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Planning for Complementarity: An Examination of the Roll and Opportunities of First-Tier and Second-Tier Cities Along the High-Speed Rail Network in California, Research Report 11-17

Anastasia Loukaitou-Sideris
University of California at Los Angeles

Dana Cuff
University of California at Los Angeles

Harrison Higgins
University of California at Los Angeles

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MTI Report 11-17

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REPORT 11-17

PLANNING FOR COMPLEMENTARITY: AN EXAMINATION OF THE ROLE AND OPPORTUNITIES OF FIRST-TIER AND SECOND-TIER CITIES ALONG THE HIGH-SPEED RAIL NETWORK IN CALIFORNIA

Anastasia Loukaitou-Sideris, Ph.D.
Dana Cuff, Ph.D.
Harrison Higgins, AICP
Wenbin Wei, Ph.D.

with
Per Johan Dahl
David Dixon
Shelma Jun
Karen Kice
Orly Linovski
Matthew Piven
Kimberly Williams

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16. Abstract

The coming of California High-Speed Rail (HSR) offers opportunities for positive urban transformations in both first-tier and second-tier cities. The research in this report explores the different but complementary roles that first-tier and second-tier cities along the HSR network can play in making California more sustainable and less dependent on fossil fuels while reducing mobile sources of greenhouse gas emissions and congestion atairports and on the state's roadways. Drawing from case studies of cities in Northern and Southern California, the study develops recommendations for the planning, design, and programming of areas around California stations for the formation of transit-supportive density nodes.

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Mineta Transportation Institute
College of Business
San José State University
San José, CA 95192-0219

Tel: (408) 924-7560
Fax: (408) 924-7565
Email: mineta-institute@sjsu.edu

transweb.sjsu.edu

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EXECUTIVE SUMMARY

High-Speed Rail (HSR) will link California's first-tier cities (the primary centers of large metropolitan areas) to one another and to second-tier cities (smaller and more peripheral towns), potentially increasing both mobility and accessibility in an unprecedented way. The system is also expected to have important physical and economic impacts on station cities, but to date, limited research exists to guide public policy efforts directing development around HSR stations. The economic, urban design, real estate market, and municipal behavior variables that may influence urban change in the context of HSR remain largely understudied.

A state agency, the California High-Speed Rail Authority (CaSHRA), is charged with designing and managing the implementation of the HSR network. While federal and state funds will pay for the construction of the network, local cities with stations connecting them to the HSR system will be responsible for development around their stations. Despite the fact that station cities will have to provide station buildings and platforms, parking, and enhanced local transit connectivity and infrastructural capacity, many have not yet started planning for HSR. Some cities that have initiated planning efforts are focusing their attention on their stations as isolated entities in the system and in the city, often ignoring the possible complement that adjacent stations on the HSR corridor may provide, and how the station may integrate into the city and region. Indeed, a regional look at the interrelationship of multiple stations on the network and an examination of possible complementary roles is all but missing. Research has, nevertheless, shown that pre-planning is essential if environmental, economic development and transportation goals are to be attained, and if the effects of transit on development patterns are to be positive and robust. Research has also shown that regional systems require regional planning practices. This is even more significant since the HSR will compress distances and travel times. Thus, cities fifty miles apart on the network can be considered as being in the same region.

Differences in land costs and housing affordability between first- and second-tier cities also point to new opportunities and potentially complementary roles for the density nodes that may develop around stations. For example, second-tier cities could provide much needed affordable housing to workers employed in first-tier cities. At the same time, residents of second-tier cities may better take advantage of the cultural, entertainment, and retail facilities of first-tier cities, thus boosting first-tier economies. The possibility for negative results also exists, however, if appropriate land use regulations and design and development guidelines are not in place. The HSR system may encourage sprawl if new housing developments are not concentrated in close proximity to stations. Furthermore, greater access to the more varied goods and services found in first-tier cities could challenge the viability of business providing similar services in second-tier cities.

The objectives of the research reported here are: 1) to understand the important preconditions for positive HSR station area development and how these may differ between first-tier and second-tier cities; 2) to assess the degree to which key economic, urban design, real estate market, and municipal behavior preconditions are present in two first-tier cities and their adjacent second-tier cities on California's HSR network; 3) to examine how California station cities are preparing for the HSR and; 4) to propose policy

and urban design recommendations to foster positive development and complementarity in California's station cities.

The study began with a systematic review of the literature of the relationship between rail transportation investments and land use effects in the United States. For an empirical grounding of our literature findings, we first conducted a survey of HSR experts from the fields of urban planning, urban design, economic development, and transportation planning, who have studied the impacts of different HSR systems in Europe and Asia. Additionally, we undertook a series of in-depth case studies of land use and urban design policy in two first-tier (Los Angeles and San Jose) and four second-tier (Anaheim, Norwalk, Fresno, and Gilroy) California cities to better understand the complexity of contextual issues of California HSR stations in first-tier and second-tier cities. For our six case studies, we reviewed existing socio-demographic, real estate, and employment characteristics, and local plans to understand their local contexts and assets, and their development potential. We also conducted interviews with important land use, development, and transportation actors in the case study cities to identify the attitudes and visions of local stakeholders and the kinds of plans and policies that direct development.

Our research on the effects of HSR on land use and development patterns suggests that the preconditions for successful development around stations are likely to differ for stations in first-tier cities and those in second-tier cities. We have found that – at least in European and Asian contexts – HSR stations in first-tier cities play a different role in catalyzing development than stations in second-tier cities, are likely to experience different positive and negative urban form impacts, and require different preconditions for successful development. Such examples imply that HSR is likely to redistribute growth in California, and the benefits and burdens of providing HSR will be unevenly distributed. We also found that there is quite a lot of variation among California's second-tier cities in terms of context (urban, suburban, exurban, rural), local economy, preexisting local assets, municipal behavior, distance from first-tier cities, etc. Such variables are likely to affect potential development impacts from the HSR.

Drawing from our research, we outline several general recommendations for station cities wishing to leverage the HSR so as to bring about positive development and growth.

1. Each station city should carefully consider both its local and regional context and economy.

2. Cities should consider the interface of four spatial zones: the station itself, the station-adjacent district, the municipality at large, and the larger region which includes adjacent station cities.

3. Planning for the HSR should include centrally locating stations, enhancing the multimodal connectivity and complementarity of different transportation nodes, encouraging greater station-area density, mitigating the barrier effect of parking, and creating an urban design vision and land use plan for the station area that builds on and complements existing local assets.

4. Current planning for HSR estimates completion of the network over two decades. The development effects of HSR may take as many as two additional decades to realize. Thus, planning must be undertaken as a set of phased goals that can be accomplished at various stages of system development. Given the uncertainty surrounding HSR development, station cities should consider scenario-planning approaches that offer a series of alternative visions for future station area development and evaluate those alternatives in terms of their desirability, feasibility, and ability to complement and enhance local comparative advantages.

5. Second-tier cities should consider catalytic projects, complementary planning with first-tier neighboring cities and branding strategies that emphasize their unique offerings and assets. Some second-tier dormitory cities have the potential to create affordable, workforce housing for their first-tier neighbors along the rail line. It will be important to plan in ways that guide this likely outcome toward positive effects and to prevent suburban sprawl. Not only will this help meet regional environmental goals, but it will make later mixed-use development in the station area more likely.

6. If second-tier cities have aspirations to become urban, mixed-use destinations, they should create interim plans that recognize their current lower density and real estate values.

7. Planning for HSR in low-density second-tier cities should take into account not only the immediate station area (half-mile radius), but also the five-mile radius and, in particular, the densest nodes or destinations within that wider region for jobs, services, and commercial activity. Particular attention should be given to the ways that these more distant nodes are well-connected to the HSR station via different transportation modes.

8. Station design should take into account value capture in the surrounding area as a means for the public sector to generate desired development effects.

9. To encourage surrounding development, stations should be less internally focused (e.g., shopping mall model) and more externally oriented hubs, and be well-connected to the adjacent area and the rest of the city through a robust transportation network.

10. To encourage complementarity at the regional level, a Joint Powers Authority consisting of high-level representatives and/or planners from all station cities should be considered. Such a body could help establish a regional vision for the HSR corridor and set goals that are mutually beneficial for cities along the line.

I. INTRODUCTION

High-Speed Rail (HSR) will link California's first-tier cities (the primary centers of large metropolitan areas) to one another and to second-tier cities (smaller and more peripheral towns), potentially increasing both mobility and accessibility in an unprecedented way (Figure 1). Additionally, the arrival of the HSR in certain California cities is likely to alter the built environment of the adjacent station neighborhoods and also have impacts on municipal economies. Scholarly literature on the physical and economic effects of railway systems on cities tells us that their impacts are not similar but depend on a variety of locational and economic factors. Additionally, positive development around stations does not happen overnight. Research has shown that pre-planning is essential if environmental, economic development, and transportation goals are to be attained, and if the effects of transit on development patterns are to be positive and robust.

An assumption of this study is that pre-planning for the HSR should simultaneously happen at two levels: 1) a *local level* that considers the particularities of each city, its physical context, local economy, comparative local assets, and aspirations, with an eye towards leveraging the HSR to complement and enhance these assets; and 2) a *regional level* that examines the possible complementary roles of different cities and their economies on the HSR network. Thus, planning for complementarity involves building on and complementing the current assets of station cities to take advantage of the HSR investment, but also better integrating these cities into the HSR network by considering how one city can better take advantage of its new-found proximity to another.

Our research on the effects of HSR on land use and development patterns suggests that the preconditions for successful development around stations differ for stations in first-tier cities and those in second-tier cities. We have found that – at least in European and Asian contexts – HSR stations in first-tier cities play a different role in catalyzing development than stations in second-tier cities, experience different positive and negative urban form impacts, and require different preconditions for successful development.[1] Because localities are increasingly assuming a large portion of the risk associated with large infrastructure projects like HSR, and because the ability to shoulder these risks is different for first-tier and second-tier cities, it is important to explore their potential implications for California localities even if they are not perfectly transferable to the state's planning context.

Figure 1. HSR Alignment and Case Study Cities

Differences in land costs and housing affordability between first- and second-tier cities also point to new opportunities and potentially complementary roles for the density nodes that may develop around stations in these different types of places. For example, second-tier cities could provide much needed affordable housing to workers employed in first-tier cities, a phenomenon that is already taking place in France and Spain. At the same time, residents of second-tier cities may better take advantage of the cultural, entertainment, and retail facilities of first-tier cities, thus boosting first-tier economies. The possibility for negative results also exists, however, if appropriate land use regulations and design and development guidelines are not in place. Under this "free market" scenario, the HSR system may encourage sprawl, if new housing developments are notconcentrated in close

proximity to stations. Furthermore, greater access to the more varied goods and services found in first-tier cities could challenge the viability of business providing similar services in second-tier cities.

Thus far, limited research exists to guide public policy efforts directing development around HSR stations. To date, the economic, urban design, real estate market, and municipal behavior variables that may influence urban change in the context of HSR remain largely understudied. In addition, many California municipalities have not yet started planning for high-speed rail. The few cities that have started the planning process seem to be planning only for stations as isolated entities in the system, often ignoring the possible complement that adjacent stations on the HSR corridor may provide. A regional look at the interrelationship of multiple stations on the network and an examination of possible complementary roles is all but missing.

RESEARCH QUESTIONS

The study seeks to answer the following questions:

1. What are important preconditions for positive station area development in HSR cities and station areas as indicated from examples in Europe and Asia, and are these relevant for California cities?

2. How are these preconditions different for first-tier and second-tier cities in California?

3. In what ways are municipalities in the case study cities preparingto take advantage of HSR? Are they planning for complementarity?

4. What policy and design recommendations should be in place to foster positive development in California's station cities?

METHODS

The study begins with a systematic review of the literature of the relationship between rail transportation investments and land use ef fects in the United States. In the U.S., most of this literature is based on observations of commuter rail systems. Nevertheless, we were able to discern – from a review of scholarship to date – the degree to which observers have identified the same or different preconditions for positive development as those found to af fect development around HSR stations in other parts of the world. We also sought to identify and review studies that examine the regional effects of HSR corridors, the relationships between first-tier and second-tier cities along such corridors, the corresponding regional land use and transportation policies, and the degree to which they realize the benefits of complementarity.

For an empirical grounding of our literature findings, we first conducted a Delphi survey (a technique that seeks to reach a systematic group judgment among a panel of experts through an iterative survey process). Survey participants were HSR experts from the fields of urban planning, urban design, economic development, and transportation planning, who

have studied the impact of different HSR systems in Europe and Asia (Appendix A). The Delphi survey gathered information on:

- the characteristics and different types of urban development that has emerged around high-speed rail stations (particularly the characteristics of development in terms of environmental and urban effects);

- the prerequisite economic, real estate, policy, transportation, urban development, and municipal response variables that must be in place for appropriate, high-speed rail urbanism to develop; and

- best practices in terms of land use, urban design, transportation planning, and architectural programming which can bring about positive changes.

Additionally, we conducted a series of in-depth case studies of land use and urban design policy in six cities to better understand the complexity of contextual issues of California HSR stations in first-tier and second-tier cities. We selected only Phase 1 cities and limited first-tier cases to the largest metropolitan city in Southern California (Los Angeles) and the largest metropolitan city in Northern California (San Jose), and second-tier cases to cities within an hour of HSR commute from these two first-tier cities. These cities were Bakersfield, Palmdale, Sylmar/San Fernando, Burbank, Norwalk, and Anaheim, all within an hour's commute from Los Angeles on the HSR network; and Gilroy, Merced, and Fresno, within a one-hour commute from San Jose. (Cities to the north of San Jose were considered to be in San Francisco' s rather than San Jose' s commuter shed). To select case study examples from these nine second-tier cities, we further classified them into: 1) small metropolitan cities (Fresno); 2) suburban employment centers (Anaheim, Burbank, and Sylmar/San Fernando); 3) suburban dormitory cities (Norwalk/Santa Fe Springs); 4) exurban dormitories (Gilroy and Palmdale), and rural dormitories (Merced) (see Figure 1). From these potential case studies, we selected four: Fresno (second-tier , small metropolitan city); Anaheim (second-tier, suburban employment center); Norwalk (second-tier, suburban dormitory); and Gilroy (second-tier, exurban dormitory). Thus, with the exception of large metropolitan cities (from which we chose two case studies) and rural dormitories (of which we chose none), we chose one of each type and ensured an equal representation of Northern and Southern California cities.

We examined the physical and economic context in each city and reviewed station-area plans and regulations. We also conducted interviews with important land use, development, and transportation actors in each city to understand the attitudes and visions of local stakeholders and how they prepare for the HSR. Through these interviews, we attempted to discern the role of municipal behavior, the existence of station master plans and economic incentives, and the potential for joint development and redevelopment projects in station areas to determine the degree to which the identified and validated preconditions for successful station area development are in place.

The data from individual cases was compiled and compared to determine the state of planning, design, policy-making and governance that exists on northern and southern portions of the California HSR network.

RESEARCH BACKGROUND: HIGH-SPEED RAIL DEVELOPMENT IN CALIFORNIA

Compared to other European or Asian countries, California has been a recent player in HSR development. The state's interest in HSR dates back to 1996, when legislation established the California High-Speed Rail Authority (CaHSRA) and required a 20-year plan. However, HSR development became more realistic with the dedication of the federal economic stimulus funds for rail projects in 2009, as well as a voter-approved bond measure in 2008, which have greatly increased the public funds available for the project, while establishing specific requirements for HSR in California.

A turning point in the development of HSR in California came with the approval of Proposition 1A in the November 2008 state elections. While some state funds had been previously dedicated for HSR, this ballot proposition and bond measure allocated $9 billion to the California High-Speed Rail Authority and additional funds for upgrading connecting train lines. The law as adopted includes specific stipulations on journey times (for example, the trip between San Francisco and Los Angeles must not exceed 2 hours and 40 minutes), number of stations and train speeds. [2] The law also includes broader conditions – that stations should be "located in areas with good access to local mass transit" and the system should "be planned and constructed in a way that minimizes urban sprawl and impacts on the natural environment."[3] While it is difficult to assess whether a station will minimize urban sprawl, the maximum time and station number regulations have limited the route options and alignments available.[4],[5]

Further commitment to HSR came from the federal government in the form of economic stimulus funds with the American Recovery and Reinvestment Act (ARRA) in 2009. While the Act included the expansion of social benefits and tax incentives, a large portion was dedicated to infrastructural projects. With over $8 billion dedicated to rail projects nationwide, California initially received $2.34 billion. As some states canceled stimulus-funded rail projects, California has received increased amounts of federal funding. Thus, in late 2009, $624 million of funds originally designated for HSR in Wisconsin and Ohio were redirected to the California project, after those states suspended work on their proposed HSR systems. Florida's recent rejection of federal funds is expected to bring the total federal commitment to California HSR up to $3.5 billion.[6]

As with Proposition 1A funds, money from the federal government has restrictions on use and length of availability. The majority of federal funds include deadlines for environmental clearance and use of funds, with the forfeiture of any funds not spent by 2017. Furthermore, the bulk of federal funds are required to be used for the Central Valley segment, which has the least public opposition and is believed to be the most likely to be completed by the 2017 deadline.[7] The remainder of the estimated $98.1-billion cost of construction is to come from state bonds, local governments, as well as the private sector through public-private partnerships or agreements with private sector contractors. [8] It is anticipated that the majority of station-area development will be undertaken by the private sector.

The California High-Speed Rail Authority (CaHSRA), established in 1996 as an independent authority with a nine-person board, is responsible for the planning and implementation of

the statewide network. Charged with undertaking system-wide planning, the Authority has completed reports for EIR review, as well as business plans and engineering guidelines. Because of the CaHSRA's limited staff (less than twenty), most of this work is carried out by contracted consultations. [9] It is intended that local-level planning is undertaken independently by municipalities, but many cities have raised concerns about this unfunded mandate. This has led the CaHSRA to publish urban design guidelines (see Section 4) and issue matching planning grants for station-area planning efforts, with a total of $4.5 million of ARRA funds allocated for station-area planning.[10] The funds allocated to each city range from $400,000 to $700,000 from federal stimulus funding and up to $200,000 from state funding. The amount is based on the cost of each city's planning efforts and available matching funds. So far, grants have been promised to the cities of Merced, Fresno,Tulare/ Kings, Bakersfield, San Jose, Gilroy, and Palmdale. As we will later report, the state of local level planning varies considerably, with significant differences in the number of dedicated staff and planning or policy initiatives.

While Proposition 1A establishes a basic route for the HSR project, stating that the "system will link all of the state's major population centers, including Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego," studies of potential station locations were initiated much earlier than the legislation. Senate Bill 1420, which created the California High-Speed Rail Authority, allowed for the Authority to select a proposed route and terminal sites. The first report detailing a "preferred corridor" and station sites was approved by the CaHSRA in July 1999 after a series of public meetings.[11]

The 2008 statewide Environmental Impact Report (EIR) presents several route alternatives and the reasons for their rejection, ranging from logistical constraints, to environmental impacts, to difficulty in acquiring rights-of-way.[12] The selection of routes and station locations included in the EIR report was based on previous feasibility studies, the scoping process, consultation with other governmental entities, and the alignment and station screening evaluation process.[13] Alignments and station sites not meeting the criteria established by the CaHSRA – connectivity, right-of-way constraints, compatibility, ridership potential, constructability, and environmental impacts – were eliminated from further consideration.[14] The location of station sites within the selected cities is still being negotiated by the CaHSRA and local authorities.

The sensitivity of fare structure in encouraging ridership has been acknowledged by both the CaHSRA and critics of the project. The original fare structure was based on interregional airfares, with the assumption that routes such as Los Angeles to San Francisco would have fares that were 50% of the average flight cost at the time of analysis in 2005.[15] In recent updates, the CaHSRA maintained that fares will be capped at a $72 maximum for all trips between the San Francisco Bay area and the Los Angeles basin (or about 80% of current airline fares), without relying on public subsidies.[16] While critics charge that flaws in the ridership estimates and projected fare revenue make the system untenable without government subsidies, the latest revisions from the CaHSRA do not anticipate any major changes in funding or ridership models.[17]

As the HSR project advances through the planning stages, there has been significant criticism about its anticipated costs, proposed design and alignment. Much of the concern has concentrated on local planning issues, and some strong opposition has emerged by groups in San Francisco, the San Franciscopeninsula, and San Jose.[18] However, there has also been system-wide criticism questioning anticipated ridership and revenue models,[19] the anticipated development effects,[20] and the decision-making structure for the project.[21] A report by the Legislative Analyst's office specifically identified concerns over the ability of the CaHSRA to manage the planning process with its very limited staff, reliance on outside consultants and short timelines associated with the use of federal funds.[22] Given the early stage of the planning process with few alignments confirmed, concern over local area effects have focused on the implications of elevated alignments.

REPORT LAYOUT

Following this introductory section, Section 2 summarizes scholarship on the impacts of existing HSR systems on economic development, urban change and spatial restructuring of adjacent station areas and station cities. Section 3 presents the results of a Delphi survey about positive and negative impacts from HSR as experienced in cities in Europe and Asia, important prerequisites for successful development around HSR stations, and applicable lessons for California. Section 4 analyzes documents that provide the framework and design guidance for HSR station area development in California. These are statewide reports as well as specific station-area plans developed by a few of our case study cities. Section 5 turns to the case study cities and gives a detailed account of their socioeconomic and physical profiles and development potential. This section also reports from interviews with local planners and policymakers in these cities regarding their vision, anticipated benefits and challenges from the HSR, and planning and design considerations. Section 6 presents our overall findings and conclusions and discusses a series of recommendations.

II. ECONOMIC AND SPATIAL IMPACTS OF HIGH-SPEED RAIL: LITERATURE REVIEW

To date, many of the variables that influence urban change and spatial restructuring in the context of HSR remain unmeasured. This is particularly true of HSR's long-term effects, which require study over two or more decades. Nevertheless, a number of studies in the last decade have sought to predict or assess how HSR meets different expectations. Most of these studies focus on the transportation, environmental, and economic development goals of HSR. A slimmer body of work examines its spatial development impacts. In what follows, we will review studies focusing on the economic development and spatial impacts of HSR.

A major challenge in examining the economic development impacts of HSR is that it is often difficult to quantify how much development is directly attributable to a railway line.[23] The economic effects of HSR are difficult to detect, even with general equilibrium models, because of the many other present trends and forces. Indeed, HSR's effect on economic development is characterized as analogous to a fertilizer's effect on crop growth.[24] In other words, it is one ingredient that could help in the process, but others must also be present to stimulate the economy.[25]

A number of factors may intervene and affect the type of economic impacts that accompany the construction and operation of an HSR corridor. These include the size of a city and its status in the urban hierarchy, its distance from other major cities on the network, the extent of other present modal links and transportation networks,[26] pre-existing economic and land market conditions, and the type of anticipatory planning and policy intervention that is put in place to leverage the coming of the HSR.[27] It comes as no surprise that scholars find that the economic development impacts of HSR are quite varied and mixed.

Studies of the economic impacts of HSR describe either predicted or observed impacts. In what follows, we will first review studies that examine predicted HSR impacts related to job growth, population growth, real estate development, and other economic effects. These will be followed by studies examining observed effects using the same categories.

PREDICTED ECONOMIC EFFECTS

A number of scholars predict extensive impacts from HSR, such as regional adjustment, economic integration, worker and firm relocation, changes in travel patterns, and productivity shifts.[28] The main reason for such extensive impacts is the increase in accessibility of the cities on the HSR network, which is typically described in terms of changes in the population's ability to access different places quicker than if there were no HSR.[29] Predictive studies vary in terms of their modeling rigor. Some simply offer an informed prediction about the magnitude of effects, while others use sophisticated forecasting models.

Job Growth

Examining Japan's *Shinkansen* and France's *Train à Grande Vitesse* (*TGV)* high-speed rail systems, Rietveld et al. argue that at the national and regional levels, HSR

effects will manifest themselves in the spatial distribution of firms and workers, while at the international level, improvement in accessibility may lead foreign firms to locate in a country, thus bringing new jobs.[30]

A number of studies refer to the high expectations for economic development and job growth harbored by municipal and regional governments. For example, according to Bellet, Spanish authorities originally expected that the opening of the Madrid-Seville line in 1992 would generate significant economic development and urban restructuring, but they had to eventually temper their expectations.[31] Similarly, Bruyelle and Thomas discuss the expected effect of HSR on economic conditions in Nord-Pas-de-Calais, a region which is considered the French rust-belt[32] because of its significant decline in the mining and manufacturing sectors and ensuing unemployment. Regional authorities believed in 1994 that the opening of an HSR station would allow the region to become a node and induce more trade and economic exchanges with Belgium and England. To this end, the region's government began collaborating with the British county of Kent on tourism development and actively planning its infrastructure growth.

Two studies, one by Kim and another by Rietveld et al., delve into more rigorous modeling of projecting HSR's impacts on the spatial distribution of jobs. Kim projects changes in employment dynamics in and around Seoul as a result of the opening of a new HSR line to Pusan in the early 2000s.[33] He uses a number of different modeling techniques, including Gini and Wright coefficients,[34] and two different scenarios – high and low growth – to estimate the train's impact. Kim writes that employment patterns, which experienced a degree of dispersion between 1981 and 1991, are expected to continue to disperse, especially as a result of job opportunities along a new development corridor on the outskirts of Seoul.

The modeling used by Rietveld et al. leads them to argue that cities linked by HSR will face an increase in demand for labor and lower unemployment rates compared to cities not on the HSR network. They expect that commuters would use HSR to travel greater distances to work. Thus, HSR may affect the spatial distribution of firms through a number of different effects, including a clustering effect comparable to the way in which firms locate around an airport.[35]

Population Growth

Garmendia et al. examine the population effects of HSR development on Spain's small cities – defined as having less than 100,000 people – using as a case study the city of Ciudad Real.[36] When HSR was constructed, the expectation was that these small cities would experience rapid growth and a roughly three- or four-fold increase within a period of ten years. While such population growth has not been observed, some small cities have become more integrated into the larger metropolitan area attracting more people and activities.

Kim develops a model to project population growth from HSR in South Korea, and finds that it would be significant and favor pre-existing concentrations.[37] He argues that population

growth will become more concentrated but this pattern of concentration will become less intense as time proceeds.

Real Estate Markets

A few studies look specifically at how changes in accessibility because of the HSR may affect local real estate markets. Rietveld et al. write that they expect demand for housing and other real estate to increase in areas where accessibility is increased as a result of HSR.[38] Van den Berg and Pol argue that thanks to HSR, firms need not have an office in every European capital and can instead more efficiently locate in the city where the business is most competitive, and then rely on HSR to travel as necessary .[39] Focusing specifically on office markets in Amsterdam, Willigers argues that gains in accessibility due to HSR will be significant and expected to drive changes in the office market.[40]

Regional Restructuring

Some scholars discuss models for understanding regional economic impacts of HSR. These studies seek to project how the structure of urban agglomerations as well as the relative position of cities within the urban structure and hierarchy may change with the addition of HSR.

Scholars argue that the regional impacts of the HSR would depend on the type of HSR network as well as the relative position of cities in the urban hierarchy. According to Blum et al., there are two main models describing HSR networks.[41] One is a point-to-point model (e.g., the Tokyo to Osaka line), where HSR connects two cities; the other is a linear model (e.g., in Germany or Spain), where many cities are linked in a "string of pearls" pattern. Van den Berg and Pol discuss the two models used to describe a city's role in an urban hierarchy. One is the "central-places" model in which the position of a city is defined by the number of its functions, and the urban structure is dominated by a central city . In this model, cities that are not served by HSR stand to lose in attractiveness. By contrast, the "network" model involves a horizontally oriented system in which the position of a city is defined by what that city offers but others do not.[42]

Some exploratory and conjectural studies have anticipated the possibility of a broad transformation of the regional territory because of increases in the accessibility and mobility patterns. A principal proponent of this hypothesis has been Peter Hall, who considers the space-time convergence created by HSR among the principal forces reshaping spatial structure and the city-system in Europeand leading to its internationalization, "information-alization," and decentralization.[43] Others, notably Garmendia et al.,[44] Horner,[45] Blum et al.,[46] Sasaki et al.,[47] and Bonnafous,[48] have echoed Hall's assertion that high-speed travel lessens the friction of distance, upending to some extent traditional theories of location and economic agglomeration. Blum et al., for instance, project the advent of corridor regions with integrated but dispersed labor and consumption markets. Sasaki et al. have modeled the potential for spatial dispersion of economic activities among Japanese HSR station cities, and Garmendia et al. have hypothesized the integration of smaller cities into the metropolitan region, encouraging the further development of polycentric urban forms. Bruinsma and Rietveld, on the other hand, have argued that an increased inequality

between locations and increased centralization will emerge as a result of the differential increase in accessibility that accompanies high-speed rail.[49] In contrast, Knowles argues that telecommunications and roadway improvements could have much greater "shrinkage effects" than high-speed rail, given the relatively small portion of the population that can access the HSR network.[50] Indeed, the literature so far has not given a definitive answer if HSR facilitates decentralization and sprawl from metropolitan centers or concentration to them, and outcomes seem to depend on particular contexts and circumstances, and key variables such as station centrality, intermodality, city size, HSR fare policy, and extend of the HSR network, among others.

A number of studies attempt to model changes in accessibility. For example, Gutiérrez et al. argue that the HSR in Europe will "have a re-structuring effect on community space by promoting regional development and encouraging interaction between regions."[51] They look at the effect of reduced travel time between places, and calculate an index of accessibility for a given node which takes into account economic activity (i.e., GDP) at a set of other regions, and the travel time that it takes to get to those regions from the node. The authors use maps and tables to demonstrate that many parts of Europe are expected to undergo significant increases in their accessibility index, and argue that the contraction of space will not be uniform but will produce further imbalances between first-tier cities and their hinterlands. Vickerman concurs with this assessment of accessibility gains favoring big cities arguing that preliminary evidence about the effects of HSR in Europe indicates that big cities benefit and their primacy increases.[52]

A few studies try to anticipate the overall impacts of HSR on the local economies of particular cities. For example, Gibb et al. examined Devon and Cornwall, two counties in Southwest England that were to be bypassed by the HSR.[53] Looking at the expected impacts on the shipping economy of the two counties, the authors predicted that it would be unaffected by improvements in the freight service through the Channel, but they expected a decline in international tourism, as the Southwest would become comparatively much further from Continental Europe than the Southeast.

In a recent study, Preston and Wall seek to anticipate HSR's impact on the city of Ashford, England.[54] They argue that intermediate stations, like Ashford, sometimes do not gain significantly from HSR, and at times even experience decline. According to them, a city's success depends on whether many trains stop there, and whether people choose to take advantage of the new transportation system. Masson and Petiot use Krugman's core-periphery model to predict the impact of a proposed HSR link between Spain and France on tourism activity in Perpignan, France.[55] They argue that there is a risk that Perpignan's vitality as a tourist center may decline with respect to that of Barcelona. This argument is based on the core-periphery model's assumption that as transportation costs fall, the larger urban agglomeration, which, in this case, is Barcelona, is reinforced and stands to gain.

So far, we have reviewed studies that predicted HSR impacts related to job growth, population growth, real estate market, and other economic effects. The next section is devoted to studies that describe observed effects using the same categories.

OBSERVED ECONOMIC IMPACTS

Some studies seek to evaluate a variety of different economic impacts of HSR (e.g., job growth, population growth, increase in property values, increase in income, etc.). Bruinsma provides a sampling of the range of analyses that can be undertaken and offers a review of the literature that has been written on the economic and urban impacts of railway developments.[56] In his view, impact studies can take several forms: examination of accessibility (e.g., office location attractiveness), real estate values (e.g., a hedonic model), and what he calls "multi-functional land use," which looks at such things as quality of place and the feasibility and safety of buildings constructed over the tracks. Sands provides a broad review of impacts of HSR, which have been documented in Japan, France, and Germany.[57]

Job Growth

In general, scholars find that HSR-driven job growth has been the highest in central urban areas, and cities that have HSR stations have fared better in terms of job growth than those that do not. According to Haynes, labor market impacts of HSR are point-specific, in spite of its corridor nature.[58]

In reviewing the literature on HSR effects on job decentralization versus centralization, Garmendia et al. note that in France economies have trended towards centralization as firms from other cities have opened offices in Paris.[59] However, Rietveld et al. write that fewer Lyon-based firms relocated to Paris than expected after the Paris-Lyon line was built. In addition, according to Rietveld et al., attracting firms around several second-tier HSR stations, like Lille and Le Creusot, has been more difficult than expected.[60]

Examining the impacts of Japan's Shinkansen, Cervero and Bernick found that by the early 1990s the Shinkansen line did not generate significant shifts of population or employment along its corridor, and it strengthened the economic role and primacy of Tokyo and Osaka at the expense of intermediate cities.[61] In a later study, Banister and Berechman found that the line had both local and regional economic development impacts on Japan's employment growth patterns, and resulted in increased land values around station areas in intermediate cities.[62] In a more recent study, Cervero argued that the Tokyo-Osaka Shinkansen line has had a greater impact on the distribution of jobs than on the distribution of residents, and employers have concentrated around the HSR stations in both Tokyo and Osaka.[63] Reporting on the Shinkansen labor market effects, Rietveld et al. found that cities with a station fared better across many sectors in terms of employment growth than cities without a station.[64] Growth across sectors has slowed since the opening of the line, but it is still higher in those cities that have stations than those that do not. Haynes' analysis[65] supports that of Rietveld et al. finding that employment growth in retail, industrial, construction, and wholesale grew between 16% and 34% more in cities with stations than in cities without stations.

In a technical paper, Sasaki et al. build a supply-driven econometric model to estimate the dispersion effect of Japanese HSR improvements.[66] They measure dispersion effects by grouping cities into regions and then observing whether the more agglomerated regions

experience a relative decline. The term "supply-driven" refers to the notion that economic activity is presumed to be a function of regional production income, which is in turn a function of changes in private capital stocks and labor supplies. These shifts in capital and labor are driven by the way in which HSR affects a region's relative efficiency and attractiveness. The authors include data from different years to infer the effects of specific pieces of the HSR system on regional economic levels. In their analysis of the model outputs, they observe that HSR contributes somewhat to regional dispersion, but that such effects are not overwhelming considering that the HSR development appears to have increased accessibility in central regions, thus reinforcing their attractiveness.

Preston and Wall have observed the effect of HSR in the economically depressed South East England. They find that because of major accessibility increases, employment growth in Ashford has outperformed its surrounding areas.[67]

Looking at another economic indicator, Rietveld et al. find that Japanese cities visited by Japan's Shinkansen had a higher income growth than Japanese cities without HSR.[68]

Population Growth

Three studies look at observed trends in population growth resulting from HSR development in Japan and Spain. Garmendia et al. focus on the impacts of HSR on small Spanish cities.[69] They observe that expectations of rapid population growth in these small cities served by HSR have not come to fruition, but their gradual decline has halted. Rietveld et al. indicate that population growth in cities with Japan's Shinkansen was higher than in cities without HSR.[70] Haynes goes into greater detail providing a deeper analysis of which cities have grown and which have not.[71] He writes that population growth in cities with HSR stations was only marginally higher than in cities without stations. Cities with high concentration of information exchange industries (e.g., business services, banking, and real estate development) experienced the highest growth rates. Meanwhile, cities served by HSR were constrained in terms of population growth if they had a high concentration of manufacturing employment and an aged population. Haynes also points out one problem with identifying economic impacts from the HSR in Japan: the extent to which HSR induced such growth is unclear because the route was planned along a corridor where growth was forecasted.

Real Estate Market

Several studies look at HSR's effects on the demand for urban land and property values. In general, the demand for land is higher in locations closer to HSR. This is evidenced by the value capture strategies employed by various HSR developers. For example, Murakami and Cervero point to the Central Japan Railway Company as an example of an agency that tries to recapture value and, in so doing, caters to the increased demand for land around transit.[72]

Some land uses appear to be popular around HSR, while others are not. In Spain, Garmendia et al. write that Ciudad Real, which is served by HSR, has become a popular city for different land uses that require cheap land. The authors also find that demand for

housing around the train station depends on whether potential consumers are locals or immigrants (i.e., originally from another city), or whether they rent or own.[73] Cervero and Bernick point out a few uses that have not been popular around HSR stations, listing multi-family housing as the primary one.[74]

Rietveld et al. write that there is evidence of residential location choice that takes into account the presence of HSR.[75] This is especially apparent in the city of Vendôme, France (about 100 miles from Paris), where the construction of HSR was associated with a huge reduction in travel time to Paris and a large influx of Parisian workers. In addition, Cervero and Bernick write that in Lille, station development has driven regional development by adding convention, entertainment, and commercial spaces to the market.[76] The area around Lyon's Part-Dieu station, has witnessed an increase in land values and a rising demand for office space.[77]

In terms of property values, the literature is mixed on whether an effect related to HSR is noticeable. Haynes observes that opening of the TGV Atlantique line, which runs between Paris and Le Mans, has coincided with a major increase (100% in three years) in land values in Le Mans.[78] The HSR line is seen as one of several contributors to this trend. Haynes' analysis of the German ICE is much more limited because the lines are new. However, he notes that demand for office and retail space around the Kassel station, on the Hannover-Würzburg line, has increased by 20%. Meanwhile, Rietveld et al. indicate that land value growth was higher in cities with Japan's Shinkansen than in Japanese cities without HSR.[79]

On the other hand, Andersson et al. did not find a noticeable effect of HSR on surrounding property values in the city of Tainan in Taiwan. They had originally hypothesized that Taiwan's new HSR line – a 345-km line that opened in 2007 and runs from Taipei down the west coast of Taiwan – would increase property values as a result of greater accessibility in HSR station areas.[80] The authors built a hedonic pricing model[81] using data from the southern city of Tainan, and examining the characteristics of property transactions from 2007. Because owner-occupied housing accounts for over 80% of Taiwan's housing stock, the authors' data involved sale prices instead of rents. In the hedonic pricing models, the distance-to-HSR variable was found to be insignificant, a finding that the authors believe is due to the fact that, with expensive tickets, few are using HSR for commuting purposes. In addition, they argue that "entrenched residential location patterns" have prevented a reshuffling of housing markets.

Tourism Impacts

Some have examined the impacts of HSR on different economic sectors, such as tourism. Several authors have written about such impacts along the Paris-Lyon line because it has been in operation for almost thirty years. Thus, Cervero and Bernick find that the greatest benefits from accessibility increases were felt by Lyon firms, because of their greater exposure to Parisian markets.[82] Haynes adds that on the Paris-Lyon line, summer tourism rose, but overnight stays in Lyon fell due to the city's enhanced proximity to Paris.[83] Masson and Petiot find that the opening of the Paris-Lyon HSR line in 1983 strongly increased

business tourism activity in L yon (such as conferences and meetings, exhibitions and trade fairs, corporate events, business travel, etc.).[84]

While the Paris-Lyon segment was the first HSR segment to open in France, the French system's expansion has allowed researchers to document impacts elsewhere. Masson and Petiot find that the LGV Atlantique HSR line, which opened in 1989 and heads southwest from Paris, has significantly increased business tourism in Le Mans and the number of Parisian visitors in Tours, another city served by the route.[85] The 2001 opening of the HSR link between Paris and Marseille (called *LGV Méditerranée*) did not lead to a noticeable effect on tourism volume, but on the Marseille end, it did lead to increases in short-stay travel (i.e., extended weekend trips), and increases in various subsectors of riders (e.g., young adults and seniors). The authors observe that increases in local tourism activity are tied to the existence of local "potentialities" (i.e., attractions that will draw visitors), local attraction strategies, and development of travel infrastructure. In Spain, scholars have found that in the "big intermediate" cities of Zaragoza (along the Madrid-Barcelona line) and Cordoba (along the Madrid-Seville line), several types of businesses (i.e., meetings and consulting work) and tourism functions are rising at the expense of the larger metropolises.[86]

Examining Japan, Cervero finds that "social-recreational" travel has similarly prospered along the Tokyo-Osaka Shinkansen line, leading to an increase in hotel and restaurant businesses around stations.[87] Froïdh, meanwhile, describes similar changes in travel behavior resulting from the development of a new HSR line in Sweden.[88]

In general, studies examining the observed economic impacts find mixed results – depending on the type of impacts studied, the particular city, or the particular corridor. The literature indicates that the economic and development effects of HSR are interlinked over the long run, but these effects may be unevenly distributed among cities. As a result, scholars continue to debate whether HSR truly generates economic development or whether it merely redistributes economic activity, moving it from locations bypassed by the rail (those that have experienced relative reduction in accessibility) to locations made more accessible because of HSR service.[89]

Some scholars argue that most growth and economic benefits from HSR accrue to the first-tier cities of the network, where firms are better positioned to expand their reach in secondary markets and smaller cities.[90] This leads some to argue that HSR facilitates the territorial polarization between central (first-tier) and peripheral (second-tier) cities.[91] Nevertheless, examples of HSR-induced economic development in small and intermediate cites are also observed. For example, in France, the TGV HSR network has had catalytic effects in the growth and development of second-tier cities such as L yon and Lille.[92] In Germany, Ahlfeldt and Fedderson found that small cities along the Koln-Frankfurt HSR corridor saw substantial increases in their GDP compared to other local towns.[93] In Spain, small cities on the HSR network less than one hour away from major metropolitan centers were found to accrue population growth and some economic development benefits thanks to their integration to the larger metropolitan network, which helped them attract new economic activities and housing investments. For example, some workers now live in Ciudad Real, a small city fifty minutes from Madrid on the new Madrid-Seville HSR line, and commute to Madrid for work.[94] Researchers point out that while larger metropolises are

the primary beneficiaries of HSR, small cities benefit from commuters and by acquiring a sense of identity of finally existing in the minds of people who live in metropolises.[95] Indeed, some of the benefits of HSR for second-tier cities may relate to a revamped and more "modern" image and the increased visibility that this new transportation mode helps them acquire.[96] Some have also argued that HSR may extend the spatial reach and economic role of exurban "edge" cities, particularly where it combines with airport facilities.[97, 98]

SPATIAL RESTRUCTURING AND URBAN DEVELOPMENT IMPACTS

Some scholars have examined the impacts of HSR on urban form, inquiring about its ability to serve as a catalyst for new development. In comparison to the studies examining the economic effects of HSR, studies focusing on its micro-impacts on the urban development patterns of local and station-adjacent areas are rather few.

In general, there does not appear to be agreement that all cities that are served by HSR see an impact in terms of development. Some authors have written about how HSR has created new opportunities for development as private and public sectors capitalize on the higher demand for land. Other studies, however, document a lack of such impact.

Hall provides a positive outlook of how HSR has stimulated development in some cities. Citing Lille, Brussels, London, Madrid, and Rotterdam as key examples, he argues that HSR lines have reinforced central business districts by encouraging development around new or upgraded stations.[99] Bellet looks in detail at the urban development opportunities created by the construction of HSR lines in Spanish cities. She writes that the construction of new HSR lines has encouraged cities to restructure land use, much as was done during the construction of nineteenth-century Spanish railways. In some cities, such as Ciudad Real, the construction of HSR has simultaneously been accompanied by the dismantling of another track, opening up huge swaths of land for redevelopment. In other cases, such as Zaragoza, urban transformation has been stimulated by a centrally constructed HSR station and the relocation of a lot of rail infrastructure to peripheral areas. Finally, cities such as Lleida are using their traditional stations as HSR stations, which has stimulated development in those stations' vicinity.[100]

On the other hand, some scholars observe that in some cities, the building of an HSR station has not brought about any catalytic effects and has not been accompanied by significant development. Thus, Cervero and Bernick write that in Japanese cities, which had been well served by rail prior to Shinkansen, there was a negligible impact on development.[101] Haynes observes that of three new stations built along the Paris-Lyon line, only Lyon Part-Dieu has had a significant effect on economic development.[102] Berlin is still awaiting redevelopment around its Central Station (Hauptbahnhof),[103] the HSR station in Tours did little to regenerate the area around it,[104] the Ashford station at Kent, UK, shows, at present, little evidence of positive development, while the Ebbsfleet International HSR station ten miles outside London has so far only witnessed the building of a park-and-ride facility.[105]

With respect to new town development, Cervero and Bernick find that it has not always coincided with the construction of HSR stations.[106] They note that HSR in France has not been accompanied by new town growth, whereas such growth has been widespread in

parts of France that do not have HSR. In contrast, Hall finds that HSR development has created new central business districts in a number of places, including Osaka, Japan; Stratford, England; and Kassel, Germany. He writes that a group of stations are inducing the development of "edge cities" in peripheral urban areas, a model that originated in a Tokyo suburb and has since been replicated in Europe.[107]

In Japan, Cervero and Bernick find that this type of HSR-driven development outside traditional cities is widespread, and can take different forms. In cities where an HSR station was placed in a suburban area (e.g., Kyoto), the result was to spur development around the station at the expense of central-city areas. Also, several new town developments (e.g., Gifu) have occurred around greenfield sites (undeveloped pieces of land used for agriculture or open space), even though there was not a good feeder service to nearby cities. Growth has been significant at the Shin-Yokohama station, where substantial urban investment accompanied the development of a new, secondary feeder rail line on land that was previously agricultural.[108]

PLANNING AROUND HSR STATIONS

The accommodation and smooth integration of transport and urban development is not a simple undertaking. Bertolini and Spit attribute this to the dual nature of station areas that need to act as nodes accommodating both transport and non-transport networks, and as places hosting a variety of diverse uses. This generates a series of dilemmas: 1) a spatial dilemma, because of the compressed nature of most sites, which nevertheless should accommodate both passengers and local residents and businesses; 2) a temporal dilemma, because transport investments do not necessarily have the same time horizons as redevelopment plans; 3) a functional dilemma entailed in the requirement of achieving a multifunctional environment; 4) a financial dilemma, because of the high cost of addressing technical difficulties and accommodating conflicting requirements; and, last, 5) a management dilemma which is inherent in the mix of public and private investments and properties, and the heterogeneity of different actors and stakeholders.[109]

Many local municipalities are interested in attracting a HSR network because as de Ureña et al. explain:

> *There are three reasons why HSR is often seen at the local level as an opportunity to transform the structure of the city center and also to change the overall city image by developing new urban projects and attracting high quality spaces: 1) local communities have become the real entrepreneurs behind attracting investment; …Cities step up their efforts to attract investors, production activities and professional services; 2) HSR projects a high-quality image and is often used in city marketing campaigns; 3) railway sites are generally large, centrally located and underused, so HSR provides an excellent opportunity to exploit the availability of such extensive and relatively vacant plots to develop the urban* center.[110]

To these factors triggering planning for station area development, Bertolini and Spit add "the ongoing privatization process or at least the shift towards greater market orientation of transportation, and, most notably, railway companies. Transportation infrastructure and

service providers are increasingly seeking ways to recapture the accessibility premium they help to create. This implies the development of commercial activities within stations and redevelopment of land above or around stations."[111]

Factors That Define Good Station Area Planning

Some studies seek to inform successful planning around HSR stations. Nuworsoo and Deakin examine several projects in HSR station areas and offer several recommendations.[112] They suggest good intermodal connections, good physical improvements (e.g., creating a greater concentration of retail establishments and cultural amenities), economic improvement (i.e., generation of more business activity), and social improvement (i.e., places for people to congregate). Examples of these kinds of station-area improvements are discussed in the context of Hong Kong, Lille, and Lyon. Cervero and Bernick add that good access to the stations for vehicles and pedestrians has been a catalyst for development.[113]

The Planning Process

While the factors that define good station area planning cited by Nuworsoo and Deakin are significant, the crucial question researchers ask is how to achieve these goals. Several studies detail the actors involved in and the structure of planning around a massive project like HSR.

According to Cervero and Bernick, growth around HSR has been highest in cities (e.g., Lille) where public sector involvement has been greatest. Smaller and intermediate cities with HSR stations have not experienced significant land use changes.[114] Murakami and Cervero argue that without proactive redevelopment agencies (or similar public agencies) pushing for investment around stations, the effects of new HSR on economic development are likely to be small.[115]

Four studies give broad overviews of HSR planning processes in various European environments. Bertolini and Spit give detailed descriptions of several major redevelopment projects around HSR stations in Europe, describing the planning process, the legal framework, and key actors within each project.[116] Hall provides an in-depth review of the integrated HSR development and strategic planning that has occurred in the London suburbs of Ebbsfleet and Stratford, where the new international train stations are intended to act as economic development hubs, and will support a series of redevelopment projects.[117] Peters highlights several aspects of the planning process related to a large project in Berlin that involved the tunneling of a road and several train tracks.[118] Part of the rationale for the project was the redevelopment of Potsdamer Platz, a historic square that had been vibrant before the city was transformed and separated by the Berlin Wall in 1961. Priemus summarizes the process of planning a HSR line in the Netherlands.[119]

HSR Stations as Nodes and Places

In each of these studies, the emphasis is on defining the node-place dynamics, i.e., interactions among land-use development, transportation and other factors, and discussing

how it can be applied to significant projects in Europe. Thus, Kloosterman and Trip examine the concept of quality of place, arguing that HSR stations function both as nodes and as places.[120] They conduct two case studies, one in Amsterdam and the other in Rotterdam, to identify the different actors in station-area development, and the extent to which the private and public sectors view themselves as creators of this quality.

Trip argues that while the South Axis project in Amsterdam is unrelated to HSR (HSR is an "added value," not an "essential precondition"), the projects in Lille and Rotterdam are in fact intricately related to HSR.[121] For each of these places, Trip discusses the quality of place from various perspectives: urban structure, functional diversity, quality of functions, public space, and architecture.

Bertolini examines the forces behind station area development around Dutch train stations, and discusses some complications associated with the node-place dynamic.[122] He describes a model in which different station areas vary in terms of their value as a node and a place, and gives examples of different station areas that fall into different categories or combinations. Value as a node is a function of the accessibility of the HSR station, or how easily you can get from it to other big cities. Value as a place is a function of the "intensity and diversity of activities in the station area."

Spatial Quality and Design Considerations

Very few studies examine aesthetics around transit projects. Dovey discusses the architecture and urban design complexities of an HSR station-area.[123] Focusing on the development at Euralille in Lille, France, he examines how architect Rem Koolhaas has tried to build a new city geared toward a new sense of globalization and the desire to travel everywhere fast. The key element of his work is its lack of grounding in its local context, which is a reminder of globalization.

Nelson and McCleskey have studied the effects of elevated commuter rail (not HSR) stations of MARTA on surrounding home values and analyzed transit planning processes in Atlanta, defining certain strategies which could help to alleviate the negative impacts of the stations on property values.[124] Since many HSR station are elevated, this study is also relevant for HSR station development.

CONCLUSION

Generally speaking, economic impacts associated with HSR are wide-ranging and significant. Even though HSR's effect on particular local contexts may vary, an increase in accessibility of workers and firms has ripple effects in a number of markets. Markets described above include labor markets, housing markets, real estate markets, and travel markets. One pattern that runs across effects is that gains caused by HSR appear to be strongest in the largest pre-existing agglomerations. Nevertheless, small towns and second-tier cities have undergone noteworthy transformations as a result of HSR, especially where the public sector has actively pursued new investment.

III. REVIEW OF INTERNATIONAL EXPERIENCES: HIGH-SPEED RAIL STATION IMPACTS ON URBAN DEVELOPMENT – A DELPHI SURVEY

Despite an emerging literature on HSR development and its associated opportunities and challenges, there is little systematic evidence as to which factors lead to positive and desirable development patterns around HSR stations, or which spatial planning strategies lead to positive local outcomes. Peter Hall argues that "HSR will be the maker of some cities but the breaker of others,"[125] but which are the preconditions that lead to positive development patterns? What potential negative impacts can be mitigated through urban planning? What should municipal governments interested in spurring development around new HSR stations know from the experiences of other cities with HSR networks? Such questions become particularly critical for some California municipalities that are now embarking in planning for the accommodation of HSR facilities.

To address these questions, we turn to a Delphi survey of knowledgeable HSR planning experts, which we conducted in 2010. The purpose of the survey was to draw from the experiences of other HSR systems around the world in order to identify:

- the positive and negative impacts of HSR stations at a local level;
- the prerequisite economic, real estate, policy, transportation, urban development, and municipal behavior variables that must be in place for desirable development to take place around HSR stations; and
- lessons drawn from international case studies that can be applicable to the California context.

THE DELPHI SURVEY PROCESS

The Delphi survey, which was developed in the early 1950s by Norman Dalkey and Olaf Helmer of the Rand Corporation, is a technique to reach a systematic group judgment.[126] It is described as "a method of structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem."[127] The technique is particularly useful in decision- and policy-making situations.[128] The goal of a Delphi survey is to achieve informed consensus (convergence of responses) or at least to delineate, clarify, and define existing opinions and views.[129] This is achieved by an iterative process in the form of three rounds of questions.[130] The goal of the iterative process is "to obtain a convergence of responses to each question. Such convergence would be indicated by the decrease in the measures of dispersion for the responses and by the stability of the distribution of the responses to each question."[131]

For the Delphi panel, we recruited 27 individuals with significant expertise in HSR research and evaluation (see Appendix A).[132] Panel members were selected by means of the following criteria:

1. Position at university or think tank with research and publications on HSR evaluation (20 participants).

2. Leading position in a public sector agency involved in HSR design, development, or evaluation (3 participants).

3. Position in a private sector company involved as consultant, urban designer, or developer of HSR stations (4 participants).

While the great majority of panel participants (22/27) had an academic affiliation, many of them (9/22) had also served as consultants to public and private sector companies involved in HSR development. The 27 panel members were from ten different countries: U.S. (5), The Netherlands (4), Spain (3), UK (3), France (2), Germany (2), Sweden (2), Italy (2), Japan (2), China/Hong Kong (1), and Australia (1). Nineteen of the respondents were male and eight were female. We identified the members of the Delphi panel through their publications but also through references from knowledgeable sources.[133]

During the first round of the Delphi survey process we asked participants the following four questions:

1. Referring to an existing HSR system with which you are familiar, please describe the positive effects this system has had on the urban development of station-adjacent communities.

2. In your view, which were the most important preconditions for the generation of the positive effects you have outlined in the first question?

3. Please describe some of the negative effects that this system has had on the urban development of station-adjacent communities and what may have precipitated them.

4. Regarding the California context, what should municipalities do to bring about positive changes in the areas adjacent to HSR?

Additionally, we asked respondents to identify successful examples of station-adjacent development that we could study as models in a later stage of our research.

Local Effects

During the first round (summarized in Table 1), the survey asked respondents to identify the local effects of HSR on cities and communities. As one Delphi respondent underlined: “On a local scale the impacts seem to be generative; however, on a regional or national scale the impacts might be distributive” (Bruinsma). Additionally, and as one respondent cautioned, the “effects of HSR service areas are embedded in complex processes of long-term spatial development. Thus, they are rarely isolated and even less measurable” (Klein). With these caveats in mind, respondents identified two major types of positive effects in some HSR adjacent areas: development-related effects and economic/market-related effects. With

regard to development effects, respondents referred to HSR stations bringing about urban regeneration and acting as catalysts for new residential and commercial developments. These included:

1. New or revitalized neighborhoods around station areas "with activities such as trade, socio-cultural facilities, and new residences, and green areas which improve the quality of the urban district such as in Amsterdam Zuidas (Figure 2), as well as new neighborhood services and creation or reclaiming of public spaces such as in Madrid Atocha and Métropont of Lausanne" (Pucci).

2. New city cores and commercial centers, such as at Lyon-Part Dieu, at Shin-Osaka, Shin-Yokohoma, and Saku-Daira Station in Hokuriku-Shinkansen;

3. Regeneration and revitalization of formerly derelict city areas such as in Lille (Euralille; see Figure 3), Nantes, Brussels, Rotterdam, Arnhem, and Torino, and redevelopment of formerly brownfield sites and railway properties such as at Kings Cross, Stratford, and Ebbsfleet.[134]

4. architectural landmarks and new attractive major buildings combining convention centers, retail, and entertainment facilities (e.g., in Lille, Lisbon, Berlin, and Kyoto).

Figure 2. HSR Station in Zuidas district of Amsterdam

Figure 3. The Mall in Euralille HSR Station Development

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Table 1. Results of Round 1 – Responses

Question 1 Positive Effects

Development Effects

- Urban regeneration
- Catalyst for new development
- New commercial development
- New residential development
- New major buildings (e.g., convention center, shopping center, entertainment center)
- Infill development
- Brownfield development
- New developable land
- New architectural landmarks
- New services (e.g. neighborhood retail, convenience stores)

Economic/Market Effects

- Increased public sector investment
- Increased land values
- Increased rents
- Increased per capita income
- Increased tourism
- New employment centers
- Increased regional significance
- Attraction of special events (e.g., business conventions, conferences)

Question 2 Preconditions

Physical/Environmental

- Central station location
- Mixture of uses around station
- Integration of station with surrounding area
- High quality architecture
- Adequate parking
- Significant station-area improvements
- Vertical integration of multimodal facilities

Economic/Market Effects

- Significant public funding
- Active real estate market
- Public sector land ownership
- Strength of existing area prior to HSR

Transportation

- Location at a transportation node
- Highway access to station
- Good public transportation connections
- Competitive HSR fares
- Good and frequent HSR service

Question 3 Negative Effects

Physical/Environmental

- Tearing down existing buildings
- Sea of parking around station
- "Barrier effect" (i.e., lack of integration between station and surrounding area)
- Buildings of inappropriate scale
- Unattractive node not conducive to residential development
- Reduction of land use mix and variety
- Noise
- Dangers, nuisances (e.g. pollution, odors)
- Decreased safety in station area
- Traffic congestion
- Empty land

Economic/Market Effects

- Significant investment costs
- Land speculation
- Decreased housing affordability
- Lowering of housing values
- Weakening of other city areas
- Regional imbalance (strength of metro areas at the expense of secondary cities or cities bypassed by the HSR)
- Increased competition among jurisdictions

Question 4 Lessons for California

Physical/Environmental

- Increase allowable density in HSR station area
- Provide high quality architecture
- Stimulate housing and mixed-use projects
- Designate special development zones around stations
- Create nodes of services
- Ban single-family zoning in station areas
- Provide diversity of housing options
- Stimulate office/commercial projects
- Plan station as lively node with mix of activities
- Develop good urban design plan of station area
- Locate stations centrally
- Minimize negative externalities (noise,ongestion)

Economic/Market Effects

- Develop marketing/promotion strategies
- Develop incentives for affordable housing around stations

Table 1. Results of Round 1 – Responses (continued)

Question 1 Positive Effects	Question 2 Preconditions	Question 3 Negative Effects	Question 4 Lessons for California
	Process/Planning • Existence of strategy to benefit from HSR station • Multifunctional plan ensuring mix of activities and versatility of spaces • Plan tailored to local conditions • Coordination between public/private sectors/joint development • Supportive state policies • One agency coordinating development • Cooperation of local stakeholders • Strong political will/vision	**Social/Political** • Gentrification/displacement • Loss of public good will for other infrastructure projects • Loss of political capital for HSR supporters	**Institutional/Regulatory** • Encourage public/private partnerships • Develop cooperative planning tools • Provide development incentives • Reduce planning/zoning regulations • Relate HSR development to local assets • Encourage community involvement • Develop distinct policies for central vs. peripheral cities • Develop regulations to prevent land use speculation **Transportation** • Provide good HSR service • Plan station as intermodal node • Connect station to local airports via transit • Integration of local and regional transportation network

Identified positive local economic effects from the HSR included: 1) Increased public sector investment, especially funding from national governments, which typically accompanies the development of HSR stations and can give an economic boost to local areas; 2) Depending on station location, increased land values and rents (though this may bring along the negative byproduct of gentrification (Hall, Wright); 3) Increased productivity measured in per capita income (Ahlfeldt); 4) Creation of new employment centers; 5) Increased regional significance of formerly remote cities; 6) Increased tourism or at least opportunities for development of tourism and the attraction of special events such as business conventions and conferences in peripheral cities, which experience an increase of their accessibility.

As one respondent stressed, however, "The HSR cannot produce development by itself but can act as catalyst when other conditions are present" (Bertolini). Delphi participants listed an array of preconditions that should be in place for positive development to occur in local areas. These included physical/ environmental factors (central station location, station integration with surrounding area, high-quality architecture and station design that accommodates multimodal facilities, adequate parking, and mix of other uses, station area improvements, etc.), economic/ market-related factors (significant public funding, active real estate market; area vitality prior to HSR development, public sector land ownership), transportation factors (location at a transportation node, good highway access and public transportation connections, competitive HSR fares, and good and frequent HSR service), and factors related to the political context and planning process (e.g., strong political will and vision, pre-planning for HSR, adjustment of plans to local conditions, coordination between public and private sectors with one public agency taking the lead, joint development activities, cooperation of local stakeholders, supportive state or national policies). The long list of responses to this question indicates that a number of items should be in place for positive development to happen.

HSR development is not only associated with positive effects. Respondents listed a variety of negative physical, economic, and social outcomes that may also accompany HSR. Physical adverse effects in some areas included the tearing down of historic buildings to make room for expanded railway tracks, the creation of "a sea of parking lots" around the station, and the negative externalities of noise, toxic pollution, odors, and traffic congestion around station areas. Many also mentioned the "barrier effect" often created when railway infrastructure, parking lots, and bulky station buildings drastically segregate the station from adjacent neighborhoods. As one respondent also noted, too often HSR stations become "complex logistical nodes that are not conducive to residential development and not attractive as destinations in and of themselves" (Cervero). Here again, we might conclude that the urban form could be planned more effectively to mitigate these negative conditions.

Negative economic effects listed by respondents included the significant public expenditure of building and operating a HSR network, which often leads to increased government subsidies, and the opportunity cost "because of other foregone services caused by the enormous public expenditure" (Ponti). Some respondents also listed certain political costs such as the possible loss of "public good will" and political capital for the development of other infrastructure projects.

Some pointed to the possible regional and economic imbalance that may accompany the building of an HSR network if the first-tier cities get strengthened at the expense of second-tier cities or cities bypassed by the train (Peters). Local negative economic impacts listed by respondents included land speculation and decreased housing affordability, though some argued that housing values may lower in station-adjacent areas. These seemingly contradictory responses pinpoint the need for more research to understand the differential effects of HSR on land and housing values in HSR station-adjacent areas.

An adverse – and for some inevitable – social impact is displacement resulting from gentrification (Hall), which has been observed around HSR station neighborhoods in Shin-Osaka and Brussels Midi. According to one respondent, development at King's Cross in London has led to the displacement of a number of disadvantaged ethnic minorities, who have found it impossible to bid for space in the new developments (Wright).

The first round of the Delphi survey did not ask the respondents to prioritize their responses. However, in the second round, the panel was given all the responses per question from the first round and asked to select and rank the ten responses per question they thought were the most significant. The ranked responses were sent one last time (during a third round) to the panel, who were then asked to select and rank the five most important responses to each question. This iterative process led to a considerable convergence of responses (see Tables 2 and 3 which summarize the results and rankings of rounds 2 and 3, respectively).

During the first round, respondents' comments made clear that impacts of HSR stations were substantially different for central (first-tier) versus more peripheral (second-tier) cities. Therefore, in the subsequent rounds, we requested that the panel address each question separately for central and peripheral cities. Additionally, we asked respondents a series of follow-up clarifying questions.

Table 2. Results of Round 2 – Priority Ratings (Scoring Range: 0-10)

CENTRAL (FIRST-TIER) CITIES

Question 1 Most important positive effects			Question 2 Most important preconditions			Question 3 Most important negative effects			Question 4 Most important lessons for California		
Rank	Responses	Score	Rank	Responses	Score	Rank	Responses	Score	Rank	Responses	Score
1	Urban regeneration	6.53	1	Central station location	6.59	1	Barrier effect	5.82	1	Provide good connection to intra-urban transport systems	4.29
2	Catalyst for additional development	5.41	2	Integration of station with surroundings	5.53	2	Significant cost	4.18	2	Locate stations centrally	2.65
3	New commercial development	4.82	3	Location at a transportation node	5.29	3	Traffic congestion	3.00	3	Plan station as intermodal mode	2.47
4	New major buildings	4.65	4	Good public transit connections	4.29	4	Gentrification/ displacement	2.41	4	Increase allowable densities	2.35
5	New architectural landmarks	4.00	5	Good and frequent HSR service	3.65	5	Land speculation	2.29	5	Good integration of regional and local transportation systems	2.18
6	Increased land values	3.94	6	Strong political will/ vision	3.24	6	Weakening of other city areas	2.18	6	Connect stations to local airports through transit	1.88
7	Increased public investment	3.35	7	Multi-functional plan with mix of activities	3.18	7*	Noise	1.47	7*	Develop good urban design plan for station	1.82
8	New public spaces	3.00	8	Strategy to benefit from HSR station	2.94	7*	Tearing down of existing buildings	1.47	7*	Plan station as lively node with mix of activities	1.82
9*	New residential development	2.94	9	Mixed-use concept	2.71	9	Loss of public good will for other infrastructure	1.17	9	Design high-quality public spaces around station	1.53
9*	Increased rents	2.94	10	High quality architecture	2.53	10	Decreased housing affordability	1.00	10	Stimulate office and commercial projects	1.41

Table 2. Results of Round 2 – Priority Ratings (continued)

PERIPHERAL (SECOND-TIER) CITIES

Question 1 Most important positive effects			Question 2 Most important preconditions			Question 3 Most important negative effects			Question 4 Most important lessons for California		
Rank	Responses	Score	Rank	Responses	Score	Rank	Responses	Score	Rank	Responses	Score
1	Catalyst for additional development	6.65	1	Location at a transportation node	6.00	1	Significant cost	4.29	1	Provide good connection to intra-urban transport systems	5.53
2	Increased public sector investment	3.82	2	Integration of station with surroundings	5.06	2	Barrier effect between station and surrounding area	4.00	2	Good integration of regional and local transportation systems	4.65
3	Urban regeneration	3.76	3	Good public transit connections	4.65	3	Land speculation	2.65	3	Plan station as intermodal mode	4.53
4	Brownfield redevelopment	3.65	4	Central station location	3.94	4	Sea of parking lots	2.47	4	Increase allowable densities	3.29
5	New residential development	3.59	5*	Good and frequent HSR service	3.59	5	Unattractive node not conducive to residential develop.	2.35	5	Locate stations in central areas	2.65
6	New employment centers	3.53	5*	Strong political will/ vision	3.59	6	Noise	1.88	6	Plan station as lively node with mix of activities	2.47
7	New commercial development	3.29	7	Strategy to benefit from HSR station	3.53	7	Sprawl in outlying areas	1.82	7	Provide good HSR service	2.41
8*	Increased land values	2.94	8	Station area plan tailored to local conditions	3.41	8	Decreased housing affordability	1.53	8	Stimulate housing and mixed-use projects	2.35
8*	Increased tourism	2.94	9	Coordination between public-private sectors	3.18	9	Gentrification/displacement	1.41	9	Design high quality public spaces around station	2.06
10	Increased regional significance	2.71	10	Multi-functional plan with mix of activities	2.53	10	Weakening of other city areas	1.23	10	Develop good urban design plan for station	2.00

* Indicates tie.

Table 3. Results of Round 3 – Priority Ratings Five Most Important Issues

Rank	Question 1 Most important positive effects: Responses	Score	Rank	Question 2 Most important preconditions: Responses	Score	Rank	Question 3 Most important negative effects: Responses	Score	Rank	Question 4 Most important lessons for California: Responses	Score
CENTRAL (FIRST-TIER) CITIES											
1	Urban regeneration	4.30	1	Central station location	2.85	1	Barrier effect between station and adjacent area	4.15	1	Provide good connection with intra-urban transport systems	3.60
2	Catalyst for additional development	3.25	2	Integration of station with surroundings	2.85	2	Significant cost	3.50	2	Locate stations in central areas	2.60
3	New commercial development	2.15	3	Station located at transportation node	2.70	3	Traffic congestion	1.75	3	Plan station as intermodal mode	2.10
4	New major buildings	1.60	4	Strong political will/ vision	1.65	4	Gentrification/ displacement	1.40	4	Increase allowable densities in HSR station	1.70
5	Increased public sector investment	1.30	5	Good and frequent HSR service	1.60	5	Land speculation	1.30	5*	Develop good urban design plan for station	1.10
									5*	Plan station as a lively node w. mix of activities	1.10
PERIPHERAL (SECOND-TIER) CITIES											
1	Catalyst for additional development	4.05	1	Station located at transportation node	3.45	1	Significant cost	3.45	1	Provide good connection with intra-urban transport systems	3.20
2	Urban regeneration	1.90	2	Strong connection to surrounding area through public transit	2.30	2	Barrier effect between station and adjacent area	3.25	2	Good integration of regional and local transportation systems	2.75
3	Brownfield redevelopment	1.90	3	Integration of station with surroundings	2.25	3	Sea of parking lots around station	2.95	3	Plan station as intermodal mode	1.95
4	Public sector investment	1.85	4	Good and frequent HSR	1.70	4	Land speculation	1.50	4	Increase allowable densities in HSR station	1.70
5	Increased regional significance	1.30	5	Strong political will/ vision	1.65	5	Unattractive node not conducive to residential development	1.30	5	Locate station in central areas	1.55

* Indicates tie.

Positive and Negative Effects on Local Development

For both first-tier and second-tier cities the most positive (or second most positive) effect of HSR, as seen by the panel, is its potential for urban regeneration of station-adjacent areas. Responding to a follow-up question, 47% of respondents felt that regeneration would take place *only* in the presence of a robust economy and property market. Others disagreed, stressing that urban regeneration projects often take place with significant public funding, and such funding can override weak market conditions (Willigers, Pucci). One respondent clarified that commercial and residential development would require a buoyant real estate market, while construction of civic buildings (government offices, convention centers, schools, etc.), which are also part of urban regeneration, would not (Trip).

Respondents argued that under certain preconditions, which will be discussed below, the HSR station may act as a catalyst for additional development, giving momentum to pre-existing urban dynamics or spurring new commercial development and major buildings in central cities as well as brownfield redevelopment in peripheral cities. Respondents saw differences in the types of development that would likely be attracted in first-tier versus second-tier cities. Most respondents (63%) believed that since second-tier cities typically have fewer economic resources, they would see significantly fewer architectural landmarks and new public spaces developed around their stations. In follow-up questions, most respondents (55%) agreed that second-tier cities are most likely to attract residential uses around their stations. As one respondent emphasized, however, "with robust policies in place, non-residential uses can also be developed" (Vickerman). One respondent also cautioned that the HSR station may act as catalyst for the wrong type of development, such as the sprawling array of warehouses and storage facilities often encountered around major airport or bus terminals in the U.S. (Deakin).

While agreeing that early signs of development were positive, respondents had mixed reactions to a follow-up question asking about the time horizon of new development around station areas.

> *It depends; it can be less or more than twenty years* (Bertolini).

> *Residential activities may happen within 5 years (or even in advance of the project), employment development may take longer. If no actions are undertaken within 10 years, I expect nothing will happen anymore* (Bruinsma).

> *If no development is seen after 5 or 10 years, it's less likely that there will be significant effects after 20 years due to the HSR alone* (Willigers).

The increased public sector investment typically accompanying HSR construction was also ranked among the five most positive effects of HSR on local development. Indeed, the majority of respondents (69%) disagreed with the argument that HSR networks use significant public funds that could be better used on other infrastructural projects.

> *I don't know that the funds would have been made available for other infrastructure projects* (Deakin).

> *If the alternative is more highways, which it often is, I do disagree (that HSR systems use public funds that could be better used on other infrastructural projects). The problem is not just the public funds. In the case of legally privatized yet still publicly owned railway companies, like the German railways, the problem is that high-speed rail funding takes away from investment in the wider railway network* (Peters).

> *I agree or disagree depending on the city system that exists in every country. I agree (that investment on HSR is not economically sound) in a dispersed and not-dense city system, but I disagree [that it is not economically sound] in a dense and compact city system with big cities at 400 to 700 km distance* (de Ureña).

It should be noted that the previous responses were referring to the capital costs of HSR system construction, and not its operating expenditures. The high cost of investment was listed as the most important and second most important negative effect of HSR for peripheral and central cities, respectively.

A second negative impact that HSR can have in both central and peripheral cities, according to the panel, is the "barrier effect" that often develops between railway stations and their adjacent areas because of surrounding parking, and elevated or at-grade lines. This "barrier effect" was addressed by Trip when he referred to "the risk of urban fragmentation of the station developing into a separate 'island,' distinctive from the surrounding area in terms of spatial and functional development, ownership, control, scale, and architecture."[135] According to the panel, second-tier cities, in particular, where land is cheaper than in first-tier cities, run the risk of acquiring a sea of parking lots, and their station developing into an unattractive node not conducive to residential development. As explained by one respondent: "The sea of parking lots will be a U.S. problem which is not so apparent in most of Europe. And the rail lines themselves, well, so much of station renovation and upgrading in Europe is all about putting them underground or building over them" (Peters).

Land speculation, accompanied by gentrification and displacement of some residents in first-tier cities, was listed among the five most significant adverse effects of HSR stations. Other negative effects that made it to the "top ten" but not the "top five" list included noise and, for first-tier cities, the possible tearing down of existing historic buildings to make room for new development, as well as the weakening of other city areas (Table 2). For second-tier cities, there was a concern that the HSR may entice sprawl in outlying areas, because of increasing rents and housing prices.

Important Preconditions

The *location* of a station appears to be the most important precondition for subsequent development, according to the expert panel (Table 3). It is important that such location is situated close to a city's central core to take advantage of pre-existing complementary development and services. Responding to a follow-up question, the majority of the Delphi participants agreed that new construction is less likely to occur around HSR stations located at the edge of first-tier cities.

Connectivity with other transportation modes appears to be equally important for creating vibrant, transit-supportive density nodes around stations. The location of the station at a *transportation*

node with strong connections to other regional and interregional networks was listed as the most important prerequisite for its future development at second-tier cities, and the third most important precondition for first-tier cities. As argued by Bertolini and Spit in an earlier publication "A railway station's essential feature appears to be its function as an intermodal interchange, rather than a place where trains arrive and depart. The railway station is to be seen as 'an urban exchange complex.'" The railway system has to offer full connectivity in both the hard sense – the infrastructure – and the soft sense – the services. In the process the railway station turns into "a place to be," not just a "place to pass through."[136] This observation underscores the importance of a station being both a place and a node.

In a follow-up question, 65% of respondents agreed that in second-tier cities, HSR stations will only act as catalysts for additional development if linked with other means of mass transit (railway, buses, and airplanes). Interestingly, proximity of the HSR station to highways was deemed less important, but this is likely an outcome of the significant European representation in the panel (eighteen of the twenty-seven participants were from Europe).

According to the panel, an additional very important prerequisite for development appears to be the HSR station's good integration with its surroundings, what Trip calls "*the embeddedness*" of the station area in spatial, visual, and psychological dimensions.[137] Here, good urban and architectural design are essential to make the station accessible to the city, give the travelers a good sense of orientation, mitigate the "barrier effect" between the station and its neighborhood, and provide bridges (literally and metaphorically) to the surroundings. In a follow-up question, 84% of respondents agreed that quality of station design and public spaces are likely to act as important catalysts for additional development. As one respondent further explained:

> *Attempts to integrate railway infrastructure into an urban environment can include 'soft' solutions (treatment of borders, increasing permeability, constructions of different types of railway crossing, adapting to specific topographic site conditions) and 'hard' solutions (covering sections of the rail tracks or constructing rail bypasses) … The restructuring of the railway system offers the opportunity to improve the integration of rail space within the urban fabric and thereby palliate the barrier effect that railway installations traditionally create* (Tiry).

Respondents also noted that a strong political will and vision are required for successful development around HSR stations. Some argued that these should be combined with station area plans tailored to local conditions, a strategy of how the city could benefit from the HSR, and good coordination between public and private sectors. According to the panel, development will not happen in a vacuum but will require careful planning and policy intervention.[138] As argued by Vickerman, "only those stations which are prepared to support HSR with complementary investment will stand to gain."[139]

The quality and frequency of the HSR service is an important precondition for ridership and was consequently listed by respondents among the top five preconditions for station-area development.

LESSONS FOR CALIFORNIA

Significant debates are looming in political and academic circles about the costs and benefits of HSR for the state, as well as the accuracy of ridership, capital cost projections, and whether the HSR system's operating costs will require major subsidies. While these are important issues, they are beyond the scope of this study , which asks a dif ferent question: How should California municipalities prepare for HSR? It should be noted that in California, the imposition of new rail systems has not necessarily been positive for the surrounding areas. This is clearly demonstrated in Southern California, where poor choice of station locations and lack of pre-planning have confounded efforts to attract projects near many heavy rail and light rail stations. [140] In January 2009, Tom Adams, California League of Conservation Voters Board President, described the vicinities around many of the region's Metrolink commuter stations – another significant investment in rail transit – as wastelands. Many of these stations are surrounded by vast plains of parking that, while providing enhanced access to commuters living at the fringe of the metropolitan area, repel the kind of local accessibility to goods and services espoused by transit-oriented development advocates. But as the transit advocacy coalition TransForm notes, "… good land use does not automatically follow new transit; policies must be in place to link investments in the high-speed train with supportive land use."[141]

To utilize the collective wisdom of the Delphi process, we asked our respondents to outline the most important lessons that California can draw from the experiences of other countries. To be certain, there are considerable differences between California cities and cities along HSR networks in Europe, and lessons are not readily transferable. For one, planning is much more ad hoc and decentralized in California cities, and development is primarily driven by the private sector . In contrast, many of the European cities that host HSR networks have benefited from deliberative master plans put together by powerful public sector agencies. Second, the urban form of many European cities is typically more compact, dense, walkab le, and transit-friendly than their California counterparts. Third, European cities have higher levels of intermodality than California cities, which are primarily built around the automobile. Thus, the HSR network in Europe is not a "standalone" system, but is intricately linked with other transportation modes. Typically, European HSR stations not only accommodate high-speed trains, they also are hubs of local transport. To these differences one should add that California residents are more "married to their cars" than Europeans. They have higher rates of automobile ownership and more automobile miles traveled per capita.

Respondents were well aware of the aforementioned differences. It is for this reason that most emphasized the need to make the HSR station a well-connected and central node within the city. They argued that the most important lesson for California municipalities is that they should provide good connections of the new HSR system with other intraurban and regional transportation systems (including local airports), and plan the station as an intermodal node. Station location (which was also described as the most important precondition for desirable development) should be chosen carefully to maximize opportunities for desirable development. Delphi participants argued that in both first- and second-tier cities the HSR station should be centrally located rather than at the edge of

the city to take advantage of the center's good accessibility and connectivity with outlying areas, as well as existing "buzz" and activities.

Pre-planning in anticipation of the rail and the preparation of station urban design plans was stressed as important to avoid the barrier effect around stations, create a lively node with a mix of activities, and high-quality public spaces. Complementary land use regulations, such as the increase of allowable densities in the HSR station area, can help stimulate housing, mixed-use, and commercial projects. Transportation planning of the station area should have the objective of enhancing its connectivity to different transportation modes, while careful attention should be given to the amount and location of parking facilities so that they do not create a barrier that separates the station from its adjacent area.

In the end, the biggest lesson from the successes and failures of HSR systems around the world to catalyze further development is that growth and development around station areas will not happen by the mere presence of the HSR network. A number of preconditions should be in place, which, at a minimum, should entail a careful choice of station location, an urban design vision for the station area, a transportation plan that links the station to other modes, supportive land use policies and zoning regulations, and processes that help create broad interest coalitions and elicit community support through transparent meetings and hearings. It seems that the means by which such preconditions are fulfilled by municipalities and transportation agencies will determine if the HSR becomes an urban catalyst or not.

IV. URBAN DESIGN FOR HIGH-SPEED RAIL: IN PRINCIPLE AND IN PRACTICE

California's high-speed rail network is being promoted by the state government on the basis of three related objectives: transportation advantages, enhanced ecological sustainability and economic benefits. Achievement of these objectives depends upon the system's ability to attract high ridership. As mentioned in the previous chapter, effective station-area planning is one important factor in getting people to use the HSR. Thus, achieving the previous objectives depends at least partly upon transforming the physical environment of station areas. In this section, we discuss and evaluate the existing urban design recommendations issued by various agencies at the state, regional, and local levels for HSR station areas in California.

HSR advocates envision greater pedestrian activity, more active transit hubs, less traffic congestion and automobile usage, more jobs (and therefore more workplaces), new housing and urban revitalization in HSR station cities. This transformation is difficult to imagine, however, since HSR is new to the United States. In California, the rail will stop in widely disparate towns and cities, some of which are exurban or suburban in character. Only the largest of the station cities presently embody the urbanity implied by the term "urban design." Additionally, the speed of travel afforded by HSR will generate new proximities among cities along the alignment. Here, again, uncertainty prevails, but change seems inevitable for a city such as Gilroy that will be just 15 minutes from San Jose and 45 minutes from San Francisco by bullet train, effectively cutting travel times to these cities by more than half.

Although it is difficult to plan, given the different types of uncertainties involving HSR construction in California (e.g., about exact station locations, fare policy expected ridership levels, parking requirements, etc.), the need to do so is great. Rather than waiting for the station area to change after the HSR arrives, a few towns and cities are taking the initiative to plan for the rail alignment, the stations, and the parking. They hope to mitigate negative impacts and, more important, to create catalysts for desired development. As we will see in the next sections, towns and cities with stations are approaching the planning process in highly varied ways. The same is true for towns along the lines with no stops.

The recommended planning and design process for station cities, as explained in the 2009 *California High-Speed Rail Project Program Summary Report*, involves a combination of state and local contributions. CaHSRA and its consultants expect to deliver a partial plan that is 30 percent complete in terms of engineering design for each section of the rail line and each station. The objective is to control preliminary engineering centrally so that the system will operate as a single network and then to give local authorities responsibility to complete the work.[142] CaHSRA's scope of work does not extend past the station design and parking. Indeed there is no specific mention of planning for the station area in the summary report. In Bertolini and Spit's terms, the Authority appears to be planning the areas around HSR stations as "nodes" but not as "places." [143] This creates a potential contradiction, in that station design and parking most certainly will be consequential for the station area's urban design. Consider the development pattern that has arisen around the state's airports, and the problematic barrier effect of parking is obvious. Instead,

the preliminary design and engineering of stations and parking should be considered in conjunction with the preliminary design of the area surrounding the station (and, therefore, in conjunction with the station city' s plans for integrating high-speed rail into its larger transportation, economic, and physical development plans). The CaHSRA recognizes that station cities must undertake substantial planning after the 30 percent scope of work is handed over, and that they do not all have the capacity to do so. For example, towns like Palmdale and Gilroy have few planners to elaborate upon currently vague station area design guidelines in their cities, or to execute them. In order to encourage such planning, those communities as well as Merced, Fresno, Tulare/Kings, Bakersfield and San Jose are scheduled to receive planning grants of up to $200,000 from CaHSRA to cover station-area planning costs.[144] As localities begin to initiate such planning, the time appears particularly opportune to examine the station area planning and urban design guidance that has already taken place.

To evaluate urban design recommendations related to station areas, we analyzeda variety of documents. Most important are the March 2011 *Urban Design Guidelines* issued by the CaHSRA. Additional reference documents include the July 2009 *California High-Speed Rail Project Program Summary Report*, Vision California's *The Golden State in 2050* (January 2009) as well as its March 2011 *Statewide Scenarios Report*, the San Francisco Planning and Urban Research Association's (SPUR) January 2011 report, *Beyond the Tracks: The Potential of High-Speed Rail to Reshape California's Growth*, the *Master Land Use Plan for the Platinum Triangle in Anaheim* (October 2010), Fresno's *Fulton Corridor Specific Plan* (prepared by Moule & Polyzoides, January 201 1), Los Angeles' *California High-Speed Rail Alignment and Station Options for the City of Los Angeles* (August 2009), and San Jose's *Diridon Station Area Plan* of April 2011. Interviews with city officials and planners in each of the six case study cities round out the information assessed.

URBAN DESIGN FOR STATION AREAS: STATEWIDE REPORTS

CaHSRA Guidelines

In March of 2011, the consultants Parsons Brinckerhoff's PlaceMaking Group issued Urban Design Guidelines on behalf of the CaHSRA. This 91-page booklet is intended to "help shape development around the high-speed rail stations."[145] The booklet defines the effort as a cooperative undertaking between the Authority and local agencies, while recognizing that the planning and execution of plans remains primarily with localities. This document posits the notion that an HSR station can be a hub for economic development, as well as transportation, and a catalyst for beneficial change in the station city. It considers the focus of urban design attention to be the "Urban Station District" defined as the area within a half-mile radius from the HSR station. The guidelines are intended to help station cities capitalize on the development potential brought by HSR, and direct public and private actions. To do so, the guidelines explain how to create a process for developing a plan, and offer anecdotal descriptions of HSR station areas in other countries. The responsibilities of the different parties are diagrammed spatially in Figure 4, with CaHSRA's involvement (here called California High Speed Train, or CAHST) terminating at the edge of the train's "project envelope," some involvement of public agencies on the adjacent streets, and private investments dominating adjacent development.

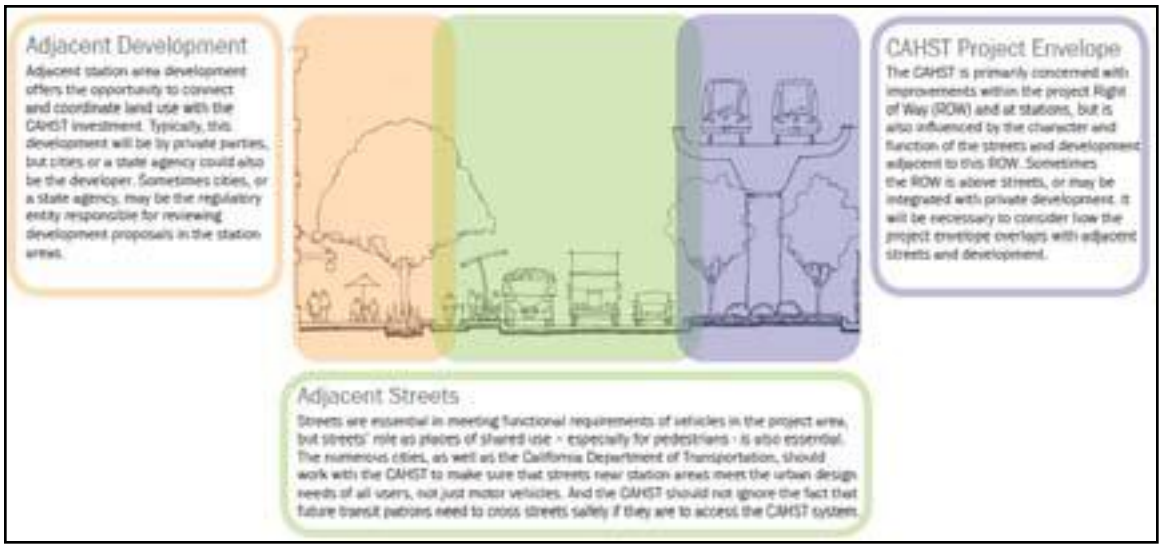

Figure 4. Spatial Diagram of California High-Speed Rail Responsibilities

The Guidelines explain how urban design and transit networks interconnect to transform areas within cities into centralized, pedestrian-oriented, and mixed-use destinations. These goals, characteristic of the goals of transit-oriented developments (TODs) are recommended without question. The guidelines state:

> *The fundamentals of TOD apply to CAHST, but they will often play out differently than with other TODs. Transit-oriented development may be described by six core principles, which define the essential characteristics of all successful TODs:*
>
> 1. *Development density that is greater than the community average.*
> 2. *A mix of uses.*
> 3. *Compact, high-quality, pedestrian-oriented environment.*
> 4. *An active defined center.*
> 5. *Limited, managed parking.*
> 6. *Public leadership.*

The CaHSRA has put forward a planning model that follows generic urban design recommendations for transit-oriented development (TOD). While these objectives are, at the most basic level, in accordance with wider goals of HSR (for example, to reduce automobile travel and GHG), our research raises questions as to whether these one-size-fits-all principles can be so readily applied to smaller, suburban and rural towns. A useful contrast to these broad-brush recommendations, which essentially comprise a list of desired, fundamental qualities, are the illustrations of a number of HSR station areas from other countries, including Germany, Japan and China. These examples suggest a variety

of highly urbanized districts that operate according to the TOD fundamentals listed above. There are no illustrations from Europe or Asia of the lower-density, suburban conditions that pertain to at least half of the present study's cases, though such examples exist. The CaHSRA does establish four categorical differences along the rail line, under the topic heading "Assure Community Fit." In that section, the Guidelines differentiate among station cities by region (along different lines than this research), examining characteristics such as density and access to mass transit in four separate regional zones from north to south: Bay Area-Santa Clara Valley, San Joaquin Valley, LA Basin-Inland Empire, and San Diego Region. The benefit of this classification is that all sections of the rail, rather than only the stops, are included; the disadvantage is that it overplays geography at the expense of socioeconomic factors, while blurring, and at times confusing, qualities within a region.[146]

Several factors lend a boilerplate feel to the CaHSRA Guidelines: While they acknowledge regional distinctions, they ignore differences among station cities within regions as well as specific similarities across regions; they allude to the specific qualities of HSR but generally treat it as a generic form of transit infrastructure; they recommend as the singular solution the "destination TOD" with high-density housing as part of the mix – where transit riders would come for shopping, work, and entertainment; and there is little description of the different ways that HSR districts have evolved and developed (or have stalled) in other countries. The document, to be fair, is intended for the public and does not record systematic research findings to back its claims. Nevertheless, as the Delphi survey and literature review have demonstrated, first- and second-tier cities will be affected by HSR differently. The goal for every station city to become a dense, mixed-use, urban destination contradicts evidence of the current conditions in many second-tier cities, which might benefit most, for example, from operating as origins where workforce housing predominates.

Even if the Guidelines accurately describe the optimistic, ultimate development goals of station cities along California's HSR corridor, there is the question of how second-tier cities like Gilroy and Norwalk, or even Fresno and Anaheim, get to that desired end-state. The Guidelines briefly touch upon implementation as a political matter, but not as a set of phases and interim conditions that move from present to desired outcomes in the long term. The development of a specific planning process for individual station cities would require substantial augmentation and, moreover, potentially the abandonment of ill-fitting objectives (such as dense mixed-use developments, extensive pedestrian environments, or high-density housing) embedded in the standard definition of transit-oriented development.

SPUR Report

In contrast to CaHSRA's Guidelines, the San Francisco Planning and Urban Research (SPUR) Report on HSR, *Beyond the Tracks*, is a critical document that grapples with not only HSR's possible positive impacts but also its possible undesired outcomes and some aspects of implementation. Its format (in contrast to the how-to Guidelines) is more clearly directed toward an audience of planners and policymakers, as well as to an interested public. It is less focused on urban design in station areas than on urban development related to HSR and thus complements and provides a foundation for urban design recommendations along the HSR line. The SPUR Report views station environments

falling into five types: traditional downtowns and established business districts (e.g., San Francisco, Los Angeles), emerging downtowns and business districts (e.g., San Jose, Anaheim), suburban commuter stations (e.g., Gilroy), airports (e.g., Burbank), and market-challenged downtowns (e.g., Fresno). The SPUR report defines the last of these as station cities where rents are low, investment is low, and vacancies are high such that "the real estate markets do not support an urban development pattern." The report cautions that standard TOD development will be difficult to attract in these cities; and that they constitute the most significant challenges along the rail line in need of proactive planning strategies.

To justify the investment in HSR, SPUR posits that a "build it and they will come" attitude is insufficient when it comes to investing in such a multibillion-dollar endeavor.

> *High-speed rail will certainly increase the desirability of these locations [such as Bakersfield] and thus tend to make higher-density construction financially feasible. But it would be naïve to believe that the existence of the rail link will solve the problem all by itself. We have only to look at the lack of development next to some of Oakland's BART stations after all these decades of near-instant proximity by BART to downtown San Francisco to see that sometimes access to a growing economy is not sufficient to create high demand*.[147]

The report makes thirteen recommendations for local governments and the State of California to take advantage of HSR's development potential. The recommendations begin generally identifying such issues as developing station area plans for each HSR station area and drafting statewide station-area planning and development guidelines to inform the local plans, along with a station-area plan implementation program. They then become quite specific in terms of how station areas can be transformed while making clear distinctions among the different challenges faced by station areas. For instance, SPUR recommends implementing land banking strategies around HSR stations to support future development and to help assemble suitable development sites and enacting farmland protection policies and open-space preservation rules that limit potential sprawl impacts in the Central Valley. With this latter recommendation, SPUR acknowledges what remains unsaid in CaHSRA publications: that clear planning and design strategies will be necessary to prevent some station cities from expanding as origins or bedroom communities, thereby promoting sprawl. Lastly the SPUR Report links its recommendations to broader policy goals: Incorporate HSR considerations into the implementation of SB 375 and the Sustainable Communities Strategy.

Vision California Report

The last of the statewide planning documents was authored by Vision California, an organization funded by the CaHSRA in partnership with the State of California's Strategic Growth Council, a cabinet-level committee tasked with coordinating the activities of member state agencies to explore the role of land use policy and transportation investments in meeting California's environmental and fiscal challenges. Led by Calthorpe Associates, Vision California's planning time horizon, unlike the HSR Guidelines, is long-range, with a 2050 horizon, and scenario-based. Its March 2011 publication, *Statewide Scenarios Report*, lays out four different future directions for the state to accommodate growth

particularly in relation to the "unique opportunity presented by California's planned High-Speed Rail network."[148]

The four growth scenarios for California assume the same increase in population. They are: "business as usual," "mixed growth," "growing smart," and "green future." Each model comprises land use patterns combined with policy options, which are then evaluated against a range of measures including energy consumption, transportation costs, and water use. Although the Vision California report does not explicitly include HSR in its analysis, the two scenarios most compatible with HSR objec tives are the most ambitious: "growing smart" and "green future." The most aggressive policy scenario is "green future," which lays out goals compatible with those enumerated by HSR advocates in terms of reductions in vehicle-miles traveled, greenhouse gas emissions, establishing more compact urban footprints and developing higher density housing. The comprehensive analysis of each scenario concludes that only the "green future" model will achieve the policy goals laid out in California's recent environmental legislation. The implications for urban form, that it is more condensed around transit nodes and includes higher density housing, are compatible with the urban design guidelines published by CaHSRA. Given CaHSRA's funding support for Vision California, this report should be viewed as providing the broader context for HSR's implementation in the state.

General Characteristics of Statewide Reports

These three reports related to station-area design and planning represent a range of relevant concerns as well as responses to them. The vast majority of the discussion of station-area design in the CaHSRA Urban Design Guidelines focuses on the district, nearly always conceived as a network of pedestrian-friendly streets. However, drawing from the analyses by SPUR and Vision California, four spatial zones must be considered in a dialogue on the urban design of HSR station areas: 1) the station itself and how it relates to its immediate surroundings; 2) the district generally defined as a half-mile radius around the station; 3) the municipality at large; and 4) the broader region. In terms of the region, newly condensed in terms of space and time, station cities must begin to identify productive relationships with newly accessible neighboring areas. The current reports do not investigate the challenges or opportunities that may arise when two station cities operate in a complementary, dependent manner, except in the broadest terms.

While the focus on the station district is justifiable, none of the cities included in this research could be said to have a pedestrian orientation around the designated station location, perhaps with the exception of Los Angeles (even there, the station area is separated from the remainder of downtown by US Highway 101) and Gilroy. In those station cities already engaged in planning efforts related to the development of HSR, particularly Anaheim, Fresno, and San Jose, HSR is viewed as a catalyst to convert the station district into a dense, pedestrian-friendly zone. Particularly in San Jose, the district design can borrow from the codified lessons of transit-oriented development. For example, CaHSRA's urban design guidelines for station districts recommends creating "a new destination" with a defined "core-center-edge," a mixture of uses (including regional office employment, hotels, destination retail, and parks), and a network of interconnected streets with an emphasis on pedestrians.[149] As we will detail later, San Jose is attempting to do just this, with the

creation of a new downtown sports venue and an array of pedestrian-oriented retail and commercial uses, all in the station area. Anaheim's effort to use HSR to stimulate urban effects around its station will need some creative scenario planning, and even more so in Fresno, according to the SPUR Report. While CaHSRA's urban design recommendations may be applicable with minor adaptation to what SPUR calls the traditional and emerging cities, their application to the market-challenged and more suburban station cities such as Fresno, Gilroy, and Norwalk will require adaptation and consideration of strategies that will improve complementarity with first-tier cities.

STATION-AREA PLANS FROM CASE STUDY CITIES

As already mentioned, California station cities are in very different stages of preparation and planning for the HSR. Anecdotal evidence suggests that the less densely populated the area the less likely the current residents are to believe that benefits of HSR outweigh its disadvantages. For example, farmers in the Central Valley have voiced their grievances that the rail will split farmland and change the rural character of their towns. It is not clear in those farming communities what, if any, positive effects HSR may hold for their local area.[150] Among our case studies, exurban and suburban station cities such as Palmdale, Norwalk/Santa Fe Springs, and Gilroy, are wary of high-speed rail and unsure about how to imagine its future impacts.[151] The larger cities of San Jose, Fresno, and Anaheim, on the other hand, while not uniformly supportive, have thus far mustered the most constructive efforts to plan for the rail's arrival. In Los Angeles, where urban design efforts were just beginning at the time of this writing, the relevant authorities are considering HSR in the larger transportation context of Union Station and in the larger urban context of downtown.

Anaheim, Fresno, and San Jose have undertaken a substantial effort toward the urban design of their station areas. Anaheim has prepared its plan in-house, while Fresno and San Jose have hired design consultants Moule & Polyzoides and Field Paoli, respectively.

Briefly, in Anaheim, the HSR station is part of an integrated, intermodal hub situated in an area called the Platinum Triangle, where the city is directing development investment. The master plan that the city has prepared for the Platinum Triangle area is split into districts, including the ARTIC area immediately surrounding the proposed station. The other adjacent zones include the Stadium district to the south, Katella to the east and the Arena district to the north. The ARTIC station and associated intermodal opportunities are some of the primary impetuses underpinning the Platinum Triangle redevelopment plan.[152] The plan offers general urban design principles and streetscape guidelines.

The Fresno plan is focused along the Fulton Corridor, tying the HSR station to the existing downtown. The station itself is downplayed, taking the form of a platform with a canopy, while emphasis is given to the streetscape and urban pattern. The urban design plan presents two alternative schemes for the two alignments east and west of the existing rail lines. Both scenarios include a parking strategy, adding 3,400 spaces to the existing 1,100 spaces, transit connections, including a proposed streetcar alignment to the north of the station, and two density scenarios: low-density, with maximum four-story buildings and five-story parking garages, and high-density with maximum eight-story buildings. The strategies outline proposed massing for both the high-density and low-density proposals

in traditional urban blocks, while differing slightly in the siting of new parking garages and residential and office components.

The San Jose plan is perhaps the most developed among the station cities at the time of this writing and is assessed here in greater depth. According to the plan, the Diridon Station area will become a "superb destination," later described as a "world-class cultural destination," comprising large projects including the station itself and a new major-league baseball stadium, while strengthening existing features including Los Gatos Creek and the current Diridon Station. The plan has a time horizon of 30 years. There are ten primary objectives for the station area, some of which align with the CaHSRA Guidelines. Together they create an optimistic portrait of growth and economic development in a mixed-use urban setting, setting the following objectives:

1. Guide land uses toward ridership, economic development, and creating destinations
2. Improve links to all modes of transit
3. Create a walkable, livable, business-supportive district
4. Encourage mixed use and variety (from large-scale corporate uses to infill development)
5. Make the area active, pedestrian friendly, connect to downtown
6. Design the station as center of architectural and functional significance
7. Build high-density, mixed-use development as catalyst, with an emphasis on residential use
8. Prepare for long-term environmental review
9. Disseminate public information about planning process and "TOD concepts"
10. Create a great place…that is a local and regional destination local and regional destination

The San Jose plan also includes another set of "Overall Themes" and "Specific Goals" that basically restate the above. The four themes involve creating a destination for live, work, play; vibrant public realm; reflecting Silicon Valley spirit of innovation, and affirming a sense of place that marks San Jose as the center of Silicon Valley. The eight goals are more generic than the themes: making an urban district with intensity and mixed-use; increasing connectivity; orienting local transportation to walking and biking; maintaining neighborhood compatibility; developing neighborhood services and hotel/entertainment, office uses; augmenting open space; integrating public art; and dispersing parking throughout the planning area. The document also proposes a three-year process during which project alternatives will be proposed, and public feedback will be gathered, ending with the selection and environmental analysis of a preferred plan.

As in the Urban Design Guidelines prepared for CaHSR, the San Jose document lays out a generic urban design and planning agenda. Only the brief mention of Silicon Valley contains a more specific idea about the station district. If each station city's unique characteristics are to guide station area planning, the San Jose plan does not yet achieve this end. It is possible that the public process is expected to deliver such specificity, or the urban designer who serves as the San Jose consultant. Alternatively, the City would be more likely to guide the area's transformation if it developed a stronger, more explicit notion about its physical form and identity. This is implicit in the San Jose station's pairing with the new sports arena, creating a popular entertainment venue thatis in the immediate vicinity.

CONCLUSION

In conclusion, this review of planning and design reports and guidelines about station-area development along the HSR found (a) a consistent approach to planning for HSR and to strategies for using stations as catalysts for creating better cities, and (b) some significant shortcomings. Both are summarized below.

- Station areas and their surrounding populations are quite different, demanding unique solutions tailored to the existing physical, economic, and political conditions. Nevertheless, station environments, are typically conceived as trip destinations (as opposed to trip origins). The economic promise of destination-based, transit-oriented-development overshadows the fact that some station cities will primarily be origins – suburban bedroom communities – for at least the near- to mid-term. Despite the fact that HSR's impact on physical form will not be homogeneous across all station cities, network-wide guidelines for urban design in station areas are, for the most part, uniform. In particular, a standard planning process is recommended for all station cities when in fact different cities are likely to benefit from planning processes tailored to their particular conditions.

- Since current urban design guidelines rely on traditional transit-oriented-development models, the larger cities with traditional commercial cores are readily served by this approach. San Francisco and Los Angeles already have some of the ingredients necessary to create a TOD, whereas the guidelines are not as well suited to smaller cities.

- The more suburban cities along with exurban and bedroom communities are not as well served by standard urban design guidelines. For these station areas, new concepts of transit-oriented-development should be developed together with steps to achieve the long-term goals of transit-oriented development.

- The process of planning station areas is generally framed as participatory master planning, that is, a process engaging stakeholders aimed at the creation of a single, built-out state portrayed in plans and renderings.

- The planning process does not take into account the timeframe to achieve long-term goals, which could extend into decades, nor the near-term and interim steps needed to achieve the overall vision.

- At present, station cities tend to either (a) adopt a standard transit-oriented-development scenario, or (b) do nothing much in terms of planning and design to alter their existing conditions. Station cities that hope to effectively harness HSR to catalyze urban development will need to adapt the existing generic guidelines toward more specifically local solutions that build in economic development plans, and they will need to engage in an extensive urban design process.

In conclusion, the urban design implications and urban development effects of HSR willvary greatly depending upon the characteristics of the different station cities and their regions. The specific physical context in which station platforms are located will also be influential in terms of station-district transformation. The suburban dormitories and market-challenged cities will either change over decades or will need to jumpstart their transformation with significant targeted investment. Cities will need interim and alternative plans for the design of their station districts. In order to develop such alternative plans, less-urbanized and more-market-challenged station cities must create policies that result from economic studies of potential development opportunities specific to the city, and development strategies that take into account the opportunities afforded by HSR connections to proximate cities.

V. CASE STUDIES

As noted in the review of the literature in Section 2, a number of scholars predict extensive economic impacts from HSR, including regional adjustment, economic integration, worker and firm relocation, and changes in travel patterns as a result of the increased accessibility the HSR network brings to station cities. Certainly in California, the expectation is that HSR will foster economic development and job growth, especially among the state's smaller cities and those located in the state's Central Valley. However, the degree to which HSR will generate new growth and development rather than redistribute it is a question that the research to date has yet to resolve. Similarly, scholars are ambivalent whether or not redistribution of growth comes in the form of a benefit or cost to smaller localities or localities bypassed by the rail. Nevertheless, the effects of HSR on the state's largest metropolitan centers are likely to be different than the effects on its more peripheral cities and hinterlands. The question is what kind of policies and planning should be in place to enhance the likelihood that HSR will in fact generate growth that will benefit the state, including small and struggling localities, and how should these differ among the station cities?

This Section examines the particularities of planning for HSR in six California cities as well as their existing assets and development potential. From eleven possible "first-phase" HSR station cities (see Table 4), we selected six case studies (see Section 1 for an explanation of the selection process): two first-tier, large metropolitan cities – Los Angeles and San Jose – and four second-tier cities – Fresno (small metropolitan), Anaheim (suburban employment center), Norwalk (suburban dormitory), and Gilroy (exurban dormitory). We examined these six case studies through the development of station city profiles (collections of socioeconomic statistics and projections as well as land use and travel data), and interviews with local stakeholders.

Table 4. All Cities Comparison

City	Type	2010 Population	2010 Jobs	Net commuter inflow/outflow
Los Angeles	Large metropolitan	4,045,873	1,793,160	-18,879
San Jose	Large metropolitan	945,942	405,000	-52,300
Burbank	Small metropolitan	103,340	168,285	132,255
Fresno	Small metropolitan	494,942	196,000	31,283
Anaheim	Suburban employment center	336,265	210,590	8,973
Sylmar/San Fernando	Suburban employment center	103,340	27,320	-12,256
Norwalk	Suburban dormitory	105,549	24,550	-20,369
Palmdale	Exurban dormitory	138,790	20,935	-28,895
Gilroy	Exurban dormitory	48,821	17,900	-841
Merced	Rural dormitory	76,313	26,040	1,664

We collected data on city populations, number of jobs and commute travel patterns. The six case study cities vary widely for most variables. In terms of population, they range from Gilroy, with a population of 48,821, to Los Angeles with nearly 3.8 million (Table 5). In terms of size, the case studies include the first, third, fifth and tenth most populous cities in California (Los Angeles, San Jose, Fresno, and Anaheim) to the 58th (Norwalk) and beyond the 100th (Gilroy). In the past ten years all but one of the station cities has grown. Some have experienced significant growth (e.g., Gilroy's population increased by 51.2%), but one has lost population (Norwalk's population loss was 3.3%). In the next 25 years, all the cities are expected to grow, with Fresno facing the largest projected population increase of more than 172%.[153]

Table 5. Station City Population Growth Comparisons

	Population			City Size Rank	% Change	
Station City	2000	2010	2035	2010	2000-2010	2010-2035
Anaheim	320,070	336,265	413,923	10	5.1%	23.1%
Norwalk	109,182	105,549	120,409	58	-3.3%	14.1%
Los Angeles	3,694,820	3,792,621	4,439,645	1	2.6%	17.1%
Fresno	427,652	494,665	1,346,439	5	15.7%	172.2%
Gilroy	32,291	48,821	58,606	>100	51.2%	20.0%
San Jose	854,468	945,942	1,313,282	3	10.7%	38.8%

The station areas themselves also vary. It should be noted that in some California cities, including Los Angeles and San Jose, HSR stations will be located at existing, historic train stations or may involve the redevelopment of existing, more recently built, commuter rail stations. Many of these stations already function as well-integrated transit hubs. In other locations, entirely new stations will need to be constructed. Thus, the level of investment, both in terms of redeveloping existing stations or developing new ones could vary significantly among station cities.

Nearly 1.4 million residents currently live within five miles of the planned Los Angeles HSR portal at Union Station; 843,709 residents live within five miles of Anaheim's ARTIC, and 610,694 residents live within five miles of San Jose's Diridon Station (Table 6). By 2035, these figures are expected to be almost 1.7 million in the case of Union Station, and over one million for both ARTIC and Diridon Station. Yet only 54,341 residents live within five miles of the planned Gilroy station today, and that number is expected to be only 85,466 by 2035.

Table 6. Station Area Population Growth Comparisons

	Population			% Change	
Station City	2000	2010	2035	2000-2010	2010-2035
Anaheim 5-mile	843,709	937,448	1,027,148	11.1%	9.6%
Anaheim Half-mile	15,170	25,035	41,677	65.0%	66.5%
Norwalk 5-mile	765,354	830,873	909,415	8.6%	9.5%
Norwalk Half-mile	31,092	33,609	37,425	8.1%	11.4%
Los Angeles 5-mile	1,378,539	1,514,569	1,658,524	9.9%	9.5%
Los Angeles Half-mile	32,734	36,180	39,948	10.5%	10.4%
Fresno 5-mile	311,232	375,342	548,541	20.6%	46.1%
Fresno Half-mile	21,057	19,968	33,624	-5.2%	68.4%
Gilroy 5-mile	54,341	64,318	85,466	18.4%	32.9%
Gilroy Half-mile	24,531	33,101	52,018	34.9%	57.1%
San Jose 5-mile	610,694	681,625	1,040,752	11.6%	52.7%
San Jose Half-mile	21,545	29,170	63,791	35.4%	118.7%

While HSR is not envisioned to serve the needs of short-distance commuters, its smooth interface with other transportation modes will be crucial for the success of the system. With this assumption, we perceive that an examination of the number and type of jobs located within the 5-mile radius of the station can give us a clear picture of the area's existing assets and development potential. Not surprisingly, the number of jobs within 5 miles of each case study station varies significantly. In Los Angeles, 685,772 jobs are located within 5 miles of Union Station, but only 18,372 jobs are located within 5 miles of the planned station in Gilroy (Table 7). The current job situations in Anaheim, Norwalk, and San Jose have more similarities, but our forecasts suggest different rates of growth among them, with only San Jose exhibiting the potential for significant job growth. Each station area also exhibits significant specialization in terms of employment; and, interestingly, none shares its specialty with the others. Downtown Los Angeles, with a number of educational institutions within the 5-mile distance from Union Station (such as the University of Southern California, California State University at Los Angeles, and numerous professional, community, and technical colleges) has a significant number of jobs in the education sector. San Jose, the so-called "capital of the Silicon Valley," specializes in information services; Anaheim, in tourism; Fresno, in agriculture; Norwalk/Santa Fe Springs, in manufacturing; and Gilroy, in retail services. Despite this variety, all station areas exhibit high demand for mobility among workers. We found that few residents of the station areas also work within them, with the vast majority working at locations beyond five miles of the station. Conversely, the vast majority of those who work within five miles of the stations live outside of the area.

Table 7. Job Growth and Sector Growth Comparisons within Five Miles of Station Areas

Job Growth Comparisons within 5 Miles of Station Areas

Station Areas	Jobs			Job Density	Gap Index Score*	
5 Mile	2002	2009	2035	(2009 Jobs/Sq. Mile)	2009	2035
Anaheim	363,578	344,558	338,221	4,386	.121	.115
Norwalk	248,171	242,675	282,823	3,089	.023	.084
Los Angeles	586,511	685,772	923,079	8,730	.256	.213
Fresno	102,441	105,200	122,531	1,339	.096	.056
Gilroy	17,520	18,372	26,879	258	- .006	.113
San Jose	326,095	308,725	333,874	3,930	.104	.055

* Scores closer to 1 indicate a higher jobs-to-workers ratio while scores closer to -1 indicate a higher workers-to-jobs ratio

Job Sector Growth Comparisons within 5 Miles of Station Areas

Station Areas	Job Sector Growth 2009-2035**			Job Sector Specialization	
5 Mile	1st	2nd	3rd	Highest Specialization	2009 Location Quotient***
Anaheim	Educational services	Professional and information	Retail	Management and administration	1.14
Norwalk	Health services	Recreation and hospitality	Retail	Manufacturing, wholesale, and transportation	1.80
Los Angeles	Agriculture and natural resources	Educational services	Management and administration	Educational services	1.67
Fresno	Financial and real estate	Agriculture and natural Resources	Educational services	Agriculture and natural resources	2.40
Gilroy	Professional and information	Financial and real estate	Retail	Retail	1.91
San Jose	Educational services	Agriculture and natural resources	Recreation and hospitality	Professional and information	1.16

** Largest % Growth

*** *Higher Scores indicate a higher degree of job specialization*

All station areas are well connected to the automobile network, including the interstate highway system, but the level of access to other transportation modes (public transit, air travel) varies widely. While all the cities exhibit some degree of multimodalism, some have more robust systems with better connectivity and access than others, with the largest cities, Los Angeles and San Jose, being the most multimodal.

Methods

Development of station city profiles: To develop the station city profiles, we collected data from the U.S. Census; the report of Longitudinal Employer-Household Dynamics (LEHD) in 2002 and 2009; regional demographic and employment projections prepared by the Association of Bay Area Governments (ABAG), the Council of Fresno County Governments, Southern California Area Governments (SCAG); regional and local transportation, land use plans, and redevelopment plans; digital aerial photography; county assessor records; and data from local economic development authorities and chambers of commerce.

In order to understand the economic development potential and comparability of each station area, we computed several new variables. For projected populations within our study areas (an area within five miles of the planned location of the HSR station platform), we relied on projections by regional councils of government. The variety of methods employed by those agencies for aggregating information on current and future jobs resulted in our developing independent extrapolations using OLS regression[154] with annual employment data gathered in the LEHD from 2002-2009. We aggregated this data from the census block level to the five-mile station area and assumed a linear growth pattern. Based on this linear growth model, we developed job and worker projections for 2010-2035.

Drawing on the methods of Murakami and Cervero,[155] to describe the potential competitive advantages among HSR station cities we calculated location quotients for jobs and workers according to grouped NAICS employment sectors. We also computed gap indexes for each grouped NAICS employment sector and for each station area. The research team also developed location quotient (LQ) scores to characterize the degree of job or worker specialization in a station area. In order to calculate this variable, we aggregated employment data from twenty work sectors, based on NAICS codes, into nine groupings, using the groupings employed by ABAG. We then computed location quotients of jobs and workers in the five-mile station area for 2009 and 2035. Each location quotient was computed as follows:

$$LQ = (x1 / y1) / (x2 / y2)$$

Where x1 = the number of jobs or workers in a sector grouping within the 5-mile station area

x2 = the number of jobs or workers in a sector grouping in California

y1 = the total number of jobs or workers within the 5-mile station area

y2 = the total number of jobs or workers in California

Using NAICS employment data aggregated to the aforementioned nine groupings, we then calculated gap index scores to indicate the balance of jobs and workers within each sector of the station area and computed a score for the station area as a whole. Gap index (GI) scores range from -1 to 1, with scores closest to -1 suggesting a worker-dominated sector or region and scores closest to 1 suggesting a job-dominated sector or region. Scores of 0 suggest a perfect balance of jobs and workers. The gap index was computed as follows:

$$GI = (a - b) / (a + b)$$

Where a = the number of jobs in a sector or station area

b = the number of workers in a sector or station area

Interviews: We conducted a series of interviews with knowledgeable public- and private-sector participants in the HSR planning process in each of the case study cities to better understand how each prepares for the coming of the HSR, the city vision and perceived benefits from the system, the challenges faced, and the process of local planning. We interviewed a total of 28 people, including planners from local redevelopment, transportation, and planning agencies; city managers; members of the city council; and private design and planning consultants (see Appendix B for list of interviewees). While this is certainly not an all-inclusive list, we sought to contact and interview some of the most knowledgeable actors involved in the planning for HSR in the case study cities.

The following sections summarize the socio-demographic, economic, and jobs profiles of the six case-study cities, as well as the information gathered from interviews.

LOS ANGELES

City and Station Profiles

The portal for HSR in Los Angeles is planned to be in or near Union Station, the city's major passenger rail terminal and transit station (Figures 5 and 6). Over time, Union Station and its environs have become largely cut off from the downtown area because of the introduction of interstate highways. The central business district of downtown Los Angeles is located close to the geographic center of the metropolitan area, and to the southwest of Union Station. In the period following World War I and accelerating after World War II, first residential development, then shopping, and finally employment became largely decentralized in Los Angeles. While downtown remains the region's largest and densest employment center and its most important administrative, financial, and cultural hub, other important centers of employment have developed in Hollywood, Beverly Hills, Westwood, West Los Angeles and in smaller municipalities around the city. In recent years, downtown Los Angeles has witnessed significant residential growth, adding 27,000 inhabitants and 17,000 housing units since 1999, and advancing towards the promise of becoming a 24-hour urban center.

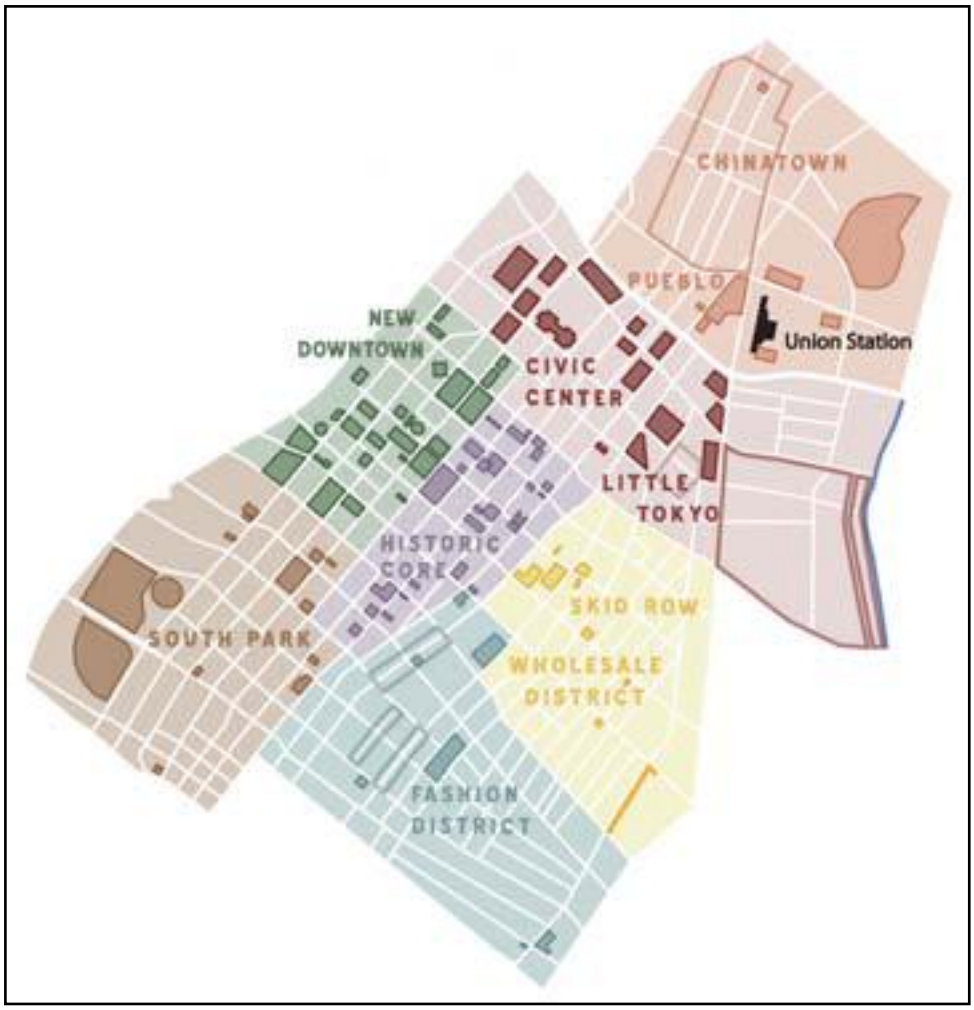

Figure 5. Map of Downtown Los Angeles

Figure 6. Aerial Photograph of Los Angeles HSR Station

Population

With almost 4 million residents in 2010 according to the U.S. Census, Los Angeles is the largest city in Los Angeles County and the State of California, and the second largest city in the United States, after New York. It will be the largest city served by California HSR. Densely populated (7,528 persons per square mile) by national standards (but far from being as densely populated as New York City or the City of San Francisco), the City of Los Angeles accounts for 39% of all residents in Los Angeles County and 21% of all residents in the six-county (Los Angeles, Imperial, Orange, Riverside, San Bernardino and Ventura) metropolitan area. Los Angeles is a minority-majority city, with non-Hispanic white residents accounting for 28.7% of the population. The remaining 71.4% of the city's residents are comprised of Hispanics of all races (48.5%), Asians (11.1%), Blacks (9.2%), and other minorities (2.6%). Between 2000 and 2010, the total population of the City of Los Angeles increased by 97,879, reaching 3,792,621 in 2010. The resulting 2.6% growth

rate was lower than the Los Angeles County rate of 3.1% and the statewide growth rate of 10%. Between 2010 and 2035, the city' s population is projected to increase by 17% to 4,439,645. Median household income in Los Angeles in 2010 was $48,617, or 83% of the median household income among all Californians.[156] The median home price in the city in 2010 was $401,000, or 120% of the statewide median home price, having fallen from $521,000 (then 120% of the statewide median) in 2008.[157] The homeownership rate (37.9%) is low when compared to the rate of homeownership statewide (57.8%).

In 2010, 1,514,569 residents lived in census tracts located entirely or containing portions within 5 miles of the station.[158] The population density of these census tracts was an average of 14,849 persons per square mile, nearly twice the average population density citywide.[159] Within census tracts located entirely or containing portions within a half-mile of the station, the 2010 population was 36,180 with an average population density of 11,201 persons per square mile.[160] The Southern California Association of Governments (SCAG) projects that residential population within 5 miles of the station will increase to 1,658,524 residents or by 9.5% between 2010 and 2035. Within a half-mile of the station the residential population is expected to increase by 39,948 or by 10.4% within the same period (Figure 7).[161]

Table 8. Residential Population and Population Density Projections within 5 Miles of Los Angeles Station, 2005-2035

	2005	2010	2015	2020	2025	2030	2035
Population							
Metropolitan Statistical Area	13,290,176	13,960,163	14,457,714	14,901,977	15,306,811	15,691,049	16,041,703
Los Angeles	1,476,835	1,514,569	1,544,003	1,574,168	1,603,392	1,631,554	1,658,524
Population Density							
Metropolitan Statistical Area	2,720	2,857	2,959	3,050	3,132	3,211	3,283
Los Angeles	14,479	14,849	15,137	15,433	15,720	15,996	16,260

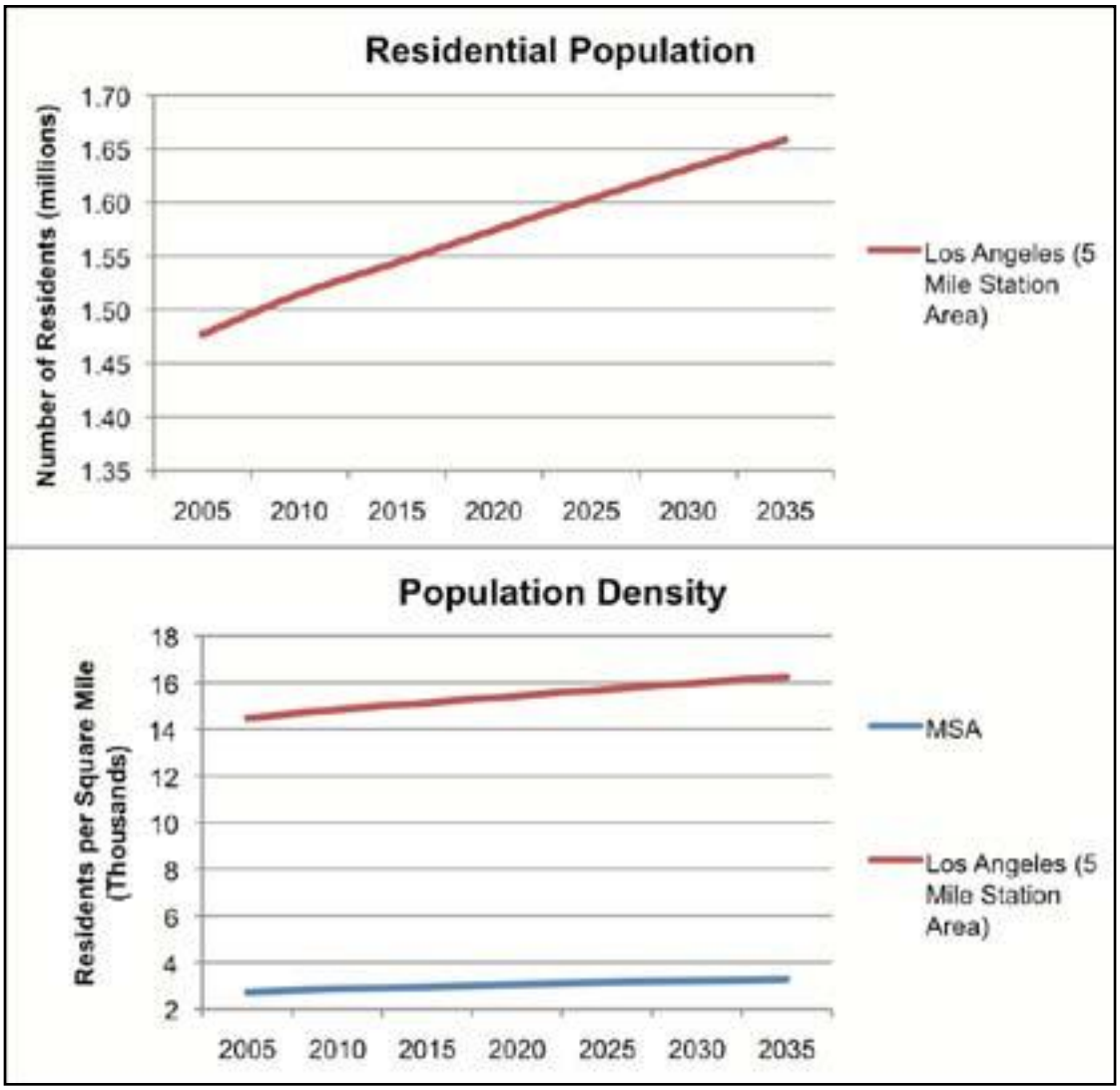

Figure 7. Residential Population and Population Density Projections within 5 miles of Los Angeles HSR Station, 2005-2035

Jobs

A large percentage (40.2%) of the jobs in Los Angeles County are located in the City of Los Angeles. The jobs-housing balance in the city (0.46 jobs for every resident) is akin to the statewide proportion (0.46). Most Angelenos work at jobs within Los Angeles County, with only 3.7% commuting outside the county for work each day . The city has a diverse economic base with the education-health sector being the largest job sector, accounting for 24.4% of total jobs in the city.

Other large sectors include professional-management (17.2%), leisure-hospitality (9.5%), and retail (9.1%). The leading industry clusters, as opposed to job sectors, are tourism and hospitality; professional and business services; entertainment (including motion picture, television, and music production); wholesale distribution; and health services and biomedical. Los Angeles County remains the largest manufacturing center in the U.S.,

employing 433,200 workers in 2008. The most important manufacturing sectors are apparel, with 55,000 workers; computer and electronic products, with 54,100 workers; transportation equipment, with 50,500 workers; fabricated metal products, with 48,900 workers; and food products, with 41,900 workers. The "new economy" of Los Angeles County is expected to be largely driven by technology and supported by the research capabilities of the array of nationally important research universities located in the region.

We estimated that the area within five miles of the station contained 685,772 jobs in 2009, just below 17% of all the jobs in Los Angeles County.[162] Within the same area, we predict the number of jobs to increase by 2035 to 923,079, or more than 34% (Figure 8).[163] The job market here features a higher proportion of educational services- and management and administration-sector jobs than the California norm (location quotient = 1.67 and 1.35, respectively). This trend will be sustained through 2035 (Table 9). Agriculture and natural resource-sector jobs in this area are just above the California average, but this sector will witness the largest growth (in terms of positive percent change) of all sectors in the area, most likely in relationship to the area's traditional role as distribution center (Figure 9). Additionally, educational services and management and professional sectors will also experience job growth in the station area between2009 and 2035.[164] This area is quite rich in jobs and features the highest gap index (.25 in 2009 and .21 in 2035) of all the station areas under study.

Of those employed within five miles of the station, greater than 80% live outside of the same area. Of those employed persons living within five miles of the station, more than 66% work outside the same area, suggesting high rates of worker mobility both into and outside of the station area for work. Figure 10 and Table 10 illustrate the top 100 work origins and destinations for the station area by zip code.

Table 9. Los Angeles 5-mile Station-Area Job Growth, Location Quotient, Gap Index

	2005	2010	2015	2020	2025	2030	2035	% Change 2010-2035
Total Jobs	613,758	663,853	715,698	767,543	819,389	871,234	923,079	39.0%
Grouped Jobs								
Agriculture and Natural Resources	448	809	1,162	1,515	1,868	2,221	2,574	218.3%
Manufacturing, Wholesale, and Transportation	174,233	154,758	137,014	119,270	101,527	83,783	66,040	-57.3%
Retail	38,078	40,040	41,972	43,904	45,835	47,767	49,699	24.1%
Financial and Professional Services	38,260	41,512	45,305	49,098	52,891	56,683	60,476	45.7%
Professional and Information	52,814	60,533	67,452	74,371	81,289	88,208	95,127	57.1%
Management and Administration	105,211	144,227	167,233	190,240	213,247	236,254	259,261	79.8%
Educational Services	95,614	102,320	125,105	147,889	170,674	193,458	216,243	111.3%
Health Services	60,266	65,925	71,606	77,286	82,967	88,648	94,329	43.1%
Recreation and Hospitality Services	48,834	53,730	58,850	63,970	69,090	74,210	79,330	47.6%
Location Quotient								
Agriculture and Natural Resources	0.03	0.05	0.07	0.09	0.11	0.13	0.15	186.5%
Manufacturing, Wholesale, and Transportation	1.14	1.03	0.92	0.81	0.70	0.59	0.48	-53.6%
Retail	0.57	0.58	0.58	0.58	0.59	0.59	0.60	4.2%
Financial and Professional Services	1.00	1.09	1.16	1.22	1.29	1.35	1.42	30.2%
Professional and Information	0.84	0.84	0.83	0.83	0.82	0.81	0.80	-5.3%
Management and Administration	1.08	1.34	1.44	1.53	1.60	1.66	1.72	28.4%
Educational Services	1.74	1.57	1.68	1.75	1.80	1.84	1.86	18.4%
Health Services	1.02	0.91	0.85	0.80	0.76	0.72	0.69	-24.5%
Recreation and Hospitality Services	0.74	0.73	0.71	0.70	0.68	0.67	0.66	-9.1%
Gap Index of All Jobs and Workers	0.27	0.25	0.24	0.23	0.22	0.22	0.21	-14.6%
Gap Index by Sector								
Agriculture and Natural Resources	-1.00	-1.00	-0.99	-0.99	-0.99	-0.99	-0.98	-1.1%
Manufacturing, Wholesale, and Transportation	-0.91	-0.91	-0.92	-0.92	-0.93	-0.94	-0.95	4.4%
Retail	-0.95	-0.95	-0.95	-0.94	-0.94	-0.94	-0.94	-1.1%
Financial and Professional Services	-0.92	-0.91	-0.90	-0.89	-0.88	-0.87	-0.86	-5.1%
Professional and Information	-0.93	-0.93	-0.92	-0.92	-0.92	-0.92	-0.92	-0.8%
Management and Administration	-0.91	-0.89	-0.87	-0.86	-0.85	-0.84	-0.83	-6.0%
Educational Services	-0.86	-0.87	-0.85	-0.84	-0.83	-0.83	-0.82	-5.4%
Health Services	-0.92	-0.92	-0.92	-0.93	-0.93	-0.93	-0.93	1.0%
Recreation and Hospitality Services	-0.94	-0.94	-0.94	-0.93	-0.93	-0.93	-0.93	-0.4%

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Table 10. Top 100 Worker Origins and Destinations by Zip Code – Los Angeles

Top 100 Worker Origins

Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs
1	90011	7,615	26	90255	3,499	51	91803	2,353	76	91776	1,780
2	90026	7,377	27	90057	3,377	52	90805	2,299	77	91405	1,779
3	90004	4,896	28	90027	3,363	53	90001	2,228	78	90046	1,778
4	90033	4,849	29	90016	3,184	54	90045	2,225	79	90744	1,745
5	90063	4,738	30	90034	3,175	55	91402	2,220	80	90220	1,744
6	90032	4,711	31	90020	3,077	56	91343	2,217	81	91601	1,731
7	90044	4,626	32	90660	2,943	57	91744	2,214	82	91205	1,724
8	90019	4,348	33	90039	2,930	58	90002	2,207	83	90038	1,661
9	90042	4,311	34	91770	2,705	59	90745	2,189	84	91311	1,641
10	90006	4,267	35	91335	2,695	60	90025	2,179	85	91710	1,636
11	90023	4,142	36	91605	2,660	61	91304	2,135	86	90247	1,625
12	90031	4,127	37	90007	2,600	62	91107	2,118	87	90631	1,620
13	91801	4,107	38	90066	2,597	63	91606	2,071	88	91306	1,615
14	90037	4,093	39	90029	2,592	64	91001	2,061	89	90241	1,612
15	91342	4,088	40	91754	2,591	65	90036	2,032	90	90017	1,598
16	90065	3,949	41	90062	2,561	66	90262	2,012	91	91790	1,596
17	90280	3,892	42	91344	2,543	67	90250	1,994	92	90035	1,592
18	90022	3,823	43	90650	2,542	68	91104	1,986	93	91325	1,590
19	90018	3,799	44	90008	2,529	69	91206	1,974	94	93550	1,588
20	90640	3,787	45	90005	2,497	70	91214	1,959	95	90230	1,575
21	90003	3,730	46	91745	2,462	71	90059	1,957	96	91709	1,558
22	90047	3,692	47	90041	2,457	72	91030	1,898	97	90746	1,540
23	91331	3,591	48	91352	2,392	73	90015	1,892	98	90278	1,536
24	90043	3,542	49	90731	2,380	74	91042	1,873	99	91780	1,512
25	90012	3,509	50	90201	2,371	75	91406	1,869	100	93065	1,508

Table 10. Top 100 Worker Origins and Destinations – Los Angeles (cont.)

Top 100 Worker Destinations

Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs
1	90015	9754	26	90036	1443	51	90064	764	76	91103	530
2	90012	9349	27	90005	1350	52	90004	763	77	91107	526
3	90058	3863	28	90011	1350	53	90255	726	78	91367	522
4	90017	3373	29	90006	1343	54	91770	725	79	91803	520
5	90021	3337	30	90640	1340	55	90404	721	80	90034	504
6	90023	2755	31	91502	1296	56	91203	713	81	91761	498
7	90007	2526	32	90022	1246	57	90245	692	82	90505	490
8	90040	2419	33	90670	1135	58	90020	688	83	90037	486
9	90033	2204	34	91754	1127	59	90032	687	84	90035	485
10	90071	2118	35	90063	1098	60	91105	678	85	90068	479
11	90010	1941	36	91101	1082	61	90220	676	86	90703	478
12	91504	1931	37	90069	1012	62	91201	672	87	91355	477
13	90031	1828	38	90038	973	63	90046	666	88	90029	476
14	90045	1777	39	90016	970	64	91733	655	89	91205	466
15	90057	1774	40	90039	964	65	90019	653	90	90211	465
16	90048	1755	41	90065	952	66	91731	624	91	90301	461
17	90026	1754	42	90049	945	67	91608	621	92	91106	456
18	90013	1751	43	90210	909	68	90280	611	93	91206	449
19	90024	1537	44	91204	874	69	91706	603	94	90066	436
20	90014	1520	45	90201	860	70	91506	601	95	91748	436
21	90028	1492	46	90025	823	71	91030	589	96	90042	430
22	90230	1465	47	90212	802	72	90401	580	97	90241	425
23	91505	1465	48	90232	802	73	90001	559	98	90250	417
24	90027	1446	49	90248	796	74	90660	543	99	92821	412
25	90067	1444	50	91801	768	75	91746	536	100	91436	409

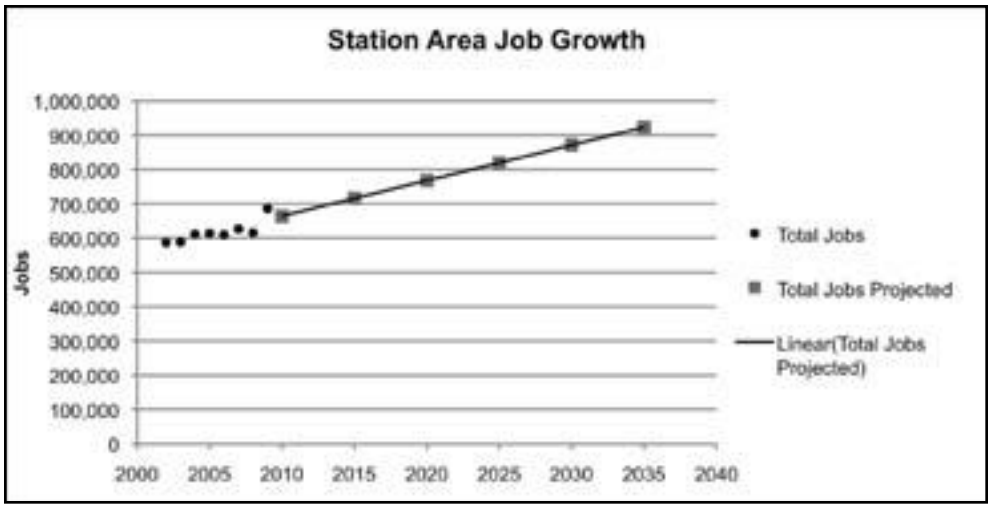

Figure 8. Job Growth Projections within 5 miles of Los Angeles HSR Station, 2000-35

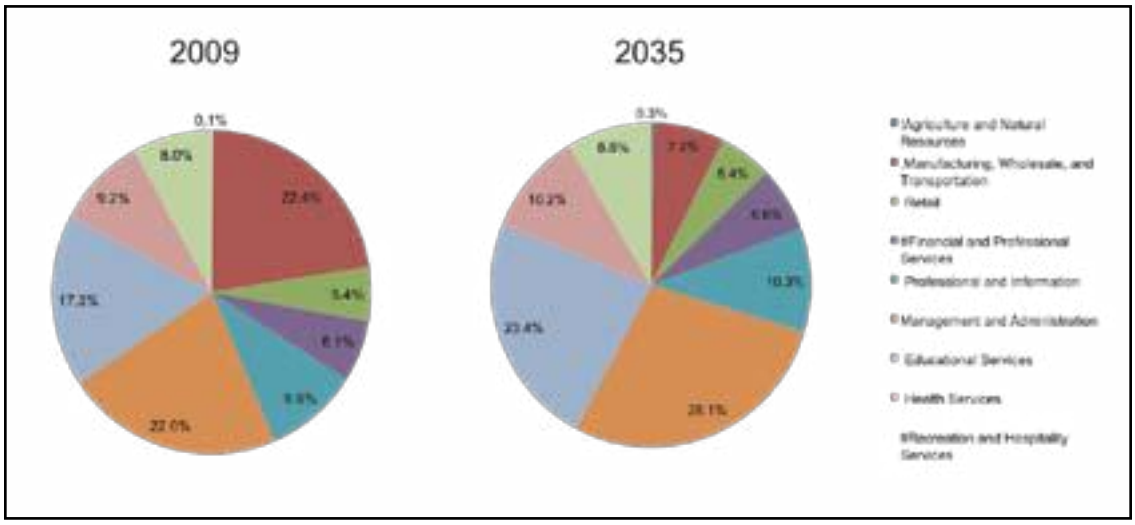

Figure 9. Comparison of Jobs by Sector within 5 Miles of Los Angeles HSR Station, 2009 and 2035

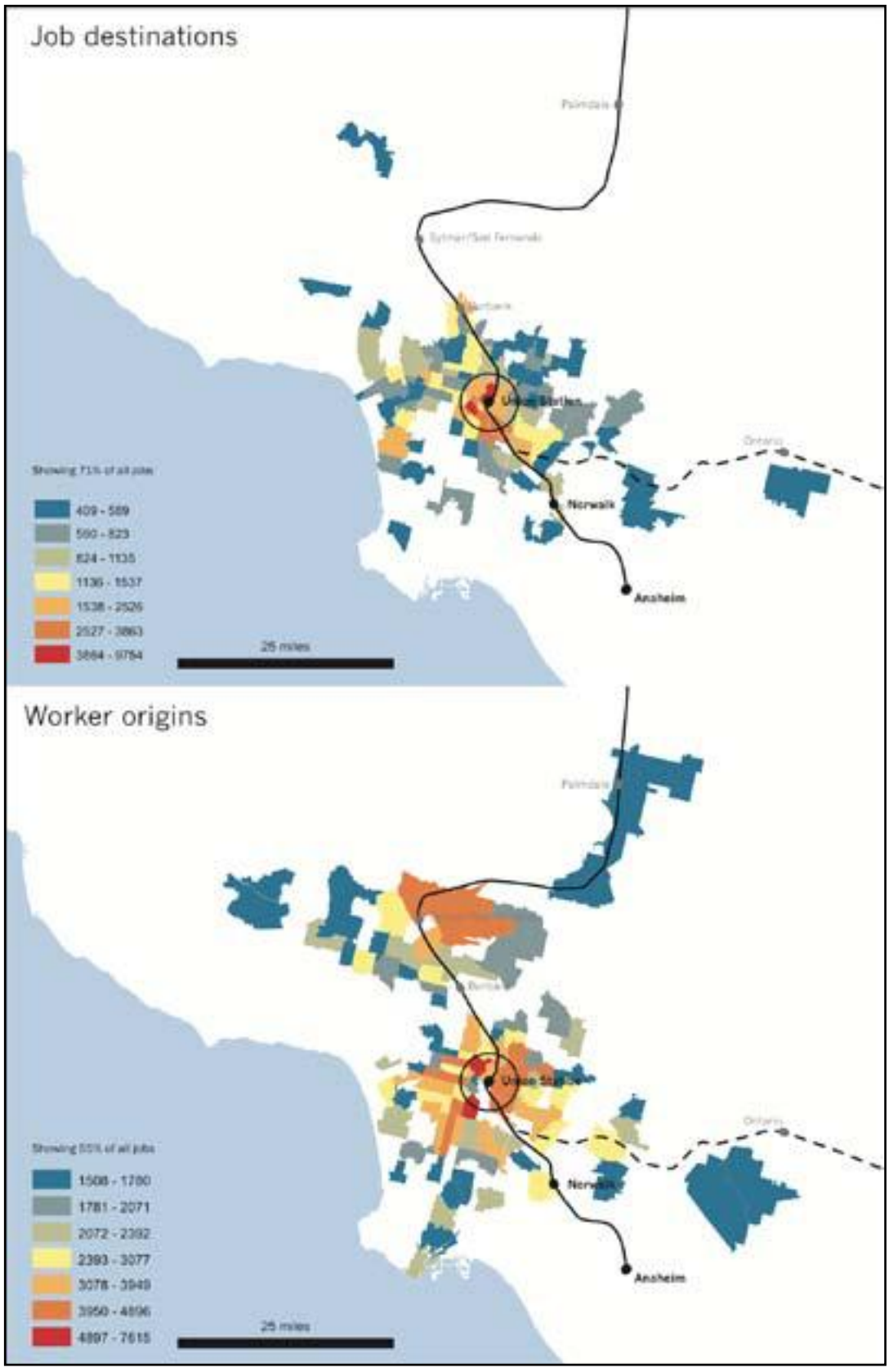

Figure 10. Los Angeles Commute Map

Current Land Use

Land use within a half-mile of the station area is dominated by transportation uses (39%) related to the functioning of Union Station and other rail infrastructure and public facilities (23%). Other important land uses include commercial and office uses (17%) and industrial uses (9%). Only 2% of the land is occupied byresidential uses, almost all of it in multifamily housing. Three percent of the land is currently vacant (Figure 11).

Figure 11. Map of Land Uses and Distribution of Land Uses (by Parcel) within a Half-mile of Los Angeles HSR Station

Subdivision Pattern

The half-mile area around the station includes the area's original colonial settlement, the Pueblo de Los Angeles. Several periods of urban development and redevelopment have left their mark in the varying orientation of the street grids and block sizes. These grids, in turn, have been interrupted by the introduction of the railroad in the nineteenth century and the freeway system in the century that followed. Land in the area has also been the subject of subdivision and reassembly from the time of the original Spanish land grant to the present. Parcel sizes in the area range from .001 to 80.1 acres, with the largest number of parcels being in the .11 to .25 acres range (Table 11). The largest parcels are currently occupied by railroad or highway rights-of-way.

Table 11. Parcel Characteristics within a Half-mile of Los Angeles Station

Min. Parcel Size (acres)	Max. Parcel Size (acres)	Modal Parcel Size Range (acres)
0.001	80.1	>10

Major Destinations

The Los Angeles Civic Center, including major city, county, and state administrative offices, is located within a half-mile of Union Station (Table 12 and Figure 12). The Grand Avenue cultural complex, including the Los Angeles Music Center, Disney Hall, the Museum of Contemporary Art, and the new Broad Museum, are within a mile of the station. Dodger Stadium, the Los Angeles Convention Center, Staples Center, and LA Live are within two miles, as are several important employment sub-centers and the Los Angeles County-USC Medical Center. The University of Southern California and California State University at Los Angeles are within four miles of Union Station.

Table 12. Activity and Employment Centers within 5 Miles of Los Angeles Station

Type	Activity/Employment Center	Miles from Station	Employees/Visitors per day
Activity	LA Coliseum	4.1	93,607 (event days)
Employment	Civic Center	0.5	56,200
Activity	Dodger Stadium	1.2	56,000 (game days)
Employment/Activity	Downtown financial district	1.6	>36,000
Education	Cal State LA	3.9	21,000
Employment/Education	University of Southern California	3.8	13,000
Activity	Staples Center	2.0	10,959
Activity	Natural History Museum of LA (Exposition Park)	4.0	10,959
Activity	LA Convention Center	2.3	6,849
Retail	Fashion district	1.8	4,110
Activity	The Music Center/Disney Hall	0.6	3,562
Employment/Health	LAC+USC	1.7	2,504
Activity	MOCA	0.8	647

Figure 12. Map of Activity and Employment Centers within 5 miles of Los Angeles HSR Station

Transportation and Transit Networks

Union Station is very well connected to the rest of Los Angeles County through extensive transportation and transit networks (Table 13). The Gateway Transit Center, built in 1993, includes the station itself, Patsaouras Transit Plaza, and the western terminus of the El Monte Busway, as well as Metro's headquarters building. The Patsaouras Transit Plaza on the east side of Union Station hosts several connecting bus lines, including Metro Rapid and Metro Local lines, as well as downtown DASH shuttles, many municipal bus lines, FlyAway express bus service to Los Angeles International Airport, and University of Southern California campus shuttles. Amtrak, Amtrak California and Metrolink share 10 of Union Station's 12 outdoor tracks, with 90 weekday trains departing (91 on Wednesday, 92 on Friday) as of July 2011. Three thousand parking spaces, including those in park-and-ride lots, are located at Union Station.

A number of freeways can be easily accessed from the station area. These include: the Santa Ana Freeway (U.S. Route 101) and Interstate 5, major coastal and inland north-

south links to Northern California; the Santa Monica Freeway (Interstate 10), a major national east-west artery; and State Route 110 and Interstate 110, connecting downtown Los Angeles to Pasadena and the Port of Los Angeles, respectively. In addition, there are many public transit options that can be accessed in or near Union Station, including Amtrak, Metrolink (commuter heavy rail), and MetroRail (subway and light rail) and various express and local bus options (Table 13). In all, 83 bus lines and 19 rail lines can be accessed in the downtown area. Downtown Los Angeles is more walkable when compared to many other parts of the city and relatively bike-friendly.

The Los Angeles International Airport (LAX) is located approximately 19 miles to the southwest of the proposed HSR station in downtown Los Angeles. The Burbank Airport is less than fourteen miles from the HSR station and may also be accessible from the HSR network.

Table 13. Transit Network within a Half-mile of Los Angeles Union Station

Automobile	Bus	Rail			Bike	Walkability
Interstate Network		Regional Passenger	Commuter	Light		(Walk Score)
Hollywood Freeway (Route 101)	Metro Express: Lines 439, 442, 485, 487, and 489; Metro Local: 33 (Weeknights), 40, 42, 45, 55, 60, 68, 70, 71, 76, 78, 79, 83, 84, 378 ; Metro Rapid: 704, 728, 733, 740, 745, and 770 Foothill Transit: Lines 481, 493, 497, 498, 499, 699 Santa Monica Big Blue Bus: Line 10 Torrance Transit: Lines 1 and 2 LADOT Dash: Lines B and D (Weekdays only); DD (Weekends only)	Amtrak Pacific Surfliner Line	Metrolink: Antelope Valley Line, Orange County Line, Riverside Line, San Bernardino Line, Ventura County Line, and 91 Line	Metro Rail: Gold Line, Red Line, Purple Line, and Silver Line	2 Class III bike routes	86, very walkable

Local Perspectives

Interviews with representatives from the Community Redevelopment Agency of Los Angeles, Los Angeles County Metropolitan Transportation Authority, Los Angeles Department of City Planning, and the Natural Resources Defense Council complemented the profile of the Los Angeles station case study and provided information about how the city is preparing for HSR.[165] Unlike San Jose, Anaheim, or Fresno, where local planners hope

that HSR will increase their prominence, Los Angeles is already a global city. According to our interviewees, the mayor is supportive of the HSR project because he believes it will be a vital economic development tool and will provide better connections between Los Angeles and other parts of the state. Nevertheless, Los Angeles has not jumped on the HSR "bandwagon" as proactively or enthusiastically as San Jose, Fresno, or Anaheim, all of whom have already preparedstation area plans and hired design consultants.According to Patricia Diefenderfer, a city planner in the Los Angeles Department of City Planning who oversees long-range planning for the Central City community plan area,[166] the city is still in "the very early phases of planning; we are actually just kind of getting into this now, evaluating how the project will get integrated into the landscape." Attributing this relative lack of action to a "barebones staff" and bad economic climate, she admits that the city has not yet considered how to better facilitate developmentaround Union Station (Diefenderfer interview).

Perceived Benefits

The city is particularly interested in two possible alternatives for a Downtown Los Angeles station location: 1) an aerial station built atop the existing rail tracks at Union Station; or 2) an aerial or trench station to the east of Union Station, identified as the Union Station East/Vignes option (Figure 13). A third alternative identified by the CaHSRA, the so-called "West Bank" option even further to the east of Union Station and along the western edge of the Los Angeles River, is not recommended by the city because of anticipated adverse effects on existing rail and city services.[167] According to Diefenderfer:

> *Both preferred options would provide tremendous potential for the City to realize economic development goals for the surrounding area. … The improved transportation services will support citywide economic development activities and related economic development revitalization initiatives. … We all believe that it will have a positive impact on the economy if it is done right and is well connected to other transit, and well integrated into the larger urban form … Improving mobility is going to generate jobs and help the economy* (Diefenderfer interview).

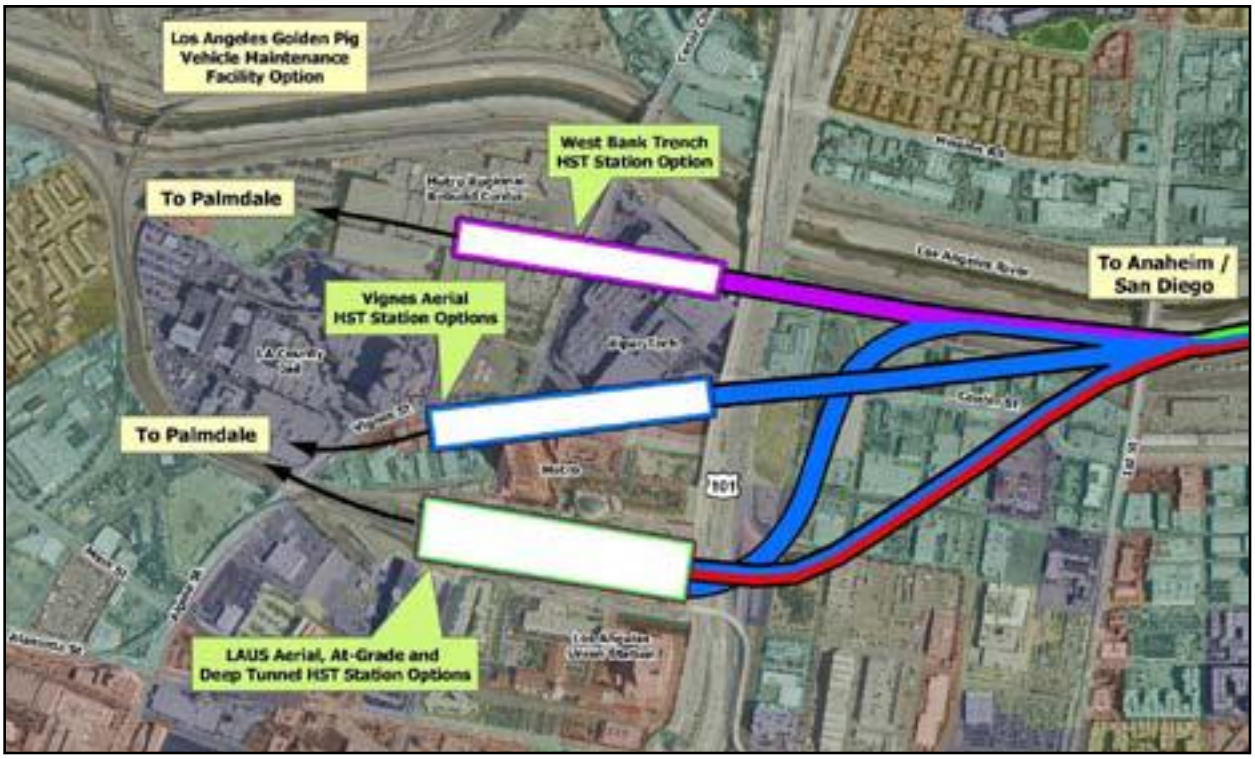

Figure 13. HSR at Union Station Alternative Locations

Currently, Union Station is cut off from the rest of the downtown fabric by freeway ramps and railroad tracks, while the land around the station is occupied by low-density industrial and institutional uses. Jeff Carpenter of the city's Community Redevelopment Agency (CRA) believes that "The land would have significant economic value in the long term and it could possibly be redeveloped, if it were carefully done as a comprehensive project." As discussed by Diefenderfer, the coming of the HSR would create new development sites and generate opportunities for joint development projects. It may even help "restitch Union Station back into downtown. This would involve some reconfiguration of streets and freeway ramps, so you can envision a whole new little neighborhood cropping up that would infill the area from Civic Center to Union Station" (Diefenderfer interview).

Vision

The issue of urban form connectivity resonates with Joel Reynolds ofthe Natural Resource Defense Council, who views the HSR terminal not only as a catalyst for a greater transportation network but as one piece of a downtown patchwork quilt that includes mixed uses, parklands, a restored river, and a transportation hub. Diefenderfer believes that this can happen if the Union Station HSR proje ct is designed in creative ways through consolidating existing railway tracks, trenching and covering to better access the L.A. River, and creating new open spaces and pedestrian ways. This vision that requires a strong urban design intervention would create a much different urban form from the car-centric and fragmented current milieu. Jeff Carpenter of CRA agrees, calling this vision

"European" – a place where you can walk around and live a very active civic life, and which is connected comfortably and unobtrusively to the rest of downtown.

There is a fairly strong focus and conviction that Union Station is to be a contemporary, urban rail transit hub, and in that sense it needs to be a very pedestrian friendly, livable urban space. It needs to be an area that is much more person- and patron-centric than perhaps has often been the case with transportation planning in the US in the previous decades (Carpenter interview).

The downtown-to-downtown connection touted by the CaHSRA is indeed an advantage of HSR over airline travel. According to Carpenter, the effort should focus on "being able to travel the length and breadth of the state by simply walking down the street, and walking into the station with your bag and taking an escalator up to a platform." For this reason, he disagrees with those consultants who tend to think of designing HSR stations to be like airports. As he explained:

> *The designs that we were presented with, the design orientation or approach that was explained to us, is really taking a lot of lessons from airports (like moving sidewalks and long pedestrian linkages that have to be handled). … Emphasis is placed on very large parking structures and rental car facilities above all else, which strikes me as not the right approach, not the right emphasis. The design needs to be much more focused on what is the potential of the urban realm, what is the potential of all the alternative modes of access at Union Station. That's really the reason we are going to Union Station to take advantage of all those connections. If we really wanted to have a giant car park, we obviously should not be taking it to Union Station; we should be taking it to some peripheral location* (Carpenter interview).

While there is considerable desire among planners in station cities to produce a high-density, mixed use and transit-oriented station environment, Carpenter is quick to point out that first and foremost designs should fit the particular local contexts and needs. As he emphasized:

> *I think any HSR terminal has a potential to become a hub of commerce and activity but that really needs to respond to a greater vision of what the community needs. In a Central Valley community that is essentially a rural hub, that locale has to use this mode of transportation to create an impetus to use alternative forms of transportation. It may be the one viable place where bus transit can come together, where there could be other community transportation operations concentrated, where there could also be certain residential and village-scale development. You aren't going to build high-rise office buildings in Turlock but you could use the stimulus of high-speed rail, along with other investments in alternative mobility and pedestrian-oriented design, to create a very lively focus of activity and a village atmosphere where the unique environment for commerce as well as living in a community would be present. The CaHSRA is saying to every community to find a way to capture the economic and social impetus that this provides, and respond to it with a proactive land use initiative that's appropriate to your community. While the visions that they put out tend to be stereotypical high-density, highly urbanized visions, I wouldn't want to accuse them of*

besmirching every community with a single design. I think they are really challenging each individual locality (Carpenter interview).

Challenges and Concerns

Our interviewees discussed three types of challenges and concerns that the planning and design of an HSR station at Union Station would need to address: physical and aesthetic challenges relating to a difficult site carved up by railway tracks and freeways; transportation challenges relating to circulation and parking; and procedural and policy challenges relating to relationships with the CaHSRA and the perceived lack of power by local agencies to influence such a complex project.

One major physical challenge that the HSR development encounters at Union Station is that the land is already encircled and cut off from the rest of downtown by existing railway tracks serving Amtrak and Metro, and by the 101 Freeway (Figure 13). As Carpenter noted:

That's an area where we should manage to sort out a myriad of engineering conundrums of how those tracks emerge – at what height and at what trajectory – and should manage to actually connect it in the manner that we would like to see the rail operation function. There is the fear that they could slice through that area in just the worst possible way, slice completely across the existing street system, and make large sections of that district unusable. Without significant mitigation effects for the fact that there will be this gradient coming down that will be a barrier at various levels and various points. So it would be a street and circulation system that would have to be completely reoriented towards that particular piece of infrastructure (Carpenter interview).

Another concern is that the HSR tracks will provide an additional physical barrier that will cut off access to the river, which runs on the east of Union Station.[168] As Diefenderfer explained:

We are trying to break down the barriers to the LA River and some are concerned that the HSR will be another layer of infrastructure along the river, another barrier between the river and the surrounding communities. How can we minimize the impact? They are proposing to do a tunnel to the north. And if they trench the HSR tracks, could they do the same for Metrolink and Amtrak to consolidate them as much as possible? How can the HSR pass through the city so that it has the least impact in terms of the river, and surrounding land uses? We also have a number of historic bridges that cross the river. If they could keep the tracks either at grade, or trenched in such a way so they go under the bridges, the bridges would be saved. How do you make sure that the land underneath the elevated tracks is still usable land? In some cases they will have to close streets. How is this going to affect the urban form and the people who are using the area? (Diefenderfer interview).

The obtrusiveness and aesthetic impact of creating an elevated viaduct as the HSR rail tracks approach Union Station from the south is also a concern. The alternative option, that of a long tunnel coming in from as far back as the intersection of the 710 and 10

freeways, may be aesthetically more acceptable but significantly more costly, according to Joel Reynolds.

There is also the issue of additional traffic that the new station would bring to the adjacent neighborhoods, and which Alex Clifford of the Los Angeles County Metropolitan Transportation Authority does not think can be easily sustained by the existing street network. Parking accommodation – the 6,000 spaces requested by the CaHSRA – gives local planners an additional headache. They want to provide significantly fewer spaces so that they can lower the development costs and enable more high-density development around the station. As Clifford explained:

> *One of the things we here at Metro and the city are working [on] with the Authority is to figure out how to pare that number down significantly, because, after all, this is a public transportation hub. People would hopefully come to the station using the various modes available: bus, light rail, heavy rail and subway. So we're trying to work with them to see if that structure can be something significantly less than 1,000 parking spaces* (Clifford interview).

Less parking would mean more land available for development. Nevertheless, Carpenter emphasized the difficulty of land assembly and acquisition:

> *As powerful as redevelopment agencies seem to be, eminent domain is a tool that is very circumscribed and very protracted, and we will not always prevail. So it is very difficult at the moment ... to conduct the land assembly that probably needs to take place for the welfare of almost everybody involved. I would say that is a basic problem. The dilemma is that we can't go to the first step in acquiring what would be a reasonable perimeter of land, even to just get basic access provided for, much less create the desired, district-level development.* (Carpenter interview).

In addition to the physical and transportation challenges, our interviewees commented on the challenges posed by CaHSRA's having a small staff and the necessity and associated ambiguity of dealing with a variety of external consultants. They lamented the lack of empowerment on behalf of local agencies to intervene and significantly influence the process.

Planning and Design

A specific plan – the Alameda District Specific Plan – governs the area around Union Station. The plan allows for up to11 million square feet of predominantly office space with a small residential component. It was put in place in 1995 but nothing much has happened in the area because of the recession. Some of our interviewees emphasized that the plan needs to be updated to reflect the reality of HSR and to encourage a more significant mixed-use and residential component. As stated by Diefenderfer, "Ideally we will have an opportunity to look at the surrounding area more holistically and think how we can use the incentive s to encourage development." She emphasized the importance of expanding the Union Station's footprint, strategically placing parking and auxiliary uses, creating access points to the station from dif ferent locations, and better integrating the

station with its surroundings and the rest of downtown. Nevertheless, in the absence of a specific urban design plan, these ideas appear still quite general. This sentiment was echoed in Carpenter's comments:

> *We have these very generalized, high density, highly urbanized visions of how things evolve around transit stations. The challenge will be to get planning and design processes, on the one hand, and an understanding of the real estate development opportunities on the other, much better understood and much more in the eye of the general public, and the stakeholders and constituents that need to be engaged around each one of these stations… We have learned that TOD is not magic, that it does not immediately pop out of the ground the day a rail system starts operation* (Carpenter interview).

To trigger development, Diefenderfer raised the idea of instigating minimum development standards:

> *In the Planning Department we are broadly considering this idea so that people don't take valuable transit-oriented sites and underdevelop them. We don't have minimum development requirements now, and you may get nothing (no development) by implementing them. But we may have to "stick to our guns." We may want to insist upon a certain level of development even if we get no development in the next 5-10 years* (Diefenderfer interview).

Carpenter seemed to disagree, stressing instead the necessity of a more sequential development that follows the whims of the real estate market:

> *Certain very important segments of development opportunity really won't become feasible perhaps for a decade or so. Somehow we have to be patient about allowing for that, maybe having some interim or placeholder development. We really need to accelerate as much as we can our understanding about how the real estate market can best respond; and really start to develop some science so the development community can better partner with the public sector on helping realize our best designs* (Carpenter interview).

Conclusion

As illustrated above, the Los Angeles station area is a major employment center with an existing concentration of knowledge-based jobs in educational services, management and public administration. It has a very good interface with other transportation modes and is in close proximity to the city's Central Business District. Given that HSR systems have already been observed to benefit places that are well connected to global business activity, growth concentrated around Union Station is likely. While increased regional accessibility may not affect public sector administrative employment, the potential to attract financial, informational and business service firms as a result of accessibility and agglomeration benefits appears real. Hotels, retail, restaurants, travel services and amenities, and mixed-use development – now located at a distance from the Union Station area – should be part of any plans for its high-end redevelopment.

Since the 1960s, regeneration has been focused on the western part of downtown, and most recently on leisure and entertainment activities. The regeneration of Union Station will, therefore, represent a change in focus for the city's redevelopment apparatus. At the same time, pressures on the state's publicly funded urban redevelopment infrastructure, resulting from diminished local and state revenues, will mean that in the near and midterm, regeneration of the area around Union Station will have to be either largely private or achieved through public-private partnerships in which the private sector has a large role. However, the current economic downturn indicates that private investment and development activity may be slow to come in the adjacent area, and a phased approach to development may be necessary.

The recent purchase of Union Station by the Los Angeles County Metropolitan Transportation Authority from Catellus Operating Limited suggests that the future planning for the station, including its expansion and adaptive reuse, and the redevelopment of its environs, will largely be in the hands of the transit agency and its private-sector partners. While the area already includes an active, multimodal transit hub, particular attention will need to be paid to connecting it to the western, northern, and eastern portions of downtown that are currently separated by infrastructure and topography. Long-planned but yet-to-be-realized interventions to span the Santa Ana Freeway near Union Station should be realized to achieve these connections.

As the interviews indicated, Union Station also presents some unique challenges: 1) It is a big, historical facility and transportation hub that should be significantly expanded to accommodate a new transportation mode; 2) it needs significant engineering and urban design ingenuity and economic resources to restitch the area to its larger urban fabric; and 3) it requires savvy land use policies and incentives to trigger private development interest and re-energize a rather atrophic real estate market in the adjacent area. Nevertheless, and despite these challenges, local planners cannot afford to turn their back on Union Station because, as Diefenderfer emphasized: "Union Station is a landmark; it is the regional transportation center in the largest city in the region, where the most jobs are. It is everybody's station.

ANAHEIM

City and Station Profiles

The portal for HSR in Anaheim is planned to be located at the Anaheim Regional Transportation Intermodal Center (ARTIC), a new, major transportation hub in Orange County. ARTIC is to be located on a site along the Santa Ana River, within the city's fast growing Platinum Triangle redevelopment area that also includes Angel Stadium, Honda Center and The Grove of Anaheim (Figures 14 and 15). Plans for the area anticipate its transformation from a low-density, commercial and industrial zone into a more urban environment with high-density housing, commercial office towers, and retail space. The Platinum Triangle is adjacent, on its western boundary, to the Anaheim Resort, an area that includes Disneyland, the Anaheim Convention Center (the largest convention center on the West Coast), and several dozen hotels.

Figure 14. Map of Anaheim HSR Station

Figure 15. Aerial Photograph of Anaheim HSR Station

Population

As of the 2010 Census, Anaheim's population was 336,265, making it the second largest city in Orange County (after Irvine). Anaheim accounts for 11.2% of the county's population and is the tenth-largest city in California. Population density is 6,618 persons per square mile. Anaheim is a minority-majority city, with non-Hispanic white residents accounting for 27.5% of the population. The remaining residents are comprised of Hispanics of all races (52.8%), Asians (14.6%), Blacks (2.4%), and other minorities. Between 2000 and 2010, the total population of the City of Anaheim increased by 2.5%, a rate that is lower than the Orange County rate of 5.8% and the statewide rate of 10%. Between 2010 and 2035, however, the city's population is projected to increase by 23%, to 413,923.[169] Median household income in Anaheim in 2009 was $57,870, 96% of the median household income of Californians.[170] The median home price in the city in 2010 was $362,000, or 108% of

the statewide median home price, having fallen in 2008 from $492,000 (then 113% of the statewide median).[171]

In 2010, 937,448 residents lived in census tracts (both within Anaheim and adjacent communities, including the City of Orange) located entirely or containing portions within a radius of 5 miles around the station area (Table 14 and Figure 16).[172] The population density of those census tracts was an average of 8,680 persons per square mile.[173] Within census tracts located entirely or containing portions within a half-mile of the station area, the 2010 population was 25,035, with an average population density of 3,793 persons per square mile.[174] SCAG projects that residential population within 5 miles of the station will increase to 1,027,148 residents or by 9.6% between 2010 and 2035.[175] Within a half-mile of the station, the residential population is expected to increase within the same period by 66%, to 41,667, largely as a result of redevelopment in the area.[176]

Table 14. Residential Population and Population Density Projections within 5 Miles of Anaheim Station, 2005-2035

	2005	2010	2015	2020	2025	2030	2035
Population							
Orange County	3,059,957	3,314,952	3,451,759	3,533,956	3,586,291	3,629,538	3,653,988
Anaheim	877,626	937,448	960,936	984,279	1,002,011	1,015,658	1,027,148
Population Density							
Orange County	3,832	4,151	4,322	4,425	4,491	4,545	4,575
Anaheim	8,126	8,680	8,898	9,114	9,278	9,404	9,511

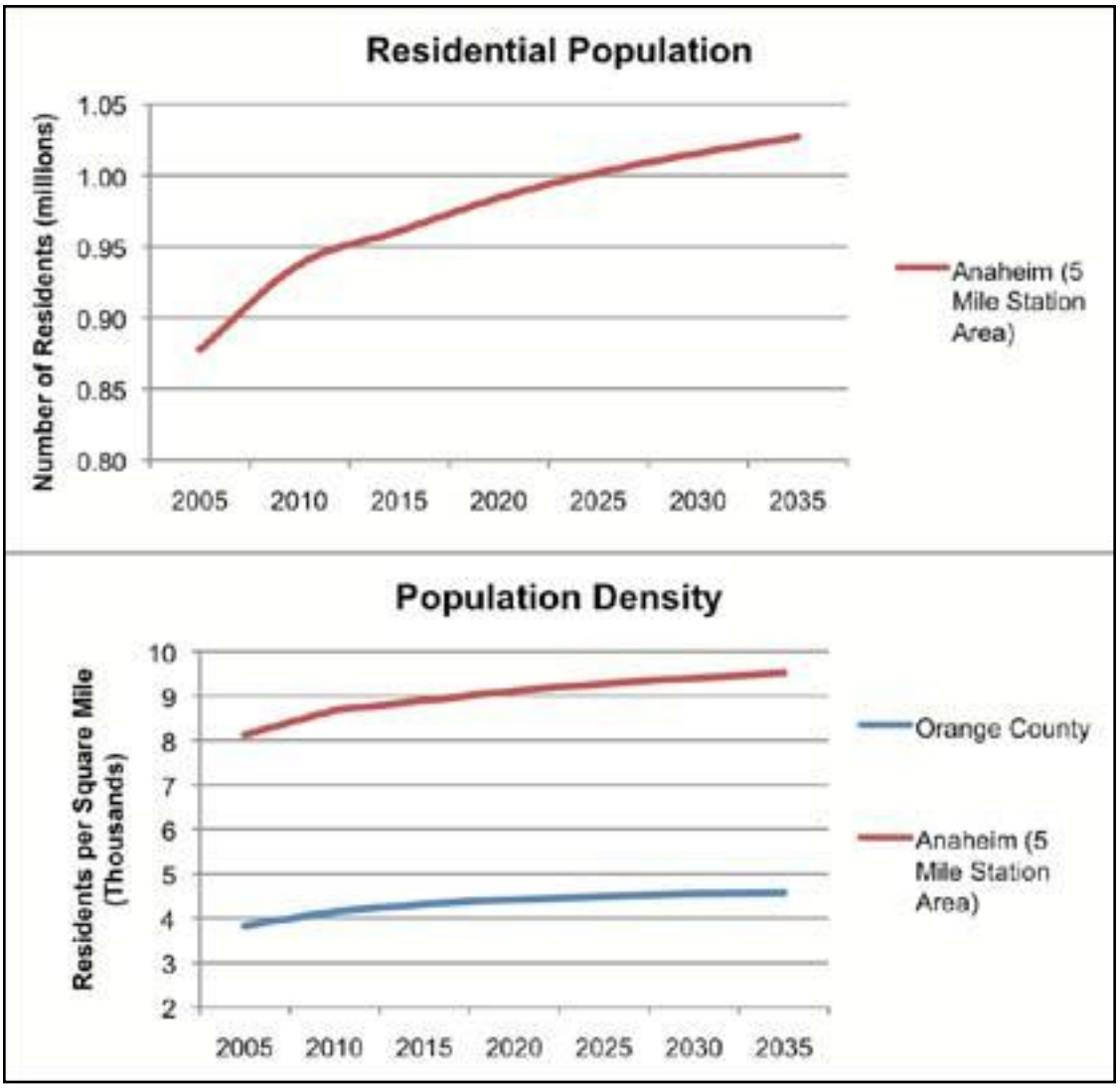

Figure 16. Residential Population and Population Density Projections within 5 miles of Anaheim HSR Station, 2005-2035

Jobs

A significant percentage (11.6%) of jobs in Orange County can be found in the City of Anaheim. The jobs-housing balance in the city (0.61 jobs for every resident) is higher than the statewide proportion (0.46). Anaheim's best-known industry is tourism. The Anaheim Convention Center hosts many nationalconferences, and the Walt Disney Company, owner and operator of Disneyland, is the city's largest employer, employing an estimated 21,000 people. An ever-growing number of visitors has resulted in the building of an increasing number of hotels, motels, restaurants and retail centers. At the time of Disneyland's opening in 1955, Anaheim had only 87 hotel or motel rooms; currently, the number has grown to nearly 20,000. Nevertheless, the city has an increasingly diverse economic base, including new manufacturing activities. The Anaheim Canyon business park makes up 63% of Anaheim's industrial space and is the largest industrial district in Orange County,

housing 2,600 businesses that employ over 50,000 workers. Not surprisingly, the largest job sector in Anaheim in 2009 was manufacturing, wholesale and transportation, with nearly 30% of all emplo yment. Other sectors include recreation and hospitality services (18.4%), management and administration (13.1%), and health services (11.0%).[177]

We estimated that the area within five miles of the station contained 344,558 jobs in 2009, or 24.4% of all the jobs in Orange County.[178] Within the same area, we predict the number of jobs to decrease by 2035 to 338,221, or by 1.8% (Figure 17). In 2009, there were a high number of jobs in this area in the recreation and hospitality services sector, management and administration sector, and financial, insurance, and real estate sector (location quotient = 1.37, 1.14 and 1.13, respectively), relative to the rest of the state (Table 15 and Figure 18). By 2035, we predict that job specialization will shift to the retail sector, although recreation and hospitality will remain a significant job specialization (location quotient = 1.34 and 1.42, respectively). Between 2009 and 2035, the greatest percentage of growth in jobs will occur within the educational services, professional and information services, and health services sectors.[179] This area tends to be jobs-rich, with the number of jobs exceeding the number of workers for every sector in 2009, except for agriculture and natural resources (gap index = -.37 for this sector). This trend will likely remain through 2035, although the number of workers in financial and professional services are projected to exceed the number of jobs in this sector (gap index = -.23 for this sector), and the retail sector will approach equilibrium of jobs and workers (gap index = .05 for this sector). Of those employed within five miles of the station, 79% live outside of the same area. Of those employed persons living within five miles of the station, nearly 74% work outside the same area, suggesting high rates of worker mobility both into and outside of the station area for work. Table 16 and Figure 19 illustrate the top 100 work origins and destinations for the station area by zip code.

Table 15. Anaheim 5-Mile, Station-Area Job Growth, Location Quotient, Gap Index

	2005	2010	2015	2020	2025	2030	2035	% Change 2010-2035
Total Jobs	383,026	364,315	359,096	353,877	348,658	343,439	338,221	-7.2%
Grouped Jobs								
Agriculture and Natural Resources	1,100	681	127	-427	-982	-1,536	-2,090	-406.9%
Manufacturing, Wholesale, and Transportation	99,004	88,738	80,849	72,961	65,072	57,183	49,294	-44.4%
Retail	33,417	34,212	35,512	36,813	38,113	39,413	40,713	19.0%
Financial and Professional Services	31,856	24,077	21,629	19,180	16,731	14,282	11,833	-50.9%
Professional and Information	27,103	28,011	30,237	32,463	34,688	36,914	39,140	39.7%
Management and Administration	84,487	71,473	64,469	57,465	50,461	43,457	36,453	-49.0%
Educational Services	22,671	28,628	33,300	37,971	42,643	47,314	51,986	81.6%
Health Services	33,596	36,395	38,781	41,168	43,555	45,941	48,328	32.8%
Recreation and Hospitality Services	49,792	52,099	54,192	56,285	58,378	60,471	62,564	20.1%
Location Quotient								
Agriculture and Natural Resources	0.11	0.08	0.02	-0.06	-0.14	-0.23	-0.33	-513.6%
Manufacturing, Wholesale, and Transportation	1.04	1.08	1.08	1.07	1.05	1.02	0.97	-9.5%
Retail	0.80	0.90	0.98	1.06	1.15	1.25	1.34	49.6%
Financial and Professional Services	1.33	1.15	1.10	1.03	0.96	0.86	0.76	-34.2%
Professional and Information	0.69	0.71	0.75	0.78	0.82	0.86	0.90	26.2%
Management and Administration	1.38	1.21	1.11	1.00	0.89	0.78	0.66	-45.4%
Educational Services	0.66	0.80	0.89	0.97	1.06	1.14	1.22	52.4%
Health Services	0.91	0.92	0.92	0.92	0.93	0.95	0.97	5.0%
Recreation and Hospitality Services	1.21	1.28	1.30	1.33	1.36	1.39	1.42	10.8%
Gap Index of All Jobs and Workers	0.17	0.15	0.15	0.14	0.13	0.12	0.12	-25.6%
Gap Index by Sector								
Agriculture and Natural Resources	-0.42	-0.55	-0.88	-1.76	-12.55	2.89	1.39	-350.9%
Manufacturing, Wholesale, and Transportation	0.10	0.11	0.12	0.14	0.16	0.19	0.23	113.4%
Retail	0.08	0.08	0.08	0.08	0.08	0.08	0.08	3.3%
Financial and Professional Services	0.24	0.14	0.08	0.02	-0.05	-0.13	-0.23	-261.3%
Professional and Information	0.12	0.09	0.08	0.08	0.07	0.06	0.06	-32.6%
Management and Administration	0.28	0.24	0.23	0.21	0.18	0.15	0.11	-56.5%
Educational Services	0.10	0.16	0.19	0.21	0.23	0.25	0.26	65.9%
Health Services	0.25	0.19	0.16	0.13	0.10	0.08	0.06	-70.3%
Recreation and Hospitality Services	0.24	0.22	0.20	0.19	0.17	0.16	0.15	-32.0%

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Table 16. Top 100 Worker Origins and Destinations by Zip Code – Anaheim

Top 100 Worker Origins

Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs
1	92805	4,428	26	92708	1,588	51	92648	910	76	92660	540
2	92804	4,335	27	92646	1,566	52	92612	908	77	91766	528
3	92867	3,606	28	92882	1,524	53	92688	887	78	92861	523
4	92801	3,308	29	92647	1,476	54	92509	857	79	91744	517
5	92840	3,234	30	92866	1,422	55	92604	829	80	92335	514
6	92802	3,093	31	92630	1,404	56	90805	812	81	92881	514
7	92806	2,831	32	90630	1,399	57	92649	803	82	90605	511
8	92869	2,730	33	92841	1,358	58	92835	797	83	91745	509
9	92807	2,540	34	92831	1,357	59	92620	787	84	92880	494
10	92704	2,516	35	92808	1,257	60	92656	744	85	92606	484
11	92683	2,390	36	90650	1,218	61	92782	738	86	92860	483
12	92870	2,320	37	90638	1,175	62	92844	727	87	92505	471
13	92705	2,317	38	92821	1,142	63	90703	723	88	92553	471
14	92886	2,116	39	91709	1,126	64	91765	710	89	91761	470
15	92868	2,057	40	90680	1,111	65	92677	701	90	91762	456
16	92833	1,987	41	91710	1,080	66	92845	697	91	90813	447
17	92843	1,986	42	92832	1,065	67	92653	683	92	91789	442
18	92706	1,978	43	92626	1,062	68	92679	669	93	90803	439
19	92703	1,853	44	90621	1,041	69	90604	638	94	92663	435
20	92780	1,846	45	92691	1,041	70	90808	624	95	91730	422
21	90620	1,773	46	92887	1,024	71	90815	599	96	90804	417
22	90631	1,718	47	92627	1,019	72	91748	596	97	92504	407
23	92865	1,685	48	92503	962	73	92614	573	98	92675	407
24	92707	1,605	49	92879	958	74	92530	571	99	92672	402
25	92701	1,599	50	92692	913	75	90720	552	100	90706	397

Table 16. Top 100 Worker Origins and Destinations by Zip Code – Anaheim (cont.)

Top 100 Worker Destinations

Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs
1	92705	4,540	26	92870	1,054	51	92648	437	76	90241	276
2	92701	4,323	27	92647	1,006	52	90638	426	77	90650	276
3	92868	3,986	28	92841	1,006	53	91710	412	78	92879	268
4	92802	3,976	29	92706	985	54	92835	402	79	92844	267
5	92806	3,504	30	92683	933	55	90720	395	80	91789	264
6	92805	3,008	31	92606	921	56	92833	394	81	92507	258
7	92626	2,833	32	92869	826	57	92656	390	82	92677	258
8	92618	2,788	33	90620	803	58	90621	382	83	90248	257
9	92867	2,647	34	90630	763	59	91748	381	84	91706	256
10	92704	2,645	35	92627	751	60	90045	376	85	92602	255
11	92614	2,460	36	92804	723	61	91730	352	86	92408	244
12	92612	2,437	37	92832	700	62	90015	336	87	92880	242
13	92780	2,088	38	92653	691	63	90017	333	88	90807	235
14	92865	1,842	39	92691	669	64	92688	333	89	92651	232
15	92660	1,773	40	90670	668	65	90071	324	90	91773	229
16	92807	1,762	41	90703	665	66	90680	324	91	91746	223
17	92801	1,673	42	92703	651	67	92675	319	92	90740	222
18	92821	1,526	43	92663	631	68	90220	309	93	90501	220
19	92831	1,369	44	91761	582	69	92610	308	94	90503	220
20	92708	1,353	45	90806	545	70	92604	307	95	92882	220
21	92840	1,198	46	90012	525	71	92782	297	96	92646	216
22	92843	1,168	47	90631	522	72	90040	296	97	92121	208
23	92707	1,128	48	92649	486	73	92886	296	98	92808	207
24	92866	1,063	49	90802	480	74	92887	280	99	92861	206
25	92630	1,055	50	90245	451	75	90505	278	100	92620	203

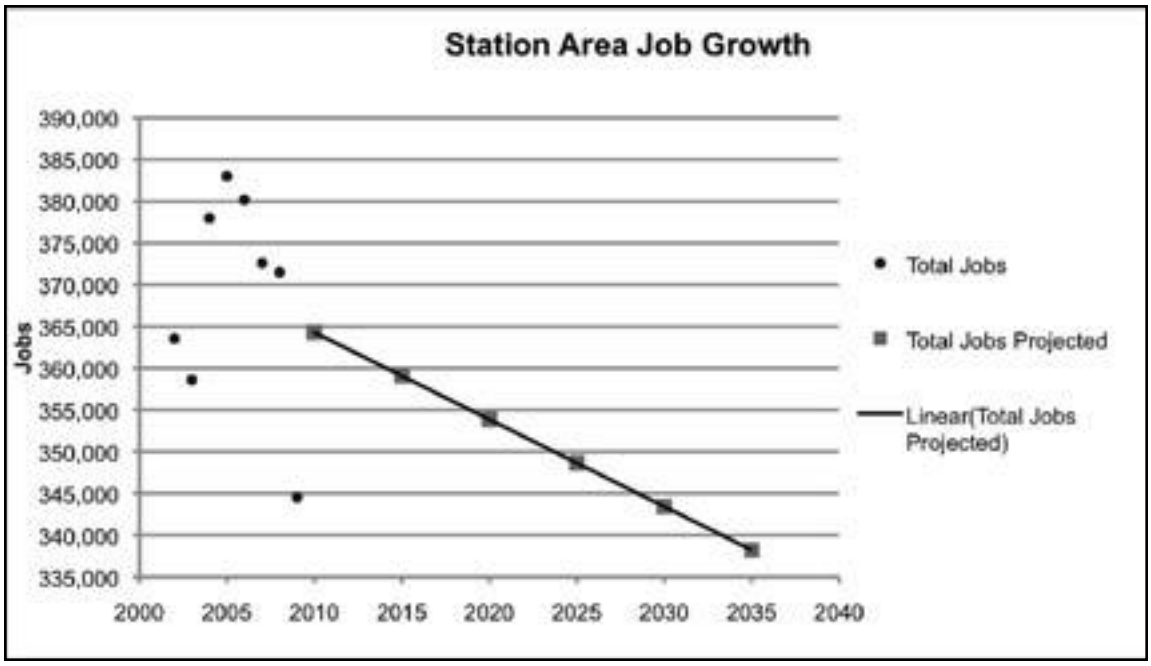

Figure 17. Job Growth Projections within 5 miles of Anaheim HSR Station, 2000-2035

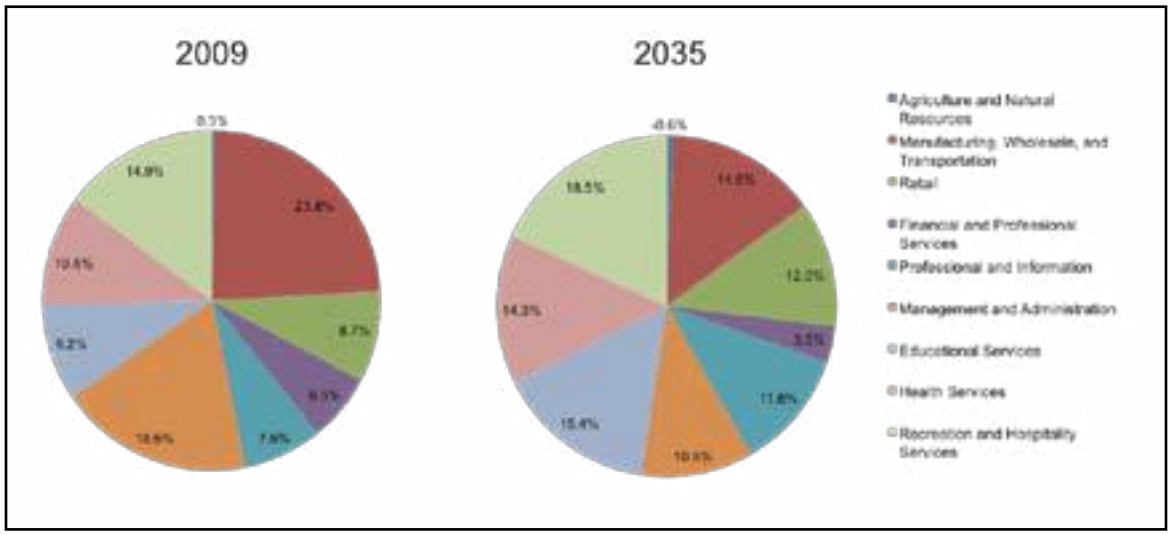

Figure 18. Comparison of Jobs by Sector within 5 miles of Anaheim HSR Station, 2009 and 2035

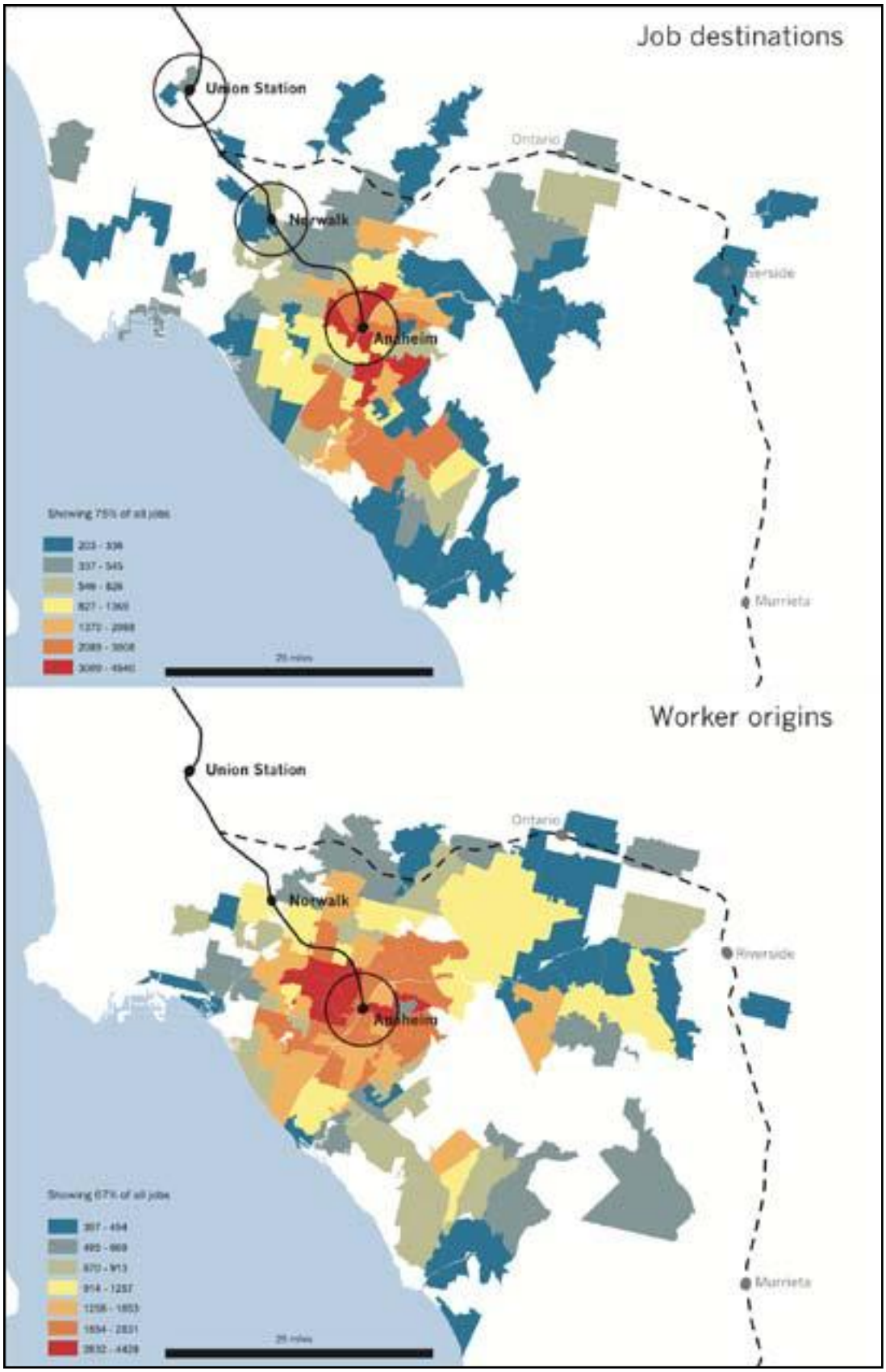

Figure 19. Anaheim Commute Map

Current Land Use

Land use within a half-mile of the station area is dominated by commercial and retail uses (39%, including the professional sports facilities), industrial uses (21%), and offices (15%). Only 4% of the land is in residential uses, almost all of it in multifamily housing (Figure 20). Very little vacant land was identified, so most of the space for development in the area must come from redeveloping existing areas and finding higher and better uses for the vast areas of surface parking that support, among other things, the professional sports venues. In 2008, Anaheim city planners announced an expansion of the initial Platinum Triangle proposal, doubling the number of housing units and amount of commercial office space from the original plans. Currently 16 projects are either planned or under construction – a total of 18,363 homes, 5,700,000 square feet of commercial space and 16,800,000 square feet of office space.

Figure 20. Map of Land Uses and Distribution of Land Uses (by Parcel) within a Half-mile of Anaheim HSR Station

Subdivision Pattern

The area around the station was originally agricultural land and has for many years been characterized by low-density industrial and commercial uses, interrupted in the 1950s by the introduction of a limited-access roadway. Parcel sizes in the area range from .03 to 251.2 acres, with the largest number of parcels being 1.1 to 5 acres, though many parcels greater than 10 acres also exist (Table 17). The largest parcels are currently occupied by the Angel Stadium and the Honda Center.

Table 17. Parcel Characteristics within a Half-mile of Anaheim Station

Min. Parcel Size (acres)	Max. Parcel Size (acres)	Modal Parcel Size Range (acres)
0.03	251.2	>10

Major Destinations

The Honda Center, Angel Stadium, and the Grove of Anaheim (a concert arena) are all within a mile from the station area (Table 18 and Figure 21). The Block of Orange (a retail and office center), Chapman University, Old Town Orange, and the Main Place (a retail center) are all within two miles of the station area. Major visitor destinations and accommodations, including the Anaheim Hilton, the Anaheim Convention Center, and the various parks and resort uses associated with Disneyland,are within three miles ofARTIC.

Table 18. Activity and Employment Centers within 5 Miles of Anaheim Station

Type	Activity/Employment Center	Miles from Station	Employees/Visitors per day
Activity	Anaheim Convention Center	2.5	9,100 per event
Employment	Downtown (Old Town) Santa Ana	3.8	50,000-400,000 (annually)
Activity	Anaheim Stadium	0.3	45,050 (game days)
Employment/Activity	Disneyland (including California Adventure Park, Downtown Disney, and Resorts)	2.5	23,105 visitors/ 15,890 employees
Employment	Honda Center	0.3	17,174 - 18,900
Entertainment	Grove of Anaheim	0.3	1,700 per event
Retail	Main Place	2.0	7,500
Employment/Retail	Old Town Orange	2.0	5,500
Employment/Retail	The Block of Orange	1.5	4,600
Education	Chapman University	1.7	1,200
Employment	Anaheim Memorial Medical Center	4.0	1,185
Employment	Anaheim Hilton	2.5	1,000
Activity	MUZEO	2.8	1,000

Figure 21. Map of Activity and Employment Centers within 5 miles of Anaheim HSR Station

Transportation and Transit Networks

Orange County's transportation network is extensive (T able 19). John Wayne Airport is located at an unincorporated portion of the county near Santa Ana, approximately eleven miles to the south of the proposed HSR station at ARTIC. The station area is accessible from the Santa Ana Freeway (I-5), the major north-south artery in California, and the Orange Freeway (State Route 57). ARTIC will serve as a major transit node in Orange County, with Metrolink commuter trains (connecting Anaheim to Los Angeles Union Station, and Oceanside in northern San Diego County, and points in between), Amtrak, and local and express bus routes operated by the Orange County Transit Authority. ARTIC will also accommodate plans for the future Anaheim Rapid Connection (ARC) as well as high-speed trains. Redevelopment of the area will be necessary to make it more accessible to travelers using non-motorized modes. Currently, the walkability of the area is limited compared to other areas of Anaheim, due to large block sizes, vast parking lots, and a street grid interrupted not only by the network of limited-access expressways but also by the Santa Ana River.

Table 19. Transit Network within a Half Mile of Anaheim ARTIC Station

Automobile	Bus	Rail			Bike	Walkability
Interstate Network		Regional Passenger	Commuter	Light		(Walk Score)
Orange Freeway (Route 57)	Orange County Transportation Authority (OCTA): Lines 430 (Stationlink), 50 (local), 57 (local), 757 (intercounty express) Anaheim Resort Transit (ART): Route 15	Amtrak Pacific Surfliner	Metrolink-Orange County Line	None	1 Class I bike path and 1 on-street Class II bike lane	69, Somewhat walkable

Local Perspectives

To complement the information presented in the previous section, we interviewed representatives from the Orange County Transportation Authority (OCTA), Anaheim Department of Public Works, and Anaheim Planning Department, as well as planning and design consultants hired by the city.[180]

Among all the cities expected to host a HSR station, Anaheim is arguably the most proactive in planning and preparing for the rail. In fact, the HSR is only one part of an ambitious master-planning effort undertaken by the city for its Platinum Triangle, the 820-acre site at the confluence of I-5 and SR-57 (Figure 22). The area is envisioned as hosting about 3.3 million square feet of office, 2.25 million square feet of retail, and over 10,000 dwelling units.[181]

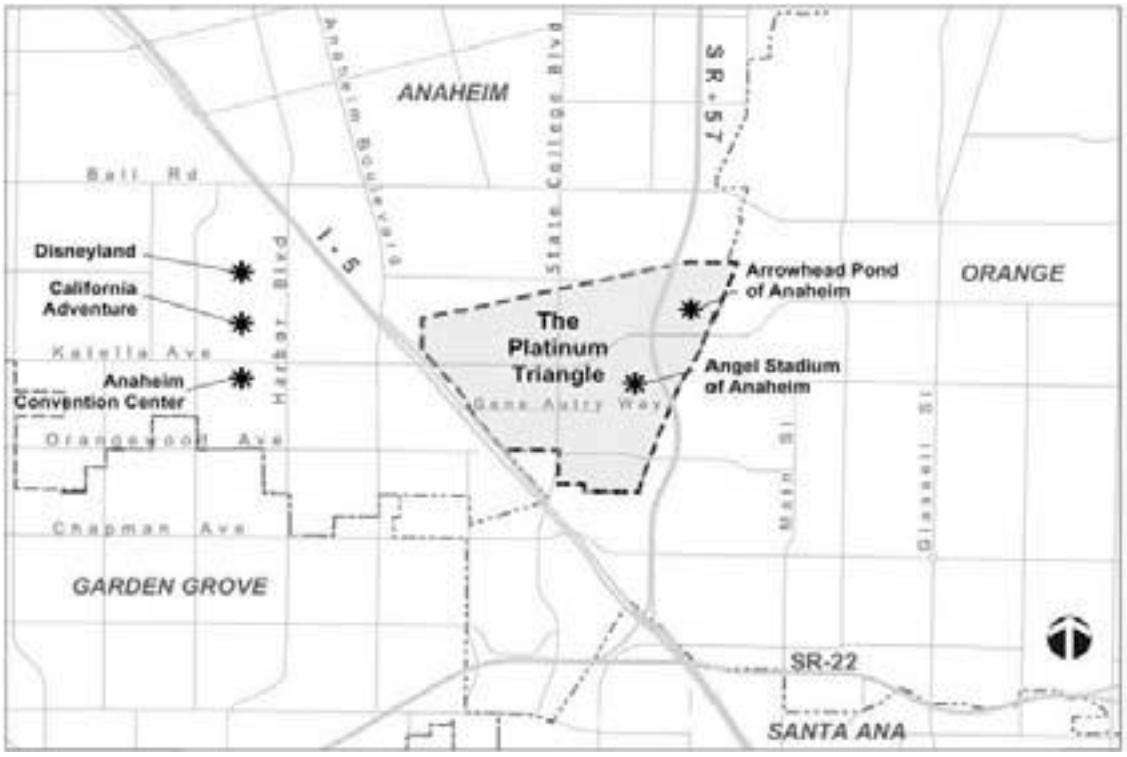

Figure 22. The Platinum Triangle

An essential component of the plan is the development of the Anaheim Regional Transportation Intermodal Center (ARTIC) on a 16-acre site owned by the Orange County Transportation Authority (OCTA) and the city of Anaheim. The city has been planning the $184-million transit center for a number of years to replace the existing Amtrak and Metrolink stations and host the new HSR station. Anaheim views the coming of the HSR as an opportunity to enhance its identity, market its sport and entertainment venues, and augment its reputation as the "top family destination" in the country.[182]

Perceived Benefits

Our interviewees were unanimous in their belief that the HSR will serve as the gateway to Anaheim and Orange County. They are projecting that by 2035, the ARTIC station will carry more people annually than the John Wayne airport. They see the station not only providing transportation benefits for Anaheim residents, who will be given more transportation options to access other parts of the state, but, more important, boosting Anaheim as an important destination for visitors. According to Anaheim design consultants Osborne and Howard, about 50,000 passengers per day are estimated to go through ARTIC station's four tracks and two platforms. According to OCTA manager Michael Litschi, the increased connectivity that the station will provide will bring more visitors to Disneyland, Anaheim Convention Center, Angel Stadium, and the Honda Center (Figure 23).

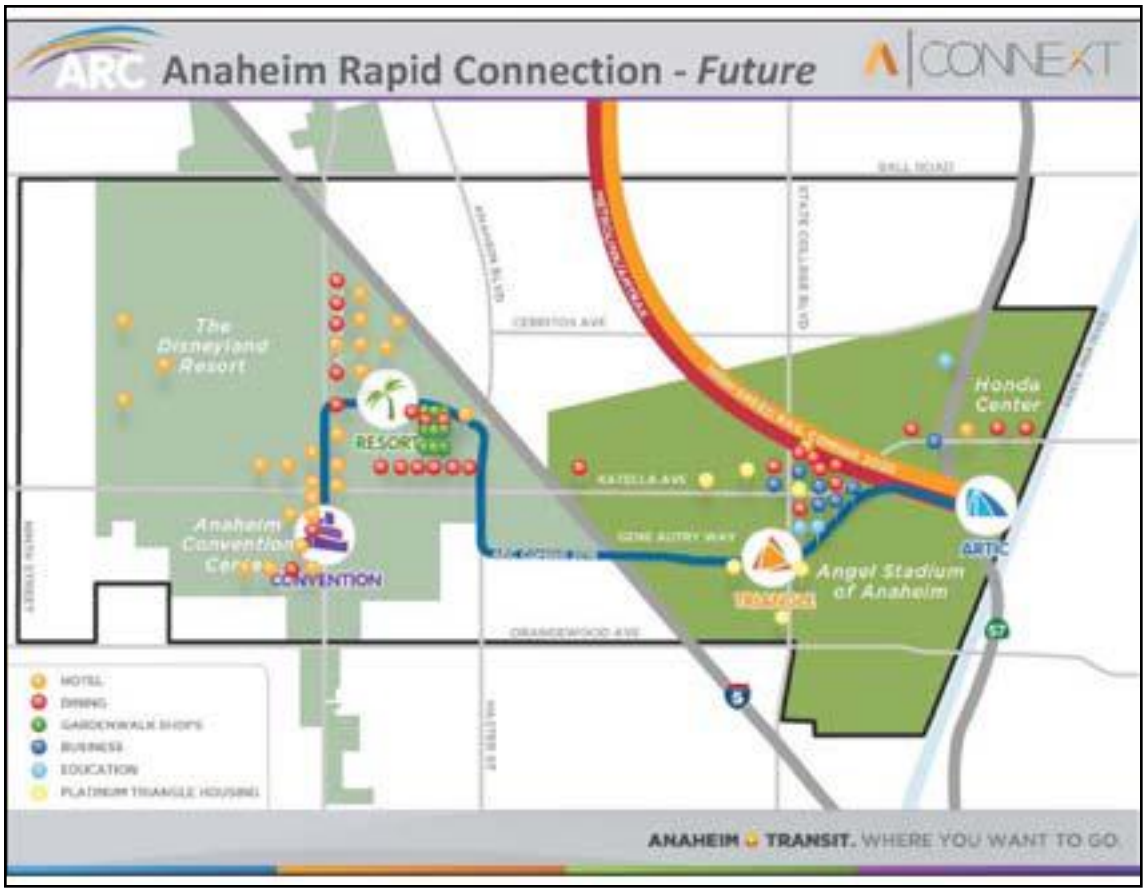

Figure 23. ARTIC Station and Surrounding Poles

Anaheim planners also expect ARTIC to provide an economic stimulus for the local economy. In addition to visitors, tourists, and conventioneers, they are anticipating that the station's construction will add about 5,000 new jobs.[183]

Other than visitors and jobs, planners also expect that the station will trigger new development opportunities. As explained by Susan Kim, senior planner in Anaheim's City Planning Department: "We have proactively planned pretty-high-density development around the location of the train station, and so we are ready , when the market is ripe, to take advantage of it." Anaheim planners envision the expansion of the convention center to accommodate demands for meetings and conventions, plenty of new hotels, and a lot of transit-oriented development around the existing station and the Anaheim stadium. They expect that the ARTIC "will change the landscape of the area in Anaheim" (Litschi interview). In addition to triggering new development, Kim expects a synergy developing between the HSR and important activity poles in Anaheim. As she explains, "The HSR will support other existing uses. For folks who are coming here for conventions and for the Disney theme parks, as well as the Honda Center, and the Angel Stadium, HSR could really support those uses for the city."

Vision

These perceived benefits from HSR lead Anaheim planners to dream of a complete transformation of the area around the station. The city's website boasts that "TODs in the immediate area will integrate with ARCTIC to form a vibrant Southern California community. Together, it will represent Orange County's continuing transformation from rural farmland and suburban community to a thriving metropolis." [184] As Kim explains, "You are going to see the whole area very much reconfigured, and I think, depending on the timing of high-speed rail as well as our other transit investments, it will most likely be a highly active, transit-oriented-development district on that property, especially if you are going twenty years out."

Being at the southern terminus of HSR's first phase, the Anaheim station is envisioned by local officials and planners as a multimodal hub, "where people would move seamlessly between transit services to reach Southern California activity centers and business districts," but also as a "destination in and of itself, like a European station with restaurants and shops where you can pleasantly spend a couple of hours" (Litschi interview).

Challenges and Concerns

Despite their optimism about the expected benefits from HSR for Anaheim, local planners outlined a number of challenges and concerns. A first concern has to do with the major physical impacts that a 100-ft. trench containing four tracks and two platforms, and its associated parking facilities, would have on the adjacent area. The CaHSRA is considering two possible options for the Anaheim HSR alignment. One option would run on tracks separate from the Metrolink and Amtrak rails, while the other option would have all three systems sharing the same tracks. The exclusive-track option would allow the HSR to run faster and go over or under streets, but it requires more space and faces higher costs and complications of crossing SR-57.[185] Kim argues that it is premature to assess the overall urban form impact of the station, since it is not clear yet if a maintenance yard would be located in Anaheim. Nevertheless, she expects that the urban form impact of station facilities would be substantial:

> *Since this would be the terminus, we are looking a lot where the maintenance facility would be, where trains would be stored. Depending on how these are located, it could impact the area differently…. Depending on which option is used – whether it is the shared-track option or the tunnel option – it could have impacts to our historical area within the city. There are a lot of cul-de-sacs that are proposed – street-closures effectively – that could divide a community if they are not done properly. We also have some recent development near the tracks that could be impacted, depending on which alternative they go with.* (Kim interview).

G.B. Arrington of Parsons-Brickerhoff (a consulting firm hired by Anaheim to supervise the master planning and building of ARTIC and by the CASHRA to create design guidelines for the HSR) agrees, adding, "if not designed right, the station could be very hostile to the local community." And, indeed, residents of Anaheim neighborhoods have been coming out to meetings and voicing their concerns, according to Kim.

Accommodation of parking is another major concern for local planners since surface parking occupies significant amounts of land and results in dead spaces. At present, there is a big discrepancy between the number of parking spaces that the CaHSRA anticipates for Anaheim as a terminal station (10,000 spaces), and what the city of Anaheim offers (1,000 spaces). According to our interviewees, Anaheim is interested in building parking structures, but at the moment there are no good available locations within the city boundaries.

Despite the fact that ARTIC is on public land (occupying a former county maintenance yard that OCTA has purchased), there are still challenges in trying to create a vibrant pedestrian-oriented setting. As Litschi explains:

> *It may be difficult to develop around stations because of the historic development patterns that treated station areas as 'backsides' of the city. Things were not built around the rail line; the line was where you put the back of your business or the industrial area. As a result, stations are surrounded by light industrial uses, and walking is difficult* (Litschi interview).

Additional development challenges include the relative lack of developable land. As Arrington argued, "Anaheim is challenged due to space, with freeways, a baseball station, and the river. It is blessed by accessibility but doesn't have a lot of land for development available." Other than the station, the only available redevelopment area is the Stadium District. Planners expressed frustration regarding their relative lack of ability to influence station-compatible and TOD uses in private development projects.

Lastly, our interviewees referred to two perceptual issues that may present important hurdles for the project. The first has to do with the Southern California mindset, which favors private automobile use and is anxious about using public transit. As argued by Litschi:

> *I think that the largest barrier for people using transit, especially in Southern California, is fear: fear of how do I buy my ticket, how do I transfer, what if the train is late. So if we can eliminate some of those unknowns, and make it easy for people to get to and from the station, I think we can have a pretty successful system* (Litschi interview).

The second hurdle relates to the phased nature of the HSR project and the accompanying level of uncertainty about future development, especially for cities not located on the first leg. This sentiment was echoed by Kim: "I think what will be really important is to keep the project alive, now that we aren't the first leg."

Planning and Design

As emphasized by our interviewees, in contrast to many other cities, Anaheim has been planning for a major multimodal transportation hub for some time and is presently in the process of working through its design plans to expand the ARTIC facility and accommodate the HSR. The city has hired the firm HOK, which has prepared conceptual renderings that show a futuristic plan with a massive shell for the station, running parallel to the river, and

fronting a landscaped plaza (Figures 24, 25, and 26). The design suggests the marriage of a nineteenth-century grand station with a shopping mall, with scales that are more “airport” than pedestrian but clearly bring multiple modes of mobility to a nexus.

Figure 24. Rendering of ARTIC Station Building

Figure 25. Site Planning of ARTIC Site

Figure 26. Rendering Showing Station and Surrounding Structures

While the land between the freeway and the station is private, the city envisions joint development opportunities for the provision of hotels, commercial buildings, and transit-oriented development. As stated on the project's website:

> *ARTIC will be an iconic regional landmark. The station will accommodate passenger arrivals, departures, and transfers with supporting retail, restaurants and passenger services within the building… Some key design elements include the exterior shell of the building; a public plaza surrounding the building including opportunities for retail space; landscaping; amenities; bicycle access to the Santa Ana River Trail; improved pedestrian access along Douglass Road and connection under the SR-57 to Angel Stadium; a public art component; and an integrated signage and way-finding program*.[186]

It is interesting to note that the city of Anaheim, in collaboration with OCTA, Metrolink, and Amtrak, is forging ahead with the development of the station structure, and expects to have the building ready by 2014. As Kim argued,

> *The building is going to be an intermodal building for the expansion of Metrolink and Amtrak, as well as a lot of bus service and other uses. But we are making sure that things are expandable, so if and when HSR comes in, we are ready to accommodate that service. So that is the proactive planning we are doing right now* (Kim interview).

A consideration for the design of such a major transportation hub is the connectivity between the different modes but also good linkages between the station and its surroundings. Both Kim and Litschi emphasized this point. According to Kim:

> *We've been working with the OCTA on the GoLocal program for connections to Metrolink; I think these will also correspond with high-speed rail. We are looking at a fixed guideway connection to the Anaheim Resort and Convention Center to provide a better connectivity for that last leg of the trip. In addition, we will have bus rapid transit and shuttle service to surrounding workforce and surrounding areas. We are also making sure we have good connections to bikeways* (Kim interview).

> According to Litchi:

> *We design the station so that it is truly a multimodal hub, easily accessible to all modes of transit, and with easy access from one mode to the other (HSR, Amtrak, Metrolink, OC buses, local and inner-county express). We want to minimize the time and distance required to transfer from one mode to the other. … We have tried hard to increase bus connections to stations, and have services like Stationlink – buses going to major employment centers timed to meet Metrolink rains in the morning and afternoon* (Litschi interview).

To respond to the parking challenge and avoid the sea of surface parking lots surrounding the station, Anaheim planners are looking across the river to the City of Orange, which provides some possibilities for the building of parking structures. However, they will not be

able to completely avoid surface parking because the management of Angel Stadium has agreements in place that retain the stadium's surface parking.

Conclusion

The increased accessibility provided by HSR should enhance Anaheim's popularity as an entertainment, leisure and convention destination, building on its current visitor and tourist infrastructure. Home to one of the most-visited amusement parks in the world (Disneyland is second only to Disneyworld in Orlando in terms of attendance) and already a major convention destination and professional sports venue, Anaheim's enhanced access to markets in Northern California (and Las Vegas, should HSR connections to that city be realized) would most likely generate growth and development in the station area and city.

Anaheim's redevelopment plans have focused on adding residential and commercial uses to areas near the station. However, the links to the station area and district with other outlying areas and poles in Anaheim have to be considered. Currently, both the Santa Ana River and the intersection of the Santa Ana Freeway and the Orange Freeway present barriers to the links between the proposed station area and other parts ofthe city, including the resort areas. Nevertheless, the opportunity for regeneration of the area is palpable, especially given that ownership is highly consolidated in large parcels. And Disneyland's reputation for transportation innovation (its monorail system opened in 1959) could be leveraged to overcome local accessibility problems.

In conclusion, the city of Anaheim is allocating a lot of resources onARTIC, hoping that this transit megacenter will also serve as a catalyst forprivate development to follow. The city's local will, aspirations and hopes are big, but the final outcome will also rely greatly on the response of the private sector.

NORWALK/SANTA FE SPRINGS

City and Station Profiles

Norwalk and Santa Fe Springs are neighboring cities separated by the rail alignment. Presently, it is not clear if the HSR station will be located within the boundaries of Norwalk or Santa Fe Springs. Norwalk is an important public administration hub of Los Angeles County, with many County administrative offices located here (Figures 27 and 28). Largely suburban in character, the city is characterized by swaths of single-family residential subdivisions, strip commercial establishments along Imperial Highway , and low-density industrial uses. Santa Fe Springs, on the other hand, is very sparsely populated, and most of its land is occupied by large industrial plots and facilities of light industry.

Figure 27. Map of Norwalk HSR Station

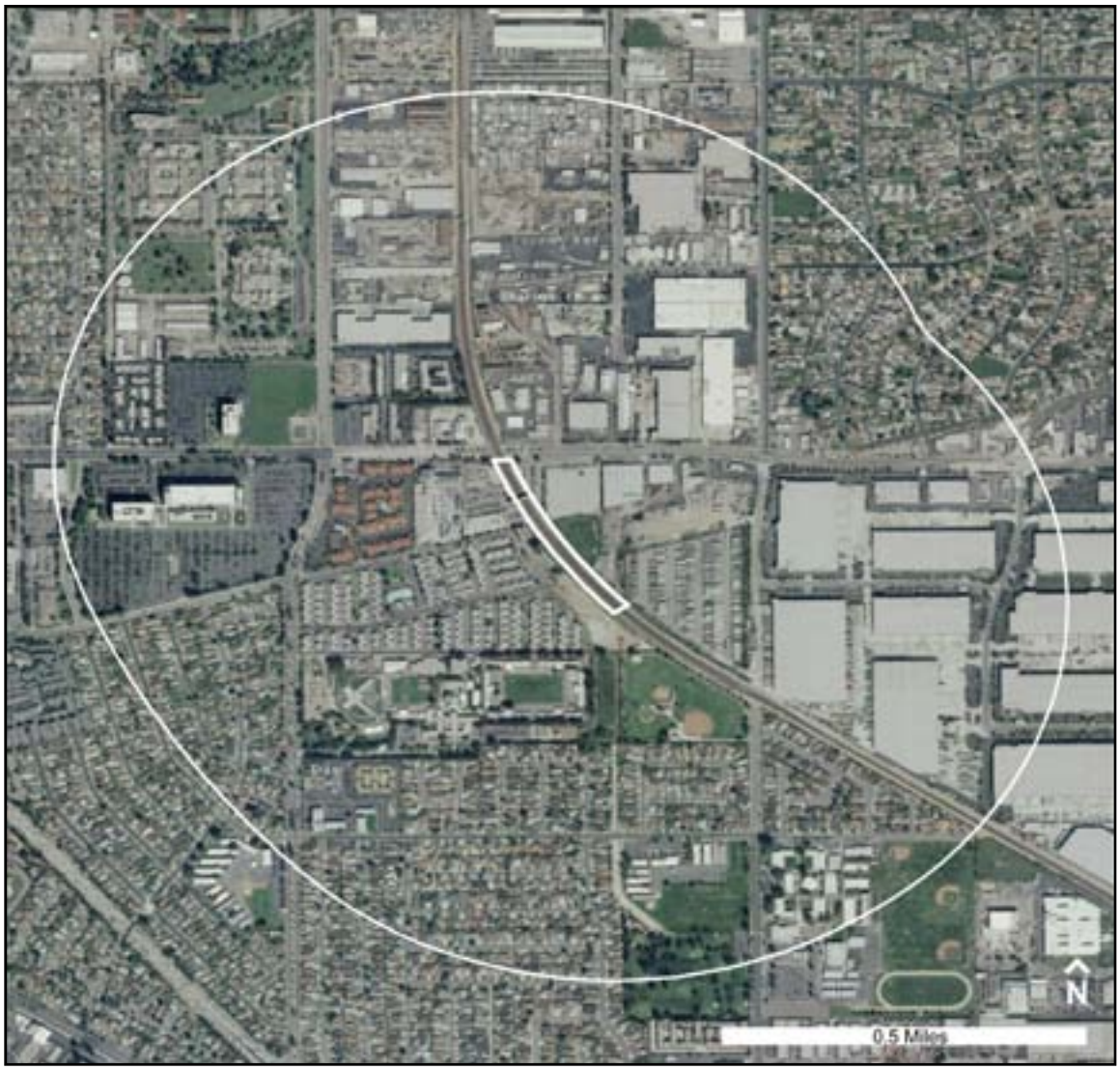

Figure 28. Aerial Photograph of Norwalk HSR Station

Population

With 105,549 residents in 2010, Norwalk is a densely populated (11,474 people per square mile) dormitory suburb of Los Angeles.[187] Over 70% of the residents are Hispanics, who constitute the majority of the city's population. Between 2000 and 2010, the total population of Norwalk increased by just over 2%, less than the Los Angeles County rate of 3.1% and the statewide growth rate of 10%. Between 2010 and 2035, the city's population is projected to increase by 14% to 120,409. Median household income in 2010 was $58,442, equivalent to the median household income of all Californians. The median home price in the city in 2010 was $312,000 – $90,000 less than the median home price in Los Angeles County as a whole – or 93% of the statewide median home price, having fallen 32% from the pre-recession high median home price.[188] The homeownership rate (65%) is high when compared to the rate of homeownership within Los Angeles County overall (47.5%) and homeownership statewide (57.8%). According to the 2010 census, Santa Fe Springs has

a population of 16,223 and a density of only 1,820 people per square mile. Between 2000 and 2010, the total population of Santa Fe Springs decreased by 7%. Eighty-one percent of the city's population is Hispanic. Median household income in 2010 was $49,867, lower than the median household income for the state. The median home price in the cityin 2010 was $307,000.

In 2010, 830,873 residents lived in census tracts, including those in Norwalk, Santa Fe Springs and adjacent cities, located entirely or containing portions within 5 miles of the station area (Table 20 and Figure 29).[189] The population density of those census tracts was an average of 7,989 persons per square mile. [190] Within census tracts located entirely or containing portions within a half-mile of the station area, the 2010 population was 33,609, with an average population density of 4,747 persons per square mile.[191] SCAG projects that residential population within five miles of the station will increase to 909,415 residents, or by 8.6%, between 2010 and 2035.[192] Within a half-mile of the station the residential population is expected to increase by 3,816, or 11.4%, within the same period.[193]

Table 20. Residential Population and Population Density Projections within 5 Miles of Norwalk Station, 2005-2035

	2005	2010	2015	2020	2025	2030	2035
Population							
Los Angeles County	10,230,219	10,645,211	11,005,955	11,368,021	11,720,520	12,061,511	12,387,715
Norwalk	808,429	830,873	848,638	865,423	880,892	895,792	909,415
Population Density							
Los Angeles County	2,502	2,604	2,692	2,781	2,867	2,950	3,030
Norwalk	7,773	7,989	8,160	8,321	8,470	8,613	8,744

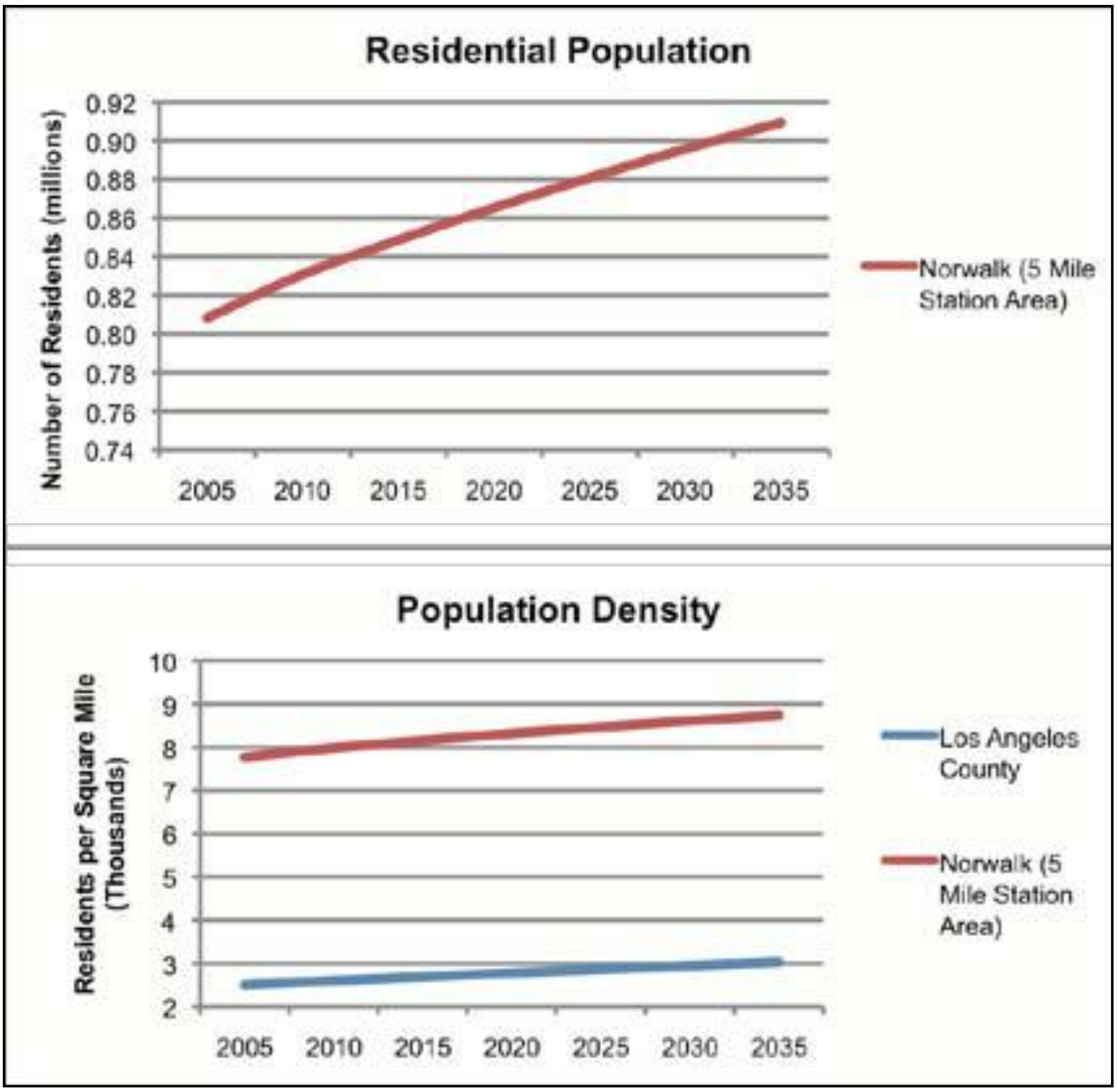

Figure 29. Residential Population and Population Density Projections within 5 miles of Norwalk HSR Station, 2005-2035

Jobs

The jobs-housing balance in Norwalk (0.22 jobs for every resident) is less than half the statewide proportion (0.46 jobs per resident). A significant proportion of Norwalk residents (18.7%) commute to jobs outside the Los Angeles County. The city has a limited economic base; the largest job sector, education-health, accounts for 27% of the total jobs in the city. The sector includes the Norwalk-La Mirada School District, the largest employer in the city, and the Metropolitan State Hospital. A large public administration sector – the city is a branch location for Los Angeles County government administration – accounts for 10% of the city's jobs.

We estimated that the area within five miles of the station contained 242,675 jobs in 2009, or less than 6% of all the jobs in Los Angeles County.[194] Within the same area, we predict

the number of jobs to increase by 2035 to 282,823, or by about 9.7% (Figure 30). [195] In 2009, jobs in the manufacturing, wholesale, and transportation and retail sectors were relatively overrepresented compared to the rest of the state (location quotient = 1.40 and 1.27, respectively) (Table 21 and Figure31).By 2035, this area willremain specialized in the aforementioned sectors, becoming an increasingly important center for retail jobs relative to the rest of California (location quotient = 1.44 for retail and 1.42 for manufacturing, wholesale, and transportation). In addition to these changes, the highest percent of job growth will occur in the health services, recreationand hospitality, and retail sectors.[196] Job loss is projected to occur in the management and administration; agriculture and natural resources; and manufacturing, wholesale, and transportation sectors.[197] While Norwalk will remain predominantly residential in nature, as population increases, the ratio of workers to jobs is likely to be roughly maintained (gap index = .02 in 2009 and .08 in 2035).

Of those employed within five miles of the station, greater than 77% live outside of the same area. Of the employed persons living within five miles of the station, more than 76% work outside the same area, suggesting high rates of worker mobility both into and outside of the station area for work. Table 22 and Figure 32 illustrate the top 100 work origins and destinations for the station area by zip code.

Table 21. Norwalk 5-mile Station-Area Job Growth, Location Quotient, Gap Index

	2005	2010	2015	2020	2025	2030	2035	% Change 2010-2035
Total Jobs	252,322	257,943	262,919	267,895	272,871	277,847	282,823	9.6%
Grouped Jobs								
Agriculture and Natural Resources	241	284	289	293	298	303	307	8.3%
Manufacturing, Wholesale, and Transportation	85,777	81,164	76,910	72,657	68,403	64,150	59,896	-26.2%
Retail	30,211	31,558	32,531	33,504	34,477	35,451	36,424	15.4%
Financial and Professional Services	12,197	11,581	11,760	11,939	12,118	12,297	12,476	7.7%
Professional and Information	12,339	12,637	13,015	13,393	13,771	14,149	14,527	15.0%
Management and Administration	40,799	43,302	45,093	46,883	48,674	50,464	52,255	20.7%
Educational Services	25,382	25,370	25,120	24,870	24,620	24,370	24,120	-4.9%
Health Services	25,515	29,321	32,466	35,611	38,756	41,901	45,046	53.6%
Recreation and Hospitality Services	19,861	22,726	25,735	28,744	31,753	34,763	37,772	66.2%
Location Quotient								
Agriculture and Natural Resources	0.04	0.05	0.05	0.05	0.05	0.06	0.06	23.6%
Manufacturing, Wholesale, and Transportation	1.37	1.39	1.40	1.41	1.41	1.42	1.42	1.8%
Retail	1.09	1.17	1.22	1.28	1.33	1.38	1.44	22.9%
Financial and Professional Services	0.78	0.78	0.82	0.85	0.89	0.92	0.96	22.1%
Professional and Information	0.48	0.45	0.44	0.43	0.42	0.41	0.40	-12.1%
Management and Administration	1.01	1.04	1.06	1.08	1.10	1.12	1.13	9.3%
Educational Services	1.12	1.00	0.92	0.84	0.78	0.73	0.68	-32.4%
Health Services	1.05	1.05	1.05	1.06	1.06	1.07	1.08	2.9%
Recreation and Hospitality Services	0.74	0.79	0.85	0.90	0.94	0.99	1.03	29.8%
Gap Index of All Jobs and Workers	-0.003	0.02	0.03	0.05	0.06	0.07	0.08	333.7%
Gap Index by Sector								
Agriculture and Natural Resources	-0.76	-0.77	-0.79	-0.81	-0.83	-0.84	-0.85	10.7%
Manufacturing, Wholesale, and Transportation	0.03	0.06	0.09	0.12	0.16	0.21	0.27	341.4%
Retail	0.03	0.07	0.10	0.13	0.16	0.18	0.21	194.7%
Financial and Professional Services	-0.09	-0.07	-0.05	-0.02	0.00	0.02	0.04	-158.7%
Professional and Information	-0.16	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15	3.4%
Management and Administration	0.00	0.03	0.05	0.07	0.09	0.11	0.13	356.8%
Educational Services	0.10	0.06	0.01	-0.03	-0.07	-0.11	-0.15	-350.3%
Health Services	0.03	0.04	0.04	0.03	0.03	0.03	0.03	-10.6%
Recreation and Hospitality Services	-0.13	-0.06	-0.02	0.02	0.05	0.08	0.11	-263.1%

Table 22. Top 100 Worker Origins and Destinations by Zip Code – Norwalk

Top 100 Worker Origins

Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs
1	90650	6,896	26	90640	820	51	92835	461	76	90001	354
2	90638	3,520	27	90621	816	52	90804	460	77	90745	352
3	90703	2,700	28	90808	804	53	90220	447	78	90731	350
4	90605	2,202	29	92801	776	54	91765	445	79	92648	346
5	90631	2,039	30	90723	747	55	90803	440	80	91702	344
6	90604	2,000	31	90242	744	56	91789	438	81	90023	340
7	90660	1,927	32	92821	709	57	90810	429	82	92806	339
8	90606	1,436	33	90022	705	58	92647	425	83	90003	334
9	90805	1,407	34	90255	676	59	92646	422	84	90044	334
10	90602	1,267	35	90815	653	60	91746	415	85	92509	333
11	90706	1,210	36	92886	626	61	90623	413	86	92832	333
12	90280	1,175	37	90240	615	62	92708	407	87	91792	332
13	90670	1,147	38	92683	612	63	92840	406	88	90716	323
14	90601	1,018	39	92870	602	64	90744	402	89	90222	318
15	92833	998	40	92805	562	65	91766	401	90	91761	318
16	90603	992	41	90221	554	66	90270	399	91	90715	317
17	90620	975	42	91706	543	67	92831	394	92	92704	317
18	90701	973	43	91710	539	68	90713	392	93	91733	312
19	92804	962	44	91748	529	69	91770	384	94	92802	309
20	90201	938	45	90813	515	70	92335	383	95	92336	303
21	91744	931	46	91709	506	71	90807	374	96	92503	301
22	90630	917	47	90011	492	72	92807	374	97	90814	299
23	90241	883	48	90063	489	73	92882	374	98	91722	298
24	90262	879	49	91790	484	74	90720	363	99	91762	294
25	91745	826	50	90806	483	75	90802	361	100	91730	293

Table 22. Top 100 Worker Origins and Destinations by Zip Code – Norwalk (cont.)

Top 100 Worker Destinations

Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs
1	90670	6,318	26	92801	770	51	90245	473	76	91770	337
2	90650	4,374	27	90601	753	52	92701	450	77	92865	327
3	90703	3,230	28	90201	673	53	92807	448	78	91731	324
4	90012	2,282	29	92705	668	54	90022	447	79	90255	323
5	90638	2,187	30	90045	655	55	90017	443	80	91733	321
6	90040	1,576	31	90280	648	56	90021	441	81	92804	320
7	90015	1,434	32	90248	639	57	91745	434	82	91710	319
8	90241	1,410	33	92805	635	58	92612	431	83	90745	317
9	90620	1,352	34	90621	631	59	92833	425	84	90807	302
10	92821	1,333	35	90720	626	60	90604	423	85	90250	301
11	90605	1,279	36	92831	624	61	92647	423	86	92683	300
12	90706	1,135	37	90602	622	62	90746	405	87	90503	299
13	90606	1,126	38	92868	595	63	90815	405	88	91754	299
14	90058	1,027	39	92626	593	64	90501	403	89	92867	299
15	92802	991	40	90802	589	65	92835	398	90	90240	297
16	90806	989	41	90023	580	66	92614	388	91	92649	296
17	90640	948	42	90805	556	67	92841	378	92	90007	295
18	90701	921	43	91748	552	68	90221	374	93	90071	295
19	90630	897	44	90262	550	69	92832	372	94	90755	293
20	90723	894	45	91746	544	70	90505	367	95	92870	293
21	90220	879	46	90712	535	71	90810	360	96	90716	288
22	92806	866	47	91706	517	72	90033	359	97	90808	281
23	90660	863	48	92618	487	73	90623	351	98	91730	280
24	90631	831	49	91761	479	74	92704	347	99	92708	280
25	90242	782	50	90603	474	75	92660	338	100	92780	275

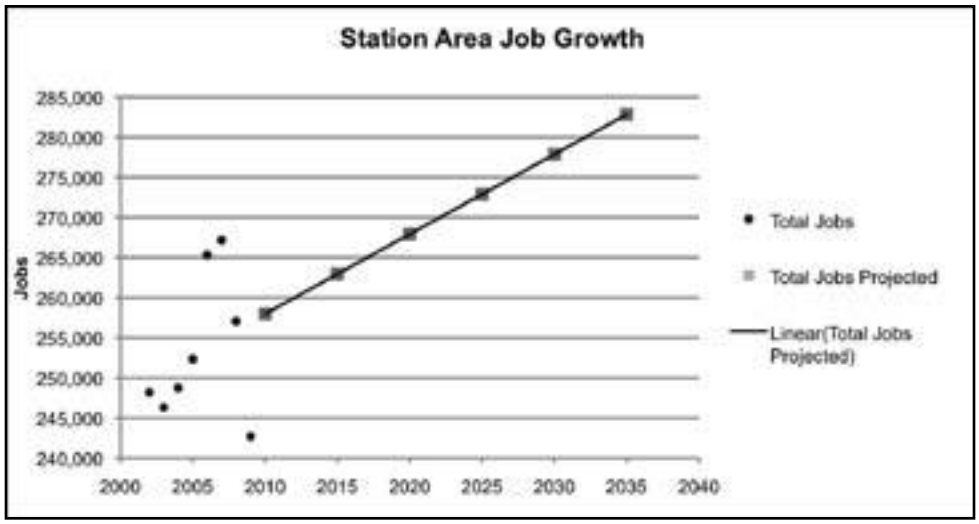

Figure 30. Job Growth Projections within 5 miles of Norwalk HSR Station, 2000-2035

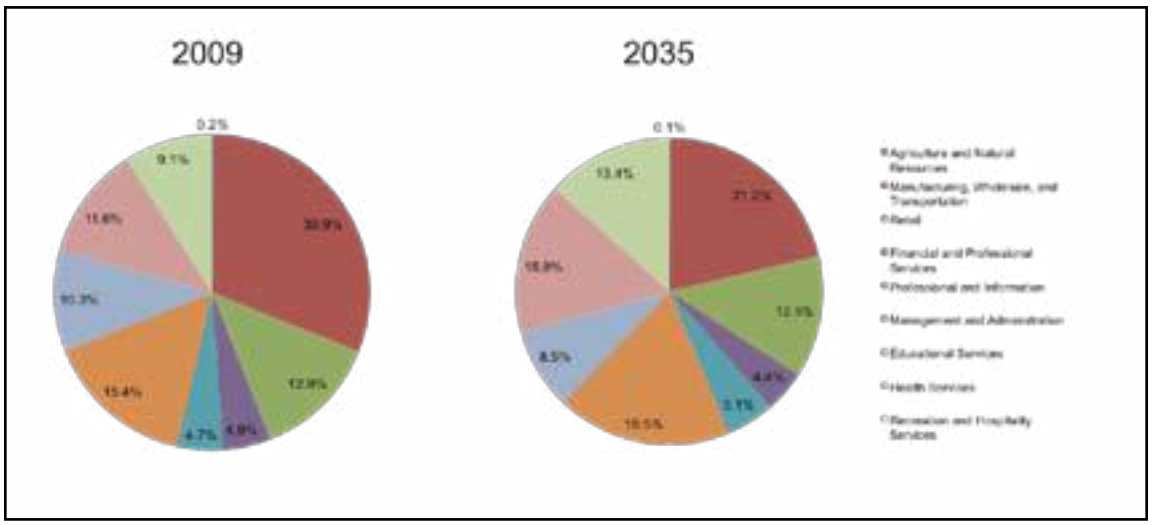

Figure 31. Comparison of Jobs by Sector within 5 miles of Norwalk HSR Station, 2009 and 2035.

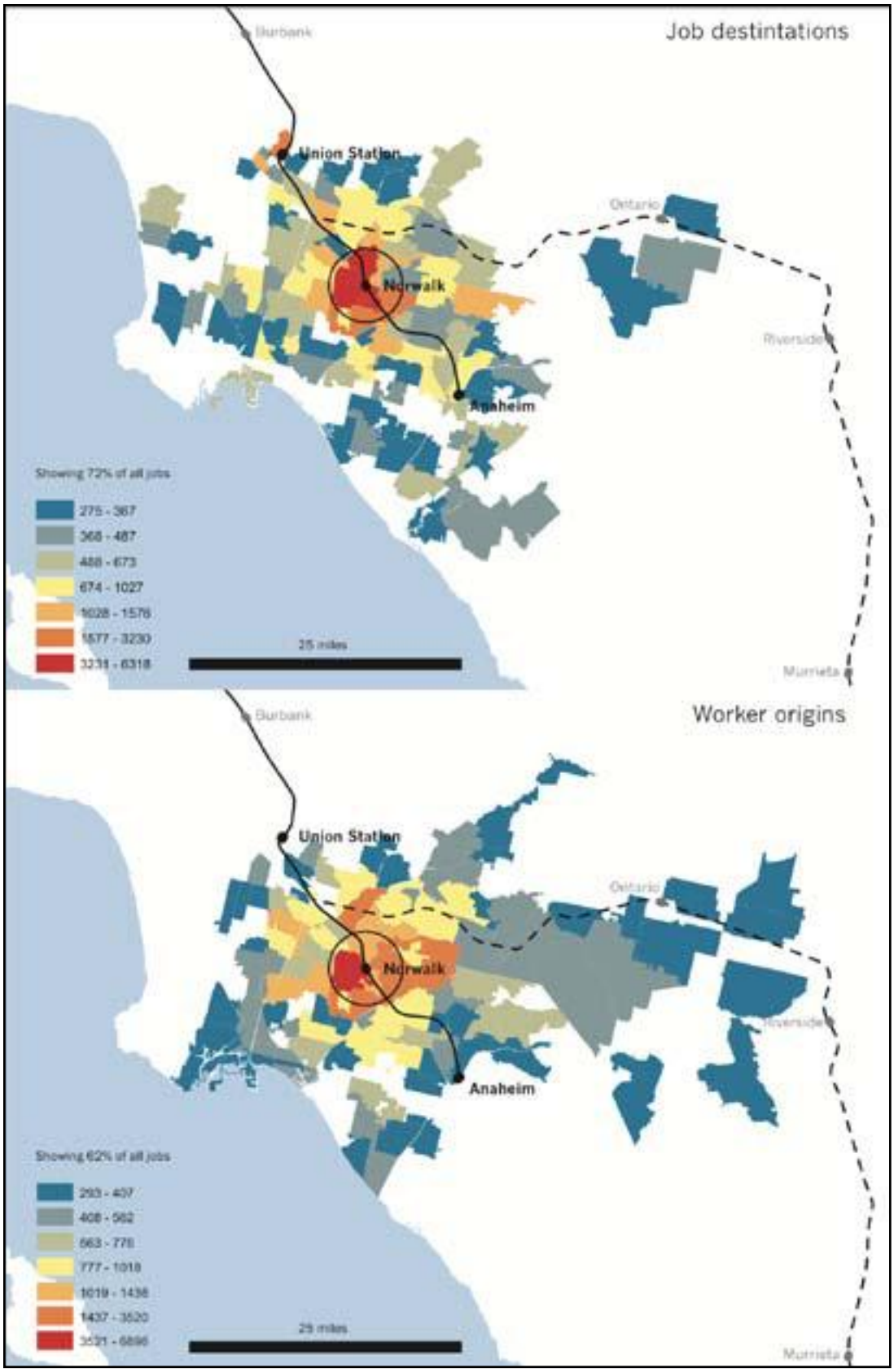

Figure 32. Norwalk Commute Map

Current Land Use

Land use within a half-mile of the station area is dominated by industrial uses and related warehousing activities (36%) and public facilities related to various County- and local government administrative uses (also 36%). Multi-family residential uses constitute 15% of the total area. Only 1% of the land is currently vacant though significant areas are underutilized as surface parking lots. (Figure 33).

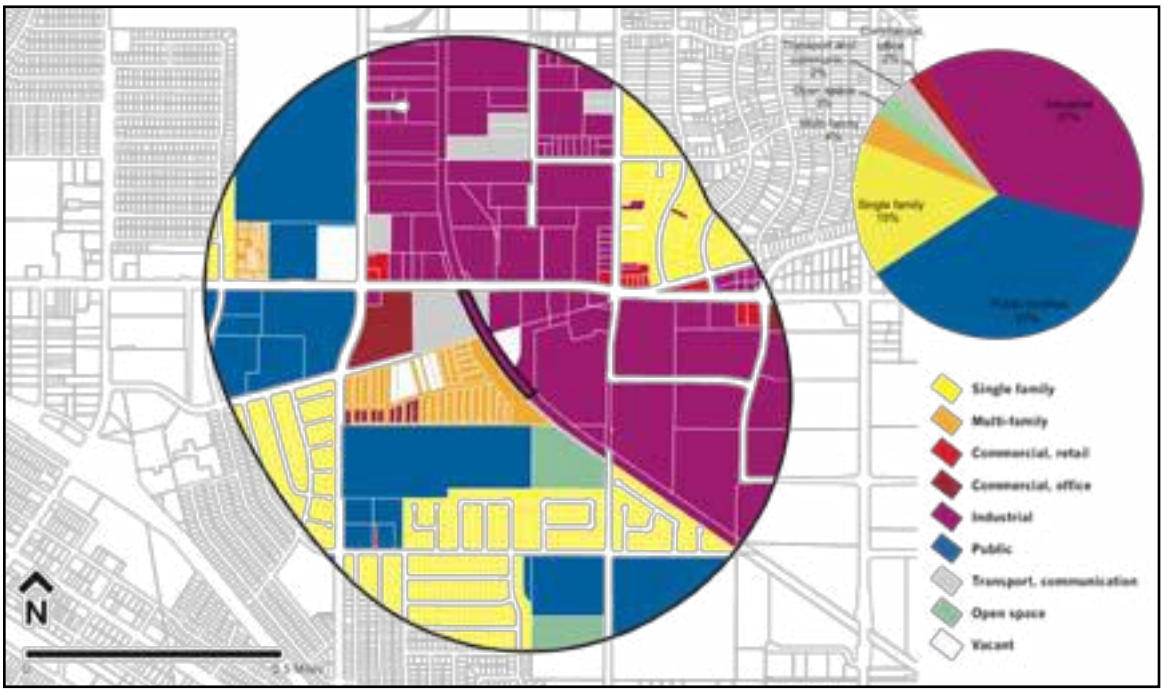

Figure 33. Map of Land Uses and Distribution of Land Uses (by Parcel) within a Half-mile of Norwalk HSR Station

Subdivision Pattern

Parcel sizes in the area range from 0.01 to 9.4 acres, with the largest number of parcels being in the 1.5 to 5 acres range (Table 23). The largest parcels are currently occupied by the Metropolitan State Hospital.

Table 23. Parcel Characteristics within a Half-mile of Norwalk Station

Min Parcel Size (acres)	Max Parcel Size (acres)	Modal Parcel Size Range (acres)
0.006	155.5	>10

Major Destinations

A number of important destinations are within a mile of the proposed station area. These include the Metropolitan State Hospital, the City of Norwalk's city hall, and regional headquarters of Bally Fitness and Vons, Inc. (Table 24 and Figure 34). Two higher education institutions (Cerritos College and Biola University) and the Cerritos Town Center (a civic and retail center) are located within three miles of the station area.

Table 24. Activity and Employment Centers within 5 Miles of Norwalk Station

Type	Activity/Employment Center	Miles from Station	Employees/Visitors per day
Retail	Los Cerritos Mall/Auto Center	4.0	26100 (visitors)
Retail/Civic	Cerritos Towne Center	3.0	6,570
Employment	Norwalk/La Mirada Unified School District	Various	4,365
Employment	LA County	0.3	2,000
Health	Metropolitan State Hospital	0.8	1,530
Education	Biola University	2.8	1,250
Education	Cerritos College	2.8	1,200
Employment	Vons Inc. (Headquarters)	1.0	800
Employment	Bally Fitness (Headquarters)	0.3	650
Employment	City of Norwalk	0.5	480

Figure 34. Map of Activity and Employment Centers within 5 miles of Norwalk HSR Station

Transportation and Transit Networks

Norwalk and Santa Fe Springs are accessible from the Santa Ana Freeway (Interstate 5), from the Imperial Freeway (Interstate 105), and the San Gabriel River Freeway (Interstate 605). They are well connected to transit (Table 25), yet less than 3% of residents use public transportation for commute trips. Los Angeles Metro offers extensive local and express bus transit to other portions of the metropolitan area. Metrolink, Amtrak, and the LA Metro Green Line trains also serve the city. Relatively few (7.3%) households in Norwalk are without an automobile, compared with 12.6% of households in Los Angeles County. The environs of the proposed station area, characterized by well-designedstreets and the universal provision of sidewalks, are relatively walkable despite large block sizes, long distances between intersections, deep setbacks for commercial buildings, and the relatively high speeds of automobile travel on Imperial Highway.

Table 25. Transit Network within a Half-mile of Norwalk Station

Automobile	Bus	Rail			Bike	Walkability
Interstate Network		Regional Passenger	Commuter	Light		(Walk Score)
None	LA Metro: Lines 69 and 270 Norwalk Transit: Lines 1, 2, 3, 4, and 8	None	Metrolink: 91 Line and Orange County Line	None	1 Class I Bike Path	62, Somewhat walkable

Local Perspectives

We interviewed Santa Fe Springs City Manager , Fred Latham, to complement the information presented in the previous section. Santa Fe Springs officials have taken the lead in organizing nine other cities (Vernon, Montebello, Commerce, Pico Rivera, Santa Fe Springs, Norwalk, La Mirada, Buena Park and Fullerton) that will be affected by the Los Angeles-Anaheim alignment. Mr. Latham, chairs a group of city managers from these nine cities, while the Santa Fe Springs Director of Public Works heads a technical group of urban planners and engineers.

The Norwalk/Santa Fe Springs station[198] is planned to be the only station between downtown Los Angeles and the ARTIC complex in Anaheim (see Figure 1). Unlike Anaheim, however, which eagerly anticipates the coming of the high-speed train, Norwalk and Santa Fe Springs are representative of a number of smaller cities that are skeptical of the benefits and concerned about the unintended consequences that the HSR may bring to their communities. And while Anaheim is proactively preparing station-area plans and moving ahead with the planning and implementation of a multimodal transportation center that will also host the HSR, Norwalk and Santa Fe Springs do not even know the exact location of the proposed HSR station (Figure 35). They are also critical that the CaHSRA is rushing a process they feel should be more participatory and deliberative. According to Latham:

> *Up to the summer of 2009, cities for the most part didn't pay much attention to what seemed to be a futuristic visioning without any real means for implementation. When the voters of California approved some seed funding and the proposition saying we were willing to issue some bonds to make the project go, those presentations took on a little more meaning. We also realized that the CaHSRA had preceded well down the path of evaluating alternative alignments for this area and had already done some preliminary environmental work in that regard. So we realized that we needed to, either individually or collectively, meaningfully engage the CaHSRA in a conversation about how that might work within our communities. And so in September of 2009, 120 folks from our communities, from CaHSRA, and from the regional transportation authorities, MTA and OCTA, met at the Metro headquarters in Los Angeles with then CEO of CaHSRA, Mehdi Morshed, and with two board members – Curt Pringle and Richard Katz – to have a very honest conversation about where we were. And where we were was that the CaHSRA, in its view, had proceeded way down the path in terms of*

alternative analysis, line analysis and CEQA process. And the cities were way behind in that process, and we needed to figure out some way to more meaningfully move forward. So we agreed to create a memorandum of understanding (MOU) between our cities and the Authority. And that MOU defined the way which we would, as a region, engage the CaHSRA and create some structure. The structure included two subcommittees from these cities. One was a technical group of urban planners from the cities and the engineers. The other was a more policy-oriented group, composed of the city managers from each of those cities. Also part of that MOU, and part of a team that is working regionally to deal with this, is MTA and OCTA. Each of them have staff assigned to the project, and the Executive Directors of each have been directly involved, as well, in meetings and discussions regarding high-speed rail. Cities retain the ability to challenge the environmental documents, and the MOU identifies rights that are available to the cities in terms of land acquisition, etc. So it defines a framework for our relationship.

The MOU is actually between a Council of Governments (COG), which is a regional entity of 27 cities who voted unanimously to approve the MOU and to say to the CaHSRA that unless they were responsive to the nine cities that are impacted by the rail, then the COG would oppose the project (Latham interview).[199]

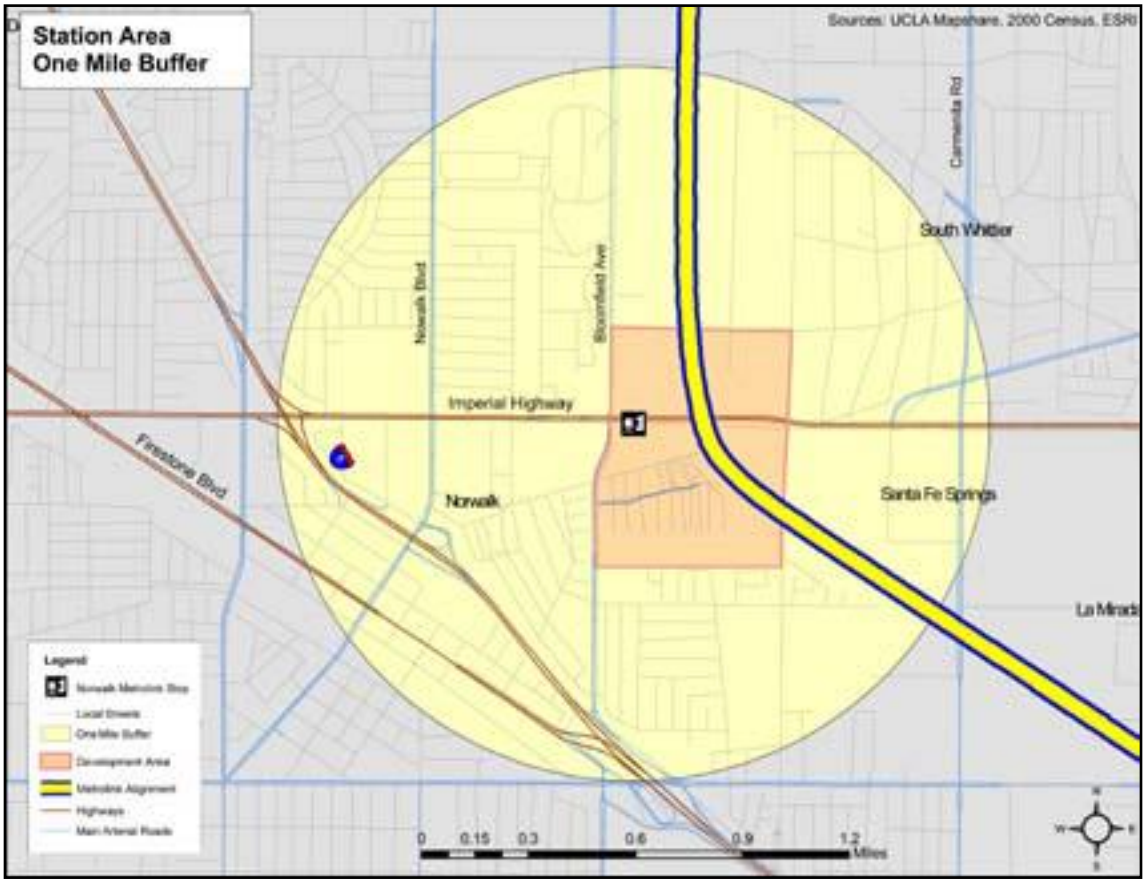

Figure 35. Possible Norwalk/Santa Fe Station Location

Perceived Benefits

While Latham does not dispute that the CaHSRA will create jobs statewide, he questions the benefits that the nine cities he represents are going to accrue and has a long list of concerns:

> *Is it really worth the impact upon all of these urban communities, some of which are low to moderate income communities? Is it really worth the impact on them to run a train basically from Los Angeles to Anaheim that maybe gets 12 or 15 minutes faster? And by doing so, you probably reduce some of the current intercity modes of transportation, if you are using the same tracks* (Latham interview).

Vision

While cities such as San Jose, Fresno or Anaheim aspire to attract new commercial and residential development around their HSR station, this vision does not hold true for cities like Santa Fe Springs that represent the industrialback lot of the metropolitan area (Figure 36). As Latham noted:

> *The multimodal transportation center with mixed-used development and other kinds of stuff is a great vision. But the problem is when you are dealing with industrial areas, it doesn't fit; it doesn't work. You have to blow out all kinds of existing uses that are all, in many cases, very highly functional, very economically valuable to the communities to put in a mixed-use project. This is really unreasonable. The other part of the vision that went astray is the assumption that cities would be able to partner into funding their transportation centers. But we are confronted with a lack of resources to go in and commit resources to these kinds of projects. For example, part of the vision was that cities would build the parking structures, and use eminent domain to clear out the areas within their transportation center in order to do mixed use development. That's just very unrealistic. In Anaheim, they had the benefit of having some land that was available in the area around the Anaheim Stadium. That way they could build ARTIC. So they had that capacity in a very dense urban area. Our ability to go in and build the kind of visionary transportation centers that the master plan for the Authority envisioned, both in terms of creating land for such things but also most importantly creating the money to build them is just unrealistic. It was probably unrealistic when they drafted it but it certainly became unrealistic when the economy went south* (Latham interview).

Figure 36. Industrial Land Uses near the Norwalk Tracks

Challenges and Concerns

At present, the Council of Governments (COG) of the nine cities is examining the pros and cons of two alternative scenarios: a dedicated track alignment and a shared track alignment. A dedicated track would add two additional tracks to the existing BNSF (freight) alignment going from Los Angeles to Anaheim, and would therefore require a significant additional amount of right-of-way acquisition and the associated costs. According to Latham, such a scenario, which would be more costly to build, would also have serious adverse effects on Santa Fe Springs, as it would require the removal of a number of businesses and relatively new industrial structures. Additionally, a dedicated track alignment would bypass the existing Norwalk/Santa Fe Springs Transportation Center, which receives Amtrak and Metro trains.

Acquiring the necessary right-of-way for this alternative in the short timeframe that the federal funding terms require is unrealistic, according to Latham. As he explained:

> *The difficulty in making the comparisons with Europe and Asia is that the land acquisition rights and responsibilities are very different. In much of Asia and good portions of Europe, in addition to the fact that the governments can own a good portion of the land, especially around transportation centers and hubs, they have the ability to simply acquire land. The property rights in the United States are very different, and there is a protracted period of time to acquire property through eminent domain. … And acquiring property from our experience is a tedious, laborious, and litigious*

process. For anyone to think that all that can be accomplished in this relatively tight timeframe is probably unrealistic in the US" (Latham interview).

The shared track alternative, proposed by Metro and OCTA, appears easier and cheaper and is somewhat more palatable to Norwalk/Santa Fe Springs and the other cities of the COG. It would use the existing BNSF lines, elevating them or putting them in a tunnel at certain parts and substantially modifying the operations of BNSF and Metro on the existing lines. This alternative would be less costly , have less impact on urban form, and would require fewer property acquisitions. The location of the HSR station in this alternative would be close to the existing transportation center. However, it is questionable if BNSF, Amtrak, and Metro would go along with this option because it would lead to complex operations, forcing them to share the same tracks. This alternative may mean running less intra-city trains and possibly reducing the relevance of the Santa Fe Springs/Norwalk Metro station.

An additional major concern of Norwalk/Santa Fe Springs, according to Latham, is what the cities perceive as a rushed process, dictated by the terms of the ARRA federal funding that requires that cities have "a shovel in the ground and a contract by 2012" (Latham interview). According to Latham, this rush does not allow a full evaluation of the economic and environmental impacts of the different alternatives on cities. As he argues:

We have pleaded with the CaHSRA board to slow the process down, even if that means that this segment would not get ARRA funding because we are very concerned that by doing so we are missing steps in the process… missing steps of community involvement, city input, [and] of really fully exploring all the available alternatives for the alignment. So certainly a very significant concern on the part of our cities is that the process is being pushed in order to qualify for ARRA funding in a way that doesn't fully realize the need that we have… for a more deliberative process (Latham interview).

Conclusion

Norwalk and Santa Fe Springs are industrial suburbs of Los Angeles and are currently characterized by the kind of development whose potential for growth is perhaps unlikely to be enhanced by the increased access afforded by HSR. Furthermore, job loss is forecasted for the industrial sector in the future.

It is not clear why a Norwalk/Santa Fe Springs HSR station has been selected, and we are not convinced that a station between LA and Anaheim is necessary. Indeed, local planners are quite ambivalent about the benefits from HSR and worried about the adverse effects that its construction might bring upon local business. For this reason and because of lack of funds, they have not started the planning process yet, and have adopted a reactive rather than a proactive stance. They are reacting and responding to the CaHSRA's proposed alternative alignments but not proactively planning for the coming of the HSR.

Nevertheless, if the current plans are realized and a station materializes at Norwalk/Santa Fe Springs, we can imagine two possible scenarios by which Norwalk (which at present is primarily occupied by residential uses) might leverage its increased accessibility. The first scenario suggests that Norwalk will continue to remain a largely residential suburb. The

relatively low cost of housing there (compared to other areas of the county) might allow Norwalk to redevelop portions of their currently underutilized warehousing and industrial lands as transit supportive, medium-density housing mixed with neighborhood-serving retail and services. The audience for such housing, much like most of Norwalk' s current single-family housing stock, would be commuters, people who may use the Green Line light rail or even the HSR (assuming that the fare is not prohibitive) to connect to major employment centers in downtown Los Angeles, Burbank, and Anaheim. Creating a transit supportive, residential environment in Norwalk/S anta Fe Springs will likely require some significant urban design interventions that would make both the proposed station area and existing retail and service activities along Imperial Highway more accessible to those traveling on foot or by bike.

The second scenario is long term and suggests that Norwalk could build on its enhanced accessibility by developing into a relatively small, but self-contained urban area of its own. Already a hub for Los Angeles County administrative services and suburban transportation services, the arrival of HSR might permit Norwalk also to become a hub for suburban business activities. As industrial and warehousing activity diminishes, Norwalk's and Santa Fe Springs' inventory of land in these categories could be regenerated for new kinds of employment activities.

The plausibility of both scenarios could be enhanced by extending the LA Metro Green Line to the Metrolink, and potential HSR, station area, and it would depend upon private sector interest and investment.

In regards to the city of Santa Fe Springs (Norwalk's industrial neighbor), we do not anticipate significant land use changes taking place in the short run. At present, it does not make sense for the city to convert its economically profitable industrial uses to residential. In the long run, if manufacturing keeps its down ward trend, however, the city may also decide to convert some of its industrial uses to higher density residential and mixed-use.

SAN JOSE

Station and City Profiles

The portal for HSR in San Jose, California' s third largest city after Los Angeles and San Diego, will be located at Diridon Station, the city's central rail passenger depot and a major transit hub for Santa Clara County and the Silicon Valley (Figures 37 and 38). An agricultural center since its days as a Franciscan mission, San Jose and its environswere among the last territories in the San FranciscoPeninsula to be urbanized. Following World War II, San Jose experienced increased demand for housing, a demand it met through the rapid conversion of agricultural land and aggressive expansion of its jurisdiction through a series of annexations in the 1950s and 1960s. By the 1990s, San Jose's location in a region booming with computer technology and defense-related industries allowed the city to claim the moniker "Capital of Silicon Valley."

Figure 37. Map of San Jose HSR Station

Figure 38. Aerial Photograph of San Jose HSR Station

Population

The 2010 U.S. Census reported San Jose's population to be 945,942, making it the tenth largest city in the U.S. Aggressive annexation and suburban development patterns have resulted in a population density of 5,758 persons per square mile. San Jose accounts for 5.6% of all residents in Santa Clara County, the fifth most populous county in California. A minority-majority city, the city's population is almost evenly divided among non-Hispanic whites, Hispanics (of any race) and Asians. Non-Hispanic white residents account for 35.7% of San Jose' s population, Asians 33.5%, and Hispanics (of any race) 33.2%. Between 2000 and 2010, the total population of the City of San Jose increased by 50,999 or 6%, in line with the Santa Clara County growth rate of 5.9% but lower than the statewide growth rate of 10%. Between 2010 and 2035, the city's population is projected by the Association of Bay Area Governments (ABAG) to increase by 46% to 1,380,900. Median household income in San Jose in 2010 was $88,506 or 138% of the median household

income among all Californians.[200] (Santa Clara County has the highest median household income among all Califo rnia counties). The median home price in the city in 2010 was $501,000, or 150% of the statewide median home price, having fallen from $649,000 (then 149% of the statewide median) in 2008.[201] The homeownership rate (61.4%) is higher than the rate of homeownership statewide (57.8%).

In 2010, 681,625 residents lived in census tracts located entirely or containing portions within 5 miles of the station area (Table 26 and Figure 39).[202] The population density of those census tracts was an average of 8,191 persons per square mile.[203] Within census tracts located entirely or containing portions within a half-mile of the station area, the 2010 population was 29,170 with an average population density of 6,992 persons per square mile.[204] ABAG projects that residential population within five miles of the station will increase to 1,040,752 residents or by 53.7% between 2010 and 2035.[205] Within a half-mile of the station the residential population is expected to increase by 34,621 or 119% within the same period.[206]

Table 26. Residential Population and Population Density Projections within 5 Miles of San Jose Station, 2005-2035

	2005	2010	2015	2020	2025	2030	2035
Population							
Santa Clara County	1,762,986	1,821,988	1,945,313	2,063,101	2,185,791	2,310,807	2,431,397
San Jose	651,067	681,625	754,637	822,126	895,906	969,354	1,040,752
Population Density							
Santa Clara County	1,366	1,412	1,507	1,599	1,694	1,790	1,884
San Jose	7,824	8,191	9,069	9,880	10,766	11,649	12,507

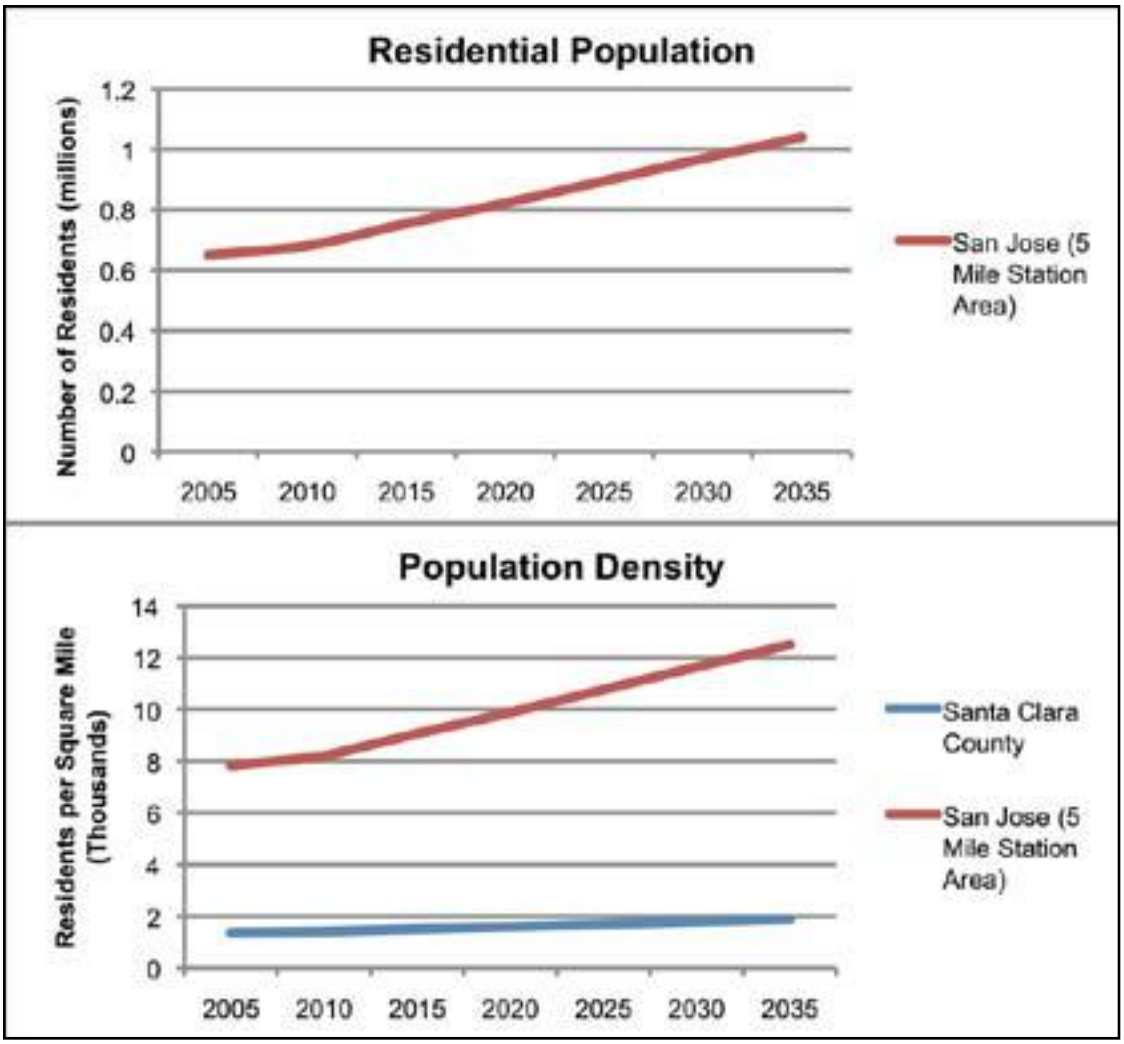

Figure 39. Residential Population and Population Density Projections within 5 miles of San Jose HSR Station, 2005-2035

Jobs

The percentage of Santa Clara County jobs located in the City of San Jose is 40%. The jobs-housing balance in the city (0.49 jobs for every resident) is akin to the statewide proportion (0.46). But Santa Clara County as a whole is jobs-rich, with 1.31 jobs for every resident. Nevertheless, 10.5% of San Joseans work outside Santa Clara County including those commuting to work in San Francisco. The city has a diverse economic base with manufacturing being the largest job sector, accounting for 20% of total jobs in the city. Other large sectors include education and healthcare (16%), retail (10%), professional, scientific, and management jobs (15%). The large concentration of high-technology engineering, computer, and microprocessor companies around San Jose has led the area to be known as Silicon Valley. Northern California universities supply thousands of engineering and computer science graduates to the local economy every year . San Jose lists many companies with 1,000 employees or more, including the headquarters of Adobe, Altera, Brocade Communications Systems, Cadence Design Systems, Cisco Systems, eBay ,

Sanmina-SCI, and Xilinx, as well as major facilities for Hewlett-Packard, Hitachi, IBM, Kaiser Permanente and KLA Tencor. Other large companies based in San Jose include Altera, Atmel, CEVA, Cypress Semiconductor, Echelon, Integrated Device Technology, Micrel, Netgear, Novellus Systems, Oclaro, Quantum, SunPower, Supermicro, Tessera Technologies, TiVo, Ultratech, and VeriFone. Sizable government employers include the city government, Santa Clara County, and San Jose State University. Acer's United States division also has its offices in San Jose.

We estimated that the area within five miles of the station contained 308,725 jobs in 2009 or just over 37% of all the jobs in Santa Clara County[207] Within the same area, we predict the number of jobs to increase by the year 2035 to 333,874 or by over 8% (Figure 40).[208] The five-mile area around the station supports a significantly higher proportion of professional and information sector jobs than is typical in California (location quotient = 1.16), followed by jobs in manufacturing, wholesale and transportation (location quotient = 1.14) (Table 27 and Figure 41). In 2009, the station area supported an above average number of jobs for all sectors. By 2035, this trend will continue across all sectors, led by the retail sector (location quotient = 1.46). Most job growth will occur in the management and professional, educational services, and manufacturing, whole sale and transportation sectors. [209] San Jose is rich in employment, but will likely trend toward a greater balance between jobs and housing by the year 2035 (gap index = .10 in 2009 and .05 in 2035).

Of those employed within five miles of the station, over 72% live outside of the same area. Of those employed persons living within five miles of the station, more than 65% work outside the same area, suggesting high rates of worker mobility both into and outside of the station area for work. Table 28 and Figure 42 illustrate the top 100 work origins and destinations for the station area by zip code.

Table 27. San Jose 5-Mile Station-Area Job Growth, Location Quotient, Gap Index

	2005	2010	2015	2020	2025	2030	2035	% Change 2010-2035
Total Jobs	307,788	317,126	320,475	323,825	327,175	330,525	333,874	5.3%
Grouped Jobs								
Agriculture and Natural Resources	597	914	1133	1351	1570	1788	2007	119.5%
Manufacturing, Wholesale, and Transportation	84,230	81,283	75,221	69,159	63,097	57,035	50,973	-37.3%
Retail	31,589	34,368	36,243	38,118	39,992	41,867	43,742	27.3%
Financial and Professional Services	16,278	15,183	14,909	14,635	14,361	14,086	13,812	-9.0%
Professional and Information	39,673	38,138	36,165	34,192	32,218	30,245	28,271	-25.9%
Management and Administration	62,776	61,408	60,502	59,596	58,689	57,783	56,877	-7.4%
Educational Services	17,260	24,431	29,831	35,231	40,631	46,031	51,431	110.5%
Health Services	27,024	30,500	32,646	34,791	36,937	39,083	41,229	35.2%
Recreation and Hospitality Services	28,361	30,900	33,826	36,753	39,679	42,606	45,532	47.4%
Location Quotient								
Agriculture and Natural Resources	0.08	0.12	0.16	0.19	0.23	0.27	0.32	160.9%
Manufacturing, Wholesale, and Transportation	1.10	1.13	1.12	1.11	1.09	1.06	1.02	-9.9%
Retail	0.94	1.04	1.12	1.20	1.29	1.37	1.46	41.1%
Financial and Professional Services	0.85	0.83	0.85	0.86	0.87	0.89	0.90	7.4%
Professional and Information	1.26	1.11	1.00	0.90	0.81	0.73	0.66	-41.0%
Management and Administration	1.28	1.20	1.16	1.13	1.10	1.07	1.04	-12.6%
Educational Services	0.63	0.79	0.89	0.99	1.07	1.15	1.23	55.8%
Health Services	0.91	0.89	0.87	0.85	0.84	0.84	0.84	-5.7%
Recreation and Hospitality Services	0.86	0.87	0.91	0.95	0.98	1.02	1.05	19.9%
Gap Index of All Jobs and Workers	0.12	0.11	0.10	0.08	0.07	0.06	0.05	-48.7%
Gap Index by Sector								
Agriculture and Natural Resources	-0.57	-0.49	-0.48	-0.47	-0.46	-0.45	-0.45	-9.5%
Manufacturing, Wholesale, and Transportation	0.08	0.09	0.09	0.09	0.09	0.09	0.09	-5.9%
Retail	0.11	0.15	0.17	0.19	0.21	0.23	0.24	65.8%
Financial and Professional Services	0.13	0.12	0.12	0.12	0.11	0.11	0.11	-11.0%
Professional and Information	0.10	0.01	-0.05	-0.12	-0.18	-0.24	-0.30	-2197.1%
Management and Administration	0.25	0.22	0.19	0.16	0.14	0.11	0.09	-58.6%
Educational Services	0.04	0.10	0.13	0.15	0.16	0.18	0.19	92.2%
Health Services	0.12	0.10	0.08	0.06	0.04	0.03	0.02	-81.7%
Recreation and Hospitality Services	0.07	0.08	0.08	0.08	0.09	0.09	0.09	11.4%

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Table 28. Top 100 Worker Origins and Destinations by Zip Code – San Jose

Top 100 Worker Origins

Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs
1	95112	6,061	26	95133	1,944	51	94555	637	76	94112	364
2	95123	6,033	27	94087	1,938	52	94085	625	77	94061	361
3	95125	5,667	28	95117	1,927	53	94544	606	78	94015	354
4	95127	5,213	29	95110	1,872	54	94043	598	79	94509	350
5	95111	4,273	30	95032	1,605	55	94306	590	80	93906	349
6	95122	4,174	31	94536	1,376	56	94550	584	81	93905	344
7	95124	4,168	32	94086	1,354	57	94403	582	82	95336	337
8	95148	4,092	33	95070	1,348	58	94566	554	83	95003	331
9	95035	3,809	34	94538	1,265	59	95062	510	84	94301	326
10	95136	3,779	35	95135	1,203	60	94025	509	85	95340	326
11	95008	3,499	36	94539	1,145	61	95134	496	86	94062	320
12	95116	3,498	37	95138	1,107	62	95023	492	87	94063	319
13	95128	3,493	38	94587	984	63	94583	483	88	94041	318
14	95120	3,290	39	95130	966	64	95376	478	89	94070	312
15	95126	3,279	40	95119	963	65	94022	473	90	94526	295
16	95118	3,220	41	95076	903	66	94080	456	91	94014	293
17	95121	3,104	42	94024	778	67	94551	450	92	94501	292
18	95132	3,103	43	94089	754	68	95033	437	93	94109	290
19	95051	2,700	44	94040	741	69	94588	434	94	95006	287
20	95050	2,427	45	95054	740	70	94404	430	95	94402	282
21	95037	2,242	46	95139	719	71	94541	430	96	94002	279
22	95014	2,217	47	94303	702	72	94110	424	97	94066	273
23	95131	2,087	48	94560	672	73	94565	416	98	94010	270
24	95129	2,081	49	95030	670	74	95066	380	99	94122	263
25	95020	2,020	50	95060	660	75	94568	376	100	95350	260

Table 28. Top 100 Worker Origins and Destinations by Zip Code – San Jose (cont.)

Top 100 Worker Destinations											
Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs
1	95112	6,091	26	95129	1,080	51	94010	459	76	94621	223
2	95110	5,858	27	95032	956	52	94022	458	77	94070	217
3	95050	3,619	28	94040	851	53	95121	457	78	94102	209
4	95054	3,042	29	94087	822	54	94080	427	79	94544	208
5	95008	2,917	30	94306	806	55	94560	425	80	95630	196
6	95131	2,854	31	95037	784	56	94404	377	81	94403	185
7	95134	2,711	32	94025	773	57	94545	376	82	94402	179
8	95014	2,490	33	95070	746	58	95148	351	83	94607	169
9	95035	2,403	34	94303	736	59	95120	344	84	94608	163
10	95128	2,192	35	94063	661	60	94111	320	85	95076	162
11	95126	2,177	36	94301	643	61	94520	315	86	95825	156
12	94043	1,995	37	95030	635	62	94107	313	87	94568	153
13	95113	1,986	38	95117	628	63	94587	308	88	93940	152
14	95125	1,943	39	95127	625	64	95132	301	89	93901	146
15	95051	1,762	40	95119	620	65	95135	297	90	94566	145
16	94089	1,720	41	94041	556	66	94065	296	91	94062	134
17	94538	1,678	42	95118	544	67	94104	281	92	94115	133
18	94304	1,564	43	94588	519	68	95060	274	93	92626	130
19	94085	1,520	44	95136	507	69	94596	270	94	94108	130
20	94086	1,229	45	95138	505	70	94577	258	95	94550	130
21	95124	1,220	46	94105	500	71	94612	245	96	95356	127
22	95133	1,218	47	95020	489	72	94583	240	97	94014	125
23	95123	1,157	48	95111	488	73	90245	236	98	94536	123
24	95122	1,090	49	94539	472	74	94551	226	99	95066	114
25	95116	1,089	50	94103	464	75	94024	224	100	95814	113

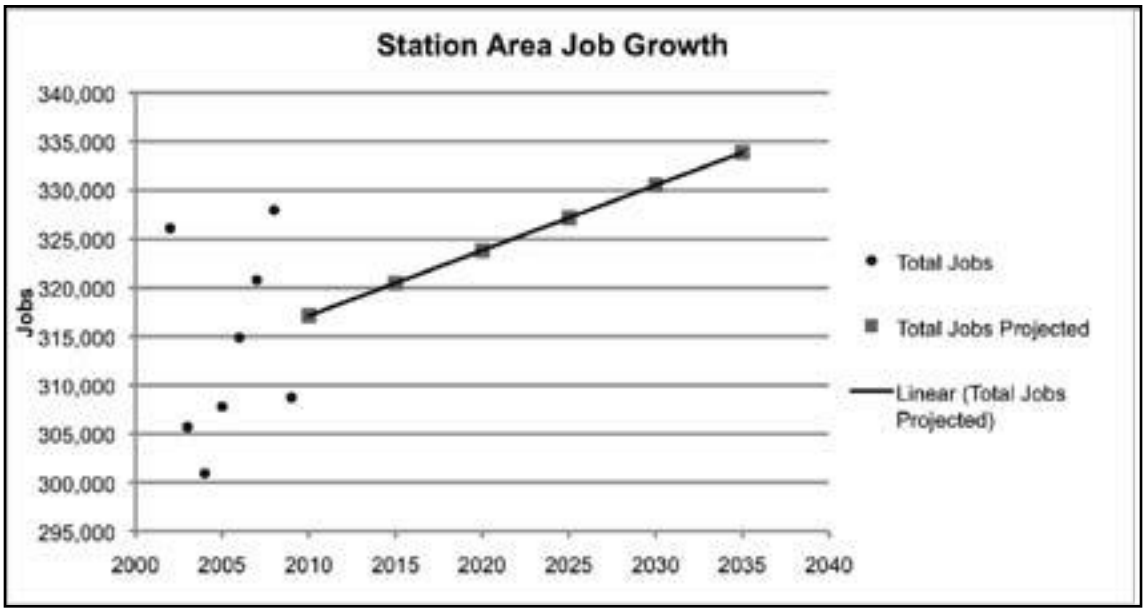

Figure 40. Job Growth Projections within 5 miles of San Jose HSR Station, 2000-2035

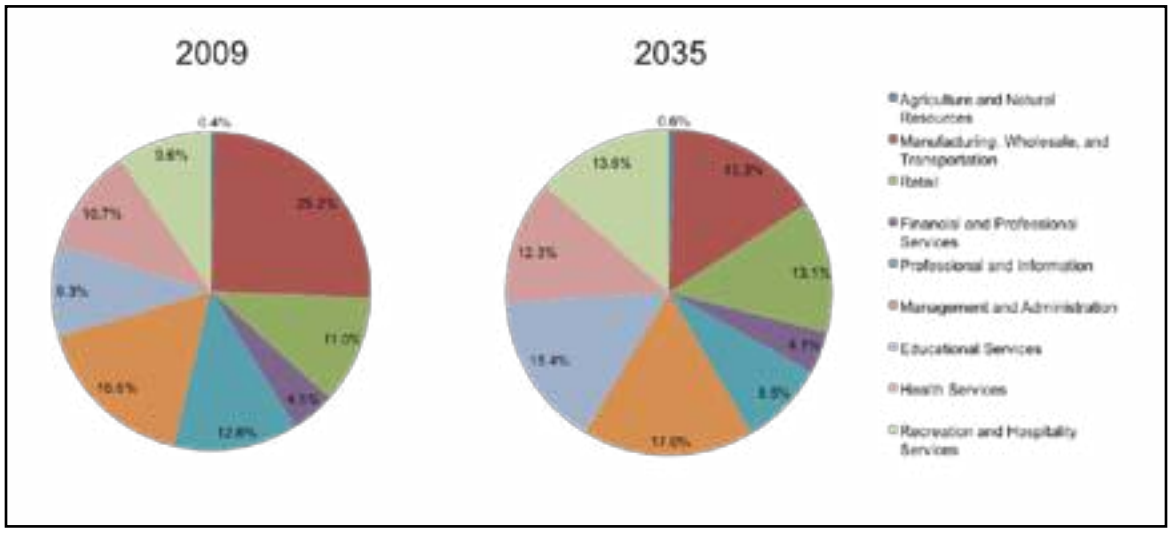

Figure 41. Comparison of Jobs by Sector within 5 miles of San Jose HSR Station, 2009 and 2035

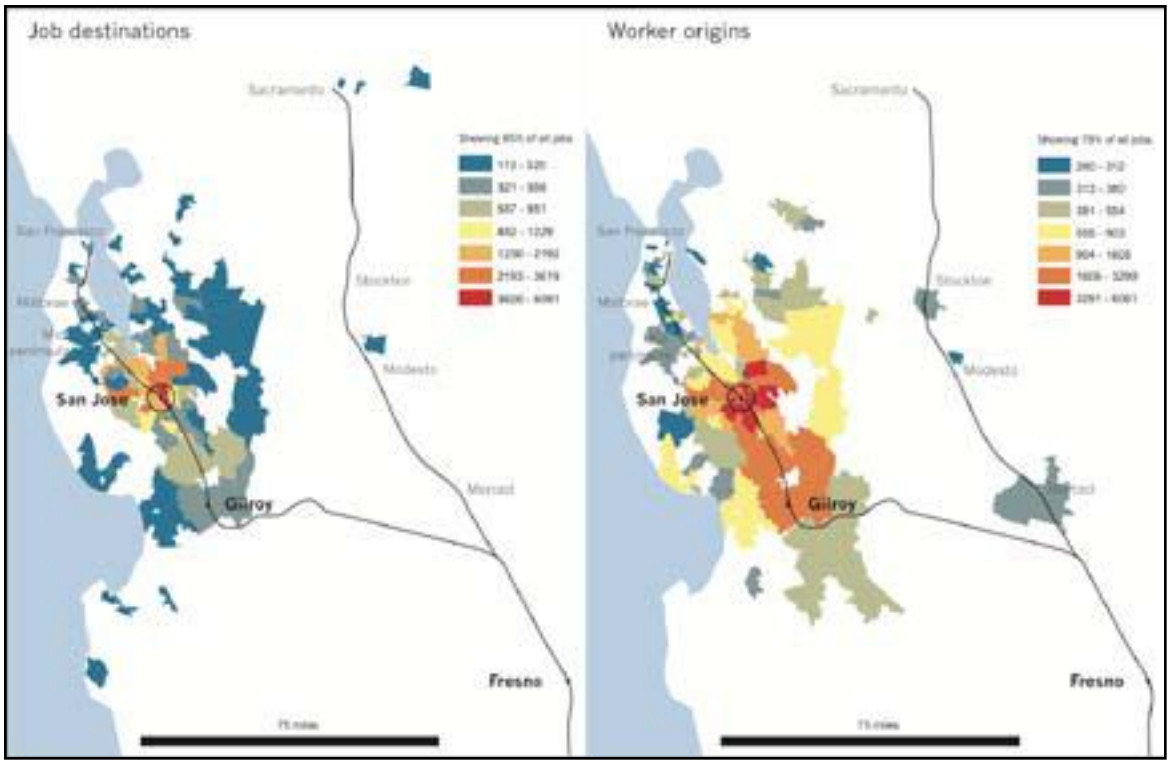

Figure 42. San Jose Commute Map

Current Land Use

Land use within a half-mile of the station is diverse: 32% is in residential uses (18.3% in single family homes, and 13.7 in multi-family dwellings); 24.9% is industrial uses; 16.7% is retail; and 7.9% is offices. Over 5% of the land is currently vacant (Figure 43).

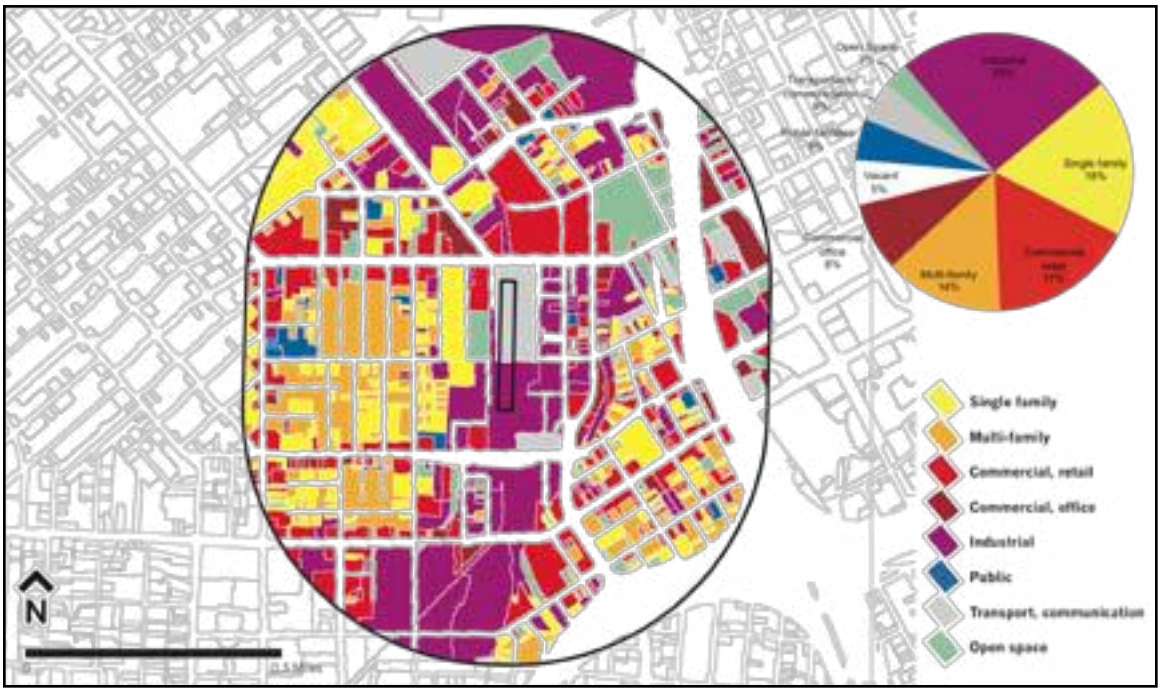

Figure 43. Map of Land Uses and Distribution of Land Uses (by Parcel) within a Half-mile of San Jose HSR Station

Subdivision Pattern

The half-mile area around the Diridon Station is a patchwork of subdivision patterns. The streets in the area are interrupted by the Guadalupe River to the east, by railroad tracks, and by the introduction of the freeway system in the twentieth century. Parcel sizes range from 0.001 to 9.4 acres, with the largest number of parcels in the .26 to .50 acre range (Table 29). The largest parcels are currently occupied by the San Jose Market Center, a retail development.

Table 29. Parcel Characteristics within a Half-mile of San Jose Station

Min Parcel Size (acres)	Max Parcel Size (acres)	Modal Parcel Size Range (acres)
0.001	9.4	0.26 - 0.5

Major Destinations

The Santa Clara County government center, just over a mile north of the station, generates 22,000 jobs in public administration or education and healthcare (Table 30 and Figure 44). Downtown San Jose, within a mile of the station, is a major job destination with the City of

San Jose's administrative centers and San Jose State University having about 5,000 jobs, combined. Additionally, several financial and technological headquarters, including Adobe Systems (about 2,500 jobs), are located downtown. Approximately two-and-a-half miles to the west, the Santana Row and Westfield regional retail center are major shopping destinations. The eBay headquarters, just under three miles to the southwest, attracts several thousand employees. Three miles north of the station, a large technology and office park is home to approximately 8,000 jobs.

Table 30. Activity and Employment Centers within 5 Miles of San Jose Station

Type	Activity/Employment Center	Miles from Station	Employees/Visitors per day
Employment/Transportation	San Jose International Airport	2.6	29,863
Employment	Santa Clara County	1.5	15,360
Employment/Education	San Jose City College	1.7	11,574
Employment	City of San Jose (City Hall)	1.0	6,620
Activity	San Jose Municipal Stadium	2.1	4,200
Employment/Education	San Jose State University	1.1	3,100
Employment	eBay	2.9	3,000
Employment	Hitachi	2.7	2,900
Employment	Xilinx	4.7	2,340
Employment	Sanmina-SCI	4.4	2,170
Education	Santa Clara University	2.4	2,100
Health	Santa Clara Valley Medical Center	2.1	2,000

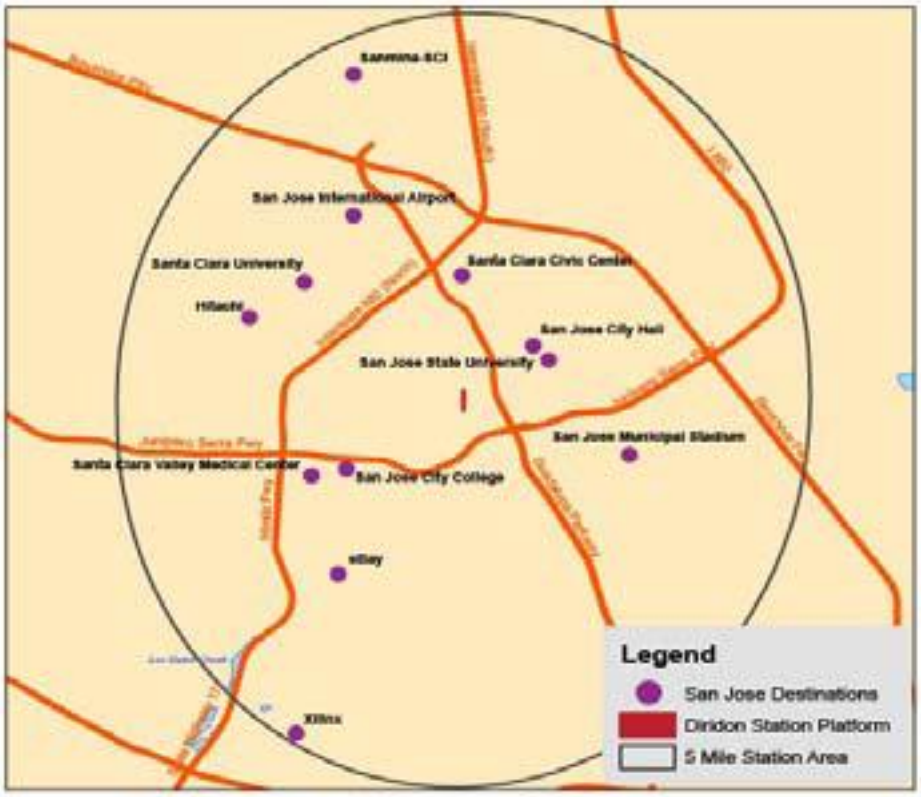

Figure 44. Map of Activity and Employment Centers within 5 miles ofSan Jose HSR Station

Transportation and Transit Networks

San Jose boasts a robust transportation system. The Mineta International Airport is about 3 miles from Diridon Station. The Station itself is located in a triangle bounded by the Nimitz Freeway (Interstate 880) to the northwest, the Guadalupe Parkway (State Road 87) to the east, and by the Sinclair Freeway (Interstate 280) to the south. The Bayshore Freeway (US Highway 101), the major north-south coastal artery in California, is approximately two miles east of the station. The station itself is served by Caltrain, Altamont Commuter Express (ACE), Santa Clara Valley Transportation Authority (VTA), light rail, Amtrak and in the future will be served by BAR T. This is in addition to several bus lines, including California Shuttle Bus, Amtrak Thruway Bus, Monterey-Salinas Transit, San Benito Transit, Santa Cruz Metro (Highway 17 Express), SMART, local VTA and employer shuttles and buses. Despite being intersected by freeways, the vicinity of the station is very walkable, and paths along the Guadalupe River make it also accessible to cyclists (Table 31).

Table 31. Transit Network within a Half-mile of San Jose Diridon Station

Automobile	Bus	Rail			Bike	Walkability
Interstate Network		Regional Passenger	Commuter	Light		(Walk Score)
Guadalupe Parkway (Route 87) and Sinclair Freeway (Route 280)	Santa Clara Valley Transportation Authority: Lines 22, 63, 64, 65, 68, 168, 181, 522 Monterrey-Salinas Transit: Lines 55 and 79 Downtown Area Shuttle (DASH)	Amtrak Coast Starlight and Capital Corridor Lines	Caltrain Altamont Commuter Express	Line 902: Mountain View-Winchester	2 on-street bike lanes and 1 off-street bike path	88, Very Walkable

Local Perspectives

We conducted interviews with a San Jose city councilmember; representatives from the San Jose Department of Planning, Building and Code Enforcement; San Jose Department of Transportation; San Jose Redevelopment Agency; Mineta International Airport, as well as a design consultant for the city, which complemented the information presented in the previous section.[210]

For San Jose, at the heart of the Silicon Valley but not as well known or celebrated as San Francisco, the coming of the HSR represents a place-making opportunity. Local planners related their vision of leveraging the HSR to convert San Jose from a bedroom community to a high-density employment center, a dynamic transportation hub, and the main gateway to the Bay Area. While our interviewees registered some concerns about the project, they also believed that economic, transportation, and urban development benefits would accompany the development of HSR.

Perceived Benefits

San Jose City Councilmember Sam Liccardo expects that the HSR will bring a significant economic and development boost for his city. San Jose planners have put a lot of effort in preparing a specific plan for Diridon Station, which Councilmember Liccardo deems "terribly important for the economic development of the city over the long haul" (Liccardo interview). He and the planners we interviewed expect that the HSR will help the local economy by bringing jobs and workers to San Jose. As explained by Deputy Director of Planning, Laurel Prevetti, for far too long San Jose has been a bedroom community for San Francisco having a larger residential population than jobs. According to her, "Most cities have a large daytime population; it is the exact opposite in San Jose. We actually export more people everyday… We can't afford to do that anymore. We are looking into ways of

how we can improve our job-housing balance so that we have more jobs than homes." She argued that the HSR will act as a catalyst in generating 'transit-oriented employment.'

In contrast to the nineteenth century, when the railway could make or break a city it chose to visit or bypass, new heavy rail and light rail stations in the late twentieth century did not bring about as dramatic urban form and real estate impacts.[211] San Jose planners believe that the coming of the HSR will change this. "The HSR," noted San Jose Redevelopment Agency Director Dennis Korbiak, "will give great emphasis to some towns and diminish others. It will diminish those cities like Palo Alto in 50 years, who chose not to have an HSR station. There will be realignments of a city's growth patterns as some cities will become much more accessible."

Indeed, San Jose transportation planners expect that the HSR is going to convert San Jose into the "largest transit hub west of the Mississippi" (Tripousis interview). Currently, 103 Amtrak and Caltrain trains pass through San Jose per day bringing about 15,000 people into the city daily. Transportation Policy Manager, Ben Tripousis, expects that when the system is fully built out by the year 2035, adding an HSR and a BART station in downtown San Jose, there will be 600 trains and 50,000 people coming to the city daily. This would increase the city's connectivity with San Francisco but also with the Central Valley and provide more options for travel within California. As Tripousis reasoned, "With a fully built-out Diridon station, we will have more transit nodes than Transbay in San Francisco with HSR, BART, light rail, Amtrak, and Caltrain. We like to think that it sets us up to be in a position to have people take transit to transit."

Dennis Korbiak expects that the HSR will spur development around the Diridon station, adding a significant area that is currently underdeveloped to the downtown core. Station-area design consultant, Frank Fuller, envisions the Diridon station as a dense urban center with mixed-use, office, and entertainment uses applications, "which is likely to appeal to a demographic of younger technology-based individuals employed in the area, and possibly encouraging many of them to live near the station" (Fuller interview).

Vision

San Jose is already the largest city in Northern California, but local officials are frustrated that it has been for too long under the shadow of San Francisco. They want to change the city's image from a sleepy residential community to a major headquarter for Silicon Valley firms, creating a dynamic employment center with a vibrant downtown. Council member Liccardo is explicit in his beliefs:

> *We'll have the largest, more dynamic transit center in the region, the largest center between Seattle and Los Angeles… We are going to be taking on far more of the growth than any other city in the region. We are going to add more people than the next three largest cities in the Bay Area combined (San Francisco, Oakland, Fresno). In other words, our growth will continue with such pace to make us the dominant city* (Liccardo interview).

According to Prevetti, San Jose envisions accommodating the desired new growth by intensifying land uses around transit stations and reinventing shopping centers as mixed-use developments with community amenities and job-generating uses, while preserving its single-family suburban neighborhoods. The new HSR station becomes an important part of this strategy because it is the area expected to attract and host most of the new growth, while at the same time help the city revamp its image. As Liccardo explained: "Attention must be paid to a city like San Jose, and we deserve more attention. We have more Fortune 500 companies around the station than anywhere in the state" (Liccardo interview).

Wishing to build on the Silicon Valley assets, San Jose hopes to lure high-tech firms to locate near the new station area and also create a lively atmosphere that would attract young high-tech professionals to live and play in the near vicinity of the station. As Tripousis emphasized: "There is an extraordinary opportunity for Diridon to become an iconic, world-class kind of transit facility and that's what we are really gravitating towards … It really is a place-making opportunity." But such a vision would also depend on the level of investment at the local level. For this reason, and similar to Fresno, San Jose is investing one million dollars for a master plan around the Diridon station. As Prevetti emphasized, "We believe in strong, proactive land use planning and that is why we are completing the Diridon Plan to achieve our vision for the area." As Liccardo explained:

> *We will have significant mixed-use, urban scale development (4-10 stories), a major entertainment venue, a major baseball stadium, combination of restaurants, clubs, with office and residential in the immediate area. This would really be a vibrant place, with a lot of attention given to place-making, and major attractions for urban dwellers and visitors…. There will be virtually no car traffic through that area; it will be entirely pedestrian and bike, with a few exceptions – maybe taxis and zip cars* (Liccardo interview).

Challenges and Concerns

San Jose elected officials and planners may have grand visions for their city and hope that the coming of the HSR will help their realization but as Liccardo acknowledged, "to the extent that HSR can be a marketing piece for the city it will be wonderful, but it is obviously in the details. If this becomes the train to nowhere, then it is not going to sell the city very well."

A major challenge is economic. Even if the state identifies the required funding to bring the train to San Jose, would the city be able to garner the considerable resources necessary to implement its station area planning? As emphasized by Tripousis, "the initial struggle is going to be who is going to foot the bill… Public agencies don't have the money to keep their doors open let alone take on this type of challenge. While San Jose has a large redevelopment agency, they are in fairly difficult straits from an economic standpoint." Liccardo agreed, adding that:

> *Certainly cities like us are facing financial difficulties. Our redevelopment agency has been pillaged by the state*[212]*…. It would be nice if the CaHSRA pick up the costs of*

> *planning for the station area, in the meantime, but that isn't their approach. It would be nice if they were to help paying for the experts to assess elevated or underground*[213] (Liccardo interview).

Concern about the finances of local development projects is enhanced by the perception that San Jose lacks the political power necessary to bring about external resources. As Liccardo complained:

> *We have the challenge of feeling like a forgotten stepchild even though we are the third largest city in the state… If you are San Francisco, and you have a representative who is the Speaker and a couple of senators that can leverage a billion dollars, you can make manna fall from heaven. We don't have the same benefit… The extent of federal resources coming to San Francisco is remarkable. The underground central subway in Chinatown and their HSR station are billion-dollar projects funded by federal funds. In our county the overwhelming majority of the projects are funded locally through local sales tax measures … The feds just ignore us because they figure we'll just pay for it* (Liccardo interview).

An obvious possible partner in the project is the private sector but as Liccardo noted:

> *The extent to which we can leverage private resources is a huge question mark for the whole HSR project… We are going to rely on developers to pay for significant infrastructure improvements in that area. Everything from people mover to parking structure is going to be leveraged with private money* (Liccardo interview).

According to Tripousis, San Jose has already started consultations with the development community as part of its master planning process. But while, in general, developers are in favor of the project, they have also made it clear they expect that the proposed station area development will receive significant public subsidies. One asset for the city is that the land adjacent to the station is already in public ownership, owned by the city redevelopment agency and the Valley Transportation Authority. Nevertheless, Prevetti worries that "in a time of tough budgets – sometimes land owners even if they are public agencies are more interested in maximizing land values as opposed of doing the right thing."

An additional economic concern has to do with the impact that the HSR would have on the local airport. According to airport planner Cary Greene, the San Jose airport mostly serves short- and medium haul markets. Therefore, the HSR could supplant some of that service. While this would be a cause for celebration for environmentalists, local politicians worry about the economic impact of such a scenario. As underlined by Liccardo, "*my concern here is that we have just poured a billion and a half into upgrading our airport, and we depend on the airlines to pay off those bonds*."

A second major challenge outlined by our interviewees has to do with the complexity of this megaproject, which involves a variety of actors and variables. This leads to a significant level of uncertainty about how and when development will take place, which complicates planning efforts. As Liccardo explained:

> *The great uncertainties about the HSR funding and how real it is that it will move north of Fresno create real challenges for us as we are trying to determine alignments….We will probably have a baseball stadium built by 2014. If we knew that HSR is coming, we might be planning around alignments in a different way, than if we think it is sometime off in the next decade and a half …. The sequence of development is quite difficult to nail down right now, and it creates great uncertainty for cities like San Jose, where people may say we have a tabula rasa at Diridon station. But there is an awful lot there and a lot of investment about to happen or is happening* (Liccardo interview).

Local planners, also registered some concern about the lack of true regional planning and the fact that regional transit and regional planning agencies are mostly observers and don't seem to get actively involved (Liccardo interview). Some of our interviewees also noted the lack of collaboration and cooperation among cities on the network that further defies opportunities for regional planning and identification of complementarities. This lack of collaboration may be partly attributed to a lack of tradition for regional planning in the state and partly to a competition among some cities that wish to attract a station. Ironically, collaboration is present among some cities that are opposing the HSR project. As emphasized by Korbiak:

> *Adjacent cities need to work together … Cities are in competition with each other but they all need to pool their money, resources and talent and propose different types of options… I see a certain amount of collaboration but it is really only from some of the peninsula cities that did not vote for HSR but they realized it is in their backyard. Now they are seeing problems and have formed a consortium for some potential litigation* (Korbiak interview).

Our interviewees also discussed a number of physical challenges, the most important of which seems to be the possibly elevated structure of the HSR station. Korbiak noted that the possible negative aesthetic effects of a 70-foot elevated structure would be significant but are, nevertheless, "*vastly understudied*" by the CaHSRA. The possible aesthetic and noise impacts of the project have generated "*grave concerns*" from neighborhoods adjacent to the Diridon Station, whose residents do not want to see the HSR becoming another Embarcadero Freeway, dividing the neighborhoods and contributing to blight (Liccardo interview). As Liccardo emphasized, "*No matter how nice the design of the station may be, in the view of some you cannot put lipstick on a pig*."

Designer Frank Fuller agreed:

> *No matter how hard people try, railroads divide cities. It is hard and expensive to keep this from happening. The HSR station – either raised or at grade – will create a physical division, which will add to already made divisions of the existing tracks. It will create a "side of the tracks" attitude played out in so many cities, affecting the social aspects of neighborhoods* (Fuller interview).

Some would like to see a tunnel instead of an elevated structure but according to Tripousis, the costs for a tunnel would be enormous. As he explained:

> *Analysis has confirmed the challenge of putting a tunnel at Diridon station. … BART is being extended into downtown San Jose, and that will be a tunnel but the BART station box is much smaller than anything you would consider for HSR. The HSR station box is equivalent of placing the Empire State building sideways underground. The CaHSRA has been fairly clear in their belief, supported by the Federal Rail Administration, that a tunnel is probably not the way to go at Diridon Station. The City has not taken an official position on aerial or underground, and we have asked them to fully evaluate both* (Tripousis interview).

The Diridon station area has some additional physical constraints. According to Fuller, it has a very high water table which does not allow excavation greater than eight to ten feet below the ground level. The area's proximity to the San Jose airport also confines the maximum allowable building height to about twelve stories. The area is divided by existing tracks, a freeway, and a river. As a major transportation hub, it is expected to serve Caltrain, HSR, BART, the VTA light rail and bus system and the whole assortment of their service needs. As Korbiak observed, "If you consider the land use, parking, and service needs of all these facilities, there's not that much land there. There's not the infrastructure capacity to accommodate everyone's needs."

Planning and Design

Despite the above-mentioned challenges, San Jose planners believe that the location of the Diridon station near downtown, the airport, and major highways, as well as the public ownership of land adjacent to the station, provide big development opportunities.[214] To harness these and to realize its planning vision, the city is preparing a 30-year master plan for the 250 acres around the Diridon Station area (Figures 45 and 46), anticipating "a maximum possible build-out of new transit-related development."[215]

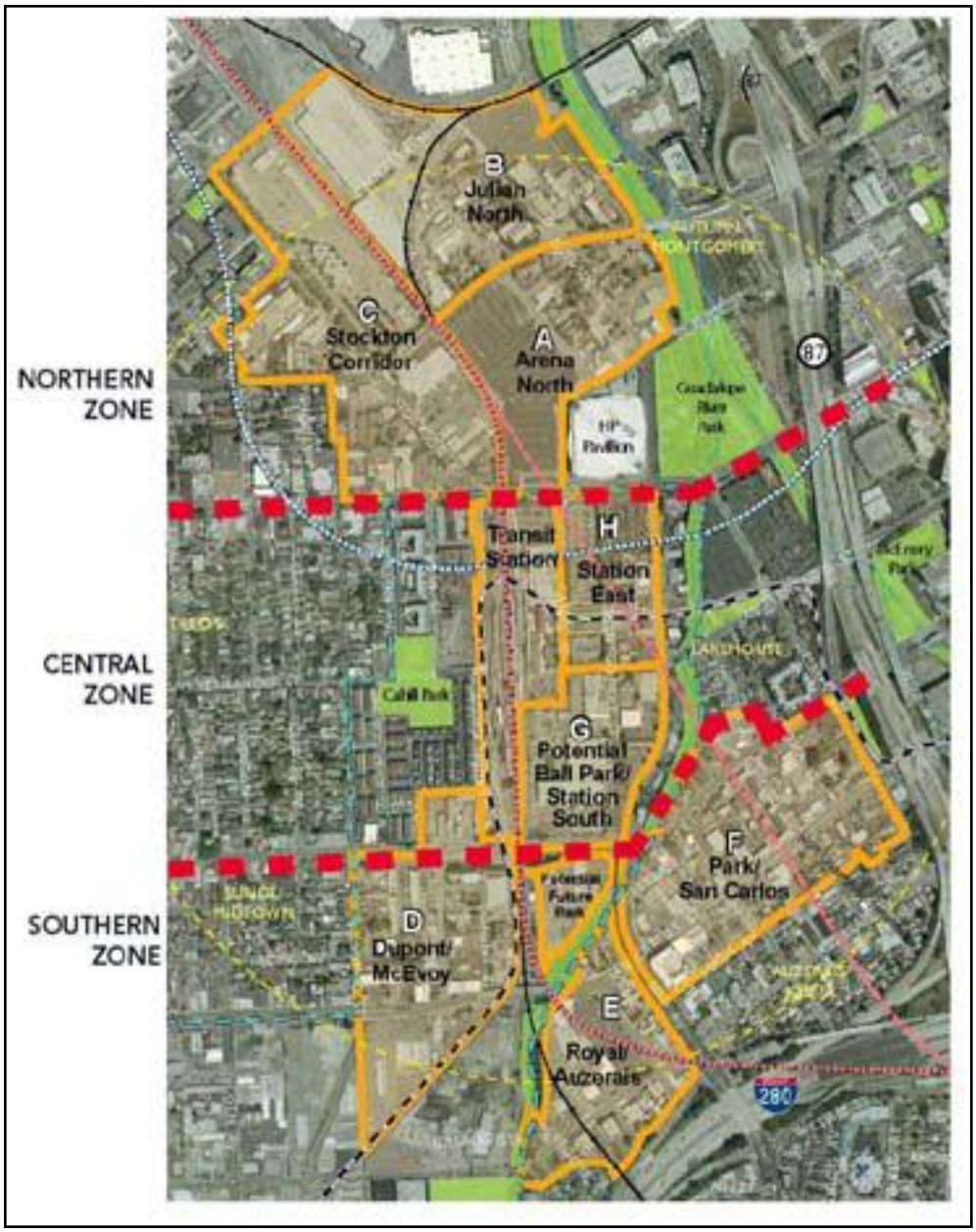

Figure 45. Diridon Station Area Plan

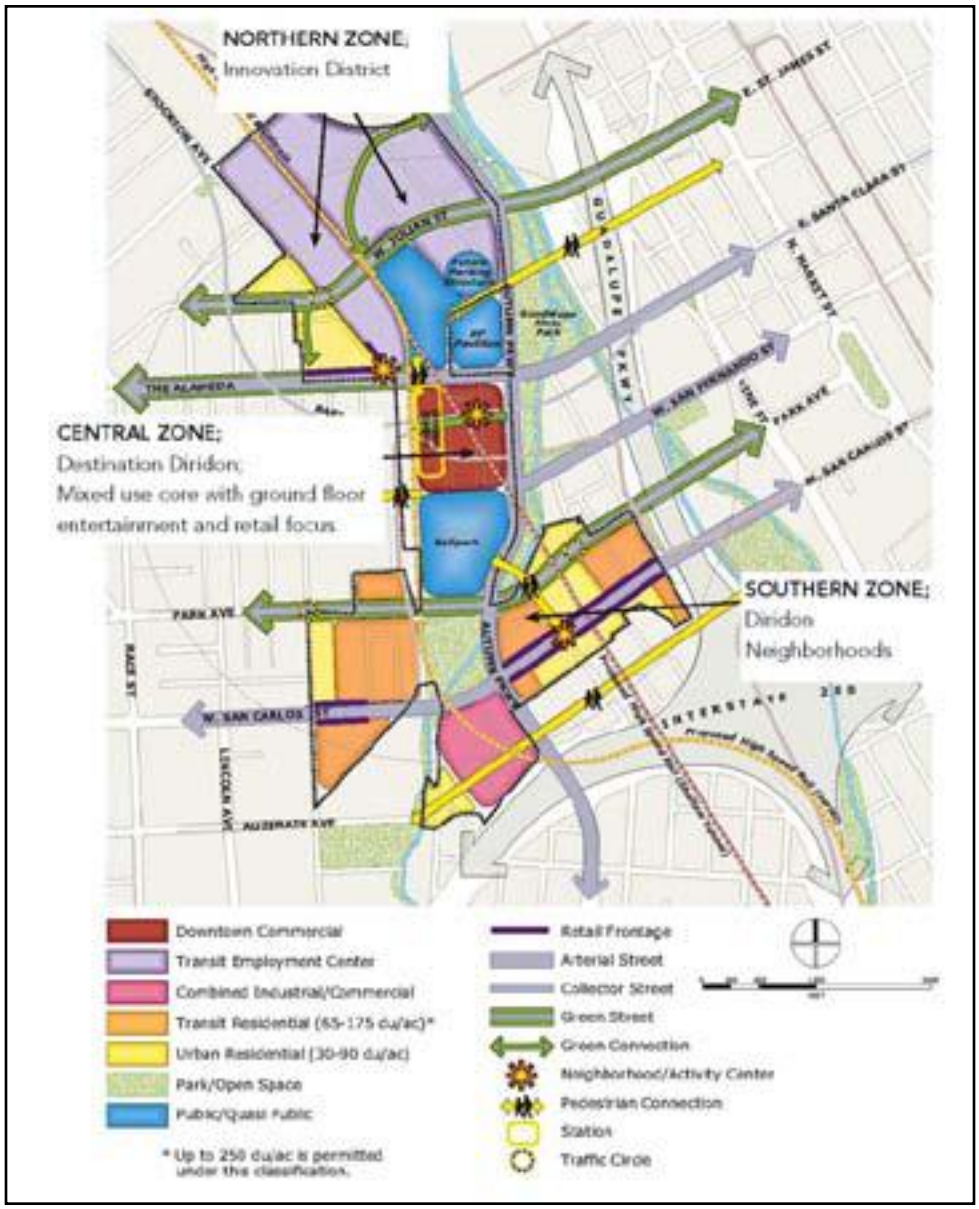

Figure 46. Diridon Station Area Land Use Plan

The plan "builds off the synergy" of three major poles – the Diridon Station, the existing HP Pavilion, and a proposed ballpark – to bring in employment, retail, and entertainment uses. The goal is "to support transit activity and establish the area as a region-wide destination."[216] As described by Fuller, "The preferred plan is for the area between the HP Pavilion and the new stadium to be entertainment based at the ground level and mixed use at the upper level, hotel, office, retail, and maybe a bit of housing to the south and to the west."

"Given our fiscal situation, the city is interested in a fiscally driven land use approach," stated Councilman Liccardo. Redevelopment Agency Manager, Korbiak further explained:

> *What we are looking at Diridon will be very unique compared to what any other city is going to do. We are focusing on major sport franchises. We've got an arena [HP*

> *Pavilion] already, which is one of the most successful in the country. We plan to build a major new stadium [ballpark]. We have a great chance to bring a major league baseball team. We are focusing the attention on a narrow corridor of activity between the HP Pavilion and ballpark with the station in the middle. Housing will not be viable for a sports-driven area, but rather we'll have something similar to Staples Center – large amount of retail, lots of people going through area. We'll have a very active retail environment with entertainment as part of it. We think it will be financially effective because of all the people who will be passing though the area. It will be one- to two-story retail with about ten stories of offices above* (Korbiak interview).

For San Jose, which tries to cast away the label of a "bedroom community" and become a destination for the region, housing is mostly an afterthought. How much housing, what type of mix (market rate and affordable), and where it will be located is "a constant source of debate," according to Fuller. At present, the draft master plan anticipates only limited "urban residential" (30-90 dwelling units per acre) and "transit residential" (65-175 dwelling units per acre) uses south of Park Avenue.

Parking is a necessary evil for a dense employment center as it counteracts the vision of a vibrant pedestrian environment. San Jose cityplanners do not want to see a sea of parking lots or treat the station as an airport with acres of parking surrounding it. At the same time, the station and the employment/entertainment center they wish to create would need nearby parking for its employees, passengers, and visitors. The solution, according to Korbiak, is to disperse parking facilities in a three-mile radius around the station and even take advantage of the existing airport parking facilities.

For such schemes but also to increase the station area's "connectivity" to adjacent districts and uses the type of linkages and multimodal connections that should be put in place becomes important. As Fuller emphasized:

> *The connection to the airport should be made a lot better through planning a connector to create a big loop. On a smaller scale, there really needs to be another set of railcars working on the light rail system that are more similar to streetcars. The El Camino system would be perfect for another connection; better connections could be made immediately. Shuttle service from BART to SJSU would keep the connection crossing the north/south dividers* (Fuller interview).

Unlike Moule & Polyzoides (designers for the Fresno station), who wish to underemphasize the design of the station structure at Fresno, San Jose planners dream of an iconic station facility: As discussed by Tripousis,

> *We like to consider iconic aesthetic urban design architectural elements that make a station facility work. Everybody uses the Embarcadero Freeway as the example of what NOT to do. We agree, and we don't want it to look like a freeway. And we also believe that we can make an aerial facility look extraordinary, and that is the opportunity that we have in San Jose* (Tripousis interview).

Design consultant Frank Fuller was in full agreement:

> *In the US we usually think of transit stations as a much more pragmatic type of place. In other parts of the world, it is more about enjoying the place than just passing through – the civic quality of this station is a big concern. My fantasy is a station facility like Calatrava's projects, that literally becomes a postcard for downtown San Jose, with beautiful cable bridge structures that bring the train into San Jose; that people look at it and go 'wow' and are excited to get off when they see the station; that the area around the station itself is a bustling, vibrant, active-all-the-time facility that is a destination not only for travel and transportation but it is an activity center, that helps San Jose evolve into a center that is worthy of its people* (Fuller interview).

The model that Fuller brought up in our interview was of Liege in Belgium. "The Liege station is the best model for San Jose: A new station with old and new buildings around … My vision is for a great station, a real urban space; Liege is a great example of opening up to the space. "

For such a complex project, it is not only sound planningand design, but also coordination among the dif ferent multiple entities and stakeholders that becomes essential. The city planning department and the redevelopment agency are working collaboratively in preparing the station area master plan and also working with the public agencies that own the land (Prevetti interview). According to Liccardo, the city is also talking to a few very active stakeholders (Silicon Valley leadership Group, Greenbelt Alliance, Urban Land Institute). The city has also started consultationwith the development community as part of its master-planning process. It hopes that the private sector would eventually step up and do more underwriting of the project, as they deem public-private partnerships as essential for the project's long-term success (Tripousis interview). As already mentioned, however, collaboration with other cities is non-existent and coordination with regional agencies is still weak.

Additionally, our interviewees stressed the importance of flexibility in the planning process a way of addressing the ambiguities entailed in building this megaproject. As Tripousis emphasized:

> *Because of the unstable economy, you almost need to accommodate an iterative process. Assuming that in the first five to ten years you may build one thing but in the next ten to fifteen years you may build something else, potentially increasing the densities as time goes on. You have to build some flexibility into the plan to accommodate the economics of it* (Tripousis interview).

The importance of outreach to the dif ferent constituents and stakeholders of the project was also emphasized as a means to assuage local opposition but also reach a consensus vision in moving ahead. As Fuller suggested, "A lot of downtown San Jose does not see the value in HSR. So there is a need for educationabout HSR through models of what/how it has been done all over the world, what is good, bad, and why."

Conclusion

In sum, San Jose politicians and planners believe that the HSR may serve as a catalyst for further development and growth in their city. But for this to happen, all important challenges and preconditions have to be met. As Tripousis admitted: "This is an incrediblycomplicated project and we have one shot at it. That's really the crux of the problem, that we have to do this amazing thing and we have to do it right the first time" (Tripousis interview).

The city has to look at its existing assets in order to "do it right." A major asset of San Jose is that it is the unofficial "capital of Silicon Valley," one of the globe's most important agglomerations of high technology industries. The proposed BART extension to San Jose and the arrival of HSR with connections to San Francisco and Los Angeles will only enhance downtown San Jose's importance as a major transit hub. Given that HSR systems have been observed to benefit places already well connected to global business activity (See Cervero, 1996; Cervero and Bernick, 2001; Rietveld et al., 2009; and Cervero and Murikami, 2010), additional growth in downtown San Jose appears likely.

Development is likely to be of two kinds: 1) resurgence of downtown as an employment center that is competitive with suburban office locations; and 2) re-establishment of the city's historic center as the region's primary arts and entertainment district. Nevertheless, those seeking to develop San Jose's economy along these lines are likely to be challenged by the increased access HSR will also provide to San Francisco, already the premier cultural center in Northern California and the site of a competing technology center, especially in the subsectors of the internet and digital media. For San Jose to benefit from the increased access HSR will afford it, it would appear important, therefore, to not only provide for high quality office space in downtown, especially in areas adjacent to the station, but to also provide for urban housing – and the amenities that attend urban residential development – while preserving the existing neighborhoods that lend the city its distinction. Additionally, urban design interventions should be considered that establish new and strengthen existing connections to the station's surrounding districts and provide east-west pedestrian and bicycle access across SR-8 and the rail corridor.

FRESNO

City and Station Profiles

The portal for HSR in Fresno is likely to be located in downtown, adjacent to the city's Chinatown and Chukchansi Park (Figures 47 and 48). Located in a largely agricultural county, the city hosts a budding Cultural Arts District, a park and bird sanctuary (Woodward Park); includes proximity to the Sierra Nevada mountains; and was home to the first landfill in the U.S. (a national historic landmark and Superfund site that closed in 1987).

Figure 47. Map of Fresno HSR Station

Figure 48. Aerial Photograph of Fresno HSR Station

Population

The 2010 U.S. Census reported Fresno's population to be 494,665, making it the fifth-largest city in California. As a steadily growing city surrounded by agricultural land, Fresno supports a population density of 4,813 persons per square mile. It is the largest inland city in California, and the largest metropolitan area in Fresno County. A minority-majority city, the city's population is distributed among 4 main groups. Non-Hispanic white residents account for 30% of Fresno' s population, Asians 12.3%, African-Americans 7.7% and Hispanics (of any race) 46.9%.[217] Between 2000 and 2010, the total population of the City of Fresno increased by 67,013 or 15.7%, in line with the Fresno County growth rate of 16.4% and higher than the statewide growth rate of 10%.[218] Between 2010 and 2035, the city's population is projected by the Fresno Council of Governments (FCOG) to increase by 28% to 1,346,439.[219] Median household income in Fresno in 2010 was $40,617 or 36.6% less than the California average.[220] The median home price in the city in 2010 was

$142,000, or 42.5% of the statewide median home price, having fallen from $209,000 (then 47.9% of the statewide median) in 2008.[221] The homeownership rate (48.6%) is low when compared to the rate of home-ownership statewide (57.8%).

In 2010, 375,342 residents lived in census tracts located entirely or containing portions within 5 miles of the station area (Table 32 and Figure 49).[222] The average population density of those census tracts was 3,877 persons per square mile.[223] Within census tracts located entirely or containing portions within a half-mile of the station area, the 2010 population was 19,968 with an average population density of 8,533 persons per square mile.[224] FCOG projects that residential population within 5 miles of the station will increase to 548,541 residents or by 46.1% between 2010 and 2035.[225] Within a half-mile of the station, the residential population is expected to increase by 13,656 or 68% within the same period.[226]

Table 32. Residential Population and Population Density Projections within 5 Miles of Fresno Station, 2005-2035

	2005	2010	2015	2020	2025	2030	2035
Population							
Fresno County	N/A	991,922	1,086,843	1,185,766	1,290,481	1,402,727	1,519,325
Fresno	N/A	375,342	411,447	444,924	480,340	511,424	548,541
Population Density							
Fresno County	N/A	166	182	199	216	235	255
Fresno	N/A	3,877	4,250	4,596	4,961	5,282	5,666

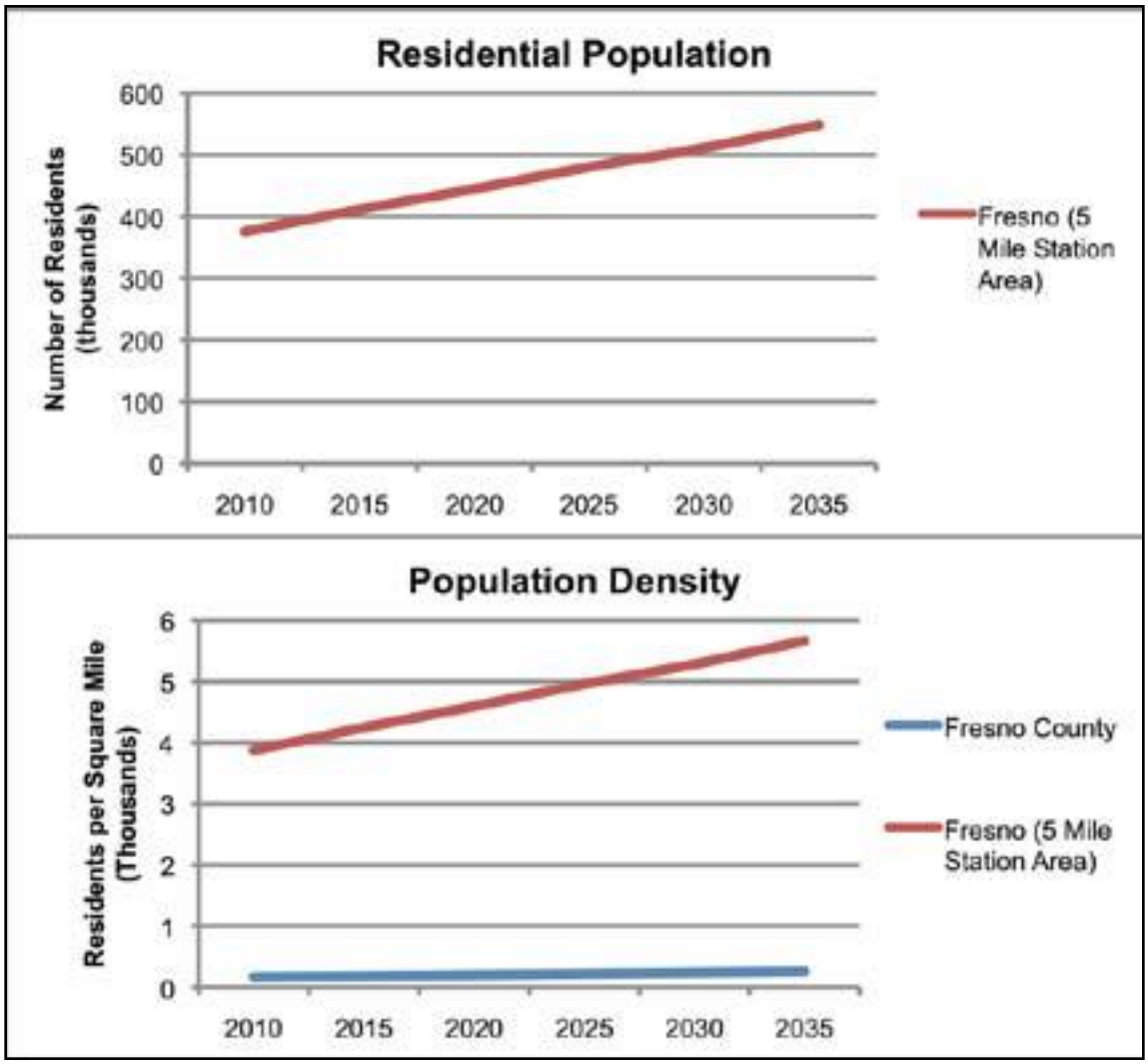

Figure 49. Residential Population and Population Density Projections within 5 miles of Fresno HSR Station, 2005-2035

Jobs

The area within five miles of the station contained 105,200 jobs in 2009 or just over 33% of all the jobs in Fresno County.[227] Within the same area, we predict the number of jobs to increase by the year 2035 to 122,531 or by over 15% (Figure 50).[228] Compared with the rest of California, this area shows a high degree ofjob specialization in the agriculture and natural resources sector and education services sector (location quotient = 2.40 and 1.48, respectively) (Table 33). By 2035, the station area will become even more specialized in these areas, relative to the California norm (location quotient = 4.23 and 1.59, respectively). Though job growth will occur in both these sectors between 2009 and 2035, the largest percent increase in jobs will be found in the financial, insurance, and real estate sector.[229] As a result of significant job losses in the manufacturing, wholesale, and transportation and management and administration sectors, health services will be the largest employment sector in 2035 (Figure 51). As a job-dominant employment center in 2009, the 5-mile area

around the station will experience more rapid worker growth than job growth, resulting in a lower ratio of jobs to workers by 2035 (gap index = .10 in 2009 and .06 in 2035).

Of those employed within five miles of the station in 2009, more than 69% lived outside of the same area. Of those employed persons living within five miles of the station, 62% worked outside the same area, suggesting high rates of worker mobility both into and outside of the station area for work. Table 34 and Figure 52 illustrate the top 100 work origins and destinations for the station area by zip code.

Table 33. Fresno 5-Mile Station-Area Job Growth, Location Quotient, Gap Index

	2005	2010	2015	2020	2025	2030	2035	% Change 2010-2035
Total Jobs	105,105	107,795	110,742	113,689	116,636	119,584	122,531	13.7%
Grouped Jobs								
Agriculture and Natural Resources	1562	3475	4742	6008	7275	8542	9809	182.3%
Manufacturing, Wholesale, and Transportation	30,250	27,019	24,776	22,534	20,292	18,049	15,807	-41.5%
Retail	7,760	8,133	8,631	9,129	9,628	10,126	10,625	30.6%
Financial and Professional Services	2,672	3,795	4,748	5,700	6,653	7,605	8,557	125.5%
Professional and Information	5,042	5,413	5,914	6,416	6,918	7,419	7,921	46.3%
Management and Administration	23,562	22,155	21,354	20,554	19,754	18,953	18,153	-18.1%
Educational Services	12,068	14,722	16,670	18,617	20,565	22,513	24,461	66.2%
Health Services	15,345	15,260	15,446	15,633	15,819	16,006	16,192	6.1%
Recreation and Hospitality Services	6,844	7,824	8,460	9,097	9,734	10,370	11,007	40.7%
Location Quotient								
Agriculture and Natural Resources	0.58	1.36	1.90	2.45	3.03	3.62	4.23	210.7%
Manufacturing, Wholesale, and Transportation	1.16	1.11	1.07	1.03	0.98	0.93	0.86	-22.1%
Retail	0.67	0.72	0.77	0.82	0.87	0.92	0.97	34.2%
Financial and Professional Services	0.41	0.61	0.78	0.96	1.14	1.32	1.51	146.6%
Professional and Information	0.47	0.46	0.47	0.48	0.49	0.49	0.50	7.9%
Management and Administration	1.41	1.27	1.19	1.11	1.04	0.97	0.91	-28.4%
Educational Services	1.28	1.39	1.44	1.49	1.52	1.56	1.59	13.9%
Health Services	1.51	1.30	1.19	1.09	1.01	0.95	0.89	-31.5%
Recreation and Hospitality Services	0.61	0.65	0.66	0.67	0.68	0.68	0.69	6.0%
Gap Index of All Jobs and Workers	0.10	0.09	0.08	0.08	0.07	0.06	0.06	-39.4%
Gap Index by Sector								
Agriculture and Natural Resources	-0.55	-0.29	-0.21	-0.15	-0.11	-0.08	-0.06	-80.6%
Manufacturing, Wholesale, and Transportation	0.16	0.14	0.11	0.08	0.05	0.01	-0.04	-129.9%
Retail	-0.08	-0.07	-0.07	-0.06	-0.05	-0.04	-0.04	-47.4%
Financial and Professional Services	-0.15	-0.03	0.03	0.08	0.12	0.14	0.17	-623.9%
Professional and Information	0.09	0.07	0.06	0.05	0.04	0.04	0.03	-52.1%
Management and Administration	0.20	0.18	0.16	0.14	0.12	0.10	0.08	-56.3%
Educational Services	0.27	0.29	0.30	0.30	0.31	0.32	0.32	12.1%
Health Services	0.20	0.16	0.14	0.11	0.08	0.06	0.04	-75.1%
Recreation and Hospitality Services	-0.14	-0.12	-0.11	-0.11	-0.10	-0.10	-0.10	-16.4%

Table 34. Top 100 Origins and Destinations by Zip Code – Fresno

Top 100 Worker Origins

Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs
1	93722	5,739	26	93721	363	51	95301	102	76	93312	47
2	93727	4,738	27	93648	359	52	93646	94	77	93514	45
3	93702	4,114	28	93277	336	53	93667	94	78	93620	45
4	93611	4,051	29	93614	320	54	93212	87	79	95338	45
5	93720	3,974	30	93618	319	55	95350	82	80	95358	44
6	93726	3,466	31	95340	277	56	93616	80	81	93286	43
7	93711	3,426	32	93650	275	57	95370	78	82	93626	43
8	93706	3,366	33	93257	254	58	95351	71	83	95354	43
9	93705	3,252	34	93609	249	59	93204	69	84	93615	41
10	93703	2,607	35	93291	247	60	93307	67	85	95240	41
11	93704	2,589	36	93245	215	61	93309	67	86	95376	41
12	93612	2,466	37	93210	204	62	93647	67	87	93660	39
13	93710	2,387	38	93292	192	63	95355	67	88	93906	39
14	93725	1,881	39	93274	187	64	95334	66	89	95076	39
15	93728	1,738	40	93640	178	65	95380	66	90	95823	38
16	93657	1,690	41	93622	161	66	93242	65	91	95828	38
17	93638	1,342	42	93644	142	67	93306	65	92	94544	37
18	93662	1,086	43	93675	137	68	93651	63	93	93905	35
19	93701	908	44	93602	124	69	93643	61	94	95210	35
20	93630	713	45	93656	122	70	95307	57	95	93305	34
21	93654	690	46	93635	121	71	93308	54	96	95327	34
22	93637	679	47	93610	117	72	95388	52	97	95361	34
23	93631	536	48	93247	113	73	93304	51	98	93280	33
24	93230	402	49	93221	112	74	93215	49	99	95206	33
25	93625	377	50	95348	106	75	95315	49	100	95382	33

Table 34. Top 100 Origins and Destinations by Zip Code – Fresno (continued)

Top 100 Worker Destinations

Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs
1	93721	4,583	26	93230	214	51	94105	62	76	94104	43
2	93706	3,518	27	93626	196	52	95354	61	77	93234	42
3	93727	2,785	28	93277	186	53	91364	58	78	95215	42
4	93725	2,203	29	93630	174	54	93901	58	79	95691	42
5	93722	1,962	30	93631	154	55	91436	57	80	93030	41
6	93726	1,621	31	95380	153	56	94545	57	81	93210	41
7	93720	1,620	32	93618	122	57	94122	56	82	93610	41
8	93710	1,587	33	93609	119	58	95112	56	83	94107	41
9	93711	1,549	34	93308	112	59	95207	54	84	94596	41
10	93612	1,412	35	93614	109	60	95348	53	85	95020	41
11	93702	1,291	36	93650	100	61	95351	53	86	95355	41
12	93611	1,162	37	93257	98	62	95815	53	87	93940	40
13	93703	1,133	38	93292	90	63	93307	52	88	93215	39
14	93704	1,125	39	93274	85	64	95035	51	89	93640	39
15	93728	842	40	95340	85	65	93301	50	90	94102	39
16	93657	717	41	94520	84	66	94577	50	91	94551	39
17	93701	619	42	93656	82	67	94588	50	92	94587	39
18	93705	512	43	93648	79	68	95834	50	93	95670	39
19	93662	465	44	95350	75	69	91367	49	94	93455	38
20	93637	436	45	95825	75	70	90058	48	95	94534	38
21	93654	322	46	93309	74	71	95076	48	96	94544	38
22	93625	293	47	93245	67	72	93304	47	97	95131	38
23	93638	264	48	95814	64	73	94538	47	98	92705	37
24	95334	226	49	95356	63	74	93635	45	99	93247	37
25	93291	220	50	94103	62	75	91733	44	100	93905	37

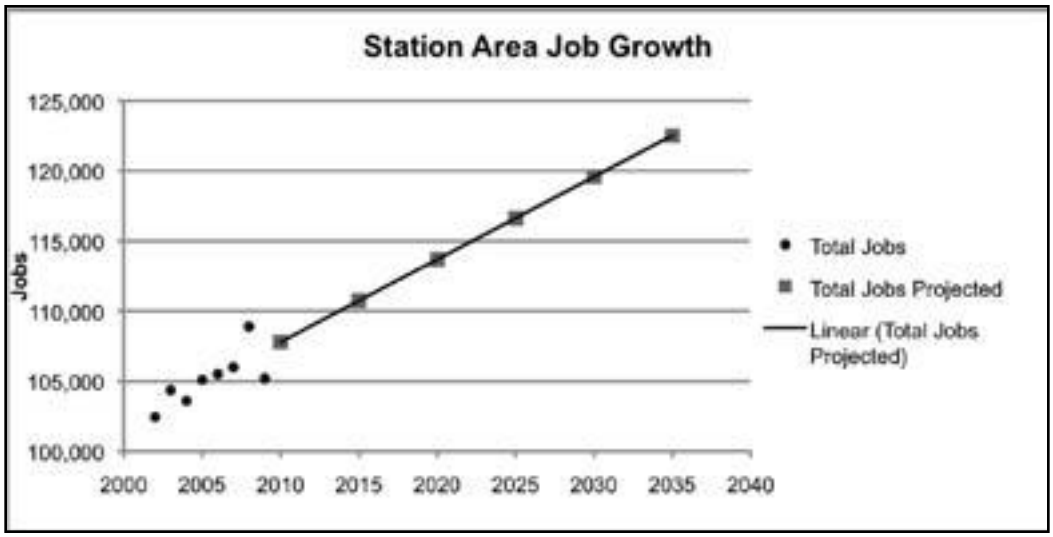

Figure 50. Job Growth Projections within 5 miles of Fresno HSR Station, 2000-2035

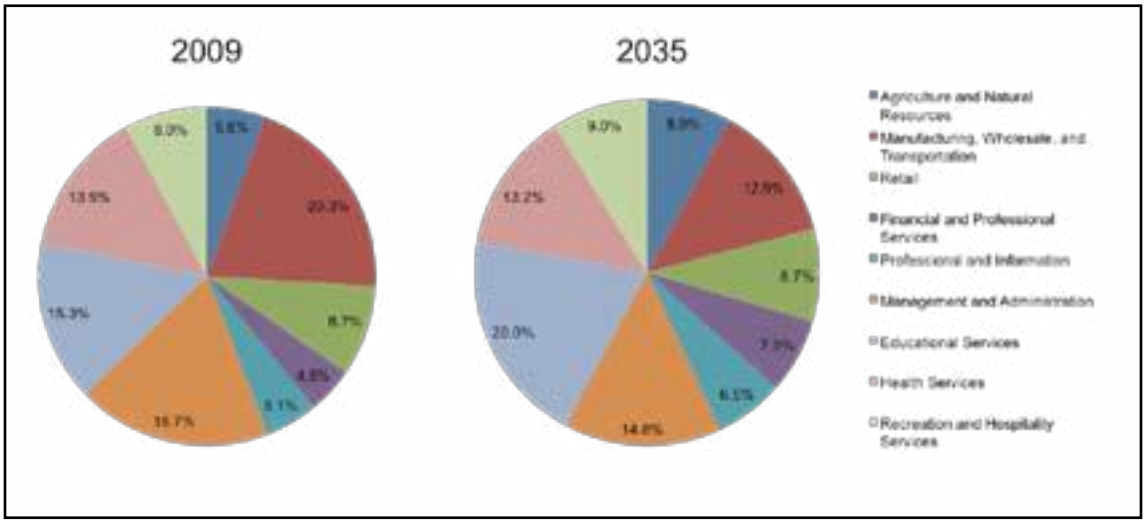

Figure 51. Comparison of Jobs by Sector within 5 miles of Fresno HSR Station, 2009 and 2035

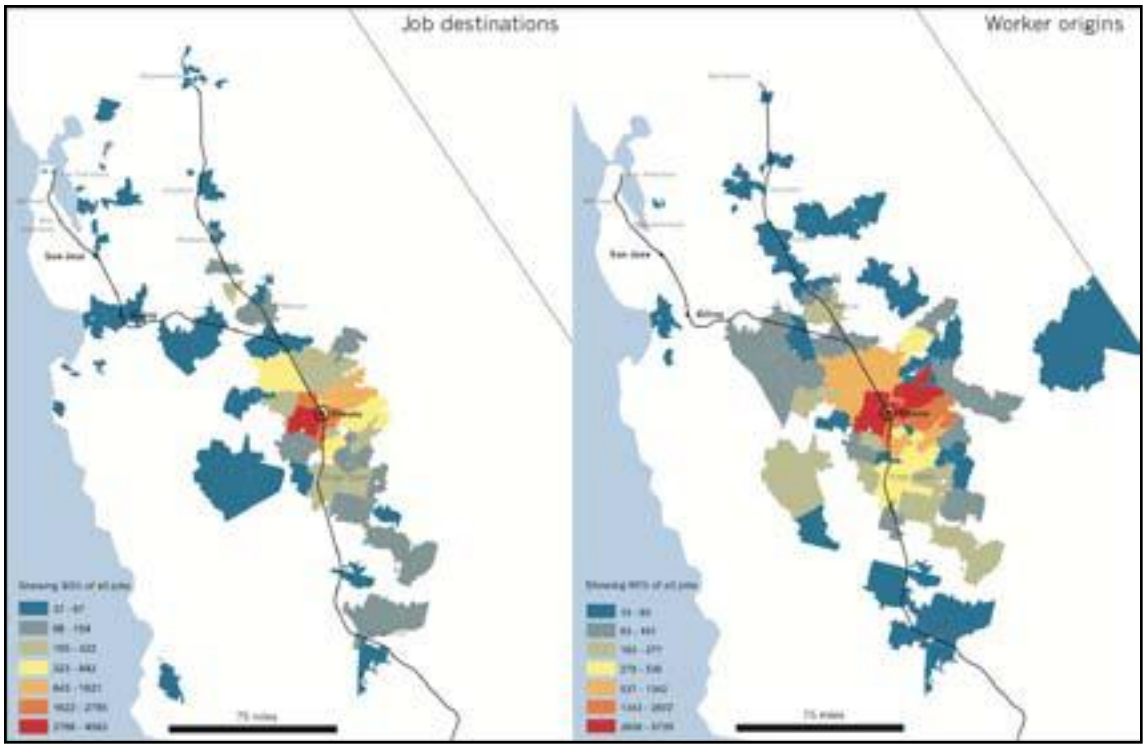

Figure 52. Fresno Commute Map

Current Land Use

Land use within a half-mile of the station is relatively diverse: 54% is commercial; 19% is industrial; 16% is residential (all multi-family housing); and 7% is public/ government uses; Three percent of the area is open space, and only 1% is used for transportation/ communication uses (Figure 53).

Figure 53. Map of Land Uses and Distribution of Land Uses (by Parcel) within a Half-mile of Fresno HSR Station

Subdivision Pattern

The area surrounding Fresno's station is on a grid system, which surrounds a prominent rail access running from northwest to southeast. The grid is interrupted only by the 99 and 41 freeways. Most parcels are between 1.1 and 5 acres (Table 35). The largest parcels are currently occupied by buildings associated with the Fresno Convention Center.

Table 35. Parcel Characteristics within a Half-mile of Fresno Station

Min Parcel Size (acres)	Max Parcel Size (acres)	Modal Parcel Size Range (acres)
0.003	9.0	0.11 - 0.25

Major Destinations

Medical services and government centers are among the largest employment destinations within five miles of the Fresno station. (Table 36 and Figure 54). Two small airports are also found within this radius, as well as three colleges: California State University Fresno, Fresno City College and Fresno Pacific University. The biggest activity centers in the five-mile area are the Fresno Convention Center , Cultural Arts District, and Chukchansi Park (home of the Fresno Grizzlies, a minor league baseball team).

Table 36. Activity and Employment Centers within 5 Miles of Fresno Station

Type	Activity/Employment Center	Miles from Station	Employees/Visitors per day
Activity	Chukchansi Park	0.1	12,500 (on game days)
Activity	Fresno Convention Center	0.4	11,300 capacity
Employment/Health	Community Medical Centers	1.3	5,327
Employment	City of Fresno	0.5	4,142
Transportation	Fresno Yosemite International Airport	4.9	3,786
Employment/Health	Heritage Center	3.9	2,000
Education	Fresno City College	2.4	1,940
Education	Fresno Pacific University	3.0	1,810
Activity	Cultural Arts District	0.6	1,620

Figure 54. Map of Activity and Employment Centers within 5 miles of Fresno HSR Station

Transportation and Transit Networks

Fresno has a multimodal transportation system consisting of air, car, bus, and rail transport. The station is bounded on the east by the Pearl Harbor Survivor's Memorial Highway (State Route 99), on the southeast by the Yosemite/ Eisenhower freeway (State Route 41), and on the north by Kings Canyon Freeway (State Route 180). The region is also served by three airports: Fresno Yosemite International Airport, Fresno Chandler Executive Airport, and Sierra Sky Park Airport. Fresno is served by different lines of passenger and heavy rail, including a stop for the Amtrak San Joaquin line. The Burlington Northern Santa Fe Railway, Union Pacific Railroad, and San Joaquin Valley Railroad run through Fresno and maintain rail-yards in the city. Public transit in Fresno is provided by the Fresno Area Express, which provide a dense downtown bus network with six different lines (the 26, 28, 32, 34, 35, and 38) running within walking distance of the proposed high-speed rail station (Table 37).

Table 37. Transit Network within a Half-mile of Fresno Station

Automobile	Bus	Rail			Bike	Walkability
Interstate Network		Regional Passenger	Commuter	Light		(Walk Score)
Yosemite Freeway (Route 41) and Pearl Harbor Survivors Memorial Freeway (Route 99)	Fresno Area Express: Lines 4, 20, 22, 26, 28, 30, 32, 34, 35, and 38	Amtrak San Joaquin Line	None	None	1 on-street bike lane	85, Very Walkable

Local Perspectives

We conducted interviews with representatives from the California Partnership for the San Joaquin Valley, officials from the Downtown Community Revitalization Department and the Downtown Association of Fresno, as well as planning and design consultants hired by the city to complement the information presented in the previous section.[230]

For Fresno, located in California's Central Valley and experiencing high levels of unemployment and poverty, the coming of the HSR is viewed as a panacea by elected officials and planners: a catalytic project that will contribute to the region's economic development, downtown revitalization, and expanded transportation options. It was not then surprising that all our interviewees talked enthusiastically about HSR's perceived economic, urban form, and transportation benefits for the city.

Perceived Benefits

Craig Scharton, Fresno's Director of Downtown and Community Revitalization department, observed that: "The economic benefits could be real game changers for Fresno, in terms of good employment, living wage – or even better – jobs, and increases in property values to

support municipal services. There is a greater potential economic benefit for us compared to other cities receiving an HSR station."

As discussed by many interviewees, a primary economic benefit from the HSR project is its potential for job creation. Fresno expects to be successful in its bid to host HSR' s maintenance yard and technical center that would bring about an estimated 1,100 new jobs to the city . According to Scharton, these well-paying jobs would have "a gigantic multiplier effect on Fresno's economy."

Mike Dozier, the Lead Executive for the California Partnership for the San Joaquin Valley, also counts on the influx of engineering, construction management, and transportation jobs, that would generate further economic activity in the city: "Either bringing those people to town or using local professionals would have huge potential implication. Hopefully, lots of local folk would get work but even if they are coming from outside, they will be spending money here. Given our depressed economy, I think it will have a huge impact."

Additionally, by increasing Fresno's connectivity the HSR is seen as also increasing Fresno's visibility and primacy as the center of its region. It is hoped that this will result in increased property values. According to Scharton, the currently very depressed property values of Fresno's downtown real estate (about $20/ sq. ft.) are likely to get a big boost with the coming of the HSR. Speculation in anticipation of the station has already started with some people "falling all over each other buying property so they can make money" (Scharton interview). While this land speculation would be a cause for worry in many cities, it is seen as promising at Fresno, where commercial vacancies are high and the property market quite depressed.

According to Jan Minami, Executive Director of the Downtown Association of Fresno, the increased connectivity that will follow the HSR is also likely to produce positive economic effects for Fresno' s agricultural industries, both in terms of promotion and access to outlying markets.

The positioning of an HSR station at Fresno's downtown is also seen as a catalyst for the revitalization of the downtown area, leading to more intense use of the city center by a broader group of people: visitors coming to conduct business, white-collar employees of the agri-business, and new residents that the city hopes will occupy new TODs in close vicinity to the station. According to Ed Graveline, rail consultant for the city of Fresno, "this will put a halt to the sort of urban sprawl, we have experienced in the Valley for years."

According to the interviewees, the transportation gains for Fresno will be significant making it easier for people in Northern and Southern California to visit the city without having to drive, and for residents of Fresno to reach the other major cities of the state. Currently, in-state flights to or from Fresno are outrageously expensive and this lack of accessibility is impacting the local economy.

Vision

All in all, city officials paint a vision for developing Fresno as the premier agri-business center for the state – even the country. The making of Fresno as a multi-modal transportation hub that includes high-speed rail and better connections to the airport is seen as helping towards this end (Dozier interview). As reasoned by Minami:

> *I think the HSR gives us a wonderful opportunity to develop what we have to offer here. Fresno is the breadbasket of the world but we have not done a good job of connecting to the outside world to showcase that. HSR will offer these opportunities. It will allow people to come and share what is fresh; it will allow people to hop on the train and go to farmers markets and get fresh produce from the Valley* (Minami interview).

The revitalization of downtown Fresno is a prominent component of this vision. According to Scharton:

> *People here say 'we don't want to be a bedroom community for San Francisco with all residential uses and no economic benefits.' San Joaquin is one of the great agricultural centers of the world but its downtown is non-existent. Creating a business center for agriculture in downtown is one of our strategies. Part of our revitalization should be to get agri-business and related services (*e.g., *accountants, web-designers) to locate downtown* (Scharton interview).

To help realize this vision, the city has hired the firm of well-known architects and New Urbanists Moule & Polyzoides and has given them the mandate to reconsider the downtown area and its future development in ways that include the HSR station (Moule & Polyzoides interview). While the station area is currently derelict and the Chinatown area of downtown cut off and forgotten, both architects and their clients envision a walkable, urban, and vibrant downtown that will be energized by the presence of HSR.

Challenges and Concerns

While Fresno planners and city officials are optimistic about the opportunities associated with the coming of HSR at Fresno and very much in favor of the CaHSRA 's decision to have the first leg of the project start at the Central Valley, they also admit a number of challenges and voice some concerns.

One challenge has to do with the opposition of some Central Valley farmers to the HSR project because of the possible loss of farmland. The elimination of at-grade crossings for livestock is also of concern to farmers. Our interviewees seemed to downplay the farmers' concerns. According to Graveline: "Issues around farming and grade-separated crossings have been mitigated all over Europe and Asia… They are mitigatable… They are not deal killers; they are just issues that have to be resolved."

A second concern involves what Dozier calls "a tension between micro-scale and macro-level planning." As he emphasized:

> *Micro and macro viewpoints are often at odds, so it is [important] getting those two viewpoints to respect each other, work together. You always hear that 'we need more regional planning,' and that is true; but you also need to have someone that is focused on an eight-block area that is saying this is how buildings are going to be designed, this is the ordinance to do outdoor dining… If you don't take care of the details you can just end up with a generic regional view* (Dozier interview).

Challenges faced by the planners and urban designers responsible for station area planning involve the elevated structure of the HSR station, the integration to its surrounding fabric, and the accommodation of its parking. As our Delphi experts commented (see Section 3), integration of the station to its surroundings is important for the vibrancy of its adjacent areas. And Moule & Polyzoides warned of the "downfall of HSR station areas," if designers treat them like superblocks, rather than weaving them back into existing grids. At Fresno, urban designers and planners have a challenge in trying to integrate a structure 60-feet above the ground while at the same time creating "a station that works within an urban context, as opposed to a station that becomes an airport surrounded by parking" (Graveline interview). While Minami sought to downplay the effect of the elevated line, arguing that an elevated structure gives the opportunity for building garages underneath and provides a better link to Chinatown,231 Dozier admitted that "most of Fresno would like to see the lines below grade, rather than above grade; this is an issue."

Fresno and other cities that are planning HSR stations also have the challenge of accommodating very high numbers of parking. As argued by Scharton: "Adding 4,000 new parking spaces downtown could end-up in building a whole world of parking structures, which doesn't do much for the city." Moule & Polyzoides agreed, underlining that "the greatest threat to station area development around HSR stations are the parking lots. A great sea of surface parking is likely to permanently stunt growth around the station."

The economic costs and benefits of constructing and implementing this large infrastructural project were not raised as a challenge by the interviewees at Fresno, presumably because Fresno expects significant economic benefits from the project. However, Dozier raised as a concern the fact that while this should be a public-private venture, the private sector has not yet come in as a major investor or player.

Planning and Design

Fresno has developed planning processes and design strategies to address some of the aforementioned challenges, and is ahead of many other cities in preparing for the HSR. Cognizant of the politics of development that such large infrastructural projects entail, local planners talked enthusiastically about the collaborative effort put forth by Central Valley stakeholders:

> *The Central Valley's never had one voice. And the different legislators haven't really come together unless they are from the same party. So it's kind of unique that they would come together as a region and be bipartisan, and I think you'll see more of that in the future...As a region, we've always been behind LA and San Francisco and the other metropolitan areas because we didn't have that unified voice. There are 4 million*

> *people here and when we come together as one it can have a good impact* (Dozier interview).

A decentralized planning system is the norm in California, with dif ferent public agencies acting independently, and at times in conflict with each other. Fresno, however, seems to have defied this norm:

> *We've come together as a community, a unified community with the city and county and the county COG, council of governments and formed a group called Fresno Works. In that collaborative effort we've basically responded to the Authority's RFEI on the heavy maintenance facility. So we've done a great deal of planning locally. We actually put $100,000 into it in presenting our response to the Authority which came out basically in a coffee table sized book… We've also been promoting that effort with private industries* (Graveline interview).

To attract desirable land uses and densities and guide development around the station, the city along with Moule & Polyzoides are preparing a specific plan for the downtown area and surrounding neighborhoods. According to Jan Minami, who represents downtown business interests:

> *A most important consideration for people who own property is that they are part of the planning process and have a say into what happens with their property. They are concerned that the process is transparent. Our city is doing a pretty remarkable job in the planning process, which is not always the case with cities. But it seems to me, looking from the non-government side, that they are doing a pretty transparent and thorough planning process, which we support* (Minami interview).

The city is very interested in placing the HSR station "in the best location for the greatest possible effect" (Scharton interview), which for Moule & Polyzoides is to the west of the existing rail lines. This would allow "subsequent positive development implications, an uninterrupted pedestrian flow to downtown, and some foot traffic in Chinatown, by virtue of locating parking structures and related retail there" (Moule & Polyzoides interview). The architects also call for a "flexible" urban design, which takes into account how the station area may change over time. To this end, while they are developing scenarios for both high-density (6-8 story) and low-density (2-4 story) structures, they believe that lower densities would make more sense during the first phase, but with time higher densities should evolve. In terms of land uses, Fresno planners envision housing, mixed uses, and entertainment-related uses, including opportunities for outdoor dining (Scharton interview).

Moule & Polyzoides are adamant that "every single station town must be considered unique. The on-ground context for the station, the kind of development that is already there, the existing communities and material conditions should determine how the urban design around the station involves." While the surrounding station environment currently leaves a lot to be desired, Moule & Polyzoides believe that the city's historic station, at the heart of downtown, provides an opportunity to establish new connections integrating the historic Victor Gruen pedestrian mall,[232] Chinatown and the AAA stadium.

We're lucky that an existing historic station, on the east side, could be saved and used in the project. Basically, the station has to be at ground level, connected to the city, with circulation up to the platform. Around the station, particularly between the station and the rest of the town, there are several city blocks that need to be reestablished and filled in overtime with connective tissue. We are designing not the buildings, but the urbanism (Moule & Polyzoides interview).

In addition to the need for pedestrian linkages and integration of the station to its adjacent area, Fresno planners also talked about integration at a larger scale and the need for a "seamles s" transportation network that connects the city' s different transportation modes, including the airport. They echoed the point made by Delphi experts, that *connectivity* with other transportation modes is a very important precondition for creating vibrant, transit-supportive density nodes around stations (see Section 3).

To address the disruptiv e effects of "a sea of parking" on the surrounding station area, Moule & Polyzoides envision utilizing structures instead of surface parking, scattering them throughout downtown, filling them in with ground floor retail, and linking them to the station through pedestrian linkages (sidewalks) (see Figure 55).

In the preliminary conceptual urban design plan that Moule & Polyzoides have prepared for Fresno's station area, the station structure is the least important element (see Figure 56). The station becomes a simple platform, almost an afterthought. In contrast, the designers seek to create a network of public spaces and pedestrian paths that link the station to the rest of the downtown fabric (Figure 57). As they reasoned:

The best thing the towns/cities could do would be to reconsider the public space. Their investment in the public sphere is the most important tool that towns have to make sure that high-speed rail has positive effects. Landscaping along streets leading to and from the station and public open space is far more important than the station itself. The stations are almost irrelevant. In Fresno, we're proposing that they spend very little on the station: Just make it a platform with a shade structure. It's California after all, and the weather is usually perfect to have the station outdoors. That station trellis or roof-structure is at the end of the axis from downtown, and makes a visual destination. Then spend the money you saved on the public way, on the paths between the station and the rest of the city" (Moule & Polyzoides interview).

Figure 55. Fresno station in relation to major buildings and parking structures

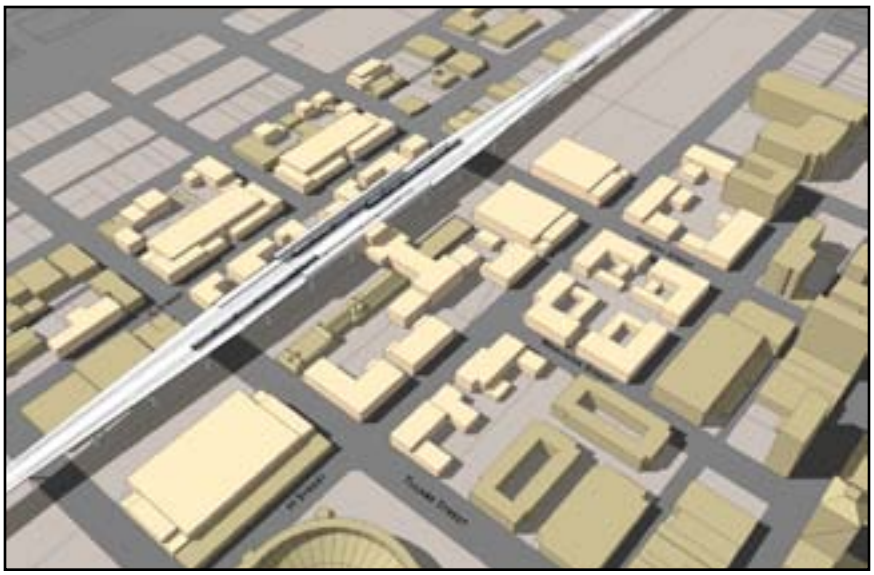

Figure 56. Conceptual Plan of Fresno Station Area

Figure 57. Public Sidewalks and Plazas around Fresno Station Area

Conclusion

With high expectations for job generation and economic gain, Fresno is proactively and energetically planning to accommodate the HSR. Local stakeholders view the HSR as potentially having catalytic effects for their city, converting it into a point of destination in the Central Valley and a center for agribusiness.

At the time of this writing, at least two Fresno HSR station locations were being considered; one in the city's redeveloping downtown and another at the edge of Fresno's urban area. A location at the edge of the city is likely to aggravate the challenges Fresno already faces in realizing the benefits of HSR. Fresno's economic competitive advantages lie in agriculture, and over the period of HSR implementation, it is expected that agriculture will become even more pre-eminent in Fresno as the number of traditional manufacturing jobs in the city and its hinterlands diminishes. The benefits of HSR access to agriculture remain unclear, but should Fresno succeed in its bid to become the major agribusiness center and attract knowledge- and service-based jobs within the wider agricultural sector to the city, the case for HSR benefits could be made more strongly. Alternatively, Fresno should concentrate on attracting the industrial, service, and technical jobs related to HSR itself. For example, if the HSR maintenance yard and technical center be located in Fresno, the city could likely realize more than 1,000 new jobs.

GILROY

City and Station Profiles

Gilroy is a low-density, exurban community and is the southernmost city in Santa Clara County, 16 miles south of San Jose (Figures 58 and 59). Gilroy is well known for its agricultural products, including its garlic crop, and for the annual Gilroy Garlic Festival. Gilroy will be the closest HSR station city to San Jose.

Figure 58. Map of Gilroy HSR Station

Figure 59. Aerial Photograph of Gilroy HSR Station

Population

In 2010, the population of Gilroy was 48,821. In terms of ethnic/racial makeup, Hispanics of any race constituted 57.8% of Gilroy's population, non-Hispanic whites were 32% of the population, and Asians were 5.5%. Between 2000 and 2010, the total population of the City of Gilroy increased by 7,357 or almost 18%, higher than the Santa Clara County growth rate of 5.9% and higher than the statewide growth rate of 10%. Between 2010 and 2035, the city's population is projected by the Association of Bay Area Governments (ABAG) to increase by 20% to 58,606.[233] Median household income in Gilroy in 2010 was $78,290 or 122% of the median household income among all Californians.[234] The median home price in the city in 2010 was $399,000 or 119% of the statewide median home price, having fallen from $626,000 (then 149% of the statewide median) in 2008.[235] The homeownership rate (65.9%) is high when compared to the rate of homeownership statewide (57.8%).

In 2010, 61,364 residents were projected by ABAG to be living in census tracts located entirely or with portions within 5 miles of the station area (Table 38 and Figure 60).[236] The average population density of those tracts was 981 people per square mile.[237] Within census tracts located within a half-mile of the station area, the 2010 population projection was 23,275 with an average density of 8,873 people per square mile. [238] ABAG projects that residential population within 5 miles of the station will increase to 85,466 residents or by 39.3% between 2010 and 2035.[239] Within a half mile of the station, the population is expected to increase by 16,193 or 70% within the same period.[240]

Table 38. Residential Population and Population Density Projections within 5 Miles of Gilroy Station, 2005-2035

	2005	2010	2015	2020	2025	2030	2035
Population							
Santa Clara County	1,762,986	1,821,988	1,945,313	2,063,101	2,185,791	2,310,807	2,431,397
Gilroy	61,808	64,318	70,181	74,116	77,728	81,818	85,466
Population Density							
Santa Clara County	1,366	1,412	1,507	1,599	1,694	1,790	1,884
Gilroy	942	981	1,070	1,130	1,185	1,247	1,303

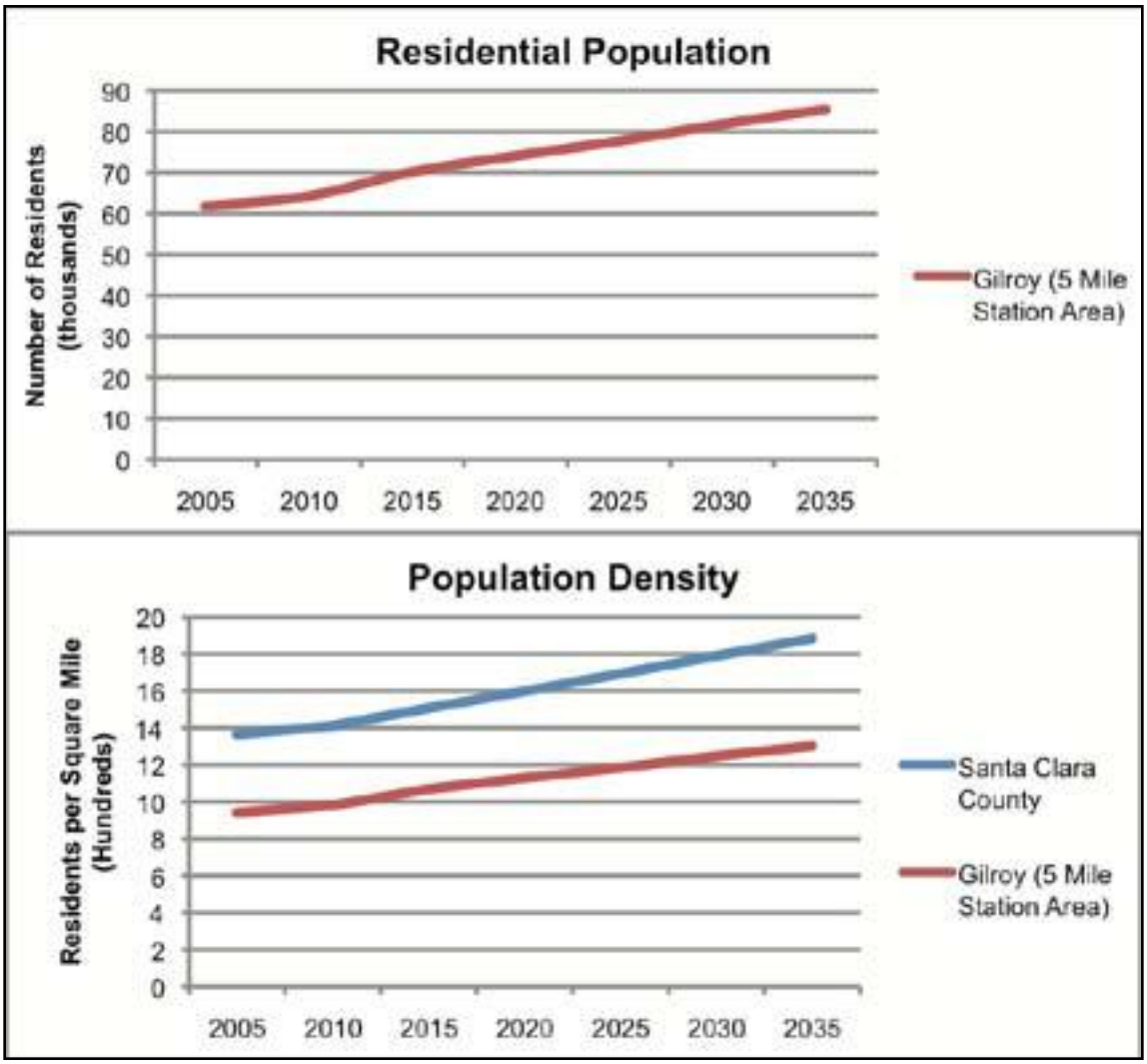

Figure 60. Residential Population and Population Density Projections within 5 miles of Gilroy HSR Station, 2005-2035

Jobs

In 2008 there were 21,623 jobs in Gilroy or 2.4% of all Santa Clara County jobs. The jobs-housing balance in the city (0.45 jobs for every resident) is approximately the same as the statewide proportion (0.46). Santa Clara County as a whole is jobs-rich, with 1.31 jobs for every resident. Nevertheless, 10.0% of Gilroy's residents work at jobs outside Santa Clara County. Education and healthcare (18%) and manufacturing (16%) are the city's largest jobs sectors. Although Gilroy is known as an agricultural center, only 6% of jobs are in this sector. However, the manufacturing sector is largely agriculturally based, as the city has large garlic processing facilities, Gilroy Foods being the largest among them.

We estimated that the area within five miles of the station contained 18,372 jobs in 2009 or 2.2% of all the jobs in Santa Clara County .[241] Within the same area, we predict the number of jobs to increase to 26,879 in 2035, or by 46% (Figure 61).[242] This area displays

a proclivity of jobs in the retail and agriculture and natural resources sectors (location quotient = 1.91 and 1.37, respectively). Though the area will likely continue to support an above average number of retail jobs in 2035, manufacturing, wholesale, and transportation sector jobs will likely also increase above the California norm (location quotient =2.55 and 1.72, respectively) (Table 39 and Figure 62). Though the area is relatively specialized in these sectors, the largest job growth is projected to occur in the professional and information, financial, insurance, and real estate, and management and administration sectors.[243] Despite these growth trends in service sector employment, by 2035 the largest employment sector will remain manufacturing, wholesale, and transportation (25.77%) followed by retail (22.88%). In 2009 the 5-mile area around the station experienced near equilibrium in its balance of jobs and workers (gap index = -0.006). In fact only the retail and agricultural sectors showed a significantly higher proportion of jobs than workers (gap index > .01). However, job growth is projected to increase at a faster rate than worker growth so that the area will have a higher ratio of jobs-to-workers in 2035 (gap index = .11). By this date only the professional and information, educational services, and health services sectors will have an excess of workers relative to jobs in the same sector (gap index < 0).

Of those employed within five miles of the station, 74% live outside of same area. Of those employed persons living within five miles of the station, 74% work outside the same area, suggesting high rates of worker mobility both into and outside of the station area for work. Table 40 and Figure 63 illustrate the top 100 work origins and destinations for the station area by zip code.

Table 39. Gilroy 5 Mile Station-Area Job Growth, Location Quotient, Gap Index

	2005	2010	2015	2020	2025	2030	2035	% Change 2010-2035
Total Jobs	19,708	20,291	21,609	22,927	24,244	25,562	26,879	32.5%
Grouped Jobs								
Agriculture and Natural Resources	1341	894	599	304	10	-285	-580	-164.9%
Manufacturing, Wholesale, and Transportation	5,645	5,698	5,944	6,190	6,436	6,682	6,927	21.6%
Retail	3,716	4,020	4,446	4,872	5,298	5,724	6,150	53.0%
Financial and Professional Services	418	550	660	769	879	988	1,098	99.6%
Professional and Information	633	951	1,220	1,488	1,757	2,026	2,295	141.3%
Management and Administration	1,914	2,220	2,554	2,887	3,221	3,555	3,888	75.1%
Educational Services	1,892	1,955	2,045	2,136	2,226	2,317	2,408	23.2%
Health Services	1,754	1,754	1,760	1,766	1,772	1,778	1,784	1.7%
Recreation and Hospitality Services	2,395	2,250	2,382	2,514	2,646	2,777	2,909	29.3%
Location Quotient								
Agriculture and Natural Resources	2.67	1.86	1.23	0.62	0.02	-0.57	-1.14	-161.3%
Manufacturing, Wholesale, and Transportation	1.15	1.24	1.32	1.40	1.50	1.60	1.72	38.9%
Retail	1.72	1.90	2.03	2.17	2.30	2.43	2.55	34.8%
Financial and Professional Services	0.34	0.47	0.56	0.64	0.72	0.80	0.89	87.3%
Professional and Information	0.32	0.43	0.50	0.55	0.60	0.63	0.66	52.7%
Management and Administration	0.61	0.68	0.73	0.78	0.82	0.85	0.89	31.3%
Educational Services	1.07	0.98	0.91	0.85	0.79	0.75	0.71	-27.5%
Health Services	0.92	0.80	0.69	0.61	0.55	0.49	0.45	-43.6%
Recreation and Hospitality Services	1.14	0.99	0.95	0.92	0.88	0.86	0.83	-16.4%
Gap Index of All Jobs and Workers	-0.02	0.00	0.02	0.05	0.07	0.09	0.11	-3814.7%
Gap Index by Sector								
Agriculture and Natural Resources	0.18	0.08	-0.04	-0.28	-0.96	-17.34	2.14	2548.8%
Manufacturing, Wholesale, and Transportation	-0.03	0.01	0.06	0.11	0.16	0.21	0.27	1838.4%
Retail	0.15	0.24	0.31	0.37	0.43	0.49	0.54	129.5%
Financial and Professional Services	-0.32	-0.20	-0.13	-0.07	-0.01	0.03	0.07	-134.1%
Professional and Information	-0.46	-0.34	-0.25	-0.19	-0.13	-0.09	-0.05	-84.3%
Management and Administration	-0.17	-0.13	-0.08	-0.05	-0.01	0.02	0.04	-132.8%
Educational Services	0.06	0.00	-0.04	-0.08	-0.11	-0.14	-0.16	-4067.7%
Health Services	-0.01	-0.04	-0.06	-0.08	-0.10	-0.12	-0.13	256.4%
Recreation and Hospitality Services	0.05	0.02	0.03	0.04	0.04	0.05	0.05	130.5%

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Table 40. Top 100 Worker Origins and Destinations by Zip Code – Gilroy

Top 100 Worker Origins

Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs
1	95020	4,527	26	95004	79	51	95110	38	76	94533	29
2	95023	1,487	27	95121	77	52	95129	38	77	94538	29
3	95037	1,011	28	95125	77	53	95138	37	78	94541	29
4	95076	454	29	95132	75	54	93933	36	79	94587	29
5	93635	434	30	95003	73	55	95322	36	80	95210	28
6	93906	194	31	95008	72	56	95350	36	81	95376	28
7	93905	186	32	95148	70	57	95370	36	82	95073	27
8	95123	170	33	95128	66	58	95051	35	83	95307	27
9	93907	143	34	95301	57	59	94015	34	84	94086	26
10	95127	138	35	95351	57	60	95119	34	85	93720	25
11	95111	126	36	95117	54	61	95206	34	86	94080	25
12	95046	125	37	95066	52	62	93955	33	87	95012	25
13	93901	122	38	95139	52	63	94560	33	88	95363	25
14	95120	116	39	95133	49	64	95131	33	89	93436	24
15	95136	115	40	93930	46	65	93908	32	90	94577	24
16	95340	111	41	95126	45	66	95014	32	91	94806	24
17	95112	106	42	95348	45	67	95334	32	92	95360	24
18	95118	103	43	95355	45	68	95361	32	93	95828	24
19	95124	103	44	93927	44	69	95687	32	94	94509	23
20	95035	102	45	95358	44	70	93620	31	95	94566	23
21	95060	102	46	93960	43	71	94565	31	96	95043	23
22	95116	91	47	93940	42	72	95050	31	97	95135	23
23	95045	89	48	95207	41	73	95388	31	98	94501	22
24	95122	86	49	95380	40	74	94536	30	99	94539	22
25	95062	82	50	94087	39	75	94544	30	100	94558	22

Table 40. Top 100 Worker Origins and Destinations by Zip Code – Gilroy (cont.)

Top 100 Worker Destinations

Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs	Rank	Zip Code	Jobs
1	95020	4,614	26	95126	111	51	95111	57	76	94301	34
2	95037	1,389	27	94086	109	52	93905	53	77	94070	33
3	95110	703	28	95133	105	53	93940	53	78	95117	33
4	95112	404	29	95051	98	54	94080	51	79	94107	32
5	95023	341	30	95113	91	55	95062	51	80	94303	32
6	95054	255	31	94085	88	56	94545	49	81	94621	32
7	95123	235	32	95060	88	57	95010	49	82	94587	31
8	95131	229	33	95116	88	58	94103	48	83	95120	31
9	95035	228	34	94304	83	59	95070	45	84	94583	30
10	95076	227	35	95138	83	60	94577	43	85	90245	29
11	95050	215	36	94588	81	61	95045	43	86	94550	29
12	95134	215	37	95136	76	62	93908	41	87	94612	29
13	95008	197	38	95032	74	63	94560	41	88	95630	29
14	95046	193	39	93906	72	64	95121	41	89	93933	28
15	93901	174	40	94087	71	65	95135	41	90	95132	28
16	94538	158	41	94063	70	66	94596	40	91	94115	27
17	95014	156	42	95118	69	67	94539	39	92	94403	27
18	95119	153	43	95127	68	68	94551	39	93	95356	27
19	94089	136	44	94105	67	69	95030	38	94	94568	26
20	95125	134	45	94025	66	70	95066	38	95	94041	25
21	95128	132	46	94010	64	71	94404	37	96	94611	25
22	93907	124	47	94040	64	72	95003	37	97	92626	23
23	95122	124	48	94306	63	73	95148	37	98	94104	23
24	95124	123	49	95129	61	74	94111	36	99	95139	23
25	94043	118	50	94520	60	75	94022	35	100	94065	22

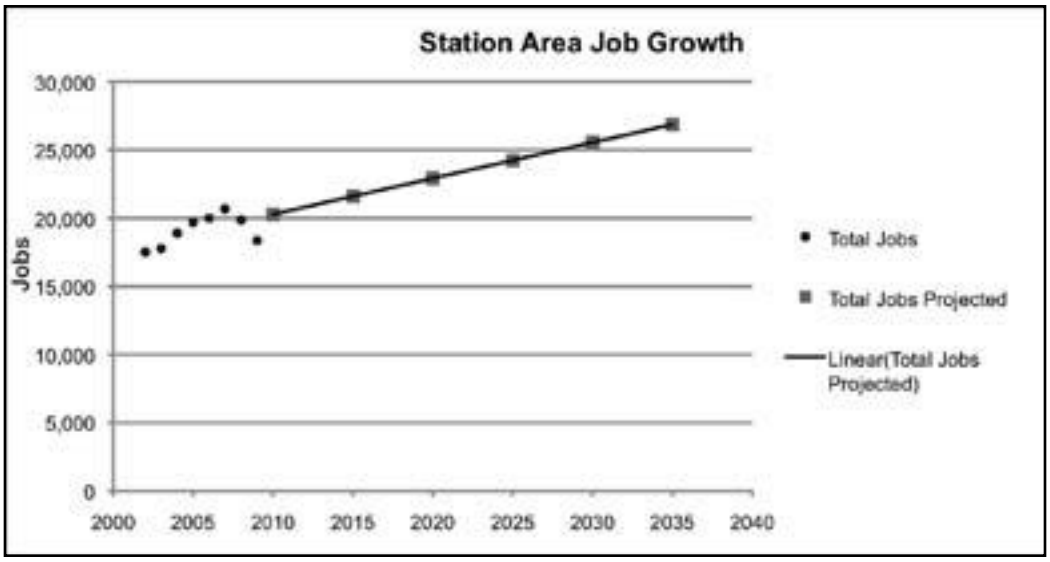

Figure 61. Job Growth Projections within 5 miles of Gilroy HSR Station, 2000-2035

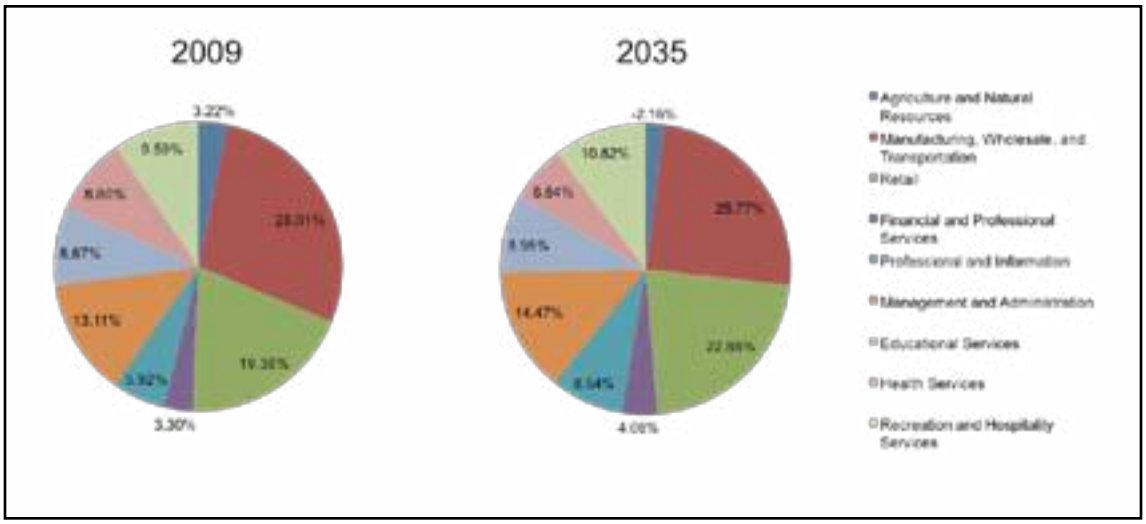

Figure 62. Comparison of Jobs by Sector within 5 miles of Gilroy HSR Station, 2009 and 2035

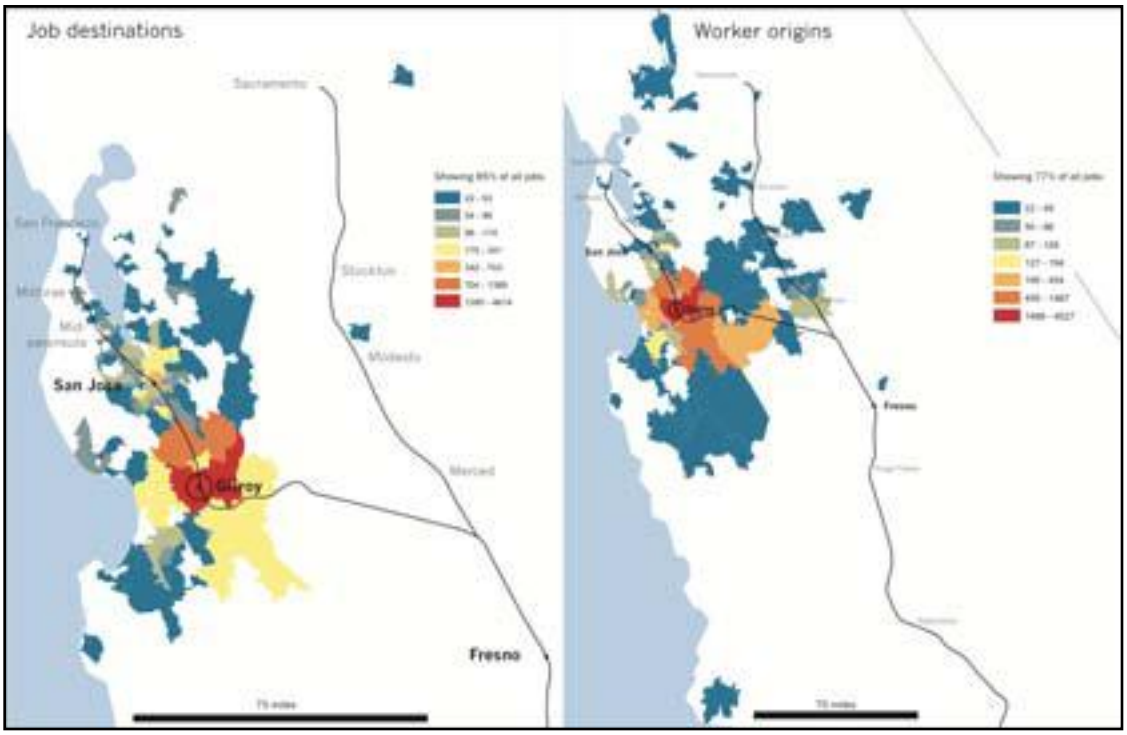

Figure 63. Gilroy Commute Map

Current Land Use

Land use within a half-mile of the station is diverse: Over half of the land is occupied by residential uses; 34.2% is in single-family homes, and 19.7% is in multifamily dwellings. The proximity of the proposed HSR station to residential development is unique among the station cities examined here and may result in constraints to development and redevelopment. Industrial uses account for19.7% of the land, and retail accounts for 13.1%. Vacant land accounts for 3.5% of the land in the area (Figure 64). When we compare this station area to those around the other case studies of station cities, we note a relative dearth of surface parking – a potential supply of land for redevelopment

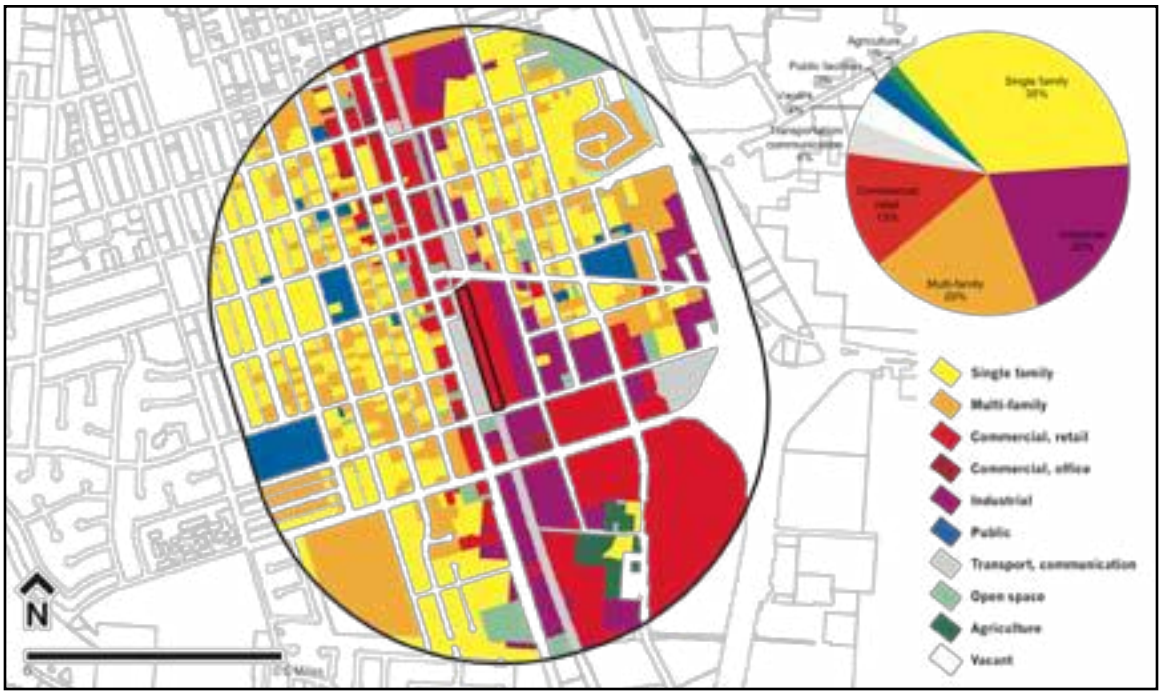

Figure 64. Map of Land Uses and Distribution of Land Uses (by Parcel) within a Half-mile of Gilroy HSR Station

Subdivision pattern

The half-mile area around the proposed station (the current Gilroy Transit Center) is subdivided into a gridiron pattern typical of nineteenth century railroad towns. Parcel sizes in the area range from .01 to 9.2 acres, with the largest number of parcels being in the .11 to .25 acre range (Table 41). The largest parcels are currently occupied by housing developments.

Table 41. Parcel Characteristics within a Half-mile of Gilroy Station

Min Parcel Size (acres)	Max Parcel Size (acres)	Modal Parcel Size Range (acres)
0.01	9.2	0.11 - 0.25

Major Destinations

Important destinations within five miles of the station include the St. Louise Regional Hospital, the Gilroy Premium Outlets, Gavilan College, and the Gilroy Gardens Family Theme Park (Table 42 and Figure 65).

Table 42. Activity and Employment Centers within 5 Miles of Gilroy Station

Type	Activity/Employment Center	Miles from Station	Employees/Visitors per day
Education	Gavilan College	2.1	6,409
Retail	Gilroy Premium Outlets	1.2	2,900
Employment	St. Louise Regional Hospital	2.1	836
Retail	Gilroy Crossing	1	800
Employment	Goldsmith Seeds, Inc.	2.6	500
Entertainment	Gilroy Gardens Family Theme Park	3.4	350
Employment	Christopher Ranch LLC	3.5	207

Figure 65. Map of Activity and Employment Centers within 5 miles of Gilroy HSR Station

Transportation and Transit Networks

Just above 3% of Gilroy workers use public transit, while about 20% utilize carpools for their daily commute. The Gilroy Transit Center, where the new HSR station may be located, is the southern terminus of the Caltrain commuter rail line connecting Gilroy to San Francisco via Silicon Valley and the peninsula cities. Four express bus lines link public transit commuters to downtown San Jose, Monterey and other nearby cities. Despite being surrounded by freeways, the vicinity of the station is very walkable, and paths along the Guadalupe River make it also accessible to bicyclists. The area is also accessible to the South Valley Freeway (US 101), the major north-south California coastal artery (Table 43).

Table 43. Transit Network within a Half-mile of Gilroy Station

Automobile	Bus	Rail			Bike	Walkability
Interstate Network		Regional Passenger	Commuter	Light		(Walk Score)
South Valley Freeway (Route 101)	Santa Clara Valley Transportation Authority: Lines 14, 17, 18, 19, 68, 121, 168 Monterey-Salinas Transit: Lines 55 and 79	Amtrak Capital Corridor Line	Caltrain	None	5 on-street bike lanes and 1 off-street bike path	83, Very Walkable

Local Perspectives

For the small, low-density and semi-rural Gilroy, the coming of the HSR is going to be accompanied by some positive and some significantly negative impacts. We interviewed Gilroy City Administrator Tom Haglund to learn more about these impacts and to complement the information presented in the previous section. Unlike planners at Fresno and San Jose, who speak enthusiastically about the prospects of HSR-associated development, Haglund appears much more skeptical about the rail' s effects on his town. And while Fresno and San Jose planners are busily preparing station area plans in anticipation of the HSR, Gilroy planners are so far only analyzing and evaluating information provided to them by the CaHSRA.

Perceived Benefits

A report prepared for the city of Gilroy by consultants in August 2010 provides the following assessment:

> *Gilroy will command a very large catchment area as the next station northbound is in San Jose (30 miles) and southbound is in Merced (95 miles)… It will open up immense*

> *opportunities and can generate enormous changes in the whole demography of the region… Improved access of this magnitude will provide a very strong catalyst for potential change in where people want to live and work and in the economic activity for the whole area. … Gilroy could become a southern hub for development and transportation.*[244]

Tom Haglund is more cautious and less enthusiastic in his assessment. He recognizes two types of benefits that Californians are likely to experience from HSR: environmental benefits because "people using the system will drive less," and transportation benefits "people will experience convenient and speedy travel and less freeway congestion." He is, however, more ambivalent when asked to identify the direct benefits for Gilroy:

> *The system will shrink the world allowing you to be deep into the Central Valley within an hour, providing a greater opportunity for people to work in Gilroy and not live there, for jobs to attract others not living in the area – and potentially adding income to the area… The economic impacts are somewhat unknown but considering that they are projecting 15,000 people passing through Gilroy (on or off the train) every day, there is likely that there will be some economic opportunity* (Haglund interview).

Haglund admits that Gilroy's business community generally views HSR as an opportunity to develop industrial land, bring jobs in, and provide better access to other parts of the state. He also recognizes an opportunity to "utilize transit oriented principles in and around the station area" so as to provide more housing for people working at Gilroy or in cities that will now become more proximate thanks to the HSR. He is, however, concerned about the rail's possible negative effects.

Vision

Thus, the HSR project is seen with a certain level of consternation by Gilroy officials and planners who are worried about possible adverse effects on their city but at the same time realize that it may also bring economic benefits. While Haglund appeared critical of the planning process and fearful of possible unintended negative consequences of the HSR, he did not hesitate to articulate an optimal vision of what he would like to see happen.

> *In 20 years we would have an appropriately located station so that the traffic impacts are mitigated to the greatest extent possible. The land use around the station would provide for the ease of public access to the HSR system and for appropriate work/life balance that it is a mix of both residential and work areas, kind of a ring around the station that provides for offices, and retail needs of the surrounding development. I'd like to see true transit oriented development present, opportunities for the developer to come in and build more high density housing in a pleasing and economic format* (Haglund interview).

Challenges and Concerns

Gilroy planners are concerned about the ambiguity of station location. One of the two primary alignments being considered would bring the HSR station in downtown Gilroy

(Figure 66), while the other would locate it in East Gilroy. The East Gilroy alignment would have lower displacement impact but a station there would be further from the heart of the city and less conducive to TOD development opportunities.[245] On the other hand, a station located at downtown Gilroy would likely cause significant disruption to the community, according to Haglund. This is the densest and most urban part of the city, and a new station would require the evacuation of significant acreage of land and extensive displacement of businesses and residents.

Figure 66. Alternative Alignments through Gilroy

According to Haglund, the negative physical impacts from the station will be significant:

> *The physical impacts will be very significant on the city, and this is a major concern. In Downtown, they are talking about constructing an aerial viaduct in the middle of the community from grade level to 82' tall. It is like putting an 8-story building down the middle of the community. I am very concerned about that aesthetic. It will be so large and ominous, and the community would be cut it in two with significant social ramifications. This will bring a significant negative impact on Downtown, ¾ miles long and 2 blocks wide, a large, above ground viaduct would have a negative aesthetic on the Downtown* (Haglund interview).

Another important concern is related to the parking prescribed by the CaHSRA. There is ambiguity as to the required parking spaces with estimates ranging from 2,800 to 6,600 new spaces. As Haglund explained:

> *We are very concerned about the parking requirements and the identified need for 6,600 parked cars per day. How will that happen? One large parking garage which would take up about 9 acres, becoming the single largest structure in the community? An off-site garage?* (Haglund interview).

Additional issues raised include the traffic congestion that the station is likely to generate, especially in Downtown, as well as the loss of prime farm land and the significant impact that the alignment would have on some farmers in the county.

Haglund also expressed frustration that local governments can only give suggestions to the CaHSRA but have no decision making authority or power to influence projects that, in his mind, are local. As he argued, "The stretch that passes through Gilroy should be a local development project, like any other development project – Gilroy is completely capable of making the necessary decisions in order to finish this project, and does not see a need to incorporate another layer of decision making process from a regional perspective." Instead the city is only allowed to provide feedback to the CaHSRA, which the Authority may choose to disregard.

According to Haglund:

> *The City of Gilroy evaluates the HSR in the context of planning, circulation and zoning policies to provide feedback to the CaHSRA on what they should choose. But these are just the city's recommendations. CaHSRA will likely listen to those, but need not abide by any of them. This is a problem. There is a problem with the way the state is proceeding with the HSR project because of the disconnect with the CaHSRA, and the fact that it can choose to do something completely different than the recommendations of the communities they are building in. The state has the ability to write over any local city rules* (Haglund interview).

According to Haglund, a lack of coordination in the planning of the different sections of the project seems to also contribute to a fragmented process. Haglund explained why this is problematic for Gilroy:

> *The project provides major challenges to transit planning both regionally and statewide, as it seems to be very disjointed in terms of how they are proceeding with the planning of it. Their approach may be necessary because it is 800 miles long and going through various regions of the state. Therefore, they have broken it into sections, but the sections have proceeded with various levels of design. One section of HSR in Santa Clara County is much further ahead of planning than the Gilroy section. This creates political turmoil. The Gilroy section is behind, and this causes Gilroy's political leadership to feel left behind, being railroaded (no pun intended) There is still lack of decision and specificity of rail design in the Gilroy section – and this has caused a lot of confusion and fear that the CaHSRA is not going to be following the same type of community engagement process in Gilroy as they have done in other areas* (Haglund interview).

A final concern has to do with what Haglund criticizes as "an unfunded mandate from the state." As he explained:

> *The city has to spend money hiring experts to review, and analyze, and understand the various documents, alignments, and studies CaHSRA is producing in support of their project. In other projects, such cost would be typically placed onto the developer, who would pay for the City of Gilroy to review and understand these documents, and make suggestions. This does not happen with CaHSRA. And this project is an order of magnitude greater than any single development in the city has ever been and will ever be* (Haglund interview).

It is probably in response to this criticism, echoed by other local governments as well, that in April 2011, the CaHSRA invited seven cities (including Gilroy) to apply for funding for their local station planning efforts.

Planning and Design

The city of Gilroy has not so far created any specific station area plans or design guidelines but has only evaluated the impact of two proposed alternatives. Regarding the potential of HSR to act as catalyst for further development in Gilroy, the city's consultants have emphasized the following:

> *It is unknown what market conditions will exist in the years leading up to the development of the high-speed rail. Current below average economic characteristics including high unemployment, below-average income levels, large tax base reductions and a strained housing market do not create a positive outlook for TOD in Gilroy; however, research on successful projects shows that mixed-use development, in the context of a community-based master plan that addresses the economic, financial and infrastructure issues, makes communities more desirable places to live and improves the environmental, social, and economic challenges facing cities today*.[246]

A possible market for transit-oriented development projects would be also determined by the amount of commuting Gilroy residents, forecasted from 2,900-15,000 per day. Opportunities for TOD development are significantly different in the two possible station

sites, with the central downtown site having a serious advantage over the more peripheral East Gilroy site. As explained by the city's consultants:

> *In addition to the presence of existing transit, the potential Downtown Station is located within ¼ mile of existing residential and downtown commercial development. … As Downtown Gilroy continues to develop and improve, a market may be created that capitalizes on the historic value of the existing downtown environment*.[247]

On the other hand, the distance (about ¾ miles) of the East Gilroy site from residential neighborhoods and services makes the building of transit-oriented development projects there more difficult. The consultants perceive that a station development there would be possibly accompanied by development that appears near airports: light manufacturing, light industry, warehouses, research and development, and car-rental services.

Conclusion

Gilroy's economy is dominated by farming and agricultural processing. The benefits of HSR to Gilroy's agricultural economy are not clear. In recent years, the city has also witnessed significant housing construction. Housing prices in Gilroy are high when compared to statewide averages, but quite lower than the housing prices in San Francisco and San Jose. A possible scenario for Gilroy in order to leverage the HSR may be to provide a wider variety of housing than it currently has, such as medium-density multifamily units – supportive of and supported by transit – with accompanying retail and service development. If the fare structure is such that a trip to San Jose or even San Francisco is affordable for commuters, some workers in these cities may choose to reside in the more af fordable Gilroy area. Such a strategy may permit Gilroy to position itself as the "favored quarter" of Santa Clara County and lead not only residents but also retailers and, eventually, employers to locate there.

VI. CONCLUSIONS

The California HSR is a controversial megaproject that has generated considerable debate among scholars and policy makers about its benefits and costs. Important questions about the system's anticipated ridership, capital and operating costs, and fare structure were not addressed in this study, which was concerned with the preconditions and strategies that different station cities should have in place to take advantage of the HSR. Admittedly, these factors are important and may influence the type of development that will appear in station areas. Ticket prices will have a direct effect on the types of trips and number of riders that the system will facilitate. However, in the absence of such information, we can only assume that the fare structure may be different for every-day users, allowing a small number of riders to use the system for commuting purposes, as it happens in other parts of the world.

Based on a systematic review of the scholarly literature on the urban development impacts of HSR in other countries, a Delphi of experts on the same topic, a review of the existing plans and urban design guidelines for the California HSR, a compilation of detailed socio-demographic and economic profiles for six case study cities in California, and interviews with main actors of the HSR planning and design process in these cities, we reach the following conclusions in response to the first 3 questions posed in the introductory section:

1. What are important preconditions for positive station area development in HSR cities and station areas as indicated from examples in Europe and Asia, and are these relevant for California cities?

2. How are these preconditions different for first-tier and second-tier cities in California?

3. In what ways are municipalities in the case study cities preparing to take advantage of HSR? Are they planning for complementarity?

Important Preconditions

Despite widespread projections of HSR-induced development in station cities, the experience in other countries indicates that a "build-it-and-they-will-come" approach is insufficient. While in theory, the economic and urban development impacts of HSR can be significant; in practice such impacts will happen only if certain preconditions exist. Factors that lead to positive impacts include proactive public sector involvement and preplanning for the HSR, private investment, a station's central-city location, quality and frequency of the HSR service, multimodal connectivity of the station area with other employment- and transportation poles, high quality station building, and good integration of station with its surrounding area. Significant also are pre-existing local assets a city can use to leverage the HSR.

As discussed in Section 3, many of the European and Asian cities that have implemented HSR systems have physical and planning contexts significantly different from those in California. Nevertheless, the existence of the factors listed in the previous paragraph becomes even more important within the California context.

Differences Between First-tier and Second-tier Cities

Research from Europe and Asia suggests that the principle benefits (jobs, growth, economic dominance, centrality) of HSR accrue more readily in first-tier cities, but second-tier cities with HSR stations have fared better than those without.

The effects of HSR on the evolution of second-tier cities are not as well understood as the effects on first-tier cities. A variety of factors play a role including the number of trains that stop in these cities, the degree of intermodal accessibility, position in the regional hierarchy, and the unique offerings of the city in the larger network. Catalytic effects are more likely to take place if second-tier cities leverage pre-existing assets (such as the existing strong agribusiness sector at Fresno or the Disneyland Theme Park at Anaheim).

Nevertheless, and within the California context, we find that a simple distinction between first-tier and second-tier cities is overly broad. As the case studies showed, there is considerable variety and different development potentials among so-called second-tier cities. Therefore, a more detailed typology is warranted (such as the one that we offer in section 1 and Table 4) that distinguishes second-tier cities into small metropolitan cities, suburban employment centers, suburban dormitory cities, exurban dormitories, and rural dormitories.

Indeed, the review of the six case studies and their "facts on the ground" – namely the socio-economic characteristics and trends of each station location – illustrates that the potential of the different station cities to leverage HSR stations varies widely. Thus, the benefits and burdens associated with HSR are likely to be very uneven among these station cities. The state's first-tier cities, places like Los Angeles and San Jose, where knowledge-based, managerial, and service work are already largely concentrated, are likely to benefit first. To do so, they must muster the necessary resources, political will, planning and regulatory discipline, and private sector investment – in very tough fiscal times – to plan and regenerate the urban areas around their stations. This means planning for more intense uses in areas that are currently industrial or warehouses, providing high degrees of connectivity between HSR and local and regional transit (as both Los Angeles and San Jose appear intent on doing), and realizing the kinds of urban design interventions necessary not only to overcome existing disruptions to the urban fabric by state and interstate freeway systems but to also mitigate potential disruptions by the HSR system itself.

Benefits should also accrue to entertainment and leisure destinations like Anaheim, where increased access to new markets will provide a wider audience for attractions and tourist destinations as well as convention and visitor facilities. Here, too, significant changes to the quality of urban environment and high degrees of local transit connectivity must be realized in order to comfortably and adequately accommodate tourists and visitors arriving by train rather than automobile.

The recommended response for small or intermediate suburban and exurban localities is less clear. The costs that these localities will have to sustain in terms of providing station structures, parking, an enhanced infrastructural capacity and local transit access may prove

to be a major burden. Such localities may accrue some benefits if they manage to provide transit supportive, medium-density housing and associated amenities for long-distance commuters to outlying housing markets. In intermediate cities, like Fresno, especially those that remain focused on agriculture or agriculture production, the increased access afforded by HSR should be required by significant local economic efforts to either capture more of the kinds of jobs that benefit the most from such access or to capture the jobs related to providing and maintaining the HSR itself.

Municipal Preparation and Response

The experience of other counties, where HSR has already been implemented, shows that the positive and negative development effects vary in first- and second-tier cities and among second-tier cities. Therefore, planning strategies and guidelines should also differ. Nevertheless, we found that the CaHSRA guidelines recommend a planning process that is relatively uniform and undifferentiated. Even worse, second-tier cities, where planning guidelines are least well suited to their local conditions (low density, market-challenged), are also home to agencies that are the least well-prepared and lacking in capacity to develop station-area plans.

As discussed, municipal response is largely driven by the extent of anticipated benefits from the HSR. Thus cities such as San Jose, Anaheim, and Fresno that want to use the HSR to attract more jobs or visitors or to improve their relative position within the urban hierarchy, are the most proactive in planning for the rail. Global cities like Los Angeles are generally interested and supportive of the process but since they do not expect any catalytic effects from the HSR (other than a possible redevelopment of the immediate station area), they are not as energetic in pursuing planning and development opportunities. Lastly, suburban and exurban bedroom communities such as Norwalk and Gilroy are very ambivalent about HSR-induced benefits and more worried about its negative impacts (in terms of noise, congestion, adverse aesthetic impacts). Partly because of this and partly because of lack of planning capacity, these cities have done little to prepare for the HSR.

The interviews also revealed that officials in all six cities share some common concerns. In a state that has no tradition of regional planning, and where regional agencies (e.g., SCAG, ABAG, Fresno CoG) have only advisory roles, planning a megaproject that spans the boundaries of different state regions is a major challenge. Second, all cities are concerned with the adverse aesthetic impacts generated by a station structure which in many cases would be elevated 60-feet above the ground. A third common concern relates to the accommodation of station-area parking. The CaHSRA has given each city a target number of required parking spaces, which in all cases far exceeds their current capacities. Cities are expected to expend their own resources for station area improvements (or at best entice joint development projects with the private sector). Finding the space and resources to accommodate that much parking provides challenges for cities. Additionally, cities are concerned by the lack of available land around station areas, as well as the negative aesthetic impact of a “sea of parking lots.” Lastly, cities are worried about the perceived uncertainty that surrounds the building and implementation of this megaproject. With funds available for only the first leg of the line in the Central Valley, station cities – even those in the first phase of the project – are not certain when to expect the coming of

the HSR. According to some interviewees, this uncertainty stands in the way of attracting private investment in potential station areas.

One major weakness of the California- and in general the US context is its lack of tradition of regional planning. Our interviews showed the while cities have considered issues of complementarity at the local level – seeking to take advantage and enhance existing assets and resources in their planning – they have failed to do so at the regional level. Even though complementarity between city-pairs along the HSR network is likelywe found that there is little systematic regional thinking about development or the potential for the development of complementary roles among cities along the HSR line. Indeed, none of the case study cities has considered how to coordinate planning efforts with adjacent station cities on the network in ways that each station provides a complement to the other . For example, San Jose intends to develop significant office and entertainment uses around its station to attract more jobs, but has not at all consideredthe possibility of coordinating with Gilroy for developing more affordable residential and mixed-uses around its station for their new employees. Second-tier cities such as Fresno and Anaheim are planning to leverage the high-speed train to grow independent of rather than in coordination with their larger, first-tier partners. Similarly, the concept of complementarity is completely absent from the deliberations of suburban and exurban dormitory cities like Norwalk or Gilroy, even though these may be able to offer more affordable TOD housing for the new employees that their larger neighbors are seeking to attract.

RECOMMENDATIONS

In this final section of our report we turn to the last research question posed in the introduction, namely what policy and design recommendationsshould be in place to foster positive development in California's station cities?

It is abundantly clear that a significant degree of preparedness and planning in the form of land use regulations and design guidelines will be needed to guide development in station areas, for both first- and second-tier cities. A high degree of attention should be paid to the quality of the urban environment itself, to mitigate any deleterious effects of HSR, to stitch back existing disruptions to the urban fabric, to ease transit and non-motorized access in and through station areas and their surroundings, to enhance the vibrancy and visual quality of places, and to provide the amenities that HSR travelers may demand.

Based on the research presented in the previous sections, we of fer the following recommendations:

1. Each station city should carefully consider both its local assets and competitive advantages as well as its regional context and economy.

2. Cities should consider the interface of four spatial zones: the station itself, the station-adjacent district, the municipality at large, and the larger region which includes adjacent station cities.

3. Planning for the HSR should include centrally locating stations, enhancing multimodal connectivity and complementarity of different transportation nodes, encouraging greater station-area density, mitigating the barrier effect of parking, and creating an urban design vision and land use plan for the station area that builds on and complements existing local assets.

4. Current planning for HSR estimates completion of the network over two decades. The development effects of HSR may take as many as two additional decades to realize. Thus, planning must be undertaken as a set of phased-goals that can be accomplished at various stages of system development. Given the uncertainty surrounding HSR development, station cities should consider scenario-planning approaches that offer a series of alternative visions for future station area development and evaluate these alternatives in terms of their desirability and feasibility.

5. Second-tier cities should consider catalytic projects, complementary planning with first-tier neighboring cities and branding strategies that emphasize their unique offerings and assets. Some second-tier dormitory cities have the potential to create affordable, workforce housing for their first-tier neighbors along the rail line. It will be important to plan in ways that guide this likely outcome toward positive effects and to prevent suburban sprawl. Not only will this help meet regional environmental goals, it will also make later mixed-use development in the station area more likely.

6. If second-tier cities have aspirations to become urban, mixed-use destinations, they should create interim plans that recognize their current lower density and real estate values.

7. Planning for HSR in low-density second-tier cities should take into account not only the immediate station area (half-mile radius), but also the five-mile radius and in particular, the densest nodes or destinations within that wider region for jobs, services, and commercial activity. Particular attention should be given to the ways that these more distant nodes are well-connected to the HSR station via different transportation modes.

8. Station design should take into account value capture in the surrounding area as a means for the public sector to generate desired development effects.

9. Stations should be less internally focused (e.g., shopping mall model) and more externally oriented hubs and well connected to the adjacent area and rest of the city through a robust transportation network to encourage surrounding development.

10. Lastly, complementarity at the regional level can be encouraged by the creation of a Joint Powers Authority consisting of high-level representatives and/or planners from all station cities. Such a body could help establish a regional vision for the HSR corridor and set goals that are mutually beneficial for cities along the line.

In conclusion, the challenges of building such a large infrastructural project are many: economic, physical, and political. The experiences of other countries show that the spatial and development impacts of HSR projects are not uniform, and they can vary from negative to positive. This study sought to uncover some of the necessary preconditions for successful development to take place. In the end, however, the idiosyncrasies of municipal responses, pre-existing local assets, and planning vision will all play a role in how California cities leverage the HSR.

APPENDIX A: LIST OF DELPHI PARTICIPANTS

Ahlfeldt, Gabriel (Lecturer in Urban Economics and Land Development, London School of Economics, UK).

Aveline, Natacha (Researcher, consultant on land market strategies of Japanese railway companies, Japan).

Bellet, Carmen (Senior Lecturer, Department of Geography and Sociology, University of Lleide, Spain).

Bertolini, Luca (Professor of Urban and Regional Planning, University of Amsterdam, The Netherlands).

Bruinsma, Frank (Associate Professor, Department of Spatial Economics, Vrije Universiteit, Amsterdam, The Netherlands).

Cervero, Robert (Professor of City and Regional Planning and Transportation, UC Berkeley, Director of the University of California Transportation Center, USA).

Deakin, Elizabeth (Professor of City and Regional Planning and Urban Design, UC Berkeley; former director of University of California Transportation Center, founding manager of Cambridge Systematics Berkeley office, USA).

Distefano, Joe (Principal, Calthorpe Associates, formerly with Surface Transportation Policy Project, USA).

Dukakis, Michael (Professor of Public Policy, Northeastern and UCLA Universities, former Governor of Massachusetts, former Vice President of AMTRAK, USA).

Garmendia, Maddi (Lecturer, Urban and Territorial Planning, University of Castilla La Mancha, Spain).

Hall, Peter (Professor of Planning and Development, Bartlett School, UCL, UK; former professor of City and Regional Planning, UC Berkeley; UK).

Holt-Damant, Kathi (Director of Urban Design Program, University of Queensland, Australia).

Ieda, Hitoshi (Professor of Transportation, University of Tokyo; former engineer, HQ of Japanese National Railways, Japan).

Karlsson, Charlie (President of the European Regional Science Association, Professor of Economics of Technological Change at Jönköping International Business School, Sweden).

Klein, Olivier (Researcher, Laboratoire d'conomie des Transports, l'Ecole Nationale des Travaux Publics de l'Etat, France).

Ng, Mee Kam (Associate Professor and Director Urban Planning Program, University of Hong Kong, China).

Peters, Deike (Director, DFG Emmy Noether Group on Urban Mega-Projects Center for Metropolitan Studies, Berlin University of Technology, Germany and Adjunct Faculty USC School of Policy, Planning, and Development, Germany).

Ponti, Marco (Professor of Transport Economics, Politecnico University of Milan, Italy and President of TRT consulting company, Italy).

Pucci, Paola (Associate Professor of Urban Planning and Transport Policy, Politecnico University of Milan, Italy).

Stamming, Mikael (Director of the Őresung Committee, consultant in traffic planning in Stockholm and Malmo, former Development Manager, city of Helsinborg, former project manager for railway studies in Sweden),

Suisman, Doug (Principal, Suisman Urban Design, USA).

Tiry, Corinne (Research Engineer, French Ministry of Culture and Communication; member of LACHT-research laboratory of Lille Graduate School of Architecture and Landscape Design, France).

Trip, Jan Jacob (Researcher, Delft University of Technology, The Netherlands).

de Ureña, Jose Maria (Professor of Urban Design and Regional Planning, University of Castilla La Mancha, Spain, former President of the University of Cantabria, Spain).

Vickerman, Roger (Professor of European Economics and Director of Centre for European Regional and Transport Economics, University of Kent; Chartered Fellow, Chartered Institute of Transport and Logistics, UK).

Willigers, Jasper (Researcher at Significance, former analyst at RAND Europe)

Wright, Philip (OMEGA Centre, Bartlett School of Planning, CL, London, UK).

APPENDIX B: LIST OF INTERVIEWEES

Name	City	Department/ Organization	Title
Litschi, Michael	Anaheim	Orange County Transit Authority	Section Manager, Metrolink Operations
Wu, Danny	Anaheim	Public Works	Principal Transportation Planner
Lai, Jamie	Anaheim	Public Works	Transit Manager
Kim, Susan	Anaheim	Planning Services	Senior Planner
Kennedy, David	Anaheim	Public Works	Associate Transportation Planner
Kim, Susan	Anaheim	Planning Services	Senior Planner
Carpenter, Jeff	Los Angeles	Community Redevelopment Agency - LA	Transportation Programs
Clifford, Alex	Los Angeles	Los Angeles County Metropolitan Transportation Authority	Executive Officer, High Speed Rail
Diefenderfer, Patricia	Los Angeles	City Planning	City Planner
Joel Reynolds	Los Angeles	NRDC	Director of the Urban Program
Latham, Fred	Santa Fe Springs [Norwalk]	City Manager	City Manager
Ruiz, Ron	San Fernando [Sylmar]	Public Works	Director
Prevetti, Laurel	San Jose	Planning	Deputy Director
Liccardo, Sam	San Jose	City Council	Council Member
Tripousis, Ben	San Jose	Transportation	Transportation Policy Manager
Korbiak, Dennis	San Jose	San Jose Redevelopment Agency	Manager of Strategic Planning
Greene, Cary	San Jose	San Jose Mineta Airport	Airport Planner
Frank Fuller	San Jose	Field Paoli	Principal
Haglund, Tom	Gilroy	Administration	City Administrator
Scharton, Craig	Fresno	Downtown and Community Revitalization	Director
Minami, Jan	Fresno	Downtown Association of Fresno	Executive Director
Graveline, Ed	Fresno	n/a	Consultant
Dozier, Mike	Fresno	Partnership for the San Joaquin Valley / CSU Fresno	Executive Director
Polyzoides, Stefanos	Fresno	Urban Design Consultant	Principal, Moule+Polyzoides
Arrington, G.B.	n/a	Parsons Brinckerhoff	Vice President
Leavitt, Dan	n/a	CaHSRA	Deputy Director for Environmental Review and Planning
Howard, Herman; Osborne, Todd	n/a	HOK	Vice President, Aviation and Transportation [Atlanta, Culver City]
DiStefano, Joe	n/a	Calthorpe Associates	Principal

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132. We solicited the most authoritative academic voices on high-speed rail research and evaluation, asking people who have publishedextensively on the subject to participate on the Delphi panel of experts.

133. One of the auxiliary questions of the first round was "Could you recommend and provide us with contacts of other individuals that we should invite to participate in this survey?"

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146. The problem of characterizing such diverse regions is evident: "Los Angeles Basin – Inland Empire: A generally flat to rolling highly urbanized metropolitan area with dense development, bounded by chaparral -covered mountain ranges and the Pacific Ocean. With the exception of downtown Los Angeles, the majority of the HSR stations in this region (such as Burbank, Ontario Airport, and Palmdale) are located in high -density auto-dependent suburban settings comprised of low -rise residential development, retail centers and office parks with significant parking lots. These stations are currently linked with regional transit, and are part of Los Angeles metropolitan economy. With the expansion of regional transit, they could become 21st century multimodal, mixed-use urban hubs. Potential station location in Norwalk, Santa Fe Springs, or Fullerton." It is difficult to describe Palmdale or Norwalk as high-density settings linked with regional transit, although characterizations of suburban development in the region are illustrative.

147. Both this and prior quote can be found at: SPUR*Beyond the Tracks.* January 2011, 9.

148. Calthorpe Associates, Vision California, Charting Our Future, "Statewide Scenarios Report," March 1, 2011, 1.

149. CaHSRA Urban Design Guidelines, 35-40.

150. See for example, Christine Souza, "High-Speed Rail Barrels toward Valley Farms," October 6, 2010; one of several articles in the California Farm Bureau Newsletter,*Ag-Alert*. http://www.cfbf.com/agalert/AgAlertStory.cfm?ID=1612&ck=52947E0ADE57A09E4A1386D08F17B656.

151. For example, Norwalk/Santa Fe Springs has taken the lead to formulate a nine-city alliance of the smaller communities along the Anaheim-Los Angeles HSR corridor to give them greater voice in the HSR planning process. Interview with Santa Fe Springs city manager, Fred Latham.

152. City of Anaheim, *Master Land Use Plan – The Platinum Triangle,* October 26, 2010, 13.

153. US Census 2010, American Factfinder.

154. Ordinary Least Squares (OLS) regression minimizes the sum of squared vertical distances between the observed responses in the dataset and the responses predicted by the linear approximation. The resulting estimator can be expressed by a simple formula, especially in the case of a single regressor on the right-hand side.

155. Murakami and Cervero. “California High Speed Rail and Economic Development.”

156. US Census 2010.

157. Yahoo Prices. http://realestate.yahoo.com/Homevalues (Accessed June 2, 2011).

158. Data provided by the Southern California Association of Governments.

159. Ibid.

160. Ibid.

161. Ibid.

162. Longitudinal Employer Household Dynamics, Local Employment Dynamics partnership, http://lehdmap.did.census.gov (Accessed March 30, 2011).

163. Ibid.

164. Ibid.

165. We have interviewed the following: Jeff Carpenter, Director of Transportation Programs, Community Redevelopment Agency of Los Angeles; Alex Clifford, Executive Officer, High Speed Rail, Los Angeles County Metropolitan Transportation Authority; Patricia Diefenderfer, City Planner, Community Planning Bureau, Department of City Planning, Los Angeles; Joel Reynolds, Director of Urban Programs, Natural Resources Defense Council.

166. The city of Los Angeles is subdivided into 37 community plan areas. Union Station falls within the Central City Community Plan area.

167. Bertoni, Vincent, Deputy Director Department of City Planning, “California High Speed Rail Alignment and Station Options for the City of Los Angeles,” Memo to Ad Hoc River Committee of the City Council, September 8, 2009.

168. This might be particularly true if the West Bank Trench option is chosen.

169. Data provided by the Southern California Association of Governments.

170. US Census American Factfinder.

171. Yahoo Prices. http://realestate.yahoo.com/Homevalues (Accessed June 2, 2011).

172. Data provided by the Southern California Association of Governments.

173. Ibid.

174. Ibid.

175. Ibid.

176. Ibid.

177. Source: Longitudinal Employer Household Dynamics, Local Employment Dynamics partnership. http://lehdmap.did.census.gov (Accessed March 30, 2011).

178. Ibid.

179. Ibid.

180. More specifically, we interviewed the following: Michael Litschi, Section Manager, Metrolink Operations, OCTA; Danny Wu, Principal Transportation Planner, Anaheim Department of Public Works; Jamie Lai, Transit Manager, Anaheim Department of Public Works; David Kennedy, Associate Transportation Planner, Department of Public Works; Susan Kim, Senior Planner, Anaheim Planning Department; G.B. Arrington, Vice President Parsons-Brickerhoff; Todd Osborne and Herman Howard, Vice Presidents HOK/Transit.

181. City of Anaheim, *Platinum Triangle Master Land Use Plan.* April 21, 2007.

182. *A Gateway to the Future: The Anaheim Regional Transportation Intermodal Center*, http://www.articinfo.com/PDF/ARTIC_factsheet%203-9-11%20FINAL.pdf (accessed June 23, 2011).

183. *A Gateway to the Future.*

184. Ibid

185. Dan Weikel, "Orange County's planned mega transit center questioned," *Los Angeles Times* January 13, 201 1. http://articles.latimes.com/print/2011/jan/13/local/la-me-artic-transit-station-20110113 (accessed June 22, 2011).

186. *A Gateway to the Future.*

187. US Census 2010.

188. Yahoo Prices. http://realestate.yahoo.com/Homevalues (Accessed June 2, 2011).

189. Data provided by the Southern California Association of Governments.

190. Ibid.

191. Ibid.

192. Ibid.

193. Ibid.

194. Longitudinal Employer Household Dynamics, Local Employment Dynamics partnership. http://lehdmap.did.census.gov (Accessed March 30, 2011).

195. Ibid.

196. Ibid.

197. Ibid.

198. Norwalk and Santa Fe Springs are neighboring cities separated by the rail alignment. Presently, it is not clear if the HSR station will be located within the boundaries of Norwalk or Santa Fe Springs.

199. According to Latham, unlike the situation in Southern California, there is not a regional government involved in Northern California. Instead, Caltrain negotiates with the CaHSRA on behalf of cities. Recently, some cities have become more actively engaged in opposition to the project, with Palo Alto and Menlo Park taking the lead.

200. US Census 2010.

201. Yahoo Prices. http://realestate.yahoo.com/Homevalues (Accessed June 2, 2011).

202. Association of Bay Area Governments, Projections 2009 San Francisco Bay Area Population, Household and Jobs Forecasts, May 2009.

203. Ibid.

204. Ibid.

205. Ibid.

206. Ibid.

207. Longitudinal Employer Household Dynamics, Local Employment Dynamics partnership. http://lehdmap.did.census.gov (Accessed March 30, 2011).

208. Ibid.

209. Ibid.

210. More specifically, we interviewed the following: Sam Liccardo, member of the San Jose City Council; Laurel Prevetti, Deputy Director, Department of Planning, Building and Code Enforcement; Ben Tripousis, Transportation Policy Manager, San Jose

Department of Transportation; Dennis Korbiak, Manager for Strategic Planning, San Jose Redevelopment Agency, Cary Greene, Airport Planner, San Jose Mineta International Airport, and Frank Fuller, Principal, Field Paoli Architects.

211. See Herman Huang, "The Land Use Impacts of Urban Rail Transit System," *Journal of Planning Literature* 11(1) (1996): 17-30.

212. California is under major financial straits and Governor Jerry Brown is proposing the abolition of all the redevelopment agencies in California as a cost-saving measure.

213. In April 2011, the HSRA invited seven cities, all near the initial HSR construction segment, to apply for funding to spearhead locally led station planning efforts. The cities invited to apply are: Merced, Fresno, Tulare/King, Bakersfield, San Jose, Gilroy, and Palmdale. According the HSRA's website, "the funds availableto each city may be as much as $400,000-$700,000 from federal stimulus funding and up to $200,000 from state funding." (http://www.cahighspeedrail.ca.gov/pr_localplanninggrants.aspx). Our interview with Councilman Liccardo took place prior to the grant announcement.

214. Public land owners include the City of San Jose, Caltrain Peninsula Joint Powers Authority, and Valley Transportation Authority (Santa Clara County).

215. "Introduction," Diridon Station Area Plan, prepared by Field Paoli et al. (Draft 2011) http://www.sanjoseca.gov/planning/diridon/Diridon_Station_Area_Plan.asp, 1-3.

216. Ibid, 1-2.

217. US Census 2010.

218. Ibid.

219. Data provided by the Fresno Council of Governments.

220. US Census 2010.

221. Yahoo Prices. http://realestate.yahoo.com/Homevalues (Accessed June 2, 2011).

222. Data provided by the Fresno Council of Governments.

223. Ibid.

224. Ibid.

225. Ibid.

226. Ibid.

227. Longitudinal Employer Household Dynamics, Local Employment Dynamics partnership. http://lehdmap.did.census.gov (Accessed March 30, 2011).

228. Ibid.

229. Ibid.

230. More specifically, we interviewed the following: Mike Dozier, Lead executive, California Partnership for the San Joaquin Valley and Director of Community and Economic Development, California State University, Fresno; Craig Scharton, Director, Downtown and Community revitalization Department, Fresno; Jan Minami, Executive Director, Downtown Association of Fresno; Ed Graveline, rail consultant for the city of Fresno; Stefanos Polyzoides, (Moule & Polyzoides Architects).

231. Currently, Chinatown is close to the downtown core but is separated by railway lines. According to Jan Minami, raising the rail lines would add to the cohesion of downtown.

232. At present, the Fulton Mall is not doing well commercially . Moule & Polyzoides are proposing to reinstate vehicular traffic at the mall. They are opposed by some Fresno preservationists who want to keep the mall as is.

233. Date provided by the Association of Bay Area Governments, Projections 2009 San Francisco Bay Area Population, Household and Jobs Forecasts, May 2009.

234. US Census 2010.

235. Yahoo Prices. http://realestate.yahoo.com/Homevalues (Accessed June 2, 2011).

236. Data provided by the Association of Bay Area Governments, Projections 2009 San Francisco Bay Area Population, Household and Jobs Forecasts, May 2009.

237. Ibid.

238. Ibid.

239. Ibid.

240. Ibid.

241. Longitudinal Employer Household Dynamics, Local Employment Dynamics partnership. http://lehdmap.did.census.gov. (Accessed March 30, 2011).

242. Ibid.

243. Ibid.

244. Hatch Mott MacDonald. *A Review of the California High Speed Train Preliminary Alternatives Analysis Report: San Jose to Merced Section High-Speed Train EIR/EIS*. Prepared for the City of Gilroy, California, August 2010.

245. Hatch Mott MacDonald, 2010.

246. Hatch Mott MacDonald, 2010, 19.

247. Hatch Mott MacDonald, 2010, 19.

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ABOUT THE AUTHORS

ANASTASIA LOUKAITOU-SIDERIS

Anastasia Loukaitou-Sideris is Associate Dean of the UCLA School of Public Affairs and Professor at the UCLA Department of Urban Planning. Her area of specialization is urban design, physical and land use planning. She has published extensively on issues of downtown redevelopment, inner-city revitalization, transit-oriented development, design and transit safety, and parks and open spaces. She has served as a consultant to the Transportation Research Board, Federal Highway Administration, Southern California Association of Governments, South Bay Cities Council of Government, Los Angeles Neighborhood Initiative, Mineta Transportation Institute, Robert Wood Johnson Foundation, the Greek government, and many municipal governments on issues of urban design, open space development, land use and transportation. Her research has been supported by the U.S. and California Departments of Transportation, the Haynes Foundation, the National Endowment for the Arts, the Mineta Transportation Institute, the California Policy Research Seminar, the Poverty and Race Research Action Council, the UCLA International Institute, and the UCLA Institute of American Cultures. Her books include *Urban Design Downtown: Poetics and Politics of Form* (1998), *Jobs and Economic Development in Minority Communities* (2006), *Sidewalks: Conflicts and Negotiation over Public Space* (2009), and *Companion to Urban Design* (2011).

DANA CUFF

Dana Cuff is a professor, author and practitioner in architecture. Her work focuses on affordable housing, modernism, suburban studies, the politics of place, and the spatial implications of new computer technologies. Cuff's research on postwar urbanism was published in a book titled The Provisional City (MIT 2000), and she recently edited *Fast Forward Urbanism* with Roger Sherman (Princeton Architectural Press 2011). She founded cityLAB in 2006 and has since concentrated her efforts around issues of the emerging metropolis. Dr. Cuff is widely published, the recipient of numerous fellowships, and she lectures internationally.

HARRISON HIGGINS

Harrison Higgins joins cityLAB as its Associate Director and Researcher in Architecture and Urban Design. He is an architect by training, via Princeton and SCIArc, and an urban designer and community planner by practice. Prior to joining cityLAB he was associate director of the Florida Planning and Development Lab. Higgins' own research interests – concerning the cultural aspects of neighborhood change; planning and design for environmental hazards, urban mobility and transportation; and new forms of spatial data representation – have been funded by various Federal and state agencies and foundations. Each of his research areas is particularly important to Los Angeles, to architecture's relevance in an urban context, and to cityLAB.

WENBIN WEI

Wenbin Wei is an associate professor in the Department of Aviation and Technology and an affiliated professor in the Department of Industrial and System Engineering, at San Jose State University. He is the director of the Human Automation Integration Lab (HAIL) and a research associate at the Mineta Transportation Institute. He holds a Ph.D. from University of California, Berkeley, majoring in transportation engineering and management, with minors in economics, and in industrial engineering and operations research. He has a master of science degree from Carnegie Mellon University with a concentration in computer-aided engineering and management. Before joining the faculty at San Jose State University, Dr. Wei worked as a postdoctoral researcher at both the California PATH program and the NEXTOR aviation research center from 2000 to 2001. He was a research analyst in the Department of Operation Research and Decision Support at American Airlines from 2001 to 2003. Dr. Wei's main research and teaching interests include transportation planning, urban transportation, public transportation, air traffic control and management; airline operations and management; airport planning and management; logistics; and supply chain management.

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