Health Impact Assessment

November 2015

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Executive Summary

Building the CV Link—a 50-mile multiuse path for pedestrians, bicyclists, and low-speed electric vehicles—will benefit the health and wellbeing of many people in the Coachella Valley by connecting communities, increasing opportunities for exercise and recreation, enabling active transportation, stimulating the economy and improving air quality. Because the population of the Coachella Valley is diverse, with significant health and income disparities, the project’s benefits to those currently facing poor health outcomes could be improved through implementation of additional initiatives.

This Health Impact Assessment\(^a\) finds that about 175,000 people in eight cities\(^b\) live within 1.5 miles of the path’s proposed initial route, and that this is the population that can be expected to make greatest use of CV Link. Construction of the core CV Link project is estimated to cost approximately $100 million from regional, state and federal funds. The core project, scheduled to begin construction in 2017, runs along the Whitewater River wash from Palm Springs in the west to Coachella in the east. Later phases would extend CV Link north to Desert Hot Springs and southeast to the Salton Sea. Additional connector routes are planned to connect communities throughout the Coachella Valley to the core alignment.

This Health Impact Assessment is based on a synthesis of an extensive set of health, income, employment and other demographic data; case studies of similar projects in other locations; plus community surveys, workshops, focus groups and stakeholder interviews. In the process, some Coachella Valley community members raised concerns about whether CV Link provides disadvantaged communities with a resource that will be of greatest use to them. These concerns, including access to the path, should be addressed.

Health benefits of CV Link include:

- **Increased physical activity.** CV Link will be a new venue for physical activity, whether for fitness, recreation or active transportation. Studies show that people who live near trails or multiuse paths get more exercise, and are more likely to meet the U.S. Centers for Disease Control and Prevention’s goals for physical activity. Physical activity is associated with many health benefits, such as weight control, prevention of many chronic diseases and improved mental health. In addition, disabled and elderly individuals may achieve more physical activity by having a safer alternative to walking and bicycling on busy roadways.

- **Better access to recreation, jobs, schools, and transit.** CV Link will be both a recreation and transportation resource in its own right and will also provide access to many additional resources. The route will pass within one mile of more than 52,000 jobs, more than 350 transit stops, 35 public schools and more than 850 acres of park land.

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\(^a\) The draft of the Health Impact Assessment was conducted by Human Impact Partners of Oakland, Calif., a non-profit research organization that studies the health and equity impacts of public policy. Riverside University Health System–Public Health and Coachella Valley Association of Governments edited and finalized the report.

\(^b\) Indio, Cathedral City, Palm Desert, Palm Springs, Coachella, La Quinta, Rancho Mirage, and Indian Wells, as well as the Agua Caliente Band of Cahuilla Indians, the Cabazon Band of Mission Indians, and the Twenty-Nine Palms Band of Mission Indians reservation lands.
• *Improvements in air quality.* CV Link can reduce air pollution slightly in two ways. It will decrease vehicle miles traveled and thus vehicle emissions in the Coachella Valley, as some people will replace car trips with use of the pathway. Paving parts of the Whitewater River wash also will reduce airborne dust and particulate matter. By 2021, CV Link could reduce air pollution in the Coachella Valley by an estimated 4 million pounds a year – and by 2035, reduce an estimated 7.5 million pounds a year. These are beneficial but small reductions relative to the total amount of air pollution in the valley, which contributes to heart attacks, asthma, bronchitis, hospital admissions, and lost workdays, and climate change. In many areas, CV Link will provide users with an active transportation resource removed from traffic pollution. Due to poor air quality in the Coachella Valley overall, there will be some days when users should modify or restrict their outdoor physical activity to protect their health.

• *Reduced pedestrian and bicyclist injuries and fatalities.* Motor vehicle collisions are the leading cause of unintentional fatal injuries among Riverside County residents ages 1 to 24. Almost every week, a pedestrian or a bicyclist is injured or killed by a motorist. By providing a protected alternative artery to youth and others who walk, run or bike on streets, CV Link can increase safety both for those people and for motorists. In many places, the arteries used to reach CV Link could be made safer by adding sidewalks, bike facilities, traffic calming devices and crosswalks.

• *Economic development.* CV Link may lead to economic benefits for people and local governments in the Coachella Valley through health care cost savings, prevention of traffic accidents, more jobs and increased property values.

**Recommendations**

The HIA’s recommendations are meant to maximize the benefits of building CV Link and to address some of the access and equity questions raised by community members. The recommendations include:

• *Prioritize CV Link Development in Communities with the Poorest Health Conditions.* In order to prioritize serving disadvantaged communities with the poorest health conditions, begin construction in disadvantaged areas of Coachella and Indio and continue pursuing grant funding for the development of the Desert Hot Springs extension and the East Valley Direct Route in Phase 2 development. However, pockets of disadvantaged communities with poor health conditions are found throughout the Coachella Valley and adjacent to the CV Link alignment, such as in Cathedral City and north Palm Springs.

\[^{C}\text{Carbon dioxide, carbon monoxide, nitrous oxides, coarse and fine particulate matter, and hydrocarbons.}\]
• **Continue Outreach and Education Targeting a Diverse Audience.** Develop more outreach materials and continue to utilize methods to educate a wide and diverse range of community members about the availability and benefits of CV Link.

• **Crime and Collision Prevention.** Through measures outlined in the CV Link Master Plan and the full HIA report, ensure that users of CV Link are as safe as possible from vehicle collisions and potential crime along the route. For example, educate Low Speed Electric Vehicle users about safety measures, ensure that jurisdictional pedestrian and bicycle plans are adequately designed to ensure safety of pedestrians and cyclists, and incorporate Crime Prevention through Environmental Design measures (CPTED).

• **Target CV Link Related Jobs to Locals.** In order to keep economic benefits within the Coachella Valley and to provide jobs to those who need them most, community leaders should encourage employment policies that target construction and maintenance jobs to residents and businesses in communities along the route and the Coachella Valley as a whole, and to economically disadvantaged groups specifically, and ensure that all jobs created by the project pay a fair wages.
Section 1. Introduction

CV Link will be a 50-mile\(^d\) multi-modal transportation path connecting eight\(^e\) cities and three Native American tribes in the Coachella Valley. The route will extend from Palm Springs on the west to Coachella on the east, with future extensions to Desert Hot Springs and the Salton Sea. Located in Riverside County, California, the path will be open to pedestrians, bicycles, other human-powered devices (e.g., skateboards and scooters), and low-speed electric vehicles (LSEVs) including golf carts and neighborhood electric vehicles (NEVs). This health impact assessment (HIA) analyzes the potential health and equity impacts and benefits of CV Link for Coachella Valley residents.

A health impact assessment is a combination of procedures, methods, and tools that systematically judges the potential, and sometimes unintended, effects of a policy, plan, or project on the health of a population and the distribution of those effects within the population. HIA identifies appropriate actions to manage those effects.\(^f\) The fundamental purpose of HIA is to inform decision-makers before they decide on a proposal. The six steps of HIA are described in the box to the right.

Extensive research recognizes that health is a product of social, environmental and economic conditions that create opportunities for individuals, families and communities to lead healthy lives. Authors and partners involved in this HIA defined health in this context, and based on evidence of impacts and community priorities, the HIA selected the following issues as priority determinants of health that may be impacted by CV Link: physical activity, access to resources, air quality, safety, and economic development.

CV Link Planning Context

The Coachella Valley Association of Governments (CVAG) is the lead agency for CV Link, and is coordinating all activities related to concept development, the planning process, construction and future maintenance. A Draft Master Plan detailing preliminary plans for CV Link was made available in August 2014 and a draft Final Master Plan

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\(^d\) Five “connectors” scheduled for Phase 2 of CV Link development, including the extension of CV Link to Desert Hot Springs, are not included in this 50 miles.

\(^e\) The addition of Desert Hot Springs, which is scheduled for Phase 2 of CV Link development, would result in a ninth city being included.

\(^f\) Adapted by the International Association of Impact Assessment from World Health Organization, 1999.
guiding the design, construction, and management of CV Link Project was released in March 2015. Construction for CV Link is projected to begin in 2017.

CV Link Master Plan describes the three-tier phasing plan for constructing the path:
- Phase 1 is anticipated to begin construction in 2017 and includes the “core alignment” between Palm Springs and Coachella.
- Phase 2 will be completed in the medium term and involves enhancement of the core route with additional paths and grade separations. Phase 2 includes additional connectors including an extension to Desert Hot Springs, an on-street segment to directly connect Coachella to the central Coachella Valley through south Indio, and a segment to connect central Thermal to the southern terminus of CV Link. CVAG has submitted a grant application under Cycle II of the Active Transportation Program to fund the aforementioned connectors.
- Phase 3 is a proposed future extension to be completed in the longer term, and includes extension to Mecca, North Shore, and Salton Sea, as well as construction of additional bridges. Funding has not yet been secured for future phases.

**Figure 1: Map of Proposed CV Link**

![Map of Proposed CV Link](image-url)

**HIA Overview**
The HIA findings and recommendations intend to inform CVAG and the general public of potential health impacts of CV Link and to recommend measures to address any adverse impacts predicted. The purpose of the HIA is to inform future decisions about CV Link. The analysis was conducted primarily on CV Link’s Core Alignment (Phase 1)
and not on Phase 2 connectors or Phase 3 extensions, except where indicated. Note that the City of Desert Hot Springs is included in Phase 2 of CV Link and the route accessing this city was not defined at the time of the HIA assessment stage. While health impact predictions for Desert Hot Springs were not possible without a defined route, several city residents participated in HIA workshops and the existing conditions information and recommendations about Desert Hot Springs are included in the HIA.

CVAG, Southern California Association of Governments (SCAG) and the Riverside County Department of Public Health (RCDOPH) commissioned the HIA. Human Impact Partners (HIP) was hired to conduct the HIA with support from Raimi + Associates. A “Project Management” team composed of representatives of the above organizations plus the California Department of Transportation (Caltrans) provided input throughout the entire HIA process. The HIA process spanned more than one year, from July 2014 until September 2015.

The findings described in this report derive from a range of methods. The consultant team reviewed literature about impacts of each of the five issues on health; conducted secondary data analysis; reviewed case studies of paths in other regions; surveyed 111 Coachella Valley residents; conducted two focus groups; held five community HIA workshops, and interviewed local stakeholders (see Appendix A for more information on focus group methods, survey methods, and Appendix B for community workshop summaries). Because HIA is a mixed methods tool, impact predictions are both quantitative and qualitative.

This HIA includes a focus on equity issues related to CV Link. Equity refers to “fair opportunity for everyone to attain their full health potential regardless of demographic, social, economic or geographic strata,” and is a core value of HIA. The inclusion of equity in HIA means having a particular focus on people who face social disadvantages. Community residents expressed concerns about equity in each of the five community workshops conducted during this HIA process, and this HIA strives to address those equity concerns and to focus on Coachella Valley populations with social disadvantages.

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\(^{g}\) As expressed at HIA workshops.

\(^{h}\) At one of the HIA workshops, youth from Land Use Planning Awareness (LUPA) presented a photovoice video including opinions about CV Link that are considered part of overall workshop feedback. The video is available here: https://www.youtube.com/watch?v=an1P2uRETI4
Section 2. Existing Demographics, Health and Equity Characteristics

The Coachella Valley Today

Summary demographics of the Coachella Valley today are described below.\(^1\) Tables C-1 through C-3 in Appendix C include more detailed demographic information.

Race and Ethnicity

Figure 2 below depicts the distribution of racial and ethnic groups in the Coachella Valley. Latinos make up over half (51.6%) of the Coachella Valley’s population, followed by whites (41.9%).

Figure 2: Coachella Valley Resident Race and Ethnicity, 2010

Source: U.S. Census, 2010

Approximately 18% of Coachella Valley residents have limited English proficiency, which is defined as both speaking a language other than English at home and speaking English less than “very well.”\(^6\) This proportion is higher than the proportion in Riverside County having limited English proficiency (16.8%) but lower than the proportion in California overall (19.9%). Latinos, Asians, and people of “some other race” are most likely to have limited English proficiency.\(^1\)

\(^1\) Unless otherwise noted, data was compiled from the American Community Survey using zip codes provided by the Riverside County Department of Public Health.

\(^6\) Census data does not recognize Hispanic/Latino as a race, so individuals may have identified...
Age
The age distribution in the Coachella Valley is illustrated below. The majority of residents (56%) are between the ages of 18 and 64. According to a Community Health Needs Assessment (CHNA) by Kaiser Permanente, the Coachella Valley has almost twice the percentage of 65 and older residents compared to Riverside County. The valley is a well-known retirement destination.

Figure 3: Coachella Valley Resident Age, 2010

Source: U.S. Census, 2010

Income
The income distribution in the Coachella Valley is shown in Figure 4 below. There are great income disparities in the Coachella Valley, with 21% of residents earning high incomes (over $100,000) and 19% of residents earning very low incomes below $20,000. Forty-three percent of residents earn incomes below $40,000. Percentages of Coachella Valley residents at the highest and lowest incomes are depicted along with data for the state in Table 1 below. Income disparities exist in both the Coachella Valley and the state.

Hispanic/Latino as their ethnicity, and white and/or “Some Other Race” as their race.
Figure 4: Coachella Valley Median Household Incomes

Table 1: Income Disparities in the Coachella Valley and California, 2009-2013

<table>
<thead>
<tr>
<th>Annual Household Income</th>
<th>Coachella Valley percent</th>
<th>California percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over $200,000</td>
<td>5%</td>
<td>7%</td>
</tr>
<tr>
<td>$100,000 - $200,000</td>
<td>21%</td>
<td>22%</td>
</tr>
<tr>
<td>$20,000 - $40,000</td>
<td>24%</td>
<td>18%</td>
</tr>
<tr>
<td>Below $20,000</td>
<td>19%</td>
<td>16%</td>
</tr>
</tbody>
</table>

Source: 2009-2013 American Community Survey

The poverty rate\(^k\) in Coachella Valley (20.77\%)\(^6\) exceeds that of Riverside County (13.41\%) and the state (13.71\%).\(^5\) In the Coachella Valley, over 26% of children live in poverty.\(^5\) Rates for “Some other race,” Hispanic/Latino, Native American/Alaska Native, and Black populations are above 20%.

Existing Health Conditions

According to various sources,\(^5,7,8\) priority health issues in the Coachella Valley include:

- Chronic illnesses associated with poor nutrition and lack of physical activity such as diabetes, obesity and overweight;
- The impact of economic instability and a lack of service infrastructure on health;

\(^k\) Defined as population below 100% of Federal Poverty Level.
• Mental/behavioral health, including substance abuse.

Each of these priority health issues is discussed below.

**Chronic Diseases**
Over 16% of adults in the Coachella Valley rate their health as fair or poor, and the most common reason cited is chronic illness. The most common chronic diseases impacting Coachella Valley residents are high blood pressure/hypertension (37.8%), high cholesterol (30.8%) and arthritis (27.9%). Other common chronic illnesses are cancer (13.8%), diabetes (10.3%), and asthma (10.1%). A list of the top 13 chronic illnesses in the Coachella Valley is included in Table C-4 in Appendix C.

**Obesity and Overweight:** The rate of adult obesity in the Coachella Valley (27.49%) is above the state average (23.25%). Youth obesity is particularly high in the Coachella Valley (34.90%) compared to Riverside County (28.85%) and California (29.82%), and is especially high for African American and Hispanic/Latino youth in the Valley. Obesity and overweight were found by the Kaiser CHNA to be associated with measures of economic instability, poor nutrition, physical inactivity, and health care access.

**Diabetes:** The prevalence of adult diabetes in the Coachella Valley is 8.77%, which is lower than the prevalence in Riverside County (8.86%) but higher than that of the state (7.57%). However, the proportion of Coachella Valley residents who have been hospitalized for diabetes-related complications (8.77%) is lower than the state proportion (10.4%), perhaps reflecting a lack of healthcare access in this area. Diabetes hospitalization rates among youth are particularly high in Cathedral City and Palm Desert. Some of the factors impacting diabetes include nutrition, physical activity, and economic instability.

**Economic Instability**
As described above, the poverty rate in the Coachella Valley is high compared to county and state rates. Rates of unemployment, Supplemental Nutrition Assistance Program (SNAP) benefit recipients, Free and Reduced Price School Lunch eligibility (73.27% in the Coachella Valley), and Medi-Cal recipients also exceed county and state rates. Economic instability creates barriers to good health, such as not being able to afford health care, healthy food, and other resources.

In 2012 about one-third of Coachella Valley adults between ages 18 and 64 did not have health insurance, and thus were required to pay out-of-pocket for medical services. Latino adults are significantly less likely than white adults to have health insurance (48.8% uninsured compared to 22.1% uninsured) and low-income households are significantly less likely than higher-income households to be insured. American citizens age 65 and over are eligible for Medicare. Coachella Valley residents 65 and over who are not legal citizens do not receive this benefit. With the implementation of the Affordable Care Act (ACA) and Medi-Cal expansion in 2012, 77% of county residents are now insured.

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1 Population percentages are extrapolated from survey results. HARC conducted a survey, and estimated Coachella Valley population percentages by applying survey proportions to the total Coachella Valley population.

m Values reported in the Health Assessment Resource Center (HARC) Coachella Valley Community Health Monitor 2013 Executive Report are slightly different.
Lack of Service Infrastructure
Compared to surrounding counties, Riverside County is lacking in nonprofit services providing public health resources, such as nutrition, healthcare, and housing services. Thus, residents of Riverside County have access disparities, especially when taking into account transportation barriers in many areas of the county. Comparison data was not available for the Coachella Valley region specifically.

Mental Health
Mental health is another priority health issue identified in the CHNA (see criteria above in section describing oral health). Poor mental health may include anxiety, mood disorders, and substance abuse. The suicide rate in the Coachella Valley (15.1 per 100,000) is higher than that in Riverside County (9.79 per 100,000) and California (9.79 per 100,000), and is highest among white residents. The percent of adults who self-report poor mental health in the Coachella Valley (11.74%) is similar to Riverside County (11.23%) and both are lower than the state rate (14.21%). Coachella Valley adults reported lower percentages of heavy alcohol consumption (16.51%) compared to the state (16.62%).

Disparities
As described above, many of these health priorities and the prevalence of chronic diseases vary by race and ethnicity. Overall in the Coachella Valley, Latino adults are more likely to have fair/poor health than white adults. Approximately 13% of white adults report having fair or poor health, while 24% of Latino adults report having fair or poor health.

Existing Equity Conditions
In general, the findings of this study are consistent with the equity analysis and discussion provided in CV Link’s Master Plan Section 1.3. This study, however delves deeper into addressing the most vulnerable communities in the Coachella Valley, particularly in the eastern part of the valley. This section presents a portrait of disadvantage communities that may benefit from this project.

The Coachella Valley includes vast golf courses and exclusive resorts as well as trailer park communities that lack infrastructure like paved streets and sidewalks, public transportation, parks, and even running water. Environmental hazards are caused by illegal dumping activities, the presence of toxic waste dumps, contaminated well water, and exposures to hazardous dust caused by the shrinking Salton Sea. The eastern Coachella Valley (East Valley) is one of the poorest areas of the United States, and at certain times of the year, one of the densest as well. Sometimes, as many as 20,000 migrant workers live in the East Valley on a temporary basis. The western Coachella Valley (West Valley) also includes poverty-stricken neighborhoods in Desert Hot Springs, Cathedral City and northern Palm Springs. Other disadvantaged areas are sprinkled throughout the Valley. In most cases, local jurisdictions are responsible for addressing regional disparities in infrastructure.

Eastern Coachella Valley
The East Valley includes the cities of Indio and Coachella as well as the communities of Thermal, Oasis, Mecca and North Shore -- with a total population of approximately
88,000 residents. The Cumulative Environmental Vulnerability Assessment tool\(^n\) developed by the UC Davis Center for Regional Change shows that as a whole, the East Valley has issues of environmental hazards and social vulnerability that far exceed those in the West Valley. These include agricultural pesticide exposure, drinking water quality, and housing quality. There are also many areas that lack infrastructure such as paved streets and sidewalks.\(^10\) East Valley residents face many health issues as well, as 36% of East Valley adults are uninsured compared to 22% of adults in the state. Additionally, 35% of East Valley adults are obese compared to 27% in the Coachella Valley, 21% in Riverside County and the state.\(^12\)

An overarching equity question from the standpoint of some East Valley residents is whether CV Link takes funding and attention away from investments in neighborhood-level resources such as pedestrian and bicycle facilities. Some unincorporated communities in the East Valley lack these resources and feel that past regional planning efforts have ignored their needs.

In addition, in HIA workshops and other forums,\(^17\) some East Valley residents have been critical of CV Link because the core project does not reach the populated, residential areas of their communities. For example, since the path stays along the Whitewater River Wash, it does not serve the central portions of Coachella and Indio. An access analysis is presented later in this HIA report.

Another equity question some East Valley residents raised in workshops and other forums is that they were not engaged enough by CVAG in planning of CV Link. However, CV Link public workshops were held in Indio and Coachella, and over 100 people attended each workshop. Feedback received at these public workshops led to the planning and design of at least two connectors in the eastern Coachella Valley: the East Valley Direct Route and the Thermal Spur.

**Funding of CV Link**
CVAG has secured more than $76 million for CV Link, which is expected to cost $100 million to build. The money comes from a variety of sources, including the Strategic Growth Council, Riverside County Regional Park and Open Space District, California Environmental Justice Grant, the federal Congestion Mitigation Air Quality (CMAQ) Program, the state’s Active Transportation Program, and the Desert Healthcare District. Although funding streams for CV Link were raised as an equity issue during the HIA workshops, addressing these concerns is beyond the scope of the HIA.

**The Disabled Community**
A disability is a condition that damages or limits a person’s physical or mental abilities.\(^18\) There are many types of disabilities, such as those affecting vision, movement, thinking, remembering, learning, communicating, hearing, mental health, and social relationships.\(^19\) According to the US Census, nearly 13% (54,727) of Coachella Valley residents are disabled in some way, and 7.5% (29,755) of valley residents have an ambulatory disability. CV Link has worked with the community of people with ambulatory disabilities, including a collaboration with the non-profit organization Incight, which provides active mobility recumbent bicycles. CV Link will provide this community with a safe place to exercise and engage in active transportation.

\(^n\) See Cumulative Environmental Vulnerability Assessment map in Appendix D. Methods are presented at http://explore.regionallchange.ucdavis.edu/ourwork/projects/ceva-coachella-valley
Section 3. Health Impacts of CV Link

Physical Activity

The Picture Today
The U.S. Department of Health and Human Services and the Centers for Disease Control recommend that children and adolescents get at least 60 minutes of moderate or vigorous exercise every day, and that adults get at least 30 minutes of moderate exercise five days a week. These same recommendations apply to older adults, as long as they do not have limiting health conditions. Brisk walking and riding a bicycle on level ground or gentle hills, activities likely to occur on CV Link, both qualify as moderate exercise.

Data from the 2009 California Health Interview Survey (CHIS) show that people in Riverside County are less likely to get the recommended amount of exercise, compared to California overall. Those who achieve recommended physical activity levels include:

- 24% of adults in Riverside County, compared to 27% of adults in California;
- 18% of older adults (age 65 and over) in Riverside County, compared to 22% in California; and
- 28% of Latino adults in Riverside County compared with 22% of white adults.

More recent CHIS data shows that in 2012-2013, 30% of adults engaged in at least 150 minutes of walking in the past week, which is not statistically different than in the state, showing that walking is a relatively popular form of physical activity.

For young people, the 2011-2012 CHIS shows that

- 14% of children and youth (age 5-17) in Riverside County achieved recommended physical activity levels, compared to 20% in California

As shown in Figure 5 below, there is not a linear relationship between poverty level and physical activity. Some lower-income populations in Riverside County exercise more than higher-income populations.

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*The California Health Interview Survey is a large, random telephone survey of California residents. It was conducted biennially until 2012, and is now conducted continuously with data released for two-year cycles. The information reported here reflects the latest data for the given questions.*
Figure 5: Percentage of Riverside County Residents getting recommended physical activity by poverty level in 2009

Compared to CHIS data reported above, data collected by HARC in 2013 for Coachella Valley residents shows a notably higher percentage of residents getting aerobic activity at least five days per week – 48% of all adults and 46% of seniors over age 55. HARC information also reports a higher percentage of young people exercising at least 60 minutes per day – 35% of children age 6-17.

The differences in CHIS and HARC figures could be due to differences in the way that survey questions are asked or the geographic scope of the respondents. The higher rates of physical activity among adults might also reflect the “snowbird” population in the Coachella Valley (as compared to CHIS data for Riverside County as a whole), many of whom live there specifically to engage to outdoor activities such as golf or hiking.

Active transportation, including getting around by walking, bicycling, or skating, is one key way for people to exercise. People who use public transit are also more likely to be physically active than people who drive, as they often walk to and from transit stops. While active transportation can be used for all types of trips, the best available data is for commuting to work and school, from the US Census. The percentage of people commuting using active transportation or public transit to get to work is very low across California, and even lower in the Coachella Valley. From 2009-2013:

- 1.6% of Coachella Valley workers walk to work and 0.4% bicycle, while 3.7% of workers in California walk, and 1% ride bikes.
- 1.6% of Coachella Valley residents take public transportation to work, compared to 5% of Californians.
- Rates of walking to work are very similar among white and Latino Coachella Valley residents, although Latinos are more likely than whites to take transit, at 2.3% compared to 0.7%.

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*p This is according to discussions with HARC staff. Staff noted upcoming plans to change survey questions for better comparisons with statewide data.

⁴ Data for the Coachella Valley was compiled from the American Community Survey using zip codes provided by the Riverside County Department of Public Health.

⁵ Census data is not available for differences in bicycling to work between white and Latino Coachella Valley residents.
Health survey data also shows that students in Riverside County were less likely than students in California overall to use active transportation to get to school. In 2009, 35% of students in Riverside County reported that they walked, biked, or skated to school in the past week, compared to 43% in California.\textsuperscript{22}

**Why it Matters**
Physical activity is one of the most important health behaviors, and getting recommended amounts of exercise has numerous positive impacts on health. Getting any amount of exercise is better than none, and health benefits generally increase with the amount and intensity of exercise.\textsuperscript{20} These benefits include reduced risk of cardiovascular disease and type 2 diabetes, weight control, improved mental health and mood, reduced risk of some cancers, and strengthened bones and muscles.\textsuperscript{25}

**The Role of CV Link**
As a shared use pathway, CV Link will provide a new venue for physical activity, whether as recreational exercise or active transportation. Overall, research finds that creation and promotion of new physical activity resources — including multiuse pathways — is beneficial for physical activity and health.\textsuperscript{26} In particular, the CDC recommends that new facilities for physical activity be accompanied by outreach, both informational and organized activities providing social support for exercising.\textsuperscript{27}

Studies of multiuse paths as well as walking trails consistently show that people are more likely to use facilities if they live close by.\textsuperscript{10,29,30,31,32,33} While there is no definitive “cut-off” distance, proximity to users’ homes has been found to be one of the most important predictors for trail use in diverse locations, including in Massachusetts, Michigan, Raleigh, Chicago, Dallas and Los Angeles.\textsuperscript{34,29,35,31} Proximity and convenience may be especially important for new exercisers.\textsuperscript{36} However, even for nearby trails, busy streets between peoples’ homes and trail facilities can be a barrier to use.\textsuperscript{31} While pathway proximity is important for users on foot and bicycle, research in Portland has also shown that cyclists are willing to add distance to their trips to use safe and attractive facilities.\textsuperscript{37} Studies of how far cyclists will generally travel to use off-road trails have found varying results, ranging from adding 10% of the trip’s distance, to between .5 and 1.5 miles.\textsuperscript{38}

Along with proximity, trail maintenance — especially of the trail surface — and perceived safety are also frequently associated with trail use and ranked as very important for trail users, especially new users.\textsuperscript{39,36,30,32} Higher usage levels have also been associated with adjacent population density, commercial uses, and natural views.\textsuperscript{28,29,33,40}

Multiple studies have shown that people living near trails or multiuse pathways get more exercise than people who do not,\textsuperscript{33,32,41,42} and nationally people who use pedestrian or multiuse trails are more likely to meet physical activity requirements.\textsuperscript{42} While most research has been done with adult populations, at least one study of multiple neighborhoods across Michigan found that availability of non-motorized trails was associated with greater likelihood of physical activity and lower obesity rates among some adolescent age groups.\textsuperscript{43} New facilities have been shown to increase pedestrian and cyclist activity in the areas they are constructed, with increases in use each year for the first several years after they are conducted.\textsuperscript{44,45,46} There have been mixed results as to whether they increase overall levels of walking and biking, or whether users shift their activity to new facilities.\textsuperscript{45,46} With regards to bicycle facilities specifically, research on
people using new cycle tracks, which are separated from vehicle traffic with a row of parked cars, posts, or a curb, indicates that about 10% of users would have used a different (unspecified) mode if the cycle track was not available.47

Where routes exist along roadways, high traffic speeds and traffic volumes are associated with decreased levels of walking and cycling, related to both real and perceived danger of injury.48 In the Coachella Valley many major roadways have high speed limits ranging from 40 to 60 miles per hour, which may deter biking and walking even where sidewalks and bike lanes exist. Transportation planners have also noted that many low speed streets are located within gated communities, and thus are not publicly accessible.

Evidence is mixed on whether there is a causal relationship between building multiuse trails and increases in physical activity.49,28 Some of the association between exercise and trail location may be related to self-selection – people who are already likely to exercise choosing to live in areas with facilities such as trails.50 In several studies, people surveyed after a trail is built near their home have reported increased walking or exercise51,36, and one study in a Southeastern city using pre- and post-surveys found that people living within a mile of a new trail had increases in physical activity.52 But, other research that used pre- and post- surveys (before and after trails were constructed) or using pedometers rather than self-reported physical activity, have found that new trail or greenway facilities did not change physical activity levels, at least in the short term over one to two years.53,52,28,54 In some cases people living near newly constructed trails were unaware of them.53 Researchers interested in this relationship between physical activity and new infrastructure have acknowledged that there is a need to examine changes over the longer term.28

In terms of demographics of the trail users, some studies in racially diverse areas have found no differences by race or ethnicity,55 while others have found that trail users are more likely to be white.35,28 Similarly, some studies have found no significant associations between trail use and income or education, while others have found that trail users are more likely to have higher incomes and educational levels.28 In general, few studies have focused on trail use in communities of color. One exception is a study in a Latino community in Chicago, which found that Latinos were more likely to use neighborhood trails as gathering spaces to spend time with friends and family.36

Locally, findings from surveys and focus groups of Coachella Valley residents conducted for the HIA generally support existing research. In a focus group of City of Coachella residents living within walking distance of the proposed CV Link, participants expressed enthusiasm for the new path and the safety it would provide for recreational walking and biking in comparison to busy streets: “Instead of exercising on your bike on the highway, like on the 86 where there is danger from the cars, you would be free and safe. That’s perfect.” One participant noted specifically that CV Link would provide a safe resource for exercising with children or grandchildren:

Children like to walk but sometimes we don’t take them for walks because we have to protect them from cars, motorcycles, and we’re scared. But if this pathway won’t have those vehicles, it’s more of a motivation for me to take the kids to the park because our path will be safe.

This focus group included Latino farmworkers and their families, who generally stated they were unlikely to use CV Link to get to work, although some reported that if it later
extends to the Salton Sea it might be useful for commuting to work. Participants stated that walking or biking on CV Link would be a useful way to get to other destinations, such as supermarkets, clinics, parks and church.

Results from a focus group at a housing complex in Palm Springs were similar. These residents, who live a few blocks from the proposed CV Link, felt overall that the pathway would improve their quality of life and health. Like in Coachella, they anticipated using CV Link primarily for recreation rather than transportation, and some participants mentioned they might use it to access nearby grocery stores. Palm Springs focus group participants specifically stated that they anticipated they would be happy to have their children use CV Link to travel to school, particularly if a significant number of students were using it during commuting hours.

Participants in both groups consistently stated that safety on the path was a priority issue, and that lighting at night would be important, especially since hot daytime temperatures could deter daytime use during some parts of the year, meaning people are likely to use the path in the early morning or at night. This HIA includes a safety analysis, which is described in a later section.

Survey respondents also stated that they were more likely to use CV Link for recreation, rather than for errands and daily activities: 86% (76 respondents) said they would use CV Link for recreation compared to 35% (31 respondents) for errands. Reflecting the literature on the importance of path proximity for use, when asked if there was any reason they would not use CV Link, respondents’ most common answer was that it was not close to their home (41%, or 30 respondents.) The majority of respondents (54%, or 57 respondents) thought that CV Link would encourage them to exercise more than they currently do, while another 31% thought that it might do so.

**Impact predictions**
- As a new resource for exercise, CV Link is likely to have a moderate to high positive impact on physical activity. All users of the path will achieve health benefits of physical activity.

These health benefits will be greater for people who live closer to CV Link, as they are more likely to use it and potentially to increase their physical activity levels. Figures C-1 and C-2 in Appendix C show the number of people living within one half and one mile of CV Link. Populations based on age, race and income that live within one half and one mile of CV Link are shown in Figure 7, 8, and 9 in the Access section later in this report. Proximity to CV Link by city is shown below in Table 2. The distances were selected based on the literature discussing the distances people generally travel by foot or by bicycle to reach trails. Coachella in particular has the smallest number and percentage of current residents located nearby. Due to the location of the Whitewater River, Coachella residents may be less likely to use the path and see the benefits of increased physical activity. However, this reflects the core CV Link route, without the connectors that CVAG has now prioritized. One of these, the East Valley Direct Route, is anticipated to greatly increase access to CV Link for Coachella’s existing neighborhoods. It is also anticipated that vacant land adjacent to the Whitewater River

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5 Note that survey sample size is small.
will be used for residential development, and that future Coachella residents will have greater access.

Table 2: Access to Core CV Link by City at .5, 1, and 1.5 miles (does not include connectors)

<table>
<thead>
<tr>
<th>City (in order of total population)</th>
<th>2010 Population</th>
<th>Population within ½ mile of CV Link</th>
<th>% within ½ mile of CV Link</th>
<th>Population within 1 mile of CV Link</th>
<th>% within 1 mile of CV Link</th>
<th>Population within 1.5 miles of CV Link</th>
<th>% within 1.5 miles of CV Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indio</td>
<td>79,005</td>
<td>12,712</td>
<td>16%</td>
<td>26,837</td>
<td>34%</td>
<td>46,519</td>
<td>59%</td>
</tr>
<tr>
<td>Cathedral City</td>
<td>51,255</td>
<td>4,331</td>
<td>8%</td>
<td>16,180</td>
<td>32%</td>
<td>30,528</td>
<td>60%</td>
</tr>
<tr>
<td>Palm Desert</td>
<td>48,453</td>
<td>9,126</td>
<td>19%</td>
<td>16,219</td>
<td>33%</td>
<td>23,764</td>
<td>49%</td>
</tr>
<tr>
<td>Palm Springs</td>
<td>44,497</td>
<td>12,264</td>
<td>28%</td>
<td>26,036</td>
<td>59%</td>
<td>35,976</td>
<td>81%</td>
</tr>
<tr>
<td>Coachella</td>
<td>40,692</td>
<td>1,092</td>
<td>3%</td>
<td>3,670</td>
<td>10%</td>
<td>10,177</td>
<td>25%</td>
</tr>
<tr>
<td>La Quinta</td>
<td>37,459</td>
<td>4,448</td>
<td>12%</td>
<td>7,176</td>
<td>19%</td>
<td>11,010</td>
<td>29%</td>
</tr>
<tr>
<td>Rancho Mirage</td>
<td>17,218</td>
<td>3,560</td>
<td>21%</td>
<td>6,240</td>
<td>36%</td>
<td>8,115</td>
<td>47%</td>
</tr>
<tr>
<td>Indian Wells</td>
<td>4,958</td>
<td>1,885</td>
<td>38%</td>
<td>3,410</td>
<td>69%</td>
<td>3,976</td>
<td>80%</td>
</tr>
</tbody>
</table>

Note: These numbers reflect access according to a “walkshed” or “bikeshed” based on the existing street network, which is discussed further in the Access Section.

- Without targeted outreach, people with more education and higher incomes may be more likely to use CV Link than those with less education and lower incomes. While current rates of physical activity in the Coachella Valley do not correlate with income level, with some lower-income populations exercising more than higher-income populations, this is based on existing research specifically focused on the users of multiuse trails.
- Coachella Valley residents of all racial/ethnic groups are anticipated to use CV Link. According to limited research evidence, some populations (e.g., Latinos) may also use CV Link access points as a gathering space for time with friends and family.
- Plans for maintenance and amenities like lighting and water fountains are likely to have a positive impact on use of the path and on physical activity.

Limitations
In general, the literature reviewed includes users of active transportation infrastructure, rather than examining rates of physical activity overall at a community-wide scale before and after a new facility is built, and thus does not support quantitative predictions for increases in physical activity. As noted above, there is also a lack of longitudinal studies that examine the long-term impact of trails on physical activity. Our conclusion that physical activity will increase as a result of the path is based on the best available evidence.

The 2010 Census block data does not reflect population growth that has occurred since 2010, or the growth in population that is projected to occur after CV Link is constructed. Projections indicate that new populations in Indio and Coachella are more likely to live
close to CV Link. We used the 2010 block data because it provides the most geographically specific information on where people live and their access to CV Link.

**Access to CV Link + Access to Resources**

**The Picture Today**
This section will focus on access to CV Link, as well as access to parks, jobs, schools and transit resources from the CV Link.

The Coachella Valley has a wide variety of park and recreational spaces, from city parks to federally protected national monuments open to hiking, horseback riding and other outdoor activities. There are also many residents living within golf communities, with golf courses accessible to residents. Community members raised concerns about park access in public meetings, particularly regarding perceived lack of publically accessible parks in the East Valley.

There are currently 91 public schools located in the Coachella Valley. One component of access to schools measures a student’s ability to get to school by walking or biking. County-wide information for this measurement is in the Physical Activity section above for Riverside County (in 2009, 35% of children in Riverside County walked, biked, or skated to school in the past week, in comparison with 43% in California.) Currently nine schools are served with Safe Routes to Schools programming through the Riverside County Department of Public Health (RCPH), and only one of these, John Kelley Elementary School in Indio, is in close proximity to the proposed core of CV Link. RCPH has received funds to work with an additional 15 schools in Indio beginning in 2015, some of which are immediately adjacent to or near the proposed route.

In 2011, there were 119,824 jobs located in the Coachella Valley, according to the U.S. Census, which serves as a baseline for evaluating jobs in proximity to the CV Link.57

**Why it Matters**
Proximity and access to multiuse pathways is a strong predictor of their use, as discussed in the Physical Activity section. Proximity to parks and park acreage within communities is associated with higher rates of physical activity for both children and adults.58 Safe conditions for children and youth to walk and bike to school are associated with higher levels of active transportation to school, higher levels of physical activity, and lower rates of injury.59 Pedestrian and bicycle infrastructure that connects to transit stops makes it easier for users to make multimodal trips, reducing the need for cars and also encouraging physical activity.

**The Role of CV Link**
CV Link is both a recreation and transportation resource in its own right, and will provide access to additional resources. CV Link itself can serve to connect Coachella Valley residents to other resources across the Valley, by providing a safe and easily accessible route to parks, schools, and jobs. In order to define the population that will have close and easy access to CV Link, we created “walksheds, which are roughly one mile, around the planned alignment. A walkshed or bikeshed, which create a two-mile buffer, analyzes the roadway network to determine the true accessible distance from CV Link, rather than using a simple and less accurate buffer/service area, which uses radial distance or is measured “as the crow flies.” We defined the walksheds/bikesheds as the distances that are walkable/bikeable from publically accessible “points of access” areas
of CV Link. These points of access are either at an improved access point, a stretch of 
CV Link along a public roadway, or a place where CV Link crosses a public roadway at 
grade. While CVAG is seeking funding for the extension to Desert Hot Springs and has 
long-term plans to connect to the Salton Sea, as well as for connectors including the 
East Valley Direct Route, this analysis only includes the core alignment of the project. 
Figure 6 shows an example of a one-mile walkshed/bikeshed, including transit stops. 
(See Figures C-1 through C-3 in Appendix C for full maps of CV Link 
walksheds/bikesheds.)

**Figure 6: One-mile walkshed/bikeshed around CV Link in Indio**

Using these walksheds/bikesheds, we compared the demographics of people who live 
within ½ mile and 1 mile of CV Link to the overall population of the Coachella Valley, for 
age, race and ethnicity, and household income. While we recognize that some people 
will travel further than one mile to reach CV Link, we chose relatively conservative 
distances given the literature on residential proximity to paths as a predictor of use. 
National travel data indicated that the average pedestrian trip is .7 miles, while the 
average bicycle trip is 2.3 miles.\(^\text{60}\) However, because travel to CV Link would 
presumably include additional travel distance on CV Link itself we focused on shorter 
proximities. Below we add an additional analysis of access by city using a 3-mile 
“access-shed.”

Figure 7 through Figure 9 below show the percentage breakdown of the 2010 
population\(^1\) of the Coachella Valley as a whole, compared to the population within a half 
mile and one mile of the first phase of CV Link.

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\(^1\) While 2010 data is several years old, it provides the best detailed information on where residents live in 
relation to CV Link.
Figure 7: Access to CV Link by Age, 2010 population

Figure 8: Access to CV Link by Race/Ethnicity, 2010 population
Figure 9: Access to CV Link by Household Income, 2009-2013 Households

As shown in the above figures, residents who live within one mile of CV Link seem to be representative of the overall population of the Coachella Valley.

However, access to CV Link does differ by city, as discussed in the Physical Activity section (See Table 2). Of the cities that CV Link’s core alignment connect, the percentage of the current population of Coachella that lives in close proximity to the pathway is the lowest (3% within a half mile and 10% within one mile and 25% within one and a half miles.) On the other end of the spectrum, the cities of Indian Wells and Palm Springs have the highest percentage of their populations with proximate access to CV Link: 80% and 81% respectively within one and a half miles. In order to provide easy access to more of the population of Coachella and Indio, CVAG is planning and seeking funding for an on-street East Valley Direct Route connector from the Whitewater River at Dillon Road in Coachella to Washington Street in La Quinta along Avenue 48. th the exception of La Quinta.

Table 3 shows the percent of population by city living within a 3-mile “LSEV-shed,” for the core route (not including connectors.) The vast majority of residents of the cities that the core route passes are within this “LSEV-shed,” - more than 80% of every city with the exception of La Quinta.
Table 3: 3-mile Access to CV Link by City, 2010 population

<table>
<thead>
<tr>
<th>City (in order of total population)</th>
<th>Total 2010 Population</th>
<th>Population within 3 miles of CV Link</th>
<th>Percent of population within 3 miles of CV Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indio</td>
<td>79,005</td>
<td>70,958</td>
<td>90%</td>
</tr>
<tr>
<td>Cathedral City</td>
<td>51,255</td>
<td>50,166</td>
<td>98%</td>
</tr>
<tr>
<td>Palm Desert</td>
<td>48,453</td>
<td>41,353</td>
<td>85%</td>
</tr>
<tr>
<td>Palm Springs</td>
<td>44,497</td>
<td>43,500</td>
<td>98%</td>
</tr>
<tr>
<td>Coachella</td>
<td>40,692</td>
<td>40,212</td>
<td>99%</td>
</tr>
<tr>
<td>La Quinta</td>
<td>37,459</td>
<td>17,809</td>
<td>48%</td>
</tr>
<tr>
<td>Rancho Mirage</td>
<td>17,218</td>
<td>14,177</td>
<td>82%</td>
</tr>
<tr>
<td>Indian Wells</td>
<td>4,958</td>
<td>4,405</td>
<td>89%</td>
</tr>
</tbody>
</table>

There are also a variety of other amenities that are easily accessible to CV Link users. CV Link will provide access to multiple other resources, including existing parks, jobs, schools, and transit. Table 4 quantifies the number of additional resources within half mile and one mile walksheds/bikesheds of the core path, although this analysis does not include connectors.

Table 4: Resources within 1/2 mile and 1 mile walkshed/bikeshed of the CV Link

<table>
<thead>
<tr>
<th>Resources</th>
<th>Within 1/2 mile of CV Link</th>
<th>Within 1 mile of CV Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acres of parkland&lt;sup&gt;u&lt;/sup&gt;</td>
<td>566</td>
<td>856</td>
</tr>
<tr>
<td>Number of transit stops</td>
<td>148</td>
<td>355</td>
</tr>
<tr>
<td>Number of public schools</td>
<td>15</td>
<td>35</td>
</tr>
<tr>
<td>Number of jobs in 2011 (based on firm location)</td>
<td>28,134</td>
<td>52,793</td>
</tr>
</tbody>
</table>

<sup>u</sup> Parkland includes all open space, city parks in addition to county, state, and federally protected open space
Note: This table reflects the core route for CV Link and not the connectors
Sources: Riverside County, Palm Desert and Coachella GIS, Longitudinal Employment Housing Database.

In both Coachella and Indio, CV Link runs to the north of most residential and commercial land uses, which means that it is less likely to provide a convenient route for residents from those cities to travel to school or jobs. As discussed previously, the addition of connectors such as the East Valley Direct Route would significantly improve access in these cities.

The plan for CV Link also includes establishing wayfinding signage along the path that will direct users to nearby resources, such as parks or other attractions, and the development of an app to provide users with additional information.

Impact Predictions

- Overall, CV Link will moderately improve access to jobs, schools, and parks in the Coachella Valley. Plans for wayfinding signage will further improve connections between these resources and CV Link.

- For schools within one mile of a point of access, CV Link is also likely to moderately enhance safe routes to school. These impacts will be greater for students attending schools immediately adjacent to the pathway, and smaller for the schools at a further distance. It is also likely that these improved routes will lead to increased rates of physical activity and reduced injuries associated with motor vehicles among children as students can walk and bike to school using the protected CV Link.

- Based on the alignment, current City of Coachella residents will have to travel further to access to CV Link than other valley residents, which means Coachella and Indio residents may be less likely than residents in the West and Central Coachella Valley to use CV Link to access other resources. Therefore we expect the health benefits that result from access to CV Link to be smaller in these cities for existing populations. However, growth projections indicate that new populations in Indio and Coachella are more likely to live close to CV Link because large areas of developable vacant land are nearby.

Limitations

The analysis of people living in proximity to CV Link relies on 2010 Census data, and therefore does not represent the most current residential distribution throughout the Coachella Valley, or the distribution for when CV Link has finished construction. However this data provides the most detailed spatial information on where people live.

The data used to analyze park access includes all protected open space, regardless of the presence of recreational amenities or fee status. There may be some parks missing from this dataset, as data was incomplete for part of the East Valley (although this section was not used in this analysis) but it presented the best available source.

Air Quality

The Picture Today

Air quality in Riverside County overall is poor, with nearly a third of days in 2014
unhealthy for sensitive groups or worse, according to the EPA's Air Quality Index (AQI).\textsuperscript{61} The AQI is an indicator of overall air quality that takes into account all "criteria pollutants" subject to federal (and sometimes state) standards.\textsuperscript{62} However, the Coachella Valley is a distinct air basin, and air quality also varies in the East and West Valley. The South Coast Air Quality Management District (SCAQMD) has two criteria pollutant monitors in the Coachella Valley, one in Palm Springs and one in Indio.

Ozone and particulate matter (PM) are two pollutants that the Coachella Valley is out of attainment for, and both present significant concern for human health. Figure 10 shows the number of days that ozone levels exceed state standards for both 1-hour and 8-hour periods in the Coachella Valley's two monitors since 1995. (For many pollutants, California has enacted state standards stricter than federal standards.) High levels of ozone are primarily due to ozone and ozone precursors transported by wind from coastal and central Los Angeles County. The levels are thus higher in West Valley, at the Palm Springs monitor, as ozone is diluted as wind carries the air to the east.\textsuperscript{63} Figure 10 also shows that ground level ozone levels look to be improving over time.

\textbf{Figure 10: Number of days annually that ozone exceeded state standards at Coachella Valley air monitors, 1995-2014}

![Graph showing number of days ozone exceeded state standards](image)

Source: California Air Resources Board\textsuperscript{64}

In comparison to ozone, PM levels are worse in the East Valley, and are primarily caused by windblown fugitive dust. PM is generally categorized as PM10 or PM2.5, where PM10 is 10 micrometers in diameter or less, and PM 2.5 is 2.5 micrometers or less. As a point of reference, PM10 is about 25 times smaller in width than a human hair.
Figure 11 shows the number of days that PM10 levels exceeded state standards at these same monitors, although for the majority of years there was not sufficient data to assess exceedances at the Palm Springs monitor.

Figure 11: Number of days annually that PM10 exceeded state standards at Coachella Valley Air Monitors, 1995-2014

Source: California Air Resources Board

The Coachella Valley has not generally exceeded standards for finer PM2.5. PM2.5 monitoring has occurred in the valley since 1999, and showed just 3 days that exceeded state standards in 2001 and 3 days in 2002, both at the Palm Springs monitor.

More recently, in 2014 SCAQMD installed an additional air monitor downwind of the Sentinel Power Plant in Desert Hot Springs, specifically to measure PM2.5. Combustion from stationary sources like power plants are one major source of PM2.5, and concerns about the Sentinel Power Plant were repeatedly raised in community meetings regarding this HIA, so information from that monitor is shown below in Table 5. Continuous hourly data is available from this monitor and available on SCAQMD’s website, but because standards for PM2.5 are based on 3-year average values, it is too soon for official results as to whether PM2.5 levels will attain federal and state health
and safety standards. However, based on the hourly data published by SCAQMD over the past year, levels appear to meet state standards.

Table 5: Preliminary PM2.5 Monitoring Results from Sentinel Power Plant

<table>
<thead>
<tr>
<th></th>
<th>State PM2.5 Standard</th>
<th>Preliminary Results from Sentinel Power Plant Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual</td>
<td>12 ug/m3</td>
<td>8 ug/m3</td>
</tr>
<tr>
<td>24-hour</td>
<td>35 ug/m3</td>
<td>15 ug/m3</td>
</tr>
</tbody>
</table>

Why it Matters
Exposure to particulate matter, both PM10 and PM2.5, can cause and exacerbate a wide variety of health conditions. Small particles, especially the fine PM2.5 particles but also PM10, can travel deep into people’s lungs and even bloodstreams, leading to adverse effects including:
- Aggravated respiratory illness;
- Development of respiratory disease such as asthma and bronchitis, especially in children;
- Aggravated cardiovascular illness;
- Heart attacks in people with existing cardiovascular conditions;
- Increased mortality;
- Development and premature deaths from cancers; and
- Premature birth and low birth weight babies.

Ground level ozone is created by chemical reactions between precursor chemicals (specifically nitrous oxides and volatile organic compounds) in the presence of sunlight, and is often referred to as smog. Ozone has adverse effects on respiratory health and high levels are associated with hospitalizations and premature death. It can cause adverse effects including:
- Wheezing, coughing and shortness of breath;
- Chest tightness; and
- Asthma attacks.

The Role of CV Link
CV Link has the potential to reduce air pollution in two major ways. One is through decreasing the vehicle miles travelled (VMT) in the Coachella Valley, as some users will replace car trips with walking, biking, skating, or using neighborhood electric vehicles. The second is by paving areas of the Whitewater River wash, which are a source of fugitive dust and PM10. One study using portable air monitoring found the wash to be the largest source of coarse PM (particulate sizes between PM2.5 and PM10) in the Coachella Valley.

CV Link also has potential to affect the level of air pollution with which users come into
contact. Along most of its length, CV Link provides a pathway that is separate from roads travelled by cars, and thus a route for walking, cycling or LSEV travel that likely has lower levels of pollution than routes that are adjacent to busy roads. Cyclists who travel along low traffic roadways, residential streets, or lanes with barriers between traffic and cyclists are exposed to significantly lower levels of PM pollution than those riding alongside high traffic roadways.\(^{73,74}\)

It is also possible that CV Link could bring users into proximity of areas with high air pollution. Prospective users have especially expressed concern about a part of the pathway in Indio that runs adjacent to Interstate 10, a busy freeway. Approximately four miles of CV Link are within 1000 feet of I-10, as shown in Figure 12.

**Figure 12: CV Link running alongside Interstate 10 in Indio**

Based on previous research on pollution near busy roadways, it is likely that there are elevated pollution levels at this distance from the freeway, although in various studies this “exposure zone” has ranged from about 160 to nearly 5,000 feet, with meta-analyses suggesting elevated pollution levels in the range of about 980 to 1,600 feet.\(^{75}\) In the climate zone where the Coachella Valley is located, the wind generally blows from the north during summer months, which could extend the exposure zone further during this season.\(^{76}\) The California Air Resources Board (CARB) recommends that sensitive
uses, including housing and schools, be built at least 500 feet from busy roadways, based on the substantial evidence that residential proximity increases risk of respiratory disease and cancer, especially for children.\textsuperscript{77} CV Link will be located at a distance greater than CARB’s recommended minimum distance of 500 square feet for development of sensitive uses such as housing and schools. However, in the absence of more site specific monitoring or air modeling, it’s uncertain whether the location of CV Link within 1,000 square feet of a section of I-10 actually does have elevated pollution in comparison to levels in the Coachella Valley as a whole.

Short-term exposure to high air pollution is associated with increased mortality and hospital admissions for respiratory and cardiovascular disease, including stroke.\textsuperscript{78,79} While there are health concerns associated with exercising in high pollution conditions, research shows that the health benefits of outdoor physical activity outweigh the negative impacts of exposure to air pollution in urban settings, including for elderly people.\textsuperscript{80,81} This is especially true when people replace car trips with active transportation; studies have found that in many cases trips by car actually expose passengers to higher levels of pollution than bicycling.\textsuperscript{82} In one small study, physical activity was shown to mitigate the negative effects of many traffic related pollutants on blood pressure, but to increase the effects of PM10 and PM2.5.\textsuperscript{83} Because exercise does increase uptake of air into the lungs, vigorous exercise on highly polluted days could make people more susceptible to air pollution’s effects.\textsuperscript{84} Researchers and medical professionals, including the Centers for Disease Control, thus recommend that people avoid or modify outdoor exercise in high pollution conditions when possible, particularly sensitive groups such as children and people with asthma.\textsuperscript{85} When conditions are identified as “Unhealthy for Sensitive Groups” by the EPA’s Air Quality Index, this would mean engaging in less intense physical activity (e.g. walking instead of running,) taking more frequent breaks, and being prepared with asthma medication.\textsuperscript{85} People can also protect themselves by exercising early in the morning or in the later evening, which is when ozone levels tend to be lower. Due to high temperatures in the Coachella Valley, CV Link users may want to exercise at these cooler times regardless.

Another concern expressed by some HIA workshop participants who reside adjacent to the northern Palm Springs route of the path is about excessive wind and extreme heat potentially making the path unusable. These residents provided data showing that winds are higher in that area compared to the rest of the valley and said that major roads there have been closed 21 times within a recent 12-month period. Based on this, they feel that CV Link would not be hospitable to recreational activities. However, our analysis did not conclude that there are unreasonable risks in this area beyond those that local residents already experience. Certain days with excessive wind and extreme heat might not be conducive to path use.

**Impact predictions**
- An analysis of air quality benefits conducted on an earlier version of CV Link Master Plan provides an estimate of the reduction of car VMT and associated decreases in air pollution.\textsuperscript{86} While the phasing for the pathway construction in that study is no longer relevant, the alignment for the former route is very similar to the current CV Link plans for the core route (although not the proposed connectors,) and so the estimates in this study are still a good proxy for anticipated benefits. These benefits were calculated by Alta Planning and Design, using their proprietary Seamless Travel Demand Model to predict increases in pedestrian and bicycle trips, and a literature review on use of Low
Speed Electric Vehicles to predict LSEV usage. The study then estimated reduction in VMT and emission reductions using the California Air Resource Board’s emission factor. A full description of their methodology is given in Appendix A of the Parkway 1e11 Air Quality Benefits Report, available on the CV Link website.\(^v\)

**These predicted benefits are shown in**

Table 6.

### Table 6: Air Quality Benefits predicted by Parkway 1e11 Study

<table>
<thead>
<tr>
<th></th>
<th>2021 annual emission reduction (pounds)</th>
<th>2035 annual emission reduction (pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrocarbons</td>
<td>14,929</td>
<td>27,601</td>
</tr>
<tr>
<td>Particulate Matter PM10</td>
<td>2,436</td>
<td>4,503</td>
</tr>
<tr>
<td>Particulate Matter PM2.5</td>
<td>560</td>
<td>1,034</td>
</tr>
<tr>
<td>Nitrous Oxides</td>
<td>2,073</td>
<td>3,834</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>22,424</td>
<td>41,459</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>4,048,229</td>
<td>7,484,506</td>
</tr>
</tbody>
</table>

- It is also possible to estimate decreases in PM10 associated with paving previously unpaved areas of the Whitewater River wash. We estimated these results based on the overall acreage of off-street paved area, and using California Air Resources Board emission factors for unpaved roads\(^v\), although this method has some significant limitations, and is likely an overestimate (see Limitations section below). A total of 68.27 acres of off-street area will be paved, and based on this CV Link could decrease PM10 in the Coachella Valley by another 59,225 pounds annually, including 7,107 pounds of PM2.5.

- SCAQMD projects annual levels for some pollutants in the Coachella Valley through 2035 in their 2012 Air Quality Management Plan.\(^v\)

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\(^v\) CV Link was previously called Parkway 1e11.
Table 7 shows total projected pollutant levels, along with the percentage decrease associated with CV Link from both reduction in VMT and paving. It is important to acknowledge that no single element of active transportation infrastructure could be expected to have a significant impact on regional air quality. Thus these benefits are relatively small when compared to overall air pollution projections for the Coachella Valley. Even so, benefits associated with the CV Link could provide some positive health impacts.

<table>
<thead>
<tr>
<th></th>
<th>Coachella Valley total annual emissions (pounds)</th>
<th>Total annual emission reductions from CV Link (including VMT and dust reductions)</th>
<th>Percentage decrease in emissions due to CV Link*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2021x</td>
<td>2021 2035</td>
<td>2021 2035</td>
</tr>
<tr>
<td>PM10</td>
<td>16,300,900</td>
<td>20,710,100</td>
<td>61,661 63,728</td>
</tr>
</tbody>
</table>

*Percentage decrease is calculated by dividing emission reductions by total annual emissions and multiplying by 100 to obtain a percentage. For example, for PM10 in 2021: 61,661 lbs /16,300,900 lbs = .00378; .00378 * 100 = 0.38%  
*Predicted emissions were not provided for 2021, so the predictions for 2020 and 2023 were used to estimate the values
<table>
<thead>
<tr>
<th></th>
<th>PM2.5</th>
<th>Nitrous Oxides</th>
<th>Carbon Monoxide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>3,070,867</td>
<td>3,723,000</td>
<td>7,667</td>
</tr>
<tr>
<td>Value</td>
<td>7,667</td>
<td>2,073</td>
<td>22,424</td>
</tr>
<tr>
<td>Value</td>
<td>8,141</td>
<td>3,834</td>
<td>41,459</td>
</tr>
<tr>
<td>Percentage</td>
<td>0.25%</td>
<td>0.02%</td>
<td>0.06%</td>
</tr>
<tr>
<td>Percentage</td>
<td>0.22%</td>
<td>0.04%</td>
<td>0.09%</td>
</tr>
</tbody>
</table>

A rough estimate of Riverside Countywide annual health benefits was created using the EPA’s Co-Benefits Risk Assessment Screening Model (COBRA), shown in Table 8. COBRA uses changes in emissions to model ambient PM2.5 and associated health impacts based on epidemiological literature, and using the year 2017 as a baseline. As a screening tool, it does not provide sophisticated air quality modeling, but is useful a basic estimate of health benefits. Limitations are discussed further below.

Table 8: Annual adverse health effects in Riverside County prevented by PM2.5 reductions associated with CV Link

<table>
<thead>
<tr>
<th>Adverse Health Effect</th>
<th>Annual Cases Prevented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult Mortality</td>
<td>0.039</td>
</tr>
<tr>
<td>Infant Mortality</td>
<td>0.000</td>
</tr>
<tr>
<td>Non-fatal Heart Attacks</td>
<td>0.005-0.045 y</td>
</tr>
<tr>
<td>Respiratory Hospital Admissions</td>
<td>0.008</td>
</tr>
<tr>
<td>CVD Hospital Admissions</td>
<td>0.012</td>
</tr>
<tr>
<td>Acute Bronchitis</td>
<td>0.080</td>
</tr>
<tr>
<td>Minor Restricted Activity Days</td>
<td>36.154</td>
</tr>
<tr>
<td>Work Loss Days</td>
<td>6.099</td>
</tr>
<tr>
<td>Asthma Exacerbations</td>
<td>0.017</td>
</tr>
</tbody>
</table>

Note: Uses 2121 emission reductions and 2017 baseline emissions.
- Based on the above estimates, we find that CV Link will have a small but positive impact on health by improving air quality. As mentioned above, no single active transportation project, even a significant one like CV Link, could be expected to significantly impact regional air quality. It will rather take many infrastructure and policy contributions that support active transportation and LSEV use and discourage driving, along with measures to reduce PM from dust, to substantially improve air quality Valley-wide. Since CV Link is intended to catalyze additional investment active transportation infrastructure, it could also contribute to further air quality improvements in the future.

Users that exercise on the CV Link instead of using on-roadway paths are also likely to experience benefits associated with decreased exposure to traffic pollution.
- Regarding the issue of bringing users into contact with existing sources of

\[ Y \] For non-fatal heart attacks, a high and low estimate is provided, so we have reported the possible range.
pollution, it is likely that CV Link users in Indio adjacent to I-10 will be exposed to higher levels of traffic related air pollution than general ambient levels of pollution in the Coachella Valley. It is positive that the alignment is outside the 500-foot buffer recommended by CARB for sensitive uses, and prevailing wind patterns in the region show that traffic pollutants would be more likely to be blown away from the path during cooler months when the path might be in heavier use.

In general, there will be days when air quality is poor enough that outdoor exercise should be modified or avoided in the Coachella Valley in general and on the CV Link, and this can be determined by using the daily Air Quality Index. Given the evidence that exercise, and especially active transportation that replaces car trips, has benefits that outweigh exposure to air pollution, it is still an overall benefit to provide new active transportation infrastructure. High pollution levels are an indication that additional efforts should be made to reduce pollution, not that Coachella Valley residents should be deprived of places for recreation.

**Limitations**

The estimate for dust reductions from paving CV Link are based on emission factors for unpaved roads, which incorporates several assumptions. It assumes that the current unpaved surfaces are similar to unpaved roads, while some areas may be stabilized, and is thus likely an overestimate. The methodology is from 1997 and also makes several assumptions regarding the percent of eroded material entrained to the air, and the representativeness of average county conditions for climate and soil erodibility.\(^7\) This methodology was suggested by staff at the South Coast Air Quality Management District, but with the caveat that it would only be a rough estimate, as more accurate estimates would require in depth analysis of the conditions of currently unpaved areas.

There are additional limitations associated with the COBRA screening model. Because it uses changes in PM2.5 to model health benefits, it likely underestimates benefits associated with other pollutants, particularly the “coarse fraction” of PM10, between PM2.5 and PM10. It also relies on baseline data from 2017, while air quality benefits from CV Link will not be realized until after this date. Thus we compare 2021 benefits to a 2017 baseline, which is not ideal. According to SCAQMD, PM10 and PM2.5 are projected to increase in the Coachella Valley, and so this probably leads to an overestimation of benefits. Finally, the COBRA model provides benefit estimates at a countywide scale, rather than for the Coachella Valley specifically. However, in absence of far more detailed air modeling data including geographic distribution of air quality improvements, COBRA provides the best option for a quantitative estimate of health benefits.

**Safety**

While most survey respondents and focus group participants were enthusiastic about CV Link, community residents who attended HIA workshops mentioned safety as one of the leading concerns. Our safety analysis includes the following elements:

- Vehicle collisions;
- Crime; and
- Heat illness.
Picture today

Vehicle collisions: Vehicle collisions in which there were victims either killed or injured were reported throughout the Coachella Valley between 2008 and 2012. Palm Springs had the highest number during this period, with an average of 21 pedestrians and 19 bicyclists killed or injured per year (86 reported pedestrian/bicycle collisions per 100,000 residents). Palm Desert also had a high number of collisions with pedestrians and bicycles. Table C-5 in Appendix C shows the average number of victims killed or injured annually between 2008 and 2012 in each of the Coachella Valley cities.

Crime: While violent and property crime are present throughout the Coachella Valley, data from 2013 illustrates that Indio has the highest per capita of both types. After Indio, Desert Hot Springs has the next highest violent crime rate, and Palm Springs has the next highest property crime rate. Tables C-6 and C-7 in Appendix C show 2013 violent and property crime rates in cities along CV Link.

Heat Illness: Temperatures in the Coachella Valley can range roughly from the high 70s to 108°F in the summertime. Temperatures can occasionally reach around 120°F in various parts of the Coachella Valley during this time of year. There were 42 heat-related hospitalizations reported annually in Riverside County between 2000 and 2005, with the number in the East Valley exceeding the number in the West Valley. Nearly all deaths were reported in July and August and half of all deaths occurred in males aged 40-49. Extreme heat exposure is well known to be highly underreported at the hospital and when reporting cause of death.

Why it matters
Safety from injury on any path, whether unintentional or purposeful, caused by poor design, violence, or natural environmental conditions, is a key determinant of health and well-being. Safety for pedestrians, cyclists and LSEV users is of primary concern because of the direct health consequences and because perceived safety will influence the use of the path and therefore impact physical activity.

Vehicle Collisions: Many CV Link users will encounter vehicular traffic to get to the actual pathway, with the majority of survey respondents saying they would walk, run, or use a bicycle to access CV Link (54% of total modes of transportation indicated; see Appendix A for a summary of HIA survey results).

Motor vehicle collisions are the leading cause of unintentional injury-related death among those 1-24 years old in Riverside County. Fifteen pedestrians were involved in motor vehicle-related traffic fatalities in 2013 in the Coachella Valley. In Palm Springs alone, an average of 21 pedestrians each year were killed or injured in motor vehicle related collisions between 2008 and 2012 according to the California Office of Traffic Safety. In the United States, motor vehicle crashes are the leading cause of unintentional injury-related death accounting for over 33,000 fatalities, and pedestrians represent 13% of all motor-vehicle traffic-related deaths.

Transportation safety for all users on this multi-modal path is a significant health concern, given the factors contributing to collisions and severity, including weight, speed, skill and/or impairment, and decision-making. The potential risk of conflicts between pedestrians and LSEVs on CV Link was a concern expressed in HIA.

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2 Causes of death are unknown.
workshops. Minor differences exist between LSEVs and golf carts but generally, both have greatly increased in popularity across the country and especially in California cities like Coronado, Playa Vista, and Lincoln Hills. Global sales of NEVs will reach 55,000 units in 2017 from 37,000 in 2011; nearly half of these sales will be in North America, with California and Florida being the major markets for U.S. sales. There is currently a demand for LSEVs in the Coachella Valley due to a number of favorable conditions including the large senior population seeking alternatives to automobile driving, a large number of rain-free days, and LSEVs being a clean air transportation option as indicated by the ongoing regional LSEV planning initiatives.

There is a minor potential for injuries associated with use of LSEVs and golf carts: one of the most prominent national studies of golf cart-related injuries indicates a steady rise in golf-cart related injuries over a 17-year period (1990-2006). Thirty-one percent of injuries occurred among those under 16, and 38% of injuries were due to falling from a golf cart. However, these numbers are small in comparison to total golf cart use: in one large planned community in Florida with roughly 50,000 golf carts, 14 golf-cart fatalities were reported over a six-year period. Local datasets specific to the Coachella Valley are not available, but an article generally documenting safety concerns related to the increasing use of golf carts quoted Mark Diercks, Palm Desert Transportation Engineer: “The only fatal accident involving golf carts that I am aware of in Palm Desert occurred on a golf course, late at night, involving some very intoxicated individuals. Seat belts were not involved.” The increasing popularity of golf carts and current injury trends suggests the need for strategic injury prevention efforts (see recommendations in Section 5) for this newer transportation mode.

Crime: Violent crime and property crime can have direct and immediate physical health, mental health, and/or community health impacts. Community violence can negatively affect social cohesion and community interaction, increase fear of crime, and reduce utilization of public spaces for physical activity. The fewer opportunities for crime to exist, the greater the potential for safer public environments and increased walkability and physical activity. HIA focus group participants echoed the need to address safety concerns, particularly at night.

Addressing and reducing opportunities for crime and actual crimes should lead to increased perceptions of safety, leading to happier and healthier users. Research has indicated that actions to reduce parental perception and fear of crime may promote outdoor physical activity. One study found that children are five times more likely to walk or bike to school when neighborhood safety is not a primary concern for their parents.

Heat Illness: Clear associations exist between increased ambient temperature and duration, and morbidity and mortality. In addition, being low-income, non-white, overweight, low socioeconomic status, or senior are some risk factors associated with heat illness and mortality. Generally, all people are at risk for exertional heat-related illness but clothing worn, activity type, exertion level, acclimatization, and wind speed are mediating factors contributing to heat-related illness. Several residents mentioned in surveys the need for frequent, predictable and reliable water access to prevent dehydration and other heat-related illnesses.
Role of CV Link
How CV Link is planned, built, used, and maintained will directly and immediately affect users’ health and safety. CV Link represents an opportunity to create a path that brings users many benefits such as physical activity, a transportation resource, and community cohesion. However, according to some community participants in HIA workshops and focus groups, concerns related to vehicle collisions, crime and heat illness were significant concerns. CV Link in itself won’t cause vehicle collisions, crime or heat illness. In contrast, CV Link has the potential to ameliorate collisions by providing a pedestrian and bicycle resource separated from vehicles, and the potential to reduce crime if it provides an alternative recreational activity. However, safety risks such as these will be present on CV Link as they are elsewhere, so decision-makers should be aware of them and address them where possible.

Impact Predictions
The decision of some Coachella Valley residents to use CV Link may be impacted by their perception of safety. The unique long distance of the trail would likely create intermittent isolated areas, which necessitates the need to create a sense of safety from crime. For others, a primary concern may be safety from fast-moving bicycles or LSEVs. Heat is also a concern in the Coachella Valley, and for CV Link, aesthetics and amenities such as adequate shade and frequently located water stations will also determine whether people use the path. The Master Plan lays out numerous, specific design elements, many of which directly address these concerns.

Collisions
- **LSEVs.** Some participants at HIA workshops expressed concern about the risk of collisions between LSEVs and pedestrians on CV Link. The Master Plan states “Pedestrians will be separated from bicycles and LSEVs where possible.” Pedestrians and cyclists are relatively more vulnerable than LSEVs and would experience greater severity of injury in collisions with LSEVs due to weight and speed factors. However, the high percentage of the path in which faster moving traffic (i.e., LSEVs and bicycles) will be separated from pedestrians will reduce opportunities for collisions. As summarized in the Table 10 in Section 4, while the level of harm associated with an LSEV collision is moderate, we predict that the magnitude of this impact will be negligible.

Another LSEV-related concern discovered in the literature is the risk of LSEV users falling or jumping from moving LSEVs. The availability of CV Link as a transportation option is expected to increase the use of LSEVs in the Coachella Valley and therefore the number of injuries associated with falling or jumping from an LSEV would increase. If sharp grades and turns (i.e., at under and overpasses) are unavoidable due to right-of-way constraints, these may lead to a higher likelihood of LSEV user falls or LSEV rollovers. While the severity of the impact of potential injuries related to falling off an LSEV is moderate, the risk of this happening is very low and therefore the magnitude of impact is negligible.

- **Motor Vehicles.** Driving, walking, and biking are the top modes of transportation HIA survey respondents intend to use to get to CV Link. Palm Springs has

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**aa** Many safety concerns were considered in the development of the Master Plan. For example, Coachella Valley police chiefs and the sheriff’s department gave input on crime prevention.
relatively higher rates of pedestrian and cyclist collisions with motor vehicles. The vast majority of collisions occur on roads that CV Link users may use while traveling to the path. Net increases in motor vehicle-related traffic collisions adjacent to the proposed route are difficult to predict because the changes in traffic patterns are unknown and collision modeling may not be robust. Our conclusion is that while pedestrian and/or bicycle collisions with motor vehicles may increase on roads that feed into CV Link due to an increase in numbers of people using all of these modes, the magnitude of this impact associated with CV Link will be negligible.

Crime
- **Violent Crime.** Violent crime has clear physical and mental health impacts. The Master Plan includes crime prevention strategies such as crime prevention through environmental design (CPTED), closed circuit television (unconfirmed), CV Link police force of County Sheriffs, strategic lighting, design of entrances/exits, and landscaping that discourages criminal activity. The deployment of CPTED-informed design strategies and ongoing assessment and action related to reported crimes is anticipated to reduce opportunities and incidence of violent and property crime. While the potential level of harm caused by violent crime is moderate to high, the magnitude of CV Link’s predicted impact on crime is negligible.

- **Perceptions of Crime.** Encountering graffiti and/or homeless persons was raised as a concern in HIA workshops. Regardless of whether the presence of graffiti and homeless populations actually represent safety risks, a perception of lack of safety may limit opportunities to obtain regular physical activity. This could evolve into broader neighborhood-level concerns about community violence on the pathway, which may deter neighborhood-level adoption and usage of the pathway. The deployment of CPTED-informed design strategies and ongoing assessment and action related to reported crimes is anticipated to reduce opportunities and incidence of violent and property crime. We conclude that perceptions of lack of safety due to graffiti and encountering homeless persons do not pose health risks.

Heat Illness
- Health concerns related to heat include heat illness, dehydration, and heat syncope (fainting due to high temperatures). The Master Plan addresses these risks by inclusion of rest area shade structures, water station access and emergency access points along CV Link. Summer temperatures during the daytime frequently exceed 100°F in the Coachella Valley, and temperatures are likely to become even higher in the future with climate change. While many residents will adjust their physical activity schedules for early morning or evening and make use of the path, in spite of mitigation measures, exertional heat-related illness is still likely to occur on CV Link due to the overall increased number of users for the new path. The severity of the impact of heat illness on health is
moderate; however, the magnitude of this impact is expected to be negligible due to mitigations measures in place.

Limitations
The literature review for transportation and LSEV collisions drew upon the largest national injury data set of golf-cart related injuries, but because the design and usage of CV Link is unique, quantifying injury estimates and severity are difficult to generalize to CV Link context. Other recent reports exist of LSEV-related injuries and deaths, but again, these incidents may not be applicable to CV Link given that particular environmental conditions vary from place to place.

Several factors constrained a more robust analysis of crimes around CV Link. The data from the Riverside County Sheriff’s Department is limited to the areas it polices and excludes Desert Hot Springs, Palm Springs, Cathedral City and Indio as they have their own city police departments. The HIA team had limited time and resources to disaggregate the nearly 50,000 crimes by types (violent vs. property) or provide analyses that could identify higher crime segments of CV Link.

Economic Development

The Picture Today
Table 9 below shows indicators of economic development. Coachella Valley cities with the highest poverty rates (including adult and child poverty), highest rates of unemployment, and lowest median income are Desert Hot Springs and Coachella. These cities will be on the western-most and eastern-most reaches of CV Link (assuming Phase 2 of CV Link, which now includes extension to Desert Hot Springs).

Table 9: Selected Economic Development Indicators for Existing Conditions

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Palm Springs</td>
<td>46,135</td>
<td>17.2%</td>
<td>29.4%</td>
<td>6.5%</td>
<td>34.0%</td>
<td>$44,544</td>
<td>$ 461,667</td>
</tr>
<tr>
<td>Desert Hot Springs</td>
<td>28,001</td>
<td>28.7%</td>
<td>40.7%</td>
<td>12.1%</td>
<td>29.5%</td>
<td>$32,548</td>
<td>$148,258</td>
</tr>
<tr>
<td>Cathedral City</td>
<td>52,595</td>
<td>20.8%</td>
<td>28.3%</td>
<td>8.2%</td>
<td>30.3%</td>
<td>$43,064</td>
<td>$233,000</td>
</tr>
<tr>
<td>Rancho Mirage</td>
<td>17,745</td>
<td>12.0%</td>
<td>15.7%</td>
<td>7.5%</td>
<td>8.6%</td>
<td>$77,304</td>
<td>$679,000</td>
</tr>
<tr>
<td>Palm Desert</td>
<td>50,417</td>
<td>9.5%</td>
<td>10.6%</td>
<td>4.9%</td>
<td>14.8%</td>
<td>$52,503</td>
<td>$364,890</td>
</tr>
<tr>
<td>Indian Wells</td>
<td>5,137</td>
<td>5.3%</td>
<td>3.3%</td>
<td>2.9%</td>
<td>4.3%</td>
<td>$100,742</td>
<td>$984,500</td>
</tr>
<tr>
<td>La Quinta</td>
<td>39,032</td>
<td>9.3%</td>
<td>14.9%</td>
<td>4.3%</td>
<td>11.2%</td>
<td>$67,033</td>
<td>$445,000</td>
</tr>
<tr>
<td>Indio</td>
<td>82,398</td>
<td>21.3%</td>
<td>30.0%</td>
<td>9.2%</td>
<td>26.2%</td>
<td>$46,822</td>
<td>$248,215</td>
</tr>
</tbody>
</table>
Why it Matters
Income has a profound impact on population health and disease not only through one’s ability to meet material needs, but also through access to health care, the quality of neighborhoods in which people can afford to live, child health and development, chronic stress, and interpersonal relationships. Income is a key predictor of many chronic disease outcomes, poor mental health, and premature death. Unemployment is associated with poor health, heart disease, suicide and correspondingly higher than average mortality rates.

The Role of CV Link
CV Link could lead to economic benefits for people and local governments in the Coachella Valley through health care cost savings, prevention of costly transportation related collisions, increased jobs and earned income, a boost to the regional economy, and increased property values.

Additionally, CV Link and the access it provides could enhance the discretionary spending by other users, especially tourists who are a major contributor to the Coachella Valley economy. CV Link could also encourage and rationalize the construction of CV Link feeders in the individual cities and possibly the county that further access for all users.

As noted in the Physical Activity section, easy access to places for physical activity, such as CV Link, can contribute to increases in physical activity. Several studies indicate that regular physical activity can lead to significant health care cost savings. Transportation related collisions exact a high financial cost on all parties involved. The prevention and/or reduction in the number of these collisions would lead to cost savings. The implementation of CV Link represents a major financial investment for the region, including for property owners within close proximity to CV Link who may realize increased property values due to this investment. Based on other long distance pathways such as Virginia’s Creeper Trail and Washington’s Methow Valley network of trails, CV Link may stimulate increased tourism, more foot traffic at local businesses and related job creation.

Impact Predictions
The potential economic benefits of CV Link represent an opportunity to improve health by increasing incomes, especially for communities with lower socio-economic status.

We based our analysis on the economic analysis previously conducted by Husing, however, we have developed alternative conclusions in some cases.

Healthcare costs
- The Husing report predicts a $152 million economic benefit through 2035 based on reduced medical costs due to reductions in obesity and related costs. This figure is based on a model that applies a 10%-20% success rate for obese persons, or that 10-20% of persons that are obese will use the trail three times per week or more. However, the relationships and mechanisms between CV Link use, obesity, and obesity-related costs savings are complex. Robust community-based interventions are required for high usage rates to be achieved.
are positive indications that residents of the eastern span of CV Link, where great health disparities exist, will use CV Link with two-thirds of survey respondents saying they would use it. Of those two-thirds of survey respondents, over 40% said they would use it “a few times per week.” A majority of respondents stated CV Link would encourage them to exercise more. We conclude that CV Link will lead to economic benefits associated with reduced medical costs but because we do not believe that there will be a 10-20% success rate among persons that are obese, we predict that these savings will be lower than Husing’s estimation. Robust community outreach and engagement to encourage physical activity will lead to increased savings.

**Jobs**

- The same economic analysis makes predictions about economic impacts of planning, building, and maintaining CV Link, along with tourism it will attract. The analysis predicts $487 million in positive impacts on the tourism industry and 743 worker-years of construction-related and other direct jobs created by the construction of CV Link. The scale of the planning, building and maintenance of CV Link and subsequent impacts suggests a significant economic benefit for the Coachella Valley.\(^{128}\)

- This HIA considers impacts on equity and health disparities, and the prediction in the Husing report does not include a distribution of job-related economic benefits for the Coachella Valley and the county, and specifically for residents with a lower socio-economic status. Coachella Valley residents currently working in jobs associated with tourism, such as at hotels and restaurants, may achieve increased hours if they are not already working full time and that could lead to increased income. Currently unemployed people or those working in other jobs may also obtain hotel and restaurant jobs. However, these jobs will only improve health outcomes if they pay a fair wage\(^{bb}\) and provide benefits.

- Coachella Valley residents who will obtain construction jobs may have a greater chance of earning a living wage and receiving job benefits, and thus opportunities for health benefits, than those working in the service industry. However, it’s not clear whether these jobs will go to the residents who need them most unless clear actions are taken to make this happen.

**Property values**

- The Husing report predicts a $103 million increase in property values for homes within a half-mile of CV Link. This increase will lead to increases in income and/or wealth, which will have health benefits for those who own property. This economic prediction, however, does not consider how the increase in property values will impact existing residents and businesses that rent their property. The construction of a large-scale public infrastructure project may contribute to rising home prices which has the potential to cause displacement of long-time residents.

\(^{bb}\) A fair wage is the hourly rate that an individual must earn to support their family, if they are the sole provider and are working full-time (2080 hours per year) (Living Wage Calculator; available at http://livingwage.mit.edu/counties/06075).
and businesses.\textsuperscript{137,138,139} Without implementing protective mitigations, long-time residents, especially renters, may face fewer options for affordable housing and retail, transportation, quality schools, and proximity to CV Link. In other regions these changes have been linked to health impacts such as stress, loss of social cohesion, and chronic disease and injury.\textsuperscript{140,137} These general concerns of increased housing values and impacts on existing residents were cited in the scoping meetings and a focus group discussion.

**Limitations**

Economic development in a region can be attributable to a number of factors, such as wage policies, demographic shifts and increased economic output. Readers should take caution in assuming that the economic benefits of CV Link will seamlessly materialize, especially given the number of assumptions required (e.g., 10\% of obese persons will regularly exercise) to obtain, for example, the health-related economic benefits.

The report of several other economically successful trails and pathways are generally supportive of the positive economic benefits of long trails in the United States.\textsuperscript{128-130} However, the unique setting and environmental conditions that exist for CV Link may have different levels of economic success as those trails referenced.
Section 4. Conclusions
The following table presents a summary of this HIA’s conclusions. Conclusions are organized by health determinant, with a column on the right indicating any impacts on equity that were identified for each analysis. As stated in this report’s introduction, the HIA’s conclusions are based on CV Link’s core alignment (Phase 1) because this was the only route that had been defined at the time of the HIA process.

Table 10: Summary of CV Link Impacts of Health Determinants

*Explanation of categories can be found at the end of the table*

<table>
<thead>
<tr>
<th>Health Determinant</th>
<th>Impact</th>
<th>Magnitude</th>
<th>Level of Impact</th>
<th>Strength of Evidence</th>
<th>Equity Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Activity</td>
<td>+</td>
<td>Major</td>
<td>Moderate – High</td>
<td>♦ ♦</td>
<td>Health impacts will be greater for those who live close to CV Link. Coachella residents, for the most part, do not live close to CV Link.</td>
</tr>
<tr>
<td>Access to Transportation and Resources</td>
<td>+</td>
<td>Moderate-Major</td>
<td>Moderate</td>
<td>♦ ♦</td>
<td>CV Link is more likely to improve access to resources in areas with residential and commercial users close to CV Link. People living in close proximity to CV Link are generally representative of the Coachella Valley in terms of age, race and income level. However, most Coachella residents and workplaces are not adjacent to CV Link. Plans to extend CV Link to the Salton Sea could provide recreational space in currently park-poor communities.</td>
</tr>
<tr>
<td>Air Quality</td>
<td>+</td>
<td>Minor</td>
<td>High</td>
<td>♦ ♦</td>
<td>Regional air quality improvements will lead to limited health benefits for all populations in the Valley. It is likely that CV Link users in Indio adjacent to the I-10 will be exposed to higher levels of traffic related air pollution than general ambient levels of pollution in the Coachella Valley. However, based on the available evidence that health benefits of exercise outweigh the risks associated with air pollution, it is still likely an overall...</td>
</tr>
<tr>
<td>Safety</td>
<td>~</td>
<td>Negligible</td>
<td>High</td>
<td>♦</td>
<td>Although the risk of collisions attributable to CV Link is negligible, it will be higher in cities in which feeder roads are unsafe. For example, the East Valley has roads characterized by a lack of sidewalks and crosswalks.</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
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<td>------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>- Collisions with vehicles on feeder roads</td>
<td>~</td>
<td>Negligible</td>
<td>Moderate</td>
<td>♦</td>
<td>Although the risk of crime attributable to CV Link is not anticipated to be different than existing crime risk, in general, violent and non-violent crime may have a greater negative impact on communities facing other disproportionate burdens.</td>
</tr>
<tr>
<td>- Collisions with LSEVs</td>
<td>-</td>
<td>Negligible</td>
<td>Moderate</td>
<td>♦</td>
<td>Risk of heat illness is higher for seniors and those who are overweight.</td>
</tr>
<tr>
<td>- Crime</td>
<td>~</td>
<td>Negligible</td>
<td>Moderate</td>
<td>- High</td>
<td>Community leaders should encourage policies that support local hiring and fair wages, which in turn will increase local income and related health benefits may for disadvantaged populations.</td>
</tr>
<tr>
<td>Economic Development</td>
<td>+</td>
<td>Minor</td>
<td>Moderate</td>
<td>♦</td>
<td></td>
</tr>
</tbody>
</table>

**Explanations:**
- **Impact** refers to whether the proposal will improve health (+), harm health (-), or whether results are mixed (~).
- **Magnitude** reflects a 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, or number of cases of beneficial health impacts):
  - Negligible = impacting up to 0.1% of Coachella Valley population (up to 426 people)
  - Minor = impacting between 0.1% and 1% of Coachella Valley population (427-4,262 people)
  - Moderate = impacting between 1% and 10% of Coachella Valley population (4,263-42,623 people)
  - Major = impacting over 10% of Coachella Valley population (42,624 or more people)
- **Level of Impact** reflects the nature of the impact on function and life expectancy and its permanence:
  - High = major impact on function and life expectancy
• Moderate = moderate impact on function and life expectancy
• Low = low or no impact on function and life expectancy

○ **Strength of Evidence** refers to the strength of the research/evidence showing the predicted impact: ★ = 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.
Section 5. Recommendations

The following recommendations are grouped by health determinant in the tables below. Many of these recommendations share co-benefits with other health determinants. The party that each recommendation is directed towards is indicated within the table. Many of the recommendations are subject to funding availability.

### 1. Equity

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Implementing Entity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure CV Link construction occurs in the East Valley (Coachella and Indio) during the first phase of project development so CV Link can first serve some of the communities that need this transportation resource the most. This recommendation is consistent with current plans.</td>
<td>✓</td>
</tr>
<tr>
<td>Through the Operations and Maintenance funding plan, ensure that the path and its amenities are constructed and maintained equally throughout its length. This recommendation is consistent with current plans.</td>
<td>✓</td>
</tr>
<tr>
<td>Continue pursuing grant funding for the development of the Desert Hot Springs extension and prioritize Desert Hot Springs in Phase 2 development. This recommendation is consistent with current efforts and plans.</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>Continue to engage residents (in English and Spanish) throughout the length of the proposed path, and especially in the East Valley and Desert Hot Springs, in all future CV Link planning efforts, including the efforts to plan and fund connectors and community connector routes.</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>Create another CV Link advisory group to assist in coordinating events, maintenance and overall decisions made around the project. (The CV Link Citizens Advisory Group disbanded after one year of input and participation.)</td>
<td>✓</td>
</tr>
</tbody>
</table>

### 2. Physical Activity

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Implementing Entity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once constructed, partner with academic or other researchers to explore the impact of CV Link on physical activity. There are few rigorous studies about the impact of new multiuse pathways, and the construction of CV Link provides an excellent opportunity to contribute to research on this topic.</td>
<td>✓</td>
</tr>
</tbody>
</table>
Update marketing campaign to appeal to a greater pool of potential CV Link users by showing diverse uses of the path (e.g., skateboards, roller skates, and scooters).

Once constructed, plan and execute robust outreach strategies to encourage CV Link use. Target significant outreach efforts to those currently facing poor health outcomes including people with lower incomes and educational levels and non-English speakers. Outreach materials should be in English and Spanish.

Work with the Riverside County Department of Public Health, Desert Healthcare District, area hospitals and clinics, non-profit groups such as Friends of CV Link, schools, and workplaces to establish and/or support physical activity programming on CV Link, including walking, running and cycling groups.

Encourage the development and establishment of bike sharing programs, including continuing the work with SunLine Transit Agency to fund a bike share feasibility study.

### 3. Access

<table>
<thead>
<tr>
<th>Recommendation</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>CVAG</td>
</tr>
<tr>
<td>Continue planning connector routes (i.e., the East Valley Direct Route and Avenue 52 connector) in Coachella, where the majority of the city’s population does not live near to the path, in order to provide safe connections between CV Link and more existing commercial and residential destinations.</td>
<td>✔</td>
</tr>
<tr>
<td>Work with cities and communities to plan parks and/or parklets around designated access points to provide more open space to park-poor communities. Also include opportunities along the route for interactive street art or other activity-enhancing uses.</td>
<td>✔</td>
</tr>
<tr>
<td>Adopt policies and guidelines to incentivize the construction of walk-and bike-friendly homes and businesses near CV Link.</td>
<td>✔</td>
</tr>
<tr>
<td>Work with adjacent schools to establish walking routes for parents and children (or “walking school buses”) that incorporate CV Link where appropriate.</td>
<td>✔</td>
</tr>
<tr>
<td>Prioritize additional active transportation infrastructure to connect CV Link with employment centers and schools within one mile of the pathway.</td>
<td>✔</td>
</tr>
<tr>
<td>Provide wayfinding information visually and/or in both English and Spanish, using signage along the route, around access points, and through the CV Link app. This recommendation is consistent with</td>
<td>✔</td>
</tr>
</tbody>
</table>
current plans.

Include information about public transit stops and routes in wayfinding signage, and provide connections to bus routes and schedules via CV Link app. This recommendation is consistent with current plans.

Encourage employers to provide incentives to bike to work such as bicycle storage.

4. Air Quality

<table>
<thead>
<tr>
<th>Recommendation</th>
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</thead>
<tbody>
<tr>
<td>Include information about current air quality and relevant recommendations for all users and for sensitive users in the CV Link app (in both English and Spanish).</td>
<td>✓</td>
</tr>
<tr>
<td>Encourage employers to provide incentives to use alternative modes of transportation for work commuting besides vehicles.</td>
<td>✓</td>
</tr>
<tr>
<td>Advise CV Link users of the health risks associated with exercising near I-10.</td>
<td>✓</td>
</tr>
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</table>

5. Safety

Vehicle Collisions

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Implementing Entity</th>
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</thead>
<tbody>
<tr>
<td>Educate LSEV users about and enforce seat belt use requirements and speed limits, and promote path-sharing etiquette. Users should be advised to respond to and report collisions.</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>Once constructed, track all transportation-related collisions with defined categories of LSEV/cyclist/pedestrian-involved parties and ensure proper aggregation of data if multiple agencies are likely to collect this data. Include data for known feeder roads to CV Link. Develop timelines for data review.</td>
<td>✓</td>
</tr>
<tr>
<td>Ensure jurisdictional pedestrian and bicycle plans include feeder roads to CV Link and are adequately designed to ensure safety of pedestrians and cyclists.</td>
<td>✓</td>
</tr>
</tbody>
</table>
### Crime

**Recommendation**

<table>
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<td>CVAG</td>
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</table>

Once constructed, conduct an ongoing assessment of which crime prevention through environmental design (CPTED) strategies are working and which ones are not.

Ensure an appropriate amount of resources and capacity building to implement CPTED, including community engagement strategies and sufficient staffing. Ongoing monitoring, reporting, and oversight of CPTED effectiveness are recommended and should be accessible to the public.

### Heat Illness

**Recommendation**

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<tbody>
<tr>
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</table>

Provide outreach/education during hot months in culturally appropriate ways including the use of a CV Link phone app.

Implement protocols that inform CV Link users about dangerous conditions based on a heat index, a measurement combining air temperature and humidity.\(^c\)

Provide protective design elements (such as shade, water fountains, cell phone signal boosters, wayfinding and signage designs) at standard intervals (for example, every ¼-mile). This recommendation is consistent with current plans.

Develop coordinated heat-related illness response and management standards for staff and users.

### 6. Economic Development

**Health Care**

<table>
<thead>
<tr>
<th>Implementing Entity</th>
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</table>

Follow the recommendations listed in the physical activity section above to maximize path usage and health care cost savings.

Encourage healthcare providers to market their illness prevention programs along CV Link.

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### Jobs and Tourism

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Implementing Entity</th>
</tr>
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<tbody>
<tr>
<td>While ensuring adherence with federal contract and funding guidelines, target at least 10% of CV Link construction and maintenance jobs for local residents in nearby communities and at least 50% of jobs for residents in the Coachella Valley. Target economic benefits to capable and high need groups.</td>
<td>CVAG</td>
</tr>
<tr>
<td>For new jobs being created for CV Link construction and maintenance, jobs should pay a fair wage.</td>
<td>CVAG</td>
</tr>
<tr>
<td>Provide incentives for health-promoting businesses (e.g., bicycle rental, exercise centers, healthy food) along and near the path. One potential avenue is that cities could zone vacant lands for a special purpose zone where such businesses receive preferential use and/or incentives.</td>
<td>CVAG</td>
</tr>
<tr>
<td>Work with the valley cities, the Coachella Valley Economic Partnership and other partners to help provide low-cost loans and technical assistance to entrepreneurs (including youth living in disadvantaged communities) across the Coachella Valley who would like to open or expand a business along or proximate to the CV Link. Particular priority should be given to industry and service providers that directly and positively impact activity along CV Link.</td>
<td>CVAG</td>
</tr>
</tbody>
</table>

### Property Values

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Implementing Entity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor, document, and report out on the cost of housing along CV Link, especially for rental units. Ensure that areas in close proximity to CV Link maintain a full range of economic housing opportunities (e.g., include requirements for low-income housing in new development).</td>
<td>CVAG</td>
</tr>
</tbody>
</table>
Section 6. References


