Order of Magnitude Capital Cost ($ Billions, 2008)		$0.00	$0.134	$1.082	$6.063	$6.997	$9.057	$9.448
C	1	a	Order of Magnitude Capital Cost (10 years) ($ Billions, YOE)		$0.00	$0.172	$1.387	$7.771	$8.968	$11.610	$12.111
C	1	b	Capital Cost Per Route Miles ($ Millions, 2008)		$0	N.A.	$34	$475	$489	$509	$507
C	1	b	Capital Cost Per Route Miles ($ Millions, YOE)		$0	N.A.	$44	$609	$627	$652	$650
C	1	c	Order of Magnitude Annual O&M Cost ($ Millions, 2008)		$1,363	$1,378	$1,369	$1,459	$1,473	$1,518	$1,530
C	1	d	Daily Hours of Transit User Benefit compared to No Build		N.A.	1,700	13,800	39,300	37,000	47,800	44,900
C	1	d	Cost per hour of transit system user benefits for selected representative alternatives compared to No Build (CEI)		N.A.	$53	$17	$35	$44	$44	$51
* Removes 2 lanes of traffic											
Financial Feasibility											
D	1	a	Relative eligibility of alts for new starts funding**		L	L	H	M	M	M	L
D	1	b	Consistency with Metro's LRTP and financial direction***		C	C	C	N	N	N	N
** L = Low; M = Medium; H = High; vh = Very High *** C = Consistent; N = No ^If traffic lanes must be replaced, then increase to Medium.											

Table 7-25. Summary Matrix (continued)

PERFORMANCE MEASURES				ALTERNATIVES							
Goal	Objective	Measure	Criteria	Today	No Build	TSM	BRT	Wilshire HRT		Combined HRT	
							17	1	14	11	16
Equity											
E	1	a	Number of low income HH within 1/2 mile of each alignment - present		39.8	39.8	39.8	18.7	18.6	25.9	26.0
E	2	a	**Local jurisdiction/communities directly impacted - displacements, construction**								
					City of SM	City of SM	City of SM	City of SM	City of SM	City of SM	City of SM
					City of BH	City of BH	City of BH	City of BH	City of BH	City of BH	City of BH
					City of WH	City of WH	City of WH	City of LA (7)	City of LA (8)	City of WH	City of WH
					City of LA (8)	City of LA (8)	City of LA (8)	LAC	LAC	City of LA (8)	City of LA (9)
					LAC	LAC	LAC			LAC	LAC
			Total jurisdictions/ communities		12	12	12	10	11	12	13
E	2	b	**Number of residents within 1/2 mile by ethnic group/minority populations**								
			Black		15,123	15,123	15,123	9,836	9,781	11,390	11,279
			Amer Indian/Eskimo		1,030	1,030	1,030	521	554	720	694
			Asian		47,951	47,951	47,951	35,528	35,358	38,356	38,620
			Hawaiian/Pacific Islander		354	354	354	208	210	249	241
			Other-Non-Hispanic		1,201	1,201	1,201	750	690	862	807
			2+Races Non-Hispanic		13,180	13,180	13,180	7,977	7,713	9,679	9,450
			Hispanic		47,041	47,041	47,041	21,837	22,012	27,021	27,048
* Removes two lanes of traffic Abbreviations: City of SM =City of Santa Monica; City of BH = City of Beverly Hills; City of WH = City of West Hollywood; City of LA = City of Los Angeles; LAC = Los Angeles County											
Estimated ROW Impact											
F	1	a	Estimated ROW impact based on proposed alt footprint (thousands of square feet)		None	Mn	1,335	420	480	550	570
Mn = Minimal											
Impacts to Traffic Circulation in Lane Miles											
F	2	a	Lane miles of traffic lanes removed or impacted		0	0	44.8	0	0	0	0
F	2	b	Lane miles of parking lanes removed or impacted		0	0	26.4	0	0	0	0
* Removes two lanes of traffic											

Table 7-25. Summary Matrix (continued)

PERFORMANCE MEASURES				ALTERNATIVES							
							BRT	Wilshire HRT		Combined HRT	
Goal	Objective	Measure	Criteria	Today	No Build	TSM	17	1	14	11	16
Estimated Visual and Noise Impacts											
F	3	a	Estimated level of visual impacts to surrounding neighborhoods		None	None	L	Md	Md	Md	Md
F	3	b	Potential noise & vibration impact - Operational Impacts		0	0	0	0	0	0	0
** L = Low; Mn = Minimal, Md = Moderate; H = High, VH = Very High *** Total amount of acreage, 2 hospitals and 5 schools											
Emergency Exits and Evacuation											
F	4	a	Ability to provide for emergency exits and evacuation		N.A.	N.A.	N.A.	Md	Md	Md	Md
* L = Low; Mn = Minimal; Md = Moderate; H = High; VH = Very High											
Vehicle/Transit/Pedestrian Conflicts											
F	4	b	Extent of vehicle/transit/ pedestrian conflicts that are not fully protected		Md	Md	L-M	L	L	L	L
* Removes two lanes of traffic ** L = Low; Mn = Minimal; Md = Moderate; H = High; VH = Very High											
Impacts on Sensitive and Protected Environmental Resources											
F	5	a	Estimated Number of Cultural or Natural Resources Directly Impacted		N.A.	N.A.	65	45	36	78	65
F	5	a	City of LA Historic Cultural Monument (HCM)		N.A.	N.A.	22	11	6	30	22
F	5	a	City of LA Historic Period Overlay Zone (HPOZ)		N.A.	N.A.	3	3	2	4	3
F	5	a	California Historic Landmark (CaHL)		N.A.	N.A.	3	2	2	3	3
F	5	a	National Register of Historic Places (NRHP)		N.A.	N.A.	5	2	1	7	5
F	5	a	Archeological Resource (AR)		N.A.	N.A.	22	18	18	22	22
* Removes two lanes of traffic											
2030 Estimated Reduction in VMT											
F	6	a	Estimated Daily 2030 Daily Reduction in VMT (Study Area) Compared to No Build (in thousands)		N.A.	6	23	61	55	73	71
* Removes two lanes of traffic											

7.11 Important Trade-offs Between Alternatives

Based on the technical information developed for the five Build Alternatives, the next step is to compare the merits of each alternative in order to recommend the most promising alternatives that will be carried into the next phase for full environmental review. The No Build and TSM Alternatives are required by the state and federal processes to be included in the environmental review.

Table 7-25 summarizes the key comparative evaluation using the seven goals identified for the evaluation framework. One of the first steps is to evaluate the Build Alternatives against Goal A – Mobility Improvement. As part of the Purpose and Need for the Westside Extension Transit Corridor Study, the major objectives are to reduce transit travel times, improve trip reliability, provide sufficient transit capacity to meet 2030 transit demand, maximize potential transit ridership, and to enhance linkages to the transportation system. Based on these objectives and the comparison to the HRT Alternatives, the Bus Rapid Transit Alternative 17 is not recommended to be carried into the next phase of analysis. The BRT Alternative is a good near-term solution, but does not provide sufficient capacity in the long term and does provide as a reliable trip time performance as the HRT Alternatives. Currently, within the City of Los Angeles, a federally sponsored program will provide peak period bus lanes as a quality near-term solution.

The next step in the comparative analysis is to compare the two "Wilshire" alternatives (HRT Alternatives 1 and 14). During Step 1 of the evaluation process, a "stand-alone" West Hollywood-Santa Monica Boulevard HRT alternative was eliminated from future consideration. Therefore, a West Hollywood connection between Wilshire Boulevard and the Hollywood/Highland Red Line Station must only be done in concert with a Wilshire alignment alternative. The process would be to first choose the "best" Wilshire alternative and then add the West Hollywood segment to the "best" Wilshire alternative to have the "best" combined alternative. In comparing HRT Alternatives 1 (straight out Wilshire) and 14 (a deviation to serve the 3rd/Fairfax and the Beverly Center areas), the most significant factors favoring Alternative 1 (straight out Wilshire) are lower initial capital cost (2 less stations and 1.5 miles shorter – almost $1 billion less cost); more new transit trips; higher rail transit usage; faster travel time by over 5 minutes; has more user benefits (a key Federal evaluation factor); and a Cost-Effectiveness Index which allows this alternative to be considered competitive for Federal New Starts funding. Based on all the evaluation factors presented in Table 7-10 and the discussion above, HRT Alternative 1 is recommended for future study in the next phase.

Based on the comparative evaluation, the selection of the best Combined HRT Alternative is straight forward. The combined HRT Alternative 16 includes the same alignment consideration as HRT Alternative 14 (Wilshire deviation). Therefore, Alternative 16 is recommended to be dropped from further consideration. This leaves HRT Alternative 11 as the best combined alternative to study in the next phase. Even though Alternative 11 has a high cost, it more closely meets the Purpose and Need of the Westside Extension Transit Corridor Study and merits further analysis and consideration in the next phase.

This comparative analysis recommends that the following alternatives be considered for future study in a Draft EIS/EIR process as the best alternatives that meet the Purpose and Need for the Westside Extension Transit Corridor Study and are the most competitive for possible Federal New Starts funding participation:

- No Build (required)
- Transportation Systems Management (required)

- HRT Alternative 1
- Combined HRT Alternative 11

During the EIS/EIR process the following issues will need to be studied leading to the selection of a Locally Preferred Alternative and preparation of an application to the Federal Transit Administration (FTA) for advancement into Preliminary Engineering:

- Decisions about optional station
- Details of station locations
- Physical alignments between stations
- Impacts identification and proposed mitigation measures
- Costs and possible phasing
- Evaluation of the cost effectiveness of project elements