4 EVALUATION OF ALTERNATIVES

This chapter summarizes the evaluation criteria used to assess the three "analysis alternatives" (Enhanced Bus, Rail Transit and Pricing/Enhanced TDM) and the results of the evaluation. Evaluation criteria were proposed to the Technical Advisory Committee (TAC) and Community Advisory Committee (CAC) in April and May of 1994 (see Chapter 3 Section 3.1 and Appendix D *Evaluation Criteria for the Assessment of Highway 101 Alternatives*). TAC and CAC comments, originally included in the project Request for Proposal, and other identified concerns were incorporated into the criteria. Final evaluation criteria and a detailed discussion of quantification methods used are found in Appendix D.

Each alternative should be considered as an "analysis alternative," or a measurable transportation strategy which can serve as a basis for estimating the transportation impacts of a broad range of implementation strategies to avoid the need to widen Highway 101. Similar levels of traffic congestion relief and environmental and community impacts are expected from these more expansive implementation strategies. Individual strategies will then be combined into an integrated, multimodal alternative to the highway widening.

4.1 EVALUATION CRITERIA

Technical and community based interests and concerns identified through the public scoping workshop and meetings conducted with the TAC and CAC fall into the following categories. These can be used to assess how well each alternative meets the community's objectives:

Effectiveness in reducing single occupant vehicles and avoiding the need to widen Highway 101
Safety
- Freedom of mobility
- Cost-effectiveness
- Minimizing environmental harm and damage
- Maintenance of a viable and healthy local economy
- Compatibility with long-term comprehensive planning
- Integration of transportation modes
- Maintenance of the area's "quality of life" and character
- Maximizing "bang for the buck"

A four part set of evaluation criteria were developed for this study. Evaluation criteria were initially identified in the revised Request for Proposal issued for this study. Criteria were then enhanced to include measures which reflect identified community interests and concerns, as well as traditional performance indicators as used by transportation planners to assess transit and travel demand management strategies. The criteria used in this study were approved by the TAC and CAC in May of 1994.

These criteria were further detailed into individual measures which are consistent with those specified in the United States Department of Transportation's regulations for evaluating major metropolitan transportation investments and with the types of measures typically used to evaluate multimodal transportation alternatives in California. Table 4-1 lists both what evaluation criteria the public asked for and what criteria the TAC and CAC approved under each of four broad categories. The methods used in this study to quantify each measure are described in Appendix D.

Many of these measures provide a quantitative basis for comparison of the "analysis alternatives". Forecast travel statistics serve as the basis for comparison in the Measures of the Problem and Measures of the Solution evaluation categories. Other measures are qualitative in nature and required subjective judgments by technical professionals conducting the study. Thresholds of significance such as those prescribed by local policies or through national, state, or local environmental regulations are used where available. Examples include federal and state ambient air quality standards, or Santa Barbara County's Congestion Management Program (CMP) traffic level of service (LOS) threshold, LOS D, for roadways and intersections on the CMP system (see Figure 4-1).

4.2 IMPACT ASSESSMENT OF ANALYSIS ALTERNATIVES

The impacts of each of the three "analysis alternatives" are tabulated in Table 4-2. These impacts were estimated primarily from the application of the SBCAG regional travel forecasting model, supplemented by the Federal Highway Administration's (FHWA) two Pricing/Enhanced TDM Analysis Model developed by Comsis Corp. under contract to FHWA. The mode choice components of these models are based upon extensive research over the past three decades (e.g. Lave, 1969; Stopher, 1967; Spear, 1976; Domencich and McFadden, 1975; Koppleman, 1980; McCord and Villoria, 1987; Neels and Mather, 1987) of the determinants of travel mode choice, behavior has concluded that people act as rational economic consumers of travel, choosing the mode that provides them the least *perceived* "generalized cost" for a given trip, in terms of both travel time and monetary costs, as well as "quality of service" factors such as comfort, convenience of use, and reliability of arrival times. These factors explain the reasons why particular modes are more "attractive" to trip-makers for specific trips in the South Coast, as elsewhere in North America, and why the proposed alternatives have the forecast travel impacts that are shown.

This research has shown that travel time is not equally valued by travelers, that the time spent traveling within a vehicle (car, bus or train) is less onerous (by a factor of 1/3 to 1/2) than the time spent walking to/from the vehicle or waiting for the vehicle. Additionally, this research has demonstrated that the cost of the trip is perceived by travelers as the "out-of-pocket" cost of the trip, in terms of transit fares paid or automobile parking charges

and tolls incurred during a trip. The research has also shown that these perceived out-of-pocket costs for a specific trip do not include the other, usually larger, costs of automobile ownership such as depreciation, insurance, etc.

Therefore, to induce travelers to shift from the currently predominant choice of single occupant vehicles (SOV) for at least some of their daily trips, the relative "generalized costs" of SOV versus alternative modes such as carpool and transit must be changed from the current conditions; the economic "signals" being sent to travelers must be modified. This can be accomplished both by making alternatives to SOV use more competitive with SOV and by making SOV usage less competitive with alternative modes. Making the alternative modes more competitive involves improving travel times for those alternatives as well as making them cheaper to use on an "out-of-pocket" cost basis. Making SOV usage less competitive can be accomplished by increasing SOV travel times (e.g. by allowing increased traffic congestion, limiting the availability of conveniently located parking, etc.) and by increasing the out-of-pocket costs of SOV use (e.g. charging higher parking fees, increasing the price of gasoline through taxes or fees, imposing tolls, etc.). These underlying travel behavior concepts formed the basis for the development of alternatives to the widening of Highway 101 and their forecast ability to reduce future automobile use.

Recent literature in transportation costs analysis (e.g. Litman, 1995; Miller and Moffet, 1993) extends this conclusion with efforts to bring out "hidden costs" of auto ownership and operation with the idea that the public will make more realistic mode choices. The "hidden cost" concept is described in more detail in Section 4.2.3 below. "As a significant share of drivers face paying more of the full cost of operating vehicles, some of them would choose alternatives. Transit might pick up some passengers and auto occupancies may increase" (Polzin, 1994).

A comparison can be made between the results of each "analysis alternative", the No Build alternative and the results forecast for the highway widening (Build Alternative) as proposed in *Caltrans' Draft Environmental Impact Report (DEIR)* of October, 1993. The No Build alternative assumes the existing configuration of Highway 101 and most other local streets in the year 2015. (See section 2.3.2 of Chapter 2 for a description of assumed improvements in local streets and roads.) The widening of Highway 101, as described in the Caltrans DEIR, assumes a six lane facility (3 lanes in each direction) between Milpas Street and the Ventura County line (see Section 2.3.2 Future Roadway Network Characteristics). Each "analysis alternative" package of transportation improvements represents a substantially different approach to accommodating travel demand in the Highway 101 Corridor in order to analyze a broad range of options and were described in detail in Chapter 3. Their comparative impacts, by category of evaluation measure, are listed in Table 4-2, and are discussed in the following sections.

4.2.1 Measures of the Problem

Measures of the Problem compare the forecast traffic volumes and resulting levels of service along Highway 101 and on parallel arterials. Highway 101 evaluations consider the average daily traffic volumes and the peak hour level of service congestion which reflects the directional split in traffic flow. The parallel arterial comparison is based on average daily traffic as directional splits were not available for these facilities. Additional comparisons of operational characteristics which measure the problem complete this section of the evaluation.

Forecast Daily Traffic and Peak Hour Level of Service on Highway 101. If no capacity enhancing improvements are implemented in the Highway 101 Corridor by 2015, traffic volumes are forecast to increase by approximately 30 to 35 percent throughout most of the Corridor. Due to forecast growth in population and employment in both Santa Barbara and Ventura Counties (see Section 2.3.1 in Chapter 2), the percent increase in traffic at the west end of the Corridor is less than for the east end because existing traffic volumes are higher at the west end, leaving less available roadway capacity for future traffic growth. Increases of approximately 17 percent are projected at the more heavily trafficked west end of the Corridor at Milpas Street. Congestion is predicted to be greatest in the Santa Barbara portions of Highway 101 and will lessen very slightly in the Montecito area, continuing to lessen as Highway 101 approaches Ventura County.

Level of Service (LOS) is a quantifiable description of the traffic flow conditions on a roadway which is based upon the relationship between of the numbers of vehicles using the roadway and the traffic flow capacity of the road. The ratio of the traffic volume to the capacity of the roadway indicates the density of traffic flow or the level of congestion predicted on the road and can then be converted into one of six Level of Service categories (A through F). Figure 4-1 provides a graphic representation of the six levels of service which gives the reader a “feel” for traffic conditions associated with each Level of Service. Appendix G describes the methodology used to calculate LOS on Highway 101.

The peak hour level of service (LOS) on Highway 101, both in the base year (1993) and in the forecast year (2015) is worse in the eastbound direction in the p.m. peak period than westbound in the a.m. peak period. This finding is consistent with traffic flow patterns in most urban areas in the U.S. where the p.m. peak period typically has higher traffic volumes and worse LOS than the a.m. peak period. The forecasts show that the worst LOS conditions on Highway 101 in the study Corridor will exist both east of Salinas Street and east of San Ysidro Road. Highway 101 in the No Build alternative as well as in the Enhanced Bus and Rail Transit analysis alternatives is forecast to operate at LOS F in the p.m. peak at these locations, compared to LOS E in 1993. The highway widening or Build alternative, is forecast to improve Highway 101 traffic LOS east of Salinas Street to LOS D and to keep a level of LOS E east of San Ysidro Road. This reduction still results in the Santa Barbara and Montecito portions of Highway 101 operating at LOS F during peak periods and the

portions in Summerland and Carpinteria operating at LOS E during average day peak periods in 2015.

The Pricing/Enhanced TDM analysis alternative offers the best forecast LOS on Highway 101 of all the alternatives to the widening, keeping both sections of the highway operating at LOS E in the p.m. peak period. This is due to the high levels of trips predicted to be eliminated as a result of the modified work weeks and the parking charges for single occupant vehicles which park all day. The incentives to carpool, in the form of either a rebate if using public transit or reduced daily charges if carpooling are expected to provide a significant motivation for changes in the home to work trip. Traffic volumes are predicted to be lower than those forecast for the No Build alternative. Those portions of Highway 101 in the Montecito area are predicted to be operating at LOS E, in excess of the CMP threshold for congestion. Remaining portions of Highway 101 in the areas of Santa Barbara, Carpinteria and south towards the Ventura County line are forecast to operate at LOS D.

2015 Forecast Daily Traffic on Parallel Arterials and CMP Intersection Impacts. The effect of any of the alternatives on local streets and roads is of paramount importance to members of the TAC and CAC. Traffic level of service on all roads in the Corridor, not just Highway 101, affects the mobility of South Coast residents. Table 4-2 displays the forecast average daily traffic on the parallel arterials at four locations along the Corridor. The No Build alternative results in highest forecast traffic volumes on these parallel arterials as forecast congestion on Highway 101 diverts more traffic to these local roads. Highway 192, Old Coast Highway and Cabrillo Boulevard in the Santa Barbara area are all predicted to experience an increase of 22 percent in average daily traffic (ADT) over the 1992 base year levels. This is a forecast increase of between 1,500 and 2,800 vehicles per day. Montecito area roadways, Highway 192 and North Jameson Lane, are predicted to experience an increase in ADT of 28 percent and 25 percent respectively. The Summerland and Carpinteria areas will also experience increased traffic volumes on parallel roadways. Highway 192, between Montecito and Summerland, is predicted to experience an increase in traffic volumes of 19 percent while Via Real is predicted to experience a 65 percent increase in traffic over the base year. Daily traffic volumes on Via Real are predicted to increase by 4,600 vehicles per day over 1992 base year traffic volumes under the No Build alternative. Carpinteria’s parallel roadways are predicted to increase traffic volumes by approximately 41 percent over the 1992 levels. The primary reason for the increase in traffic on the parallel arterials under the No Build scenario is the high level of traffic congestion which is predicted to be experienced on Highway 101, which would make these parallel routes more attractive, in terms of travel time, to motorists, compared with Highway 101.

The Build alternative results in the greatest reductions in daily traffic volumes on the major parallel arterials. Forecast traffic volumes on many parallel arterial streets will be reduced substantially from ADT predicted under the No Build alternative. In

the Santa Barbara area, the three parallel arterials are predicted to have traffic volumes 37 to 56 percent less than would occur in the No Build alternative. In the Montecito area Highway 192 is predicted to have ADT reduced by 85 percent over the No Build alternative. Only North Jameson Lane is predicted to experience an increase in traffic, a significant increase over the 2015 No Build estimated daily traffic volumes. This is due to the road's ability to continue to serve as a frontage road to Highway 101. This increase may result in significant congestion at this ramp.

The Enhanced Bus and Rail Transit analysis alternatives are forecast to provide slight reductions in these forecast traffic volumes compared to the No Build volumes. The reductions in traffic volumes on the parallel roadways predicted from the Rail Transit package are not as significant as those predicted for the Build alternative due to the congested conditions predicted for Highway 101. Access to bus or rail stations will still continue primarily by automobile with this traffic collecting on the parallel arterials and other major streets in each community. Increasing congestion on Highway 101 as predicted under the Enhanced Bus and Rail Transit analysis alternatives will cause drivers to look for alternate routes on local roads.

The Pricing/Enhanced TDM analysis alternative is forecast to result in traffic volumes on parallel arterials slightly higher than 1993 levels, but lower than all alternatives except the Build (highway widening) alternative, which is forecast to have arterial volumes less than 1993 values. This forecast result for the Build Alternative is a consequence of SBCAG's traffic assignment model, which, like most urban area travel forecasting models, tends to under-forecast traffic volumes on roads of lesser capacity and regional significance, particularly those paralleling a major freeway. Although a traffic volume "smoothing" approach (Appendix E) was applied to the volumes output form the traffic model to mitigate this problem, it could not completely eliminate it.

A total of nineteen Congestion Management Plan (CMP) intersections were initially evaluated for traffic LOS impacts under each alternative as an additional assessment of each alternative's effect on local streets and roads in the Corridor (see Table 4-3) for full list and intersection approach volumes). In order to focus attention on those intersections which may be more adversely affected by changes in overall travel demand or circulation patterns, the following checks were applied to reduce the number of intersections that were analyzed and listed here:

eliminate from consideration those intersections currently operating at LOS A or B;
eliminate from consideration those intersections currently operating at LOS C which have capital improvements identified in the 1993 Regional Transportation Plan (RTP).

Intersections eliminated from further focus by the above screening procedure are presumed to have sufficient capacity to absorb

additional demand through the year 2015 and still remain within the CMP LOS standards regardless of which alternative for the Highway 101 Corridor is pursued. Santa Barbara County's adopted CMP sets a threshold of LOS D for intersections, below which future intersection capacity improvements must be identified or transit or Pricing/Enhanced TDM strategies must be implemented which will bring the failing intersection to within the designated LOS threshold. Those intersections which were not screened out by the above criteria were analyzed in greater detail using the Transportation Research Board's Circular 212 method for estimating intersection level of service. Table 4-4 includes the results of this intersection analysis. CMP intersections are generally forecast to see improved levels of service under the Build, Bus, Rail or Pricing/Enhanced TDM analysis alternatives over those forecast for the No Build alternative.

Two intersections are predicted to fail the CMP threshold under the No Build alternative and two are predicted to fail the threshold under the Build alternative. It is the Pricing/Enhanced TDM analysis alternative, with its major shift of trips to carpooling and vanpooling which is expected to result in the greatest improvements in local intersection performance. None of the critical intersections are predicted to fail under the Pricing/Enhanced TDM analysis alternative.

Table 4-4
Congestion Management Plan Intersection Analysis

INTERSECTION	91-94 CMP LOS	2015 NO-BUILD		2015 BUILD		2015 ENHANCED BUS		2015 RAIL		2015 PRICING/ ENHANCED TDM	
		V/C (1)	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
U.S.101 NB. Milpas St.	D	.78	C	.85	D	.75	C	.75	C	.62	B
U.S. 101 SB-off/ Mission St.	D	.99	**E**	.99	**E**	.94	**E**	.94	**E**	.82	C
U.S. 101 NB-off/ Las Positas	D	1.05	**F**	.82	D	1.04	**F**	1.04	**F**	.77	C
U.S. 101 NB/EW/ Calle Real	D	.87	D	.69	B	.74	C	.74	C	.55	A
Castillo Blvd./ Montecito Street	D	.48	A	.54	A	.47	A	.47	A	.37	A
Calle Real / U.S. 101	D	.68	B	.98	**E**	.62	B	.62	B	.49	A

The LOS results above reflect Intersection Improvements identified in the 1993 RTP or the 1994 CMP.

(1) V/C is volume to capacity ratio for highest traffic level intersection approach volume.

Total Vehicle Miles of Travel (VMT) and Total Vehicle Hours of Travel (VHT) on Highway 101. Vehicle Miles of Travel (VMT) on Highway 101 are forecast to increase approximately 43 percent over 1993 levels by the year 2015 for the No Build alternative. Forecast VMT varies slightly among the alternatives, with the Build alternative forecast to have the highest VMT on Highway 101 and the Pricing/Enhanced TDM analysis alternative the lowest, with a difference of 16 percent between them.

Vehicle Hours of Travel on Highway 101 are forecast to increase by 292 percent from 1993 to the year 2015 No Build alternative, reflecting the growth in delay due to forecast congestion from increased traffic volumes. The Build alternative is forecast to have the lowest level of future VHT on Highway 101, as its extra two lanes of capacity better accommodate future traffic volumes allowing for higher vehicle speeds. Among the alternatives to the widening, the Pricing/Enhanced TDM analysis alternative provides the lowest forecast VHT on Highway 101, 13 percent higher than the Build alternative.

Percent of VMT Operating at LOS E or F in the Corridor. Only the Build alternative is forecast to provide for acceptable (as defined by the County's CMP) traffic flow (level of service D or better) along all segments of Highway 101 on an average daily basis in the

year 2015. Based on measures of congestion, the Pricing/Enhanced TDM analysis alternative is the next most effective after the Build alternative in relieving forecast traffic congestion in the Corridor. Under this alternative, only one segment of Highway 101 in the Corridor, east of San Ysidro Road, (or approximately 13 percent of the forecast vehicle miles of travel) would be operating at LOS E during peak periods. The remainder of the Highway 101 Corridor is forecast to operate at LOS D during peak periods in this alternative.

The Rail Transit analysis alternative and the Enhanced Bus analysis alternative are forecast to result in traffic conditions of LOS E or worse along the entire length of Highway 101 in the Highway 101 Corridor in the year 2015. Under both the Rail Transit and Bus analysis alternatives, approximately 33 percent of the forecast vehicle miles of travel in the Highway 101 Corridor would operate under LOS F conditions.

Total Daily Vehicle Trips Produced in Corridor. The largest increases in the number of daily vehicle trips produced in the Corridor over Existing are projected to occur in the No Build and Build Alternatives (18,300 and 18,600), for an increase in daily vehicle trips of about five percent. The number of daily trips is expected to decrease by about 5,000 (or one percent) for the Enhanced Bus and Rail Alternatives. The largest decrease in trips is expected to occur in the Pricing/Enhanced TDM Alternative, with a decrease of 90,500 trips. Under this alternative, major shifts of trips to carpooling and vanpooling are expected, thereby reducing the total number of vehicle trips by about 21 percent.

Percent of Total Person Trips in Single Occupant Vehicles (SOV). Changes in the forecast average daily percentage of single occupant vehicle trips is greatest under the Pricing/Enhanced TDM analysis alternative; reduced from 67 percent under the No Build alternative to 48 percent. The Pricing/Enhanced TDM analysis alternative includes both an enhanced employer performance element and an areawide pricing element. The employer element is one that involves all employers within the county with 20 or more employees implementing comprehensive, aggressive Pricing/Enhanced TDM programs (See Section 3.3.3). The areawide pricing element tests the effects of pricing incentives or disincentives on reducing single occupant vehicle trips. A. $3.00 per day surcharge on all SOV all day parking in the South Coast region was used as a surrogate for various pricing disincentives (parking tax, parking charges, flat tolls or congestion fees). The surcharge was applied to all travel, i.e. all trip purposes with destinations in the South Coast region. In assessing the impact of the enhanced employer element versus the areawide pricing element, one should remember that the enhanced employer element is applied to home-based work trips (HBW) only, whereas the areawide pricing strategy is applied to all trip purposes.

The pricing element alone is estimated to reduce HBW trips by about 10 percent. Full implementation of both elements (employer and areawide elements of the Pricing/Enhanced TDM analysis alternative program) is estimated to result in a reduction of HBW trips by 21

percent. The relatively impressive results generated by the enhanced employer strategies need to be tempered by the realization that HBW trips account for only 22 percent of forecast total daily trips in the Corridor. However, according to the results of the intercept travel survey (see Table 2-5), 66 percent of the trips on Highway 101 in a weekday PM Peak hour of traffic were work related trips. Thus, the full implementation of the existing Pricing/Enhanced TDM ordinance alone would have a measurable impact on traffic congestion in the Corridor during peak hours, but a lesser impact at other times of the day. By far, the effectiveness of the combined Pricing/Enhanced TDM analysis alternative on reducing daily SOV trips is derived from the application of the pricing element to all trip purposes as it provides a noticeable "out of pocket" cost to those who drive alone.

Smaller reductions in single occupant vehicle percentages are also predicted for the Rail Transit and Enhanced Bus analysis alternatives. These alternatives improve the attractiveness of transit relative to the auto for many trip origins and destinations in the Corridor, but do not simultaneously penalize the auto mode.

4.2.2 Measures of the Solution

Measures of the Solution focus on the ability of each "analysis alternative" to result in a shift in travel mode, either to transit or bicycle. The associated reductions in daily vehicle trips and travel time are summarized here for each of the alternatives.

Daily Transit Trips and Percent of Trips Made by Transit. Under the Build alternative, the percent of transit trips in the Highway 101 Corridor is estimated to be approximately two percent, compared to one percent in 1990. However, based on the SBCAG travel model forecasts, the average daily auto occupancy in the Corridor under the Build alternative is estimated to be 1.36 persons per vehicle, somewhat lower than the 1.41 estimated from Caltrans travel survey data in 1990. This suggests very little, if any, change in the predominance of the single-occupant automobile for most travel in the Corridor is forecast by 2015 for this alternative. The continued domination of the single-occupant automobile in the 2015 Build alternative can be attributed to two primary factors. The proposed addition of two lanes of freeway capacity reduces future levels of congestion (compared to the No Build alternative) and therefore the inconvenience of automobile travel in terms of travel time delays. Secondly, the Build alternative, as forecasted, does not include any significant enhancements (such as rail transit, express bus service or even enhanced local bus service) over existing conditions which would provide motorists with attractive alternatives to the automobile.

The three analysis alternative packages (Rail Transit, Enhanced Bus and Pricing/Enhanced TDM analysis alternatives) all achieve greater transit ridership levels than those forecast for the highway widening alternative. Improved traffic flows and a highway Corridor operating with no VMT in stop and go or congested traffic in the Build

alternative effectively eliminate any incentive for trip making to shift modes to transit. Both the Enhanced Bus and Rail Transit alternatives dramatically increase transit service levels and intermodal service significantly, which result in the more than tripling of the daily numbers of transit riders.

The tripling of transit ridership as a result of the Enhanced Bus Transit Package can be attributed to the addition of express bus service in the Highway 101 Corridor itself, which provides commuters an alternative to driving along in congested traffic. New or enhanced bus service levels both to and around the proposed freeway transit "stations" provide for quicker trips and less waiting time at stations for transfers from the Express Bus service into the downtown areas. The frequency of peak period service in the Carpinteria area is forecast to tripled on existing MTD bus routes as it is on most existing service which connects directly with the proposed freeway transit stations. Increased service along with the proposed new shuttle service both provide direct access to proposed freeway express bus stops. The addition of new evening local bus or shuttle service in Montecito, Santa Barbara, and Isla Vista areas on designated lines, which connect with new evening express bus service along the Corridor provides Corridor area residents and visitors the ability to travel by bus where little or no opportunity existed before.

The Rail Transit Package attracts essentially the same level of transit ridership as the Enhanced Bus Transit Package for several reasons. The new rail service is complemented by express bus service in this package resulting in travel times which compete favorably with the congested levels of service forecast on the Highway 101 freeway. New shuttles proposed in the Carpinteria area, the City College area and the new shuttle along Ward Memorial Boulevard between UCSB and the freeway provide increased service focused on trip attractors, particularly the schools, which traditionally have greater transit patronage. Conversely, the somewhat shorter travel times offered by the rail transit line compared with the express bus is offset for many potential riders by the additional time needed to transfer between feeder buses and shuttles to/from the proposed rail line.

The percent of daily trips which are forecast to be made by transit under the Pricing/Enhanced TDM analysis alternative is forecast to be approximately 2.4 percent, with an overall average daily vehicle occupancy in the Corridor of 1.71 persons per vehicle. Compared to the Build alternative, the Pricing/Enhanced TDM analysis alternative is estimated to result in a reduction of 109,100 daily vehicle trips in the Corridor. This is primarily due to the steep $3.00 per day (1994 dollars) parking charge on each SOV trip taken that is included in this alternative, compelling travelers to carpool or take transit to defray the additional out-of-pocket cost of using an auto to make a trip.

The Pricing/Enhanced TDM analysis alternative achieves a forecast transit share of 2.4 percent, a level higher than that predicted

under the No Build alternative while lower than the Enhanced Bus or Rail Transit analysis alternatives. This is due, in part, to the assumption that the Pricing/Enhanced TDM analysis alternative included no complementary improvements in transit service, only incentives and disincentives encouraging its use. This results in most forecast mode shifts in this analysis alternative primarily being made into carpools and vanpools as opposed to transit. This is consistent with early Regulation 1501 experience in the greater Los Angeles area (Guiliano, Hwang, and Wachs, Transportation Research, 1993). Modified work weeks are included in the enhanced employer element of the Pricing/Enhanced TDM analysis alternative. Recent evidence shows that compressed work weeks do reduce both trips and vehicles miles of travel (VMT). Additional non-work trips made do not totally off-set the commute trips avoided on the employees' day off (Ho and Stewart, 1992), thus producing a net reduction in average daily trips and VMT.

Average Vehicle Occupancy in the Corridor. The average daily vehicle occupancy (AVO) is forecast to remain relatively constant with today's AVO under either the Build, Rail Transit or the Enhanced Bus analysis alternative. A slight decrease in AVO is forecast under the Build alternative which is attributable to increased travel speeds and reduced congestion in the Highway 101 Corridor, making it less attractive for travelers to carpool. The slight increase in AVO predicted for the Enhanced Bus or Rail analysis alternatives reflects the increase in transit ridership.

The Pricing/Enhanced TDM analysis alternative is forecast to achieve the largest increase in AVO of all "analysis alternatives" evaluated, with a major shift of travelers into carpools help to defray the costs of the $3.00 per day SOV parking charge as well as reflecting the affect on mode choice of the assumed employer incentives to use alternative modes included in this alternative.

The parking fee program is expected to have a limited impact on visitor and weekend travelers to the Corridor. The impact on weekend and visitor trips is expected to be less than on the daily commute trips as vacation trips have a higher auto occupancy generally than other trips. The intercept travel survey results support this conclusion. Sunday peak period average vehicle occupancy was calculated at 2.18 persons per vehicle. Only thirty percent of the observed vehicles had one occupant, as observed during the Sunday PM peak southbound survey, while the weekday evening peak period observed drive alone share was 71.1 percent. The continuation of the 90 minute free parking program is expected to apply to the majority of visitor and non-work related trips. Although overnight stays could result in some application of the enhanced fee program to visitors to the area, most are expected to receive some subsidy due to the higher auto occupancy rate for these travelers.

Percent Daily Bike Trips. The percent of daily trips made by bicycle is a measure of the attractiveness of the bicycle mode among each of the alternatives. The future No Build and Build alternatives were estimated to have the same average daily bicycle mode share, 0.7

percent, as the base 1993 conditions, as no additional bicycle facility improvements or bicycle amenities were assumed in those alternatives. Bicycle travel can be expected to have greater reductions in the visitor and weekend trips as a result of the expanded bicycle facilities. No firm plans have been developed by MTD for enhanced bicycle accessibility on the bus system at this time, although an initial bike rack on bus equipment testing study was completed by MTD and further studies are expected. Connectivity with the existing bus service would be enhanced with the completion of the planned bicycle facilities. For these reasons, the percent of trips made by bicycles under either the No Build or the Highway widening alternative is predicted to be equal.

Increases in the percent of trips made by bicycles under either the Rail Transit or Bus Transit packages (0.88 percent of daily person trips) can be attributed in some part to the interconnectivity between planned bicycle improvements and proposed transit and rail stations or services. The two alternatives assume additional bike on transit equipment is provided. Specific examples of modal interconnectivity follow.

The existing class II bike lanes on Hollister Avenue and Modoc Road would provide a direct link to the proposed transit station in the vicinity of Five Points just east of the intersection of Hollister and Modoc Road, and the existing Maria Ygnacia Creek bike path on Patterson Avenue at the railroad tracks would provide direct access to the Patterson Avenue area transit station under the Rail Transit package. The existing State Street class II facility and the planned class II facilities in downtown Santa Barbara would be located on Anacapa Street parallel to State Street would provide a parallel route for bicyclists to connect with the existing Amtrak station. Further connections from the proposed express bus flyer station with enhanced transit connections to either downtown Santa Barbara, the Waterfront, or the Santa Barbara City College campus may provide even greater connectivity for bicyclists. Bicyclists who choose to board their bicycles could make connections to the existing class I and II facilities on East Cabrillo Boulevard as well as the other planned and existing bicycle facilities in downtown Santa Barbara.

In the Montecito area, existing class II facilities on Olive Mill Road and San Ysidro Road would provide direct access to either the Olive Mill Road station proposed under the Rail Transit package or the proposed flyer stop station at the San Ysidro Road/Highway 101 interchange. However, improvements to the route (especially Ortega Hill Road) would be required to make this route suitable for even Class III designation. In the Carpinteria area existing class II bicycle facilities on Casitas Pass Road and Carpinteria Avenue would provide nearby bicycle access to the proposed rail/transit station at Linden Avenue railroad crossing. Planned class II bicycle facilities on Linden Avenue would provide a direct connection to the Linden Avenue Interchange freeway flyer station as the route is planned to cross Highway 101 and continue to a proposed class I facility along the railroad right of way. The County’s plan for a class I bike path along the existing rail Corridor would also enhance

travel between stations along the highway and provide for access of freeway transit stops as proposed in under the Enhanced Bus Transit analysis alternative along the length of the Study Area.

The Pricing/Enhanced TDM analysis alternative includes additional employer programs to support bicycle commuting. The results of the forecasting reflect the impacts on bicycle shares of these elements of the alternatives as the bicycle share for the two transit alternatives increases to 0.88 percent, a 26 percent increase over the future No Build and the share for the Pricing/Enhanced TDM analysis alternative increases to 1.01 percent, a 44 percent increase over the No Build share. Most of these increases are expected to come from trips less than six miles in length, one-way, which will affect a reduction more in shorter auto trips which will have less impact on Highway 101 traffic volumes.

Average Speed on Highway 101. The average daily speed is forecast to drop by half between 1993 and the year 2015 No Build alternative due to forecast increases in traffic volumes and associated congestion as a result of forecast increases in population and employment in the South Coast and Ventura County over the next 20 years. This will result in more traffic diverting to the parallel, local arterials as they will be as fast or faster than Highway 101 to travel on during peak periods. The Build alternative is forecast to have the highest future average speed at 42.5 mph, which is still less than the 1993 average. The Enhanced Bus and Rail Transit analysis alternatives provide for a slight increase in average speed over the No Build, while the Pricing/Enhanced TDM is forecast to have the highest average speed of the alternatives to the widening, but still significantly below today's average daily speeds on Highway 101.

Net Reductions in Daily Vehicle Trips. The Rail Transit analysis alternative and the Enhanced Bus analysis alternative are both forecast to result in approximately 24,000 (5 percent) fewer daily vehicle trips in the Corridor, with a correspondingly reduced estimate of vehicle miles of travel, approximately 132,000 vehicle miles per day, 11 percent fewer than the Build alternative.

The forecast effects of the pricing element of the Pricing/Enhanced TDM analysis alternative; reduced vehicle trips, are supported in several surveys of case studies where driver paid parking was initiated. These surveys are coalesced in a recent article, *An Opportunity to Reduce Minimum Parking Requirements*, (Shoup, 1995) and shown in Table 4-5. Shoup observes that " on average, in these seven case studies, driver paid parking reduced the numbers of cars driven to work by 19 cars per 100 employees".

Table 4-5
Driver-paid Parking Reduces Solo Driving to Work

(Cars driven to work per 100 Employees)

Location and Date	Employer Pays for Parking	Driver Pays for Parking	Difference	Price Elasticity of Demand

Civic Center, Los Angeles, 1969 (a)	78	50	-28	-0.22
Downtown Ottawa, Canada, 1978 (b)	39	32	-7	-0.10
Century City, Los Angeles, 1980 (a)	94	80	-14	-0.08
Mid-Wilshire, Los Angeles, 1984 (b)	48	30	-18	-0.23
Warner Center, Los Angeles, 1989 (b)	92	64	-28	-0.18
Washington, D.C., 1991 (a)	76	58	-18	-0.13
Downtown Los Angeles, 1991 (a)	75	56	-19	-0.15
Average of Case Studies	**72**	**53**	**-19**	**-0.15**

Sources: Groninga and Francis (1969), Transport Canada (1978), Shoup and Pickrell (1980), Surver, Shoup, and Wachs (1984), Soper (1989), Miller (1991), Wilson (1991) in Shoup (1995)

(a) Case study compared the commuting behavior of employees with and without employer-paid parking.

(b) Case study compared the commuting behavior of employees before and after employer

4.2.3 Measures of Effectiveness

Cost effectiveness is one concern frequently mentioned at the public scoping meeting and at several TAC/CAC meetings. Measures of effectiveness focus on the relative cost of each scenario compared with the benefits each offers.

Total Cost of the Alternative. The highest total costs for an alternative are estimated for the either the Build alternative or the Rail Transit analysis alternative, depending on which scenario or technology is selected. The total cost of the Build alternative is estimated to be between $102 and $142 million expressed in 1994 dollars based upon the cost estimates provided by Caltrans in the Draft EIR. Total project costs for the proposed rail strategy vary due to the two types of rail technology considered with $102 million representing the cost-effectiveness of the diesel rail car (DRC) technology and the $142 million representing the light rail transit (LRT) technology. Higher LRT costs are attributable to the need for construction of the 22 miles of new track, electric power distribution system, and a requirement for a complete LRT storage yard and maintenance shop. These needs are required for either a small or large LRT fleet.

Operating and maintenance costs for the DRC are higher than those for the LRT or the Enhanced Bus analysis alternative because of the cost

of operating in a shared track environment with Southern Pacific Railroad and Amtrak. These costs are affected by who operates the signals and dispatch systems. Total cost estimates for the rail alternative range from $134 million for the DRC based system to $357 million for the LRT based system while total costs for the Enhanced Bus Transit package are estimated between $43 million and $47 million. Both costs include the cost of additional buses to serve the revised bus service levels. The higher bus costs are due to estimates for union based operations and maintenance costs if no contract service could be negotiated for the new Highway 101 express bus service. Total cost of the Pricing/ Enhanced TDM analysis alternative is the lowest of all alternatives evaluated except the No Build. Costs are associated with the administration of Pricing/Enhanced TDM programs estimated from cost information provided by Traffic Solutions, and the cost of providing incentives to tourists or visitors to the Santa Barbara area.

Annualized Total Cost of the Alternative. The annualized cost of the Build alternative ranges from between $11 million to $15 million per year. Annualized costs for the Enhanced Bus analysis alternative and resulting cost effectiveness are forecast to be slightly higher than those achieved by the Pricing/Enhanced TDM analysis alternative. The total annualized cost of the Enhanced Bus analysis alternative is estimated at between $5.5 million and $6.0 million. Total annualized costs of the Pricing/Enhanced TDM analysis alternative are estimated at $5 million per year.

Annualized Total Cost Per Vehicle Trip Reduced. As trips are predicted to increase under the Build alternative, no cost effectiveness measure of annualized cost per vehicle trip reduced can be calculated. The most “bang for the buck” is achieved with the Pricing/Enhanced TDM analysis alternative with the total annualized cost per vehicle trip reduced by $0.17, or less than a quarter. The Measures of Effectiveness (“bang for the buck”) for the Enhanced Bus Transit analysis alternative have been calculated as an estimated total cost per vehicle trip reduced (in 1994 dollars) of between $2.31 and $2.59. This is 12 to 14 times higher than the cost per vehicle trip reduced by the Pricing/Enhanced TDM analysis alternative. The total annualized cost per vehicle trip reduced, is also the highest of the three alternatives – ranging from $3.81 to $5.70 per vehicle trip reduced.

Annualized Capital Cost Per Vehicle Trip Reduced. No capital costs within the Corridor are associated with the No Build alternative. Capital costs for the Build alternative exceed the operations and maintenance costs for this alternative.

Annualized capital cost per trip reduced for the Enhanced Bus analysis alternative are estimated as half of those for the Rail Transit analysis alternative on the low end of the estimate and nearly five times greater than those capital costs estimated at the high end. It is with capital costs that differences between the bus and rail strategies are the most dramatic. The estimated annualized capital cost per vehicle trip reduced is $1.56 for the DRC technology

and $4.15 for the LRT. The corresponding annualized capital costs per trip for the Enhanced Bus analysis alternative range from $0.80 to $0.88 cents per trip. The Rail Transit analysis alternative results in annualized capital cost effectiveness rate per trip reduced which are estimated at from ten to thirty times more expensive than those achieved by the Pricing/Enhanced TDM analysis alternative while the Enhanced Bus analysis alternative results in differences which are three to four times more expensive than the Pricing/Enhanced TDM analysis alternative.

The Pricing/Enhanced TDM analysis alternatives program's capital costs contribute an annualized cost of $0.15 per vehicle trip. The absence of expensive construction costs keeps the lid on the overall costs. This cost effectiveness evaluation also does not estimate the additional revenue generated by the parking fee program which is estimated at potentially between $25 and $50 million per year.

Annualized Operating and Maintenance Cost Per Vehicle Trip Reduced. Operations and maintenance costs for the No Build and the Build are assumed from between $500 to $2,000 per lane mile per year depending on the type of concrete (Chuck Gaunt, Caltrans District 11, personal conversation, 1994). This is estimated at approximately $96,000 per year for the No Build and $144,000 per year for the build alternatives (1994 dollars). As before, the absence of any reduction in vehicle trips due to either of these alternatives makes a comparison of annualized capital, operations and maintenance costs per vehicle trips reduced impossible.

Forecast annualized operating and maintenance costs for the Enhanced Bus analysis alternative is between $10 to $12 million (1994 dollars) per year, depending upon the amount of enhanced service forecast to be operated by private contractors as compared with MTD operation. However the annualized Enhanced Bus analysis alternative's operations and maintenance costs are a result of the lower operations costs than those estimated for the Rail Transit. The cost of even non-contract bus operations can be expected to be less than the cost of the jointly shared track operations. The estimated annualized operating and maintenance cost per trip reduced is $1.56 for the LRT technology and $2.15 for the DRC technology. These estimates were based on conversations with joint track use operations in Washington State, Oregon, and San Diego County's North County Transit District. Differences between the Enhanced Bus and Rail analysis alternatives on the operations and maintenance side range from a five cent to nearly a seventy five cent difference per vehicle trip reduced.

The Pricing/Enhanced TDM analysis alternatives program's capital costs contribute an annualized cost of $0.15 per vehicle trip reduced while the operating and maintenance costs contribute $0.02 per trip reduced. The Pricing/Enhanced TDM analysis alternatives program is, however, expected to generate revenue which would cover the estimated operations and maintenance costs, including the costs of proposed promotions and discounts for tourists and visitors to choose modes other than the auto for trips to and within the South Coast.

Externalized Costs of Auto Operation. The costs of infrastructure built to accommodate auto traffic are often underestimated in a general economic sense under the assumption that they encourage economic development. That causes alternatives to new roadway construction, such as the Enhanced Bus Transit analysis alternative, to be at a competitive disadvantage since many of the costs associated with the Highway 101 widening alternative are externalized and borne by society rather than the user (M.W. Cameron, *Efficiency and Fairness on the Road: Strategies for Unsnarling Traffic in Southern California*, 1994). These costs are both internal and borne by the automobile user or external and borne by society in the form of fuel taxes and registration fees. These "hidden" costs can also be fixed or variable, depending on use. These costs can be market costs that are goods regularly traded in a competitive market such as gasoline or non-market costs such as driver stress. Table 4-6 summarizes and classifies these "hidden" costs. Highway widening or new highway construction alternatives typically lead to increases in driving and total costs as well as reduced productivity as drivers perceive economies of scale. The economies of scale offered by new and widened roadways affect drivers who now have more route choices available when they make a trip; these route choices may lead to an increase in trip length and driving (T. Litman, *Transportation Cost Analysis: Techniques, Estimates and Implications*, March 1995).

Table 4-6
Motor Vehicle Hidden Costs

	Variable	Fixed
Internal (User)	Fuel	Vehicle Purchase
	Short-term Parking	Vehicle Registration
	Vehicle Maintenance	Insurance Payments
	User Time	Long-term Parking Facilities
	User Accident Risk	Vehicle Maintenance
	Stress	
External (Social)	Road Maintenance	Road Construction
	Traffic Law Enforcement	"Free" or Subsidized Parking
	Insurance Disbursements	Traffic Planning
	Congestion Delays	Street Lighting
	Environmental Impacts	*Land Use Impacts*
	Uncompensated Accident Risk	*Social Inequity*

Note: Italicized items represent non-market costs
Source: T. Litman, *Transportation Cost Analysis: Techniques, Estimates and Implications*, March 1995

Under priced driving, another term used to refer to "hidden" costs,

is inequitable because non-drivers are forced to subsidize drivers. Typically, non-drivers are those with the lowest incomes and are those most dependent on transit. The circulation system is typically not geared towards their needs. Under priced driving also encourages residents to select automobile-dependent housing since many housing options are available to those with access to an auto.

These “hidden” costs should be used to more precisely develop estimates of the true costs to the South Coast of the Highway 101 widening alternative. Table 4-7 summarizes typical internal and external costs that have been estimated for automobile travel in the U.S.

Based on this national analysis, a cost of $0.40 per mile can be applied during the peak periods and $0.27 during the off-peak periods to approximately account for the “hidden” (external) costs of auto travel in Santa Barbara. These cost estimates, an average of the urban and rural external costs during each of the periods, reflect the level of development in the Highway 101 Study Area. Given an estimated average auto trip length of seven miles in the South Coast, these “hidden” costs can also be expressed as an average of $2.80 per peak period auto trip taken and $1.89 per off-peak auto trip.

Table 4-7
U.S. Motor Vehicle Costs, by Mile and Total

	Vehicle Miles Traveled (billions)	Internal Per Mile (dollars)	% of Total	External Per Mile (dollars)	% of Total	Total Costs Per Mile (dollars)
Urban Peak Period	460	$0.71	54%	$0.61	46%	$1.32
Urban Off-Peak	920	$0.71	68%	$0.34	32%	$1.05
Rural	920	$0.64	76%	$0.20	24%	$0.84
Weighted Average		***$0.67***	***68%***	***$0.32***	***32%***	***$0.99***

Source: T. Litman, *Transportation Cost Analysis: Techniques, Estimates and Implications*, March 1995

4.2.4 Measures of Community and Environmental Impact

A combination of qualitative and quantitative evaluation measures were developed to assess community and environmental impacts of the "analysis alternatives". These measures are more subjective in nature, with fewer established thresholds of significance available for comparison. Rating systems provide the reader the thresholds used in each area of analysis. Air quality and energy consumption impacts are quantified in grams per day and British Thermal Units (Btu's), units typically calculated for these types of impacts. Social impacts receive a more subjective rating system with a plus "**+**" indicating a positive impact, an "**X**" indicating no perceived impact and a "**--**" indicating a negative impact as a result of the alternative. Rating systems for social impacts are provided in the following sections while a more detailed descriptions of these rating systems is found in Appendix D.

Vehicle Emissions and Vehicle Energy Consumption. Transportation energy consumption increases with the forecast amount of VMT. The greatest energy consumption impact would result from the Build alternative. The Enhanced Bus and Rail alternatives result in proportionately lower levels of energy consumption according to their predicted levels of VMT. Direct energy consumption of automobiles under the Enhanced Bus and Rail analysis alternatives results in between 1.35 and 1.4 percent less energy consumption than levels predicted under the No Build alternative.

The Pricing/Enhanced TDM analysis alternative is forecast to result in the lowest levels of running vehicle emissions, lower than each of the other alternatives in every emission. Total mobile source emissions are forecast to decline, even as traffic volumes are forecast to increase, due to assumed improvements in vehicle emissions controls, technologies and Clean Air Act mandates. The future emissions analysis assumed that alternative technologies would be fully operational by 2015. At this point, however, not all of the technologies are ready for implementation; this analysis is, therefore, optimistic. The Pricing/Enhanced TDM analysis alternative

was also estimated to have the lowest annual direct energy consumption. Lower energy consumption levels are associated generally with changes in the weekday home to work trip making and are not a result in changes to the tourist or weekend travel.

Transportation energy consumption increases with the forecast amount of vehicle miles of travel (VMT). The greatest energy consumption impact would result from the Build alternative. The Enhanced Bus, Rail and Pricing/Enhanced TDM analysis alternatives result in proportionately lower levels of energy consumption according to their predicted levels of VMT. Direct energy consumption of automobiles under the Enhanced Bus and Rail analysis alternatives results in approximately 1.4 percent less energy consumption than levels predicted under the No Build alternative. The Pricing/Enhanced TDM analysis alternative would result in the lowest energy consumption levels of all of the alternatives, approximately eight percent below the No Build. Lower energy consumption levels are associated generally with changes in the weekday home to work trip making and are not a result in changes to the tourist or weekend travel.

Caltran's direct energy consumption method relies on average fuel efficiency and VMT as the two primary components used to estimate energy consumption. Speed variations are only generally reflected in the average fuel economy. Although speed does effect fuel consumption, this quantification method is not able to reflect the nuances of the speed differences.

Impact on Vegetative Cover. No impacts to vegetative cover within the Corridor are expected under the No Build alternative as there is no construction associated with this alternative and therefore no removal of any vegetation. Caltrans' Draft EIR (March 1993) summarizes the impacts of the highway widening on vegetation stating "loss of many of the mature trees is unavoidable and substantial." The removal of some mature trees is also predicted for the areas of the bus flyer stops. These stations are expected to be on and off stops adjacent to the highway at existing interchanges. The amount of mature vegetation to be removed under this alternative would most likely be less than that associated with the full highway widening approach and median plantings would not be impacted. Impacts on vegetative cover are considered negative as express bus station locations within the freeway Corridor would result in removal of trees and shrubs which have achieved maturity and substantial height. The screening benefit against noise, glare and visual intrusion would be reduced through the loss of these trees. Remaining bus station sites have limited vegetative cover and are not expected to have as great a removal of vegetation. Specific estimates of impact and possible mitigation would be determined in future, detailed implementation studies if this alternative were to be pursued further.

Impacts on vegetative cover from the Rail Transit analysis alternative are considered less negative than those resulting from either the Build alternative or from the Enhanced Bus Transit analysis alternative, as mature vegetation along the existing Highway

101 Corridor will not be disturbed. The ability to place additional track within the existing rail right of way is expected to have limited impact on vegetation along the existing alignment. The greater number of station locations proposed in the Rail Transit analysis alternative may result in somewhat more removal of vegetative cover than those proposed for the bus approach. No impacts to vegetative cover are expected from the Pricing/Enhanced TDM analysis alternative as no construction is assumed necessary to meet the requirements of this alternative.

No comparison of mitigation for removal of vegetation resulting is possible in this analysis as the conceptual station location and design make it impossible to provide comparable levels of analysis between the highway widening alternative and the other alternatives

Neighborhood Intrusion/Impact on Community Character

Change in ADT on parallel streets. Application of the rating system for changes in traffic volumes on parallel streets in the Highway 101 Corridor is based on traffic volumes and roadway segments. The changes in daily traffic volumes were rated using the following scale:

Percent Decrease in ADT	Rating
> 50% decrease	**+**
25% - 50% decrease	**X**
< 25% decrease	**--**

The results of the evaluation system are listed in Table 4-8. The Highway Build alternative results in the largest reductions in ADT on parallel streets due to the added capacity on the highway itself, the resulting reduced congestion, and increased speeds. Only marginal reductions in daily traffic are predicted for the parallel arterials under either the Bus, Rail or Pricing/Enhanced TDM analysis alternative.

Although congestion is reduced on Highway 101 as a result of the Pricing/Enhanced TDM analysis alternative, the resulting average speed of approximately 32 miles per hour does not provide enough of a travel time incentive for all motorists to remain on Highway 101. Travel times for drivers using the parallel road system will compete with those staying on Highway 101 if the Pricing/Enhanced TDM analysis alternative were implemented.

Changes in Bus/Train Service Frequencies. New bus routes and increased service on existing routes, proposed as part of either the Enhanced Bus or Rail Transit packages, are expected to increase vehicular noise locally along the streets that are traversed by these routes. This noise would be the most intrusive in residential areas, particularly single family residential areas. A simplified rating system was applied based on the bus routes for which increased headways or new service were proposed.

Change in Bus/Train Route Frequencies	Rating

Frequencies increase by less than 2 times	+
Frequencies increase 2 times	X
Frequencies increase 3 times	--

Table 4-9 includes the impact results of the qualitative evaluation tool based on the increase in frequency of bus routes during the week day peak periods. No impacts under this criteria are predicted for the No Build, the Build, or the Pricing/Enhanced TDM analysis alternative. Although some increase in bus service under these alternatives is assumed due to increased growth in the area and MTD's continued service levels, the identification of what service increases would occur on which routes is outside of the scope of this study.

The Carpinteria area would experience the greatest increases in noise from the addition of new or extended bus routes proposed under the Enhanced Bus analysis alternative. Many of the bus route service revisions propose a ten minute headway in place of thirty minute headways. This almost threefold increase during the morning peak period (6:00 AM to 8:30 AM) is expected to be the most noticeable as ambient noise levels are generally lower. (It is important to remember that this increase results in only six buses per hour per route.) Express bus service on the freeway connecting to existing or new stations is not expected to create disruptions to either residential or commercial areas.

Compatibility with Current Land Uses. The need for local street reconfiguration identified in Chapter 3 for freeway flyer bus or rail transit stations will serve as a basis for a negative impact. Highway widening impacts was based on those socioeconomic impacts identified in Caltrans' Draft EIR. A simplified rating system was applied to each station or bus stop location.

Station Compatibility with Existing Land Uses	Rating
Commercial	+
Industrial	+
Multifamily Residential	+
Single Family Residential	X
Special Generators (schools, hospitals)	+
Resort/ Tourist	+
Local street reconfiguration potential	--

Proposed rail or bus station compatibility with existing land uses is listed by station in Table 4-9. Current land uses are described in this section and serve as the basis of comparison for the bus and rail analysis alternatives. The stations of the Enhanced Bus or Rail Transit alternatives are expected to have the greatest impact on community or neighborhood character. Compatibility of proposed stations with existing land uses and local zoning are described. Table 4-9 includes a broad assessment of availability of space for park and ride facilities at proposed station locations. The overall rating for stations associated with the Rail Transit analysis alternative is considered compatible due to the types of land uses encountered in the vicinity of each station. Bus Flyer stations are

assumed to require limited space for drop off and pick up. All stations would require further site-specific evaluation. Provisions for auto and bus transit ingress and egress would need to be examined. At several locations extensive redesign of the existing arterials and local streets would be needed to make such candidate locations viable.

The *Caltrans Highway 101 Widening Project DEIR (Caltrans, 1993)* states that the project will not impact access to schools or recreational facilities in the area but will require relocation of a women's rehabilitation shelter under one scenario. The report further states that "impacts to specific neighborhoods will stem from a change in character traffic patterns and land use. Neighborhoods that have the potential to be impacted include the Southbound side of Route 101 in the Olive Mill Road area and the north and southbound side of Route 101 between Linden Avenue and Casitas Pass Road in Carpinteria." (Caltrans, 1993)

Community impacts to neighborhoods are not expected to result from the Pricing/ Enhanced Pricing/Enhanced TDM analysis alternative. No new facilities are proposed and increased bus service needed to serve the additional riders is very low when compared with either the Rail Transit or Bus Transit analysis alternatives. Therefore, no intrusions into neighborhoods are predicted.

Compatibility with Long-Term Comprehensive Planning. Land use policies and land use designations of properties adjacent to either Highway 101 or proposed station locations identified in either the Rail Transit or Bus Transit analysis alternatives are used to develop an evaluation of each alternative's compatibility with long term comprehensive planning for the County, the cities of Santa Barbara and Carpinteria, and the Montecito Community. Proposed rail or bus station compatibility with existing land uses is listed by station in Table 4-9. Both the City and County of Santa Barbara's general plans and Carpinteria's general plan recognize the need for expanded carrying capacity in the Highway 101 Corridor to accommodate a projected increase in travel demand (Caltrans, March 1993). Express bus service in the freeway would increase the person trip carrying capacity of the Corridor. Enhanced and expanded local bus service will provide additional service capacity between portions of the Study Area which is predicted to further accommodate travel demand in the Corridor. Therefore this alternative is considered compatible with the local plans.

4.3 EVALUATION SUMMARY

In summary, Table 4-10 illustrates the relative performance of each analysis alternative against each of the evaluation criteria. A value of 1 indicates that the alternative performed best on that criterion and a value of 4 indicates that it performed the worst. No overall ranking is computed as that would be based upon a "weighted" average. Weighting of evaluation measures is always a much debated concern in most communities. No weighting system has been proposed

or is recommended for these measures. Each reader is encouraged to apply their own relative importance to each factor in assessing the overall performance of each alternative. In those cases where the values forecast for a particular measure are equal, the same number is given to both alternatives.

The Pricing/Enhanced TDM analysis alternative achieves the greatest degree of improvement in the Measures of the Problem, Measures of the Solution, Measures of Effectiveness and Measures of Environmental and Community Impact of the three alternatives to the highway widening. This is primarily due to the significant $3.00 per day parking fee disincentive to single occupant vehicle use, compelling travelers to carpool, vanpool, take transit, and telecommute. The best forecast traffic Level of Service on Highway 101 and lowest traffic volumes on parallel arterials are still predicted to result from the highway widening. This is due to the faster travel speeds which result from the additional capacity offered by the widening, making Highway 101 the most attractive route to drivers, even in the face of increased traffic volumes on Highway 101 predicted for the Build alternative.

4.4 ALTERNATIVE IMPLEMENTATION APPROACHES

The purpose of this section is to begin to “draw out” the results from the analysis of the alternative packages into a discussion of specific implementation approaches. Each of the three “analysis alternatives” described in Chapter 3 and evaluated in this chapter presents primarily a single approach as an alternative to the widening of Highway 101. The specifics of each alternative package were detailed only to a level which allowed for its evaluation and quantification at the long range planning level of analysis undertaken in this study. They can be referred to as “analysis alternatives”. Individual elements of each alternative package were developed based upon recommendations from the public (February, 1994 workshop and CAC/TAC meetings) and the definition of the current transit and road systems in the Study Area.

A range of specific implementation strategies can and should be developed for each analysis alternative package. These specific implementation strategies for each of the three analysis alternatives can then serve as a menu from which a comprehensive, multi-modal recommendation for an alternative to the widening of Highway 101 will be developed. Strategies are drawn from the Task 3 Technical Report - *Effectiveness of Alternative Measures*, (Parsons Brinckerhoff, 1994) and included here as Appendix C. As an intermediate step towards this multi-modal recommendation, which is presented in Chapter 5, an implementation strategy for each of the three “analysis alternatives” as well as identified bicycle and highway operational improvements common to all alternatives follows. A separate table is presented for each analysis alternative, which identifies:

what the public identified as potential components of each alternative,

what the “analysis alternative” included, and what the ultimate implementation strategies could include.

The supporting text describes the implementation strategies identified in each table.

4.4.1 Implementation Strategies for an Enhanced Bus Alternative

Development of an implementation strategy for an Enhanced Bus analysis alternative was initiated at the public meeting stage, defined into a TAC and CAC approved alternative which was analyzed for effectiveness. Table 4-11 includes the three components of the development process for the alternatives. Implementation strategies for a transit-based alternative to the widening of Highway 101 will build upon existing MTD ridership patterns and *Traffic Solutions'* ridematching database. Implementation of the Enhanced Bus analysis alternative will require ridership promotion, revisions to approved regional and local funding documents to prioritize transit freeway bus “station” development, park and ride lot construction or expansion, and transit vehicle capital acquisition and deployment. Express bus service provision prior to the design and construction of the freeway flyer stops should be implemented to build ridership.

MTD Service and Capital Purchase Planning & Implementation. A detailed service plan, transit operating plan and associated capital facility and equipment requirement study should be prepared to establish a phased implementation program for express bus service including related freeway “stations”, expanded bus maintenance facilities and park and ride lots. Precise locations for “stations”, service frequency refinements and specific funding strategies should be determined in these studies. The initiation of express bus service and the potential for, and timing of, additional express bus routes should also be considered.

Ridership Development. All employers submitting ridesharing plans should be apprised of the express bus service and asked to identify potential riders among their employees. Efforts to target riders for the express bus service should cross jurisdictional lines into Ventura County given the significant level of intercounty commuting identified in the intercept travel survey and forecast ridership level of intercounty travel. Coordination between MTD and Ventura County’s transit provider, South Coast Area Transit (SCAT), should include intercounty services and coordinate with ongoing intercity rail planning. New or expanded service promotions by MTD could target the new service connections to express bus commuter service within each community. The business organizations (e.g. local Chambers of Commerce, Santa Barbara Industrial Association, Coalition of Labor, Agriculture and Business (COLAB), etc.) should be asked to develop and participate in the promotional efforts. Special community events could also be used to promote ridership and use of the enhanced bus services. Separate efforts should be targeted at the tourist industry with input from local Chambers of Commerce and the Santa Barbara Conference and Visitors Bureau.

Fiscal Planning and Programming. Existing financial plans including Santa Barbara's Regional Transportation Improvement Program (RTIP), MTD's Short Range Transit Plan (SRTP) and local capital improvement programs would need to be revised during regularly scheduled updates to include the freeway flyer stations and park and ride lot construction and other transit oriented improvements. Use of flexible federal ISTEA moneys in future years, in particular, would need to be considered. Environmental clearance, design, and construction plans for freeway flyer stations and park and ride facilities should be developed and a phased implementation plan should be coordinated with MTD's bus acquisition plans. Preparation of detailed cost and revenue estimates should be prepared early in the preliminary design phase to determine needed financial strategies and actions to secure financing. Local agency financial participation in freeway flyer stations, and park and ride facilities may be needed prior to finalizing of improvement plans.

4.4.2 Implementation Strategies for an Rail Transit Alternative

The design of the Rail Transit "analysis alternative" closely parallels those rail related items identified by the public early in the study. Identified implementation strategies for an Rail Transit analysis alternative are detailed in Table 4-12 along with the publicly generated strategies and the elements of the analysis alternative for which impacts were estimated earlier in this chapter. Several scenarios for implementation are available for the rail component and were described in the technical report *The Effectiveness of Alternative Measures* (see Appendix C). These include:

Using Diesel Rail Cars (DRC) and operating vehicles on the existing Southern Pacific tracks between Carpinteria and Goleta,

Electric powered Light Rail Transit running on Santa Barbara city streets,

Placement of a parallel track in the existing Southern Pacific railroad right-of-way and running Light Rail Transit, or

•. Increasing service frequency on existing intercity service between Los Angeles, Ventura/Oxnard and Santa Barbara.

The operating of rail transit on Santa Barbara city streets was eliminated from further consideration by the TAC and the CAC due to concerns regarding the magnitude of the disruption of local traffic circulation and the related impacts to local businesses and residents as well as the slow travel speed required of rail vehicles when running on-street.

A rail transit based alternative to the widening of Highway 101 would include both intra-county and inter-county/city service elements due to both the work trip travel between Santa Barbara and Ventura Counties and the weekend, recreational based travel between several counties in the Los Angeles metropolitan region and Santa Barbara.

While the emphasis in the Ventura County Transportation Commission (VCTC)/SBCAG's *Comprehensive Rail Plan, Final Report* (Korve, April, 1995) program focuses on inter-county/city services for longer trips, a rail plan focused on providing an alternative to Highway 101 would also include intra-county services, using either DRC or LRT technology. Consideration of inter-county rail services should include the ongoing coordination efforts between SBCAG and VCTC. Rail based alternatives will also require integrated bus transit service provision and park and ride lots to be successful.

Intra-County Rail Program Definition, Planning and Preliminary Design. SBCAG and MTD could jointly develop the details of an intra-county rail plan element, focusing on service type and frequency, station locations, feeder service, and supporting infrastructure needs within the Highway 101 Corridor. Initial steps would include the definition of an intra-county rail program including recommendations for a particular technology (DRC versus LRT), exploration of issues regarding shared use of the Southern Pacific right-of-way, and the identification of modified and new bus services to act as collector/distributor systems for the rail service. Designation by the state and local governments of a rail operations agency (MTD or new agency) and identification of other intra-county rail service needs would be critical during the early stages of project development. Development of a rail based alternative would also take the longest time to implement as no infrastructure (beyond tracks) to operate and maintain an intra-county rail service currently exists in the Highway 101 Corridor.

Express bus services (described above) could provide an initial link between the communities within the Highway 101 Corridor, serving to both build ridership and establish potential rail station locations early in the project development process. Connections to MTD's existing transit services could be established as part of the implementation of express bus service. Once more detailed rail and supporting transit service plans are developed, cost estimates and phased implementation schedules would follow.

Land uses in the vicinity of potential stations could gradually begin to be changed during the five to seven years it would require to perform the planning, design and implementation of the rail service. Early designation by local governments of station sites and possible land acquisition by the designated operating authority(ies) would provide a focus for transit-oriented land development. Use of redevelopment actions, joint development techniques, and/or general plan and zoning changes could all be used to promote a market driven change in land uses to better support a rail based alternative to the widening of Highway 101. Development of tourist related attractions in the vicinity of the rail stations would further serve to promote ridership in advance of the actual rail service implementation.

Inter-County Rail: Comprehensive Rail Plan, Action Plan Implementation. SBCAG's ongoing work with the Ventura County Transportation Commission (VCTC) to implement the recommendations of the *Comprehensive Rail Action Plan*, which only addresses inter-city

service, should be continued to identify policy choices for inter-county rail and supporting local transit programming. This report recommends,

A six month demonstration weekend service between Los Angeles and Santa Barbara consisting of 4 one-way weekend trips. Operating cost estimates from Metrolink are approximately $1 million with an estimated cost to the Santa Barbara region of between $743,000 and $881,000.

The expansion of existing San Diegan Intercity Services to add 4 daily round trips between Los Angeles and Santa Barbara as state financed service at no additional cost to the Santa Barbara region.

Capital improvements already programmed to upgrade Coast Line signaling between Goleta and Moorpark which includes track improvements, upgrading and re-establishing sidings and new station facilities at Goleta, Guadalupe and Surf, and a major rehabilitation and upgrade to the Santa Barbara station. These facilities are financed by Caltrans as part of intercity service between Santa Barbara and Los Angeles.

The provision of 2 daily round trip commuter trains between Simi Valley and Goleta with cost shares to SBCAG estimated at $10.93 million in capital costs and annual operating subsidy of $1.02 million and no identified funding sources. Long term daily ridership is projected at 750 which is below normal thresholds for viable commuter service.

Development of a Financial Strategy to Implement a Comprehensive Rail Program. Implementation of a comprehensive rail based alternative to widening the Highway 101 would have the highest cost of all of the alternatives. Development of a specific financial strategy to implement this approach would be an essential element to finalizing a phasing and implementation plan. Use of flexible funding programs, to the extent possible, should be maximized, however, limits to available funding will result in the need to identify additional local funding sources. A policy choice may arise between funding an intra-county rail program as an alternative to widening Highway 101 and funding inter-county service which may not address the future Highway 101 Corridor congestion problem. Funding decisions should be considered in light of the degree to which an either the intra-county or inter-county rail plan continues to address the traffic congestion problem in the Highway 101 Corridor. Development of both a rail and supporting transit financial strategy could be expected to result in changes to both the adopted Transportation Improvement Program (RTIP) and the Regional Transportation Plan (RTP).

4.4.3 Implementation Strategies for the Pricing/Enhanced TDM Alternative

An implementation strategy which emphasizes Pricing/Enhanced TDM elements over the widening of Highway 101 includes the greatest choice among specific methods (refer to Table 4-13). A multi-part approach to the implementation includes strategies which:

Identify long term funding sources for Santa Barbara's current Pricing/Enhanced TDM program, *Traffic Solutions*;

Strengthen the employer ridesharing ordinance targets and establish prescriptive components if targets are not met;

- Establish non-work trip reduction programs in coordination with the MTD and the Conference and Visitors Bureau membership;

Traffic Solutions Funding Source Identification. Development of any additional or enhanced promotions or educational efforts must first identify additional sources of revenues to fund such activities. Traditional revenue sources may be reduced and competition for flexible, federal, and ISTEA and Measure D funding will increase. For the current fiscal year, *Traffic Solutions* budget is funded by $175,000 in Caltrans TDM/Rideshare funds and $200,000 each in federal Congestion Mitigation and Air Quality (CMAQ) funds passed through the City and County of Santa Barbara. These CMAQ funds substituted for prior Measure D funding. Costs associated with each element of a selected implementation should be estimated as a basis for revenue needs.

Review and Update of Santa Barbara's Ridesharing Ordinance. A performance based implementation strategy could build on *Traffic Solutions'* regular reviews of employer plans and performance and the CMP intersection evaluations performed by SBCAG in association with local cities and Santa Barbara County as required under state laws. A comparison of the results of the existing ordinance against local (see Guiliano, Hwang, and Wachs, 1993) and national (Comsis, 1993) performance reports could be used to identify those employer strategies which are producing the greatest trip reduction results. At the scheduled 1996/7 review of the current Pricing/Enhanced TDM ordinance, provisions could be strengthened to require employers to achieve average vehicle ridership (AVR) targets and prescriptive strategies could be specified if targets are not met. Successful strategies should be incorporated into more prescriptive ordinance components, while unsuccessful components could be eliminated. For example, if a large employer (100+ employees) does not achieve an AVR of 1.25 persons per vehicle, it would be required by the ordinance to provide transit and rideshare subsidies.

Tourist Travel Automobile Trip Reductions. Efforts to target automobile trip reductions in tourist related portions of trip making are generally not felt to be of high priority due to both the small fraction of average daily trips which are made by the tourist market and the fact that the majority of tourist trips arriving in Santa Barbara via automobile are already made in multi-occupant vehicles (see Table 2-2). Therefore, no implementation measures are recommended for this travel market.

4.4.4 Implementation Strategies for Freeway Operational Improvements

Recommended roadway operational enhancements (see Table 4-14)

identified by the public were not modeled in any of the analysis alternatives due to the regional traffic forecasting model's inability to reflect the effects of these types of improvements, however, planning level cost estimates for selected highway operational improvements were included in cost effectiveness evaluations. Implementation strategies focus on specific elements which could be incorporated in a multimodal transportation solution which emphasizes either bus transit, rail or demand management approaches. Caltrans' *Traffic Operations System Plan for District 5*, currently under development, is planned to identify Transportation System Management (TSM) elements in the Highway 101 Corridor. SBCAG and local jurisdictions could use this plan development stage to identify and prioritize those improvements which will assist in an overall improvement in traffic flow in the Highway 101 Corridor.

Implementation strategies for freeway operational improvements will require multi-agency coordination to prioritize, design, program funding in the Transportation Improvement Program (TIP), and then construct. These actions should be done in the context of a broader, overall strategy to reduce congestion in the Highway 101 Corridor, Coordination efforts between freeway operational improvements and a broader strategy could include completion of interchange improvements or ramp metering installation at the time of (or in advance of) express bus station construction at the same interchange. Other interchange improvements might need to incorporate identified bicycle improvements during their design and construction phases. Coordination with the CMP program at congested intersections near interchanges may create a priority for a particular improvement. Ramp metering efforts would require more detailed analysis to determine if installation would result in level of service deficiencies at adjacent CMP intersections. Conversely, deficiency plans at "failing" CMP intersections near or adjacent to Highway 101 could consider the effects of ramp metering. Coordination should also extend to funding issues, as multimodal improvements will meet more of the requirements for flexible funding than single mode applications. The ability to maximize funding can be enhanced if various dollar sources are used to leverage other sources. Existing Measure D funds and the current STIP funds for the Highway 101 improvements may be re-programmed for highway operational improvements, and at the same time leverage other federal flexible funding for transit, congestion management or transportation enhancement projects.

4.4.5 Implementation Strategies for Bicycle Improvements

Implementation of any of the three analysis alternatives, with recommended bicycle improvements, would provide greater intermodal connectivity in the Highway 101 Corridor. Slight reductions in vehicle trips are predicted, Although an appreciable mode shift to bicycle usage is forecast, only slight reductions in vehicle trips on Highway 101 are predicted due to the shorter trip lengths of the new bicycle trips and the auto trips for which they substitute. SBCAG has developed an extensive, multi-jurisdictional bikeway plan, the *Regional Bikeway Study* (SBCAG, 1994), which identifies specific

improvements, currently available funding sources, and a set of actions intended to lead to construction of identified improvements. Recommended bikeway improvements located within the Highway 101 Corridor were assumed as part of the "analysis alternatives" for each of the improvements. The *Regional Bikeway Study* places special emphasis on intermodal connections. The study also recommends a comprehensive set of actions which implement actions identified in California's state transportation plan. *The California Transportation Plan*, (Caltrans March 1994) includes an objective to "Expand and improve transportation services and systems to provide users better access and choice." Specific bicycle and pedestrian actions identified in the state plan to meet this objective include:

Develop Pedestrian and Bikeway Plans: Caltrans, in cooperation with the Department of Parks and Recreation, Regional Transportation Planning Agency (RTPAs) (e.g. SBCAG) and cities and counties will produce a State Pedestrian and Bicycle Plan for developing high priority bikeway and pedestrian networks The plan should include all trip types, identify missing or substandard links, safety enhancements, and intermodal connections. Caltrans, RTPAs, and cities and counties should work with bicycle advocacy groups to develop or update local pedestrian and bikeway plans.

Expand Bicycle and Pedestrian Facilities: Caltrans, the California Transportation Commission (CTC), regional and local agencies should plan and program construction of bicycle and pedestrian facilities for commute and recreation purposes as options for travel equal to other modes. Highway and road design should accommodate bicycle and pedestrian commute travel.

Table 4-15 details those bicycle and pedestrian elements identified by the public, those improvements which are included in the analysis, and identifies implementation strategies included in the *Regional Bikeway Study* which design, fund, program and construct bicycle facilities in the Highway 101 Corridor. These recommended implementation strategies should be completed as part of any multimodal recommendation for the Highway 101 Corridor.

4.5 A Strategic and Policy Based Approach

Santa Barbara is faced with balancing the choice between the benefits of the highway widening; improved travel speeds and reduced traffic congestion on Highway 101 and reduced traffic on parallel arterials, with associated community and environmental impacts and the benefits of the Pricing/Enhanced TDM policy approach which is the least costly public dollar approach, is forecast to produce similar traffic performance to the widening and results in the best results in the areas of environmental and community impact yet has an effective, but politically unpalatable disincentive, a significant new user fee for auto use. Alternatives evaluated through modeling of Enhanced Bus, Rail Transit and Pricing/Enhanced TDM analysis alternatives are forecast to have varying degrees of success in reducing future traffic congestion to levels which provide an acceptable alternative

to widening Highway 101.

Implementation strategies for each of the “analysis alternatives” provide a range of incremental steps which can be assessed against the forecast, increasing congestion levels on Highway 101. A strategic approach to implementation of an alternative to widening Highway 101 should include the selection of elements of each of the “analysis alternatives” which would most complement each other and work in a synergistic, multi-modal fashion to reduce vehicle trips in the Highway 101 Corridor. A strategic implementation approach responds to changes in travel behavior, allowing for the implementation of additional elements as future traffic conditions warrant while, at the same time, providing and developing necessary background information to anticipate needs of the entire program in a timely fashion. Chapter 5 presents a multi-modal set of recommendations as an alternative to the widening of Highway 101 which is an outgrowth of the analysis and discussion presented here.