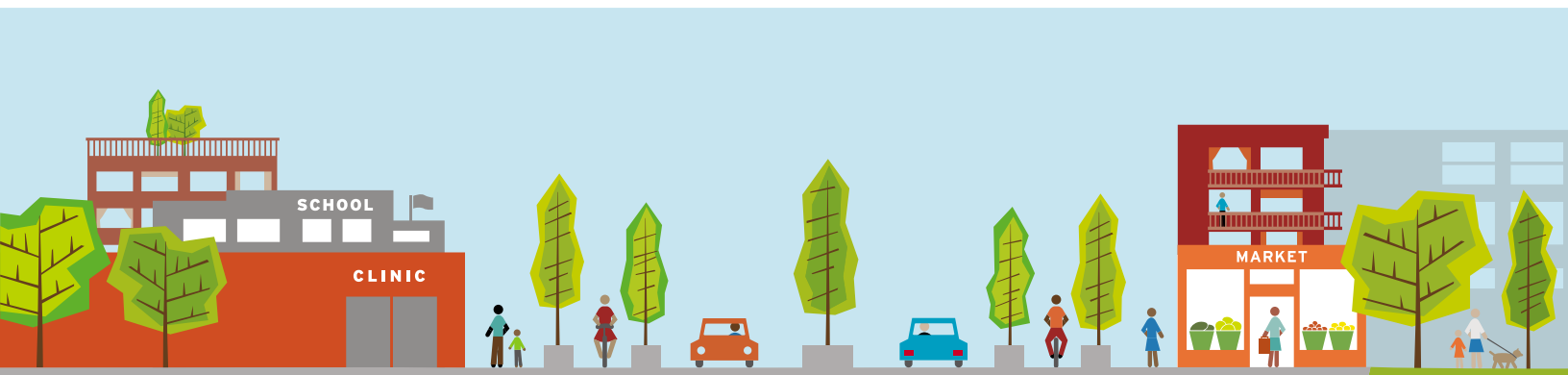


BUILDING IN HEALTHY INFILL



ChangeLab Solutions
Law & policy innovation for the common good.

CONTENTS

ACKNOWLEDGMENTS

Written by Benjamin D. Winig (senior staff attorney & program director), Heather Wooten (vice president of programs), and Allison Allbee (planner).

Additional support for this report was from Ellie Gladstone (staff attorney), Raymond Leung (staff attorney), Claire Aylin Bilir (legal fellow), and Sonya Rifkin (healthy planning fellow). All affiliated with ChangeLab Solutions.

ChangeLab Solutions thanks the Resource Legacy Fund and California Department of Public Health's Obesity Prevention Program for funding this work. Additionally, we gratefully acknowledge the support and insight from staff and members of the California Health in All Policies Task Force.

The development of this report was informed by literature reviews, California agency guidelines, analyses of the health components of 30 general plans, and ongoing consultation with a wide variety of stakeholders and experts from the planning, health, development, environmental, social equity, housing, and transportation sectors. Early findings were disseminated to participants of the February, 2013 Healthy Infill Development convening. Participants identified a number of issues and opportunities to strengthen this report, and their feedback is reflected here. Thank you to these partners for their insights and contributions.

Design & illustration:
Karen Parry | Black Graphics

ChangeLab Solutions is a nonprofit organization that provides legal information on matters relating to public health. The legal information in this document does not constitute legal advice or legal representation. For legal advice, readers should consult a lawyer in their state.

Introduction	3
1 Public Health & Infill Development: An Overview	6
Infill Development & Transportation	7
Traffic Safety & Injuries	8
Noise	8
Infill Development & Air Quality	10
Infill Development & Access to Daily Needs & Services	12
Infill Development, Housing Quality & Affordability	14
2 Approaches for Addressing Healthy Infill in General Plans	16
Transportation Policies	17
Air Quality Policies	17
Policies to Improve Access to Daily Needs	18
Recreation Spaces	18
Healthy Food	18
Jobs	19
Education	19
Healthcare	19
Housing Quality & Affordability in General Plans	20
Conclusion	21
Appendix: General Plan Policy Review	23
Endnotes	24

INTRODUCTION

INFILL DEVELOPMENT: the development of vacant or underutilized parcels within urban centers and rural hubs

California's population, now closing in at 38 million, is projected to increase significantly in the near future; state analysts estimate it will exceed 50 million by 2050. Communities of all sizes are planning how best to accommodate the additional housing, transit, and other infrastructure needs of a growing population. Infill development – the development of vacant or underutilized parcels within urban centers and rural hubs – is increasingly seen as a critical solution to addressing these needs.

Infill development can help balance three primary goals of land use planning that are often in conflict: transportation improvements, environmental protection, and community revitalization. Infill also has the potential to improve public health outcomes. When done well, communities benefit from more walkable and connected neighborhoods, greater access to daily needs and services, and quality affordable housing. Regions experience improved air quality, and fewer vehicle-related injuries and deaths as people rely less on cars for transportation. The right kind of infill can also reduce greenhouse gas emissions, making healthy and climate-friendly development a win-win.

At the same time, infill development has the potential to compound public health risks. It can perpetuate poor urban planning and design if it fails to align with regional public transportation, resulting in disconnected and isolated developments. New development may lead to displacement of long-term residents, especially when development is not coupled with strong affordable housing protections. Infill can also expose more people to harmful air pollution when housing and other uses are sited near mobile and stationary sources of pollution, such as heavily trafficked corridors. These types of unintended outcomes are particularly acute when they add to the cumulative health burdens that many low-income communities already shoulder. Infill is not a universally positive development strategy, and special care must be taken to maximize its benefits.

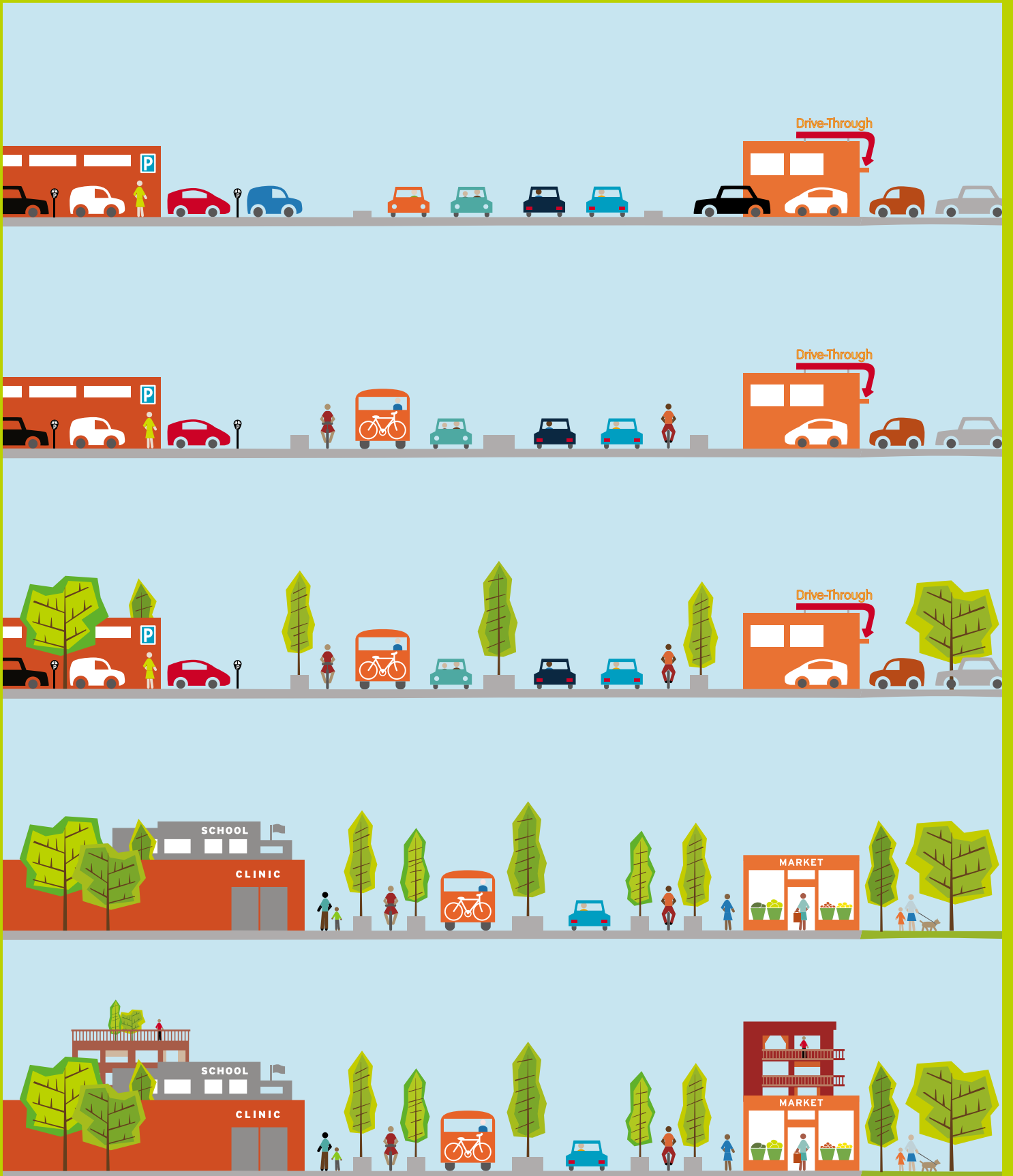
While infill development is fast becoming the major focus of how we grow our cities and towns, the toolbox California planners, policymakers and developers use to revive underutilized spaces is filled with a hodgepodge of regulations and practices from the bygone era of greenfield development. Infill is often faced with a maze of challenges,

from complex parking and regional environmental regulations, development fees that are misaligned with housing markets, lack of funding for affordable housing and infrastructure, limited or outdated analyses of traffic patterns, and small or irregular parcels. Fortunately, many of the policy solutions to these challenges can be directly tied to improving public health outcomes.

Many of the solutions to the challenges of building infill can be directly tied to improving public health outcomes

This paper is designed to provide useful strategies for encouraging healthy infill. We begin with an overview of literature linking public health and infill in four key issue areas. Next, we offer examples of general plan policies that support healthy infill in a diversity of communities. We have chosen to focus on general plans because they provide the policy framework used to guide infill development in cities and counties. At the same time, we acknowledge that many other tools – from zoning to financing, to environmental regulations, to regional planning – are part of a successful infill strategy.

In the long-term, public health concerns will likely change as new technology transforms the way we move from place to place, how we work and where we live. But we needn't wait to find and implement solutions for the public health challenges endemic to many of today's infill opportunity sites. Planners and advocates should seek to champion infill strategies that promote community health and well-being now, and into the future.



1 PUBLIC HEALTH & INFILL DEVELOPMENT: AN OVERVIEW

While infill development has the potential to affect a range of health issues – everything from access to childcare, green building materials, and minimizing storm-water runoff – a review of the relevant literature on the built environment and health highlights four core issues that are of critical concern to creating healthy infill:



Transportation (including active transportation, noise & injuries)



Air quality

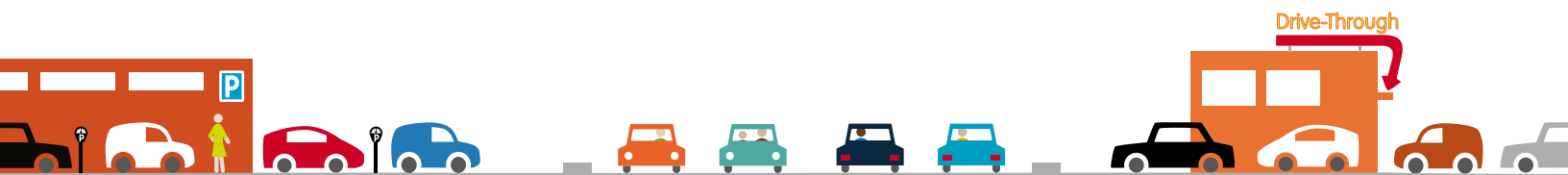


Access to daily needs, services & health promoting amenities



Quality affordable housing

Stakeholders within and beyond the public health community are actively working to address these health issues, but are not always able to do so in a consistent and coordinated manner. For example, the planning and development community may not understand how to incorporate a holistic and healthy infill approach into policies and projects. Or they may perceive health-related improvements as yet another regulatory or financial barrier to developing infill sites. But when health issues are used as a guidepost for decision making from the beginning, developers and planners have the opportunity to mitigate the ballooning individual and collective costs of poor health, and create the foundation for lasting community wellbeing.



Infill Development & Transportation

Infill development is considered a preferred urban growth strategy in large part because it can reduce vehicle miles travelled (VMT). Compared with greenfield development, infill often results in shorter average trip distance and travel time, which not only reduces vehicle emissions but also household transportation costs! Reducing travel time also decreases drivers' and passengers' exposure to traffic-related pollutants.^{2,3}

Residents of highly walkable neighborhoods are more likely to meet the recommended physical activity levels

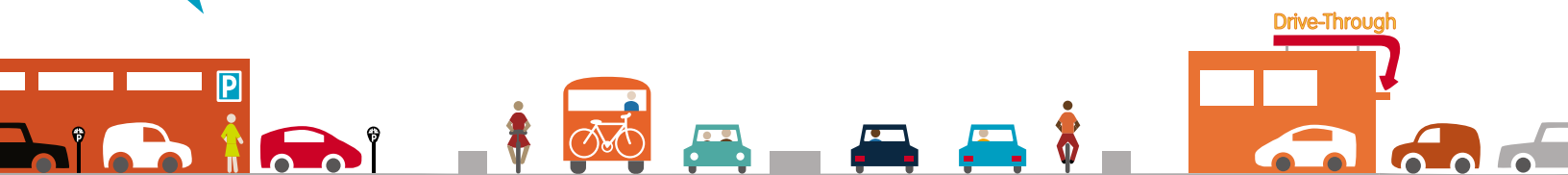
Infill sites can also provide more active transportation options like walking and biking, whether through proximity to public transit or by placing destinations closer to where people live and work. Active transportation has proven health benefits, and is an important strategy for combating obesity and its associated health risks.⁴ Residents of highly walkable neighborhoods, or those who rely on public transit,⁵ are more likely to meet the recommended physical activity levels.⁶

Infill that is disconnected from transportation options will likely result from fewer health benefits and may even increase some risks. For example, using a model designed to measure the overall health impacts of active transportation in the San Francisco Bay Area, researchers found that increasing the median minutes of daily walking and bicycling from 4 to 22 minutes has the potential to decrease greenhouse gas emissions by 14 percent and the burden of cardiovascular disease and diabetes by 14 percent; at the same time, risks for injury increased by 39 percent.⁷ This study underscores the importance of strategies that enhance safety for all users as a core component of infill planning and development.

Planners should also consider the possibility that an infill project will add vehicles to the road and increase parking demand if residents continue to use their cars for every trip.⁸ Higher-income residents, especially, are less likely to rely on public transit for their daily commutes.⁹ At the same time, access to cars has been found to be essential to the economic mobility of low-income residents.¹⁰ While these two findings point to a continued reliance on personal automobiles in communities across the income spectrum, the realities of climate change necessitate transformations to our local, regional and statewide land use and transportation systems to enhance connectivity and link residents to jobs.

Enhancing public transit options means fewer people need to have their own cars

Protected bike lanes improve safety and encourage bicycling





Complete Streets policies ensure streets are designed to comfortably and safely accommodate the needs of all users, including pedestrians, bicyclists and automobiles

Traffic Safety & Injuries

Development that increases both the volume of cars as well as bikers and pedestrians on the same roadways – without providing enhanced traffic calming and pedestrian and bicycle safety infrastructure – increases the probability of serious and fatal injury accidents.¹¹ As noted above, one study found when people’s median daily walking and bicycling increased from 4 to 22 minutes, risk of traffic related injury increased by 39 percent.¹² Although on a community-wide scale, projected health benefits from physical activity may outweigh the increased health risks from collisions,¹³ the prospect of facing traffic hazards may deter individuals from choosing active transportation.¹⁴ Building multimodal transportation networks can reduce traffic hazards for bicyclists and pedestrians, but may require new infrastructure investments.¹⁵ Strategies such as “Complete Streets” already exist for communities to plan for and build streets designed to comfortably and safely accommodate the needs of all users, including pedestrians, bicyclists and automobiles.¹⁶



Noise

Like air pollution (discussed in the following section), noise impacts will be more acute when infill development is closer to major transportation corridors.¹⁷ Noise is a well-recognized source of environmental stress that can raise blood pressure and disturb sleep, and is linked to increased risk of heart disease.¹⁸ Studies also link high levels of noise with poor school performance,¹⁹ making the issue of noise impacts critical to residential or school infill developments. Noise levels are regulated locally as part of a city’s general plan and must be in accordance with state guidelines.²⁰ California law requires that general plans quantify current and projected noise impacts from transit sources (freeways, major streets, railroads, airports) and industrial plants.²¹ Noise impacts can often be mitigated effectively through construction features, such as building sound walls along highways or soundproofing new buildings. These features create additional design considerations to ensure noise mitigation strategies do not diminish opportunities for outdoor recreation or block natural light and ventilation in soundproofed buildings.

PLANNING STRATEGIES FOR INFILL DEVELOPMENT: TRANSPORTATION



1. Adopt complete streets policies to improve the safety and comfort of all users, especially the most vulnerable. Such policies support developing and maintaining:

- sidewalks;
- crosswalks;
- bike lanes;
- street lighting;
- well-spaced trees and vegetation; and
- reducing vehicle speeds.



2. Develop and maintain pedestrian and bicycle access to public transit.



3. Enact parking pricing policies, such as unbundling, to reduce congestion and vehicle ownership.



4. Focus on safety from crime (in addition to safety from cars).



5. Establish strategies for noise mitigation through project design features, like soundproofing or sound walls.

Infill Development & Air Quality

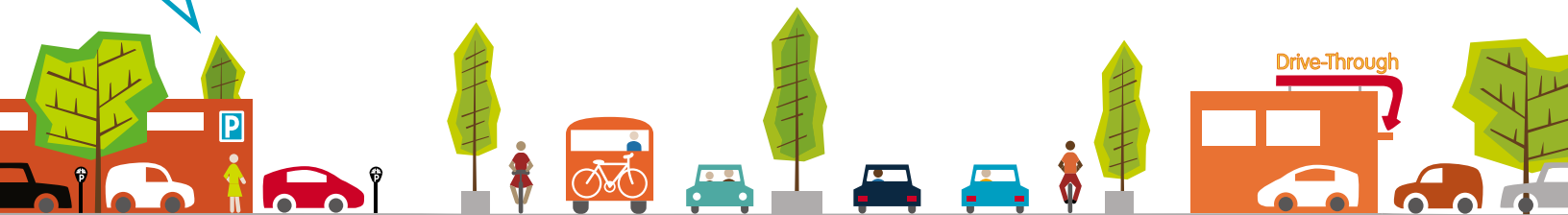
The impact of infill development on air quality can result in both beneficial and harmful public health outcomes. Infill has the potential to reduce regional VMT, and in turn, improve regional air quality. But infill can also place new residents and users near existing mobile and stationary sources of air pollution, exposing them to poor air quality.

Infill development has the potential to improve regional air quality

The transportation sector is a significant source of air pollution, along with other commercial and industrial sources.²² Air pollution from transportation has been the subject of extensive study, and has been called “one of the most recognized and quantified environmental impacts of transportation.”²³ Although cars and trucks emit a mix of pollutants,²⁴ studies often focus on certain pollutants as markers of exposure, such as particulate matter (PM), ozone, carbon monoxide (CO), and nitrogen dioxide (NO₂).²⁵ This may lead us to think about the problem of pollution abstractly, when in fact there are very real and tangible consequences. Adverse health effects from traffic-related air pollutants are wide-ranging,²⁶ and include reduced life expectancy,²⁷ higher rates of asthma and other respiratory conditions,²⁸ increased risk of insulin resistance in children,²⁹ increased risk of developing heart disease,³⁰ and increased risk of developing different cancers.³¹ Recent research in 10 European cities estimates that near-roadway traffic-related pollution contributes to 14 percent of childhood asthma cases,¹⁵ percent of acute childhood asthma events, and approximately a quarter of coronary heart disease cases and hospitalizations for heart attacks and strokes in older adults.³² Expected climate change temperature increases are anticipated to make the effects of poor air quality more acute.³³

Because the health impacts of air pollution vary by concentration of the pollutants and the duration of exposure, the populations at highest risk are those who spend considerable time in proximity to high-volume roadways.³⁴ Sensitive populations such as young children, pregnant women, the elderly, individuals with existing respiratory conditions, and low income people who often experience a cumulative burden from harmful environmental exposures, are at higher risk of suffering negative health impacts from traffic pollution.³⁵ For example, spatial distribution research in Orange County suggests that subsidized housing units have high overall traffic exposure, particularly units in areas with predominantly Latino populations.³⁶

Adding street trees enhances pedestrian comfort and improves air quality



The California Air Resources Board recommends that new projects intended for sensitive populations, including schools, medical facilities, or residences, should be at least 500 feet from a freeway and 1,000 feet from a rail yard.³⁷

However, distance is only an approximate measure of traffic pollution impacts; actual pollution levels depend on weather and wind conditions, and a project located downwind from a highway may have unhealthy levels of air pollution at greater distances.³⁸ To address the potential health impacts from traffic pollution at a particular site, planners need to conduct site-specific analyses of pollution patterns and select appropriate distances or mitigation measures based on the sensitivity of the intended user population, rather than relying on region-wide air quality measures.³⁹ Emerging technologies may make some of these challenges less acute, as vehicle fleets transition to electric and other clean power.

PLANNING STRATEGIES FOR INFILL DEVELOPMENT: AIR QUALITY



1. Conduct site-specific analyses of pollution patterns and cumulative health impacts. Absent site-specific analysis, the California Air Resources Board recommends a minimum buffer of 500 feet around potential polluting sites adjacent to areas designed for children, the elderly and people facing potential cumulative health burdens.⁴⁰



2. Incorporate mitigation measures, such as adjusting building orientation and design, adding filtration systems, and using real-time intelligent transportation systems to increase the flow of traffic and reduce congestion.



3. Eliminate roadway obstacles that create traffic congestion and/or reroute traffic in residential areas, and near schools and hospitals, particularly in areas with high volumes of diesel vehicles.

Infill Development & Access to Daily Needs & Services

Infill development that brings new services and amenities into neighborhoods, or provides housing near existing services, increases the viability of active transportation and reduces the barriers communities face accessing vital services. Reducing the need for private automobiles to get to and from daily needs can be particularly beneficial for low-income households, for whom the cost of vehicle ownership can be significant or prohibitive.

Infill development can have a positive effect on health when it enhances access to recreation areas

Infill development can have a positive effect on health when it enhances access to recreation areas (including parks, green spaces, and open spaces). Creating new places for physical activity or improving their accessibility can lower Body Mass Index (BMI) in children⁴¹ and increase the proportion of residents engaging in regular physical activity.⁴² Such amenities provide health benefits and reduce the cumulative health burdens to communities beyond lack of physical activity: the presence of shared natural or open spaces has been associated with stronger social ties among neighbors⁴³ and improved mental health of residents.⁴⁴ Children with easier access to green space in their own neighborhoods have exhibited better ability to concentrate in school.⁴⁵ Preserving greenery and open space may have long-term health and environmental benefits as well, by preserving biodiversity, enhancing flood control, and performing carbon sequestration services.⁴⁶

Infill development also has the potential to improve access to healthy food. Fruit and vegetable consumption is higher among residents with access to a large grocery store,⁴⁷ and the presence of supermarkets is associated with a lower prevalence of obesity in neighborhoods.⁴⁸ When mixed-use developments include food retailers or locate housing or employment near existing healthy retailers, residents' diet and health can benefit.

Planning for healthy infill necessitates taking stock of current resources, in order to make efficient use of existing infrastructure and prevent increased strain on resources that may be at capacity or over-extended. When done in partnership with residents and community partners,

Incorporate health-promoting uses like parks, healthy food retail, schools, and health clinics



these types of analyses provide powerful platforms for engagement. Community members have the opportunity to describe how they use existing resources and identify gaps in necessary neighborhood amenities.

Neighborhood resource analysis should also identify investment and development opportunities. This may include studying retail leakage,⁴⁹ exploring unique partnership structures (e.g., shared use agreements, etc.);⁵⁰ and seeking out private/public partnerships that expand investment opportunities targeting resident health and wellbeing, such as community benefit agreements.⁵¹

PLANNING STRATEGIES FOR INFILL DEVELOPMENT: ACCESS TO DAILY NEEDS & SERVICES



1. Encourage infill development that increases access to healthy food and recreational spaces.



2. Catalogue and analyze how the existing critical community resources are utilized and by whom.



3. Identify investment and development opportunities that may have been previously overlooked.

Infill Development, Housing Quality & Affordability

Infill projects and mixed-use developments that revitalize older downtowns or unused retail space may improve housing quality, attract new businesses and residents, and increase or stabilize property values. Rising housing prices in infill areas reflect a growing demand for housing options that are in walkable neighborhoods and are convenient to transit. Without proper safeguards, such projects may effectively price out existing residents who can no longer afford rents in a revitalized neighborhood.⁵²

30% of infill opportunities in California have been identified in central downtown areas occupied by low-income tenants

Housing affects health in multiple ways. Housing quality can impact physiological health (e.g., exposure to lead, radon, mold, extreme temperatures),⁵³ psychological health (e.g., noise, inadequate light),⁵⁴ and safety (e.g., falls, fires).⁵⁵ Housing instability caused by frequent moves, eviction and foreclosure, is related to elevated stress levels, depression, and hopelessness.⁵⁶ Children's education also appears to be undermined when they repeatedly change schools.⁵⁷ Similarly, crowding resulting from housing instability causes increased levels of psychological distress, helplessness, and higher blood pressure.⁵⁸ Physical violence towards partners and children may also increase in crowded home environments.⁵⁹ In addition, studies have demonstrated that crowding can negatively impact physical health through increased exposure to respiratory and other infectious diseases.⁶⁰ And, access to affordable housing increases the income a household has available for maintaining and supporting health, like health care, food, and transportation.⁶¹

Researchers have pointed out that infill lots often have environmental contamination or other features that lead to increased development costs over greenfield development, despite access to existing utilities and infrastructure.⁶² These costs can contribute to higher rents in new infill projects compared to existing housing stock, leading to displacement. When displacement occurs, not only are residents unlikely to find adequate affordable replacement housing,⁶³ they also risk housing instability, overcrowding,⁶⁴ and the loss of critical social networks.⁶⁵

Protecting and enhancing affordable housing is an important step to ensure that healthy infill benefits everyone



Around 30 percent of infill opportunities in California have been identified in central downtown areas currently occupied by low-income tenants.⁶⁶ Low-income, black, and Latino renters and homeowners have the least amount of home equity and the highest housing financial burdens, and therefore are most vulnerable to displacement.⁶⁷ As prices increase, the housing cost burden for these populations becomes even more difficult as a result of higher rent, fluctuating interest rates or property taxes.⁶⁸ California has a number of laws that seek to maintain minimum quantities of affordable housing stock,⁶⁹ but there are few state or local protections against displacement. Planners should assess the potential for involuntary displacement, even though it may occur gradually over time.⁷⁰

PLANNING STRATEGIES FOR INFILL DEVELOPMENT: QUALITY AFFORDABLE HOUSING



1. Identify areas that are at risk for increased rents and property values as far in advance of new investment as possible, and plan for preserving affordable housing before and during development. The time to put policies into place is before displacement occurs, not afterward.



2. Introduce policy and financing options that protect long-time residents from displacement and create strong incentives for new affordable housing construction. Protective strategies include preservation, retrofitting, and rehabilitation initiatives of existing properties; accessory dwelling units or small lot single-family ordinances. Strategies for new housing include tax-credits or multifamily tax exemptions; parking requirement reductions and transferring development rights; and structures that ensure long-term affordability, such as land trusts.



3. Reduce construction costs through innovative housing design, bundling small projects or splitting large ones, and creative approaches to smooth price fluctuation for construction.



4. Adopt policies to protect housing quality. Strategies may include smoke-free housing ordinances; moving from complaint-based code enforcement to proactive inspections for rental units; revising or developing mold, moisture and nuisance codes; requiring disclosures to buyers and renters; regulating businesses that charge for remediation services and providing guidelines for remediation; and providing additional statutory protections for tenants.

2 APPROACHES FOR ADDRESSING HEALTHY INFILL IN GENERAL PLANS

Opportunities abound for creating policies that promote healthy infill in general plans, from the vision and framework to many of its individual elements. In California, urban infill planning decisions are governed by the applicable city or county General Plan, which must address seven elements: land use, circulation, housing, conservation, open space, noise and safety.⁷¹ The plan may optionally address other specific elements such as health, agricultural land, air quality, cultural resources, economic development, historic preservation, parks and recreation, urban design, or others.⁷² In a 2009 scan of general plans from 17 California communities that identified health-related policies and language, ChangeLab Solutions found that only about 35 percent of plans explicitly addressed urban infill.⁷³ A 2011 scan of an additional 13 recently updated plans in 2011 found that the topic was much more prevalent: 77 percent of plans addressed urban infill, representing a 42 percentage point increase in just two years. (For more information on the plans analyzed in 2011, see the *General Plan Policy Review* on page 23.)

Healthy infill policies should be crafted through engagement with key stakeholders, including public health department staff, community-based organizations, health advocates, and community residents

Healthy infill policies should be crafted through engagement with key stakeholders, including public health department staff, community-based organizations, health advocates, and community residents. They should also respond to data about local health issues and community context, such as: rates of asthma, obesity, and other chronic diseases; locations of health-promoting community services (like grocery stores and parks); quality and availability of affordable housing; and crime and public safety data such as rates and locations of pedestrian and bicyclist traffic injuries.⁷⁴

General plans can support infill broadly by including policies to amend zoning codes to allow for mixed-use, higher-density, and more compact development, as well as policies that limit greenfield and “leapfrog” development, which creates inefficient and non-contiguous pockets of urban infrastructure like streets and sewers.

An increasing number of California cities directly promote infill as a key strategy for creating healthier and more vibrant urban neighborhoods. For example, the general plan for Chino explicitly supports infill

development among a host of strategies, including transit-oriented and mixed-use development, to enhance the livability of neighborhoods. The plan language also recommends using fee structures to create incentives for desired land uses, including infill development.⁷⁵ While policies supporting healthy infill are most often found in a plan's land use elements, Chino's economic development element also recommends that the city direct administrative resources to facilitate the development of infill properties as a strategy to increase the presence of local businesses and availability of local jobs.⁷⁶ Similarly, the City of El Monte's general plan directly promotes infill as a basis for healthier development, which includes proximity to necessary services and the inclusion of pedestrian and bike routes.⁷⁷



Transportation Policies

To maximize health benefits, infill policies should be paired with those that encourage active transportation, reduce automobile dependency, and increase connectivity. Under state law, all cities and counties are required to address complete streets in their general plans,⁷⁸ further emphasizing the value of aligning these synergistic approaches. For example, Marin and Riverside Counties both include policies that promote infill development near transit corridors and support bicycle and pedestrian-friendly development patterns.⁷⁹

The City of El Monte includes policies to reduce the potential for car collisions through design improvements, enforcement, and education efforts. They also call for implementing recommendations from pedestrian safety studies, and maintaining data on and prioritizing improvements for locations with high incidences of pedestrian/vehicle collisions. In addition, the city commits to implement a traffic calming program in high volume pedestrian areas (which could include infill development sites).⁸⁰ The City of San Pablo's general plan includes policies that incentivize developers to build pedestrian-friendly retail, and to require pedestrian-oriented amenities and design in mixed use areas⁸¹ – places where infill may be most likely to occur.



Air Quality Policies

General plans can include policies that ensure infill development is located in areas that are less likely to be exposed to poor air quality, as well as policies that require that developments include design features that mitigate the effects of poor air quality. The City of South Gate has adopted a comprehensive set of policies designed to promote healthy indoor and outdoor air quality. These include policies that promote active transportation, as well as policies to reduce pollution from stationary sources and limit the location of new homes, schools, childcare and elder care facilities near freeways and other sources of pollution.⁸² Kings County's general plan includes policies that encourage developers to provide landscaping and shade trees to both improve air quality, as

well as reduce energy costs related to cooling buildings.⁸³ Finally, the City of San Pablo's Open Space & Conservation Element calls for the establishment of a 500-foot Air Quality Health Risk Overlay Zone to protect sensitive populations and land uses from toxic emissions.⁸⁴



Policies to Improve Access to Daily Needs

One of the promising potential health benefits of infill development is that it can increase access to health-promoting services and daily needs. Increasing the mix of uses within walking distance of homes and workplaces and increasing density so that more services are nearby are both important strategies to creating “complete neighborhoods.” Dense, mixed-use neighborhoods should include development that allows people to meet their everyday needs, buy healthy food, be physically active, and access jobs, education, and healthcare.



Recreation Spaces

Cities can promote healthy communities by encouraging and prioritizing equitable distribution of recreational facilities, such as parks, trails, and playgrounds. The City of Rancho Cucamonga's general plan expresses an integrated view of healthy communities, which includes opportunities for educational and cultural experiences, active recreation, and environmental protection, along with a specific vision and policies for achieving these goals through infill development.⁸⁵

The City of Encinitas' general plan calls for the use of incentives and zoning policies to promote the development of public and private recreation centers and health clubs, in order to increase residents' access to recreational opportunities.⁸⁶ In South Gate, a city lacking adequate parkland, the general plan takes a more aggressive approach to development of new recreational areas, parks, and community gardens on infill sites. The policy states that the city will encourage the creation of additional public open space, particularly targeting underserved neighborhoods, and outlines a program by which new development can offer recreational land dedications in lieu of development fees.⁸⁷



Healthy Food

Infill development policies can support healthy food access by including language that encourages or removes barriers to a variety of healthy food sources, including grocery stores, farmers' markets, community gardens, and mobile markets. Rancho Cucamonga's plan recommends infill development that is responsive to the needs of each community and increases residents' access to fresh produce. Strategies the plan identifies include farmers' markets, community gardens, and school gardens.⁸⁸ Murietta's general plan promotes the use of incentives for the development and equitable distribution of healthy food retail and dining options.⁸⁹ Murietta also encourages farmer's markets that carry local foods, as well as small scale urban agriculture, community gardens, and school gardens in residential areas.⁹⁰



Jobs

A thriving local economy and strong job base are important to every city. Plans focused on the health and employment nexus include provisions for job training, programs to attract and retain industries, increasing local transit options to and from employment centers, encouraging employers to sponsor health policies and programs, and promoting local hire policies. Sonoma County's general plan contains policies to encourage development that reduces VMT and the distance between jobs and housing. Their multi-pronged approach includes increasing the amount of jobs and housing along their passenger rail corridor, incentivizing programs such as workforce housing, increasing the share of home-based work, and requiring major employment centers to provide facilities and programs that support alternative transportation modes.⁹¹

The City of Chino's economic development objective is to decrease the amount of residents commuting to other cities for work by matching residents' with available jobs that meet their skill set. Policies supporting this objective include initiating collaborations between local high schools, colleges and local industries, and producing studies on the skills and education of Chino residents as a way to recruit new firms to the City.⁹²



Education

Access to schools, daycare, and other educational opportunities is an essential part of complete neighborhoods. Redwood City's general plan states that the city will strive to integrate schools, community centers, and parks into every neighborhood. To fund projects meant to increase physical access to educational resources, the city also outlines a requirement that new development pay its "fair share" for public services, including schools.⁹³ In addition to guidelines that improve access to educational opportunities, general plans can also specify how to site schools and develop complementary amenities. Fresno's general plan includes policy language to site schools in neighborhoods with safe pedestrian and bicycle access, or develop those amenities in neighborhoods without them. Fresno also discourages the siting of schools in agricultural areas "due to the growth-inducing potential of schools and conflicts with farming practices such as pesticide application."⁹⁴



Healthcare

The City of El Monte recognizes that location of facilities in neighborhoods and proximity to transit are important factors in accessing healthcare. Their general plan calls for a mix of incentives and reduced permit fees to promote the development of new healthcare facilities. In addition, the city plans to take an active role in recruiting new providers and healthcare institutions to locate in areas of need.⁹⁵



Housing Quality & Affordability in General Plans

General plan policies can encourage both the preservation and creation of quality affordable housing through infill – a critical strategy to ensuring that infill development promotes positive public health outcomes. Without such policies, low-income households may never benefit from the positive health effects of infill, particularly if they are displaced by rising property values or the replacement affordable housing units with new, higher-cost infill. Marin County uses an equity framework in their policy to concentrate new medium- to high-density land uses in infill areas, stating, “[c]oncentrating development expands affordable housing and employment options and improves the quality of life for residents.”⁹⁶

The City of Richmond’s general plan includes policies that promote both preservation and creation of affordable housing, including exploring the feasibility of creating long-term affordable housing through a community land trust study, and developing an inclusionary housing incentive policy, which could include density bonuses, financial support to nonprofit housing developers and fee waivers.⁹⁷ In addition, Richmond’s plan encourages the development and inclusion of affordable housing units close to community and retail amenities such as parks, full-service grocery stores, local public transit stops, retail and public services.⁹⁸

Though most homes built as a part of infill developments will be new, the quality of the surrounding residential building stock affects residents in both the new and old homes. Santa Ana’s general plan promotes housing quality through proactive code enforcement. This includes provisions for proactive inspections, educating landlords and tenants about housing codes and standards, and the mitigation or removal of blighted or unhealthful conditions.⁹⁹

CONCLUSION

Over 35 years have passed since then-Governor Jerry Brown released “An Urban Strategy for California,” a groundbreaking report that included a framework for sustainable and healthy infill development. Over the past three decades, major changes in the state’s demographics and shifting economic and environmental landscapes have altered our urban form. Infill development is no longer a groundbreaking vision; it is a prerequisite for our communities’ growth.

The social, economic and environmental consequences of sprawl have forced development from the agricultural lands and open space at the edge of our communities, back to their centers. But unlike development that took place in open greenfields, infill is moored to the contours of industrial ports and freeways, sprawling suburbs, segregated neighborhoods, and other relics from California’s planning past. Infill development creates new challenges and requires new cooperation.

Ultimately, it will take a “Health in All Policies” approach to address the health impacts associated with infill development

Recent state-level actions underline that the time for change is now. In 2008, California passed SB 375, with the goal of reducing greenhouse gas emissions by linking land use to transportation planning. In 2011, the state enacted a law streamlining environmental review for urban infill projects that meet certain criteria, one of which is the “protection of public health.”¹⁰⁰ In 2012, the Strategic Growth Council made infill development one of its primary focus areas. The 2013 legislative session dealt with a multitude of bills seeking to incentivize infill development through reforming the California Environmental Quality Act (CEQA). Notably, Senate Bill 743 changed the analysis of transportation impacts under CEQA from one of “driver delay (e.g. level of service, or LOS) to reduction of greenhouse gas emissions, creation of multimodal networks and promotion of a mix of land uses.”¹⁰¹ And, in 2014, the Governor’s Office of Planning and Research (OPR) intends to release an update to its General Plan Guidelines, which provide guidance to California’s cities and counties as they prepare their local general plans. Ultimately, it will take a “Health in All Policies”¹⁰² approach to address the health impacts associated with infill development. General plans, zoning ordinances and Regional Transportation Plans (including Sustainable Communities Strategies) all need to play a role in encouraging healthy infill.



As a whole, California continues to struggle to create meaningful policy solutions that will not only promote the positive health impacts associated with infill development, but also minimize the potentially negative effects – particularly for people shouldering the greatest health burdens. Such changes are needed to drive planning and development toward a cleaner and more interconnected transportation infrastructure that can link residents with jobs, create a new mix of housing types reflecting the diversity and demographics of our cities, and build neighborhoods with a mix of uses that allow residents to meet their daily needs. The policies and plans that we develop over the next ten years will shape our cities and set the foundations for our quality of life long into the future. It is imperative, then, to use our best tools and most promising strategies to create healthy, thoughtfully-designed communities.



APPENDIX: GENERAL PLAN POLICY REVIEW

HEALTHY INFILL GENERAL PLAN POLICIES BY JURISDICTION

	Chino	El Monte	Encinitas	Humboldt County	Kings County	Mountain View	Murietta	Rancho Cucamonga	Redwood City	San Jose	San Pablo	Santa Clara	South Gate
LAND USE													
Mixed-use/neighborhoods	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Explicit	Health Implicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit
Urban infill	Health Explicit	Health Explicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit
TRANSPORTATION													
TOD	Health Implicit	Health Explicit	Health Explicit	Health Implicit	Health Implicit	Health Explicit	Health Implicit	Health Explicit	Health Implicit	Health Explicit	Health Implicit	Health Explicit	Health Explicit
Transit access	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Implicit	Health Explicit	Health Implicit	Health Explicit	Health Implicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit
VMT/traffic reduction	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Implicit	Health Explicit	Health Implicit	Health Explicit	Health Implicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit
Traffic safety	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Explicit	Health Explicit	Health Implicit	Health Explicit	Health Explicit	Health Implicit	Health Explicit
Truck routes and emissions	Health Explicit	Health Explicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit
Safe routes to schools	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit
Complete streets	Health Implicit	Health Explicit	Health Explicit	Health Implicit	Health Implicit	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit
Transit incentives and education	Health Implicit	Health Implicit	Health Explicit	Health Implicit	Health Implicit	Health Implicit	Health Explicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit
Bicycle facilities/design	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Explicit	Health Explicit	Health Implicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit
Pedestrian facilities/design	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit
AIR & ENVIRONMENTAL QUALITY													
Pollution/hazardous materials	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit
Brownfield cleanup	Health Implicit	Health Implicit	Health Implicit	Health Explicit	Health Implicit	Health Explicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit
Green streets/trees and landscaping	Health Explicit	Health Implicit	Health Explicit	Health Implicit	Health Implicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Explicit
ACCESS TO DAILY NEEDS													
Access to health care and services	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Explicit	Health Implicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit
Parks, open space, and recreation	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Implicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit
Food access	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Implicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit
Urban agriculture	Health Explicit	Health Implicit	Health Explicit	Health Implicit	Health Implicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Explicit
Farmers' markets	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Implicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit
Healthy food retail	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Implicit	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit
Emergency food and food assistance	Health Explicit	Health Implicit	Health Explicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit	Health Implicit
EQUITY													
Equitable distribution of opportunity and risk	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Explicit	Health Implicit	Health Implicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Explicit
Vulnerable populations	Health Explicit	Health Implicit	Health Explicit	Health Explicit	Health Implicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Explicit	Health Implicit	Health Explicit

 **"Health Explicit;"** policy language includes health rationale
 **"Health Implicit;"** policy language does not include specific health rationale

ENDNOTES

- 1 *The Transportation and Environmental Impacts of Infill Versus Greenfield Development: A Comparative Case Study Analysis*. United States Environmental Protection Agency, Urban and Economic Development Division, EPA publication 231-R-99-005, October 1, 1999 (noting infill can provide lower public infrastructure costs compared with greenfield developments). Available at www.epa.gov/dced/pdf/infill_greenfield.pdf.
- 2 See Fitz, Dennis R. et al. *Characterizing the Range of Children's Pollutant Exposure During School Bus Commutes, Final Report*. California Environmental Protection Agency Air Resources Board, 2003. (Finding "Overall, children's school bus commutes in Los Angeles appear to expose them to significantly higher concentrations of vehicle-related pollutants than ambient air concentrations and frequently higher concentrations than those measured on roadways.") Available at www.arb.ca.gov/research/schoolbus/schoolbus.htm.
- 3 Health Effects Institute, Panel on the Health Effects of Traffic-Related Air Pollution. *Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects*. Health Effects Institute Special Report 17, 2010, at 3-7 - 3-8. Available at <http://pubs.healtheffects.org/getfile.php?u=553>.
- 4 See Maizlish, Neil, et al. "Health Cobenefits and Transportation-Related Reductions in Greenhouse Gas Emissions in the San Francisco Bay Area." *American Journal of Public Health* 103, no. 4 (2013): 703-709. Available at <http://ajph.aphapublications.org/doi/full/10.2105/AJPH.2012.300939>.
- 5 Besser, Lilah M., and Andrew L. Dannenberg. "Walking to Public Transit: Steps to Help Meet Physical Activity Recommendations." *American Journal of Preventive Medicine* 29, no. 4 (2005): 273-280.
- 6 See Frank, Lawrence D., et al. "Linking Objectively Measured Physical Activity with Objectively Measured Urban Form: Findings from SMARTRAQ." *American Journal of Preventive Medicine* 28, no. 2 (2005): 117-125, 124 (concluding that "people are more physically active and more likely to meet recommendations of + 30 minutes of moderate activity when they live in neighborhoods with nearby shops and services, with many street connections between residential and commercial districts."). Available at [www.ajpmonline.org/article/S0749-3797\(04\)00325-3/fulltext](http://www.ajpmonline.org/article/S0749-3797(04)00325-3/fulltext).
- 7 Maizlish, *id.* at 703.
- 8 Landis, John D., et al. "The Future of Infill Housing in California: Opportunities, Potential, and Feasibility." *Housing Policy Debate* 17, no. 4 (2006): 681-725.
- 9 Pollack, Stephanie, Barry Bluestone, and Chase Billingham. *Maintaining Diversity in America's Transit-Rich Neighborhoods: Tools for Equitable Neighborhood Change*. Northeastern University Kitty & Michael Dukakis Center for Urban and Regional Policy, 2010, at 1. Available at http://iris.lib.neu.edu/dukakis_pubs/3.
- 10 Pendall, Rolf, et al. *Driving to Opportunity: Understanding the Links among Transportation Access, Residential Outcomes, and Economic Opportunity for Housing Voucher Recipients*. Urban Institute, 2014. Available at www.urban.org/url.cfm?ID=413078&renderforprint=1.
- 11 See, e.g., Loukaitou-Sideris, Anastasia, Robin Liggett, and Hyun-Gun Sung. "Death On The Crosswalk: A Study Of Pedestrian-Automobile Collisions In Los Angeles." *Journal of Planning Education and Research* 26, no. 3 (2007): 338-351 (noting California is already one of the most dangerous states for pedestrians, based on national injury data).
- 12 Maizlish, *supra* note 4, at 703.
- 13 *Id.* at 703 (discussing Bay Area-based model of ambitious active transportation scenario, in which additional risk of harm would be 14 percent of total anticipated health benefits).
- 14 See Jacobsen, Peter L., F. Racioppi, and H. Rutter. "Who Owns the Roads? How Motorised Traffic Discourages Walking and Bicycling." *Injury Prevention* 15, no. 6 (2009): 369-373.
- 15 Maizlish, *supra* note 4, at 707-708. See also Lindley, J. *Guidance Memorandum on Consideration and Implementation of Proven Safety Countermeasures*. U.S. Dept. of Transportation, Federal Highway Administration, July 10, 2008. Available at <http://safety.fhwa.dot.gov/policy/memo071008>.
- 16 See Smart Growth America. "National Complete Streets Coalition." Accessed April 29, 2014. www.smartgrowthamerica.org/complete-streets-fundamentals/complete-streets-faq.
- 17 See IFC Consulting with Myra L. Frank & Associates. *Desk Guide: Environmental Justice in Transportation Planning and Investments*. California Department of Transportation, January 2993, at 10. Available at www.dot.ca.gov/hq/LocalPrograms/saferoutes/EnvironmentalJusticeDeskGuideJan2003.pdf.
- 18 Passchier-Vermeer, Willy, and Wim F. Passchier. "Noise Exposure and Public Health." *Environmental Health Perspectives* 108, no. Suppl 1 (2000): 123. Available at www.ncbi.nlm.nih.gov/pmc/articles/PMC1637786.
- 19 See Clark, Charlotte, and Stephen A. Stansfeld. "The Effect of Transportation Noise on Health and Cognitive Development: A Review of Recent Evidence." *International Journal of Comparative Psychology* 20 (2007): 145-158.
- 20 Cal. Govt. Code § 65302(f) (2014).
- 21 *Id.* at § 65302(f)(1).
- 22 See *Air Quality and Land Use Handbook*. California Environmental Protection Agency Air Resources Board, April 2005, at 33. Available at www.arb.ca.gov/ch/landuse.htm.
- 23 *Desk Guide*, *supra* note 17, at 10.
- 24 For an exhaustive list, see *Expanding and Updating the Master List of Compounds Emitted by Mobile Sources - Phase III: Final Report*. U.S. Environmental Protection Agency, Report No. EPA 420-R-06-006, February 2006. Available at www.epa.gov/otaq/regs/toxics/420r06005.pdf.
- 25 See Health Effects Institute, *supra* note 3; see generally, US Environmental Protection Agency. "What are the Six Common Air Pollutants?." Last updated Apr. 2012. <http://epa.gov/airquality/urbanair>.

- 26 See generally, California Environmental Protection Agency Air Resources Board. "Health Impacts from Air Pollution." Last reviewed August 23, 2012, www.arb.ca.gov/research/health/health.htm; *Desk Guide*, *supra* note 17, at 11-15.
- 27 See *Estimate of Premature Deaths Associated with Fine Particle Pollution (PM2.5) in California Using a U.S. Environmental Protection Agency Methodology*. California Environmental Protection Agency Air Resources Board, August 31, 2010, at 19. Available at www.arb.ca.gov/research/health/pm-mort/pm-report_2010.pdf.
- 28 See generally, *Air Quality and Land Use Handbook*, *supra* note 22 at 8 (summarizing health studies on air pollution and respiratory conditions).
- 29 Thiering, E., et al. "Long-Term Exposure to Traffic-Related Air Pollution and Insulin Resistance in Children: Results from the GINIplus and LISAPlus Birth Cohorts." *Diabetologia* 56, no. 8 (2013): 1696-1704. Available at www.ncbi.nlm.nih.gov/pmc/articles/PMC3699704.
- 30 Brook, Robert D., et al. "Particulate Matter Air Pollution and Cardiovascular Disease: An Update to the Scientific Statement from the American Heart Association." *Circulation* 121, no. 21 (2010): 2331-2378. Available at <http://circ.ahajournals.org/content/121/21/2331.full>. See also American Heart Association, "New Evidence Links Ozone Exposure to Potential Heart Attacks" (June 25, 2012). Available at <http://newsroom.heart.org/news/new-evidence-links-ozone-exposure-235515>.
- 31 See Maizlish, *supra* note 4, at 704 (citing scientific reviews for specific outcomes including colon cancer, breast cancer and lung cancer).
- 32 Perez, Laura, et al. "Chronic Burden of Near-Roadway Traffic Pollution in 10 European Cities (APHEKOM network)." *European Respiratory Journal* 42, no. 3 (2013): 594-605.
- 33 See *Draft California Climate Adaptation Policy Guide*. California Emergency Management Agency and California Natural Resources Agency, April 2012, at 46-51. Available at http://resources.ca.gov/climate_adaptation/docs/DRAFT_APG_Public_Review_April_2012.pdf.
- 34 Health Effects Institute, *supra* note 3, at 3-3.
- 35 *Air Quality and Land Use Handbook*, *supra* note 22, at 1; Clark, Lara P., Dylan B. Millet, and Julian D. Marshall. "National Patterns in Environmental Injustice and Inequality: Outdoor NO₂ Air Pollution in the United States." *PLoS One* 9, no. 4 (2014): e94431. ("Nonwhites experience 4.6 ppb (38%) higher residential outdoor NO₂ concentrations than whites - an exposure gap that has potentially large impacts to public health. Within individual urban areas, after controlling for income, nonwhites are on average exposed to higher outdoor residential NO₂ concentrations than whites; and, after controlling for race, lower-income populations are exposed to higher outdoor residential average NO₂ concentrations than higher-income populations.") Available at www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0094431.
- 36 Houston, Douglas, Victoria Basolo, and Dongwoo Yang. "Walkability, Transit Access, and Traffic Exposure for Low-Income Residents with Subsidized Housing." *American Journal of Public Health* 103, no. 4 (2013): 673-678. Available at <http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2012.300734>.
- 37 *Air Quality and Land Use Handbook*, *supra* note 22 at 4.
- 38 See Health Effects Institute, *supra* note 3, at 3-10 - 3-13.
- 39 See *Status of Research on Potential Mitigation Concepts to Reduce Exposure to Nearby Traffic Pollution*. California Environmental Protection Agency Air Resources Board, 2012. Available at www.arb.ca.gov/research/health/traff-eff/research%20status%20-%20reducing%20exposure%20to%20traffic%20pollution.pdf.
- 40 *Air Quality and Land Use Handbook*, *supra* note 22 at 4.
- 41 Wolch, Jennifer, et al. "Childhood Obesity and Proximity to Urban Parks and Recreational Resources: A Longitudinal Cohort Study." *Health & Place* 17, no. 1 (2011): 207-214.
- 42 Kahn, Emily B., et al. "The Effectiveness of Interventions to Increase Physical Activity: A Systematic Review." *American Journal of Preventive Medicine* 22, no. 4 (2002): 73-107; See also Frank, Linking Objectively Measured Physical Activity with Objectively Measured Urban Form: Findings From SMARTRAQ, *supra* note 6.
- 43 Kuo, Frances E., Magdalena Bacaicoa, and William C. Sullivan. "Transforming Inner-City Landscapes: Trees, Sense of Safety, and Preference." *Environment & Behavior* 30, no. 1 (1998): 28-59.
- 44 See, e.g., Maas, Jolanda, et al. "Green Space, Urbanity, and Health: How Strong is the Relation?" *Journal of Epidemiology and Community Health* 60, no. 7 (2006): 587-592. Available at <http://jech.bmj.com/content/60/7/587.short>; Hartig, Terry, et al. "Tracking Restoration in Natural and Urban Field Settings." *Journal of Environmental Psychology* 23, no. 2 (2003): 109-123.
- 45 Taylor, Andrea Faber, Frances E. Kuo, and William C. Sullivan. "Coping with ADD: The Surprising Connection to Green Play Settings." *Environment & Behavior* 33, no. 1 (2001): 54-77.
- 46 See generally, Smart Growth Online. "Smart Growth Principles: Preserve open Space, Farmland, Natural Beauty, and Critical Environmental Areas." Accessed April 29, 2014. www.smartgrowth.org/principles/open_space.php.
- 47 Zenk, Shannon N., et al. "Neighborhood Retail Food Environment and Fruit and Vegetable Intake in a Multiethnic Urban Population." *American Journal of Health Promotion* 23, no. 4 (2009): 255-264.
- 48 Morland, Kimberly B., and Kelly R. Evenson. "Obesity Prevalence and the Local Food Environment." *Health & Place* 15, no. 2 (2009): 491-495.
- 49 Examples of retail leakage studies can be found at www.socialcompact.org. For a sample neighborhood market study see: "The Saint Louis Neighborhood Market DrillDown Catalyzing Investment for the Common Good," last accessed June 13, 2014. http://socialcompact.org/images/uploads/2012-05_STL_DrillDown_Report.pdf.
- 50 ChangeLab Solutions. "Shared Use," last accessed June 13, 2014. www.changelabsolutions.org/shared-use.
- 51 Sandy Gerber, "Community benefits agreements: A tool for more equitable development?," Community Dividend, Federal Reserve of Minneapolis, November 1, 2007, last accessed June 13, 2014, www.minneapolisfed.org/publications_papers/pub_display.cfm?id=1881.
- 52 Pollack, Stephanie, Barry Bluestone, and Chase Billingham. "Maintaining Diversity in America's Transit-Rich Neighborhoods: Tools for Equitable Neighborhood Change." *New England Community Developments*, 2010 (Issue 1). Available at www.bostonfed.org/commdev/necd/2010/issue1/diversity-transit-rich-neighborhoods.pdf.

- 53 Jacobs, David E., et al. "The Prevalence of Lead-Based Paint Hazards in US Housing." *Environmental Health Perspectives* 110, no. 10 (2002): A599. Available at www.ncbi.nlm.nih.gov/pmc/articles/PMC1241046/pdf/ehp0110-a00599.pdf; US Department of Health and Human Services. *The Surgeon General's Call to Action to Promote Healthy Homes*. Washington, DC: US Dept of Health and Human Services, Office of the Surgeon General, 2009, available at www.ncbi.nlm.nih.gov/books/NBK44192; Eggleston, Peyton A., et al. "Home Environmental Intervention in Inner-City Asthma: A Randomized Controlled Clinical Trial." *Annals of Allergy, Asthma & Immunology* 95, no. 6 (2005): 518-524; Kercksmar, Carolyn M., et al. "Reduction in Asthma Morbidity in Children as a Result of Home Remediation Aimed at Moisture Sources." *Environmental Health Perspectives* 114, no. 10 (2006): 1574. Available at www.ncbi.nlm.nih.gov/pmc/articles/PMC1626393; Centers for Disease Control and Prevention and US Department of Housing and Urban Development. *Healthy Housing Reference Manual*. Atlanta: US Department of Health and Human Services, 2006. Available at www.cdc.gov/nceh/publications/books/housing/housing.htm.
- 54 Stansfeld, Stephen, Mary Haines, and Bernadette Brown. "Noise and health in the urban environment." *Reviews on Environmental Health* 15, no. 1-2 (2000): 43-82; *Healthy Housing Reference Manual*, *supra* note 56; *The Surgeon General's Call to Action to Promote Healthy Homes*, *supra* note 53, at ch.2.
- 55 Runyan, Carol W., et al. "Unintentional Injuries in the Home in the United States: Part I: Mortality." *American Journal of Preventive Medicine* 28, no. 1 (2005): 73-79; Runyan, Carol W., et al. "Unintentional Injuries in the Home in the United States: Part II: Morbidity." *American Journal of Preventive Medicine* 28, no. 1 (2005): 80-87.
- 56 Pollack, Craig Evan, and Julia Lynch. "Health Status of People Undergoing Foreclosure in the Philadelphia Region." *American Journal of Public Health* 99, no. 10 (2009): 1833-1839. Available at www.ncbi.nlm.nih.gov/pmc/articles/PMC2741520; Evans, Gary W., et al. "Chronic Residential Crowding and Children's Well Being: An Ecological Perspective." *Child Development* 69, no. 6 (1998): 1514-1523, Available at <http://onlinelibrary.wiley.com/doi/10.1111/j.1467-8624.1998.tb06174.x/pdf>; Lepore, Stephen J., Gary W. Evans, and M. N. Palsane. "Social Hassles and Psychological Health in the Context of Chronic Crowding." *Journal of Health and Social Behavior* 32, no.4 (1991): 357-367; Gove, Walter R., Michael Hughes, and Omer R. Galle. "Overcrowding In the Home: An Empirical Investigation of its Possible Pathological Consequences." *American Sociological Review* (1979): 59-80.
- 57 Gasper, Joseph, Stefanie DeLuca, and Angela Estacion. "Switching Schools: Revisiting the Relationship Between School Mobility and High School Dropout." *American Educational Research Journal* 49, no. 3 (2012): 487-519.
- 58 Evans, *supra* at note 56; Lepore, *supra* at note 56, Gove, *supra* at note 56.
- 59 Gove, *supra* at note 56, at 72; Peedicayil, Abraham, et al. "Spousal Physical Violence Against Women During Pregnancy." *BJOG: An International Journal of Obstetrics & Gynaecology* 111, no. 7 (2004): 682-687. Available at <http://onlinelibrary.wiley.com/doi/10.1111/j.1471-0528.2004.00151.x/full>.
- 60 Cardoso, Maria RA, et al. "Crowding: Risk Factor or Protective Factor for Lower Respiratory Disease in Young Children?" *BMC Public Health* 4, no. 1 (2004): 19. Available at www.biomedcentral.com/1471-2458/4/19; Baker, Michael, et al. "Household Crowding a Major Risk Factor for Epidemic Meningococcal Disease in Auckland Children." *The Pediatric Infectious Disease Journal* 19, no. 10 (2000): 983-990; Fonseca, Walter, et al. "Risk Factors for Childhood Pneumonia Among the Urban Poor in Fortaleza, Brazil: A Case - Control Study." *Bulletin of the World Health Organization* 74, no. 2 (1996): 199-208. Available at www.ncbi.nlm.nih.gov/pmc/articles/PMC2486894; Victora, Cesar G., et al. "Risk Factors for Pneumonia Among Children in a Brazilian Metropolitan Area." *Pediatrics* 93, no. 6 (1994): 977-985.
- 61 March, Elizabeth L. et al. *Rx for Hunger: Affordable Housing*. Boston: Children's HealthWatch and Medical-Legal Partnership Boston, 2009. Available at www.childrenshealthwatch.org/publication/rx-for-hunger-affordable-housing; Pollack, Craig Evan, Beth Ann Griffin, and Julia Lynch. "Housing Affordability and Health Among Homeowners and Renters." *American Journal of Preventive Medicine* 39, no. 6 (2010): 515-521, available at [www.ajpmonline.org/article/S0749-3797\(10\)00455-1/fulltext](http://www.ajpmonline.org/article/S0749-3797(10)00455-1/fulltext).
- 62 Steinacker, Annette. "Infill Development and Affordable Housing Patterns from 1996 to 2000." *Urban Affairs Review* 38, no. 4 (2003): 492-509, 495 (noting "infill areas by definition are less desirable sites, often suffering from brownfield or other environmental problems").
- 63 Bhatia, Rajiv, and Carolina Guzman. *The Case for Housing Impacts Assessment: The Human Health and Social Impacts of Inadequate Housing and their Consideration in CEQA Policy and Practice*. San Francisco Department of Public Health. Occupational and Environmental Health Section, Program on Health, Equity, and Sustainability, 2004.
- 64 *Id.* at 496, 505 (discussing greater complexity and financing difficulties for city redevelopment than suburban greenfield projects, noting that infill projects most successful with financing had highest housing values relative to suburbs); California Infill Builders Association. "The Top Roadblocks to Infill Development in California." Accessed April 29, 2014. <http://infill-builders.org/pdfs/Roadblocks-226-Letter.pdf>. (Describing less economically competitive status of many infill projects in existing neighborhoods relative to those in undeveloped areas).
- 65 Beyers, Matt et al., *Life and Death from Unnatural Causes: Health and Social Inequity in Alameda County*. Oakland, CA: Alameda County Public Health Department, 2008, at 134-135. Available at: www.acphd.org/media/53628/unnatcs2008.pdf.
- 66 Landis, *supra* note 8, at 710-12.
- 67 *The State of the Nation's Housing 2013*. Cambridge, MA: Joint Center for Housing Studies of Harvard University, 2013, ch. 4. Available at www.jchs.harvard.edu/research/state_nations_housing.
- 68 Bhatia, Rajiv, and Carolina Guzman, *supra* note 63, at 5.
- 69 See Cal. Govt. Code § 65583(c) (2014); Cal. Pub. Res. Code § 21155.1 (2014).
- 70 Pollack, *supra* note 9, at 33 ("While we can confidently say we found some evidence of gentrification in the majority of newly transit-served neighborhoods, it is more difficult to determine whether this gentrification was accompanied by involuntary displacement of former neighborhood residents."). In contrast, some communities have adopted assessment metrics for affordable housing in their planning guidelines. See Bhatia, Rajiv, and Carolina Guzman, *supra* note 63.
- 71 Cal. Govt. Code § 65302 (2014).
- 72 See California Environmental Resources Evaluation System (CERES). "What's in a General Plan." Accessed April 29, 2014. <http://ceres.ca.gov/planning/genplan/whatsin.html>.
- 73 *Healthy Planning Policies: A Compendium from California General Plans*. Oakland, CA: ChangeLab Solutions, 2009. Available at www.changelabsolutions.org/publications/healthy-planning-policies.

- 74 *How to Create and Implement Healthy General Plans: A Toolkit for Building Healthy, Vibrant Communities*. Oakland, CA: ChangeLab Solutions, 2008. Available at www.changelabsolutions.org/publications/toolkit-healthy-general-plans.
- 75 Chino, Cal., "Envisioning Chino: City of Chino General Plan 2025: A Healthy City" (2010), available at www.cityofchino.org/home/showdocument?id=3439.
- 76 Chino, Cal., "Envisioning Chino: City of Chino General Plan 2025: Economic Development Element" (2010), available at www.cityofchino.org/home/showdocument?id=3434.
- 77 El Monte, Cal., "Vision El Monte" (2011), City of El Monte General Plan: Health and Wellness Element, available at www.elmonteca.gov/LinkClick.aspx?fileticket=fxX1AXvVXhQ%3d&tabid=660.
- 78 Cal. Govt. Code § 65302 (2014).
- 79 Marin County, Cal., "Marin Countywide Plan: Built Environment Element" (2007), available at www.marincounty.org/depts/cd/divisions/planning/2007-marin-countywide-plan/countywide-plan; Riverside County, Cal., "County of Riverside General Plan - GPA 1096: Chapter 10 - Healthy Communities Element" (2011), available at www.rivcoph.org/Portals/0/pdf/FINALHCE3_23_2011.pdf.
- 80 El Monte, Cal., *supra* note 77.
- 81 San Pablo, Cal., "San Pablo General Plan 2030: Land Use Element" (2011), available at www.sanpabloca.gov/DocumentCenter/Home/View/669.
- 82 South Gate, Cal., "South Gate General Plan 2035: Healthy Community Element" (2010), available at www.sogate.org/sgcms/media/File/General_Plan/07_SouthGate_General_Plan_Chapter_7_Health.pdf.
- 83 Kings County, Cal., "County of Kings General Plan 2035, Resource Conservation Element" (2010), available at www.countyofkings.com/home/showdocument?id=3112.
- 84 San Pablo, Cal., *supra* note 81.
- 85 Rancho Cucamonga, Cal., "Rancho Cucamonga General Plan: Chapter 1: An Introduction to the Rancho Cucamonga General Plan" (2010), available at www.cityofrc.us/civica/filebank/blobdload.asp?BlobID=6812.
- 86 Encinitas, Cal., "Encinitas 2035 General Plan Update. Public Health Element, Draft" (2012), available at www.cityofencinitas.org/modules/showdocument.aspx?documentid=1382.
- 87 South Gate, Cal., *supra* note 82.
- 88 Rancho Cucamonga, Cal., "Rancho Cucamonga General Plan: Chapter 2: Managing Land Use, Community Design, and Historic Resources" (2010), available at www.cityofrc.us/civica/filebank/blobdload.asp?BlobID=12518.
- 89 Murietta, Cal., "Murietta General Plan 2035: Healthy Community Element" (2011), available at www.murrieta.org/cityhall/cd/planning/general.asp.
- 90 Murietta, Cal., "Murietta General Plan 2035: Conservation Element" (2011), available at www.murrieta.org/cityhall/cd/planning/general.asp.
- 91 Sonoma County, Cal., "Sonoma County General Plan 2020: Circulation and Transit Element" (2010), available at www.sonoma-county.org/PRMD/gp2020/index.htm.
- 92 Chino, Cal., "Envision Chino General Plan 2025: Transportation Element" (2010), available at www.cityofchino.org/home/showdocument?id=3435.
- 93 Redwood City, Cal., "Redwood City General Plan: Built Environment Element" (2010), available at www.redwoodcity.org/phed/planning/generalplan/FinalGP/01.2_Built_Environment_Urban_Form_Lnd_Use.pdf.
- 94 Fresno County, General Plan Public Facilities and Services Element, Section I, www2.co.fresno.ca.us/4510/4360/General_Plan/GP_Final_policy_doc/Public_Facilities_Element_rj.pdf (Accessed June 11, 2014)
- 95 El Monte, Cal., *supra* note 77.
- 96 Marin County, Cal., *supra* note 79.
- 97 Richmond, Cal., "General Plan 2030: Community Health and Wellness Element" (2011), available at www.ci.richmond.ca.us/index.aspx?nid=2608.
- 98 *Id.*
- 99 City of Santa Ana, "General Plan Housing Element." www.ci.santa-ana.ca.us/housingelement/2014-2021HousingElementUpdate.asp (Accessed June 11, 2014)
- 100 Environmental Quality, Cal. S.B 226, 2011-2012 Reg. Sess. (October 4, 2011).
- 101 *Preliminary Evaluation of Alternative Methods of Transportation Analysis*. State of California, Governor's Office of Planning and Research, 2013 (describing Cal. S.B. 743, 2013-2014 Reg. Sess. (September 27, 2013)). Available at www.opr.ca.gov/docs/PreliminaryEvaluationTransportationMetrics.pdf.
- 102 Kickbusch, Ilona, and Kevin Buckett. "Implementing health in all policies: Adelaide 2010." Adelaide: Government of South Australia, 2010. Available at www.who.int/sdhconference/resources/implementinghiapadel-sahealth-100622.pdf.



ChangeLab Solutions
Law & policy innovation for the common good.