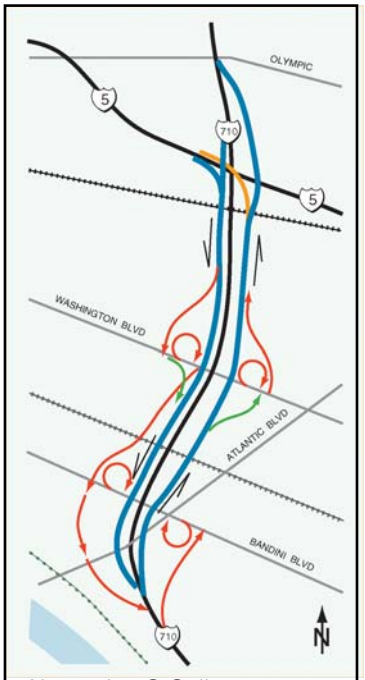
5.0 ALTERNATIVE REFINEMENTS AND EVALUATION

During Alternatives Evaluation, several technical studies were performed on the Final Set of Alternatives. The purpose of these studies was to elicit evaluative information on the alternatives as well as provide a higher level of definition of their respective operational and physical characteristics. These technical studies included: conceptual engineering; travel demand forecasting; right-of-way impact analysis; environmental analysis; and estimation of capital costs. Once the technical studies were completed, this information was used to assess the travel benefits, costs, and impacts of the proposed alternatives. Key trade-offs among the alternatives were also evaluated and discussed, and public input was sought.

5.1 Design Concepts

Following adoption by the Oversight Policy Committee in June 2002, the specifics of the design concepts of each of the build alternatives, C, D, and E of the Final Set evolved. This evolution was a result of the conceptual engineering work undertaken to refine the alternatives for further evaluation and analysis. The conceptual plans developed for the build alternatives in January 2003 are provided in Appendix L of this report under separate cover. While the basic design concept and scope of each of the build alternatives did not change from those concepts approved by the OPC, the objective of the conceptual design process was to further define the specifics of the alternatives within the framework of three background assumptions: (1) meet the intent of the OPC-approved alternative definition; (2) maintain federal and state highway design standards; and (3) minimize right-of-way/land use impacts.

Alternatives A and B did not change significantly during this phase of the I-710 Study.



Alternative C Collector-Distributor Road System

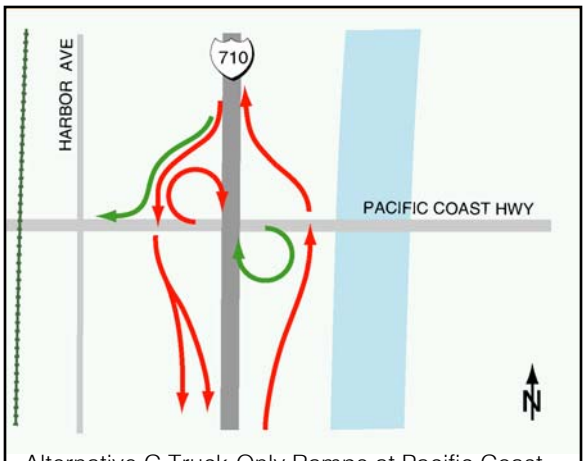
5.1.1. Alternative C—Medium General Purpose/Medium Truck Alternative

Changes in Alternative C included refinements to the design concepts for the following components:

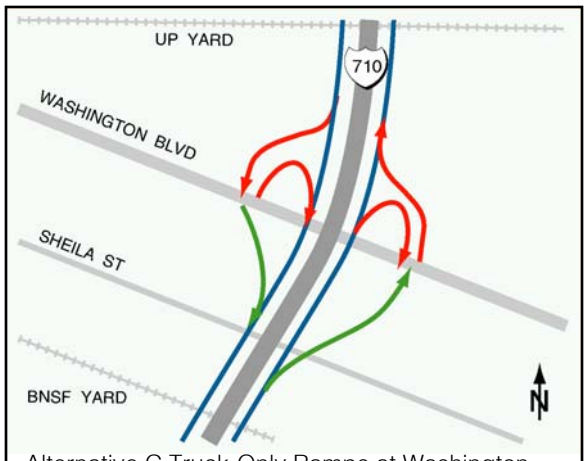
- Collector-Distributor Road
- Truck Bypass Lanes
- Truck Inspection Facility
- Truck-Only Ramps
- Terminal Island Freeway Extension

A Collector-Distributor Road system was refined in Alternative C from the Atlantic Boulevard/Bandini Boulevard interchange north through the I-5/I-710 interchange, both northbound and southbound. The collector-distributor road system would separate the entering and exiting traffic from the through movements on I-710, providing a higher level of service for the vehicles traveling through this area. Ramping configurations were developed that address federal and state concerns about weaving, merging, and interchange spacing.

Truck-Only Ramps in Alternative C were proposed at two locations, Pacific Coast Highway (PCH) and Washington Boulevard. The Truck-Only Ramps at PCH evolved from one bi-directional ramp into two separate ramps: from southbound I-710 to westbound PCH, an additional, truck-only lane would be added to the existing ramp. For eastbound PCH to northbound I-710, the existing loop ramp would be converted to a truck-only ramp, while cars will be required to make a left turn to the existing westbound to northbound ramp. At Washington Boulevard, there would be two truck-only ramps: a northbound exit ramp and a southbound entrance ramp to address truck traffic traveling between the rail yards and destinations south of Washington Boulevard.

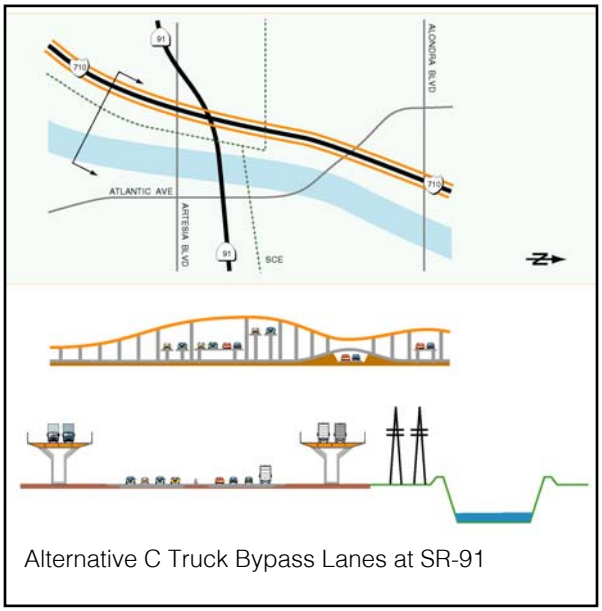


Alternative C Truck-Only Ramps at Pacific Coast Highway

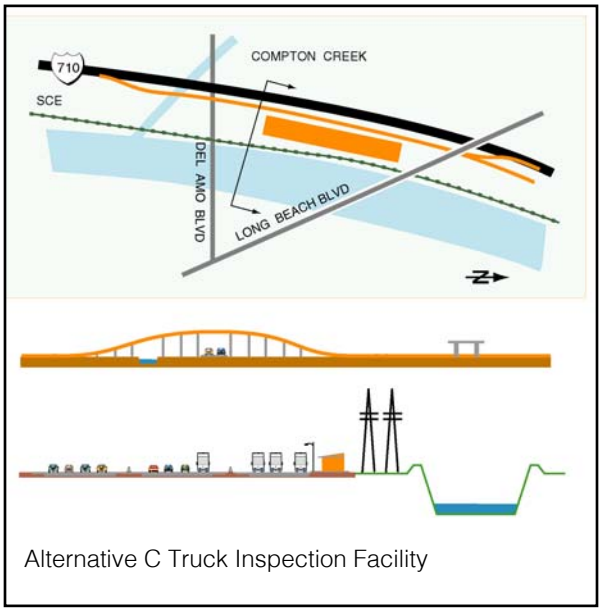


Alternative C Truck-Only Ramps at Washington Boulevard

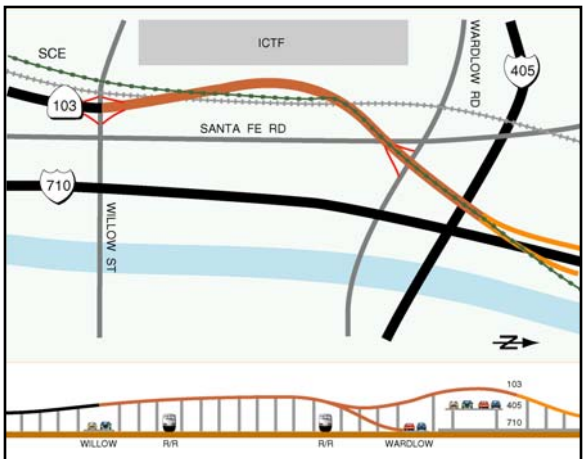
The Truck Bypass Lanes design concept evolved due to the close proximity of the SR-91/I-710 interchange and the I-105/I-710 interchange. Instead of separate bypass lane facilities, a single bypass facility was developed around both interchanges starting south of SR-91 and terminating north of I-105. The proposed Truck Inspection Facility was also altered somewhat so that it was located on the northbound bypass facility.



Alternative C Truck Bypass Lanes at SR-91



Alternative C Truck Inspection Facility



Alternative C Terminal Island Freeway Extension

The proposed Terminal Island Freeway Extension in Alternative C had changed substantially from the initial concept in response to comments received from both FHWA and City of Long Beach. Rather than connecting the Terminal Island Freeway Extension to I-405 near Alameda Street, approximately one mile west of I-710, as originally conceptualized, the Terminal Island Freeway Extension was re-routed along the Southern California Edison right-of-way to connect with I-710 north of I-405. Access to I-405 would be achieved via local access ramps at Wardlow Road and Santa Fe Road.

Additionally, the design of improvements to the I-710/I-405 interchange would eliminate the ability of northbound I-710 traffic to exit I-405 at Santa Fe Avenue or Alameda Street.

A concept map and description of the revised version of Alternative C is shown in the *I-710 Major Corridor Study Final Set of Alternatives, Revised January 2003*, in Appendix M of this report.

5.1.2. Alternative D—High General Purpose/High HOV Alternative

Changes in Alternative D included refinements to the following elements:

- Number of HOV lanes
- Elevated vs. At-Grade Profile
- Southern Terminus

The prior definition of Alternative D included four HOV lanes the entire length of the project. Through the design concept refinement process, Alternative D was changed to provide two HOV lanes (one in each direction) between PCH and I-405, four HOV lanes (two in each direction) between I-405 and Slauson Avenue, and two HOV lanes (one in each direction) between Slauson Avenue and just north of I-5. The proposed number of HOV lanes was changed because of the difficulty in physically transitioning two HOV lanes per direction at both the north and south ends of the project. While locations with one HOV lane in each direction would be at grade, those with two HOV lanes in each direction would generally be elevated, except for ingress / egress locations to reduce right-of-way impacts. Operationally this would work well in the southern section, from Pacific Coast Highway to I-405, because the HOV connector from I-405 adds an additional lane north of I-405 which corresponds with the two-lane HOV section (each direction) between I-405 and Slauson Avenue. North of Slauson Avenue, there are a number of closely spaced interchanges, including I-5, and there is a perceived need for access to the proposed HOV lanes. Because of all of the access points, the volume of HOVs is anticipated to be less at this location than in the central portion of the Corridor. Therefore, north of Slauson Avenue to approximately Olympic Boulevard, one at-grade HOV lane in each direction is proposed to address the operational needs.

The proposed southern terminus of I-710 improvements in Alternative D was changed such that the improvements would end at Pacific Coast Highway again largely because of the physical and operational difficulty of terminating the HOV lane south of that location, and also because of the complexity of the number of closely spaced interchanges in that segment. The proposed terminus was moved north from the Shoemaker Bridge to avoid the complications of the modifications to access to I-710 required by the closely spaced interchanges at Pico Avenue, 9th Street, Anaheim Street, and Pacific Coast Highway – five in this 2.4-kilometer (1.5-mile) section.

A concept map and description of the revised version of Alternative D is shown in the *I-710 Major Corridor Study Final Set of Alternatives, Revised January 2003*, in Appendix M of this report.

5.1.3. Alternative E—High Truck Alternative

Changes in Alternative E included refinements to the following components:

- Truckway Alignment Relative to the I-710 Mainline
- Truckway/Autoway Configuration at the South End

Previously, the proposed Truckway component of Alternative E had been envisioned as being located primarily elevated in the median of the freeway. In response to public, Caltrans, and CHP comments, the proposed Truckway was relocated so that it would no longer be elevated above the median of the I-710 freeway, but would be located either on one side of the freeway or the other, or split so that there would be lanes on both sides of the freeway, and those lanes would either be elevated or at-grade, depending upon the location. The refined roadway concept is described as follows: Starting at the north end near Whittier Blvd., the truck lanes would split into two lanes on either side of I-710 until the vicinity of Atlantic Blvd., where all four lanes would shift to the east side of I-710 until south of Imperial Blvd. where the lanes would diverge again into two lanes on either side of the freeway and then would converge again into four lanes on the east side of I-710 until south of Wardlow Ave. where they diverge into two lanes on either side for a short distance until the southern terminus of the truckway.

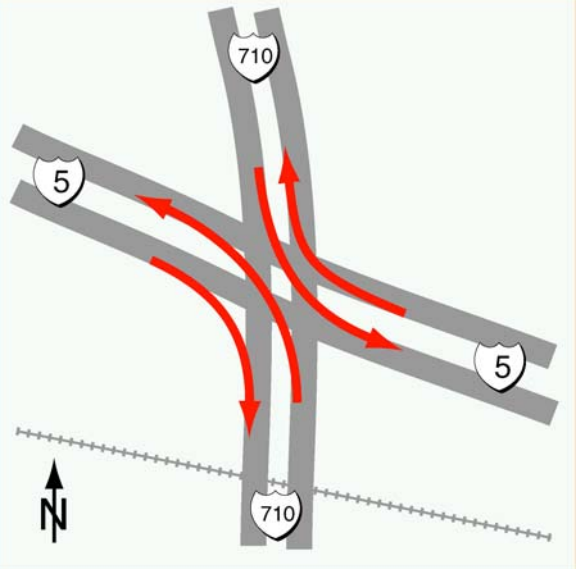
At the south end of the proposed improvement limits, Alternative E had previously been conceived with the Truckway extending as far south as Anaheim Street. To reduce right-of-way impacts and construction related impacts, this concept was modified to include a generally elevated exclusive auto facility, “Autoway”, that would run from the Shoemaker Bridge to north of Willow Street. This proposed four-lane facility would carry autos to/from the Long Beach downtown/entertainment area. The proposed Truckway would then begin north of Willow Street and extend north the rest of the length of the Corridor.

Alternative E Autoway and Southern Truckway Terminus

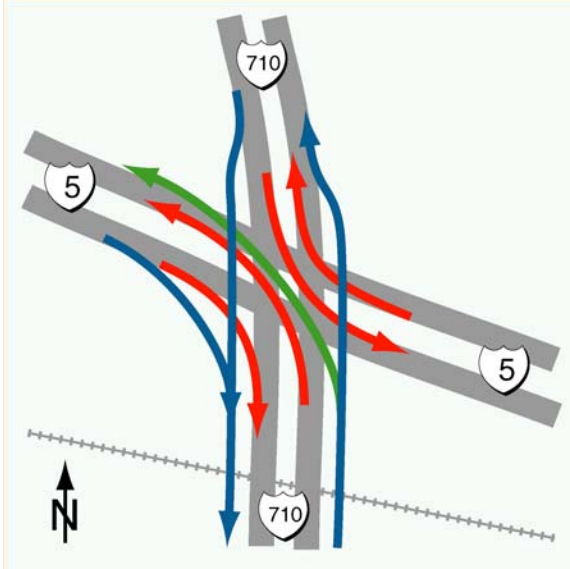
A concept map and description of the revised version of Alternative E is shown in the *I-710 Major Corridor Study Final Set of Alternatives, Revised January 2003*, in Appendix M of this report.

5.1.4. I-710/I-5 Interchange Concepts

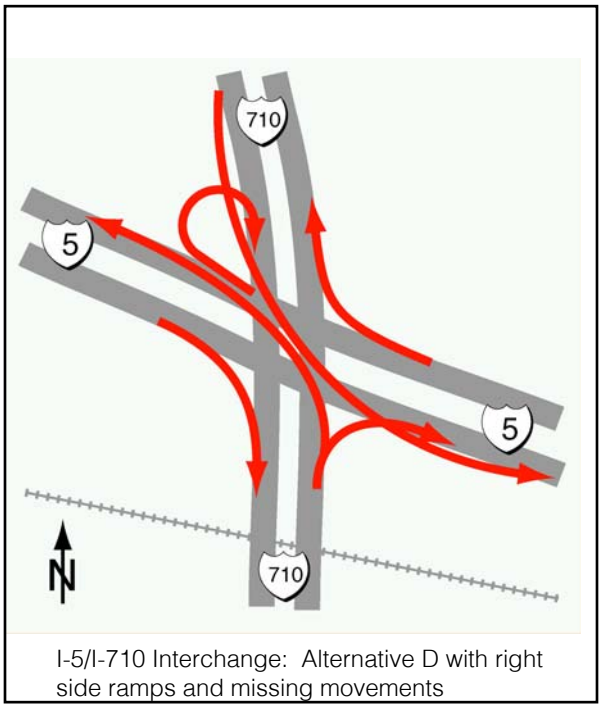
The three build alternatives also proposed different concepts for the I-5/I-710 interchange so that a range of options could be analyzed at this sensitive location during this phase of the I-710 Study. Alternative C proposes leaving the existing interchange as it is, and adding a new northbound I-710 to northbound I-5 connector on the right side – all trucks would be prohibited from the existing left side connector and directed to use the new right side connector.



I-5/I-710 Interchange: Existing Condition



I-5/I-710 Interchange: Alternative C with Collector-Distributor System



I-5/I-710 Interchange: Alternative D with right side ramps and missing movements

I-5/I-710 Interchange: Alternative E with right side ramps and Atlantic Boulevard Viaduct

Alternative D proposes replacing the existing I-5/I-710 interchange with all new right-side connectors designed to current design standards, plus the addition of two new connectors – from northbound I-710 to southbound I-5 and from northbound I-5 to southbound I-710. Alternative E also proposes to replace all of the existing connectors, plus incorporate the same two new movements via an elevated viaduct over Atlantic Boulevard. This four-lane viaduct would connect the two freeways, but have no access to or from local streets.

5.2 Transportation System Performance

This section assesses the travel benefits and impacts of the Final Set of Alternatives. The assessment is for an assumed design year of 2025 and is based upon travel demand forecasts developed using the I-710 Major Corridor Study subarea travel forecasting model and the FHWA ITS Deployment Analysis System (IDAS) travel benefit assessment model. The transportation system performance of the alternatives is assessed from two perspectives: (1) the performance of the I-710 freeway for each of the alternatives, and (2) the performance of the transportation system for the entire I-710 Study Area for each of the alternatives. These two perspectives provide differing information as to the distribution of benefits of the proposed alternatives between users of the I-710 and users of the road system throughout the I-710 Study Area.

5.2.1 I-710 Facility Performance

In order to understand the major differences among the final set of five alternatives, Table 5.2-1 illustrates the I-710 mainline configuration of the “through” lanes included in each of the alternatives, not counting lane drops and adds at various locations up and down the freeway associated with the interchanges or with auxiliary lanes.

Table 5.2-1
I-710 Mainline Lane Configurations

Segments on I-710		Number of General Purpose Lanes and Special Purpose Lanes (SP, HOV, TR)					
		Existing	Alt A	Alt B	Alt C	Alt D	Alt E
From	To	GP	GP	GP	GP + SP	GP + HOV	GP + TR
SR-60	I-5	8	8	8	8	8 + 2	8
I-5	Washington	10	10	10	10 + 4[a]	12 + 2	10 + 4
Washington	Atlantic/Bandini	10	10	10	10 + 4[a]	12 + 2	10 + 4
Atlantic/Bandini	Florence	8	8	8	10	12 + 4	8 + 4
Florence	Firestone	8	8	8	10	12 + 4	8 + 4
Firestone	Imperial	8	8	8	10	12 + 4	8 + 4
Imperial	I-105	8	8	8	8 + 4[b]	10 + 4	8 + 4
I-105	Rosecrans	8	8	8	8 + 4[b]	10 + 4	8 + 4
Rosecrans	Alondra	8	8	8	8 + 4[b]	10 + 4	8 + 4
Alondra	SR-91	8	8	8	8 + 4[b]	10 + 4	8 + 4
SR-91	Artesia	8	8	8	8 + 4[b]	10 + 4	8 + 4
Artesia	Long Beach	8	8	8	8 + 4[b]	10 + 4	8 + 4
Long Beach	Del Amo	8	8	8	8	10 + 4	8 + 4
Del Amo	I-405	8	8	8	8	10 + 4	8 + 4
I-405	Wardlow	6	6	6	8	10 + 2	6 + 4
Wardlow	Willow	6	6	6	8	10 + 2	6 + 4
Willow	Pacific Coast Highway	6	6	6	8	10 + 2	6 + 4[c]
Pacific Coast Highway	Anaheim	6	6	6	8	10 + 2	6 + 4[c]
Anaheim	9th	6	6	6	8	6	6 + 4[c]
9th	Ocean	4	4	4	4	4	4

Source: Parsons Brinckerhoff, Inc. and Cambridge Systematics, Inc., April 2003.

Notes: Mainline lane configurations show the total number of through lanes for both directions of I-710. Auxiliary lanes are not counted. General purpose (GP) lanes are travel lanes that are used by all vehicle types. Special purpose (SP) lanes are lanes devoted to a specific purpose (i.e., collector-distributor lanes, high occupancy vehicle lanes (HOV), truck bypass lanes, truckway (TR), and autoway).
[a]Collector-Distributor System, [b]Truck Bypass Lanes, [c]Autoway Lanes

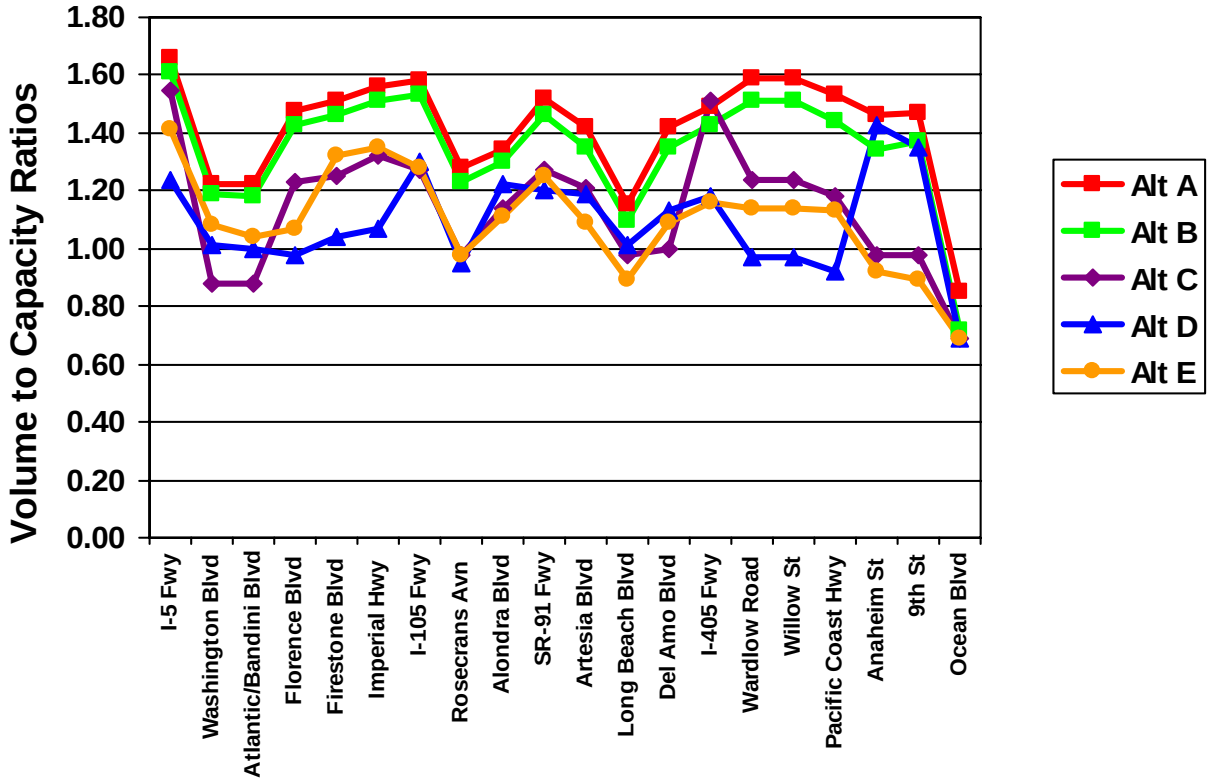
There are several measures of the forecast travel and mobility performance of I-710 facility among the Final Set of Alternatives. Each of these measures provides a slightly different perspective on the performance of I-710 for each of the alternatives. These include:

- Volume/Capacity Ratios
- Average Travel Speeds
- Utilization of New Lanes
- Truck Utilization of Lanes/Truck Diversion

Volume/Capacity Ratios

The first mobility performance measure presented is the forecast Volume/Capacity (V/C) ratios along I-710 for each of the alternatives (Figure 5.2-1). The V/C ratio is an indicator of overall traffic congestion along I-710, with values greater than 1.0 indicating significant traffic congestion on those freeway segments.

Figure 5.2-1
Volume/Capacity Ratios by Link
I-710 Northbound GP Lanes, PM Peak Period, Year 2025



Source: Cambridge Systematics, Inc., April 2003.

V/C was estimated using passenger car equivalency (PCE) factors. These PCE factors account for the higher roadway capacity utilization impacts of large trucks relative to autos based on the size and operational characteristics of these vehicles. Consistent with prior SCAG and Ports traffic forecasting analyses, an average PCE of 2.5 was used in this analysis

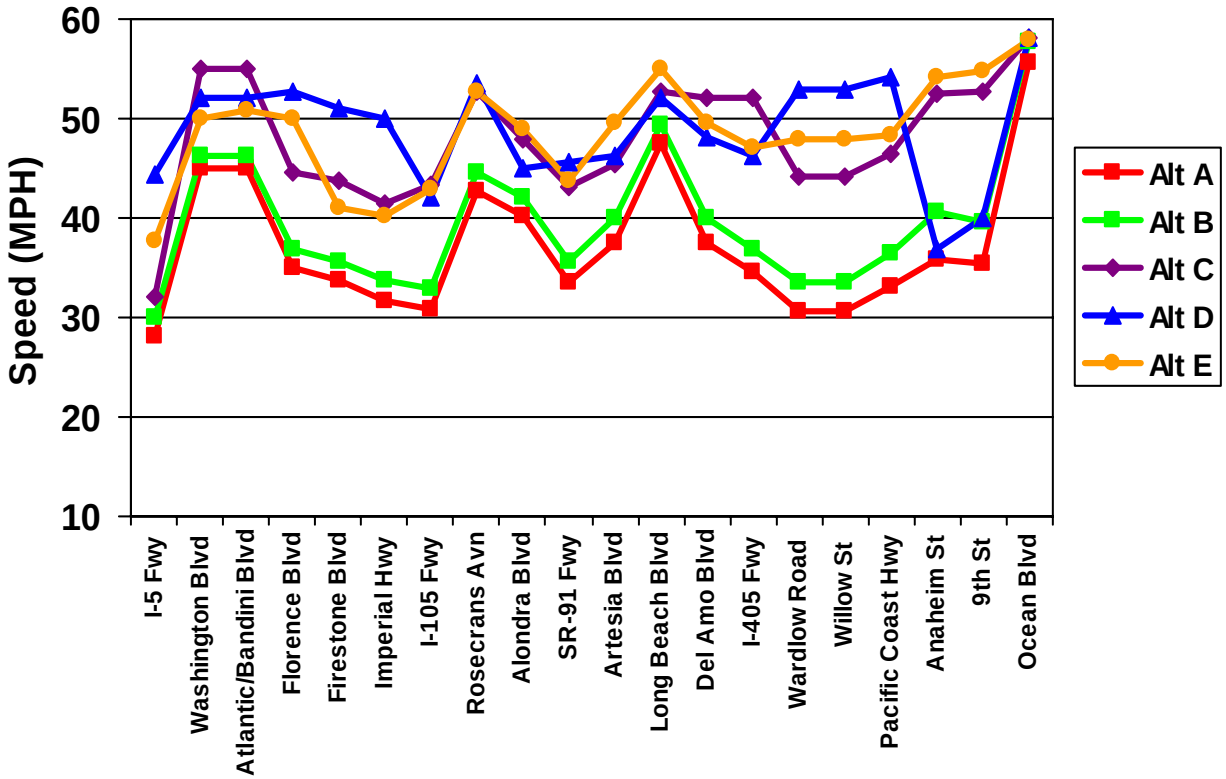
for heavy duty trucks. That is, one heavy duty truck, on average, uses as much roadway capacity as 2.5 autos. Year 2025 forecast V/C ratios are presented that compare each of the alternatives for the northbound direction for each segment of the I-710 between Ocean Blvd. and SR-60 during the PM peak period.

The analysis of V/C first focuses on I-710 mainline general purpose lane characteristics. While the results vary by location along the I-710 mainline (Figure 5.2-1), Alternative D, High General Purpose/High HOV, generally is forecast to have the lowest V/C ratios along I-710 of all the alternatives. This is primarily because it adds the most capacity relative to forecast traffic demand, even though HOV lane utilization is not forecast to be that high. Alternative D adds a total of 6 - 8 lanes to I-710 depending upon the location. Alternative E, High Truck, also is forecast to reduce V/C ratios on the mainline considerably, due to the forecast diversion of trucks from the mainline to the proposed truck-only lanes of this alternative. Because of the higher capacity utilization of large trucks, their forecast diversion to the proposed truck lanes in Alternative E improves the V/C ratio on the I-710 mainline general purpose lanes.

Average Travel Speed

The next I-710 facility performance measure is the Year 2025 projected average travel speed by segment of I-710 (Figure 5.2-2).

Figure 5.2-2
Estimated Travel Speeds by Link
I-710 Northbound GP Lanes, PM Peak Period, Year 2025

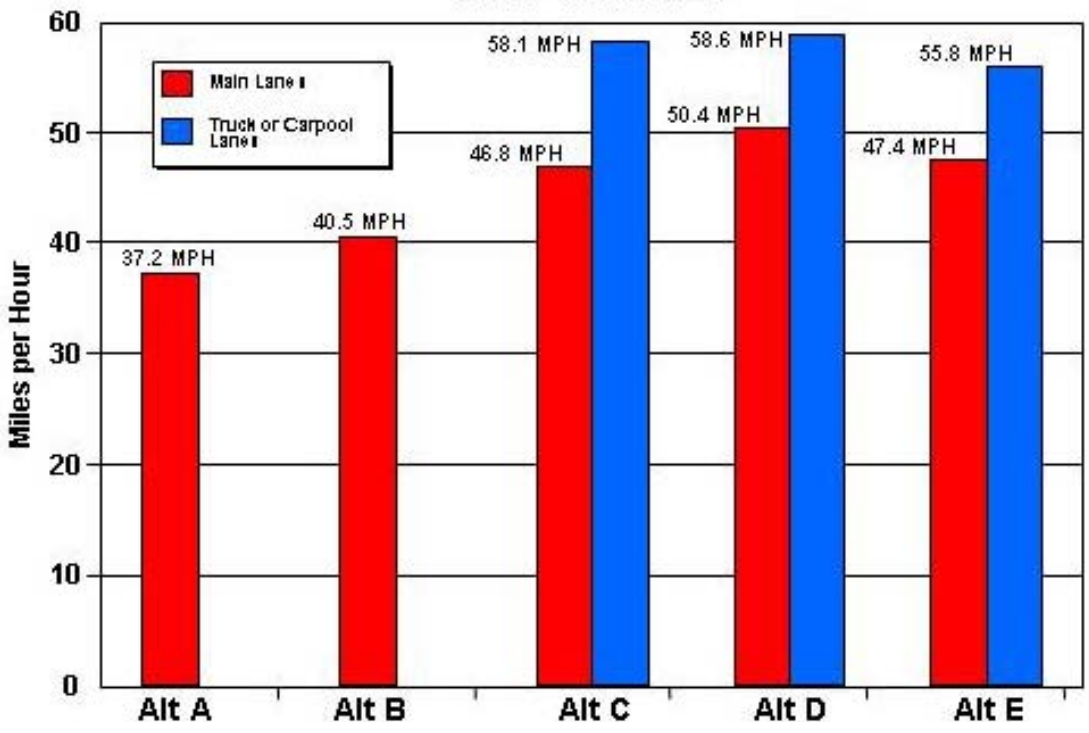


Source: Cambridge Systematics, Inc., April 2003.

This measure results in a similar comparison among the alternatives as that of the V/C ratios, as average travel speeds are a function of V/C. The higher the V/C ratio, the greater the traffic congestion and the lower the average travel speed. I-710 mainline average speeds for the future No Build Alternative (Alternative A) in the PM peak period in the northbound direction are forecast to average between 30 and 45 mph for most of the freeway, with several segments forecast to have average PM peak period traffic speeds below 35 mph on a typical weekday. Alternative D is forecast to produce the greatest improvement in average travel speeds with many segments of the I-710 general purpose lanes forecast to achieve speeds above 50 mph. The forecast average speeds for Alternative E and Alternative C are similar to the performance of those two alternatives with respect to V/C ratios, with most northbound segments of the I-710 general purpose lanes forecast to achieve average speeds of between 40 mph and 50 mph in the PM peak period. It is noted that the improvement of travel times on the I-710 mainline for Alternative E, due to the higher forecast average speeds, will have implications for tolling on the proposed truck lanes in that alternative because trucks may not realize significant enough trip time savings as compared to the I-710 general purpose lanes to make paying tolls very attractive (given the option by trucks to use either the general purpose lanes or the truck lanes, see Section 6.5.2).

Figure 5.2-3 displays the traffic volume weighted average speeds for the entire length of the I-710 mainlines for each of the five alternatives in the PM peak period for 2025. In this figure, a distinction is made between the general purpose travel lanes and the lanes that would be used either exclusively by carpools or by trucks depending upon the alternative.

Figure 5.2-3
Average Travel Speeds, NB Lanes, PM Peak Period, 2025



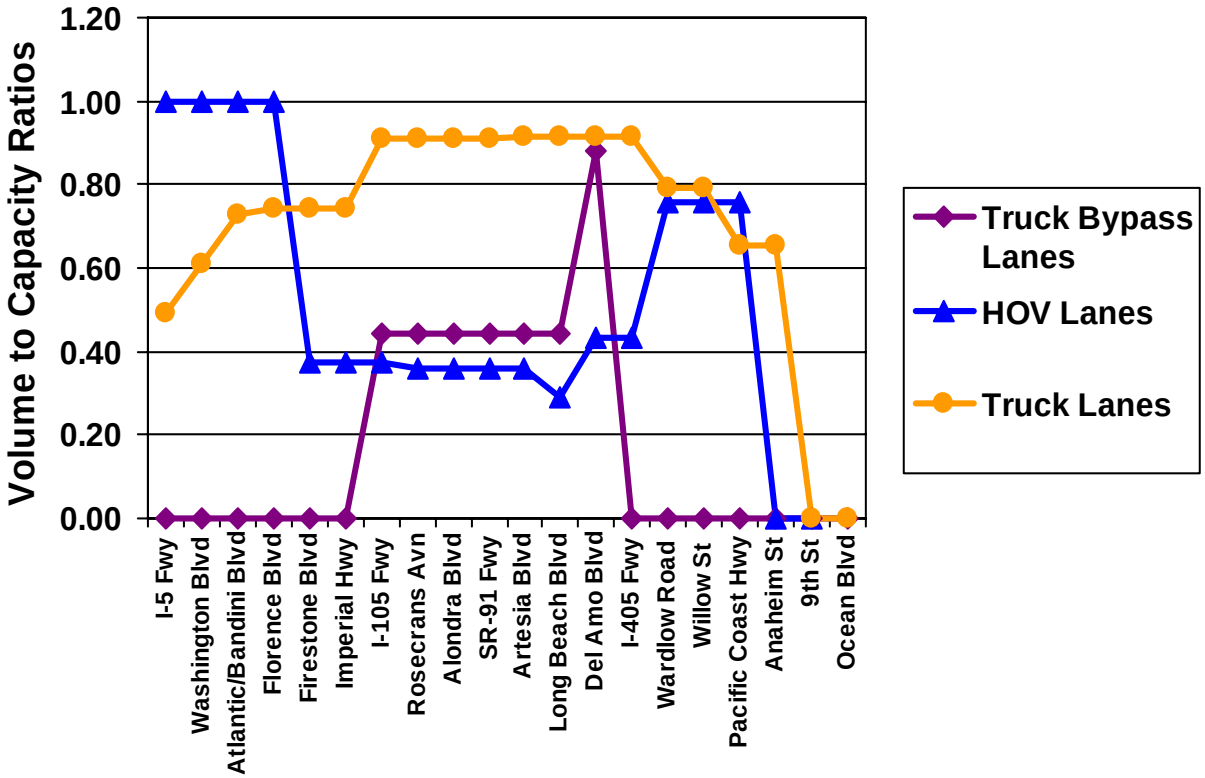
Source: Cambridge Systematics, Inc., April 2003.

Alternatives B, C, D and E are all forecast to improve travel speeds on the I-710 as compared to the future no build condition, Alternative A. Mainline general purpose lanes average PM peak period speeds are forecast to be the highest with Alternative D, followed by E and C respectively. The proposed HOV and truck lanes in the build alternatives are forecast to all have average speeds above 55 mph, providing time savings to their users. The overall forecast improvement in PM peak period average speeds will save time for users of I-710 and contribute to reduced pollutant emissions and fuel consumption compared to the future no build alternative.

Utilization of New Lanes

The next travel demand measure is the projected utilization of the proposed new lane facilities along I-710 that would be added in the build alternatives (truck by-pass lanes in Alternative C, HOV lanes in Alternative D, and truck-only lanes in Alternative E) based on how well the capacity of these lanes is utilized. Volume to capacity ratios are presented northbound for the PM peak period (Figure 5.2-4) and indicates the relative attractiveness of the proposed new lanes which are designed to serve trucks or carpools, depending upon the alternative.

Figure 5.2-4
Projected V/C Ratios of I-710 Special Purpose Lanes
Northbound Direction, PM Peak Period, Year 2025



Source: Cambridge Systematics, Inc., April 2003.

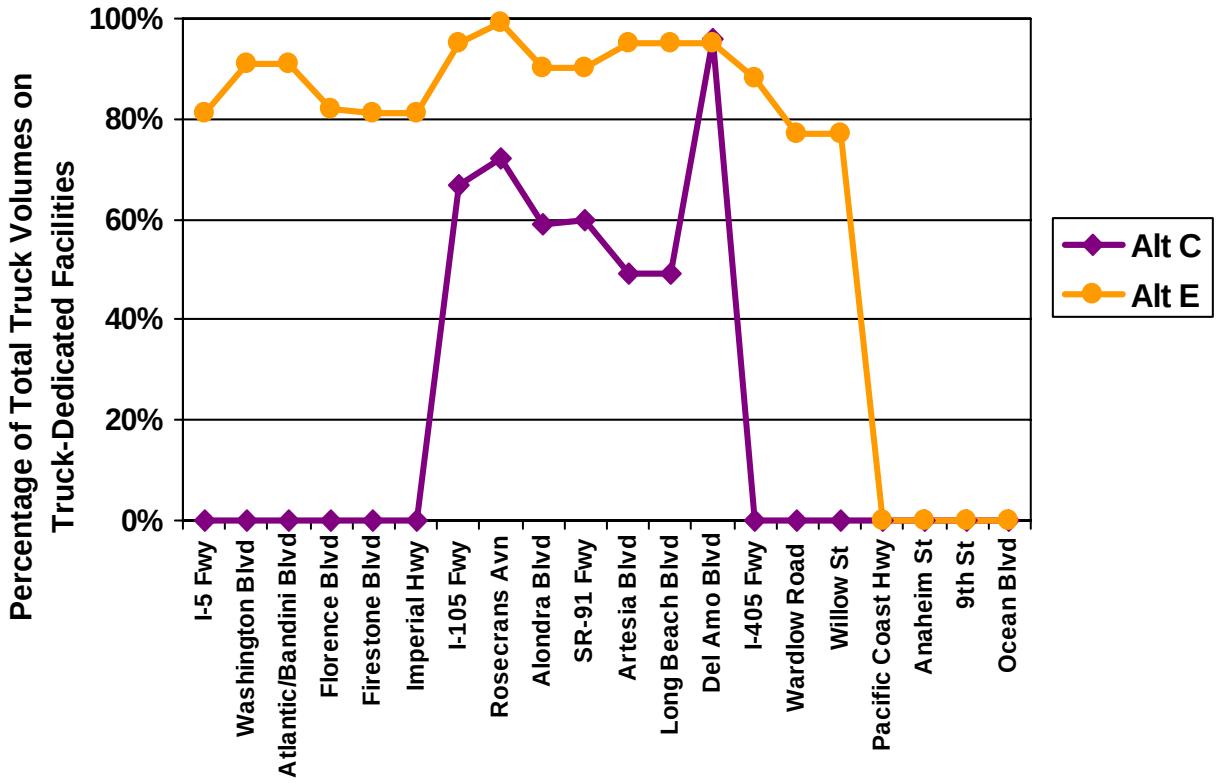
The truck lanes in Alternative E have the highest projected utilization of all of the proposed new I-710 lanes, with V/C ratios above 0.8 along most of their alignment. The proposed truck by-pass lanes in Alternative C also are forecast to have high utilization relative to capacity, with

V/C ratios slightly above 0.6. Alternative C also contains a truck inspection facility in the vicinity of Del Amo Boulevard, which would see high truck use. HOV lane utilization in Alternative D is forecast to be relatively low along the entire length of I-710, with V/C ratios in the middle segment of the proposed HOV lanes only slightly above 0.3. Alternative D's mobility improvements therefore come more from the proposed addition of general purpose traffic lanes as opposed to proposed HOV lane additions.

Truck Utilization of Lanes

The percentage of trucks using the proposed truck by-pass lanes in Alternative C and the proposed truck lanes in Alternative E is another measure of I-710 performance for the build alternatives (Figure 5.2-5). This measure indicates to what degree the alternatives are able to attract truck traffic to the proposed new truck lanes from the general purpose traffic lanes, hence helping to separate trucks and autos.

Figure 5.2-5
Forecast Truck Utilization of Proposed I-710 Truck Lanes



Source: Cambridge Systematics, Inc., April 2003.

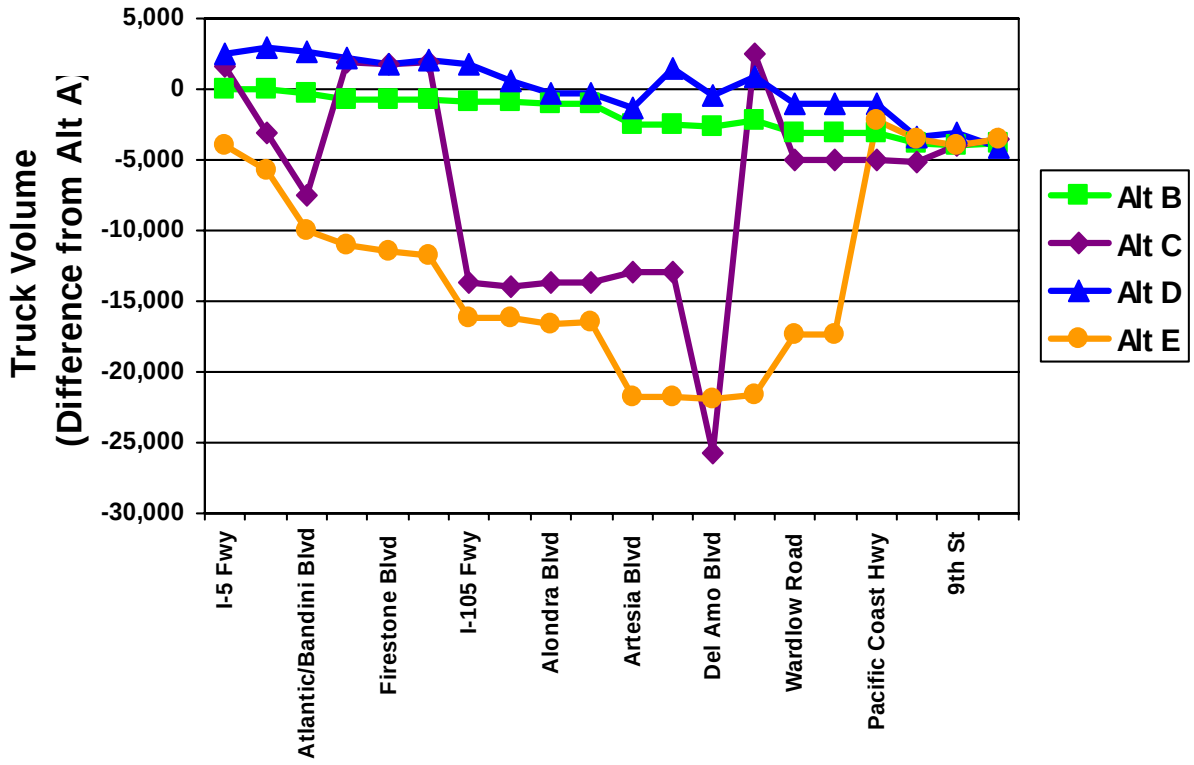
Truck lane utilization rates in these two alternatives are forecast to be very high, generally between 60 and 80 percent. Truck by-pass lane utilization in Alternative C is forecast to be somewhat lower due to the fact that only trucks that would be moving through an I-710 interchange are candidates for using these lanes. Almost all trucks would use the truck inspection facility in Alternative C. It is noted that in some segments truck lane utilization in Alternative E may drop because the proposed truck lanes are forecast to be operating close to a V/C of 1.0, indicating congested conditions. As the volume/capacity ratio approaches 1.0 on

the proposed truck lanes, the projected travel time savings benefits for trucks using the proposed truck lanes relative to the I-710 general purpose lanes would not be that substantial, making them less attractive to use.

Truck Diversion

The final I-710 facility specific measure is the forecast change in truck average daily traffic (ADT) on the I-710 general purpose lanes for each of the alternatives (Figure 5.2-6) as compared to Alternative A (No Build Alternative).

Figure 5.2-6
Truck Diversion from the I-710 General Purpose Lanes
Northbound Direction, PM Peak Period, Year 2025



Source: Cambridge Systematics, Inc., April 2003.

The ability of the proposed truck by-pass lanes (Alternative C) and truck lanes (Alternative E) to separate truck and auto traffic are evident in these projections, with significant decreases in forecast truck ADT on the general purpose lanes of I-710 for these two alternatives. The decrease in truck volume due to the truck inspection facility in the vicinity of Del Amo Boulevard in Alternative C is represented by the dip in the illustration. Diversion of trucks from the southern segments of I-710 due to the proposed Terminal Island Freeway improvements is reflected in the projected decrease in truck volumes on I-710 general purpose lanes south of I-405 in Alternatives C and D.

5.2.2 Study Area Transportation System Performance

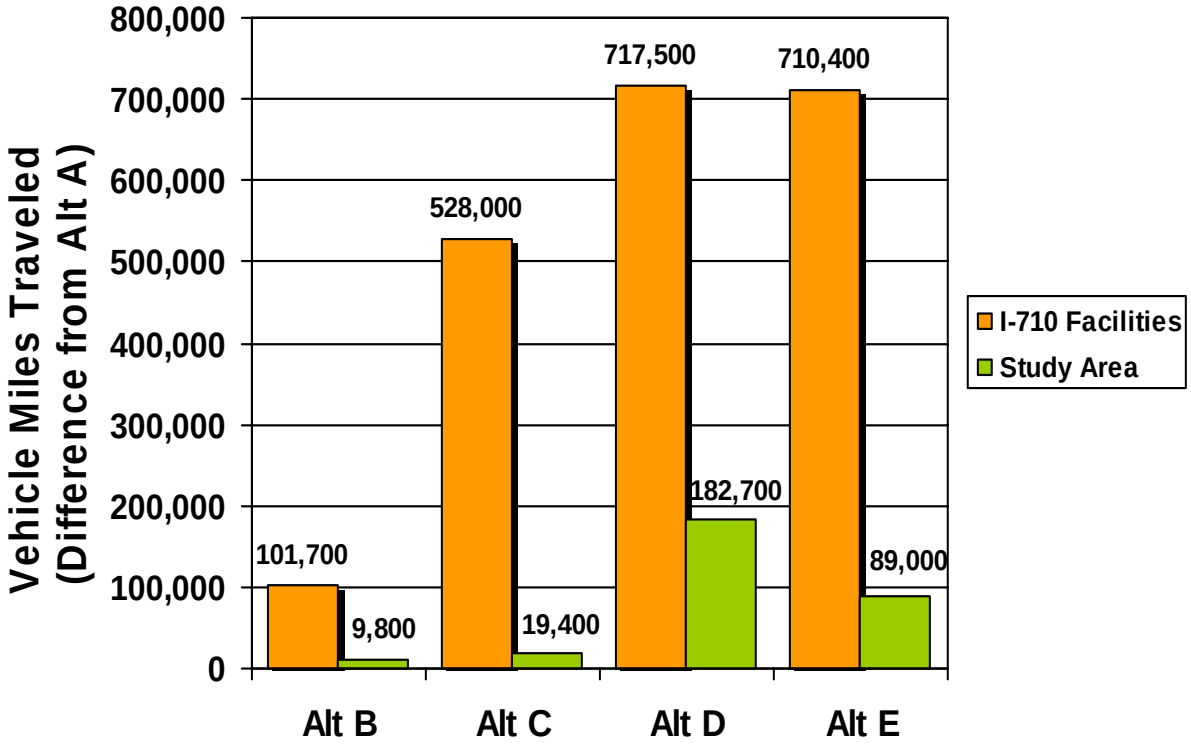
In addition to focusing on the transportation system performance of the I-710 among the Final Set of Alternatives, it is important to assess the performance of the entire roadway system within the I-710 Study Area. The Study Area, as described in Section 1.2, encompasses the roadway system between approximately Alameda Street on the west, Lakewood/Rosemead Boulevard on the east, the Ports of Long Beach and Los Angeles on the south and SR-60 on the north. Proposed physical and operational changes in Alternatives B through E would affect not just traffic and system performance on I-710 itself, but the surrounding parallel and connecting freeways and arterials as well. The measures presented in this section attempt to capture these broader transportation system performance changes among the alternatives. These study area wide system performance measures include:

- Vehicle miles traveled
- Vehicle hours traveled
- Person hours traveled
- Annual traffic accidents
- Travel time reliability

Vehicle Miles Traveled

The first study area-wide performance measure is forecast average weekday daily vehicle miles traveled (VMT) as compared to the No Build Alternative. (Figure 5.2-7).

Figure 5.2-7
Change in Vehicle Miles Traveled



Source: Cambridge Systematics, Inc., April 2003.

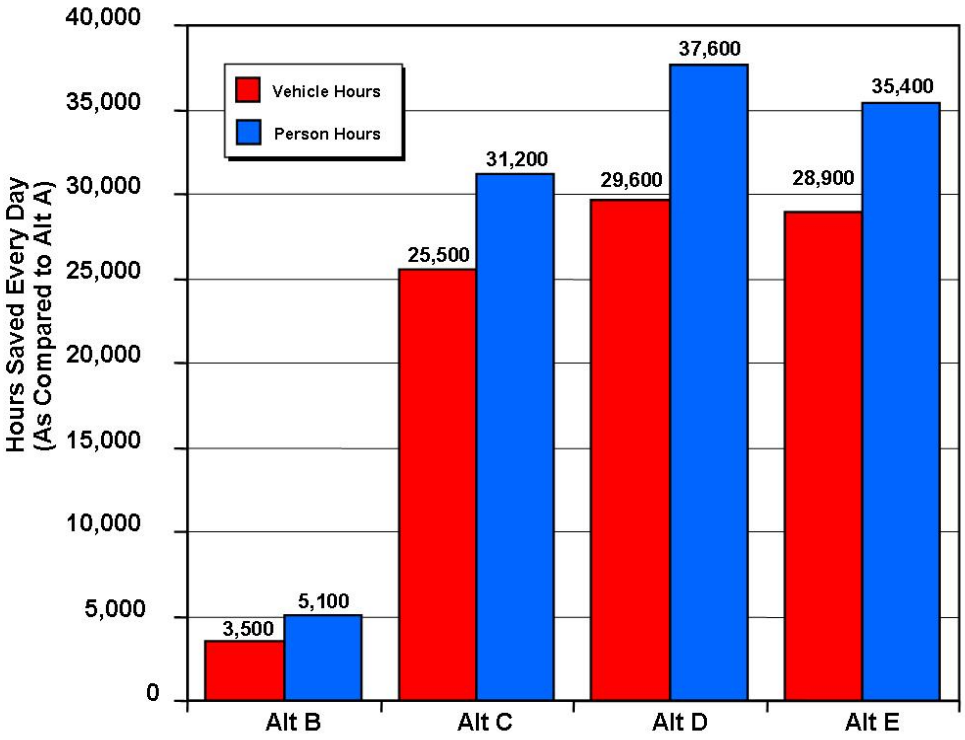
As expected, VMT increases significantly on the I-710 for each of the build alternatives (Alternatives C-E, including HOV lanes, truck by-pass lanes, and truck lanes) as compared to the no build condition. These alternatives add substantial capacity to I-710 and hence are forecast to attract traffic from other congested roadways within or near the Study Area. These forecast changes in VMT on I-710 range from a 2.3 percent increase for Alternative B to a 16.4 percent increase for Alternative D as compared with the future No Build, Alternative A.

The overall increase in VMT is relatively small (to the point of being negligible). While the I-710 improvements attract vehicles that would otherwise be traveling on the arterial streets, the improvements to arterial streets would attract new vehicles to the network in the Study Area. The forecast Study Area VMT increases compared to the future No Build Alternative range from 0.02 of the 1 percent for Alternative B to 0.3 of 1 percent for Alternative D.

Reduction in Hours of Travel

Figure 5.2-8 shows how better speeds on I-710 translates to delay reductions for all travelers throughout the I-710 Study Area, including motorists on major street arterials as well as those vehicles using I-710.

Figure 5.2-8
Daily Reductions (Vehicle Hours, Person Hours Saved)



Vehicle hours of travel measures the total travel time spent by all vehicles on the roadway system during a given time period, such as an average weekday. Person hours of travel measures the total travel time spent by the people riding in each of the vehicles on the

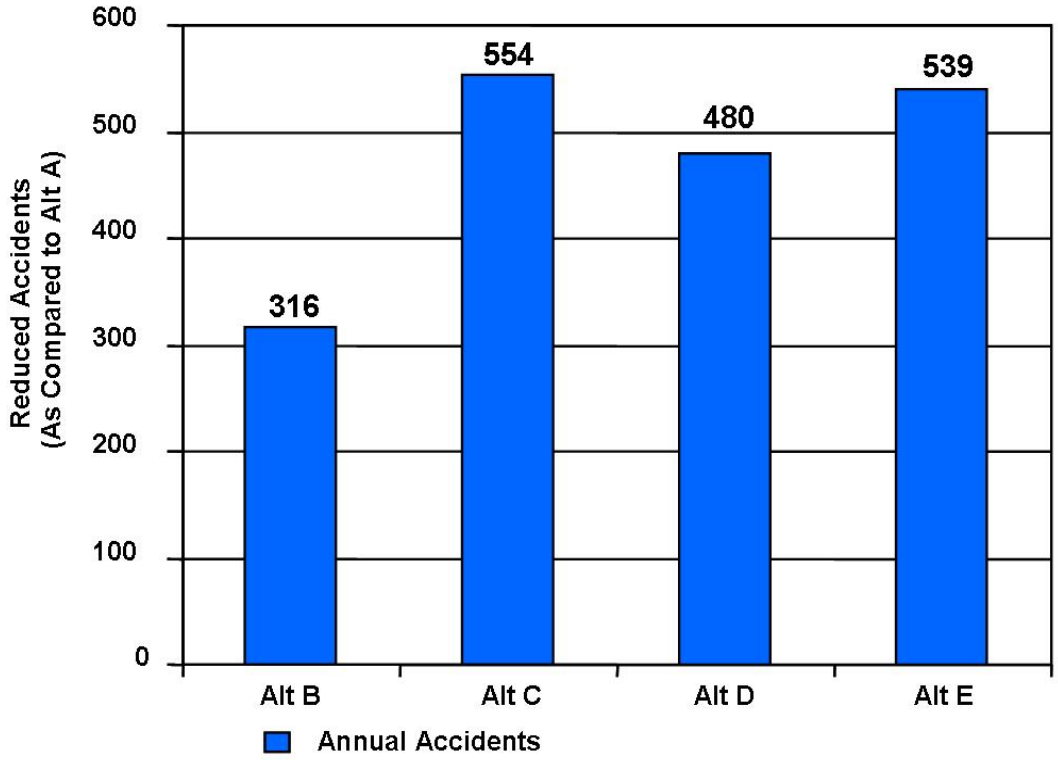
roadway system during a given time period. For example, if a car carrying two people (driver and passenger) spent one hour traveling from home to work in the Study Area, it would compute as one vehicle hour of travel and two person hours of travel.

In 2025, Alternatives D and E are forecast to produce the greatest reductions in overall average weekday travel time (measured both in terms of vehicle hours traveled and person hours traveled) in the Study Area as compared to the No Build alternative. This is because these two alternatives add the most capacity to the transportation system in the I-710 Study Area. Both Alternative D and Alternative E are forecast to save travelers over 35,000 hours of travel time per day in the year 2025 as compared to the No Build, Alternative A.

Accident Reduction

Figure 5.2-9 presents information on the safety benefits of the alternatives compared to Alternative A in terms of estimated accident reductions.

Figure 5.2-9
Annual Accident Reductions



Source: Cambridge Systematics, Inc., April 2003.

In general terms, the greater the amount of predicted congestion (volume/capacity ratio), the worse the accident rate gets. In addition, accidents vary by facility type. The more that traffic uses the arterials compared to freeways, the higher the accident rate. Using travel demand forecasts for each of the alternatives, FHWA's ITS Deployment Analysis System (IDAS) model was used to predict the number of accidents that would occur over a one year period, assuming the Year 2025. Figure 5.2-9 shows the number of accidents that would be *reduced* by Alternatives B, C, D, and E, respectively, compared to the no build condition.

Interpretation of the accident data shown in Figure 5.2-9 indicates that the incident management strategies related to the intelligent transportation improvements in Alternative B are forecast to provide significant accident reduction benefits. By definition, these incident management strategies are also included in Alternatives C, D and E. On top of that, the build alternatives are forecast to reduce accidents, in part, by shifting traffic from the arterials to the freeways, where accident rates are lower. It is important to note here that FHWA's IDAS model does not account for certain types of safety benefits – specifically the predicted benefits of separating cars from trucks – since insufficient accident data on exclusive truckways exists that would provide the basis to quantify these estimates. Thus, the potential for accident reductions attributable to Alternative E is likely under-reported in Figure 5.2-9. However, it is logical to assume that separating trucks and autos would provide significant safety benefits for traveling motorists that is not necessarily reflected in Figure 5.2-9.

Travel Time Reliability

The final transportation system performance measure presented is the travel time reliability analysis. Travel time reliability is measured as the estimated change in non-recurrent (incident-related) traffic delay, expressed in hours (Figure 5.2-10).

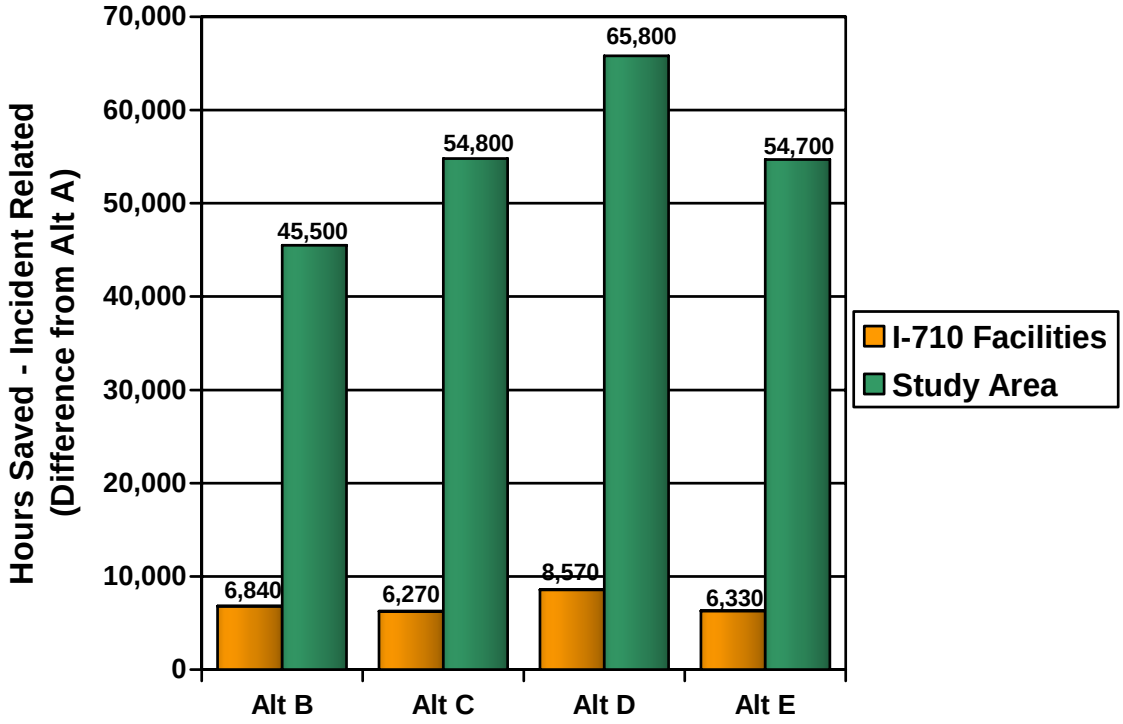
The following conclusions can be drawn from Figure 5.2-10:

- Alternative B is forecast to show significant reliability benefits due to the benefits of incident management in reducing the estimated duration of each incident and its effect on traffic congestion.

- Alternative D has the greatest estimated reliability improvements. This is due to the addition of lanes, which reduces the impact of incidents, and the forecast reduction in overall traffic congestion making it easier to clear incidents more quickly and thereby reducing the duration of traffic congestion caused by the incident.

- The travel time reliability benefits of Alternative E are most likely underestimated because they these estimates do not take into account the accident reductions likely to result from separating trucks and autos. [See preceding discussion of accident reductions.]

Figure 5.2-10
Time Savings due to Reduction in Accidents
Travel Time Reliability



Source: Cambridge Systematics, Inc., April 2003.

5.3 Right-of-Way Impact Analysis

Due to the importance of this criterion, right-of-way impacts were assessed using several different measures to portray the relative differences among the alternatives. For instance, total acres of right-of-way impacts attributable to the different build alternatives was examined as well as impacts on various types of land uses. The purpose was to provide comparative information on the alternatives so that the general public, advisory committees and the Oversight Policy Committee could assess the right-of-way acquisition implications of each of the alternatives, including specific components within each alternative. Right-of-way limits were determined based on the concept engineering plans and state guidelines for right-of-way. The right-of-way limits that were drawn in CADD were imported into geographic information systems (GIS) software and compared to the land uses that were already defined in the GIS database. The land use categories include: Sensitive uses (e.g., parks, schools, green space, cemeteries), Commercial/Industrial, Public/Utility Corridor, Residential, Railroad, and Undevelopable Property. The comparison provided acreages of the various land use types that were located within the proposed right-of-way lines for each of the three build alternatives.

At this stage of project development, it is important to understand that the right-of-way impacts as identified are conceptual. There will be numerous opportunities between the I-710 Major Corridor Study and any future construction for the design concepts to be refined, which, in turn, would affect the right-of-way estimates. The right-of-way impact analysis conducted for the build alternatives assumed full Caltrans design standards for slopes and maintenance. Changes in these and other key assumptions would also affect the right-of-way impact estimates. The detailed results of the right-of-way analysis are presented in Appendix O of this report.

Right-of-way impacts were calculated for those improvements that would entail acquisitions beyond what is already planned and committed for the I-710 Corridor. Since Alternative A, the No Build Alternative, represents the "no action" option, this alternative would not result in any acquisitions beyond what is already planned for implementation by 2025. Alternative B does not include any elements on I-710 that require right-of-way acquisition, so this alternative is not included in the following analysis. Right-of-way estimates for the other three alternatives reflect the right-of-way acquisitions of these alternatives over and above the No Build Alternative.

The right-of-way impacts were compared in various ways to illustrate the differences among the alternatives. A comparison of the total right-of-way impacts showed that Alternative E would impact the most acreage (Figure 5.3-1).

Figure 5.3-1
Total Right-of-Way Comparison by Alternative

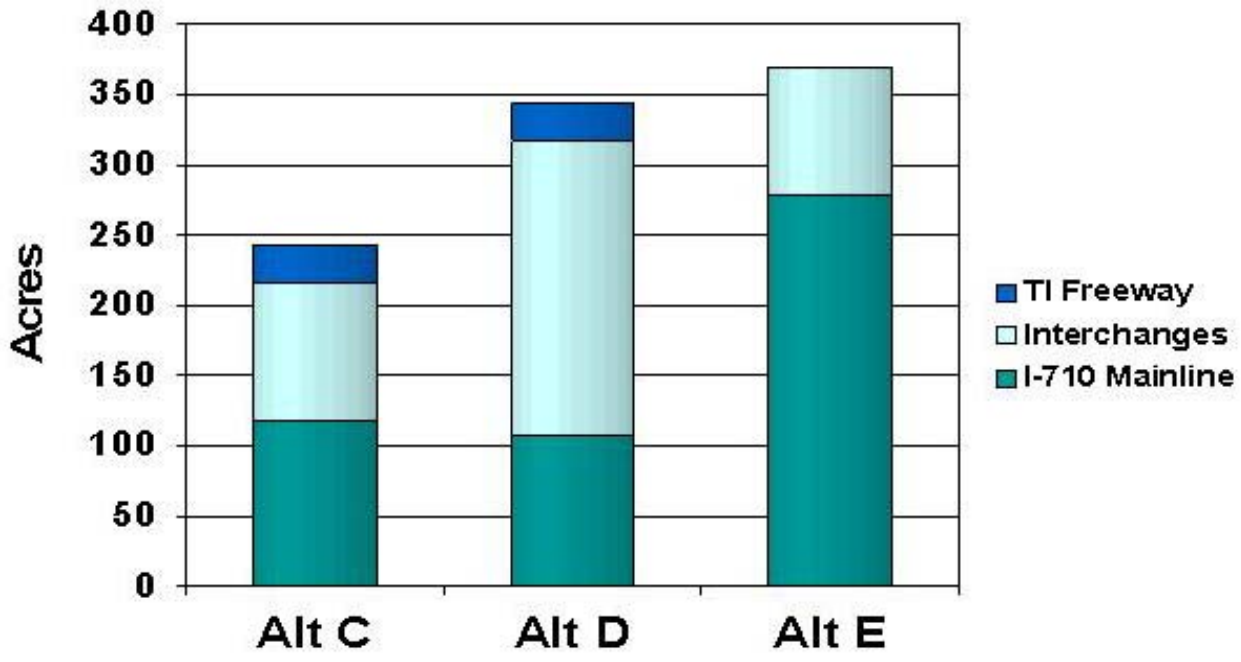
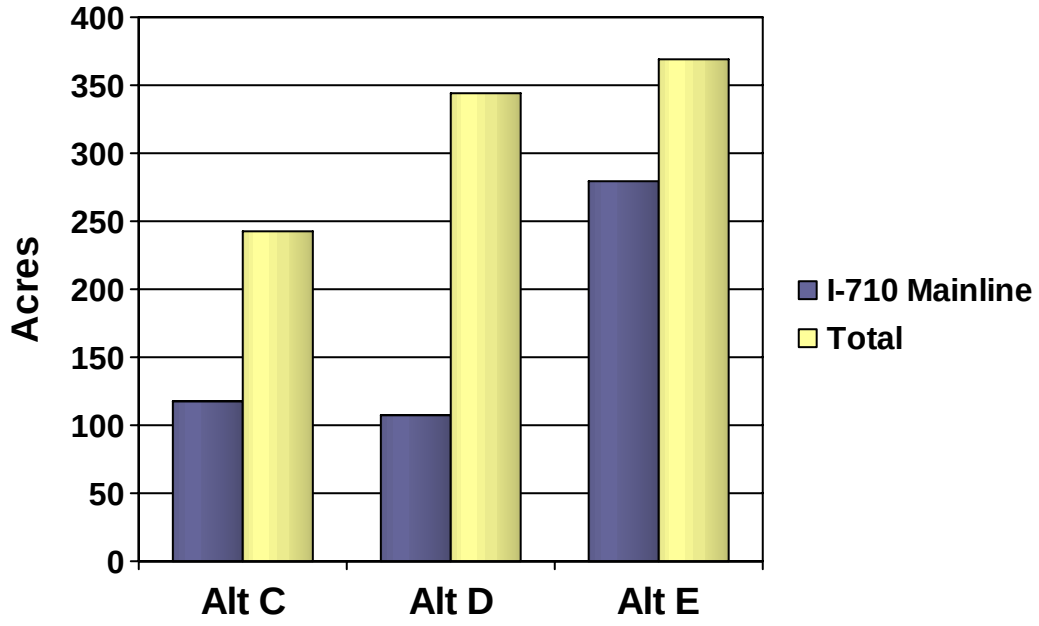


Figure 5.3-2 illustrates that of the three alternatives compared, the Alternative E High Truck design concept would have the greatest right-of-way impact.

The high proportion of right-of-way impacts of the Alternative E, High Truck, mainline design concept result because Alternative E implements a new facility along the entire length of the

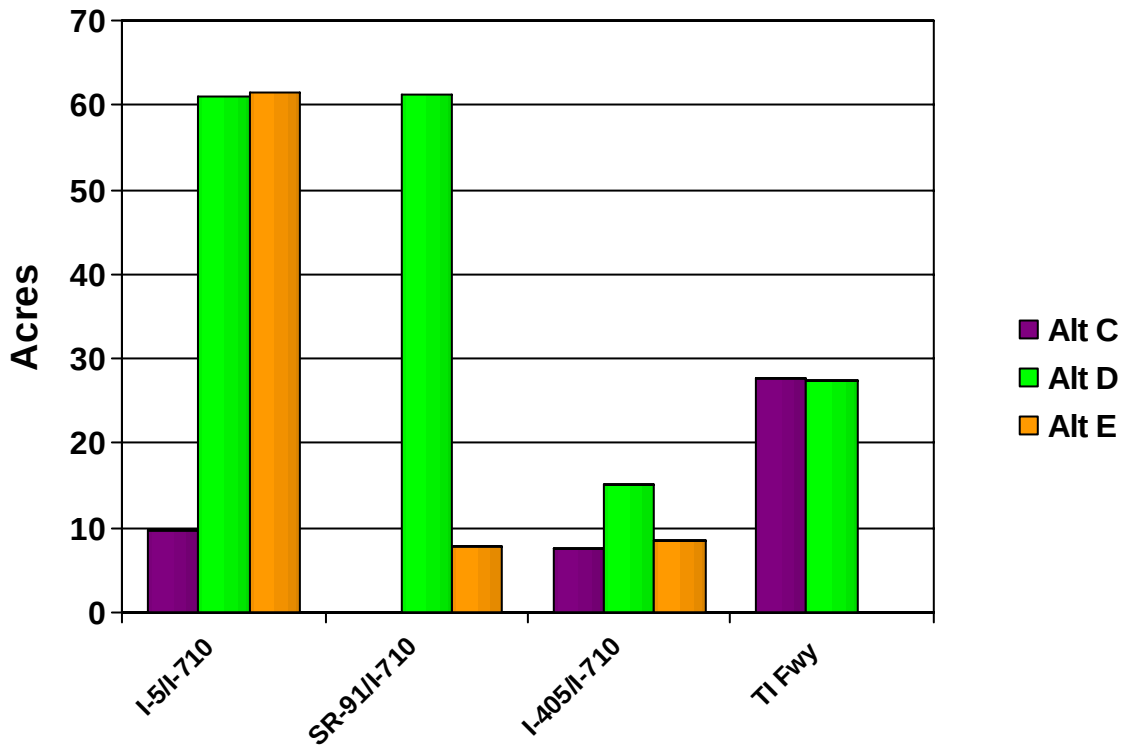
Corridor (the truck lanes from Willow to I-5). Alternative C only implements new facilities at a few specific locations, and Alternative D relies largely on widening the existing I-710, which results in proportionately less right-of-way impact associated with the I-710 mainline improvement element of the alternative. Alternative D includes major proposed improvements to the I-710/SR-91 and I-710/I-5 interchanges, which would have significant right-of-way impacts.

Figure 5.3-2
I-710 Mainline vs. Total Right-of-Way Comparison



In comparing design options for several of the components among the alternatives, the following is noted: although the improvement design concepts are different, the right-of-way impacts for the I-5/I-710 interchange in Alternatives D and E are very similar (Figure 5.3-3). The improvements at the SR-91/I-710 interchange require more right-of-way for the design concept proposed in Alternative D than in Alternative E. The right-of-way impacts at the I-405/I-710 interchange are similar among all three alternatives with Alternative D again requiring the most. Finally, the two proposal concepts for extension of the Terminal Island Freeway in Alternatives C and D would require approximately the same amount of right-of-way acquisitions.

Figure 5.3-3
I-710 Right-of-Way Comparison By Component



The total right-of-way impact and the right-of-way impact excluding the Public/Utility Corridor category of impacts for each city was assessed (Figure 5.3-4 and Figure 5.3-5). The Public/Utility Corridor category of land use primarily includes the Southern California Edison and Los Angeles Department of Water and Power properties. Excluding this category of estimated acquisitions provides a clearer representation of the potential impacts of the different alternatives to the local communities and businesses. In either case, the number of acres impacted would be highest in Long Beach for Alternatives C and D. Right-of-way impacts would be the highest in Long Beach in Alternative E if the Public/Utility Corridor right-of-way impacts are included and would be the largest in Commerce if the Public/Utility Corridor impacts are excluded.

Figure 5.3-4
Total Right-of-Way Impacts by City by Alternative

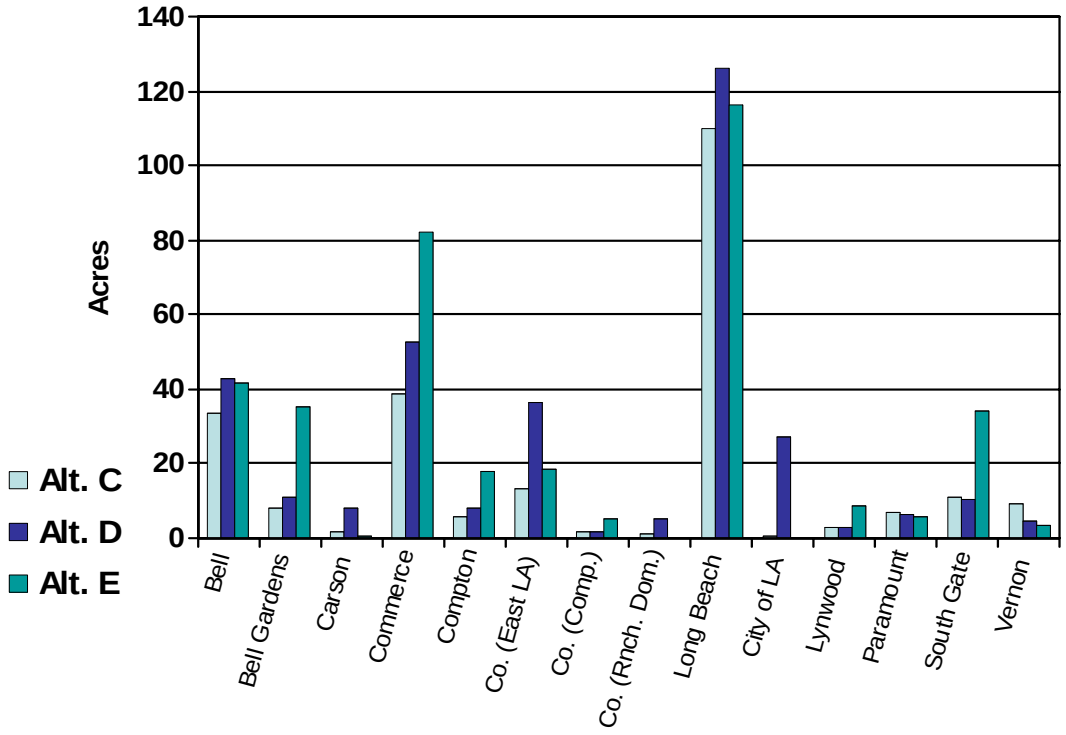
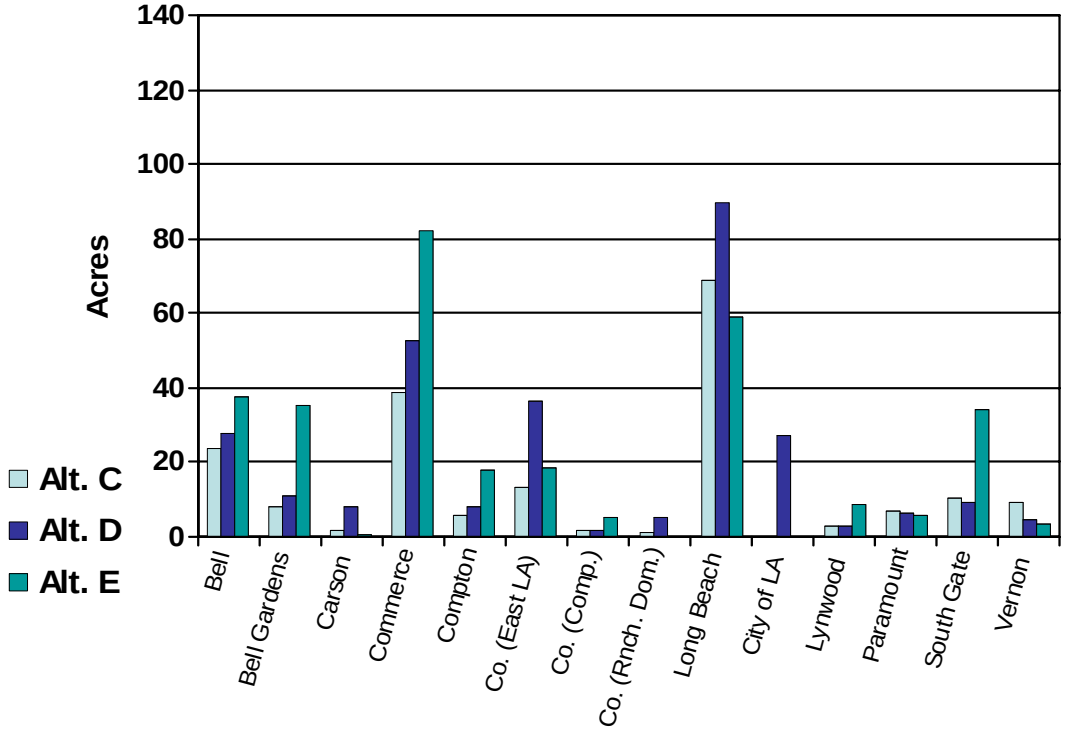


Figure 5.3-5
Right-of-Way Impacts by City (Excluding Utility Right-of-Way)



5.4 Environmental Analysis

An environmental screening analysis was performed for the Final Set of Alternatives to identify potential environmental impacts as well as elicit evaluative information on the alternatives from an environmental perspective. The environmental overview encompassed: acquisitions and right-of-way, aesthetics and visual quality, biological resources, cultural resources, hazardous materials, water resources, noise, parks and recreation, traffic, and air quality. The estimated right-of-way impacts of the alternatives are discussed separately in Section 5.3 of this report.

The environmental analysis considered the physical and operational characteristics associated with the different alternatives in light of existing and future conditions in the I-710 Study Area using conceptual plans dated March 2003. Due to the complexity of the environmental issues and transportation needs within the I-710 Study Area, each alternative contains an extensive mix of transportation elements that are structured to solve various problems in different ways. For example, a key issue for the Study Area is how to address the relatively large number of trucks that use I-710 to travel between the Ports of Long Beach/Los Angeles and the freight rail yards located in the cities of Commerce and Vernon. The alternatives were deliberately structured in a manner such that the effects of various design concepts and actions could be analyzed and understood. It is intended that only the best, most desirable transportation elements would be carried forward for further study at the conclusion of the I-710 Major Corridor Study. Based on the results of the mobility analysis, preliminary environmental evaluation, and public input, these different elements were further modified or dropped altogether to form the Locally Preferred Strategy.

Where possible, the environmental discussions in Section 5.4 are broken down according to the major transportation elements inherent to each alternative in order to highlight the environmental effects attributable to the different elements. This was done to provide decision-makers with some environmental information on the different transportation components so that they could “mix and match” selected transportation improvements from different alternatives to form a Locally Preferred Strategy. In some cases, such as traffic and circulation, it is not possible to isolate the effects of the individual components. However, in these cases, general patterns were noted and described.

The environmental analysis focused on describing major differences among the five alternatives or illustrating where the environmental effects are generally similar. It follows that future studies of the Locally Preferred Strategy will include an in-depth analysis of environmental impacts. These future studies may focus on particular transportation elements or geographic areas within the alternatives examined in the I-710 Major Corridor Study or they may examine the I-710 Corridor as a whole. Regardless, the elements that make up the Locally Preferred Strategy will undergo more detailed environmental analysis consistent with NEPA and CEQA regulations. The environmental overview analysis provided in Section 5.4 of this report was developed in order to provide background information and focus for those future environmental studies and it also identified areas where the conceptual design of the various alternatives would need to be altered to avoid and minimize impacts to sensitive resources such as neighborhoods, public parks, and historic properties.

5.4.1 Aesthetics and Visual Quality

The I-710 freeway is a heavily traveled corridor serving the Port of Long Beach and several major freeways. The I-710 freeway and related interchange connections represent a significant visual element within the I-710 Study Area. Other major visual elements include the Union Pacific and BNSF railroad yards and tracks located just south of I-5 that extend underneath the freeway to the east and west. The Los Angeles River parallels the I-710 freeway throughout most of the project area. In addition, high-power electrical transmission towers can be seen alongside the freeway between I-405 and Atlantic Avenue and also between Imperial Highway and Slauson Avenue. The I-710 Study Area is highly urbanized, consisting mainly of industrial/ manufacturing areas and some scattered residential neighborhoods. Most of these residential areas are screened from view of I-710 by sound walls and vegetation. Landscaping in the area is minimal and consists primarily of non-native plant and tree species, with the exception of some native coastal scrub located closer to the southern part of the I-710 Corridor.

Visual impact is related to the change in the existing visual environment. The first criterion is sensitive land uses. The I-710 Corridor was characterized based on field surveys to determine areas that represented visually sensitive land uses. These uses included residential neighborhoods, parks, and cultural resources. The second criterion is physical change. Engineering plans were reviewed to determine areas where a physical change to the existing visual environment would occur. Change was represented by either the removal or addition of physical elements attributable to the proposed alternative such as the removal of a building or the addition of freeway structures. In addition, elevated structures would have a greater potential for visual impacts compared to new structures that are principally at grade due the sight lines involved.

Alternative A – No Build

Alternative A is a future baseline alternative consisting primarily of operational improvements and reconstruction activities that involve pavement replacement, standard shoulders, and a new median for I-710. By definition, these transportation improvements have already been planned and committed for the Year 2025. No additional impacts associated with visual quality are anticipated to occur under Alternative A beyond what has already been studied and approved.

Alternative B – TSM/TDM Alternative

Alternative B is a low impact alternative consisting of operational investments, policies, and actions targeted at improving goods movement, facilitating passenger auto and transit travel, and reducing existing environmental impacts of transportation facilities and operations in the I-710 Study Area. Most of the improvements associated with this alternative are anticipated to have a beneficial impact on visual quality by providing additional landscaping, hardscape design treatments, improved signage, and aesthetic improvements to curbs and gutters at the interchanges. However, the addition of high-mast illumination at freeway-to-freeway interchanges would have the potential to adversely affect surrounding areas particularly for residential areas located in close proximity to the interchanges. Although the I-710 freeway already incorporates lighting for safety and directional purposes, the addition of high-mast

illumination would represent a significant new light source that could have the potential to adversely affect sensitive areas.

Alternative C – Medium General Purpose / Medium Truck Alternative

The following comparative table (Table 5.4-1) lists the different transportation elements included in Alternative C as well as a summary assessment of the potential for visual impact for each element given the presence of visually sensitive resources and the type and extent of the proposed visual change. Potential visual impacts can be avoided, minimized, or mitigated by one or more of the following actions: dropping the proposed element, changing the conceptual design, or by adding aesthetic features such as landscaping.

Table 5.4-1
Alternative C - Visual Impact Assessment

Alt. C - Transportation Element	Visual Impact Assessment	Notes
I-710 Mainline Improvements		
Mainline Widening	Potentially Significant	up to three linear miles of sensitive resources next to the freeway potentially affected
Collector-Distributor Lane System	Potentially Significant	about one and a half linear miles of sensitive resources affected
Truck Inspection Facility	Minor	surrounded by industrial / commercial uses
I-405 Truck Bypass Lanes	Minor	surrounded by industrial / commercial uses
SR-91/I-105 Bypass Lanes	Potentially Significant	for elevated portions of southbound bypass lanes next to neighborhoods (west of I-710)
Pacific Coast Highway Truck Ramps	Minor	surrounded by industrial / commercial uses
Washington Boulevard Truck Ramps	Minor	surrounded by industrial / commercial uses
I-710 Interchanges – Freeway		
I-405/I-710 Interchange	Potentially Significant	elevated flyover ramp element within state ROW adjacent to residents in SW quadrant
I-5/I-710 Right Side Ramp	Potentially Significant	residents next to I-5 NB lanes; see also potential collector-distributor lane impacts
I-710 Interchanges – Local		
Anaheim Street Braid	Minor	surrounded by industrial / commercial uses
Pacific Coast Highway Braid	Potentially Significant	residential uses in NW quadrant of the interchange
Willow Street Interchange	Potentially Significant	residential uses in NW quadrant of the interchange
Del Amo Boulevard Interchange	Minor	surrounded by industrial / commercial uses
Imperial Highway Interchange	Potentially Significant	apartment building complex in NW quadrant of the interchange
Florence Avenue Interchange	Minor	surrounded by industrial / commercial uses
Atlantic/Bandini Interchange	Minor	surrounded by industrial / commercial uses

Table 5.4-1 Continued
Alternative C – Visual Impact Assessment

Alt. C - Transportation Element	Visual Impact Assessment	Notes
Washington Boulevard Interchange	Potentially Significant	residential uses and parks in NE and NW quadrants of this interchange
Slauson Boulevard Interchange	Minor	surrounded by industrial / commercial uses
Terminal Island Freeway Extension	Significant	four miles of elevated structure that would affect residents in adjacent properties and surrounding areas on both sides of the new roadway facility
Arterials	Potentially Significant	74 linear miles of arterial roadways to be improved; visual impacts could occur due to roadway widenings in some locations

Source: Parsons Brinckerhoff, April 2003.

Alternative D – High General Purpose / High HOV Alternative

Table 5.4-2 lists the different transportation elements included in Alternative D and provides a brief summary assessment of the potential for visual impact for each element given the presence of visually sensitive resources and the type and extent of the proposed visual change. Potential visual impacts can be avoided, minimized, or mitigated by one or more of the following actions: dropping the proposed element, changing the conceptual design, or by adding aesthetic features such as landscaping.

Table 5.4-2
Alternative D – Visual Impact Assessment

Alt. D - Transportation Element	Visual Impact Assessment	Notes
I-710 Mainline Improvements		
Mainline Widening	Potentially Significant	About seven linear miles of sensitive resources potentially affected; extensive stretches of new elevated lanes above existing I-710 travel lanes
I-710 Interchanges – Freeway		
I-405/I-710 Interchange	Potentially Significant	residents next to I-405 NB lanes west of I-710; also elevated ramp elements within state ROW
I-405/I-710 HOV Connector	Minor	surrounded by industrial / commercial uses
SR-91/I-710 Interchange	Potentially Significant	extensive areas of removal of residential structures, landscaping; elevated ramp elements
I-5/I-710 Interchange	Potentially Significant	extensive areas of removal of residences, parks, landscaping affecting all four quadrants
I-710 Interchanges – Local		
Willow Street Diamond	Potentially Significant	residential uses in SW and NW quadrant of the interchange
Del Amo Boulevard Diamond	Minor	surrounded by industrial / commercial uses
Long Beach Boulevard	Minor	surrounded by industrial / commercial uses
Imperial Highway Diamond	Potentially Significant	residences in SW quadrant and apartment building complex in NW quadrant

Table 5.4-2 Continued
Alternative D – Visual Impact Assessment

Alt D - Transportation Element	Visual Impact Assessment	Notes
Florence Avenue Diamond	Potentially Significant	residents in NE quadrant of the interchange
Atlantic/Bandini Interchange	Minor	surrounded by industrial / commercial uses
Washington Boulevard Interchange	Potentially Significant	residential uses and parks in NE and NW quadrants of this interchange
Terminal Island Freeway Connector	Minor	surrounded by industrial / commercial uses
Arterials	Potentially Significant	44 linear miles of arterial roadways to be improved; visual impacts could occur due to roadway widenings in some locations

Source: Parsons Brinckerhoff, April 2003.

Alternative E - High Truck Alternative

Table 5.4-3 lists the different transportation elements included in Alternative E and provides a brief summary assessment of the potential for visual impact for each element given the presence of visually sensitive resources and the type and extent of the proposed visual change. Potential visual impacts can be avoided, minimized, or mitigated by one or more of the following actions: dropping the proposed element, changing the conceptual design, or by adding aesthetic features such as landscaping.

Table 5.4-3
Alternative E - Visual Impact Assessment

Alt. E - Transportation Element	Visual Impact Assessment	Notes
I-710 Mainline Improvements		
Exclusive Autoway	Potentially Significant	About 3.5 linear miles of sensitive resources affected; includes new elevated lanes
Exclusive Truck Facility	Potentially Significant	Several linear miles of sensitive resources affected; incl. stretches of new elevated lanes
I-405 Truck Ramps	Minor	surrounded by industrial/commercial uses
SR-91 Truck Ramps	Potentially Significant	residential uses located at NW and SW quadrants of the interchange
Firestone Boulevard Truck Ramps	Minor	surrounded by industrial / commercial uses
Washington Boulevard Truck Ramps	Potentially Significant	residential uses and park located at NE quadrant of the interchange
I-710 Interchanges – Freeway		
I-405/I-710 Interchange	Potentially Significant	new ramp connectors would affect residents in SW quadrant
SR-91/I-710 Interchange	Potentially Significant	residential uses in SW quadrant of interchange; see also SR-91 truck ramps
I-5/I-710 Interchange/ Atlantic Viaduct	Potentially Significant	residential areas near Atlantic Blvd. and SB lanes of I-5; extensive elevated lane sections

Table 5.4-3 Continued
Alternative E - Visual Impact Assessment

Alt. E - Transportation Element	Visual Impact Assessment	Notes
I-710 Interchanges – Local		
Slauson Boulevard Interchange	Minor	surrounded by industrial / commercial uses
Arterials	Minor	About 17 linear miles of arterial roadways to be improved; however, potentially affected areas are exclusively industrial / commercial with the exception of one segment of Florence Avenue.

Source: Parsons Brinckerhoff, April 2003.

5.4.2 Traffic and Circulation

Travel demand forecasting models were used to predict future traffic volumes on I-710 based on forecasts of future population, housing units, jobs, and cargo. In this case, a subarea travel forecasting model was developed for the overall I-710 Study Area. It is important to look at future travel demand so that proposed transportation improvements are not rendered obsolete by failing to take into account anticipated future growth in traffic. The planning horizon year for the I-710 Study is 2025. Travel demand forecasts were developed for all five alternatives to show how traffic would change in response to the proposed alternatives. Please note that the build alternatives (Alternatives C, D, and E) also include the proposed actions and operational improvements included in Alternative B in their project descriptions. [See Section 4.5 of this report for a detailed description of Alternatives A, B, C, D and E.]

The travel demand forecasts predict how many travelers are likely to use any new transportation facilities tested using the model. Table 5.4-4 shows future traffic volumes on I-710 under all five alternatives, including all vehicle types (autos, trucks, buses, etc.) Since trucks take up more space on the freeway than cars, heavy duty trucks were converted to passenger-car-equivalent units consistent with Highway Capacity Manual procedures. In general, a single heavy duty truck is the equivalent of 2.5 autos. Table 5.4-4 indicates that Alternative B would result in a slight decrease in traffic volumes on I-710, most likely due to the strategies designed to discourage and reduce vehicle trips. On the other hand, the build alternatives (Alternatives C, D, and E) would result in increased traffic volumes on I-710 because the added capacity and operational improvements would result in a better level of service to motorists. Most of these vehicles are switching to I-710 from parallel arterials within the I-710 Study Area closest to I-710 and also from parallel freeways such as I-110 and I-605 as traffic redistributes itself to take advantage of improved travel times on I-710.

Table 5.4-5 shows the changes in estimated truck volumes only. In this case, passenger-car-equivalent units do not apply – a single heavy duty truck is the equivalent of one vehicle in this table. Table 5.4-5 shows a pattern similar to Table 5.4-4, which is not surprising since a good portion of the vehicle stream on I-710 are trucks. Table 5.4-5 also shows that one of the elements proposed in Alternative C (extension of the Terminal Island Freeway) would reduce truck traffic on I-710 south of the I-405 since many trucks would elect to use the Terminal Island Freeway for this one stretch. However, overall truck traffic would increase somewhat on I-710 north of the I-405 compared to the no build condition (Alternative A) as these trucks from the Terminal Island freeway rejoin I-710.

Table 5.4-4
I-710 Average Daily Traffic Volumes (in Passenger Car Equivalent units), Year 2025

Segments on I-710		Alt A Volumes	Alt B Volumes	B – A % Diff.	Alt C Volumes	C - A % Diff.	Alt D Volumes	D - A % Diff.	Alt E Volumes	E – A % Diff.
From	**To**									
SR-60	I-5	280,300	280,900	0.2%	289,900	3.4%	313,400	11.8%	297,900	6.3%
I-5	Washington	280,100	281,300	0.4%	321,700	14.9%	329,000	17.5%	320,400	14.4%
Washington	Atlantic/Bandini	294,300	294,000	-0.1%	325,100	10.5%	342,800	16.5%	338,000	14.8%
Atlantic/Bandini	Florence	298,400	296,100	-0.8%	339,600	13.8%	345,600	15.8%	364,200	22.1%
Florence	Firestone	305,100	302,800	-0.8%	341,600	12.0%	349,300	14.5%	355,800	16.6%
Firestone	Imperial	306,000	303,400	-0.8%	342,000	11.8%	355,100	16.0%	350,400	14.5%
Imperial	I-105	325,700	322,700	-0.9%	344,900	5.9%	363,000	11.5%	366,400	12.5%
I-105	Rosecrans	250,200	247,400	-1.1%	266,500	6.5%	272,700	9.0%	284,400	13.7%
Rosecrans	Alondra	441,500	437,700	-0.9%	468,200	6.0%	451,300	2.2%	486,800	10.3%
Alondra	SR-91	431,900	427,800	-0.9%	458,100	6.1%	434,700	0.6%	479,200	11.0%
SR-91	Artesia	312,300	304,400	-2.5%	339,300	8.6%	371,600	19.0%	358,000	14.6%
Artesia	Long Beach	322,000	314,300	-2.4%	350,200	8.8%	383,100	19.0%	373,200	15.9%
Long Beach	Del Amo	306,500	298,600	-2.6%	331,000	8.0%	352,200	14.9%	350,100	14.2%
Del Amo	I-405	311,100	303,800	-2.3%	342,300	10.0%	356,200	14.5%	358,700	15.3%
I-405	Wardlow	290,000	281,400	-3.0%	281,000	-3.1%	334,500	15.3%	307,000	5.9%
Wardlow	Willow	302,000	293,100	-2.9%	299,400	-0.9%	350,700	16.1%	328,600	8.8%
Willow	Pacific Coast Hwy.	291,400	279,600	-4.0%	279,400	-4.1%	335,800	15.2%	308,100	5.7%
Pacific Coast Hwy.	Anaheim	268,300	254,100	-5.3%	244,200	-9.0%	277,300	3.4%	278,200	3.7%
Anaheim	9th	251,700	237,000	-5.8%	245,500	-2.5%	250,400	-0.5%	200,500	-20.3%
9th	Ocean	166,900	151,300	-9.3%	144,600	-13.4%	154,100	-7.7%	158,300	-5.2%

Source: Cambridge Systematics, Inc. and Kaku Associates, Inc, Electronic Data File, April 2003.

Notes: Average daily traffic volumes are shown for each alternative for the Year 2025 for vehicles using I-710 mainline travel lanes, including general purpose lanes, collector-distributor lanes, high occupancy vehicle lanes, truck bypass lanes, truckway lanes, and autoway lanes.

Percentage difference compares each alternative to the No Build Alternative (Alt. A).

Table 5.4-5
I-710 Average Daily Heavy Duty Truck Volumes, Year 2025

Segments on I-710		Alt A Volumes	Alt B Volumes	B – A % Diff.	Alt C Volumes	C - A % Diff.	Alt D Volumes	D - A % Diff.	Alt E Volumes	E – A % Diff.
From	**To**									
SR-60	I-5	17,400	17,500	0.6%	20,300	16.7%	21,200	21.8%	25,200	44.8%
I-5	Washington	18,800	19,100	1.6%	24,200	28.7%	23,500	25.0%	29,800	58.5%
Washington	Atlantic/Bandini	28,600	28,300	-1.0%	33,300	16.4%	32,500	13.6%	39,900	39.5%
Atlantic/Bandini	Florence	38,400	37,200	-3.1%	42,600	10.9%	41,700	8.6%	48,700	26.8%
Florence	Firestone	39,700	38,400	-3.3%	43,400	9.3%	42,400	6.8%	48,900	23.2%
Firestone	Imperial	39,600	38,300	-3.3%	43,300	9.3%	42,500	7.3%	48,300	22.0%
Imperial	I-105	41,100	39,600	-3.6%	43,900	6.8%	43,500	5.8%	49,700	20.9%
I-105	Rosecrans	38,300	36,800	-3.9%	40,900	6.8%	39,200	2.3%	46,900	22.5%
Rosecrans	Alondra	57,700	55,500	-3.8%	60,200	4.3%	56,700	-1.7%	64,500	11.8%
Alondra	SR-91	57,000	54,900	-3.7%	59,600	4.6%	55,700	-2.3%	64,000	12.3%
SR-91	Artesia	56,800	53,100	-6.5%	60,900	7.2%	59,500	4.8%	61,100	7.6%
Artesia	Long Beach	57,800	54,100	-6.4%	62,100	7.4%	60,700	5.0%	62,600	8.3%
Long Beach	Del Amo	58,000	54,200	-6.6%	61,200	5.5%	59,200	2.1%	62,500	7.8%
Del Amo	I-405	60,300	56,800	-5.8%	66,000	9.5%	62,500	3.6%	65,800	9.1%
I-405	Wardlow	69,000	65,000	-5.8%	54,500	-21.0%	69,800	1.2%	68,500	-0.7%
Wardlow	Willow	71,900	67,700	-5.8%	57,600	-19.9%	73,100	1.7%	71,900	0.0%
Willow	Pacific Coast Hwy.	72,000	67,900	-5.7%	57,700	-19.9%	73,300	1.8%	72,000	0.0%
Pacific Coast Hwy.	Anaheim	68,200	63,400	-7.0%	54,400	-20.2%	65,200	-4.4%	66,300	-2.8%
Anaheim	9th	66,300	61,500	-7.2%	56,100	-15.4%	62,200	-6.2%	62,500	-5.7%
9th	Ocean	59,100	54,800	-7.3%	49,500	-16.2%	53,800	-9.0%	55,700	-5.8%

Source: Cambridge Systematics, Inc. and Kaku Associates, Inc., Electronic Data File, April 2003.

Notes: Average daily truck volumes are shown for each alternative for the Year 2025 for trucks using I-710 mainline travel lanes, including general purpose lanes, collector-distributor lanes, truck bypass lanes, and truckway lanes.

Percentage difference compares each alternative to the No Build Alternative (Alt. A).

Changes in vehicular traffic combined with the proposed operational and capacity improvements included in the various alternatives affect how the travel lanes on I-710 would operate under each of the alternatives in the future year. Several performance measures such as anticipated changes in travel speeds, accident reductions, truck diversion, travel time reliability, and reductions in vehicle hours of delay, are already discussed in Section 5.2 of this report. An important indicator of the traffic impacts to a freeway or roadway facility is level of service as represented by the ratio of traffic volume to the design capacity of the roadway. Under optimal conditions, a freeway lane is capable of carrying about 2300 vehicles per hour (in Passenger Car Equivalent units). When traffic volumes exceed this number per lane (i.e., when volume/capacity is higher than 1.0), then the freeway is considered to be over capacity. In urban areas, Caltrans seeks to achieve a level of service of E or better for a general purpose travel lane, which is the equivalent of a volume / capacity ratio of less than 1.0. However, Caltrans acknowledges that this goal is not always achievable, particularly in highly congested regions such as Los Angeles. In general terms, the lower the volume/capacity ratio, the better the freeway operates for the traveling motorist. Volume /capacity values of 1.0 or higher indicate that the freeway is experiencing significant amounts of congestion.

Tables 5.4-6 and 5.4-7 illustrate the predicted volume/capacity ratios for I-710 for the AM peak period and the midday time period for all five alternatives in the future year. The AM peak period was selected because that is when traffic is generally most concentrated. For I-710, the midday time period was also selected because of the high amounts of truck traffic that typically occur during the middle part of the day. These tables show both directions of the freeway (northbound and southbound). They also show volume / capacity ratios, by segment, for the general purpose lanes as well as HOV lanes in Alternative D and the exclusive truck lanes in Alternative E.

In the AM peak period (Table 5.4-6), I-710 is predicted to be highly congested in the future year if no action is taken (Alternative A). Alternative B improves this situation only slightly, mainly due to the implementation of empty container management policies that would reduce truck trips somewhat. Despite the added traffic volumes that would be attracted to the I-710 freeway, Alternatives C, D, and E would result in marked improvement in the level of operation for the freeway in the AM peak period compared to the no build condition. This is due to the capacity enhancements included these three alternatives. However, with the exception of the HOV lanes (Alternative D) and the truck lanes (Alternative E), I-710 would still experience congested conditions as many segments are predicted to have volume/capacity ratios higher than 1.0 in the future year. Alternative D comes closest to achieving a level of service of E or better (i.e., volume/capacity ratio less than 1.0), followed by Alternative E, and then Alternative C.

In the midday time period (Table 5.4-7), Alternatives A and B would still experience high levels of congestion in the future year. The average volume/capacity ratio is 1.21 for Alternative A and 1.16 for Alternative B. In essence, I-710 would still be congested all day long under these two alternatives. Much of this is attributable to the high number of heavy duty trucks that are predicted to use I-710 as trucks use more lane capacity compared to autos. On average, Alternatives C, D, and E all bring volume to capacity ratios below 1.0. However, a few segments of the general purpose lanes on I-710 would be over capacity under Alternative C.

Both of these tables show that the proposed improvements in Alternatives B, C, D, and E would result in a beneficial impact to traffic on I-710.

Table 5.4-6
I-710 Volume/Capacity Estimates – AM Peak Period, Year 2025

Segments on I-710		Alt A		Alt B		Alt C		Alt D				Alt E			
		GP		GP		GP		GP		HOV		GP		TR / AU[1]	
From	**To**	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
SR-60	I-5	1.37	1.39	1.33	1.35	1.30	1.31	0.96	1.03	0.83	0.80	1.24	1.15	0.14	0.47
I-5	Washington	1.11	1.06	1.08	1.03	0.74	0.67	0.89	0.86	0.83	0.80	1.05	0.92	0.29	0.57
Washington	Atlantic/Bandini	1.13	1.10	1.09	1.06	0.74	0.67	0.88	0.94	0.83	0.80	0.98	0.94	0.57	0.74
Atlantic/Bandini	Florence	1.43	1.41	1.38	1.36	1.20	1.16	0.89	0.93	0.83	0.80	1.07	0.99	0.59	0.74
Florence	Firestone	1.44	1.43	1.39	1.38	1.19	1.18	0.95	0.97	0.30	0.24	1.23	1.22	0.59	0.74
Firestone	Imperial	1.47	1.43	1.42	1.38	1.17	1.21	0.96	0.99	0.30	0.24	1.24	1.19	0.59	0.74
Imperial	I-105	1.47	1.39	1.42	1.34	1.20	1.08	1.15	1.15	0.30	0.24	1.14	1.06	0.79	0.90
I-105	Rosecrans	1.25	1.11	1.20	1.07	0.95	0.81	0.87	0.83	0.32	0.21	0.86	0.78	0.79	0.90
Rosecrans	Alondra	1.46	1.18	1.41	1.14	1.21	0.98	1.25	1.07	0.32	0.21	1.21	0.93	0.79	0.90
Alondra	SR-91	1.62	1.32	1.56	1.27	1.35	1.09	1.19	1.04	0.32	0.21	1.36	1.04	0.79	0.90
SR-91	Artesia	1.41	1.33	1.34	1.26	1.11	1.06	1.16	0.66	0.32	0.21	1.07	0.93	0.95	0.93
Artesia	Long Beach	1.17	1.07	1.11	1.02	0.93	0.86	0.92	0.96	0.62	0.16	0.91	0.76	0.99	0.93
Long Beach	Del Amo	1.36	1.34	1.30	1.26	1.38	0.84	1.00	1.03	0.62	0.24	1.04	0.92	0.99	0.93
Del Amo	I-405	1.30	1.38	1.24	1.32	1.36	1.35	0.95	1.09	0.62	0.24	1.01	0.97	0.99	0.93
I-405	Wardlow	1.68	1.52	1.63	1.44	1.35	1.14	1.67	0.88	0.62	0.65	1.20	1.01	0.93	0.69
Wardlow	Willow	1.76	1.52	1.69	1.44	1.13	1.14	1.08	0.88	0.44	0.65	1.34	1.01	0.93	0.69
Willow	Pacific Coast Hwy.	1.66	1.41	1.60	1.30	1.03	1.03	1.03	0.82	0.44	0.65	1.26	0.98	0.86	0.49
Pacific Coast Hwy.	Anaheim	1.59	1.32	1.55	1.20	0.99	0.88	1.60	1.25	-	-	1.21	0.85	0.86	0.49
Anaheim	9th	1.45	1.32	1.41	1.20	0.99	0.88	1.33	1.20	-	-	1.09	0.85	-	-
9th	Ocean	1.00	0.85	0.95	0.71	0.73	0.67	0.92	0.66	-	-	0.99	0.66	-	-
Weighted Average (per VMT)[2]		**1.42**	**1.34**	**1.37**	**1.28**	**1.15**	**1.07**	**1.04**	**0.96**	**0.55**	**0.49**	**1.14**	**1.00**	**0.81**	**0.73**

Source: Cambridge Systematics, Inc., Electronic Data File, April 2003.

Notes: Volume/Capacity (VC) estimates are shown for the 3-hour AM peak period (6 – 9 AM) for the Year 2025. The VC calculations reflect PCE volumes on I-710 travel lanes. VC calculations for the truck bypass lanes and collector-distributor roadway elements (Alt. C) are not shown.

1. For this alternative, the special purpose travel lanes operate as an autoway (AU) between 9th Street and Willow Street and operate as a truckway (TR) between Willow Street and I-5.
2. The weighted average VC calculation is an aggregate measure for the entire length of I-710 in each direction normalized based upon the vehicle miles traveled (VMT) for these segments.

Table 5.4-7
I-710 Volume/Capacity Estimates – Midday Time Period, Year 2025

Segments on I-710		Alt A		Alt B		Alt C		Alt D				Alt E			
		GP		GP		GP		GP		HOV		GP		TR / AU[1]	
From	**To**	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
SR-60	I-5	0.94	1.26	0.91	1.23	0.86	1.17	0.62	0.88	0.47	0.66	0.82	1.09	0.10	0.20
I-5	Washington	0.79	0.85	0.78	0.83	0.49	0.61	0.59	0.62	0.47	0.66	0.69	0.72	0.26	0.31
Washington	Atlantic/Bandini	0.85	0.89	0.83	0.86	0.49	0.61	0.63	0.66	0.47	0.66	0.66	0.69	0.48	0.49
Atlantic/Bandini	Florence	1.13	1.15	1.09	1.10	0.93	0.89	0.66	0.66	0.47	0.66	0.77	0.76	0.50	0.50
Florence	Firestone	1.14	1.17	1.10	1.12	0.91	0.94	0.68	0.71	0.20	0.20	0.92	0.97	0.50	0.50
Firestone	Imperial	1.16	1.18	1.11	1.14	0.88	0.97	0.69	0.74	0.20	0.20	0.91	0.94	0.50	0.50
Imperial	I-105	1.16	1.19	1.11	1.14	0.85	0.79	0.85	0.88	0.20	0.20	0.79	0.86	0.73	0.67
I-105	Rosecrans	0.97	0.97	0.93	0.93	0.64	0.60	0.66	0.68	0.19	0.17	0.58	0.64	0.73	0.67
Rosecrans	Alondra	1.24	1.07	1.20	1.02	1.00	0.81	1.05	0.93	0.19	0.17	0.98	0.83	0.73	0.67
Alondra	SR-91	1.41	1.20	1.36	1.14	1.12	0.91	1.00	0.90	0.19	0.17	1.10	0.93	0.73	0.67
SR-91	Artesia	1.22	1.23	1.16	1.15	0.91	0.92	0.95	0.54	0.19	0.17	0.91	0.84	0.73	0.86
Artesia	Long Beach	1.03	1.00	0.98	0.93	0.78	0.75	0.77	0.81	0.37	0.13	0.78	0.69	0.77	0.86
Long Beach	Del Amo	1.16	1.23	1.11	1.14	1.16	0.73	0.83	0.89	0.37	0.19	0.84	0.82	0.77	0.86
Del Amo	I-405	1.13	1.29	1.08	1.21	1.18	1.26	0.80	0.95	0.37	0.19	0.84	0.87	0.77	0.86
I-405	Wardlow	1.51	1.57	1.45	1.46	1.25	1.10	1.45	0.93	0.38	0.28	0.98	1.01	0.80	0.63
Wardlow	Willow	1.63	1.57	1.57	1.46	1.06	1.10	0.97	0.93	0.31	0.28	1.21	1.01	0.80	0.63
Willow	Pacific Coast Hwy.	1.55	1.56	1.49	1.41	0.98	1.07	0.93	0.89	0.31	0.28	1.23	1.10	0.57	0.39
Pacific Coast Hwy.	Anaheim	1.49	1.40	1.43	1.23	0.94	0.84	1.47	1.26	-	-	1.19	0.87	0.57	0.39
Anaheim	9th	1.36	1.40	1.30	1.22	0.94	0.86	1.26	1.24	-	-	1.05	0.86	-	-
9th	Ocean	0.97	0.87	0.97	0.66	0.84	0.61	0.91	0.60	-	-	0.94	0.61	-	-
Weighted Average (per VMT)[2]		**1.21**	**1.23**	**1.16**	**1.16**	**0.96**	**0.94**	**0.86**	**0.83**	**0.33**	**0.34**	**0.92**	**0.87**	**0.63**	**0.59**

Source: Cambridge Systematics, Inc., Electronic Data File, April 2003.

Notes: Volume/Capacity (VC) estimates are shown for the 6-hour midday time period (9 AM – 3 PM) for the Year 2025. The VC calculations reflect PCE volumes on I-710 travel lanes. VC calculations for the truck bypass lanes and collector-distributor roadway elements (Alt. C) are not shown.

1. For this alternative, the special purpose travel lanes operate as an autoway (AU) between 9th Street and Willow Street and operate as a truckway (TR) between Willow Street and I-5.
2. The weighted average VC calculation is an aggregate measure for the entire length of I-710 in each direction normalized based upon the vehicle miles traveled (VMT) for these segments.

Local Circulation

With regard to potential traffic and circulation impacts, local circulation is another important issue. Alternative A would have no impacts to local access or circulation as these future transportation improvements and projects have already been studied and approved. Alternative B is largely made up of operational improvements to the transportation system in the I-710 Study Area as well travel demand management programs and strategies. None of the physical improvements included in Alternative B are predicted to result in an adverse impact to the local circulation system in the I-710 Corridor.

Alternatives C, D, and E all would involve the reconstruction of I-710 in some capacity, due to added travel lanes, new ramps, and the reconfiguration of existing interchanges. In some locations, the proposed transportation improvements would necessitate the elimination or closure of general purpose on- and off-ramps where vehicles currently access the freeway system from the local roadway network. This would adversely affect some motorists as they would need to take a more circuitous route to access the freeway near these locations.

Under Alternative C, freeway access would be eliminated at five ramp locations:

- exit from I-710/southbound (SB) I-405 connector to North Pacific Place (1 ramp)
- entrance/exit I-710 at Olympic Blvd./Eastern Ave. NB and SB (4 ramps)

Under Alternative D, freeway access would be eliminated at eight ramp locations:

- exit from I-710/SB I-405 connector to North Pacific Place (1 ramp)
- entrance/exit SR-91 at Atlantic Blvd. (2 ramps)
- exit from NB I-5 to Telegraph Rd. (1 ramp)
- entrance/exit I-710 at Olympic Blvd./Eastern Ave. NB and SB (4 ramps)

Under Alternative E, freeway access would be eliminated at 16 ramp locations:

- exit from I-710/SB I-405 connector to North Pacific Place (1 ramp)
- entrance/exit I-405 at Santa Fe Rd. (2 ramps)
- entrance/exit SR-91 at Long Beach Blvd. (2 ramps)
- entrance/exit SR-91 at Atlantic Blvd. (2 ramps)
- entrance/exit I-710 at Martin Luther King Jr. Blvd. SB (2 ramps)
- entrance/exit I-5 at Downey Rd. (2 ramps)
- exit from NB I-5 to Telegraph Rd. (1 ramp)
- entrance/exit I-710 at Olympic Blvd./Eastern Ave. NB and SB (4 ramps)

In addition, Alternatives C, D, and E include improvements to major arterials within the I-710 Study Area. One feature of these arterial improvements would be the implementation of access management strategies such as the construction of raised medians and the elimination or consolidation of driveways and smaller streets to improve traffic flow. Whereas these access management strategies would improve circulation on the arterials themselves, access for some local businesses and/or local residents would be modified. Any changes that would result in loss of access to these properties would need to be mitigated.

Lastly, in order to implement the proposed transportation improvements in Alternatives C, D, and E, an extensive amount of construction would need to occur, particularly on I-710. This will require lane and ramp closures while this construction takes place. It is likely that construction

would occur over several years depending on how the overall project is phased. Whereas every effort will be taken to maintain traffic and circulation during construction, these construction activities will negatively affect circulation in the short term. [Note: In light of this issue, members of the I-710 Technical Advisory Committee have recommended that any arterial improvements in the I-710 Study Area be implemented first so that these arterials can better accommodate the added traffic that would likely be diverted as a result of construction activities on I-710.]

Parking

None of the five alternatives include elements that would directly reduce or significantly affect parking in the I-710 Study Area. The only potential exception is the peak hour parking restrictions for major parallel arterials currently included in Alternative B, which would prohibit on-street parking for these arterials during the AM and PM peak periods. Alternatives C, D, and E all include arterial street improvements that may result in the elimination of on-street parking for some sections, however, the I-710 Technical Advisory Committee has included the provision of off-street parking in the description of Alternatives C, D, and E to compensate any parking losses. Therefore, no parking impacts are predicted for these alternatives.

5.4.3 Air Quality

Air quality and its potential impact on public health was the leading environmental issue for the I-710 Major Corridor Study. In March 2000, the South Coast Air Quality Management District (SCAQMD) completed a study that measured and estimated the effect of 29 toxic compounds within the Greater Los Angeles Area. Entitled MATES-II, which stands for Multiple Air Toxics Exposure Study, this study pinpointed some of the leading air pollutants that contribute to carcinogenic risk for people that live and work in the I-710 Study Area. In this case, carcinogenic risk refers to the increased probability that an individual exposed to an average air concentration of a chemical will develop cancer when exposed over a period of 70 years. A key conclusion of the MATES II Study is that mobile emissions sources, specifically diesel particulates, are the primary contributor to carcinogenic risk in the South Coast Air Basin.

Diesel Particulate Matter – Health Effects

Diesel exhaust is produced when an engine burns diesel fuel and is commonly found throughout the environment. It is emitted from a broad range of diesel engines: on road diesel engines of trucks, buses and cars and off road diesel engines that include locomotives, marine vessels and heavy duty equipment. Diesel exhaust is a complex mixture of thousands of gases and fine particles (commonly known as soot) that contains more than 40 toxic air contaminants. These include many known or suspected cancer-causing substances, such as benzene, arsenic, formaldehyde, and nickel. The sizes of diesel particulate matter (DPM) that are of greatest health concern are those that are in the categories of fine and ultra fine particles. The composition of these particles may be composed of elemental carbon with absorbed compounds such as organic compounds, sulfate, nitrate, metals and other trace elements.

Diesel exhaust particles and gases are suspended in the air, so exposure occurs whenever a person breathes air that contains these substances. The fine and ultra fine particles are respirable, which means that they can avoid many of the human respiratory system defense mechanisms and enter deeply into the lung. Exposure to diesel exhaust matter comes from

both on road and off road engine exhaust that is either directly emitted from the engines or aged through lingering in the atmosphere. This is of concern because the I-710 Corridor is a major route that is heavily utilized by heavy-duty diesel truck traffic.

Whereas information on human exposure to diesel particulate matter is still evolving, there is enough evidence to indicate that inhalation exposure to diesel exhaust causes acute and chronic health effects. Based upon human and laboratory studies, there is considerable evidence that diesel exhaust is a likely carcinogen. In 1998, the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA) completed a comprehensive health assessment of diesel exhaust. OEHHA developed a cancer potency factor using diesel particulate matter as a surrogate measure for diesel exhaust exposure. This assessment formed the basis for a decision by the California Air Resources Board (ARB) to formally identify particles in diesel exhaust as a toxic air contaminant (TAC) that may pose a threat to human health. Effects of diesel particulates on lung functions[1], asthma, and other respiratory conditions[2], were presented by experts from the University of Southern California (USC) during meetings of the Technical Advisory Committee (TAC) and the Oversight Policy Committee (OPC).

Diesel Particulate Matter Estimates

To estimate the relative health effects of the five alternatives, a screening level mobile source air quality dispersion analysis was conducted. The purpose of this analysis was to understand the implications of different actions based on their estimated effect on DPM levels to help identify which elements of the alternatives should be carried forward into the environmental phase for further study. The screening level mobile source air quality dispersion analysis was conducted at a level of environmental detail on par with the general design concepts of the proposed alternatives that were developed for the I-710 Major Corridor Study.

Mobile Source Dispersion Model

Mobile source dispersion models are the basic analytical tools used in air quality analyses to estimate pollutant concentrations expected under given conditions of traffic, roadway geometry, and meteorology.

CAL3QHC is a line-source dispersion model that predicts pollutant concentrations near congested intersections and heavily traveled roadways. Input parameters include emission rates of free flow and idling vehicles, roadway geometries, site characteristics, background pollutant concentrations, signal timing, and meteorological conditions. CAL3QHC predicts inert pollutant concentrations, averaged over a one-hour period, near roadways using stable meteorological conditions and peak-hour traffic flow. Pollutant concentrations for longer averaging times (e.g., 8-hours, 24-hour, and annual) are then estimated by multiplying the estimated 1-hour values by reasonably conservative persistence factors.

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[1] Ms. Andrea Hricko, Associate Professor of Preventive Medicine, University of Southern California; June 25, 2003 OPC Meeting. (See Meeting Minutes in Appendix B)

[2] Dr. John Peters, Co-Director, Children's Environmental Health Center, Keck School of Medicine of USC; April 9, 2003 TAC Meeting. (See Meeting Minutes in Appendix C).

CAL3QHCR is a refinement to CAL3QHC in that it uses actual meteorological data. CAL3QHCR was used as the dispersion model for this analysis because of the following reasons:

- High traffic volumes and close proximity to sensitive land uses required more accurate pollutant estimates;
- Forecast traffic conditions for multiple traffic periods (i.e., AM peak, midday, PM peak, and nighttime) could be incorporated; and
- Health-risk assessments are based on estimated annual average pollutant concentrations and CAL3QHCR can be utilized to directly estimate annual values.

Each freeway segment was considered in the modeling analysis to be an infinite line source. DPM concentrations at fixed distances from the center of the existing roadway were estimated for each design concept. The absolute coordinates from a fixed point, the roadway centerline, were used in order to take into account the different roadway widths of the different I-710 alternatives for purposes of directly comparing their estimated emissions levels to sensitive receptors located adjacent to the freeway.

Pollutant Emission Rates

Vehicular emissions were estimated for the 2025 analysis year using ARB's vehicular emission factor algorithm, EMFAC2002 v2.2. This model is recommended for use by ARB and guidance is given for its use in Caltrans's *The Use of EMFAC 2002 to replace CT-EMFAC A Users Guide*, dated February 27, 2003. Emission factors were calculated for the South Coast Air Basin using an annual average season. Air basin specific default vehicle registration data, inspection and maintenance program parameters and mileage distribution parameters were used to calculate DPM emission factors. Future year truck volumes for each lane of the various I-710 segments were allocated based on traffic volumes and speeds developed by Cambridge Systematics, Inc. over a 24-hour timeframe according to four time periods.

Since the focus of this analysis is the potential health risks associated with diesel emissions, only tailpipe emissions, and not re-entrained dust from vehicle tires (or break or engine wear), were considered. Emission rates were calculated separately for each lane of I-710 traffic.

Two variables -- analysis year and vehicular (truck) speeds -- notably affected the estimated pollutant concentrations for this analysis, as follows:

- DPM emission factors are forecast to decrease in future years (as compared to existing values) due to increasingly stringent emission controls and the replacement or older, higher polluting, vehicles with newer, less polluting, ones.
- DPM emission factors decrease with increased vehicular speeds. This is based on ARB's belief that the DPM emission trend closely resembles that of hydrocarbons. The fact that the I-710 Build alternatives all result in increased vehicular speeds, as compared to the future No Build scenario, is a major reason why estimated concentrations are lower with the Build alternatives. [Note: these results are closely tied with EMFAC2002 v2.2 (most recent version of this model currently available in April 2003). It is presumed that future environmental studies and DPM emissions analyses will incorporate ARB's future updates to the EMFAC model when these occur.]

Traffic Data

The amount of traffic, particularly heavy duty trucks, is projected to more than double on I-710 by the Year 2025. Future year truck volumes for each lane of the various I-710 segments were allocated based on traffic volumes and speeds developed by Cambridge Systematics, Inc. over a 24-hour timeframe according to four time periods. The 24-hour timeframe was divided into AM (6 AM-9 AM), midday (9 AM-3 PM), PM (3 PM-7 PM) and nighttime (7 PM-6 AM) time periods. Heavy duty truck volumes tend to be highest during the midday time period, which is why all four time periods were utilized in the analysis rather than relying exclusively on the AM and PM peak periods. [Note: average daily heavy duty truck volume data for the five alternatives is presented in Section 5.4.2 of this report.]

Analysis Sites

The screening analysis estimated DPM concentrations at selected distances from the I-710 freeway corridor for the different alternatives near two representative roadway segments of I-710 – (1) between I-405 and Willow Street, and (2) between Rosecrans Avenue and Alondra Boulevard. These two sites were selected because residences are located very close to the existing I-710 travel lanes, heavy duty truck volumes are high, and because these locations capture differences in the physical attributes of the proposed alternatives. Future truck volumes for each lane of the various freeway segments were considered under AM peak, midday, PM peak, and nighttime traffic conditions.

Critical distances were estimated at the two analysis sites for the different alternatives given the truck volumes forecast on each lane of travel of each design concept. See Sections 4.5 and 5.1 of this report for a detailed description of the five alternatives. Since the vertical and horizontal configuration of each alternative varies along the full 20-mile length of the I-710 Corridor, typical sections were utilized in the screening level analysis to represent the physical characteristics of the roadway near the two analysis sites. At one of the sites, the truck lanes in Alternative E are transitioning from an at-grade configuration (E1) to an elevated configuration (E2) and thus both options were examined to bracket the results.

Analysis Results

Figures 5.4-1 and 5.4-2 show the diesel particulate analysis results for the two sites.

Figure 5.4-1
I-710 Concentrations of Diesel Particulate Matter
(between Willow St. and I-405)

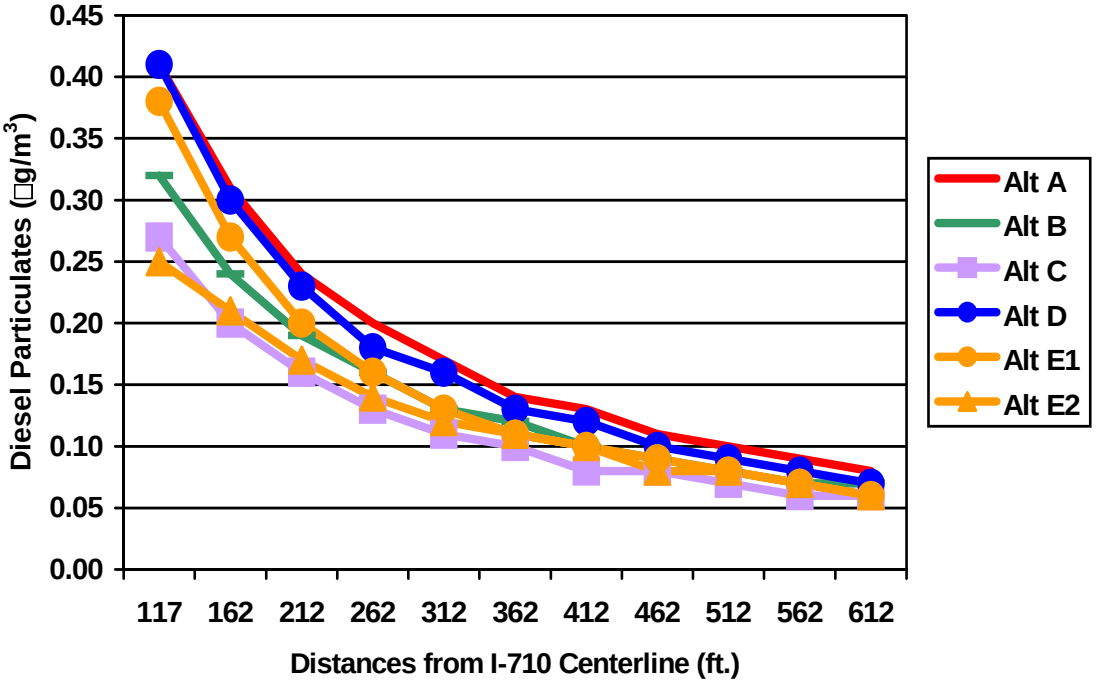
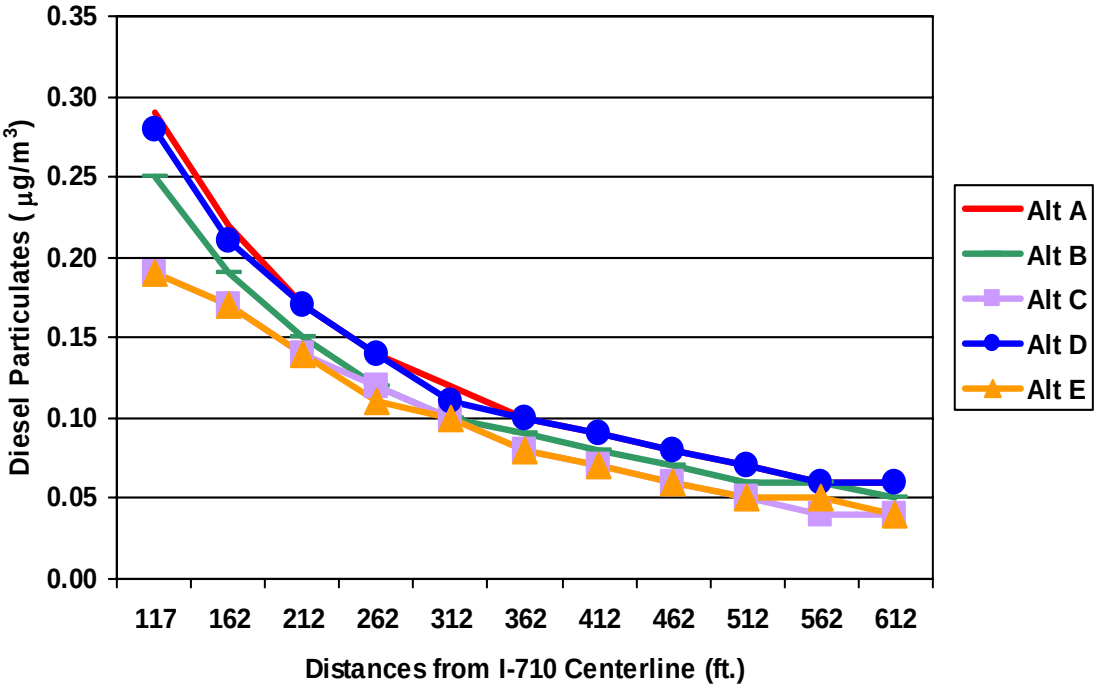


Figure 5.4-2
I-710 Concentrations of Diesel Particulate Matter
(between Rosecrans and Alondra)



Viewing Figures 5.4-1 and 5.4-2 together leads to the following conclusions:

- Concentrations of diesel particulate matter are higher for those who live closest to the freeway. Concentrations drop the further one gets from the freeway.

- Among the build alternatives (Alternatives C, D, and E), diesel particulate matter concentrations increase when ground-level truck-only lanes are located to the outside of the I-710 freeway (i.e., lanes closest to sensitive land uses).

- Diesel particulate matter concentrations with the elevated truck-only lanes (Alternative E2) are lower compared to the ground-level truck-only lanes (Alternative E1), particularly at distances closest to the freeway.

- Alternative B results in a decrease of diesel particulate matter concentrations compared to the No Build Alternative (Alternative A), due to reduced truck volumes and improved vehicle speeds.

- Diesel particulate matter concentrations are lower under the future build alternatives (Alternatives C, D, and E) compared to Alternative A due to lower emission rates associated with higher vehicle speeds.

- Alternatives C and E2 exhibit the lowest diesel particulate matter concentrations of the build alternatives. [Note: Between Rosecrans and Alondra the configuration of the truck bypass lanes in Alternative C is similar to the elevated truck-only lanes in Alternative E. The truck bypass lanes contained in Alternative C results in lower diesel particulate matter concentrations as trucks are able to maintain better speeds since they are routed around pockets of congestion. In addition, in Alternative C, some trucks are drawn to the Terminal Island Freeway Extension component and away from I-710.

Additional information on the diesel particulate matter screening analysis can be found in a technical report prepared for the I-710 Major Corridor Study, entitled *A Comparison of Alternatives with Respect to Localized Diesel Particulate Matter Concentrations*, May 2003, which is provided in Appendix N of this report. It is important to note that more detailed analysis on health and air quality will be performed on the Locally Preferred Strategy that results form the I-710 Major Corridor Study in follow-on environmental studies as part of the environmental documentation phase of the project.

Other Criteria Pollutants

Whereas most of the focus on air quality for the I-710 Major Corridor Study was on diesel particulate matter as a toxic air contaminant in order to respond to public concerns related to public health, other air pollutants from mobile sources were examined as well. Using travel demand forecast data developed for the five alternatives, the ITS Deployment Analysis System (IDAS) model was employed to estimate changes in emissions levels for four criteria pollutants: reactive organic gases (ROG); carbon monoxide (CO); nitrogen oxide (NOx); and particulate matter 10 microns or less in size (PM10). These pollutants are monitored by SCAG on a regional level to ensure that future changes to the transportation system will not result in increases in air pollutants beyond federal and state thresholds established for air quality. The

I-710 Study Area is part of the South Coast Air Basin, which is currently in non-attainment status for both ozone and PM10. ROG contributes to the formation of ozone in the atmosphere.

The results of the emissions analysis for the four criteria pollutants for the Year 2025 are presented in Figures 5.4-3 and 5.4-4.

Figure 5.4-3 looks at air quality from a regional perspective as air quality conformity analysis conducted by SCAG is performed for the entire six-county region. Emissions levels were generated for Alternatives B, C, D, and E and then compared to the No Build Alternative (Alternative A) in order to estimate whether or not the actions proposed in these alternatives would result in a positive or a negative change in regional air quality. In this case a decrease in air pollutant levels would be considered a positive effect and an increase in air pollutant levels would be a negative effect. The regional-level evaluation includes both running and cold-start vehicle emissions.

Figure 5.4-3 shows that Alternatives B, C, D, and E would result in a very slight decrease in emissions levels for the overall SCAG region for all four pollutants. This slight reduction in regional emissions is likely attributable to improved performance of the overall freeway network, particularly vehicle speeds, as traffic redistributes itself to take advantage of an improved I-710. On a percentage basis, the change is barely perceivable (less than half of one percent).

Figure 5.4-3
Estimated Percentage Change in Regional Emissions

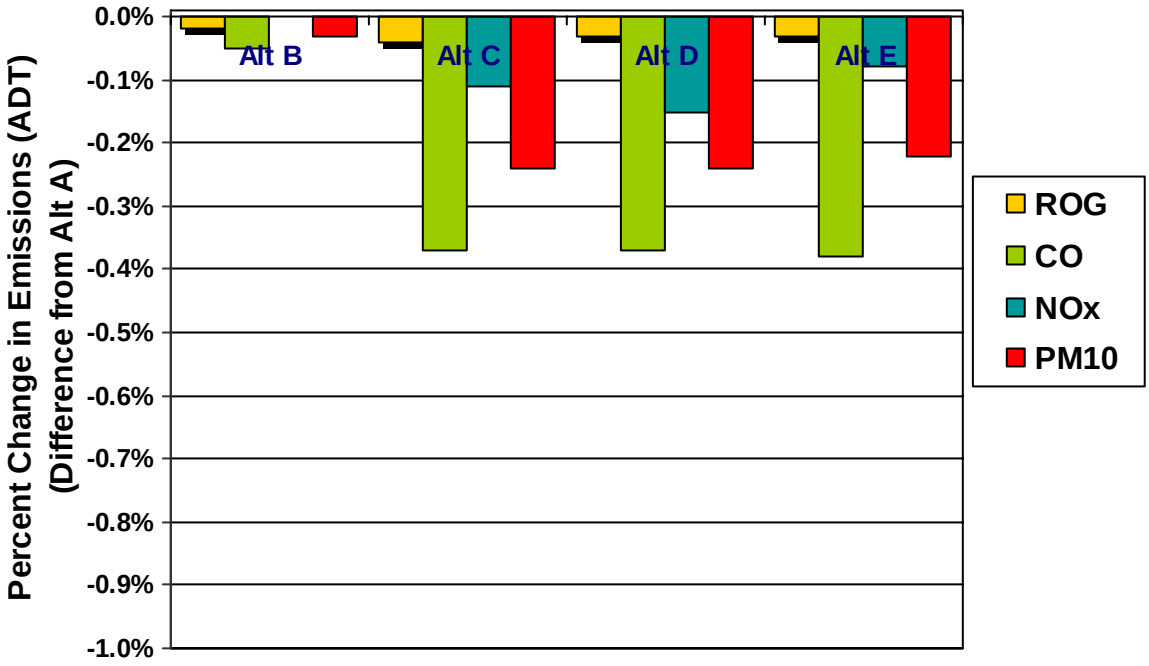


Figure 5.4-4
Estimated Percentage Change in I-710 Study Area Emissions

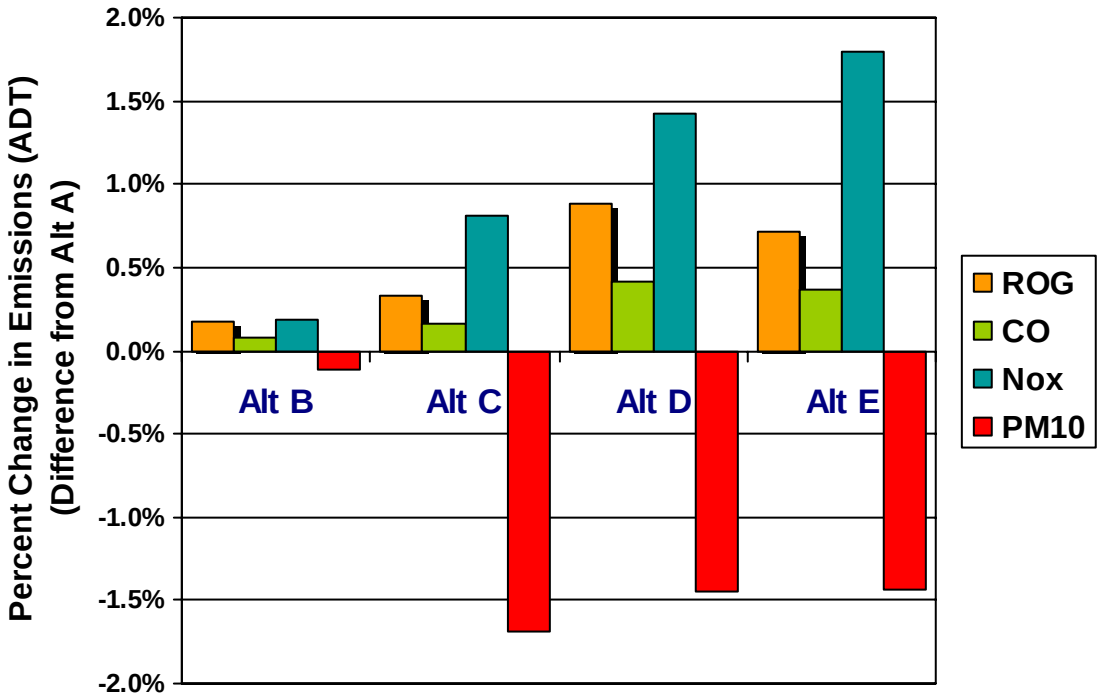


Figure 5.4-4 provides a more focused look at just the I-710 Study Area, including roadways and freeways. In this case, the percentage changes in emissions levels are more discernable. Figure 5.4-4 also shows that vehicle emissions are expected to increase for ROG, CO, and NOx within the I-710 Study Area for Alternatives B, C, D, and E compared to the No Build Alternative (Alternative A). This change is like due to projected increases in vehicle miles traveled (VMT). To some extent additional vehicles are attracted to the freeway and roadway network within the I-710 Study Area. However, because travel conditions within Los Angeles County are so congested, motorists will typically trade longer distances for better travel times, which is a factor that also drives up VMT in the I-710 Study Area. On the other hand, PM10 levels are expected to improve (i.e., decrease) for Alternatives B, C, D, and E compared to Alternative A. This result is tied to improved travel speeds within the I-710 Study Area.

5.4.4 Agriculture

Although no state or federal law explicitly prohibits the conversion of farmlands to other nonagricultural uses, there are established policies and programs to maintain farmland for agricultural use.

The I-710 Study Area contains areas beneath the electrical utility corridors that are currently leased and used for agricultural purposes. Alternative E and, to some extent, Alternative C encroach into these areas. However, these Southern California Edison properties are not designated as Prime Farmlands, Unique Farmlands, Farmlands of Statewide Importance, or

Farmland of Local Importance. For this reason, none of the proposed alternatives are expected to result in an adverse impact to agricultural lands.

5.4.5 Biological Resources

The I-710 Corridor lies in an urbanized setting, with few biological communities. The cities in the I-710 Study Area are mostly built-out, with the exception of scattered vacant and open space parcels. A GIS records search of the California Natural Diversity Data Base was conducted to help identify the existing biological resources in the Study Area. The biological resources in the Study Area consist mainly of a variety of plant and animal habitats found in undeveloped areas or in open space within urban developments. The urbanized areas support mainly man-introduced species and landscaping materials. The City of Long Beach, however, still presents a variety of habitats, although many of these have been severely impacted by urbanization.

In addition, five cities in the I-710 Study Area have occurrences of sensitive, rare, or endangered species. These cities are: Carson, Los Angeles, Long Beach, Lakewood, and Downey. The status of these species are shown in Table 5.4-8.

A project would have a significant effect on the environment if it would:

- Substantially affect a rare or endangered species of animal or plant, or the habitat of the species;
- Substantially affect a federally protected wetland;
- Interfere substantially with the movement of any resident or migratory fish or wildlife species; or
- Conflict with any local policies or ordinances protecting biological resources, or an adopted Habitat Conservation Plan or other approved protection plan.

Table 5.4-8
Sensitive Species Federal and State Ranking

Scientific Name	Common Name	Federal Status	California Status
Cordylanthus maritimus	Salt Marsh Bird's-Beak	Endangered	Endangered
Perognathus longimembris pacificus	Pacific Pocket Mouse	Endangered	None
Orcuttia californica	California Orcutt Grass	Endangered	Endangered
Sterna Antillarum Browni	California Least Tern	Endangered	Endangered
Passerculus sandwichensis beldingi	Belding's Savannah Sparrow	None	Endangered

Source: California Natural Diversity Data Base, 2002

Each alternative was examined as a whole to assess its potential effect upon biological resources in the I-710 Study Area. See Section 5.4.9; Hydrology, Water Quality, and Floodplains; for a description of potential impacts to wetlands areas.

Alternative A – No Build

Alternative A is a future baseline alternative consisting primarily of operational improvements and reconstruction activities that involve pavement replacement, standard shoulders, and a new median for I-710. By definition, these transportation improvements have already been planned and committed for the Year 2025. No additional impacts associated with biological resources are anticipated to occur under Alternative A beyond what has already been studied and approved.

Alternative B – TSM/TDM Alternative

There are no major construction elements proposed under Alternative B; therefore, no biological impacts are anticipated.

Alternative C – Medium General Purpose / Medium Truck Alternative

Some of the arterial roadway elements listed as part of Alternative C could potentially affect biological resources. Roadway improvements for Alternative C involve arterial capacity enhancements to ten major arterials by adding one new travel lane in each direction, either through restriping or through roadway widening. If selected, the description of the proposed arterial roadways will be further refined in subsequent studies. Of these arterials, Paramount Boulevard (from Carson Avenue to I-5), Firestone Boulevard (from Atlantic Boulevard to Paramount Boulevard), and Florence Avenue (From Atlantic Boulevard to Paramount Boulevard) may directly affect the California Orcutt Grass in Downey, depending upon the specific nature of the proposed roadway improvements. This species is listed as endangered on both the Federal and the California List. In addition, the improvements on the Pacific Coast Highway (from SR-103 to Cherry Avenue) would be 500 meters distant from the salt marsh bird's-beak habitat in the City of Long Beach. And, the arterial roadway element of Willow Street (From SR-103 to Cherry Avenue) is located about 160 meters from the habitat of the pacific pocket mouse in the City of Carson and in the southern reaches of the City of Los Angeles.

Alternative D - High General Purpose / High HOV Alternative

The Terminal Island Freeway Truck Expressway Connector component of Alternative D could potentially have a direct, significant impact on the pacific pocket mouse, in the Cities of Los Angeles and Carson, and on the salt marsh bird's-beak in Long Beach. The pacific pocket mouse is classified as endangered species on the Federal List, and the salt marsh bird's-beak is classified as endangered species on both Federal and State listings.

None of the proposed arterial roadway elements included in Alternative D are situated in proximity of any of the listed biological sensitive species or designated natural communities. Therefore, no biological impacts associated with the Alternative D roadway arterials are expected to occur.

Alternative E - High Truck Alternative

Some of the arterial roadway elements listed as part of Alternative E could potentially affect biological resources. Roadway improvements for Alternative E involve arterial capacity enhancements to five major east-west arterials by adding one new travel lane in each direction,

either through restriping or through roadway widening. If selected, the description of the proposed arterial roadways will be further refined in subsequent studies. Of these arterials, Ocean Boulevard (from SR-47 to I-710) may directly affect the salt marsh bird's-beak plant habitat in the City of Long Beach and southern portions of the City of Los Angeles, a species classified as endangered on both the Federal and State listings. In addition, improvements to the Pacific Coast Highway (from SR-103) would be located at a distance of 160 meters from the pacific pocket mouse's habitat located in the City of Carson and southern part of the City of Los Angeles.

5.4.6 Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) requires that the effects of federally funded projects on cultural resources be carefully considered. These procedures apply to all federally assisted actions that may affect properties included in or eligible for inclusion in the National Register of Historic Places (NRHP).

Cultural resources would be impacted if the property is acquired by the project. A project would have a significant effect on the environment if it would:

- Cause a substantial adverse change in the significance of historical or archaeological resources;
- Disturb any human remains; or
- Directly or indirectly destroy a unique paleontological resource or site.

A preliminary cultural resources survey was performed for the I-710 Study Area. The survey included the areas where undertaking the proposed improvements may have effects on historic properties. With the Study Area nearly built out, the discovery of new archeological or paleontological resources is unlikely. There is no record of known sites within the proposed project area or in immediate surrounding areas. In addition, there are no known cultural resources or Native American sites that have been found within the I-710 Study Area to date.

Alternatives A and B would have no additional impacts other than those already planned and approved. There are no cultural impacts associated with I-710 mainline improvements for any of the alternatives. There are, however, potential impacts associated with the arterial components of the build alternatives. The arterial improvements listed in Alternative C would have the greatest potential impact on cultural resources. The Alternative C arterials would potentially affect two sites listed on the National Register of Historic Places and five structures of local importance. Alternative D's arterial improvements would affect the Lynwood Pacific Electric Railway Depot, which is listed on the NRHP, and six structures listed in the general plans of the City of Commerce. Alternative E's arterial improvements would have the least impact on cultural resources, since it may affect only one cultural site of local importance in the City of Commerce.

Table 5.4-9 lists the potential impacts to cultural resources for each of the build alternatives and also identifies the transportation elements associated with the identified impacts based on a review of the NRHP, California Historical Landmarks, and the general plans of the local jurisdictions. Since all of the potential impacts identified in Table 5.4-9 are related to the arterial improvements (which at this early planning stage are only generally defined), additional definition and refinements of the proposed arterial improvements are required to determine the

significance of the potential impact or if impacts to sensitive cultural resources can be avoided altogether.

Table 5.4-9
Potential Impacts to Cultural Resources

Alternative/Element	Location	Cultural Resource
Alternative A	none	none
Alternative B	none	none
Alternative C - Arterial Atlantic Boulevard	City of Commerce City of Cudahy City of Cudahy City of Cudahy	Pillsbury Mill (Local) Robbie's Hobby Center (Local) Graham's Auto Electric (Local) Scott Gasket (Local)
Alternative C - Arterial Cherry Ave./Garfield Ave.	City of Commerce City of Bell Gardens	Pillsbury Mill (Local) Clara Street Water Company (Local)
Alternative C - Arterial Long Beach Boulevard	City of Lynwood	Lynwood Pacific Electric Highway Depot (NRHP – Bldg. No. 74000524)
Alternative C - Arterial Florence Avenue	City of Downey	Casa de Parley Johnson (NRHP – Bldg. No. 86000449)
Alternative D - Arterial Atlantic Boulevard	City of Commerce City of Cudahy City of Cudahy City of Cudahy	Pillsbury Mill (Local) Robbie's Hobby Center (Local) Graham's Auto Electric (Local) Scott Gasket (Local)
Alternative D - Arterial Garfield Avenue	City of Commerce City of Commerce	Vail Field (Local) Mount Carmel (Local)
Alternative D - Arterial Eastern Avenue	City of Commerce	Pillsbury Mill (Local)
Alternative D - Arterial Long Beach Boulevard	City of Lynwood	Lynwood Pacific Electric Highway Depot (NRHP – Bldg. No. 74000524)
Alternative E – Arterial Bandini Boulevard	City of Commerce	Sleepy Lagoon Murder site (Local)

Source: Parsons Brinckerhoff, April 2003

Notes: (Local) refers to Local Cultural Resource.

Note: The Pacific Electric Bridge (north of Firestone), a bridge located south of Del Amo Boulevard, and a bridge south of Florence Avenue may be classified as historic bridges. In order to determine whether these bridges are classified as historical, a certified architectural historian must be consulted in subsequent study phases. The proposed project may have potentially significant impact on these sites. In addition, in order to determine whether the sites are impacted, a certified architectural historian must be consulted in subsequent study phases.

5.4.7 Geology, Seismicity, and Soils

The potential impact of geology, seismicity, and soils were reviewed for the area in general and for the alternatives as a whole. Seismic hazards are generally classified in two categories: (1) primary seismic hazards (surface fault rupture and ground shaking) and (2) secondary seismic hazards (liquefaction and other types of seismically induced ground failure, along with seismically induced landslides).

Principal state guidance relating to geologic hazards is contained in the Alquist-Priolo Act and in the Seismic Hazards Mapping Act of 1990. The Alquist-Priolo Act prohibits the location of most types of structures for human occupancy across active traces of faults in earthquake fault zones and regulates construction in the corridors along active faults. Several major faults are present within 50 miles of the I-710 Study Area. In addition, numerous smaller faults are located throughout the Los Angeles Basin. Some of the major and smaller faults directly underlie, or are in very close proximity to, the I-710 Corridor. Faults potentially affecting the project area include:

- Newport-Inglewood Fault Zone (crosses through the project area)
- Raymond Fault (8 miles north)
- San Andreas Fault Zone (2 miles southwest)
- Coyote Pass Fault (3 miles northeast)
- Charnock Fault (6 miles west)
- Elysian Park Structure (5 miles to the north-northeast)
- Santa Monica-Hollywood Fault (7 miles north-northwest)
- Norwalk Fault (8 miles east)
- Overland fault (9 miles west)

In addition, the majority of the I-710 Study Area is directly underlain by Holocene age alluvial deposits of the Downey Plain and Dominguez Gap. The alluvial deposits are composed of poorly consolidated sand, silt, clay, and gravel. [Note: for a discussion of groundwater issues and conditions related to the I-710 Corridor, please refer to Section 5.4.9, Hydrology, Water Quality, and Floodplains, of this report.] Liquefaction potential, which is associated with earthquakes, has been found to be greatest where the groundwater level is shallow and loose fine sands occur within a depth of 50 feet or less. A major proportion of the I-710 Study Area, including all of I-710 from the Ports to approximately Washington Boulevard, falls within the liquefaction hazard zone as delineated by the California Geological Survey (1999).

All of the build alternatives include transportation elements that would involve the construction of structures such as bridges, viaducts, and ramp connectors. Examples of these transportation elements include: elevated sections of the truck bypass lanes and the Terminal Island Freeway extension in Alternative C; the elevated HOV lanes in Alternative D; and the autoway, sections of the truckway, and the Atlantic Boulevard viaduct in Alternative E. All of the new structures included in these alternatives would need to adhere to current California construction and design standards with regard to seismicity. In addition, none of the build alternatives, as currently proposed, involve tunneling, trenches, or appreciable amounts of excavation. Therefore, there are no appreciable differences among the three build alternatives related to geology, soils, or seismicity.

All of the build alternatives would pass through the Dominguez and Wilmington oil fields. There is no documented ground subsidence associated with the Dominguez oil field. In addition, the

corridor is located on relatively flat ground with no slope stability problems and no potential for lurching (movement at right angles to a steep slope during ground shaking).

Surface fault rupture, ground shaking, and seismically induced ground failure all can result in substantial damage to structures. A detailed assessment, as well as mitigation for potential impacts related to geologic and soils conditions, must be developed on a site-specific basis, based on the results of more detailed (design-level engineering), geologic, and geotechnical studies. The design needed to withstand a certain magnitude of earthquake would be determined during subsequent stages of design and development of the proposed facilities.

A thorough assessment of the existing hazard combined with appropriate design and construction can reduce the potential for damage substantially, including potential risks to public safety. For example, the potential for collapse or toppling of superstructures such as bridges or retaining structures due to strong ground motion can be mitigated by designing structures to withstand the estimated ground motions. Designs typically include additional redundancy and ductility in the structure. The potential for structural damage and resulting traffic hazard as a result of liquefaction can be mitigated through site-specific methods such as ground modification methods (soil densification) to prevent liquefaction, or structural design (e.g., deep foundations) to accommodate/resist liquefiable zones.

5.4.8 Hazardous Materials

For each of the alternatives, properties designated as hazardous materials/waste sites were identified and categorized. These properties are located either partially or fully within the proposed footprint of each of the alternatives and outside of the state right-of-way currently owned by Caltrans.

The source of these hazardous materials/waste sites is the Fidelity National Information Solutions database (Fidelity), formerly Vista Environmental Information Solutions, Inc., dated February 2002. The following categories were used to identify potential hazardous materials/waste sites within the vicinity of the proposed alternatives:

- Above Storage Tanks (AST)
- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) sites
- Emergency Response Notification System (ERNS)
- Leaking Underground Storage Tank (LUST) sites
- No Further Remedial Action Planned (NFRAP)
- Federal National Priorities List (NPL)/Superfund
- Resource Conservation and Recovery Act (RCRA) Treatment, Storage, and Disposal (TSD) facilities
- RCRA Corrective Action Sites (CORRACTS)
- RCRA Violators (VIOL)
- Spills-State
- State CERCLA or State Superfund (SCL)
- State Priority List (SPL)
- State of California Solid Waste Landfills (SWLFs)
- Toxic Chemical Release Inventory System (TRIS)
- Underground Storage Tank (UST) sites

Alternative A does not propose any property acquisitions beyond what has already been funded and committed for the future year (2025). Alternative B has no new property acquisitions as these improvements would occur within existing state right-of-way. Therefore no hazardous materials impacts are predicted to result from either Alternative A or B.

On the other hand, each of the build alternatives could potentially result in hazardous materials impacts as these alternatives either traverse or are located adjacent to sites that have the potential to contain hazardous materials. Tables 5.4-10, 5.4-11, and 5.4-12 list the estimated number of sites that would be impacted by each transportation element, for Alternatives C, D, and E, respectively, in order to illustrate the differences among these alternatives.

Table 5.4-10
Alternative C – Estimated No. Hazardous Materials Sites Impacted

Alt. C - Transportation Element	Estimated Number of Potential Hazardous Materials Sites Impacted
I-710 Mainline Improvements	
Mainline Widening	331
Collector-Distributor Lane System	62
Truck Inspection Facility	19
I-405 Truck Bypass Lanes	11
SR-91/I-105 Bypass Lanes	93
Pacific Coast Highway Truck Ramps	65
Washington Boulevard Truck Ramps	27
I-710 Interchanges – Freeway	
I-405/I-710 Interchange	11
I-5/I-710 Right Side Ramp	37
I-710 Interchanges – Local	
Anaheim Street Braid	87
Pacific Coast Highway Braid	83
Willow Street Interchange	9
Del Amo Boulevard Interchange	10
Imperial Highway Interchange	8
Florence Avenue Interchange	15
Atlantic/Bandini Interchange	30
Washington Boulevard Interchange	31

Source: Fidelity National Information Systems Database (2002), Parsons Brinckerhoff, April 2003.

Table 5.4-10
Alternative C – Estimated No. Hazardous Materials Sites Impacted - Continued

Alt. C - Transportation Element	Estimated Number of Potential Hazardous Materials Sites Impacted
Slauson Boulevard Interchange	32
Terminal Island Freeway Extension	16
Arterials	1,407

Table 5.4-11
Alternative D - Estimated No. Hazardous Materials Sites Impacted

Alt. D - Transportation Element	Estimated Number of Potential Hazardous Materials Sites Impacted
I-710 Mainline Improvements	
Mainline Widening	254
I-710 Interchanges – Freeway	
I-405/I-710 Interchange	20
I-405/I-710 HOV Connector	5
SR-91/I-710 Interchange	23
I-5/I-710 Interchange	64
I-710 Interchanges – Local	
Willow Street Diamond	9
Del Amo Boulevard Diamond	21
Long Beach Boulevard	21
Imperial Highway Diamond	18
Florence Avenue Diamond	4
Atlantic/Bandini Interchange	37
Washington Boulevard Interchange	33
Terminal Island Freeway Connector	56
Arterials	960

Source: Fidelity National Information Systems Database (2002), Parson Brinckerhoff, April 2003.

Table 5.4-12
Alternative E - Estimated No. Hazardous Materials Sites Impacted

Alt E - Transportation Element	Estimated Number of Potential Hazardous Materials Sites Impacted
I-710 Mainline Improvements	
Exclusive Autoway/Truck Facility	380
I-405 Truck Ramps	10
SR-91 Truck Ramps	18
Firestone Boulevard Truck Ramps	17
Washington Boulevard Truck Ramps	31
I-710 Interchanges – Freeway	
I-405/I-710 Interchange	9
SR-91/I-710 Interchange	10
I-5/I-710 Interchange/ Atlantic Viaduct	135
I-710 Interchanges – Local	
Slauson Boulevard Interchange	34
Arterials	295

Source: Fidelity National Information Systems Database (2002), Parson Brinckerhoff, April 2003.

Looking at the build alternatives as a whole, Alternative C would have the highest number of estimated impacts to hazardous waste sites (2,378), followed by Alternative D (1,525), and then Alternative E (939). It is important to note that the arterials component of each of the alternatives is responsible for a significant proportion of the total estimated number of impacted sites as the improvements associated with the arterials involve the addition of a travel lane in each direction through urbanized, commercial areas either through restriping or roadway widening. This is particularly evident with Alternatives C and D.

In the environmental screening analysis conducted for the I-710 Major Corridor Study, only the potential hazardous materials impacts are identified for each alternative. A more detailed, site-specific assessment will need to be performed during the environmental phase of project development in order to determine the extent and nature of the hazardous materials present on each site as well as the potential for a significant adverse impact. This step often reduces the total number of estimated impacts as more about these sites are known and understood. At this stage, avoidance or mitigation strategies would also be developed based on the findings of this analysis.

5.4.9 Hydrology, Water Quality, and Floodplains

At its southern terminus, the I-710 freeway begins at the Port of Long Beach in the San Pedro Bay. The freeway crosses the Los Angeles County Flood Control Channel (Los Angeles River) at Shoemaker Bridge and follows along the west side of the Los Angeles River. Next, I-710 crosses Compton Creek just south of Del Amo Boulevard. I-710 crosses the Los Angeles River again just north of the Los Angeles River / Rio Hondo River confluence. The I-710 Study Area is located within the Los Angeles River Watershed and part of the Dominguez Channel and Los Angeles/Long Beach Harbors Water Management Areas (WMA). The Los Angeles Watershed includes major tributaries such as the Pacoima Wash, Tujunga Wash, Burbank Western Channel, Verdugo Wash, Arroyo Seco, Rio Hondo, and Compton Creek.

The environmental screening assessment conducted for the I-710 Major Corridor Study examined three inter-related issues associated with water resources in the I-710 Study Area: water quality, floodplains, and groundwater.

Water Quality

Protection of water quality in California is primarily the responsibility of the State Water Resources Control Board (SWRCB) and, on a regional basis, the nine California Regional Water Quality Control Boards. With regard to the I-710 Study, the water quality in the watersheds is primarily under the jurisdiction of the California Regional Water Quality Control Board, Los Angeles Region (LARWQCB).

> *Los Angeles River*: The Los Angeles River is currently identified on the 1998 Clean Water Act Section 303(d) list of impaired waters for pH, ammonia, a number of metals, coliform, trash, scum, algae, oil, chlorpyrifos as well as other pesticides, and volatile organics. The Los Angeles River Channel has year-round flow which is maintained by urban and agricultural runoff, and discharges of treated wastewater. The soft bottom area of the river, which is tidally influenced, extends up to Willow Street Bridge, a distance of 2.6 miles from the mouth at Queensway Bay. Anywhere that the soft bottom portion of the river would be impacted, the California Department of Fish and Game (CDFG) would be involved.
>
> *Dominguez Channel*: The Dominguez Channel area historically consisted of marshes and mudflats with a large marshy area, Dominguez Slough, to the north, and flow from the Los Angeles River entering where Dominguez Channel now drains. The Dominguez Channel is currently identified on the 1998 Clean Water Act Section 303(d) for aldrin, ammonia, ChemA, chlorade, chromium, copper, DDT, Dieldrin, coliform, lead, PAHs, PCBs, and Zinc.

The proposed project would need to demonstrate that it is consistent with the total daily maximum load (TDML) for the criteria pollutants identified for these two rivers: Dominguez Channel and the Los Angeles River.

Floodplains

A review of the Flood Insurance Rate Maps (FIRM) for Los Angeles County revealed that the I-710 freeway is within the Los Angeles River 100-year floodplain zone between 7th Street and Pacific Coast Highway and then again between Compton Creek and just north of Rio Hondo

River. On February 25, 2000, the Federal Emergency Management Agency (FEMA) redesignated many communities within the project study area as not being within a flood zone as a result of the U.S. Army Corps of Engineers (Corps) restoration of a section of the Los Angeles River levee system. The freeway also experiences the Rio Hondo 100-year floodplain effects when the freeway is in the vicinity of the Rio Hondo River. The Dominguez Channel 100-year floodplain zone is limited to the channel.

Groundwater

Groundwater accounts for most of the region's local supply of fresh water. The Los Angeles/Orange County coastal plain aquifer system extends across an area of approximately 860 square miles (2,230 square kilometers). Groundwater in the Coastal Plain Groundwater Basin generally flowed toward the Pacific Ocean, although flow directions have been altered by increased withdrawals due to rapid urban development. The I-710 Study Area is located in the West and Central Groundwater Basins. The general quality of groundwater within the Los Angeles Regional Water Quality Control Board (RWQCB) area has degraded substantially over the years as a result of fertilizers and pesticides; nitrogen and pathogenic bacteria from overloaded or improperly sited septic tanks; storage tanks that have leaked or are leaking hazardous substances into the subsurface; and a variety of other sources or conditions. In areas with industrial or commercial activities, aboveground and underground storage tanks contain vast quantities of hazardous substances. Results of basin-wide monitoring have confirmed that the quality of groundwater extracted from the Central Basin has been good. However, there is a continuing problem with industrial solvents contaminating groundwater within limited areas of the Central Basin. Also, seawater intrusion that has occurred in these basins is now under control in most areas through an artificial recharge system consisting of spreading basins and injection wells that form fresh water barriers along the coast; however, large plumes of saline water have been trapped behind the barrier of injection wells in the West Coast Basin, degrading significant volumes of groundwater with high concentrations of chloride.

Water level measurements from the Los Angeles County Department of Public Works (LACDPW) indicate that shallow groundwater exists along the I-710 Corridor in the vicinity of the Dominguez Gap and the Los Angeles Harbor area along Alameda Street, south of Pacific Coast Highway, and in the vicinity of Henry Ford Avenue. Although shallow groundwater was found in the above-mentioned adjacent areas, further investigation would be need to be conducted for subsequent environmental planning studies, via observation wells, to determine if shallow groundwater areas exist in the study area.

It is also important to note that water recharge areas are provided by a combination of permeable areas including spreading facilities, yards, parks, utility rights-of-way, and water recharge areas within the Rio Hondo River and Los Angeles River rights-of-way. The Los Angeles County Department of Public Works (LADPW) operates 2,436 acres of spreading grounds and soft-bottom channel spreading areas for replenishment of local groundwater supplies. Spreading facilities located within the project study area include the Dominguez Gap and Rio Hondo Coastal Spreading Facilities. A search of the U.S. Department of Transportation, Federal Highway Administration website (2002) indicates that the I-710 study area is not designated as having sole-source aquifers.

Impacts Evaluation

Adverse impacts could occur if the hydrology of the river system is affected. In cases where portions of the proposed build alternatives cross the Los Angeles River and Compton Creek, pier walls would be constructed or lengthened, which could raise the water level in those areas. In addition, the final phase of flood control improvements implemented by the Corps for the Los Angeles River was completed in December 2001. Reconstruction of overcrossings, on- and off-ramps, and construction of elevated portions of the freeway may affect areas identified within existing as well as these newly defined floodplain zones. Any redevelopment activity related to the proposed transportation improvements has the potential to impede or redirect flood flows and each redevelopment project will need to be evaluated to ensure they do not adversely impact flooding. Portions of the build alternatives that cross or modify the channel could adversely impact the hydrology of the river to sustain flood flows.

In addition, during construction of freeway improvements, there would be an increased potential for silt erosion and sediment transport due to grading and removal/addition of vegetation. Implementation of best management practices (BMPs) for erosion and storm-water pollution control, in accordance with the National Pollution Discharge Elimination System (NPDES) and compliance with all RWQCB water quality standards and waste discharge requirements would reduce potential impacts on drainage patterns and erosion to less than significant. Specific short-term and long-term erosion control measures prepared and implemented for the proposed transportation improvements would reduce potential impacts from erosion and siltation to less than significant on the Los Angeles River and Compton Creek.

The environmental screening analysis for the I-710 Study identified potential impacts to water resources in the I-710 Study Area attributable to each alternative as well as specific transportation components within the build alternatives. Alternatives A and B would not result in any additional potential impacts to hydrology or water quality beyond what has already been studied for previously approved projects. Each of the build alternatives has the potential to impact water resources within the I-710 Study Area. Tables 5.4-13, 5.4-14, and 5.4-15 highlight the potential impacts for Alternatives C, D, and E. Potential impacts associated with hydrology are identified as well as the estimated amount of acres of floodplain and/or wetlands that would be directly affected by the proposed transportation improvements.

All of the transportation components of these three alternatives involve construction, and thus there is potential for construction-related impacts due to erosion or siltation. The information presented in Tables 5.4-13, 5.4-14, and 5.4-15 does not incorporate the positive effects of mitigation that would be identified in subsequent environmental studies to the I-710 Major Corridor Study.

Table 5.4-13
Alternative C – Water Resources Impact Assessment

Alt. C - Transportation Elements	Potential Impacts to Water-Related Resources
I-710 Mainline Improvements	
Mainline Widening	Would extend the pier walls in the Los Angeles River where I-710 crosses the LA River Channel north of Imperial Highway, thereby potentially affecting water levels in this area; 5.5 acres of floodplain affected; impacts during construction.
Collector-Distributor Lane System	Potential for impacts during construction.
Truck Inspection Facility	Potential for impacts during construction.
I-405 Truck Bypass Lanes	Potential for impacts during construction.
SR-91/I-105 Bypass Lanes	New columns in the LA River would likely be required for this project element at some locations. Potential impact to Dominguez Gap Spreading Grounds Facility that may affect groundwater recharge; 0.7 acres floodplain affected; 0.4 acres of wetlands affected; potential for impacts during construction.
Pacific Coast Highway Truck Ramps	6.2 acres of floodplain affected. Potential for impacts during construction.
Washington Boulevard Truck Ramps	Potential for impacts during construction.
I-710 Interchanges – Freeway	
I-405/I-710 Interchange	Would extend and add piers in the Los Angeles River near I-405, thereby potentially affecting water levels in this area; potential impact to Dominguez Gap Spreading Grounds Facility; potential for impacts during construction.
I-5/I-710 Right Side Ramp	Potential for impacts during construction.
I-710 Interchanges – Local	
Anaheim Street Braid	8.7 acres of floodplain affected. Potential for impacts during construction.
Pacific Coast Highway Braid	6.2 acres of floodplain affected. Potential for impacts during construction.
Willow Street Interchange	Potential for impacts during construction.
Del Amo Boulevard Interchange	Would extend pier walls of I-710 in Compton Creek Channel, which could raise water levels; 0.2 acres of floodplain affected; impacts during construction.
Imperial Highway Interchange	Potential for impacts during construction.
Florence Avenue Interchange	Potential for impacts during construction.
Atlantic/Bandini Interchange	Potential for impacts during construction.
Washington Boulevard Interchange	Potential for impacts during construction.
Slauson Boulevard Interchange	Potential for impacts during construction.
Terminal Island Freeway Extension	Potential for impacts during construction.
Arterials	Potential impacts could occur for arterial roadway modifications along Compton Creek and the Rio Hondo River. Any construction of pier extensions and abutments built in river could cause water levels to rise. Portions of the arterials are located in the floodplain. Potential for impacts during construction.

Source: Parsons Brinckerhoff, April 2003.

Table 5.4-14
Alternative D – Water Resources Impact Assessment

Alt. D - Transportation Element	Potential Impacts to Water-Related Resources
I-710 Mainline Improvements	
Mainline Widening	Potential impact to Dominguez Gap Spreading Grounds Facility that may affect groundwater recharge; 1.3 acres floodplain affected; 0.5 acres of wetlands affected; potential for impacts during construction.
I-710 Interchanges – Freeway	
I-405/I-710 Interchange	Would extend and add piers in the Los Angeles River near I-405, thereby potentially affecting water levels in this area; potential impact to Dominguez Gap Spreading Grounds Facility; potential for impacts during construction.
I-405/I-710 HOV Connector	Potential for impacts during construction.
SR-91/I-710 Interchange	Would result in new columns for this interchange in Los Angeles River, which could raise water levels; potential impact to Dominguez Gap Spreading Grounds Facility; potential for impacts during construction.
I-5/I-710 Interchange	Potential for impacts during construction.
I-710 Interchanges – Local	
Willow Street Diamond	Potential for impacts during construction.
Del Amo Boulevard Diamond	Would extend pier walls of I-710 in Compton Creek Channel, which could raise water levels; potential for impacts during construction.
Long Beach Boulevard	Would extend the pier walls in the Los Angeles River where elements of this interchange crosses the LA River Channel, thereby potentially affecting water levels in this area; potential for impacts during construction.
Imperial Highway Diamond	Potential for impacts during construction.
Florence Avenue Diamond	Potential for impacts during construction.
Atlantic/Bandini Interchange	Potential for impacts during construction.
Washington Boulevard Interchange	Potential for impacts during construction.
Terminal Island Freeway Connector	This new roadway element would cross the Dominguez Creek Channel and would result in new footings within the channel, which could impact hydrology. Groundwater resources in the area include the Domingez Gap Barrier Project, which is a program to prevent seawater intrusion into the groundwater supply. Impacts to this facility may adversely affect groundwater recharge in the area. 1.1 acres of floodplain affected; 0.3 acres of wetlands affected; potential for impacts during construction. .
Arterials	Potential impacts could occur where Garfield Ave. crosses the Rio Hondo River. Any construction of pier extensions in the river could cause water levels to rise. Portions of the arterials are located in the floodplain. Potential for impacts during construction.

Source: Parsons Brinckerhoff, April 2003.

Table 5.4-15
Alternative E – Water Resources Impact Assessment

Alt E - Transportation Element	Potential Impacts to Water-Related Resources
I-710 Mainline Improvements	
Exclusive Truck Facility	Would add new piers in Compton Creek and the Los Angeles River near where I-710 crosses over these two waterways, thereby potentially affecting water levels in these two areas; potential impact to Dominguez Gap Spreading Grounds Facility that may affect groundwater recharge; 14.1 acres floodplain affected; 1.1 acres of wetlands affected; potential for impacts during construction.
I-405 Truck Ramps	Would add new piers in Compton Creek Channel near where I-710 currently crosses over, which could raise water levels; 0.8 acres floodplain affected; 0.5 acres of wetlands affected; potential for impacts during construction.
SR-91 Truck Ramps	Would add new piers in Los Angeles River near where SR-91 currently crosses over, which could raise water levels; 0.7 acres of floodplain affected; impacts during construction.
Firestone Boulevard Truck Ramps	Would add new piers in Los Angeles River, which could raise water levels; 0.7 acres of floodplain affected; potential for impacts during construction.
Washington Boulevard Truck Ramps	Potential for impacts during construction.
I-710 Interchanges – Freeway	
I-405/I-710 Interchange	Would add new piers in the Los Angeles River near I-405, thereby potentially affecting water levels in this area; potential for impacts during construction.
SR-91/I-710 Interchange	Would add new piers in Los Angeles River near where SR-91 currently crosses over, which could raise water levels; 0.7 acres of floodplain affected; impacts during construction.
I-5/I-710 Interchange/ Atlantic Viaduct	Potential for impacts during construction.
I-710 Interchanges – Local	
Slauson Boulevard Interchange	Potential for impacts during construction.
Arterials	Potential for impacts during construction.

Source: Parsons Brinckerhoff, April 2003.

5.4.10 Noise

As part of the I-710 Study, a sketch-level noise analysis was conducted for the five alternatives. Both short-term (15-minute sampling) and 24-hour noise measurements were taken next to I-710 along the Corridor to provide an assessment of existing noise levels. No detailed noise modeling was conducted for the alternatives. [Note: This level of analysis is performed during the environmental document phase of project development.] However, estimates of noise impacts were developed for each of build alternatives compared to the no build condition based on: the proposed change in the edge of roadway, locations of existing state noise barriers, anticipated vehicle mix; proximity of sensitive receivers, the proposed profile of the roadway element (e.g., elevated versus at-grade), and past noise modeling experience drawn from similar freeway projects. The sketch noise analysis conducted for the I-710 Major

Corridor Study did not take into account the effects of any noise mitigation that would be identified through detailed noise modeling to be conducted in subsequent project phases. Thus, only the potential adverse impacts of the alternatives were examined in the I-710 Study for purposes of comparing the alternatives.

The Federal Highway Administration (FHWA) and Caltrans have established criteria and protocols for determining what levels of noise impacts meet the test for significance as well as thresholds for noise abatement. FHWA's maximum exterior noise abatement criteria (NAC) is 67 dBA for sensitive receivers (e.g., residential areas, playgrounds, parks, schools, churches, libraries, and hospitals) and 72 dBA for commercial areas. In addition, according to these federal /state noise guidelines, potential noise mitigation such as sound walls would need to reduce the future noise levels on I-710 (assuming that the alternative is in place) by 5 dBA or more in order to be considered feasible.

Based on the noise measurements conducted in the I-710 Study Area, nearly all of the residential areas currently exposed to freeway noise directly adjacent to the I-710 freeway (e.g., first row receivers) exceed FHWA's NAC level of 67 dBA. Therefore, any discernable increase to noise levels on I-710 attributable to proposed transportation improvements is considered significant under federal guidelines. The term "first row" and "second row" in the noise discussion refers to parcels directly proximate to the freeway or roadway elements of the proposed alternatives. The first row is defined as those parcels (typically business or residences) directly adjacent to the freeway. The only objects between these first row parcels and the freeway could be a sound barrier and/or landscaping. The second row is defined as those parcels which are located directly behind the first row of parcels. The first row acts as a partial noise barrier for the second row as noise decreases with added distance. If, for example, the first row is removed when the freeway or arterial is widened, then the second row then becomes the first row and experiences an increase in noise levels.

Alternative A – No Build

Alternative A is a future baseline alternative consisting primarily of operational improvements and reconstruction activities that involve pavement replacement, standard shoulders, and a new median for I-710. By definition, these transportation improvements have already been planned and committed for the Year 2025. Potential noise impacts associated with these committed transportation improvements have already been studied, and mitigated as necessary.

Alternative B – TSM/TDM Alternative

Alternative B is a low impact alternative consisting of operational investments, policies, and actions targeted at improving goods movement, facilitating passenger auto and transit travel, and improving the flow of traffic in the I-710 Study Area. With the possible exception of extended Port gate hours, the strategies included in Alternative B would have no adverse effect on future noise levels on I-710 compared to Alternative A. Extended gate hours at the Ports and for related businesses may cause traffic noise levels to increase in non-peak hours, although these impacts could be offset by reductions in truck trips attributable to the empty container management strategy in Alternative B. Therefore, taken as a whole, Alternative B ranges between no noise impact and potentially low noise impact.

Alternative C – Medium General Purpose / Medium Truck Alternative

Alternative C has a high potential for adverse noise impacts. Existing noise levels in residential areas along I-710 already exceed 67 dBA and any measurable increase in noise levels (1 dBA) would be considered significant. In addition, new areas of sensitive receivers would be exposed to freeway noise levels due to the extension of the Terminal Island Freeway, the Truck Bypass Lanes, and the Collector-Distributor Lane system. Table 5.4-16 lists the different transportation elements included in Alternative C as well as a summary assessment of the potential for noise impact for each element given the presence of noise sensitive receivers and the location and configuration of the proposed transportation element. Potential noise impacts can be avoided, minimized, or mitigated by one or more of the following actions: dropping the proposed element, changing the conceptual design, or by adding noise abatement measures such as noise barriers (e.g., soundwalls) and double-pane windows.

Table 5.4-16
Alternative C – Noise Impact Assessment

Alt. C - Transportation Elements	Potential Noise Impacts
I-710 Mainline Improvements	
Mainline Widening	Noise levels for first row sensitive receivers currently exceed 67 dBA. Mainline widening would require the relocation of at least one existing noise barrier and would remove first row receivers in some areas. Would result in an adverse noise impact without mitigation.
Collector-Distributor Lane System	Four added lanes combined with roadway widening is estimated to result in a 3-5 dBA increase for first row receivers. Some of the first row parcels would be removed and second and third row receivers will experience greater levels of noise as a result. Potentially significant adverse noise impact without mitigation.
Truck Inspection Facility	No sensitive receivers in the immediate area.
I-405 Truck Bypass Lanes	Noise sensitive receivers are located to the west of the proposed ramps. Existing noise levels are due to traffic noise from Wardlow Rd. and from I-405 at the north end of this element. The proposed alignment of this element would expose these areas to freeway noise. Potential adverse noise impact without mitigation.
SR-91/I-105 Bypass Lanes	The proposed southbound truck bypass lane would affect 4.8 miles of noise sensitive receivers. This element is elevated and places trucks closer to these sensitive receivers. Noise levels in areas currently protected by a noise barrier would increase, along with 2nd and 3rd row receivers and receivers above the height of the existing freeway that would have unobstructed line-of-sight to the elevated lanes. Potential adverse noise impact without mitigation.
Pacific Coast Highway Truck Ramps	Proposed southbound truck ramp would require the relocation of the existing sound barrier as well as some first and second row receivers. Results in added noise exposure for remaining receivers. Potential adverse noise impact without mitigation.
Washington Boulevard Truck Ramps	No sensitive receivers in the immediate area.
I-710 Interchanges – Freeway	
I-405/I-710 Interchange	No sensitive receivers in the immediate area.
I-5/I-710 Right Side Ramp	No sensitive receivers in the immediate area.

Table 5.4-16 Continued
Alternative C – Noise Impact Assessment

Alt. C - Transportation Elements	Potential Noise Impacts
I-710 Interchanges – Local	
Anaheim Street Braid	No sensitive receivers in the immediate area.
Pacific Coast Highway Braid	Proposed southbound off-ramp to Pacific Coast Hwy. would require the relocation of the existing sound barrier and the acquisition of some first and second row receivers. Results in added noise exposure for remaining receivers. Potential adverse noise impact without mitigation.
Willow Street Interchange	Proposed southbound on- and off-ramps would require the relocation of the existing sound barrier and the acquisition of some first and second row receivers. Results in added noise exposure for remaining receivers. Potential adverse noise impact without mitigation.
Del Amo Boulevard Interchange	No sensitive receivers in the immediate area.
Imperial Highway Interchange	Proposed interchange modification is predicted to cause a noise increase of 1 to 2 dBA to first row receivers located to the west of I-710 and to the north and south of Imperial Highway. Potential adverse noise impact without
Florence Avenue Interchange	Proposed interchange modification is not predicted to cause a discernable noise impact to any noise sensitive receivers.
Atlantic/Bandini Interchange	No sensitive receivers in the immediate area.
Washington Boulevard Interchange	Proposed interchange modification would take most of the first and some of the second row receivers, leaving remaining residences with greater noise exposure to I-710. Potential adverse noise impact without mitigation.
Slauson Boulevard Interchange	No sensitive receivers in the immediate area.
Terminal Island Freeway Extension	Several residential areas are located along the proposed alignment, representing sensitive receivers. Existing noise levels are currently below the state/federal NAC because these residential areas are only exposed to traffic noise from local roads. The T.I. Freeway Extension would expose these residential areas to freeway noise, thus substantially increasing the noise level. Potential adverse noise impact without mitigation.
Arterials	Minor potential for noise impact to sensitive receivers that abut the arterials where improvements are proposed. Majority of land uses are commercial and current noise levels are well below 72 dBA. The addition of one lane in each direction may cause an increase of 1 dBA.

Source: Parsons Brinckerhoff, April 2003.

Alternative D - High General Purpose / High HOV Alternative

Table 5.4-17 lists the different transportation elements included in Alternative D as well as a summary assessment of the potential for noise impact for each element given the presence of noise sensitive receivers and the location and configuration of the proposed transportation element.

Table 5.4-17
Alternative D - Noise Impact Assessment

Alt. D - Transportation Element	Potential Noise Impacts
I-710 Mainline Improvements	
Mainline Widening	This element would entail both roadway widening and the construction of elevated HOV lanes in the median of I-710 along a major portion of the I-710 freeway. Noise levels for first row sensitive receivers currently exceed 67 dBA. Sensitive receivers along the alignment would experience increases in noise levels particularly those receivers that are above the elevation of the existing freeway that would have unobstructed line-of-sight to the elevated lanes. Would result in an adverse noise impact without mitigation.
I-710 Interchanges – Freeway	
I-405/I-710 Interchange	No sensitive receivers in the immediate area.
I-405/I-710 HOV Connector	No sensitive receivers in the immediate area.
SR-91/I-710 Interchange	Proposed interchange modification would result in the acquisition of several homes in the vicinity of this interchange, exposing remaining homes to freeway noise. It would also add new ramps closer to existing receivers, which would also increase noise levels. Would result in adverse noise impact without mitigation.
I-5/I-710 Interchange	Proposed interchange modification would add ramps closer to existing receivers and could result in increased noise levels of 1 to 3 dBA. Potential adverse noise impact without mitigation.
I-710 Interchanges – Local	
Willow Street Diamond	Proposed reconfiguration is not predicted to result in increased noise levels.
Del Amo Boulevard Diamond	No sensitive receivers in the immediate area.
Long Beach Boulevard	No sensitive receivers in the immediate area.
Imperial Highway Diamond	Proposed interchange modification is predicted to cause a noise increase of 1 to 2 dBA to first row receivers located to the west of I-710 and to the north and south of Imperial Highway. Potential adverse noise impact without mitigation.
Florence Avenue Diamond	Proposed reconfiguration is not predicted to result in increased noise levels.
Atlantic/Bandini Interchange	No sensitive receivers in the immediate area.
Washington Boulevard Interchange	Proposed interchange modification would take most of the first and some of the second row receivers, leaving remaining residences with greater noise exposure to I-710. Potential adverse noise impact without mitigation.
Terminal Island Freeway Connector	No sensitive receivers in the immediate area.
Arterials	Minor potential for noise impact to sensitive receivers that abut the arterials where improvements are proposed. Majority of land uses are commercial and current noise levels are well below 72 dBA. The addition of one lane in each direction may cause an increase of 1 dBA.

Source: Parsons Brinckerhoff, April 2003.

Alternative D has a high potential for adverse noise impacts. Existing noise levels in residential areas along I-710 already exceed 67 dBA and any measurable increase in noise levels (1 dBA) would be considered significant. Unlike Alternatives C and E, no elements are proposed that would expose new areas of sensitive receivers to freeway noise levels. However sensitive receivers near the freeway would experience some increase in noise levels. This is particularly true of second and third row receivers who are near proposed elevated lanes and ramps or who would be exposed to added freeway noise due to the acquisition of first row receivers. Beyond the first and second row, receivers that are located above the elevation of the existing freeway would have unobstructed line-of-sight to the elevated lanes and ramps resulting in higher traffic noise. Potential noise impacts can be avoided, minimized, or mitigated by one or more of the following actions: dropping the proposed element, changing the conceptual design, or by adding noise abatement measures such as noise barriers (e.g., soundwalls) and double-pane windows.

Alternative E - High Truck Alternative

Alternative E has a high potential for adverse noise impacts. Existing noise levels in residential areas along I-710 already exceed 67 dBA and any measurable increase in noise levels (1 dBA) would be considered significant. In addition, new areas of sensitive receivers would be exposed to freeway noise levels due to property acquisitions at the freeway-to-freeway interchanges (I-405/I-710, SR-91/I-710, and I-5/I-710) and between Imperial Highway and Slauson Avenue due to the proposed elevated truckway.

Table 5.4-18 lists the different transportation elements included in Alternative E as well as a summary assessment of the potential for noise impact for each element given the presence of noise sensitive receivers and the location and configuration of the proposed transportation element. Potential noise impacts can be avoided, minimized, or mitigated by one or more of the following actions: dropping the proposed element, changing the conceptual design, or by adding noise abatement measures such as noise barriers (e.g., soundwalls) and double-pane windows.

Table 5.4-18
Alternative E - Noise Impact Assessment

Alt E - Transportation Element	Potential Noise Impacts
I-710 Mainline Improvements	
Exclusive Autoway/Truck Facility	Along some stretches of the I-710 Corridor, elevated truck lanes are proposed next to and to the outside of existing travel lanes on I-710. Noise levels for first row sensitive receivers currently exceed 67 dBA. Predicted increases of noise levels to first row sensitive receivers would be 3 dBA or more. In addition, some first row receivers would be acquired, exposing second and third row receivers to added freeway noise. Beyond the first and second row, receivers that are located above the elevation of the existing freeway would have unobstructed line-of-sight to the elevated lanes and ramps resulting in higher traffic noise. Would result in an adverse noise impact without mitigation.
I-405 Truck Ramps	No sensitive receivers in the immediate area.
SR-91 Truck Ramps	Proposed element adds ramps closer to existing receivers and could result in increased noise levels of 1 to 3 dBA. Potential adverse noise impact without mitigation.
Firestone Boulevard Truck Ramps	No sensitive receivers in the immediate area.
Washington Boulevard Truck Ramps	Proposed interchange modification would take most of the first and some of the second row receivers, leaving remaining residences with greater noise exposure to I-710. Potential adverse noise impact without mitigation.
I-710 Interchanges – Freeway	
I-405/I-710 Interchange	Proposed interchange modification would result in the acquisition of first and second row receivers resulting in added noise exposure for remaining receivers. Would also add new elevated ramps near to existing receivers. Potential adverse noise impact without mitigation.
SR-91/I-710 Interchange	Proposed interchange modification would add ramps closer to existing receivers and could result in increased noise levels. It would also acquire several homes, exposing the remaining homes to higher levels of noise. Potential adverse noise impact without mitigation.
I-5/I-710 Interchange/ Atlantic Viaduct	Proposed viaduct would increase noise levels for sensitive receivers by bringing freeway traffic along Atlantic Boulevard at a height above the first row of buildings. At this interchange, ramps would also be placed closer to existing sensitive receivers and some first row homes would be acquired. Would result in an adverse noise impact without mitigation.
I-710 Interchanges – Local	
Slauson Boulevard Interchange	No sensitive receivers in the immediate area.
Arterials	Some potential for noise impact to sensitive receivers that abut the arterials where improvements are proposed. Majority of land uses are commercial and current noise levels are below 72 dBA. The addition of one lane in each direction may cause an increase of 1 dBA.

Source: Parsons Brinckerhoff, April 2003.

5.5 Costs

Similar to the right-of-way impact analysis, costs were also assessed to establish the relative differences among the alternatives in terms of absolute cost and the cost of various components of the alternatives to support decision making for the I-710 Study. The cost estimates assume that all the transportation improvements associated with each alternative would be constructed.

It is important to recognize that these are concept level estimates and that they will be further refined in any subsequent preliminary engineering and final design phases of project development. At this early stage in the project development process, a great deal of uncertainty exists about precisely how the proposed improvements would be constructed and eventually implemented. Consequently, average unit costs were developed for some quantities (pavement, earthwork, structures); some categories of cost were included on a per mile basis (drainage, traffic handling); and others were based on percentages of construction cost (mobilization, contingency, design). The right-of-way unit costs were developed based on a database search of recent sales in the Study Area. Due to the uncertainties at this early stage of project definition, a cost contingency factor of 50 percent was applied to the construction and right-of-way cost estimates. All costs are shown in year 2003 dollars. Appendix O of this report contains a breakdown of the estimated costs for each alternative by category.

Costs are included for those improvements that would entail an additional capital cost beyond what is already planned and committed for the I-710 Corridor. Since Alternative A, the No Build Alternative, represents the “no action” option, this alternative would not result in any additional capital expense beyond what is already planned for implementation by 2025. Thus no costs are shown for Alternative A. Cost estimates for the other four alternatives reflect the capital expenses of these alternatives over and above the No Build Alternative.

For Alternative B, the TSM/TDM Alternative, the component categories included I-710 Mainline Improvements, Interchanges and Arterials, Goods Movement, Transit, and Intelligent Transportation Systems (ITS). For Alternatives C, D and E, the component categories included I-710 Mainline Improvements, Interchanges, the Terminal Island Freeway, TSM/TDM/Transit, and Arterials. Total costs for Alternative B were estimated at approximately $355 million, $3.2 billion for Alternative C, $3.6 billion for Alternative D, and $3.5 billion for Alternative E (2003 dollars).

The costs were compared in various ways to illustrate the differences between the alternatives. A comparison of the total cost shows that Alternative D had the highest total cost (Figure 5.5-1). A comparison of the mainline costs relative to the total costs shows that the Alternative E mainline concept would be the highest total cost, twice the cost of the Alternative C mainline, and almost twice the cost of the Alternative D mainline (Figure 5.5-2). The Alternative E mainline design concept is largely comprised of a new, four-lane structure 17.5 miles long for the proposed truckway and autoway. Construction of that much structure would be very costly. The Alternative C and D mainline design concepts provide for more of the construction at grade and less on structure, thus resulting in a lower mainline cost element.

Figure 5.5-1
Total Cost Comparison

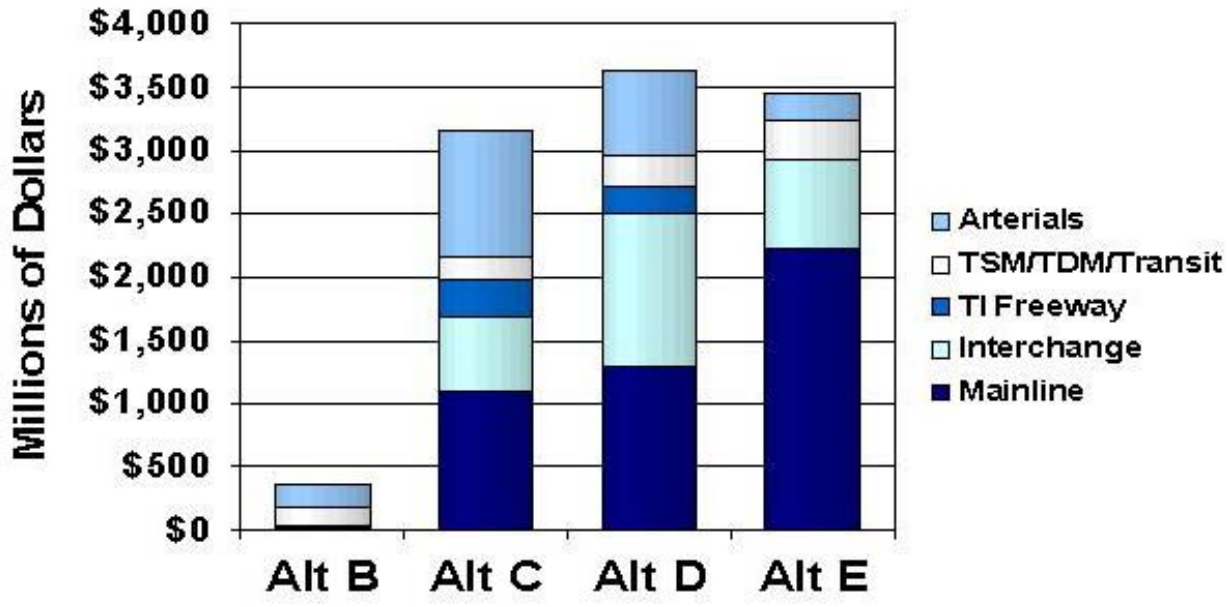
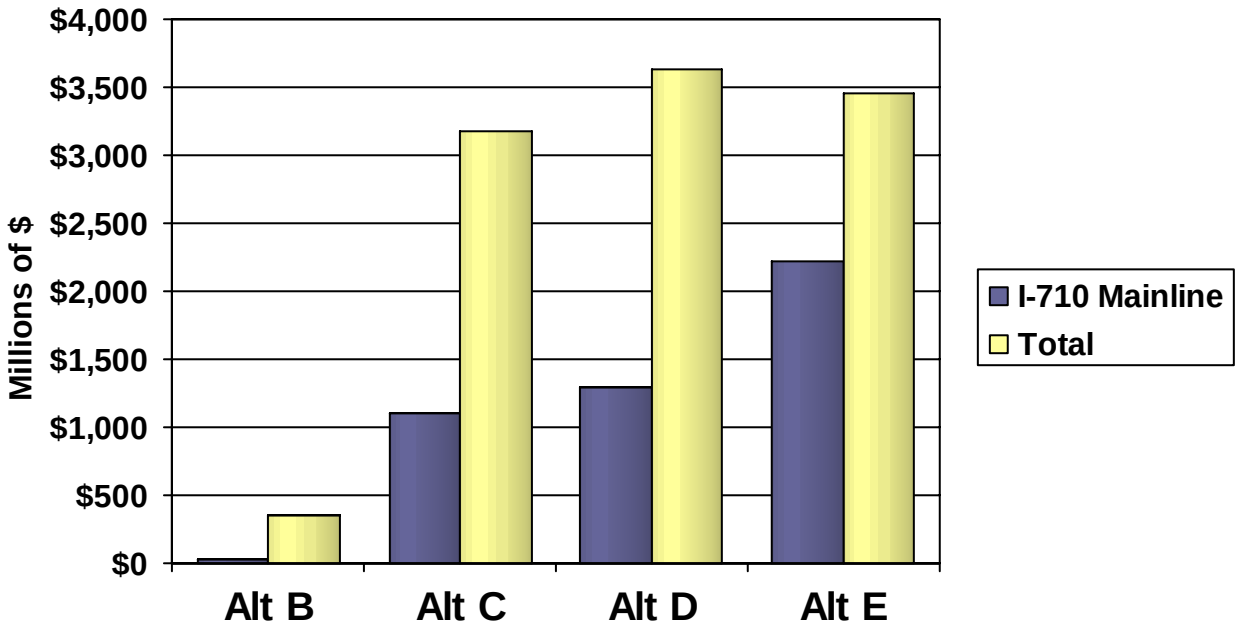
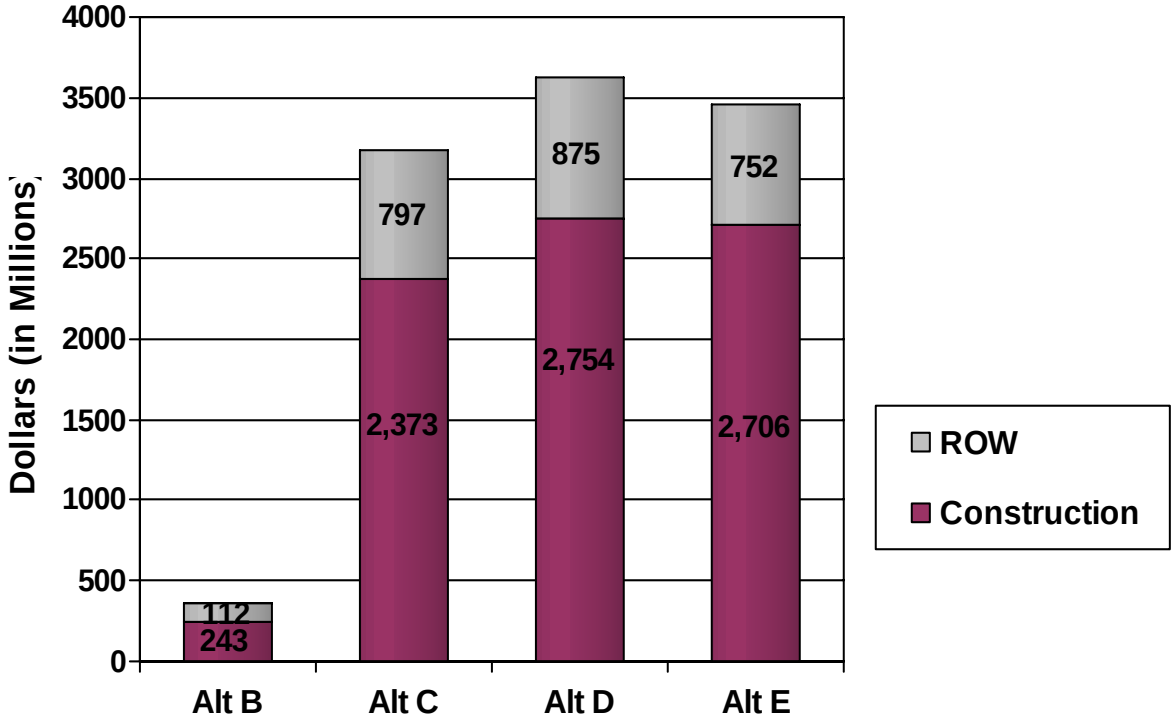


Figure 5.5-2
I-710 Mainline vs. Total Cost Comparison



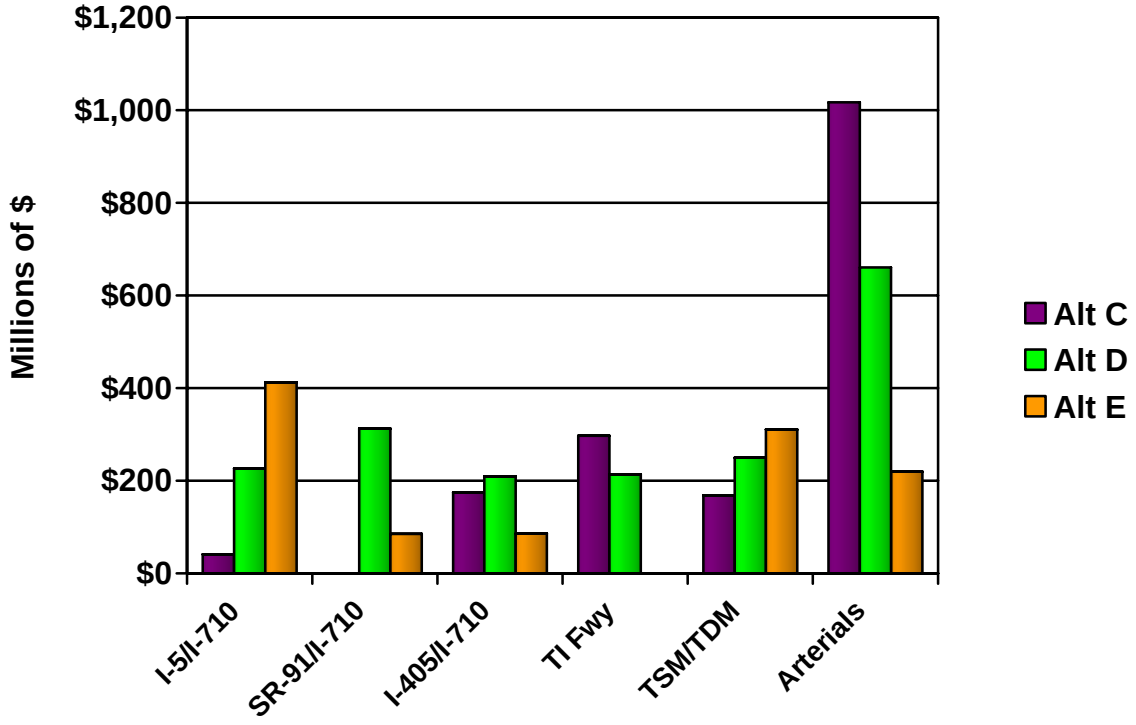
Right-of-way costs for Alternative B were estimated at $112 million associated with the assumed off-street replacement of on-street parking that would be removed from arterials during the peak periods. Right-of-way costs for the three build alternatives ranged from approximately $752 million to approximately $875 million (2003 dollars) (Figure 5.5-3).

Figure 5.5-3
Construction vs. Right-of-Way Cost Comparison



The different alternatives include different design options for several of the transportation facility components (Figure 5.5-4). The costs for the three freeway-to-freeway interchanges, I-5/I-710, SR-91/I-710, and I-405/I-710, vary with the complexity and degree of benefit of the proposed improvements across the alternatives. The proposed extension of the Terminal Island Freeway in Alternative C would have a higher cost than the Alameda Street/TI connector proposed in Alternative D. The TSM/TDM/Transit costs are lowest for Alternative C because more of the TSM/TDM/Transit-type of improvements are already included in the I-710 mainline, interchange and arterial components of Alternative C than any other alternative. This is also evidenced by the fact that the proposed arterial improvement costs for Alternative C are considerably higher than those of the other alternatives.

Figure 5.5-4
Component Cost Comparison



5.6 Public and Community Input

The Alternatives Evaluation phase of the public involvement process for the I-710 Study involved conducting outreach to stakeholders and gathering feedback regarding the final set of five alternatives (refer to Section 2.4). The goal of this phase of the I-710 Study was to identify a Locally Preferred Strategy based on the best combination of transportation elements drawn from the Final Set of Alternatives.

The outreach process contacted and met with elected officials at all levels of government along the Corridor, as well as with numerous community, business, and environmental groups regarding the five alternatives. Once the potential impacts of the alternatives, including potential right-of-way acquisition requirements became known, the previously approved outreach strategy was revised to go beyond what is typically undertaken for a Major Corridor Study to ensure that all stakeholders would have an opportunity to review study information, including right-of-way impacts, as well as provide feedback on the Final Set of Alternatives. Details of the outreach process and public and community input summarized in this section can be found in the *I-710 Major Corridor Study – Final Set of Five Alternatives Issues Analysis* (October 2003.)

5.6.1 Public and Community Outreach Opportunities

Throughout the Alternatives Evaluation phase of the I-710 Study, meetings with key community organizations along the Corridor, as well as all other groups interested in receiving a

presentation were held. These organizations were invited to participate in the process as soon as the Final Set of Alternatives was selected and approved by the OPC. After each presentation, groups were given the opportunity to ask questions and submit oral or written comments regarding the alternatives.

A mailing was conducted in October 2002 inviting local elected officials and interested stakeholders to request individual or group briefings regarding the five alternatives. Targeted outreach efforts were also directed towards churches and schools throughout the I-710 Corridor. After the mailing, all churches and schools in the stakeholder database received follow-up calls asking if their organizations were interested in receiving a briefing regarding the Final Set of Alternatives. Briefings were then held with all interested stakeholders.

As additional information was developed and became available regarding the potential impacts of each of the five alternatives, it became crucial to ensure that local environmental groups had ample opportunities to provide feedback about the I-710 Study, as well as any potential impacts that would need to be addressed further in subsequent environmental analyses. A meeting for the environmental community was held in January 2003. Attendees were first given an overview presentation regarding the alternatives. At the conclusion of the presentation, all those present had the opportunity to ask questions and submit comments regarding the alternatives.

Roundtable sessions, with the goal of bringing members of similar stakeholder groups (e.g. community groups, business groups, transportation groups, etc.) together to review and exchange information, were held for this study phase in mid April 2003 to discuss the final set of five alternatives. These meetings provided the public another opportunity to provide comments regarding the alternatives.

A total of three Open Houses regarding the I-710 Major Corridor Study Final Set of Alternatives were held at the end of April 2003 in the cities of Long Beach (south Corridor), Bell Gardens (mid-Corridor), and in the unincorporated area of East Los Angeles (north Corridor). The open house format was used to facilitate the exchange of information with the general public, as well as allow for interaction with the study agencies and their consultants. As a result of concerted outreach efforts, attendance at each of the open houses ranged from 100 to 400 people.

Finally, community meetings were held in the most potentially impacted cities along the Corridor to offer local residents and businesses another opportunity to review and comment on the Final Set of Alternatives. Impacted cities are those that were identified as having the greatest amount of right-of-way impacts among the three build alternatives, and included Commerce, unincorporated East Los Angeles, Long Beach, and Bell Gardens.

5.6.2 Public and Community Feedback

The key issues and themes identified throughout this phase of the public involvement process were: concerns about the large amount of proposed property acquisitions and relocation among the proposed build alternatives, environmental and health concerns, concerns about environmental justice, and perceived shortcomings in the public outreach for the I-710 Study. Each of these issues is elaborated below.

Property Acquisition/Relocation—The majority of residents, business leaders, and elected officials along the Corridor expressed strong dissatisfaction with the amount of residential and

commercial property that would need to be acquired for the implementation of the build alternatives. Some of the property that could be acquired would include homes, businesses, parks, schools, and churches. There was also a pervasive feeling among the public that property owners would not receive adequate compensation for their properties in an acquisition process. There were also significant concerns regarding the impacts to their communities of the magnitude of the proposed property acquisitions.

Environmental/Health Concerns—Many stakeholders were concerned that construction of any of the alternatives and the additional truck traffic that is expected on I-710 will lead to increases in dust, smog, noise, and diesel emissions in the communities adjacent to the freeway. Increased cancer risks from diesel toxins and increased incidence of respiratory diseases were also a major concern of stakeholders throughout the I-710 Study Area.

Environmental Justice—Most of the residents living along the I-710 freeway are members of minority groups, and as such, feel that their communities will be unfairly impacted by any of the build alternatives. They would prefer to see further studies conducted to ensure that all potential negative impacts to their communities can either be avoided or sufficiently mitigated.

Public Outreach— An open house format was used for disseminating Final Set of Alternatives related information to the public. This format was chosen to ensure that all stakeholders had the opportunity to view project study maps and displays, and to speak with study team members one-on-one. In response to the stated preference for formal meetings over the open house format, by some stakeholders, such meetings were held in each potentially impacted city. At these meetings, the stakeholders were able to receive presentations regarding the I-710 Study, and formally interact with study staff in a group setting.

As a consequence of the high level of public and community concern voiced about the Final Set of Alternatives, the MTA Board and the I-710 Oversight Policy Committee (OPC) directed agency staff to undertake a revised community engagement process. The goal of this revised process was to develop a community consensus on a Hybrid Strategy for the I-710 Major Corridor Study. The revised process is discussed in Section 2.0 of this report and public feedback during the steps taken to develop a Hybrid Design Concept, operational and policy Improvements, and ultimately the Locally Preferred Strategy is summarized in Sections 6.1, 7.0, and 9.0 of this report.