

ATTACHMENT A
FINAL DRAFT HIA REPORT – EXECUTIVE
SUMMARY
Under separate cover

DRAFT

The Los Angeles County Metropolitan Transportation Authority (Metro) and its funding partners are preparing the I-710 Corridor Project Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) to analyze alternatives for improving Interstate (I-) 710 from Ocean Boulevard in the City of Long Beach to State Route (SR-) 60, a distance of 18 miles. The purposes of the I-710 Corridor Project, as stated in the EIR/EIS Notice of Preparation, are to:

- Improve air quality and public health
- Improve traffic safety
- Address design deficiencies
- Address projected traffic volumes
- Address projected growth in population, employment, and economic activities related to goods movement.

The Gateway Cities Air Quality Action Plan (AQAP) is a corridor-specific study requested by the I-710 Oversight Policy Committee in 2004 and subsequently supported by the Metro Board. It will assess how best to continue to improve air quality and public health by addressing both near-term and long-term measures for emissions reductions for all Gateway Cities. The Gateway Cities Council of Governments (GCCOG) is responsible for preparing the AQAP with administrative management and support from Metro.

This Health Impact Assessment (HIA) is one component that was added to the AQAP. The I-710 Corridor Project EIR/EIS has numerous studies that were used as resource material for input into this HIA, which is intended to assess the proposed I-710 Corridor Project and evaluate selected health determinants to assess health outcomes linked to proposed actions of the alternatives.

HIA is a public engagement and decision-support tool that can be used to assess planning and policy proposals, and make recommendations to improve the health outcomes associated with those proposals. Environmental, social, demographic, and economic conditions drive the health and wellbeing of communities. Factors such as transportation, employment and income, noise, air quality, access to goods and services, and social networks have well-demonstrated and reproducible links to health outcomes. HIA investigates these relationships in the context of specific policy proposals and makes predictions related to health outcomes through a six-step process, as shown below in Table 1-1.

This executive summary briefly describes the screening and scoping processes of the I-710 HIA, and summarizes key findings and recommendations related to the six domains assessed in the HIA: mobility, air quality, noise, traffic safety, jobs and economic development, and access to neighborhood resources.

Table 1-1. Screening & Scoping Process

Screening	Determines the Need and Value of a HIA
Scoping	Determines which health impacts to evaluate, methods for analysis, and a workplan
Assessment	Provides: 1) a profile of existing health conditions 2) evaluation of potential health impacts
Recommendations	Provide strategies to manage identified adverse health impacts
Reporting	Includes: 1) development of the HIA report 2) communication of findings and recommendations
Monitoring	Tracks: 1) impacts on decision-making processes and the decision 2) impacts of the decision on health determinants

1.1 Screening

Screening, the first step of HIA, involves establishing the feasibility and value of an HIA for a particular decision-making context. A number of factors were taken into consideration in making the decision to conduct this HIA on the I-710 Corridor Project:

- Conditions related to the I-710 (e.g., air quality and traffic safety) are currently impacting the health of residents in the surrounding communities, and the proposed project has potentially significant health implications for these residents.
- There is a wealth of research, literature, and methods available to conduct this analysis. The EIR/EIS being developed for the project, which addresses some but not all of the health impacts of the project, contains a large amount of information that can be used as a starting point for analyzing health outcomes in the HIA.
- Residents near the I-710 and other stakeholders have vocalized their health-related concerns regarding the project and have called on decision-making bodies to conduct an HIA.
- Decision-making bodies associated with the project voted in favor of conducting an HIA.

As a result of these factors, Metro decided to allocate funding to conduct this HIA as part of the AQAP. Human Impact Partners led the I-710 HIA with support of a project team that consisted of Metro, GCCOG, ICF International, and Arellano and Associates.

The Project Team for the I-710 HIA was guided by input from the Gateway Cities Air Quality Action Plan I-710 Health Impact Assessment Technical Working Group (TWG), the Gateway Cities Air Quality Action Plan Technical Roundtable, the Gateway Cities Air Quality Action Plan Advisory Roundtable, and the Gateway Cities Environmental Committee. The GCCOG Transportation Committee and Board of Directors also participated in the preparation of the HIA.

The I-710 HIA will be used to inform the development of additional measures to further assess public health outcomes resulting from the I-710 Corridor Project and will be provided to the I-710 Corridor

Project EIR/EIS Project Team upon completion. The decision, which has yet to be made, to include the results of the I-710 HIA in the I-710 Corridor Project EIR/EIS rests with the California Department of Transportation (Caltrans), the agency of record for the environmental clearance and documents.

1.2 Scoping

Scoping, the second step of HIA, involves determining which health determinants to evaluate, data sources and methods for analysis, and a workplan for completing the HIA.

The goals of this HIA are to:

- Provide I-710 Corridor Project decision-makers and other stakeholders with positive and negative health effects, findings, and recommendations for alternatives being considered;
- Increase stakeholder participation and understanding of the I-710 Corridor Project;
- Identify community health concerns/issues within the Gateway Cities, the solutions to which may be unrelated to the I-710 Corridor Project;
- Provide a model for future transportation and infrastructure HIAs (including evidence and utility of conducting an HIA);
- Add value to the I-710 related analyses while utilizing the I-710 Corridor Project EIR/EIS technical data in the HIA to the greatest extent possible to reduce redundancy.

These goals set some parameters for the analysis. For example, the HIA analyzed only the alternatives being considered in the EIR/EIS. These alternatives were:

- **Alternative 1—No Build Alternative:** This alternative consists of those transportation projects that are already programmed and/or committed to be constructed by or before the study's planning horizon year of 2035.
- **Alternative 5A—Freeway Widening up to 10 General Purpose (GP) Lanes:** The intent of Alternative 5A is to improve the I-710 mainline by widening the freeway to include ten lanes throughout the length of the corridor and modernizing its design. Alternative 5A also includes: the projects included in Alternative 1; Transportation Systems Management/Transportation Demand Management (TSM/TDM)/Transit/Intelligent Transportation Systems (ITS) improvements—including operational investments, policies, and actions aimed at improving goods movement—and passenger auto and transit travel; and arterial highway and I-710 congestion relief improvements including arterial highway improvements.
- **Alternative 6A—10 GP Lanes plus Four-Lane Freight Corridor:** Alternative 6A includes all the improvements from Alternative 5A with the addition of four separated freight movement lanes for exclusive use by conventional trucks from the ports (Ocean Boulevard) to the intermodal rail yards in Commerce and Vernon. This alternative is the Locally Preferred Strategy (LPS) that resulted from the prior I-710 Major Corridor Study plus additional design concept refinements.

- Alternative 6B—10 GP Lanes plus a Zero-Emissions Four-Lane Freight Corridor. Alternative 6B includes all the improvements of Alternative 6A (described above) with the freight corridor restricted to trucks with zero tailpipe emissions.
- Alternative 6C—10 GP Lanes plus a tolled Four-Lane Freight Corridor: Alternative 6C includes all the improvements of Alternatives 6A and 6B, but would toll trucks using the freight corridor.

The HIA used the same assumptions as, and much data from, the EIR/EIS. The HIA was completed before the draft EIR/EIS was completed, however, and not all the EIR/EIS data (e.g., noise and PM2.5 modeling) was available. Therefore there are sections of the HIA that could be revisited when all the EIR/EIS data is available.

The following health determinants were selected for study:

- Mobility
- Air quality
- Noise
- Traffic safety
- Jobs and economic development
- Access to neighborhood resources

Pathway diagrams (examples shown in Figures 1-1 and 1-2) for each of these health determinants were developed to describe how the proposed project would impact health. Geographic boundaries were determined for each health determinant. In all cases, the HIA analyzed impacts in the year 2035 only. In addition to assessing impacts on the general population, impacts on vulnerable populations—including those defined by age, race/ethnicity, and/or income—were considered when stratified data was available.

The detailed scope is available in Chapter 3 of the report.

Figure 1-1. The Potential Health Impacts of the I-710 Corridor Project Mediated through Air Quality

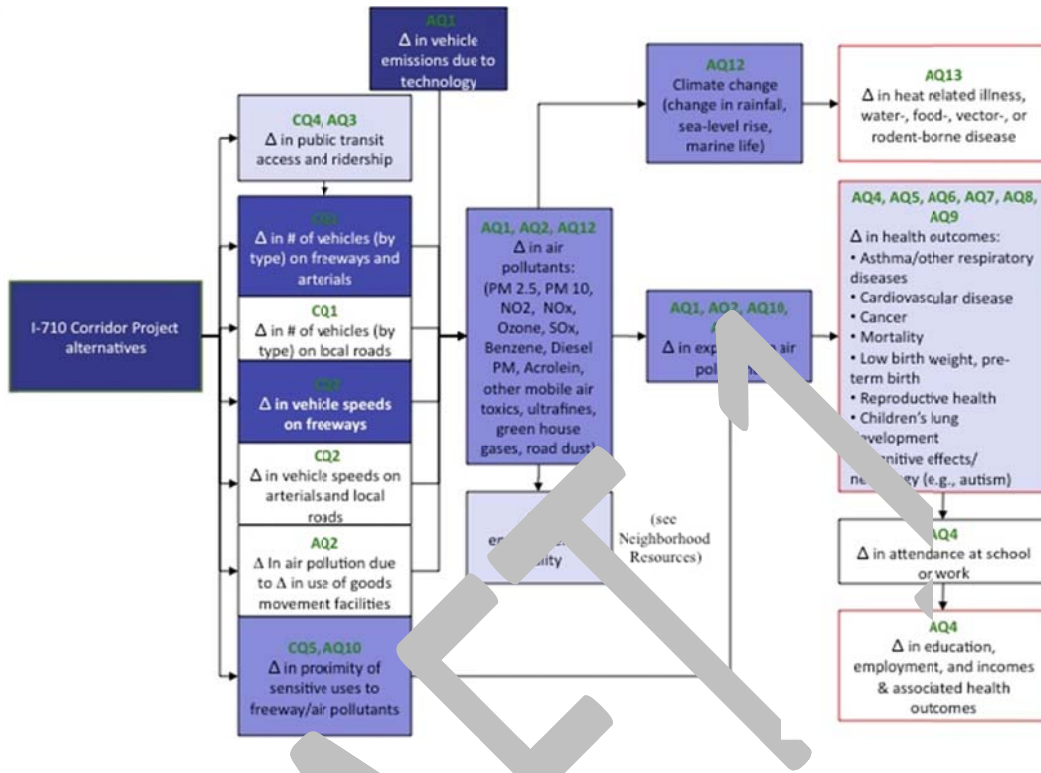
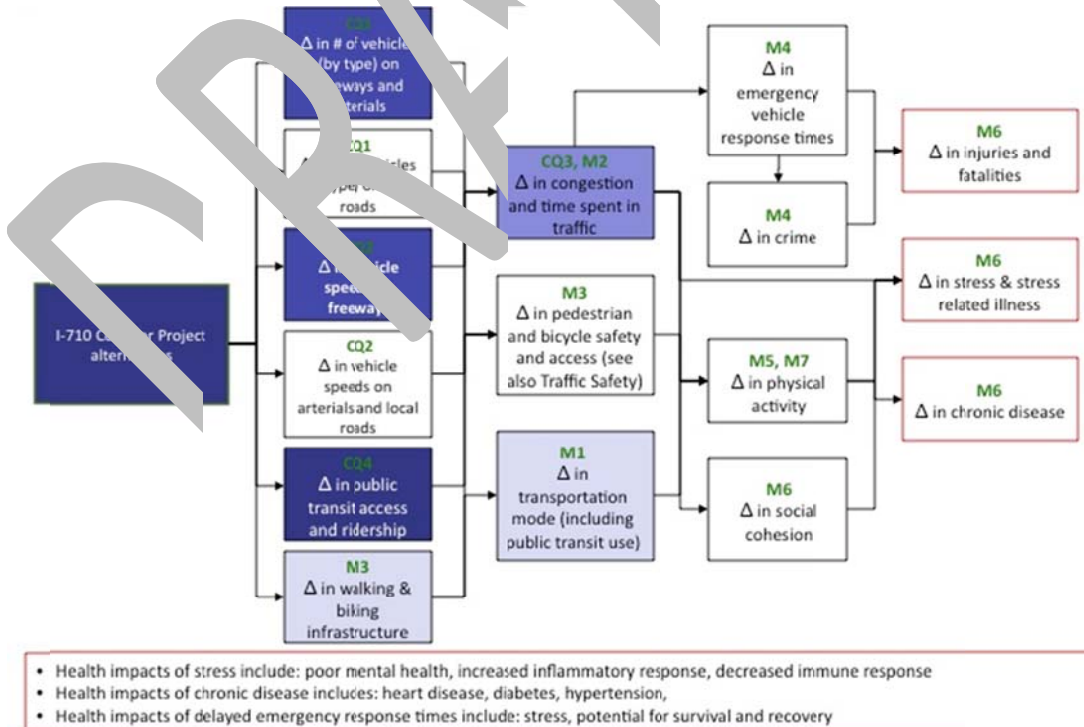


Figure 1-2. The Potential Health Impacts of the I-710 Corridor Project Mediated through Mobility



1.3 Assessment

Assessment, the third stage of HIA, involves profiling existing conditions and evaluating potential health outcomes. Scientific evidence found in the public health literature was reviewed to evaluate the relationships hypothesized in the pathway diagrams developed during scoping. Existing conditions data was collected from a number of sources, including documents being prepared for the EIR/EIS and other project-related documents (e.g., the Final I-710 Tier 2 Committee Report), the U.S. Census Bureau, the Los Angeles County Department of Public Health, the Office of Statewide Health Planning and Development, Metro, the Statewide Integrated Traffic Records System, and elsewhere. Using all this information, the proposed alternatives were then analyzed to understand how each would impact health.

One important caveat related to the Assessment findings in this HIA is that when analyzing effect levels for public health impacts, the transition from risk exposure to disease is complex and multifactorial. Many diseases are borne of multiple overlapping risk exposures, as well as social, economic, and environmental risk modifiers. Modifying factors are not distributed equally between all subpopulations. In addition, there is often a long delay between exposure and overt disease for many health determinants. This HIA investigates many health impacts and diseases but should not be construed as implying that the I-710 is or will be the only factor that determines health outcomes in the communities discussed.

Findings for each of the six health determinant assessed in the HIA are described in Section 1.4 below.

1.4 Findings and Recommendations

The HIA finds that the alternatives under consideration are likely to lead to mixed health impacts:

- Health would likely improve under all the alternatives in terms of air quality impacts.
- Negative health impacts related to noise and traffic safety will diminish the project's objective of improving public health and traffic safety.
- Impacts from changes in mobility and access to neighborhood resources were not found to be health beneficial, and, as such, the proposed alternatives miss important opportunities to improve public health.

Changes in jobs and economic development resulting from the alternatives could not be predicted; therefore the health impacts of such changes also cannot be predicted.

Findings and recommendations for each of the six analyzed health determinants are summarized below.

1.4.1 Mobility

Findings

Under all of the alternatives, automobile and truck traffic volumes on the freeway and arterials; speeds on the freeway, and, under some alternatives, on the arterials; vehicle miles traveled (VMT); and vehicle

trips are likely to increase. The amount of these increases is dependent on the alternative. Although the EIR/EIS assumes the same public transit ridership for each alternative, the transportation literature indicates that mode share is likely to be dependent on traffic speeds and volumes, which differ between project alternatives. Traffic volumes and speeds are also likely to impact the use of active transportation—walking and biking—as a mode of transportation.

Scientific evidence in the public health literature firmly establishes the relationship between transportation mode choice and health. The health effects of mode choice are mediated through the following:

- Physical activity through active transport: Even small changes in physical activity rates resulting from changes in walking and biking would be likely to lead to changes in diabetes, heart disease, obesity, stress, mental illness, and longevity. Because higher traffic volumes on arterials and higher speeds on arterials and the freeway will reduce active transport use, Alternatives 6A/B/C are least likely to increase physical activity and positively impact these health outcomes. Alternative 5A is likely to have slightly better outcomes than Alternatives 6A/B/C because freeway speeds are lower. Because congestion may discourage driving, Alternative 1 is likely to negatively impact physical activity and health the least of all the alternatives being considered. These impacts are most likely to affect children, the elderly, and disabled and lower-income people who have fewer opportunities to participate in sports or formal exercise programs.
- Social cohesion: Social connectivity helps manage stress, and is connected with longer lifespan and access to emotional and physical resources. Reductions in travel speeds and VMT and increases in walking/biking and public transit use will increase the amount of time one has with family, for social activities, and with neighbors. Because increases in travel speeds are likely to be offset by decreases in walking/biking, Alternatives 6A/B/C are unlikely to positively impact social cohesion. Negative impacts on social cohesion are more likely for Alternatives 1 and 5A than for Alternatives 6A/B/C because of longer commute times.
- Emergency response times: Under Alternatives 6A/B/C, emergency response times are likely to improve somewhat as a result of higher traffic speeds and will improve health outcomes associated with medical response. Under Alternative 5A, response times are likely to be similar to current levels because traffic speeds are similar. With lower roadway speeds, Alternative 1 is likely to result in slightly longer response times, which could put more people at risk of poor outcomes in emergency situations. The impacts of these changes are likely to be minor.

As a result of these changes in active transport and social cohesion, levels of chronic disease (e.g., cardiovascular disease, diabetes) and mental illness (e.g., depression) are expected to stay the same or increase, and lifespan is expected to stay the same or decrease. Small changes in active transport could lead to significant changes in lifespan, chronic disease, and mental health, so this represents a significant lost opportunity to improve public health.

The health impacts of the proposed I-710 Corridor Project EIR/EIS alternatives mediated through mobility are summarized in Table 1-2.

Table 1-2. Summary of Mobility-Related Health Impacts

Health Impact/ Alternative	Impacts of Alternatives		Health Outcome		Uncertainties
	Impact	Magnitude	Severity	Strength of Causal Evidence	
Chronic Disease (e.g., cardiovascular disease, diabetes; from changes in active transportation, social cohesion, and stress)					
1	~/-	Potentially significant, non-quantifiable	Mod-High	◆◆◆	Project will have multiple impacts, some of which offset others.
5A					
6A					
6B					
6C					
Mental Illness (e.g., depression; from changes in active transportation, social cohesion, and stress)					
1	~/-	Potentially significant, non-quantifiable	Mod-High	◆◆	Project will have multiple impacts, some of which offset others.
5A					
6A					
6B					
6C					
Decreased Lifespan (e.g., from changes in active transportation, social cohesion, and stress)					
1	~/-	Potentially significant, non-quantifiable	High	◆◆◆	Project will have multiple impacts, some of which offset others.
5A					
6A					
6B					
6C					
Negative Health Outcomes Associated with Delayed Emergency Response					
1	-	Minor	Mod-High	◆	Data in the literature is not conclusive regarding the impact of response time on health outcomes; emergency response time changes roughly estimated.
5A	~	Negligible			
6A	+	Minor			
6B	+	Minor			
6C	+	Minor			
<p>Explanations:</p> <p><i>Impact</i> refers to whether the alternative will improve (+), harm (-), or not impact health (~).</p> <p><i>Magnitude</i> reflects a qualitative judgment of the size of the anticipated change in health effect (e.g., the increase in the number of cases of disease, injury, adverse events): Negligible, Minor, Moderate, Major.</p> <p><i>Severity</i> reflects the nature of the effect on function and life-expectancy and its permanence: High = intense/severe; Mod = Moderate; Low = not intense or severe.</p> <p><i>Strength of Causal Evidence</i> refers to the strength of the research/evidence showing causal relationship between mobility and the health outcome: ◆ = plausible but insufficient evidence; ◆◆ = likely but more evidence needed; ◆◆◆ = causal relationship certain. A causal effect means that the effect is likely to occur, irrespective of the magnitude and severity.</p>					

Recommendations

To offset the negative health impacts associated with the reliance on driving as the primary mechanism for mobility, the alternatives being considered should include more concrete proposals and

commitments to improve public transit, walkability, and bikeability. For example, public transit, walking, and biking infrastructure improvements proposed in the 2008 Regional Transportation Plan should be fully funded before the I-710 Corridor Project funding commitments are sought. Such proposals and commitments would help the project meet its stated objective of improving public health. A complete set of recommendations is contained in the main HIA chapters below; some key recommendations include:

Vehicle Travel

- Adopt policies to reduce automobile and truck usage including, for example, by increasing use of clean rail technologies to transport freight; and promote land use policies in the Gateway Cities that encourage higher density and mixed use development.
- Reduce speeds on residential roads and arterials using traffic calming for safety and to encourage bicycling and walking.
- Discourage trucks on residential streets and other non-major streets through engineered deterrents such as speed bumps, traffic circles, and chicanes.

Public Transportation

- Create dedicated bus lanes to improve transit speed to make it more time competitive with automobiles and train.
- Improve bus stops to make them safer, more accessible by foot, and more comfortable.

Walkability

- Using physical engineered measures, reduce traffic speeds and volumes on streets with restaurants, stores, and services so that safety and walkability are improved. Examples include chicanes, lateral shifts, speed bumps, reduced lane width, pedestrian refuges, and narrower lane width.
- Improve pedestrian infrastructure, including piano-key crosswalk striping and pedestrian count-down signals at signalized intersections.
- Connect residential communities across arterials with pedestrian-friendly crossings and identify and beautify walking routes through neighborhoods.

Bikeability

- Create more bicycling routes and improve bicycling infrastructure beyond what is already proposed with the 2008 Regional Transportation Plan to offset increased traffic and volume associated with any build alternative.

1.4.2 Air Quality

Los Angeles has the worst air pollution in the nation, primarily as a result of motor vehicle use. The I-710 is a major corridor linking the ports of Long Beach and Los Angeles to other major highways and communities in the region. Traffic flow on the I-710 is very high, and over 25% of vehicles are heavy-

duty diesel trucks. Vehicle emissions impact air quality in the corridor communities and region, and contribute significantly to regional greenhouse gas emissions.

Scientific evidence in the public health literature firmly establishes the relationship between traffic-related air pollution and numerous negative health impacts. Traffic-related air pollutants known to impact health include the following:

- Criteria air pollutants: ozone, particulate matter (PM, including PM₁₀, PM_{2.5}, and ultrafines), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide, and lead.
- Mobile Source Air Toxics (MSATs): while there are hundreds of MSATs, the six most commonly studied are benzene, 1,3-Butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter (DPM).
- Greenhouse gases (GHGs) such as carbon dioxide (CO₂).

It is well documented that traffic is a significant source of most of these air pollutants. Other sources include, for example, maritime vessels and point sources such as refineries and warehouses. Research also suggests that low income and minority populations live closer to busy roadways and freeways, and thus are exposed to higher concentrations of air pollutants from vehicle emissions.

Health outcomes causally related to these pollutants include asthma and other respiratory diseases, cardiovascular disease, cancer, premature death, mortality, and preterm and low birth weight births. Furthermore, epidemiologic studies have consistently demonstrated that children and adults living in proximity to busy roadways have poorer health outcomes. Many studies supporting these findings have been conducted in southern California, and several have been specific to the I-710.

Based on this literature, this HIA finds that almost 4% of the asthma prevalence in children ages 5 to 9 in the 1-mile study area is currently attributable to I-710 pollutants and that the excess mortality rate due to PM_{2.5} exposure from I-710 emissions is 35 per 100,000 persons.

Although traffic volumes are assumed to increase significantly, because of cleaner fuels and more efficient technologies, under all the alternatives being considered in the I-710 Corridor Project, air quality in 2035 near the I-710 and in the region is predicted to improve. With reductions in emissions of and exposure to NO₂, CO, PM_{2.5}, and PM₁₀ as well as the MSATs, asthma, mortality, cancer, cardiovascular disease, and low birth weight and preterm birth levels will decrease. These reductions in air pollution from the I-710 do not ensure that the region will meet PM_{2.5} air quality standards. Also note that these conclusions are based on preliminary and incomplete data contained in an early version of the draft I-710 Corridor Project EIR/EIS.

Levels of regional GHGs are estimated to increase under all of the alternatives but this is not expected to noticeably impact health in the I-710 corridor.

The health impacts of the proposed I-710 Corridor Project EIR/EIS alternatives mediated through air quality are summarized in Table 1-3.

Table 1-3. Summary of Air Quality–Related Health Impacts

Health Impact/ Alternative	Impacts of Alternatives		Health Outcome		Uncertainties
	Impact	Magnitude	Severity	Strength of Causal Evidence	
Asthma					
1	+	Odds ratio of 1.15 for every 10 µg/m ³ increase of annual average NO ₂	High	◆◆◆	Final traffic analyses and air quality modeling were not available at the time of completion of this HIA; modeling results are not always accurate.
5A					
6A					
6B					
6C					
Mortality					
1	+	Estimates pending PM2.5 modeling data	High	◆◆◆	Modeled estimates of mortality attributable to PM2.5 were not available for this analysis. Magnitude is not estimated.
5A					
6A					
6B					
6C					
Cancer					
1	+	(6.0 in a million cancers)	High	◆◆◆	Final traffic analyses and air quality modeling were not available at the time of completion of this HIA; modeling results are not always accurate.
5A	+	(5.6)			
6A	+	594			
6B	-	(6.8)			
6C	+	Not available			
Cardiovascular disease					
1	+	Magnitude not estimated	High	◆◆◆	Final traffic analyses and air quality modeling were not available at the time of completion of this HIA; modeling results are not always accurate.
5A					
6A					
6B					
6C					
Low birth weight and pre-term births					
1	+	Magnitude not estimated	Mod	◆◆	Final traffic analyses and air quality modeling were not available at the time of completion of this HIA; modeling results are not always accurate.
5A					
6A					
6B					
6C					
<p>Explanations:</p> <p>Impact refers to whether the alternative will improve (+), harm (-), or not impact health (~).</p> <p>Magnitude reflects a qualitative judgment of the size of the anticipated change in health effect (e.g., the increase in the number of cases of disease, injury, adverse events): Negligible, Minor, Moderate, Major.</p> <p>Severity reflects the nature of the effect on function and life-expectancy and its permanence: High = intense/severe; Mod = Moderate; Low = not intense or severe.</p> <p>Strength of Causal Evidence refers to the strength of the research/evidence showing causal relationship between air quality and the health outcome: ◆ = plausible but insufficient evidence; ◆◆ = likely but more evidence needed; ◆◆◆ = causal relationship certain. A causal effect means that the effect is likely to occur, irrespective of the magnitude and severity.</p>					

Recommendations

Although air quality is predicted to improve, because the issue is a primary concern of the community, there are steps that can be taken to further improve air quality and public health in the I-710 corridor. Many of the recommendations in this HIA can be implemented before the project is complete. A full set of recommendations is contained in the main HIA chapters below.

Research and Analysis

- Update all the findings in this HIA with the final data from traffic modeling in the I-710 Corridor Project EIR/EIS and the Health Risk Assessment (HRA), including completing the particulate matter analyses.
- Ensure air quality modeling takes into account the distribution of air pollution in the presence of sound walls and the impacts of low noise road surfaces, if there are any.
- Fund a study to understand the most effective way to accelerate the adoption of zero emissions technologies for trucks carrying freight under any alternative being considered for the I-710.
- Conduct an equity analysis to examine where transit will be most utilized and will have the greatest impact while serving those with the most need for transit options.

Goods Movement, Transportation, and Land Use Planning

- Consider fully funding transit service in the neighboring communities for future years before raising/spending funds on the I-710 Corridor Project.
- Invest resources for planning and implementation of bike and walking infrastructure to improve walking and biking conditions, increase walking and biking mode share, and reduce vehicle trips.
- Consider alternative transport of goods such as clean rail from the ports.
- Planning departments should ensure that all local land use planning improves the separation of residential and other sensitive uses from the goods movement infrastructure. All attempts should be made to move the goods movement infrastructure as close to the freeway as possible and to move sensitive uses away from the freeway and its associated traffic as well as away from the goods movement infrastructure. For example: develop truck parking facilities and truck stops with services near the freeway; pass city ordinances restricting potential land uses to reduce conflict between sensitive receptors and air pollution-producing facilities and requiring new residential construction or uses to evaluate air existing pollution levels and mitigate if necessary before issuing permits.
- Develop a complete inventory of goods movement facilities (e.g., warehouses, transloading facilities) in the corridor in order to be able to understand the impacts that air pollution related to these facilities have on nearby receptors.

Air Pollution Emissions Reductions and Exposure Mitigations

- Aggressively apply a variety of truck emissions reductions strategies: Consider following strategies outlined by the Federal Highway Administration (FHWA) to reduce truck emissions through

technology advancements and operations. Strategies include the implementation and use of filters and catalysts, the use of alternative “cleaner” fuel, increasing fuel efficiency, replacement of vehicle fleets, and reducing truck idling.

- Provide increased incentives for cleaner trucks, especially for local and small businesses that may not be able to afford truck upgrades/replacement.
- Increase vegetation known to reduce air pollutants (such as conifer trees) along the I-710.

Funding, Enforcing, and Strengthening Air Quality-Related Regulations

- Seek funding for mitigations (such as providing safer and more accessible access to walking, biking, and transit to reduce individual automobile driving by mode shift) to air quality impacts, or if Alternative 6C is adopted, use revenue from tolling for this purpose. Consider tolling or pollution tolling under all alternatives to provide revenue to fund mitigation strategies.
- If cleaner trucks or zero emissions trucks are adopted as a strategy, ensure that proper regulatory and enforcement actions maintain emissions reduction goals over time and that such efforts are fully funded.
- Enforce and, if needed, strengthen regulations regarding truck emissions and consider funding truck emissions reduction programs.
- For any alternative selected, fully fund and, if necessary, strengthen enforcement of truck route usage as well as idling regulations. For example, truck routes should not be located near sensitive receptors such as parks, schools, and senior citizen facilities.

Post Build Out Monitoring and Mitigation

- After the project is completed, regularly monitor air quality at sensitive receptors such as schools, community centers, libraries, and senior facilities and commit to retrofit these facilities (e.g., providing upgrades to building thermal performance and ventilation systems) to keep indoor air pollutant levels below that which is considered harmful to human health.
- After the project is completed, regularly monitor air pollution levels at parks and playgrounds and commit to providing communities with new parks away from freeways if I-710 traffic emissions increase to levels considered harmful by federal and state standards.

If any alternative that includes zero emissions trucks is adopted, policies and mechanisms must be put in place before construction begins to ensure that the freight corridor is used only by designated clean trucks. If such policies are not securely in place, there is the possibility that the freight corridor could be built and it is then found that implementing the zero emissions truck policy is impossible, which would be detrimental to air quality and health. The communities neighboring the I-710 must have concrete assurances that zero emissions truck policies for the freight corridor will be implemented and enforced.

1.4.3 Noise

Findings

Scientific evidence in the public health literature firmly establishes the relationship between traffic-related noise and health. The health effects of noise from the I-710, truck traffic on arterials and local roads, and goods movement facilities in the communities near the I-710 include the following:

- **Annoyance:** Annoyance is related to several health effects associated with noise, including elevated blood pressure, circulatory disease, ulcers, and colitis. An estimated 22,000 and 35,000 people would currently report being highly annoyed by exposure to noise in the southern portion of the I-710 corridor (south of I-105). Unmitigated, estimated 2035 noise levels under all alternatives being considered in the EIR/EIS are well above the 50–55 A-weighted decibels (dBA) noise levels at which a causal effect of noise on annoyance has been well established.
- **Sleep Disturbance:** Sleep disturbance has been shown to begin in the 55–60 dBA range. An estimated 5,000 and 7,000 people would currently be expected to report high degrees of sleep disturbance as a result of noise exposure in the southern portion of the I-710 corridor (south of I-105). Estimated 2035 noise levels under all alternatives at night are likely to be above the range at which sleep disturbance begins. Health consequences of lack of sleep include fatigue, impaired endocrine and immune systems, and psychological effects.
- **Cardiovascular disease:** Estimated 2035 noise levels under all alternatives are in the range of levels at which noise has been shown to cause hypertension ($L_{dn} = 70$ dBA) and myocardial infarction ($L_d = 60$ dBA).
- **Cognitive impairment and academic achievement in children:** Without mitigation, under all alternatives being considered, the number of schools with indoor noise levels well above the World Health Organization (WHO) recommended 35 dBA is highly likely to increase, and noise levels in schools with already high levels are also highly likely to increase. There is significant evidence that many school age children will be at increased risk of attention span, concentration and remembering, and reading ability deficits. These are likely to result in significant impacts on lifespan, earning potential and the associated impacts on health of income, and prevalence of chronic and contagious disease as well as mental health issues.
- **Hearing impairment:** There is strong evidence that none of the alternatives being considered is likely to result in noise levels that would lead to hearing impairment. However, people with existing hearing impairment, for example, seniors experiencing hearing loss, will be impacted. Those populations will have more difficulty communicating with others as a result of higher noise levels.

The health impacts of the proposed I-710 Corridor Project EIR/EIS alternatives mediated through noise are summarized in Table 1-4.

Table 1-4. Summary of Noise-Related Health Impacts

Health Impact/ Alternative	Impacts of Alternatives		Health Outcome		Uncertainties
	Impact	Magnitude	Severity	Strength of Causal Evidence	
Annoyance					
1	-	Estimates pending noise modeling data from Caltrans	Low	◆◆◆	Modeled changes in noise exposure were not available for this analysis; magnitude is not estimated.
5A					
6A					
6B					
6C					
Sleep Disturbance					
1	-	Estimates pending noise modeling data from Caltrans	Mod-High	◆◆◆	Modeled changes in noise exposure were not available for this analysis; magnitude is not estimated.
5A					
6A					
6B					
6C					
Cardiovascular Disease (including hypertension and myocardial infarction)					
1	-	Estimates pending noise modeling data from Caltrans	High	◆◆	Modeled changes in noise exposure were not available for this analysis; magnitude is not estimated.
5A					
6A					
6B					
6C					
Cognitive Impairment and Academic Achievement					
1	-	Estimates pending noise modeling data from Caltrans	Mod-High	◆◆◆	Modeled changes in noise exposure were not available for this analysis; magnitude is not estimated.
5A					
6A					
6B					
6C					
Hearing Impairment					
1	~	None	Mod	◆◆◆	
5A		None			
6A		None			
6B		None			
6C		None			
<p>Explanations:</p> <p>Impact refers to whether the alternative will improve (+), harm (-), or not impact health (~).</p> <p>Magnitude reflects a qualitative judgment of the size of the anticipated change in health effect (e.g., the increase in the number of cases of disease, injury, adverse events): Negligible, Minor, Moderate, Major.</p> <p>Severity reflects the nature of the effect on function and life-expectancy and its permanence: High = intense/severe; Mod = Moderate; Low = not intense or severe.</p> <p>Strength of Causal Evidence refers to the strength of the research/evidence showing causal relationship between noise and the health outcome: ◆ = plausible but insufficient evidence; ◆◆ = likely but more evidence needed; ◆◆◆ = causal relationship certain. A causal effect means that the effect is likely to occur, irrespective of the magnitude and severity.</p>					

Recommendations

Caltrans has proposed building 5.5 miles of soundwalls along the I-710 and keeping noise levels below 67 dBA for sensitive uses. This is a very important mitigation measure, but, as the Final I-710 Tier 2 Committee Report states, “Noise issues go beyond simply building more soundwalls.” In addition to building soundwalls the recommendations in the following areas would mitigate impacts of noise on health in the I-710 communities. A complete set of recommendations is contained in the main HIA chapters below.

Noise Analysis

- Complete the noise modeling for the I-710 Corridor Project EIR/EIS alternatives and use the results to quantitatively predict changes in annoyance and sleep disturbance under the proposed alternatives.

Goods Movement, Transportation, and Land Use Planning

- Fewer trucks on the freeways and arterials will result in decreased noise. All strategies to reduce the number of trucks should be implemented including other alternatives for moving freight such as increasing on- and near-dock rail using clean rail technologies.
- Develop truck parking facilities and truck stops with services (e.g., restaurants, repair shops) near the freeway so that drivers do not need to drive farther into the communities and near sensitive uses.
- Pass city ordinances restricting potential land uses to reduce conflict between sensitive receptors and noise-producing facilities.

Noise Mitigations through Design

- Construct sound walls in all locations in the corridor that are adjacent to a residential area, school, or park. For these soundwalls, use greening and aesthetic principles found in the project’s Urban Design and Aesthetics Toolbox Report.
- Use low-noise (e.g., rubberized) road surfaces, evaluating alternative materials with regards to their effects on air quality.

Funding, Enforcing, and Strengthening Noise-Related Regulations

- For any alternative selected, fully fund and if necessary strengthen enforcement of truck route and parking regulations as well as idling regulations. For example, parking rules could prohibit trucks from parking adjacent to parks and other recreational facilities. Local jurisdictions could implement enforcement of the California Air Resources Board’s (CARB’s) idling regulations.

Post Build-Out Monitoring and Mitigations

- After the project is completed, regularly monitor noise levels at schools, community centers, libraries, and senior facilities and commit to retrofit these facilities (e.g., providing upgrades to

windows and ventilation systems) to keep indoor noise below levels considered harmful by the WHO standards.

1.4.4 Traffic Safety

Findings

Scientific evidence in the public health literature firmly establishes the relationship between traffic volumes and speeds and the number and severity of collisions involving cars, trucks, and/or pedestrians and bicyclists. The literature can generally be summarized as follows:

- **Automobiles:** The number of collisions between cars and others increases with vehicle volume and speed. The severity of these collisions increases with speed.
- **Trucks:** The number and severity of collisions between trucks and others increase with vehicle volume and speed. These collisions tend to be disproportionately severe.
- **Pedestrians/bicyclists:** The number of collisions between a vehicle and a pedestrian or bicyclist increases with the volume of pedestrians/bikes. These collisions tend to be disproportionately severe.

Based on these findings and on predicted changes in traffic volumes and speeds under the alternatives being considered in the I-710 Corridor Project EIR/EIS, in the I-710 general purpose lanes:

- Higher rates of severe truck-related vehicle collisions under all the alternatives are expected. Rates are likely to be highest under Alternatives 5A and 1.
- Collisions involving cars will increase a small amount under Alternative 1; due to lower speeds, these are more likely to be non-severe injuries. Under Alternative 5A, a small increase in the number of collisions is expected and the number of severe collisions is expected to go up proportionately. A greater increase in both the number and severity of collisions is expected under Alternatives 6A/B/C due to both higher volumes and speeds.

On arterials near the I-710:

- Under Alternatives 5A and 6A/B/C, because of the increased volumes and increased intersection level of service and subsequently higher speeds, vehicle–vehicle collisions are likely to increase and the number of severe collisions will also increase. Because changes expected under Alternative 1 impact the number of collisions in opposing directions, changes in the frequency and severity of vehicle–vehicle collisions cannot be predicted without further modeling.
- Under all alternatives being considered, an increase in truck-related collisions is likely. These tend to be disproportionately severe.
- Future growth in population and traffic volume will result in an increased frequency of vehicle–pedestrian/bicycle collisions, which are disproportionately severe (especially when the vehicle involved is a truck), under all alternatives. Changes in pedestrian/bicycle volumes specific to each alternative may lead to differences in the number of such collisions.

In addition, the number of hazardous material incidents on the I-710 is expected to increase in proportion to truck volume. Infrequently, such incidents can be highly severe, but most often they are of low severity.

The health impacts of the proposed I-710 Corridor Project EIR/EIS alternatives mediated through traffic safety are summarized in Table 1-5.

Table 1-5. Summary of Traffic Safety–Related Health Impacts

Health Impact/ Alternative	Impacts of Alternatives		Health Outcome		Uncertainties
	Impact	Magnitude	Severity	Strength of Causal Evidence	
Non-truck Vehicle–Vehicle Fatalities and Injuries					
1	-	Minor	High	◆◆◆	Relative effects of improved freeway ramps on collision rates uncertain; changes in Alternative 1 arterial collisions uncertain.
5A		Minor-Mod			
6A		Minor-Mod			
6B		Minor-Mod			
6C		Minor-Mod			
Truck–Auto Fatalities and Injuries					
1	-	Moderate	High	◆◆◆	Relative effects of improved freeway ramps on collision rates uncertain.
5A		Moderate			
6A		Minor-Mod			
6B		Minor-Mod			
6C		Minor-Mod			
Vehicle–Pedestrian/Bicycle Fatalities and Injuries					
1	-	Minor-Mod	High	◆◆	Changes in pedestrian and bicycle activity uncertain.
5A		Minor			
6A		Minor			
6B		Minor			
6C		Minor			
Hazardous Materials Exposure from Releases					
1	~/-	Negligible	Typically low, but infrequently high	◆	High severity hazardous material spills are low probability events.
5A		Negligible			
6A		Negligible			
6B		Negligible			
6C		Negligible			
<p>Explanations:</p> <p><i>Impact</i> refers to whether the alternative will improve (+), harm (-), or not impact health (~).</p> <p><i>Magnitude</i> reflects a qualitative judgment of the size of the anticipated change in health effect (e.g., the increase in the number of cases of disease, injury, adverse events): Negligible, Minor, Moderate, Major.</p> <p><i>Severity</i> reflects the nature of the effect on function and life-expectancy and its permanence: High = intense/severe; Mod = Moderate; Low = not intense or severe.</p> <p><i>Strength of Causal Evidence</i> refers to the strength of the research/evidence showing causal relationship between traffic safety and the health outcome: ◆ = plausible but insufficient evidence; ◆◆ = likely but more evidence needed; ◆◆◆ = causal relationship certain. A causal effect means that the effect is likely to occur, irrespective of the magnitude and severity.</p>					

Recommendations

All of the build alternatives are focused on vehicle-throughput efficiency, and what is best for this aim is not necessarily beneficial for preventing collisions or increasing the safety of those walking or biking. However, the Final I-710 Tier 2 Committee Report recommended separating cars from trucks with separate truck lanes and that recommendation continues to be followed by the decision makers. This HIA's recommendations primarily revolve around taking additional steps to help mitigate these corresponding negative health impacts.

Traffic Safety Analysis

- Conduct further traffic modeling to determine vehicle speeds and trips taken on arterials to inform how the freeway expansion will affect traffic collisions in neighborhoods.

Vehicles

- Arterial speeds should be limited via traffic controls and traffic calming measures in order to reduce the number and severity of collisions and to encourage traffic to remain on the freeway.
- Strictly enforce truck routes to keep them out of residential neighborhoods in order to reduce truck–pedestrian/bicyclist collisions.

Walking and Bicycling Improvements

- Supplement the intersection improvements outlined in the draft I-710 Corridor Project EIR/EIS with pedestrian-level improvements that increase their visibility and safety. Such improvements include, for example, clearly marked and protected crosswalks (e.g., with laddered crosswalks and pedestrian countdown signals).
- Starting with existing residential streets that are walkable/bikeable, expand the network of walkable/bikeable streets throughout the I-710 corridor to provide safe and pleasant streets that can be used for active transportation. This could include implementing “bicycle boulevards” (i.e., limited-access, low speed streets that have traffic calming features such as mid-block diverters with bicycle cut-outs) in local streets.

1.4.5 Jobs and Economic Development

Findings

Income is one of the strongest and most consistent predictors of health and disease in the public health research literature, and health is inextricably linked to the availability and affordability of material resources. Because of this, the economic health of a region is an important indicator of the potential health of its residents.

Socioeconomic status (SES) has been extensively researched as a key factor that affects health. Scientific evidence in the public health literature firmly establishes the relationship between education, income, and occupational prestige or status, or “job control” and many health outcomes including lifespan,

overall health, and chronic disease. In addition, unemployment has been shown to be a serious risk factor for both chronic disease and mental health.

All the alternatives being considered in the I-710 Corridor Project EIR/EIS assume that the Ports of Los Angeles and Long Beach will expand their operations to process approximately 42 million twenty-foot-equivalent units (TEUs) annually in 2035 (compared to approximately 13 million TEUs in 2008). In making this assumption for ports container volumes, the EIR/EIS also therefore assumes that, under any alternative, the goods movement sector will grow the same (substantial) amount. The bulk of goods movement–related job growth is therefore assumed to be the same for all alternatives, and the differences between the alternatives in terms of job growth are limited to changes specific to each alternative. Because of this, the primary factors that inform this HIA’s impact analysis is the speed of moving freight, which may impact the cost of transported goods, and the location of future growth in the goods movement industry.

There are at least two competing hypotheses regarding impacts of the I-710 Corridor Project on the local economy in the study area and in the Gateway Cities:

- It is possible that Alternatives 5A and 6A/B/C will lead to economic growth along the corridor. As a result of decreased congestion and travel times, costs of business inputs may be lower, and the area may become more attractive to businesses and thus improve commercial land values. On the other hand, under Alternative 1 congestion may increase the costs of doing business (e.g., by requiring the hiring of more truck drivers to move the same amount of goods) and may thereby hurt the local economy. There is little evidence that supports this hypothesis, as congestion has not been found to have a major impact on the cost of doing business.
- It is also possible that, especially for Alternatives 6A/B/C, parts of the goods movement infrastructure (e.g., warehouses and transloading facilities) may relocate farther from the ports to locations with cheaper land and less congestion (e.g., the Inland Empire). This could lead to decreased use of the goods movement facilities in the Gateway Cities and negative impacts on the local economy. Using this logic, Alternative 1, on the other hand, could make it more difficult for goods movement–related business to move farther inland and thus keep businesses and jobs in the Gateway Cities.

Because these changes are difficult to predict and are not modeled elsewhere in the I-710 Corridor Project EIR/EIS analyses, there is not enough information to make justifiable predictions regarding the impact of the I-710 Corridor Project EIR/EIS alternatives on the future economy or employment in the study area or in the Gateway Cities.

Because it is not possible to assess the impacts of the I-710 Corridor Project EIR/EIS alternatives on the costs of goods and services or employment, the health impacts of the project that are mediated through changes in jobs and economic development cannot be predicted.

Alternative 6B may potentially create and foster a new sector of jobs in the research, development, and manufacturing of zero emissions technologies. The growth of this “green” industry may help to increase employment rates in the study area, assuming that the education and skills required for these jobs either match the education and skill base of the local population or that a significant investment in local

job-training is made. Increased employment would likely result in health benefits (e.g., increased lifespan, reduced chronic disease, and improved mental health) for corridor residents.

Recommendations

It is unclear how the I-710 Corridor Project will impact the residents and businesses in the I-710 corridor from the perspective of jobs and economic development. To protect and grow the prosperity of the I-710 corridor, the following is recommended.

Jobs and Economic Analysis

- Conduct economic research and modeling to determine how the proposed I-710 Corridor Project alternatives, through changes in traffic volumes and speeds, will impact local and regional costs of doing business and job growth.

Local Job Tracking, Creation, and Training

- Measure and track the proportion of local jobs in each industry that are filled by local residents. This data would allow policymakers to make informed decisions regarding strategies to enhance and stimulate local economies.
- Through incentives, encourage new and small businesses to locate in the I-710 corridor communities.
- Increase job-training opportunities for residents in the study area to better prepare the workforce for the employment opportunities in the region and reduce unemployment. Training should target jobs that pay a living wage and provide benefits such as health insurance.

Green Jobs Tracking and Stimulus

- The green and sustainable technology jobs created locally (e.g., through Alternative 6B or projects at the ports) could be a strong source of employment, training opportunities, and improved health outcomes for residents in the study area. Opportunities in this relatively new industry should be encouraged to move into the I-710 Corridor Project study area regardless of the build alternative chosen, and government agencies and employers should be encouraged to train local workers in skills that will allow them to succeed in this field.

1.4.6 Neighborhood Resources

Findings

Transportation planning research describes the trade-offs between a freeway's ability to increase mobility and move people and goods through an area and its negative impacts on "place-making." Access to a mix of public services and retail goods is important for health and quality of life, increasing walking and biking, possibilities for healthful and meaningful work, and interactions among neighbors while reducing daily vehicle trips and miles traveled as well as air and noise pollution. Scientific evidence in the public health literature establishes links between the following neighborhood resources and

health: childcare, schools, libraries, parks, community centers, community gardens, post offices, banks, pharmacies, public art, food retail, and health care facilities.

The I-710 corridor communities currently have adequately complete neighborhoods, with access to a reasonable variety of resources, though some areas have more access to this variety than other areas. The I-710 Corridor Project is likely to impact neighborhood resources through changes in access to these resources, through changes in investment in the I-710 Corridor communities, and potentially through changes in the usability of these resources, though these are difficult to predict. As described in Chapter 6, “Mobility,” none of the alternatives being considered is likely to increase walkability/bikeability and public transit use, and, therefore, access to goods and services by these modes is likely to, at best, stay the same. Access to resources by car is likely to improve under Alternatives 6A/B/C, stay the same under Alternative 5A, and degrade under Alternative 1.

Historically, freeway construction was associated with disinvestment in communities along the I-710 corridor evidenced by, for example, low residential property values. It is unclear whether the additional lanes of freeway being proposed in Alternatives 5A and 6A/B/C will lead to continued disinvestment in the Gateway Cities. It is difficult to hypothesize mechanisms by which these alternatives would increase investment that would benefit local residents.

Based on the conclusion that access to neighborhood resources will not improve and could degrade, it is likely that physical activity, social cohesion, and neighborhood wealth as mediated through neighborhood resources are unlikely to improve. As a result, health outcomes associated with these factors would not be expected to improve and may get worse. These health outcomes include:

- Chronic disease levels associated with a lack of physical activity (e.g., not walking to goods and services because they are not available, because walking is not safe, or because residents continue driving), poor diet, lack of access to needed services, and poor social cohesion;
- Mental health issues associated with increases in stress as a result of poor social cohesion and lack of physical activity;
- Decreased lifespan associated with a lack of physical activity and poor social cohesion; and
- Injuries and fatalities associated with higher crime levels that could result from a lack of social cohesion and negative perceptions of the corridor communities.

The health impacts of the proposed I-710 Corridor Project EIR/EIS alternatives mediated through access to neighborhood resources are summarized in Table 1-6.

Table 1-6. Summary of Health Impacts Related to Access to Neighborhood Resources

Health Impact/ Alternative	Impacts of Alternatives		Health Outcome		Uncertainties
	Impact	Magnitude	Severity	Strength of Causal Evidence	
Chronic Disease (e.g., cardiovascular disease, diabetes; from changes in physical activity, social cohesion, and stress)					
1	~/-	Potentially significant, non-quantifiable	Mod–High	◆◆	Changes in investment in communities difficult to predict.
5A					
6A					
6B					
6C					
Mental Illness (e.g., depression; from changes in physical activity, social cohesion, & stress)					
1	~/-	Potentially significant, non-quantifiable	Mod–High	◆	Changes in investment in communities difficult to predict.
5A					
6A					
6B					
6C					
Decreased Lifespan (e.g., from changes in physical activity, social cohesion & stress)					
1	~/-	Potentially significant, non-quantifiable	High	◆◆	Changes in investment in communities difficult to predict.
5A					
6A					
6B					
6C					
Injury and fatality (e.g., from crime)					
1	~/-	Potentially significant, non-quantifiable	Mod–High	◆	Changes in investment in communities difficult to predict.
5A					
6A					
6B					
6C					
<p>Explanations:</p> <p><i>Impact</i> refers to whether the alternative will improve (+), harm (-), or not impact health (~).</p> <p><i>Magnitude</i> reflects a qualitative judgment of the size of the anticipated change in health effect (e.g., the increase in the number of cases of disease, injury, adverse events): Negligible, Minor, Moderate, Major.</p> <p><i>Severity</i> reflects the nature of the effect on function and life-expectancy and its permanence: High = intense/severe; Mod = Moderate; Low = not intense or severe.</p> <p><i>Strength of Causal Evidence</i> refers to the strength of the research/evidence showing causal relationship between access to neighborhood resources and the health outcome: ◆ = plausible but insufficient evidence; ◆◆ = likely but more evidence needed; ◆◆◆ = causal relationship certain. A causal effect means that the effect is likely to occur, irrespective of the magnitude and severity.</p>					

Recommendations

The following recommendations would increase the likelihood that the I-710 Corridor Project results in positive health impacts mediated through changes in access to neighborhood resources.

Access to Neighborhood Resources

- Recommendations contained in Chapter 6, “Mobility,” would help ensure that access to goods and services in the I-710 corridor is maximized; specifically those that describe improvements to public transit infrastructure and accessibility as well as walking and biking infrastructure.
- In order to at least partially offset any negative impacts on access to neighborhood resources, the I-710 Corridor Project could include additional improvements to neighborhood resources that are currently available:
 - ◆ Local jurisdictions could each be given funding as part of the project to invest in the neighborhood resources (e.g., libraries, schools, parks, community centers) that are likely to be impacted by the project or by future changes in the community that may result from the project.
 - ◆ After further studying the unmet needs for services and retail outlets in neighborhoods close to the freeway, the project could provide funding that would address some of these needs.

Environmental Quality

- Recommendations contained in Chapter 7, “Air Quality,” Chapter 8, “Noise,” and Chapter 9, “Traffic Safety,” including those related to future land use, would help ensure improvements to environmental quality. Improved perceptions of environmental quality are likely to follow actual improvements and lead to more investment in the corridor communities, improve social cohesion, increase physical activity, and lead to other neighborhood improvements.

Public Investment

- Increase direct government investment in community infrastructure and services to ensure that people have access to the goods and services they need to live healthy lives and to improve social cohesion in local communities. Such investment could help attract private investment and, together, could prevent or break the cycle of poverty and disinvestment that I-710 communities have historically experienced, which could continue without proper mitigations.

DRAFT