APPENDIX H

I-710 Major Corridor Study Screening Methodology**,** Parsons Brinckerhoff, Inc., March 2002

Description of Screening Measures, Parsons Brinckerhoff, Inc., May 2002

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I-710 Major Corridor Study
Screening Methodology
March, 2002

Purpose of Screening

Screening will take place during the months of March, April and May. The purpose of screening will be to elicit the technical information needed to identify which alternatives and transportation elements from the initial set are most competitive and should, therefore, be carried into the more detailed evaluation stage of the study. At the conclusion of the Screening task in June 2002, a No Build Alternative, a TSM/TDM Alternative, and three build alternatives will be selected for further analysis. These are called the final set of alternatives.

Key Questions for Screening

During Screening, is important to focus the analytical effort on key questions and those technical issues that highlight the major differences among the alternatives so that their relative benefits, costs, and impacts can be clearly understood. In certain cases, the predicted benefits, costs, and impacts among some of the proposed improvements are either similar or the differences are relatively small, particularly at this level of project definition. During Screening, these smaller or operational improvements will be grouped together in logical packages so that their combined effects can be examined or deferred to the more detailed stage of Alternatives Evaluation. Examples of where this would occur include the following: TSM/TDM strategies; goods movement strategies; arterial improvements; interchange modifications. The bulk of the screening effort will be devoted to identifying "order of magnitude" differences among the proposed improvements and answering key questions.

The following is a partial list of some the key questions that have been developed by the project team to date where input from the Technical Advisory Committee, the public, and participating or resource agencies would be helpful to the project team. In most cases, the technical team will need to develop the evaluative information to answer the question.

Answers to these key questions, will help define which alternatives should be carried forward as well as help focus the screening activities. Some of these questions are interrelated.

1. Re: analytical framework for the final alternatives: Do we need a high, medium, and low alternative for the final set of alternatives?
2. Re: analytical framework for the final alternatives: Is it necessary to keep the modal emphasis in the final set?
3. Re: analytical framework for the final alternatives: Do we want to maintain both at-grade and elevated options in the final set?
4. How important are ROW impacts when balanced against capacity improvements, costs?
5. Can we encroach into the Los Angeles River? And if so, how far?
6. Is there an upper limit in cost to "financially feasible?"
7. Is there sufficient physical room to address both the truck (goods movement) problem and add HOV facilities? If not, what is more important? HOVs or Trucks?
8. Are any of the alternatives physically/operationally infeasible? (For example: access/egress ramps to elevated truckway; will an elevated truckway work given to the need to maintain low grades?)
9. How much benefit will be derived from the TSM/TDM strategies?

10. How much truck demand will be attracted to an exclusive facility? Will it be enough to make the alternative viable?
11. If an elevated structure were to be built, what types of vehicles should use the elevated lanes? Trucks? General purpose traffic? HOVs?
12. What kind of ridership is reasonable to expect on the high rail alternative, given that there are no "in revenue service" systems to draw upon for an example?
13. Will the high rail alternative compete with the Blue Line for ridership? And, if so, to what extent?
14. Should factors such as institutional barriers, existing travel behaviors, supply chain practices be factored into the quantitative analysis or should these issues be dealt with on a purely qualitative basis?
15. Others?

Key Screening Activities

During screening, both quantitative and qualitative performance measures will be utilized. The following is a partial list of some of the screening activities that will be employed by the project team that are designed to answer key questions or which will produce information that draws clear distinctions among the alternatives and that can be accomplished within the Screening timeframe with the analytical tools available to the project team. This is not intended to be a comprehensive list as methods to assess operational improvements and financial feasibility are still being discussed among members of the project team.

Estimate Right-of-Way Impacts

- Establish five categories of land use: (1) SCE ROW/Railroads, (2) LA River, (3) Residential, (4) Commercial/Industrial, (5) 4f property.
- Develop a footprint for the interchanges (site-specific, worst case).
- Develop an estimated footprint for ingress/egress facilities, c/d facilities, truck bypass facilities.
- Develop an estimated footprint for the mainlines.
- Develop an estimated horizontal and vertical alignment for the elevated facilities.
- Use GIS to estimate aggregate land takes by five categories.
- Initiate consultation with LACFCD and USACOE regarding LA River encroachment. (Note: May not have definitive answer to this issue by the conclusion of Screening)

Estimate Costs

- Prepare sketch level capital cost estimates, including a rough assessment of ROW costs.
- At this stage, will not include an estimate of O&M costs, but will include liberal contingencies consistent with the planning-level cost estimate.
- Cost estimates/contingencies will also reflect uncertainty, to some extent (i.e., unknowns associated with technology, applications).

Estimate Travel Demand

- Using travel demand volumes developed during the purpose and need phase of the I-710, will develop existing year and future year (2025) travel demand estimates for autos and trucks.

- Existing and future year HOV estimates will be derived from Caltrans and SCAG model mode split data.
- Future year transit estimates will be drawn from MTA's regional model.
- Future year high speed rail estimates are still under discussion.

Estimate Mode/Facility Demand Shift Due to Major Capacity Improvements

- Estimates will be conceptual, broad brush at the screening level
- Travel demand on major facilities include:
  - I-710 mixed flow lanes, autos + trucks (Alts. 1- 12)
  - HOV lanes, including carpools and express buses (Alts. 5, 11)
  - Exclusive truck lanes, with and without toll (Alt. 9)
  - Special purpose lanes, with and without toll (Alt. 10)
  - New riders on high speed rail (Alt. 12)
- Mode/Facility shift estimates include:
  - Estimated truck trip reductions due to goods movement strategies (Alts 2, 10)
  - From autos to transit (Alt. 2)
  - From autos + light rail to HOV (alts 5, 11)
  - from autos + light rail to high speed rail (Alt. 12)
  - trucks from I-710 to Terminal Island Freeway (alt. 10)
- Mode/facility shifts will be estimated based on: travel demand data; truck origin and destination data; HOV origin and destination data; previous model runs; travel demand estimates from other, similar projects.

Estimate Travel Benefits

- Levels of Service on I-710
- Change in V/C across major screenlines to account for arterial improvements
- Change in average travel speeds on I-710, Terminal Island Freeway, major arterials
- Change in estimated travel time by mode
  - Point to Point Travel Time on I-710 from Ocean to SR-60
  - Point to Point Travel Time from Port of LB to ICTF
  - Point to Point Travel Time from Port of LB to UP or BNSF RR Yard
  - Point to Point Transit Travel Time from LB to downtown LA (bus, lrt, hsr)
- Change in Annual Hours of Delay (Recurring Congestion)
- Change in Annual Hours of Delay (Non-Recurring Congestion)

Estimate Safety Benefits

- Change in estimated number of accidents (annual) on I-710 from Ocean Blvd. to SR-60 for each alternative using factors drawn from IDAS (ITS Deployment Analysis System) software.

- Based on change in V/C (capacity improvements)
- Based on improved geometric designs (adjust capacity assumptions)

Assess Environmental / Other Qualitative Factors

- Qualitative assessment of visual/noise issues for elevated facilities, widening.
- Qualitative assessment of potential for disproportionate ROW impact (EJ).
- Qualitative assessment of community cohesion issues (e.g., near Washington Blvd.).
- Qualitative assessment of land use management program (land use incentive zones)
- Qualitative assessment of transportation system issues (regional truck system, HOV system, transit/rail) etc.

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I-710 Major Corridor Study
Alternatives Screening Evaluation Matrix

Description of Evaluation Measures

Mobility

% Vehicles Shifted from I-710 Mixed Flow Lanes in the AM Peak Period (% PCEs Shifted)
as compared to the No Build Alternative, (+) quantitative measure

Derived from year 2025 traffic forecasts, reflects effects of alternatives on volume of am peak period two-way traffic in the mixed flow lanes on I-710, measured as both percentage change in total vehicle volumes (auto + truck) compared with the future No Build alternative, as well as percentage change in passenger car equivalents (PCEs) to better represent change in trucks and their higher impact on roadway capacity utilization. The higher the percentage shifts in vehicles and, more specifically PCEs, the more traffic congestion relief offered by an alternative.

% Persons Shifted from I-710 Mixed Flow Lanes in the AM Peak Period
as compared to the No Build Alternative, (+) quantitative measure

Derived from year 2025 traffic forecasts, reflects effects of alternatives on volume of am peak period two-way person trips on I-710, expressed as percentage change from the No Build alternative, that are shifted from the mixed flow lanes onto other passenger carrying facilities provided by some of the alternatives, specifically HOV lanes in Alternatives 5 and 11, auto only special use lanes in Alternative 10 and high speed rail in Alternative 12. This calculation excludes the counting of drivers of the heavy duty trucks.

Average V/C Ratio in the AM Peak Period, I-710 Southbound Mixed Flow Lanes
(-) quantitative measure

Derived from year 2025 traffic forecasts, reflects effects of alternatives on weighted average congestion levels on the southbound direction of I-710 mixed flow lanes in the am peak period. The volume/capacity (V/C) ratio measures the vehicle demand on a freeway compared to the available roadway capacity, averaged over a specific time period, in this case the am peak period (6-9 am). V/C ratios above 1.00 indicate severe traffic congestion, also characterized as level of service (LOS) F. These volume calculations include the conversion of heavy duty trucks into passenger car equivalents (PCEs), to acknowledge the trucks' greater utilization of roadway capacity as compared to autos.

Minutes Saved, Average Vehicle Travel Time, I-710 SB Mixed Flow Lanes, AM Peak Period
as compared to the No Build Alternative, (+) quantitative measure

Derived from year 2025 traffic forecasts, reflects the effects of alternatives on average vehicle travel time to traverse I-710 from SR-60 to Anaheim Street southbound in the am peak period, expressed as a reduction in minutes of time from the future No Build alternative. The greater the measure, the more time savings offered by an alternative for each vehicle traveling along the mixed flow lanes southbound between SR-60 and Anaheim Street, as compared to the No Build.

Reduction in Recurrent Vehicle Hours of Delay, I-710 SB Mixed Flow Lanes, AM Peak Period
as compared to the No Build Alternative, (+) quantitative measure

Derived from year 2025 traffic forecasts, this measure reflects the effects of alternatives on reducing vehicle hours of delay that occur on I-710 due to traffic congestion during rush hours. This measure compares the performance of the southbound mixed flow lanes on I-710 during the AM peak period. The vehicle delay reductions are annualized and are shown in thousands of hours. The higher the delay reduction, the more effective the alternative is in reducing morning and evening peak traffic congestion compared to the No Build Alternative.

Reduction in Non Recurrent Vehicle Hours of Delay, I-710 Mixed Flow Lanes, Daily
as compared to the No Build Alternative, (+) quantitative measure

Derived from year 2025 traffic forecasts, this measure reflects the effects of the alternatives on reducing vehicle hours of delay attributable to incidents and off-peak traffic congestion. This measure compares the daily performance of the southbound mixed flow lanes on I-710. Hours of delay reductions are added over the period of a year, and are shown in thousands of hours compared to the No Build Alternative. The higher the delay reduction, the more effective the alternative is in addressing off-peak congestion and thus trip reliability.

Average V/C Ratio in the AM Peak Period, Screenlines of N/S Arterials in the Study Area
(-) quantitative measure

Derived from year 2025 traffic forecasts, reflects the effects of alternatives on north/south arterial am peak period traffic congestion as a result of adding capacity to selected north/south arterials in two of the alternatives. Computed as average of northbound and southbound am peak period volume/capacity ratios of all study area arterials crossing 4 different screenlines along the study area. The lower the V/C ratio, the less the aggregate average arterial traffic congestion in the AM peak period.

Average V/C Ratio in the AM Peak Period, Screenlines of E/W Arterials in the Study Area
(-) quantitative measure

Derived from year 2025 traffic forecasts, reflects the effects of alternatives on east/west arterial am peak period traffic congestion as a result of adding capacity to selected east/west arterials in two of the alternatives. Computed as average of eastbound and westbound am peak period volume/capacity ratios of all study area arterials crossing one screenline along the study area. The lower the V/C ratio, the less the aggregate average arterial traffic congestion in the AM peak period

Safety

Reduction in Annual Number of Accidents on I-710, All Lanes (% Reduction of Accidents)
as compared to the No Build Alternative, (+) quantitative measure

Accidents were estimated for each of the alternatives under 2025 traffic conditions on a link by link basis based on estimated changes in volume/capacity ratios. All lanes in both directions of I-710, including new HOV lanes, truck lanes, and special purpose lanes were included in the calculation. The number of accidents for each alternative was then compared to the No Build Alternative. This measure shows the number of accidents that would be reduced by each alternative as well as the percentage of accidents that would be reduced as compared to the No Build Alternative. The higher the accident reduction, the better the alternative is in addressing accident concerns on the freeway.

Qualitative Safety Assessment (Design Perspective)

(+) quantitative measure

The extent to which each alternative would improve the safety of the affected facilities was assessed based on the extent to which each of the alternatives addressed the physical factors that contribute to accidents from an operational as well as design perspective. The affected facilities that were assessed include the I-710 mainline, the local access interchanges, and the freeway-to-freeway interchanges. Each alternative was rated on a score of zero to 10 with 10 being best. Alternatives that positively affected more of the facilities from a design and operational stand-point were rated closer to 10 and those that positively affected fewer of the facilities (or negatively affected some of the facilities) were rated closer to zero.

Environment

Total ROW Impact in Acres

(-) quantitative measure

Estimated total right of way impact of alternative, in acres. Estimated by overlaying "footprint" of physical alternative improvements on existing land uses in the Study Area, compared to existing limits of transportation facility right of way limits. The total sum of seven categories of ROW impact: residential, commercial/industrial, Section 4(f)/community resource, LA River/water channel, power/utility corridor, railroad, undevelopable.

Residential ROW Impact in Acres

(-) quantitative measure

Estimated residential right of way impact of alternative, in acres. Land use category allocations were general and conducted at a sketch-level of precision consistent with the available mapping/conceptual sketches of the alternatives. Both single family and multi-family residential land is included in this category.

Commercial/Industrial ROW Impact in Acres

(-) quantitative measure

Estimated commercial/industrial right of way impact of alternative, in acres. Land use category allocations were general and conducted at a sketch-level of precision consistent with the available mapping/conceptual sketches of the alternatives. Both commercial and industrial land uses are included in this category. Railroad spurs were designated as a commercial/industrial use.

Section 4(f)/Community Resource ROW Impact in Acres

(-) quantitative measure

Estimated Section 4(f)/community resource right of way impact of alternative, in acres. Land use category allocations were general and conducted at a sketch-level of precision consistent with the available mapping/conceptual sketches of the alternatives. Section 4(f) refers to land deemed of sensitive use such as parkland and cemeteries. This category has been broadened to include community use land uses such as schools, firestations and libraries.

Water/Los Angeles River ROW Impact in Acres

(-) quantitative measure

Estimated ROW impact or level of encroachment that each alternative would have on the Los Angeles River Channel or similar Water Use as measured in acres.

Visual Impact (-)
as compared to the No Build Alternative, (-) qualitative measure

Scale**:**
0 → 10 = No Impact → Worst Case

The assessment of visual impacts of proposed alternative actions is subjective, by its nature. It is based upon the assessor's evaluation of community perceptions related to the visual context of the proposed transportation improvements, and involves estimations of the extent to which the proposed actions/facilities would: be consistent with the existing visual context, visually intrude into the existing context, or visually enhance the existing context. Further, the assessment may include the perspective from the viewer of the proposed actions/facilities as well as the perspective from the user of the proposed actions/facilities.

Noise Impact (-)
as compared to the No Build Alternative, (-) qualitative measure

Scale**:**
0 → 10 = No Impact → Worst Case

No noise measurements were conducted at the screening level. A qualitative evaluation was made of the potential for increased noise impacts for each of the alternatives based on the following factors: geographic proximity of sensitive receptors; new structures; relative roadway widths; ambient conditions; and proposed modes/vehicle mix. In terms of noise from vehicles, cars are the quietest, medium trucks/buses/light rail transit are about the same, heavy trucks are noisier, and heavy rail, such as high speed rail, tends to be the noisiest.

Environmental Justice Impact (-)
as compared to the No Build Alternative, (-) qualitative measure

Scale:
0 → 10 = No Impact → Worst Case

In February 1994, President Clinton issued Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" which includes the requirement that, to the greatest extent practicable and permitted by law, "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." The I-710 Major Corridor Study Area is through predominantly (i.e., disproportionately high) minority and low-income population areas. These populations are already living with the direct and indirect impacts associated with the existing freeway corridor. A subjective attempt has been made to indicate where those alternative components would have increased impacts upon the minority and low-income residents, expressed primarily in terms of right-of-way (ROW) takings of residential properties. Other factors that may impact minority and low-income populations, to a lesser degree, are the loss of commercial/industrial properties, which may represent employment and/or shopping areas, and the loss of community resources/Section 4(f) properties.

Community Cohesion Impact (-)
as compared to the No Build Alternative, (-) qualitative measure

Scale:
0 → 10 = No Impact → Worst Case

In accordance with NEPA legislation and in recognition of the fact that the most damaging impacts of highway construction, most notably for new highway construction, are those impacts arising from the acquisition of property and the creation of a permanent dividing element through a cohesive community, an assessment was made of the potential impacts to cohesive communities within the study area. The term "cohesive community" is generally applicable to inner-city locations in close-knit ethnic or other types of communities. In these instances, the combination of family ties, religious and ethnic homogeneity, ethnic food stores, restaurants, churches and social clubs are tightly intertwined, frequently in combination with low-cost housing. The disruption of such areas and the forced relocation of population may constitute the destruction or weakening of the existing community.

Cost

Total Estimated Cost ($ millions)
as compared to the No Build Alternative, (-) quantitative measure

The costs were developed based on the concepts that were developed for each alternative. Roadway and structure quantities were established at a conceptual level of detail. Other components of the cost were based on percentages of the roadway costs, the miles of freeway affected (drainage, traffic handling, surveillance and communication), or direct measurement from the digitized topography provided by Caltrans (electrical transmission tower relocation). A contingency factor of 50 percent of the roadway and other costs was assumed for this sketch-level of concept development. Alternatives which have an impact on the flow of the Los Angeles River would require mitigation to maintain flow that has not been estimated. Environmental impact mitigation costs have not been estimated. Design and design administration, and construction inspection and administration were included in the cost estimate. Right-of-way costs were developed based on the acreages of impact to several categories of land uses and average unit costs for those land uses based on assessor data from within the corridor.

Average Cost per Mile ($ millions)
as compared to the No Build Alternative, (-) quantitative measure

The average cost per mile was derived based on the total cost (including construction and right-of-way), and dividing that by the total number of centerline miles affected by each alternative, or in the case of Alternatives 3, 4, and 7, the length of the corridor. This number can be used to represent the alternative cost normalized over the length of the project, to assess the relative scale of the alternatives. It should not be inferred that a project of half the length would have half the cost. Some of the components of the cost are at spot locations (i.e., local access and freeway-to-freeway interchanges) which would result in a cost only if they were included in an alternative.

Constructability

Qualitative Assessment of Ease of Construction

(+) qualitative measure

The constructibility rating is a qualitative assessment of the varying degrees of difficulty associated with the construction of each alternative both from the constructor's stand-point as well as the I-710 corridor user's stand-point. Each alternative was rated on a score of zero to 10 with 10 being best. Alternatives whose implementation is anticipated to be similarly difficult (or easy) would have the same score, and if no alternative could be considered "easily" implementable, then none would be rated as a 10.