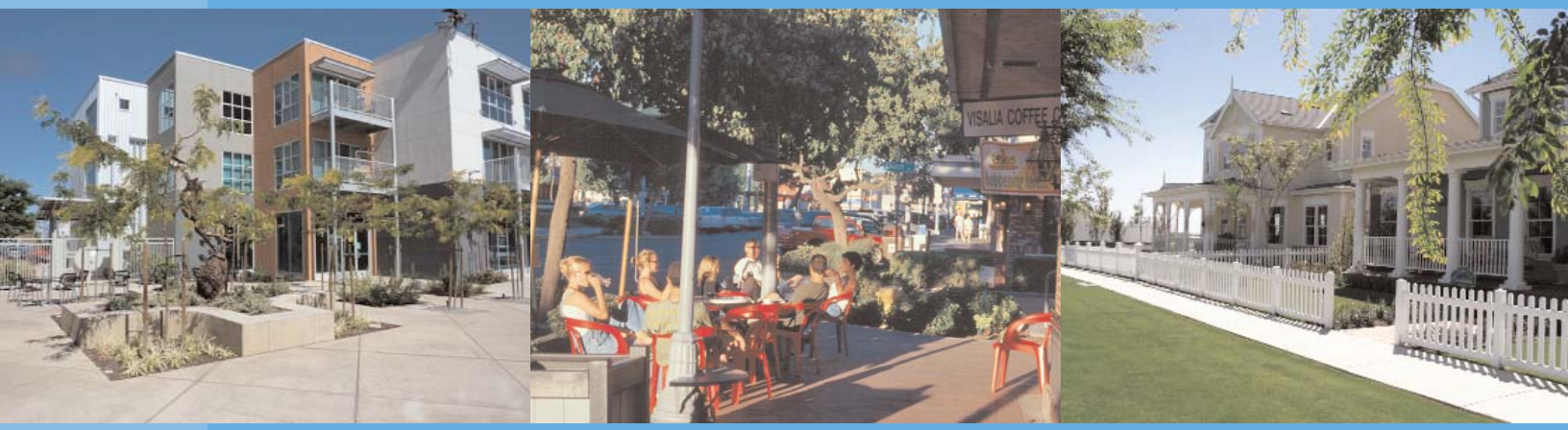

A Home for Everyone

San Joaquin Valley Housing Preferences and Opportunities to 2050

ARTHUR C. NELSON

COUNCIL OF INFILL BUILDERS

Council of Infill Builders

The Council of Infill Builders is a 501(c)(3) nonprofit corporation of real estate professionals committed to improving California through infill development. Infill development revitalizes neighborhoods and communities, provides transportation choices, creates viable close-knit, mixed-use areas, reduces greenhouse gas emissions, and improves the overall economy. Our organization seeks to educate the public and decision-makers about these benefits by conducting and supporting research on market-based solutions for healthy, prosperous and convenient communities.

The Council of Infill Builders is pleased to present this report as a contribution to the scholarship on infill development in California. We hope that this scholarship and data will inform the decision-making process related to growth and development and lead to improved outcomes for California's cities and counties.

For more information:
councilofinfillbuilders.org ▪ staff@councilofinfillbuilders.org

■ This report is available online:

councilofinfillbuilders.org/resources/valley-housing.html

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Prepared for the Council of Infill Builders
editing + design: Dave Davis

January 23, 2013

What's Inside

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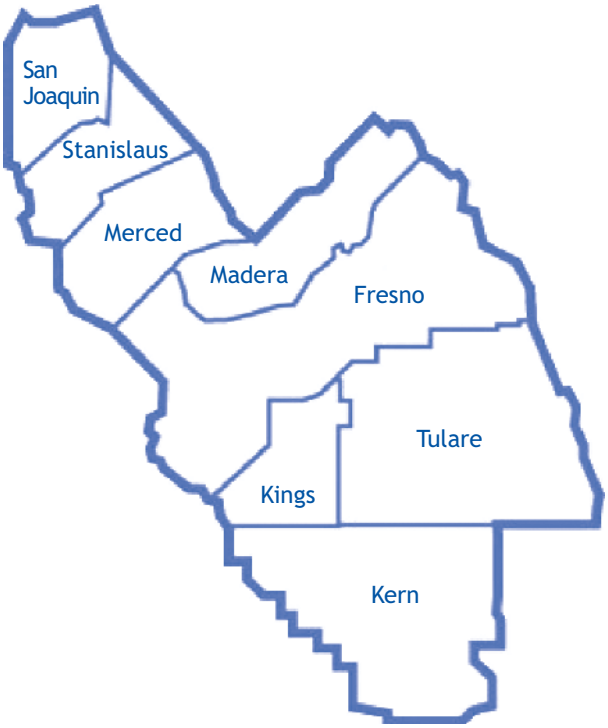
Executive Summary

People are coming to the San Joaquin Valley. California's fastest-growing region will grow in household population by 72% over the next four decades, from 3.8 million in 2010 to 6.6 million in 2050. That growth will require creating homes for nearly 700,000 new households.

If future decision-making followed past trends, Valley leaders would accommodate most of this growth through large-lot, low-density, single-family homes: approximately 90% of the average annual residential permits issued in the Valley during 1990-2011 were for single-family homes.

In addition, the past model of decision-making would enable the conversion of hundreds of thousands of acres of farmland to development to accommodate the millions of new residents. As a recent report from the American Farmland Trust found, Valley cities and counties are on pace at current trends to convert nearly 600,000 acres of irreplaceable farmland by 2050, resulting in lost economic value of $100-$190 billion.



The San Joaquin Valley's Eight Counties

But that growth scenario presumes the housing market of the future looks like the housing market of the past. This report challenges that assumption. By analyzing the latest economic and demographic trends facing the Valley, it finds that market trends are fostering a renaissance for the region's cities and towns with more demand for walkable neighborhoods and homes closer to jobs and transit. The housing market of the future should therefore look noticeably different from business-as-usual development of the past.

The Valley's leaders are currently engaged in a planning process to adopt growth and transportation plans for the next several decades as part of implementation of Senate Bill 375, California's Sustainable Communities and Climate Protection Act (Steinberg, 2008), which will culminate in October 2013.

"This study highlights forces of change including economic and financial trends, rising energy prices, and new population dynamics that will influence the future of the San Joaquin Valley. The forces of change give rise to the importance of planning for future generations by expanding housing options and choices. While many of the changes ahead are unclear, we can make choices today that build more sustainable communities, resilient in the area of change and offering residents a high quality of life."

— Patrick Kelly, AICP, Planning Manager, City of Modesto

The Council of Infill Builders therefore presents this report to help Valley residents and leaders plan for the new growth in ways that can improve and strengthen communities and quality of life. The report analyzes real-estate trends and opportunities and poses a Scenario for the future growth of the San Joaquin Valley and its eight counties to 2050.

CHANGING DEMAND IN THE VALLEY

This report's key finding — based on consumer preference data and economic trends — is that the majority of future demand for new homes in the Valley will be for apartments, townhomes and small-lot, single family homes in walkable neighborhoods.

This report builds upon a 2012 study prepared for the Fresno Council of Governments on behalf all of the Valley's regional agencies by The Concord Group. That study projected that up to 45% of all new occupied residential units built between 2010 and 2050 should be attached units — such as apartments and townhomes — in order to meet market demand by 2050. Using that data, this report analyzes likely demand for different types of detached, single-family housing units — providing Valley leaders and residents with a broader assessment of housing supply and demand in the Valley.

Preference surveys for the entire San Joaquin Valley, as well as a recent a consumer survey for Kern County, indicate that by 2050 up to 48% of the total housing demand will be for single-family homes on smaller lots (6,000 square feet or less). But only 5% of the current supply of single-family homes in the Valley are on small lots. Therefore, Valley leaders will need to build potentially all new single-family homes to 2050 on small lots to meet projected market demand.

Economic and financial trends may also encourage Valley residents to reduce commutes and live in mixed-use, walkable communities. Rising gasoline prices and increasing traffic congestion may motivate people to live closer to their jobs. Between 2002 and late 2012, for example, gasoline prices rose by more than 10% per year compounded, or four times faster than inflation. If Valley leaders implement the strategy outlined in this report, the region's homes of the future will consume less farmland and be more connected to vibrant, walkable neighborhoods — a trend driven both by consumer demand and economic changes.

THE VALLEY IS NOT PREPARED FOR NEW HOUSING TRENDS

While this report finds that residents may increasingly demand apartments, townhomes and single family homes in walkable neighborhoods, the overwhelming majority of existing housing supply in the valley is single-family homes on larger lots. Valley communities may already have about as many existing homes on larger lots (those over 6,000 square feet) in 2010 as they need by 2050. While these homes may have met demand in the past, emerging markets appear to prefer different housing options, and Valley leaders should adjust planning and zoning regulations accordingly.

The Scenario presented in this report suggests that Valley decision-makers can better match supply and demand by ensuring that all new detached units feature small-lot configurations in walkable communities.

Figure A indicates the current 2010 supply and projected 2050 demand for attached (apartments, townhomes and condominiums), smaller-lot, walkable single-family detached homes, and large-lot conventional single-family homes ("all other lots"). By comparing current supply to future demand, Figure A reveals the nature of future demand for these broad housing types.

Valley residents and leaders would therefore be wise to anticipate these changes and plan for them. Several Valley cities have already begun this process. For example, the City of Turlock recently amended its general plan to include a housing mix that looks substantially different from past patterns but very similar to the Scenario.

HOW THE VALLEY CAN ADDRESS THE CHALLENGE

To address these coming changes, Valley leaders can substantially reshape the region by accommodating a large share of new growth through the infill and mixed-use redevelopment of existing nonresidential areas. Much of the current developed urban footprint in the Valley is in low-density configurations along major corridors and in urban centers. Almost all nonresidential development outside Valley downtowns is built at a floor-area-ratio (FAR) of less than 0.20, meaning that at least 80% of the land on which these

This report found that the majority of future demand for new homes in the Valley will be for apartments, townhomes and small-lot, single family homes in walkable neighborhoods. Valley communities may already have about as many existing homes on larger lots (those over 6,000 square feet) in 2010 as they need by 2050.

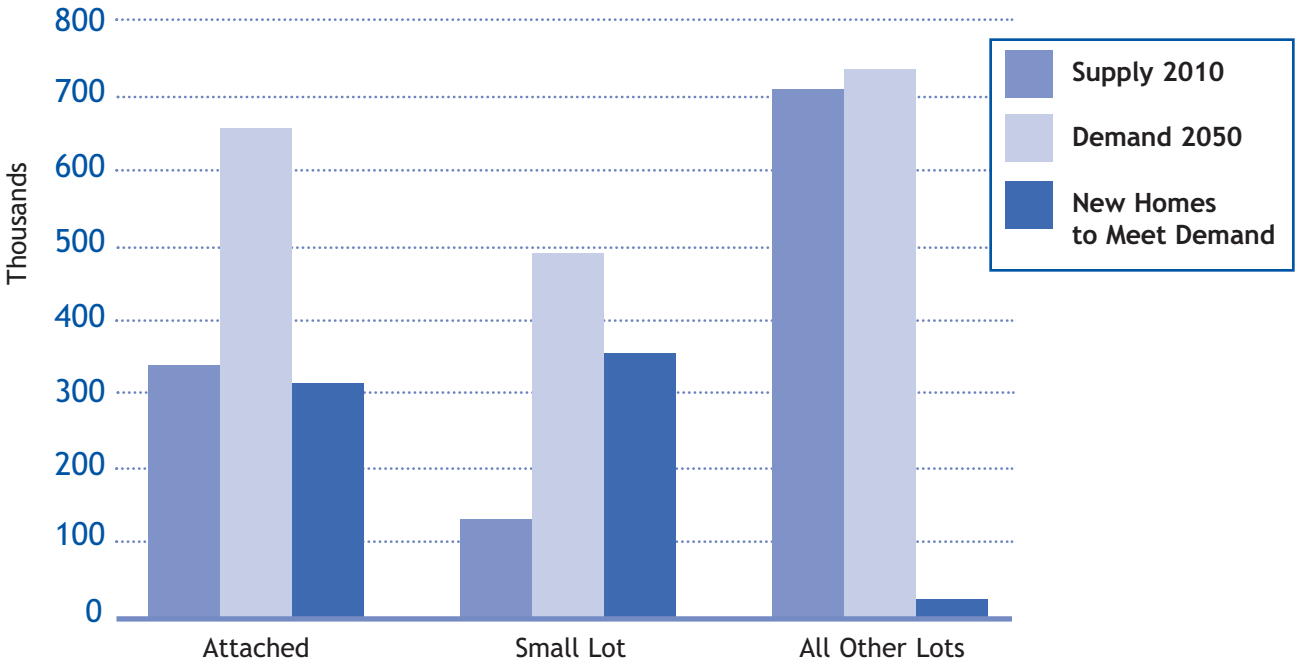


Figure A. Supply of Occupied Units by Housing Type (2010), Demand by 2050, and Additional Homes to Meet Projected Demand for 2010-2050

structures sit is used for parking, loading, storage or other non-structural uses, a highly unsustainable and extremely inefficient land-use development model.

With only minor changes to zoning and development regulations to facilitate a mix of uses, cities and counties can accommodate substantially more housing, commercial and retail activity along these corridors and centers without compromising parking needs. The result would be more efficient use of land supporting these activities, less new farmland to be developed, and facilities that can be provided at less cost per unit of development served.

This report finds that nearly all nonresidential growth, as well as all new attached residential demand, could be accommodated through the infill and redevelopment of existing low-density areas, substantially reducing pressure to develop new farmland.

In addition to seizing infill and redevelopment opportunities, Valley leaders should require that any new communities are mixed-use and connected to existing centers. They can develop public-private-nonprofit partnerships to take advantage of emerging market opportunities.

Elected officials and planners in the Valley will have to balance competing demands to make decisions about the future of their communities. This report seeks to inform this process by highlighting the dual, mutually reinforcing opportunities to provide a mix of housing types to meet the needs of a diverse new market while also helping to preserve one of the valley's most prized natural and economic resources — its irreplaceable farmlands. Ultimately, Valley leaders can accomplish both objectives with the support of local residents, businesses and supportive state policies.

"Coincidentally and through an entirely independent analysis, the City of Turlock concluded in its recently adopted general plan that only 55% of housing growth needs to be single-family, thereby correcting the over-production of single-family units (83%) that occurred during the last housing boom. By the end of the planning period, the city will have a market-based housing mix that provides more affordable housing opportunities to meet the needs of a growing and changing community."

— Debbie Whitmore, Deputy Director, Development Services, City of Turlock

Major Trends Facing the San Joaquin Valley

People are coming to the San Joaquin Valley. California's fastest-growing region will grow in household population by 72% over the next four decades, from 3.8 million in 2010 to 6.6 million in 2050. That growth will require creating homes for nearly 700,000 new households.

If the past is any indication of future decision-making, most of this growth will be accommodated in large-lot, low-density, single-family homes: approximately 90% of building permits over the past decade in the Valley have been issued for this kind of housing. Hundreds of thousands of acres of farmland will be converted to development to accommodate the millions of new residents.

As a recent report from the American Farmland Trust (Unger and Thompson 2013) found, Valley cities and counties are converting their irreplaceable farmland resources to development at an alarming rate. If current trends continue, nearly 600,000 acres of farmland will be permanently converted by 2050, resulting in lost economic value of $100-$190 billion.

The Valley's leaders are currently engaged in a planning process to adopt growth and transportation plans for the next several decades as part of

Table A. Household Population Projections for the San Joaquin Valley

Year	Household Population	White, non-Hispanic	Hispanic All Races	All Other Races	Total New Majority	New Majority Share
2010	3,848,803	1,451,451	1,820,337	577,015	2,397,352	62%
2020	4,513,592	1,199,020	2,548,665	765,907	3,314,572	73%
2035	5,557,357	935,319	3,583,472	1,038,566	4,622,038	83%
2050	6,632,787	729,408	4,592,912	1,310,467	5,903,379	89%
2010-20	664,789	(252,431)	728,328	188,892	917,220	143%
2010-20%	17%	-17%	40%	33%	38%	----
2010-35	1,708,554	(516,132)	1,763,135	461,551	2,224,686	131%
2010-35%	44%	-36%	97%	80%	93%	----
2010-50	2,783,984	(722,043)	2,772,575	733,452	3,506,027	129%
2010-50%	72%	-50%	152%	127%	146%	----

* Figures more than 100% indicate white, non-Hispanic population reductions are offset by growth in the New Majority. Figures may not sum due to rounding.

Source: Adapted from The Planning Center (2012) based on the sum of individual counties.

implementation of Senate Bill 375, California's Sustainable Communities and Climate Protection Act (Steinberg, 2008), which will culminate in October 2013.

The Council of Infill Builders therefore presents this report to help Valley residents and leaders plan for the new growth in ways that can improve and strengthen communities and quality of life. The report analyzes real estate trends and opportunities and poses a Scenario for the future growth of the San Joaquin Valley's eight counties to 2050.

Table A shows the growth projected for the San Joaquin Valley as a whole as developed by The Planning Center.[1] It includes projections of the household population as well as projections for white non-Hispanics, Hispanics of all races, all other people, and the total "New Majority" household population (comprised of Hispanics of all races plus Asians, African Americans, Native Americans and others), including their share, over the period 2010 to 2050. The table also details the changes in household population from 2010 to 2020, 2035 and 2050. (Figures for the eight individual counties are available in the appendices.)

While the San Joaquin Valley will grow substantially, it will also become much more diverse as the white non-Hispanic population actually declines while Hispanics of all races become an even more dominant ethnic group.

Although many other changes are also occurring, three are highlighted here: tighter home mortgage financing, lagging incomes and rising gasoline prices. These, plus overall demographics, become key factors that need to be considered when projecting housing demand.

TIGHTER MORTGAGE FINANCING

The "Great Recession" of 2008-09 was caused in large part by the bursting of the"housing bubble" in the middle 2000s. Banks and other financial institutions were closed, home equity saw its biggest decline since the start of the Great Depression, and millions of homes were foreclosed or "sold short" to avoid foreclosure.

Numerous policy changes have come in the wake of this financial disaster. One of the changes is more rigorous analysis of prospective borrowers, often leading to higher credit scores to qualify. Another is that down payment requirements are increasing. This may affect home ownership rates substantially. In 2011, for instance, about two-thirds of American households were living in homes either owned outright or with a mortgage, and about two-thirds of those with a mortgage put less than 20% down.

The National Association of Home Builders worries that requiring 20% down "would disqualify about 5 million potential home buyers,"[2] and this, in turn, would reduce the nation's home ownership rate to about 60% from the 2010 level of about 65%.[3]

Consumers also appear to be changing their attitudes about buying homes. Cunningham (2009) of the National Foundation for Credit Counseling summarizes results of a 2009 survey it commissioned: "The lack of confidence in consumers' ability to buy a home, improve their current housing situation, or trust homeownership to provide a significant portion of their wealth sends a strong message about the impact of the housing crisis. It appears that whether a person was directly affected or not, Americans' attitudes toward homeownership have shifted." (2009: 1)

The survey also found that:

1. Almost one-third of those surveyed — representing about 72 million people — do not think they will ever be able to afford to buy a home.
2. 42% of those who once purchased a home, but no longer own it, do not think they will ever be able to afford to buy another one.

3. Of those who still own a home, 31% do not think they will ever be able to buy another home (upgrade from an existing home, buy a vacation home, etc.).

Home ownership in the United States and California peaked in the mid-2000s and has declined since. It is expected to continue to fall in the coming years — with the only question being how much lower.

LAGGING INCOME

Since the end of World War II, Americans have enjoyed consistently rising incomes. Between 1953 (the earliest year available) and 2000, median household income rose nearly 2.5 times in constant dollars.[4] Inflation-adjusted median household income in 2010, however, was 6% lower than in 2000.

In its projections of future jobs, data from the California Employment Development Department indicate that the mean annual salary of all occupations in the state will remain about the same between 2010 and 2020.[5] Projections for the San Joaquin Valley over the period 2008 to 2018 are similar.[6] Stagnating incomes will moderate the ability of households to buy homes.

RISING ENERGY COSTS

Since the end of World War II, home ownership in the U.S. rose steadily, going from 55% in 1950[7] to 69% in 2004.[8] A key reason was the vast supply of inexpensive land available for home building outside cities. Another reason was cheap gasoline: the cost of driving to work and other destinations was low.

Since 2000, energy prices have been rising steadily in real terms . Locations far away from work, shopping and other destinations are more expensive because of rising vehicle fuel costs. From 2002 to 2012, the national average price of a gallon of gasoline rose more than 10% per year (compounded).

At this rate, gasoline prices may approach $8 per gallon by 2020 and perhaps more than $15 per gallon by 2030. While higher gasoline prices may be offset by more fuel-efficient vehicles, they tend to be more expensive than conventional vehicles.

Steadily increasing gasoline prices will dampen the attractiveness of sub-urban fringe and exurban areas for home buying. On the other hand, homes closer to jobs and services are usually more expensive to purchase. As a consequence, consumers may demand more rental housing in areas that require less driving.

KEY FINDINGS

These trends, plus the demographic changes outlined below, result in a housing market of the future that has little in common with the past.

- The ability to buy homes in the future may not be as easy as it was during the housing bubble of the 2000s. Higher mortgage underwriting standards plus higher down payments may mean lower home ownership rates in 2020, 2035 and 2050 than in 2010, which was already lower than 2000.
- Prospective buyers may also become more cautious in the future than the past in assuming their homes will appreciate in value.
- Incomes in 2020 may not be higher than in 2010, which were lower in real terms than 2000.
- Gasoline prices are rising several times faster than inflation and this may affect decision-making about where to live — and buy — probably to 2020 and beyond.

Professor Dowell Myers of the University of Southern California also identifies key demographic trends that will lead to more attached housing demand, as well as demand for smaller homes perhaps on smaller lots in the decades to come. Some key findings, along with their implications for the Scenario include:[9]

- The period from the late 2000s into the 2020s and perhaps beyond will see resurgence in the demand for attached housing, especially rental apartments.
- Baby boomers will sell off their homes between 2015 and 2040. Growing areas may be able to absorb many of the suburban homes that these seniors will sell off, but the result is that demand for new, especially large-lot suburban homes may be dampened.
- The market may return to the housing norms seen from the 1960s into the 1980s. They included a larger share of rental housing and apartment construction than subsequent eras. Those norms also included higher down payments for homes.

As will be seen in the next several chapters, there are also emerging market preferences for new communities along with and infill/redevelopment that integrate different land uses, provide mixed-housing options, and enhance accessibility to key destinations through multiple modes of transportation. The overall effect of these factors may be substantially more demand than in the recent past for smaller homes on smaller lots, more rental units through new construction, and the conversion of owner-occupied homes into rental units, including accessory dwelling units.

PERSPECTIVES

The Scenario presented in this report makes the case that all new attached residential and nonresidential development could be directed to infill and redevelopment of existing developed areas; that about 45% of all new housing demand will be for attached options (apartments, townhouses, condominiums); and that nearly all the demand for new detached residential units will be for lots of 6,000 square feet or less.

This is based on a number of key perspectives:

1. The demographic profile of the San Joaquin Valley is changing dramatically. The Valley is projected to add nearly 3 million people by 2050, most of whom will what may be termed the "New Majority," comprised of Hispanics of all races plus Asians, African Americans, Native Americans and others. In contrast, the white non-Hispanic population is projected to fall by more than 700,000. Because New Majority households own homes at a lower rate than white non-Hispanic households, their population increase may impact on the demand for owner-occupied homes.
2. There will be a larger market for substantially more attached products, especially rental apartments. There will also be a bigger market for substantially more smaller detached homes on smaller lots.

"The region has historically under-delivered higher-density housing, particularly for renter households."

— The Concord Group, report prepared for Fresno County Council of Governments

3. The place where most of this redevelopment could occur will be outside downtowns and in suburban communities, especially along commercial corridors. They are also composed mostly of low-rise structures at relatively low FARs.

   Infill and redevelopment creates important benefits. It revitalizes neighborhoods and communities, provides the opportunity to expand transportation choices, enhances viable close-knit, mixed-use areas, reduces greenhouse gas emissions, and improves the overall economy (Nelson 2013).

   Unfortunately, because local governments have been stripped of key redevelopment powers, large-scale infill and redevelopment may be more difficult, at least in early years of the Scenario. However, the Legislature appears poised to re-establish the core functions of redevelopment, albeit updated with a focus on meeting the state's environmental goals.

4. Much of the rest of the demand for new development should be in new communities and other developments near existing urban and suburban centers that include mixed uses, such as mixed-residential options connected to the centers.

The Scenario begins by reviewing emerging San Joaquin Valley citizen support for transportation options as well as the preservation of farmland and open spaces. These preferences can help to explain emerging market preference for more mixed-use development with more attached and small-lot detached home options than in the past.

1.Support for Transportation Options and Preservation of Farmland and Open Spaces

Estimates of support for transportation options and for preserving farmland and other open spaces presented here are based on the Kern Council of Governments' annual Community Survey, most recently for 2012, but also including historic surveys for reference.

For the past several years, the Kern Council of Governments (COG) has used Godbe Research (2012) to gauge opinions of county residents. The Kern County survey is an opinion survey as opposed to a stated preference survey, the distinction between which will be made later.

The Kern County survey has the largest sample size and is the longest-running of any survey in the San Joaquin Valley. It is assumed that views of Kern County residents are reasonably consistent with those of the San Joaquin Valley as a whole. Later in this report, comparisons will be made between the Kern County survey with subsamples of San Joaquin Valley and Central Valley respondents to statewide and national surveys, and a market analysis by The Concord Group, that will demonstrate the reasonableness of this assumption.

Table 1.1. Support for Transit, Sidewalk, Bike Lanes, and Alternatives to Driving Alone among All Respondents

	Not important to extremely important					
	0	1	2	3	4	3+4
Expanding local bus services						
2012	5%	5%	20%	27%	41%	68%
2008	6%	5%	20%	28%	39%	67%
Improving public transportation to other cities						
2012	5%	5%	18%	28%	44%	72%
2008	5%	8%	17%	27%	43%	70%
Maintaining and improving sidewalks and bike lanes						
2012	2%	6%	14%	33%	45%	78%
2008	5%	5%	20%	27%	43%	70%
Providing public transportation, carpooling and other alternatives to driving alone						
2012	4%	6%	18%	31%	41%	72%
2009*	4%	7%	21%	30%	38%	68%

* Question was not asked in 2008. Figures may not sum due to rounding.

Source: Adapted from Godbe Research (2012).

The 2012 edition was based on a telephone survey of 1,201 residents gauging (a) overall opinions of the quality of life, (b) the importance of issues related to future quality of life, and (c) housing options. Because the survey has been conducted for several years, many questions have been asked regularly over the years. This allows for tracking of changes in opinions over time. Because of its large size, the survey also provides the opportunity to understand how opinions vary by demographic group.

Finally, because almost all growth in the San Joaquin Valley to 2050 is projected to be attributable to the Hispanic population, the tables below summarize survey results for all respondents as well as Hispanic respondents.

SUPPORT FOR TRANSPORTATION OPTIONS

The survey asked respondents four questions relating to their support for transit, sidewalks, bike lanes, and providing alternatives to driving alone from the late 2000s to 2012. The results are reported in Table 1.1. The 2012 Godbe Research survey shows that support for:

- Expanding local bus service increased from 67% (2008) to 68%.
- Improving public transportation to other cities increased from 70% (2008) to 72%.

Table 1.2. Support for Transit, Sidewalk, Bike Lanes and Alternatives to Driving Alone among Hispanic and Non-Hispanic Respondents in 2012

	Not important to extremely important						
Preference	0	1	2	3	4	3+4	
Non-Hispanic Respondents							
Expanding local bus services	7%	9%	24%	25%	34%	58%	----
Improving public transportation to other cities	7%	8%	21%	27%	35%	63%	----
Maintaining and improving sidewalks and bike lanes	3%	8%	18%	32%	39%	71%	----
Providing public transportation, carpooling and other alternatives to driving alone	7%	8%	21%	31%	33%	64%	
Hispanic Respondents							**Difference**
Expanding local bus services	4%	2%	16%	29%	44%	73%	+25%
Improving public transportation to other cities	2%	2%	16%	28%	52%	80%	+27%
Maintaining and improving sidewalks and bike lanes	1%	3%	9%	35%	50%	85%	+20%
Providing public transportation, carpooling and other alternatives to driving alone	1%	4%	14%	31%	49%	80%	+26%

* Figures may not sum due to rounding. Source: Adapted from Godbe Research (2012).

- Maintaining and improving sidewalks and bike lanes increased from 70% (2008) to 78%.
- Providing public transportation, carpooling, and other alternatives to driving alone increased from 68% (2009) to 72%.

Assuming Kern County respondents' attitudes about transportation are reasonably comparable to those of San Joaquin Valley residents as a whole, one may conclude that two-thirds or more of them would support efforts to expand alternatives to driving alone.

Table 1.2 compares the level of support for alternatives to driving alone among non-Hispanic (mostly white) and Hispanic respondents. In every case, Hispanic residents' support for alternatives to driving alone exceeded those of non-Hispanics by 20% to 27%. About eight in ten Hispanic residents would support more options to driving alone.

Table 1.3. Support for Farmland and Open Space Preservation among All Respondents

	Not important to extremely important					
Year	0	1	2	3	4	3+4
Preventing the loss of farm land to residential and commercial development						
2012	4%	5%	15%	28%	48%	76%
2008	6%	5%	20%	28%	39%	67%
Preserving open spaces and native animal habitats						
2012	3%	5%	17%	28%	47%	75%
2008	5%	8%	17%	27%	43%	70%

* Figures may not sum due to rounding. Source: Adapted from Godbe Research (2012).

With Hispanics projected to account for most of the new growth in the San Joaquin Valley, their preferences should be an important consideration for long-range transportation planning and investment.

SUPPORT FOR FARMLAND AND OPEN SPACE PRESERVATION

Table 1.3 shows the level of support for preserving farmland and open space for all respondents for 2008 and 2012, while Table 1.4 compares support between Hispanic and non-Hispanic respondents for 2012. The level of support for farmland preservation among all residents has increased from two-thirds to three-quarters, while support for open space preservation has increased from 70% to three-quarters.

Support for farmland and open space preservation is higher among Hispanics than non-Hispanics, as seen in Table 1.4. As Hispanics are a substantial source of labor for the agricultural industry, one explanation may be that they are more concerned than others about losing the agricultural land base.

Table 1.5 shows that over the period 1990 to 2008, about a quarter million acres of agricultural land were taken out of production, mostly through conversion to urban development.[10] The rate of loss is equivalent to 0.22 acres of farmland per new resident, or more than three-quarters of an acre per new household. At this rate, development could reduce the inventory of farmland in the San Joaquin Valley by another 600,000 acres by 2050.

Table 1.4. Support for Farmland and Open Space Preservation among Hispanic and Non-Hispanic Respondents in 2012

	Not important to extremely important						
Preference	0	1	2	3	4	3+4	
Non-Hispanic Respondents							
Preventing the loss of farm land to residential and commercial development	5%	3%	14%	27%	49%	76%	----
Preserving open spaces and native animal habitats	5%	8%	19%	29%	40%	70%	----
Hispanic Respondents							**Difference**
Preventing the loss of farm land to residential and commercial development	4%	5%	8%	28%	54%	82%	+8%
Preserving open spaces and native animal habitats	2%	3%	14%	27%	54%	81%	+16%

* Figures may not sum due to rounding. Source: Adapted from Godbe Research (2012).

Table 1.5. Change in Agricultural Land 1990-2008, with Trend to 2050

Land Type	1990	2008	Change	% Change
High Quality Farmland	5,671,987	5,228,902	(443,085)	-8%
Farmland of Local Importance	327,909	491,199	163,290	50%
Grazing Land	4,844,267	4,875,106	30,839	1%
Agricultural Land Total	10,844,163	10,595,207	(248,956)	-2%
Population	2,742,000	3,885,963	1,143,963	42%
Land Change per Capita	----	----	-0.22	----
Population 2050	----	----	6,632,787	----
Population Change 2008-2050	----	----	2,746,824	----
Trend Agricultural Land Change	----	----	(597,780)	----

* Figures may not sum due to rounding. Source: Adapted from Unger and Thompson (2013).

KEY FINDINGS

Two key findings emerge from the Kern COG Community Survey that may be applicable to the San Joaquin Valley as a whole:

- More than two-thirds of all residents support transportation options such as adding buses, providing public transportation including expanded transit between cities, improving sidewalks and bike lanes, carpooling, and other alternatives to driving alone. Compared to non-Hispanic residents, Hispanic residents express substantially more support for these options.
- Three quarters of all residents and eight in ten Hispanic residents support farmland and open space preservation, a significant trend considering that the supply of agricultural land fell by about one-quarter of an acre per new resident from 1990 to 2008. At this pace, the Valley could lose 600,000 acres of productive farmland by 2050.

2.Housing Preferences, or What Valley Residents Want

This chapter uses the Kern COG 2012 Community Survey along with a 2004 survey by the Public Policy Institute of California (PPIC) and a 2011 survey by the National Association of Realtors (NAR) to establish the emerging market preference for attached, small-lot and all other detached-lot options.

KERN COG 2012 COMMUNITY SURVEY

Using the Kern COG survey, Table 2.1 shows that the level of support for developing a variety of housing options, including townhouses, condominiums and apartments, has increased from about half in 2008 to about two-thirds in 2012. However, the differences of support among Hispanic and non-Hispanic respondents are stark.

Table 2.2 shows that about half of non-Hispanic respondents supported expanding housing options in the 2012 survey, while nearly eight in ten Hispanic respondents did. As most of the projected population growth in the San Joaquin Valley will be comprised of Hispanic households, policy-makers should consider their level of support for expanding attached housing options.[11]

Table 2.1. Support for Developing a Variety of Housing Options among All Respondents

	Not important to extremely important					
Year	0	1	2	3	4	3+4
■ Developing a variety of housing options, including apartments, townhouses and condominiums						
2012	8%	7%	19%	32%	34%	66%
2008	8%	12%	27%	23%	29%	52%

* Figures may not sum due to rounding. Source: Adapted from Godbe Research (2012).

Table 2.2. Support for Developing a Variety of Housing Options among Hispanic and Non-Hispanic Respondents in 2012

	Not important to extremely important						
Preference	0	1	2	3	4	3+4	
Non-Hispanic Respondents							
■ Developing a variety of housing options, including apartments, townhouses and condominiums	11%	10%	24%	27%	27%	53%	----
Hispanic Respondents							**Difference**
■ Developing a variety of housing options, including apartments, townhouses and condominiums	5%	3%	14%	37%	41%	78%	+46%

* Figures may not sum due to rounding. Source: Adapted from Godbe Research (2012).

Another question related to the kinds of housing options respondents wanted to have. The choices were:

- Single-family home with a small yard.
- Single-family home with a large yard.
- Townhouse or condominium.
- A building with offices and stores on the first floor and condominiums on the upper floors (shortened to "condominiums in mixed-use buildings" in the tables below).
- Apartment.

It is important to note that respondents were not told the size range of a "small" or "large" yard, so their responses are in the context of what they perceive as small or large yards. This is common in surveys of this type. In the case of Kern County, most of the single-family detached homes sit on lots ranging between 6,000 and 10,000 square feet; this is the county's "typical" lot size.

Although survey developers do not know whether respondents occupying homes on typical lots consider their yards to be small or large, they assume respondents would consider small yards to be smaller than their present lot. As a general guide, the cities of Merced and Modesto define small lots as 3,000 square feet or less. Assuming Kern COG survey respondents perceive a small lot to be 6,000 square feet or less would seem to err on the side of overstatement.

Respondents could answer "definitely yes," "yes" or "no" to every option, creating the possibility that any given respondent could answer the same way for each. This is not a stated-preference question based on tradeoffs, only an indication of support for each housing option.

Table 2.3. Support for Housing Options, 2008-2012

Residential Type	Year	Yes + Definitely Yes	Change in Yes	No	Change in No
Single-family home with a small yard					
	2012	78%	+20%	21%	-38%
	2008	65%	----	34%	----
Single-family home with a large yard					
	2012	84%	0%	15%	0%
	2008	84%	----	15%	----
Townhouse or condominium					
	2012	52%	+30%	47%	-19%
	2008	40%	----	58%	----
Condominiums in mixed-use buildings					
	2012	28%	+33%	71%	-9%
	2008	21%	----	78%	----
Apartment					
	2012	35%	+21%	65%	-8%
	2008	29%	----	71%	----

* Figures may not sum due to rounding. Source: Adapted from Godbe Research (2012).

Table 2.3 shows support for housing options between 2008 and 2012. Some key trends are evident:

- Support for having the single-family home with a large-yard option stayed the same for both "yes" and "no" answers.
- Support for the single-family home with a small-yard option rose 20%, gaining share from those not wanting that option.
- Support for having the townhouse or condominium option rose by 30%, gaining share from those not wanting that option.
- Support for having the condominium in a mixed-use building option rose by 33%, gaining share from those not wanting that option.
- Support for having the apartment option rose by 21%, gaining share from those not wanting that option.

While the support for having the single-family home on a large lot remains the strongest among the options, that support has not changed as support for expanding other options has increased substantially. This is consistent with preferences seen in Tables 2.1 and 2.2.

Table 2.4. Support for Housing Options among Hispanic and Non-Hispanic Respondents

Residential Type	Yes	Definitely Yes	Yes + Definitely Yes	No
Non-Hispanic				
Single-family home with a small yard	41%	35%	76%	23%
Single-family home with a large yard	62%	20%	82%	17%
Townhouse or condominium	20%	28%	48%	49%
Condominiums in mixed-use buildings	11%	19%	30%	69%
Apartment	12%	19%	31%	68%
Hispanic				
Single-family home with a small yard	47%	32%	80%	20%
Single-family home with a large yard	67%	20%	87%	12%
Townhouse or condominium	23%	33%	56%	43%
Condominiums in mixed-use buildings	9%	17%	26%	73%
Apartment	13%	25%	37%	62%

* Figures may not sum due to rounding. Source: Adapted from Godbe Research (2012).

Table 2.4 shows the level of support for these options among Hispanic and non-Hispanic respondents in the 2012 survey. While Hispanic respondents supported the single-family home with large-lot option more than non-Hispanic respondents (87% to 82%), more of them also supported most other options than non-Hispanic respondents (80% support for a single-family home on a small lot compared to 76%, 56% support for townhouse or condominium compared to 48%, and 37% support for apartments compared to 31%).

Recall that the Kern COG's Community Survey did not explicitly require respondents to make choices between housing options. Instead, respondents could technically give "definitely yes" and "yes" answers to several housing types — and many did.[12] However, by normalizing responses with respect to the pool of all responses within the same survey group, one can create a continuum showing the normalized share of respondents favoring each choice. This adjustment is provided in Table 2.5 for the detached, condominium and townhouse, and apartment options.[13]

Table 2.5. Normalized Preferences for Detached and Attached Units

Residential Type	All	Non-Hispanic	Hispanic
Single-family home with a small yard	31%	32%	31%
Share of detached	48%	48%	48%
Single-family home with a large yard	34%	34%	33%
Share of detached	52%	52%	52%
Total Detached	**65%**	**67%**	**64%**
Townhouse or condominium	21%	20%	21%
Share of attached	60%	61%	60%
Apartment	14%	13%	14%
Share of attached	40%	39%	40%
Total Attached	**35%**	**33%**	**36%**

* Figures may not sum due to rounding. Source: Adapted from Godbe Research (2012).

Table 2.6. Preferences for Neighborhood, Home and Mixed-Use Features

Area	Central Valley	California	Nation
Own or rent an apartment or townhouse, and have an easy walk to shops and restaurants and have a shorter commute to work	37%	39%	63%
Own or rent a detached, single-family house, and have to drive to shops and restaurants and have a longer commute to work	63%	61%	62%

Source: Adapted from NAR (2011).

The results show that normalized preferences are for 65% detached and 35% attached units with minor variation among the respondent subsets. Notably, however, the split between small- and large-lot options is roughly even at 48% and 52% respectively, with little variation between respondent subsets. For the townhouse/condominium and apartment options, the split is 60% and 40%, again with little variation among respondent subsets.

As will be seen below, these results are consistent with the NAR and PPIC surveys. They are also consistent with The Concord Group's market analysis of the San Joaquin Valley that will be reviewed in the next chapter.

NATIONAL ASSOCIATION OF REALTORS COMMUNITY PREFERENCE SURVEY

In 2011, the National Association of Realtors commissioned a national poll to ascertain preferences of respondents between options. Theirs was a "stated preference" survey (as opposed to an "opinion" survey), where respondents are given only two choices from which they must pick one. Stated preference surveys, also called "forced choice" surveys, are used in market analysis to gauge the direction of consumers given roughly opposite choices.

One of the NAR's questions is pertinent to this Scenario. It asks respondents to indicate their preference between owning or renting an apartment or townhouse and having an easy walk to shops and restaurants and a shorter commute to work, or owning or renting a detached, single-family house and having to drive to shops and restaurants and a longer commute to work.

Because it was a national survey, only a subset of respondents representing the Central Valley (comprised of both the Sacramento and San Joaquin valleys) was of reasonable size for analysis.

Table 2.6 shows that 37% of Central Valley respondents would choose the attached-unit option while 63% of respondents would choose the detached-unit option. Figures for California and the nation are comparable. The figure is also remarkably close to the normalized choice for attached options (35%) from the Kern COG Community Survey.

PUBLIC POLICY INSTITUTE OF CALIFORNIA SURVEY

In 2004, the Public Policy Institute of California (PPIC) conducted a survey asking many of the questions used in the 2011 NAR survey. Unlike the NAR survey, there are enough respondents from this survey to reasonably represent the San Joaquin Valley. Three questions are relevant here. They pertain to the trade-off between small and large lots with respect to (a) short

Table 2.7. Preference for Lot Size and Accessibility to Destinations

Trade-off	San Joaquin Valley
1A. Would you choose to live in a small home with a small backyard if it means you have a short commute to work OR	48%
1B. Would you choose to live in a large home with a large backyard even if it means you would have a long commute?	52%
2A. Would you choose to live in a mixed-use neighborhood if it means you can walk to stores, schools, and services OR	41%
2B. Would you choose to live in a residential-only neighborhood, even if it means you have to drive to stores, schools, and services?	59%
3A. Would you choose to live in a neighborhood where single-family homes are close together if it means you could walk to parks and outdoor recreation OR	42%
3B. Would you choose to live in a neighborhood where single-family homes are far apart even if it means you have to drive to parks and outdoor recreation?	58%

Source: Adapted from PPIC (2004).

or long commutes,[14] (b) walking or driving to stores, schools and services, and (c) walking or driving to parks and outdoor recreation. The results are reported in Table 2.7.

If all response levels are given equal weight,[15] about 44% of San Joaquin Valley respondents would choose the small-lot option. Although this assumes certain attributes associated with the small lot, the responses are roughly consistent with the normalized small-lot preference indicated from the Kern COG Community Survey.

It should be noted that there are many reasons a household chooses to live where they do. Households trade off housing space, tenure and type with respect to location based on the time, distance and transportation costs to such destinations as working, shopping, recreation, and friends and family. A household with multiple wage earners makes even more complex trade-off decisions. The Kern County, NAR and PPIC survey results thus need to be interpreted in the context of preferences, all other things being equal.

KEY FINDINGS

Several key inferences emerge from these surveys:

- Nearly eight in ten Hispanic residents want expanded housing options compared to about half of non-Hispanic residents.
- While all respondents want the option to live in single-family homes with large yards, an increasing share also want options expanded to include single-family homes with small yards, townhouses and condominiums, condominiums in mixed-use buildings, and apartments. With the exception of condominiums in mixed-use buildings, it also appears that Hispanic respondents support more housing options than non-Hispanic respondents.
- The Kern COG Community Survey indicates that 65% of respondents prefer detached residential options and 35% prefer attached ones. This result is consistent with the NAR 2011 survey showing that 63% preferred detached options and 37% preferred attached ones for the Central Valley. It is also consistent with The Concord Group's projection of the market demand for new residential units constructed to 2050 (see Chapter 3).
- Among detached units, the PPIC 2004 survey shows that an average of 44% with a range of 42% to 48% of San Joaquin Valley respondents would prefer the small-lot option into the future. The normalized figure for the small-lot preference based on the Kern COG Community Survey is 48%.
- Based on these surveys and considering changing economic, housing finance, demographic and other factors, the Scenario thus assumes the following distribution of housing units by type in 2050:
  - 35% attached.
  - 25-30% small lot (6,000 square feet and less).[16]
  - 35-40% all other lot.

3.Market Demand and Market Viability for Attached and Detached Housing

In 2012, The Concord Group provided the San Joaquin Valley with its projections of the market demand for higher density housing as well as for detached units in five-year increments to 2050. It also projected the market viability for owner-occupied units. This chapter summarizes both analyses but, for Scenario purposes, it focuses on the market viability analysis.

Table 3.1 reports projections by The Concord Group of the market demand for occupied flats (apartments), townhouses and detached homes for the San Joaquin Valley over the periods 2010 to 2020, 2035, and 2050.

Table 3.1. Distribution of Residential Units Based on Market Demand Projections

Period	Total	Flats (10 or more units/acre)	Townhouses <10 units/ acre)	Total Attached	Attached Share	Detached	Detached Share
2010	1,186,475	148,361	192,434	340,795	29%	781,291	71%
2010-2020	1,292,492	187,940	222,248	410,188	32%	882,304	68%
Change 2010-20	**170,406**	**39,579**	**29,814**	**69,393**	**41%**	**101,013**	**59%**
2010-2035	1,619,237	251,694	268,440	520,134	32%	1,034,714	68%
Change 2010-35	**432,762**	**103,333**	**76,006**	**179,339**	**41%**	**253,423**	**59%**
2010-2050	1,882,447	319,079	315,136	634,215	34%	1,183,843	66%
Change 2010-50	**695,971**	**170,718**	**122,702**	**293,420**	**42%**	**402,552**	**58%**

* Figures may not sum due to rounding. Source: Adapted from The Concord Group (2012).

In short, The Concord Group estimates that there will be a demand for 695,971 new occupied housing units between 2010 and 2050. Of this, flats will comprise 170,718 units, townhouses 122,702 units, and detached homes 402,552 units. Together, the market demand for flats and townhouses comprises 42% of the entire demand for new units. If these units are built, the share of occupied attached units in the San Joaquin Valley will increase from 30% in 2010 to 34% in 2050.

The Concord Group indicates, however, that market demand and market viability may differ. While the market may demand certain kinds of products, developers may be unable to produce those products at prices the market can afford. Recognizing this dynamic, The Concord Group projects that 45,992 households may want to own homes, but may not be able to afford them.[17]

The Scenario thus apportions those 45,992 households into rental units in the following proportions: market viable rental flats (69%) and townhouse units (31%).

Table 3.2. Scenario Distribution of Residential Units Based on Market Viability Projections

Period	Total	Flats (10 or more units/acre)	Townhouses <10 units/ acre)	Total Attached	Attached Share	Detached	Detached Share
2010	1,186,475	148,361	192,434	340,795	29%	781,291	71%
2010-2020	1,292,492	213,817	221,323	435,140	34%	857,352	66%
Change 2010-20	**170,406**	**65,456**	**28,889**	**94,345**	**55%**	**76,061**	**45%**
2010-2035	1,619,238	274,571	267,515	542,086	33%	1,012,763	67%
Change 2010-35	**432,763**	**126,210**	**75,081**	**201,291**	**47%**	**231,472**	**53%**
2010-50	1,882,448	341,956	314,211	656,167	35%	1,161,892	65%
Change 2010-50	**695,971**	**193,595**	**121,777**	**315,372**	**45%**	**380,601**	**55%**

* Figures may not sum due to rounding here or from individual counties' data in the appendices.

Source: Adapted from The Concord Group (2012) by assigning non-viable market demand owner-occupied units to rental flats and townhouses as noted in text.

Table 3.2 shows the effect of this adjustment for each of the time periods. This is called the "Scenario distribution" of residential units based on The Concord Group's viability projections.

The Scenario results in a 45%/55% share of new occupied attached units to detached units over the period 2010 to 2050; this is a slightly higher share of new occupied attached units than under the market demand projections (42%). Most of the difference occurs in the first time period, 2010-2020, reflecting continued recovery from the Great Recession combined with stagnating incomes. During this period, attached units would comprise 55% of the share of new occupied unit construction.

Under the Scenario, occupied attached units will increase to about 35% of the share of all occupied units. This is similar to the normalized results from the Kern COG Community Survey indicating that 35% preferred attached housing options over detached ones. It is also comparable to preference estimates generated from the PPIC and NAR surveys. In effect, the Kern County, PPIC and NAR surveys, as well as The Concord Group market analysis, come to about the same conclusion.

The Concord Group's market demand projections estimate that 402,552 new occupied detached units will need to be built between 2010 and 2050. Based on viability demand adjustments, the Scenario shows detached home demand will be about 5% less than this, or 380,601 units. While The Concord Group was not asked to apportion new occupied detached unit demand by lot size, this Scenario performs that analysis.

Table 3.3. Distribution of Detached Homes by Lot Size

Lot Size	Fresno	Kern	Merced	Total	Share of Detached
Small (<6k sq.ft.)	33,580	23,145	6,147	62,872	14%
Typical (6k sq.ft. to 20k sq.ft.)	153,920	156,065	38,652	348,637	77%
Estate (20k sq.ft. to 5 acres)	19,300	21,262	1,360	41,922	9%
Total (5 acres and less)	206,800	200,472	46,159	453,431	----

* Figures may not sum due to rounding. Source: Fresno, Kern and Merced county assessors.

Table 3.4. Apportionment of New Occupied Units Built between Small and All Other Lots to 2050

Type	Supply 2010	Demand 2050	Scenario 2050
Small Lot	133,010	490,512	513,609
All Other Lots	712,670	735,767	712,670
Total Detached	845,680	1,226,279	1,226,279

* Figures may not sum due to rounding.

Table 3.3 shows the 2012 distribution of lots in Fresno, Kern and Merced counties based on data provided to the author.[18] For these counties, homes on lots ranging from more than 6,000 square feet to 20,000 square feet account for 77% of all detached lots under 5 acres (lots over 5 acres are excluded from this analysis because they represent a completely different market).

Small lots, those of 6,000 square feet or less, comprise about 14% of the supply in these three counties. The Scenario conservatively assumes that about 15% of all detached lots in the other San Joaquin Valley counties in 2010 are on small lots (an overstatement).

Table 3.4 allocates new occupied detached residential unit demand between small and all other lots to 2050. Based on the Scenario, the only way for developers to meet the projected demand for small-lot homes in 2050 may be for them to build nearly all new, occupied detached homes to 2050 on small lots.

Table 3.5. Scenario for the San Joaquin Valley Based on Market Viable Housing Distribution, 2010-2050

Time Period	Total	Flat	Townhouse	Attached	Attached Share	Small Lot	All Other Lots	Detached	Detached Share
2010	1,186,475	148,361	192,434	340,795	29%	133,010	712,670	845,680	71%
2020	1,356,881	213,817	221,323	435,140	32%	209,071	712,670	921,741	68%
Change 2010-2020	170,406	65,456	28,889	94,345	----	76,061	0	76,061	----
Change 2010-2020%	14%	44%	15%	28%	----	57%	0%	9%	----
2035	1,619,238	274,571	267,515	542,086	33%	364,482	712,670	1,077,152	67%
Change 2010-2035	432,763	126,210	75,081	201,291	----	231,472	0	231,472	----
Change 2010-2035%	36%	85%	39%	59%	----	174%	0%	27%	----
2050	1,882,446	341,955	314,212	656,167	35%	513,609	712,670	1,226,280	65%
Change 2010-2050	695,971	193,594	121,778	315,372	----	380,600	0	380,600	----
Change 2010-2050%	59%	130%	63%	93%	----	286%	0%	45%	----

* Figures may not sum due to rounding.

Source: Adapted from The Concord Group (2012) by assigning the difference between market demand and market viable units to rental viable flat and townhouse units proportionate to their 2050 rental viability distribution. Small lot is defined as 6,000 square feet or less.

Table 3.5 uses the market viability projections to generate the Scenario for the San Joaquin Valley, including occupied flat, townhouse, small-lot and all other lot units to 2050. The Scenario assumes no net change in the number of units on all other lots so that by 2050 market demand for those units would just about equal supply.

KEY FINDINGS

By 2050, the share of occupied new residential units by major type would need to be as follows to meet the market viability projections of demand:

- About 315,000 new occupied attached residential units would be needed, including 194,000 flats and 122,000 townhouses. If this occurs, attached units will comprise 35% of the total supply of occupied units — about what Kern County, PPIC and NAR surveys found and consistent with the market analysis conducted by The Concord Group.
- About 380,000 new occupied detached units would be needed, bringing the total of occupied detached units to about 1.2 million occupied homes. Based on preference surveys focusing on the San Joaquin Valley, about 25% to 30% of all occupied residential units in 2050 may need to be on small lots, with the balance of 35% to 40% on all other lots.
- The Scenario assumes that all new detached residential units will be built on small lots (6,000 square feet or less). Nonetheless, there will be some new demand for detached units on larger lots in niche markets as well as to replace large-lot homes that are redeveloped into mixed-used and/or higher-density residential projects. Still, the Scenario shows that potentially the only way to meet the demand for homes on small lots in 2050 is if nearly all new occupied detached homes built to 2050 are on small lots.

4.Space-Occupying Jobs and Nonresidential Space Redevelopment

Developers will not build all new homes on open space and agricultural land. In fact, a large share of new attached homes will probably go where they can maximize their convenience and efficiency, such as along commercial corridors and centers. Many of those attached homes can be part of the redevelopment of nonresidential space already built in those corridors and centers.

This chapter estimates the volume of nonresidential space existing in 2010 that will be replaced and/or repurposed — "recycled" — to 2050. As will be seen, the equivalent of more than all nonresidential space that existed in 2010 will be recycled by 2050.

Because the recycling process also applies to new nonresidential space that will be needed to 2050, this chapter also identifies the kinds of jobs that occupy nonresidential space, estimates the total number of workers (full-time and part-time) who will occupy that space, and projects the space supported by those to 2020, 2035 and 2050.

The recycling process should thus accommodate new and replaced nonresidential space, as well as a large share of new attached residential homes.

SPACE-OCCUPYING EMPLOYMENT

The focus of this analysis is on those jobs that need to be housed in built space, such as stores, offices, schools and the like. Natural-resource jobs, such as farming, fishing and mining, do not usually require built space. Construction workers, who build the spaces people occupy, usually do not have space of their own; rather they move from job to job. Not addressed are military jobs because, although they certainly occupy space, the planning and development of that space is mostly beyond the influence of local governments.

The relevant jobs that occupy space can be loosely organized into four broad land-use groups: industrial, office, retail and institutional.

SPACE-OCCUPYING EMPLOYMENT PROJECTIONS

Since the 1980s, no federal agency has projected employment over the long term and few commercial services do. Woods & Poole Economics has been making these kinds of projections for decades; this Scenario uses its projections of full-time and part-time jobs.

NONRESIDENTIAL SPACE PROJECTIONS

In most urbanized areas, nonresidential space accounts for a third or more of the built environment and up to half or more of the taxable value.[19] Estimating employment-based space needs can be complex and fraught with uncertainties about how technology influences the use of space in the future. The need for nonresidential space may be declining because of such factors as working at home, telecommuting, Internet retailing, and even office "hotelling" — where workers never have an assigned work area, but use space when needed based on the task and the need to be in an office.

Whether these factors increase the efficiency with which space is used, and result in less space needed in the future, is uncertain. For example, working at home accounts for a very small share of workers despite its growing prevalence (Nelson 2013).

Telecommuting does not necessarily reduce office space needs. Telecommuters may work from home part of a day or some days of the week but still have an office. Office hotelling applies only to workers who travel and need places to function on the road — but does this mean they need less space than if working in a permanent office or cubicle? Or does it mean more space is needed to meet their office needs when aggregated across several locations? Internet retailing is growing but may plateau as people tend to prefer the tactile and social aspects of shopping.

A decade of advances in telecommuting, office and retailing technologies has not reduced overall nonresidential space needs. In fact, the trend seems to be toward increasing square feet per person. Total nonindustrial space in the U.S. averaged 233 square feet per person in 1992 and 246 square feet per person in 2003.[20]

While the nonresidential space needs per capita may be increasing over time, the actual needs per worker have not changed much (Nelson 2004). While analysts debate how small office-worker stations will become, principally because of electronic filing and interactions that do not require meeting spaces, they have not reached a consensus. For one thing, productive people still need space to work in, and office buildings still need halls, meeting rooms, restrooms, lobbies and so forth.

Office buildings are also adding exercise space, day care facilities and space for other activities. On the whole, total space per office worker does not seem to have changed much over the past few decades (Nelson 2013).

To estimate space needs per worker, the Scenario uses the total square feet of space for each category of activities reported by the U.S. Department of Energy's Commercial Buildings Energy Consumption Survey for 2003 (Energy Information Administration 2005) and the Manufacturing Energy Consumption Survey for 2006 (Energy Information Administration 2009) and divided that space by workers in each activity group for the respective years. The result is the average square feet per worker for all workers in the industrial and nonindustrial categories reported in Table 4.1.

These figures are applied to Woods & Poole Economics (2011) projections of workers in each of the four employment groups and aggregated into a total amount of space that is estimated to be supported by the economy valleywide.

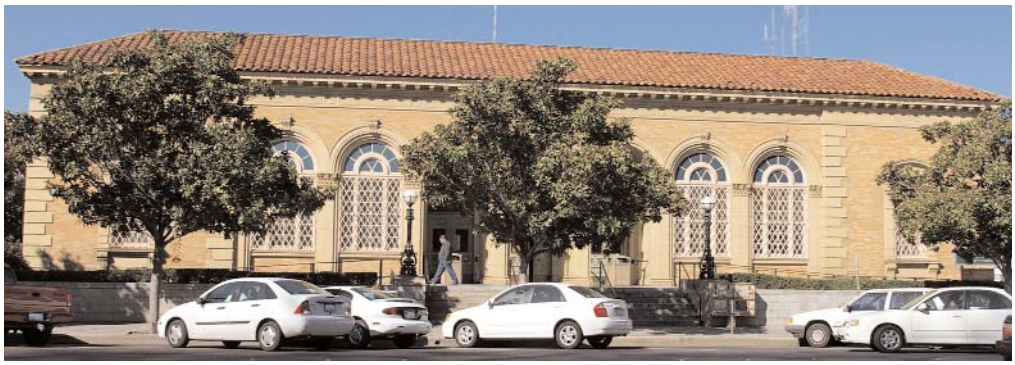


Table 4.1. U.S. Space Consumed per Industrial and Nonindustrial Worker

Land Use	Square Feet Per Worker (square feet)	Average Structure Depreciation (years)
Industrial		
Utilities	300	50
Manufacturing	900	50
Transportation & Warehousing	1,800	40
Wholesale Trade	1,300	40
Nonindustrial		
Office & Office-Based Services	300	50
Education and the Arts	750	60
Lodging/Food Service	720	45
Retail Trade	605	35
Health Care	500	50

* Space includes all occupied areas such as work spaces, lobbies, conference rooms, assembly areas, hallways, elevator shafts, etc.; collateral service functions such as cafeterias, theaters, exercise and day care; and vacant space. Figures are rounded.

Sources: Nonindustrial space estimated from CBECS (Energy Information Administration 2005) and industrial space estimated from CBECS and MECS (Energy Information Administration 2009). Depreciation of buildings adapted from Marshall & Swift (2012).

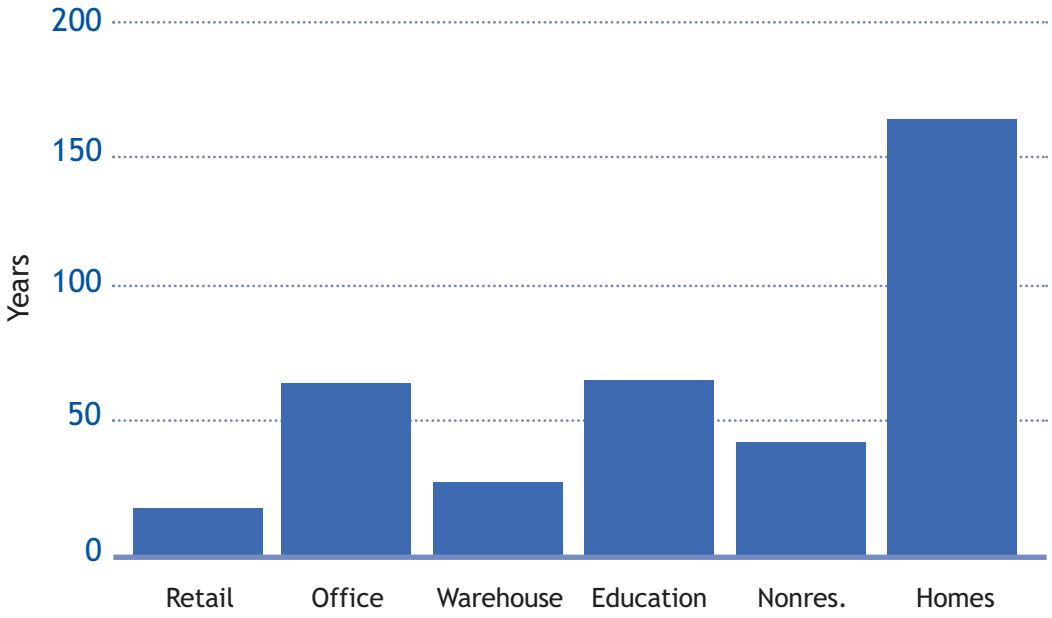


Figure 4.1. Life Span of Major Building Types

Source: Arthur C. Nelson, based on Commercial Buildings Energy Consumption Survey.

These projections show that, between 2010 and 2020, the San Joaquin Valley may need to add nearly 90 million square feet to the inventory of nonresidential space that the market appears to have supported in 2010 (Table 4.2). The net increase in nonresidential space may rise to nearly 300 million square feet in 2035 (Table 4.3) and nearly 600 million square feet by 2050 (Table 4.4).

Policymakers should consider, however that nonresidential space wears out and is not as durable as residential space. The typical residential unit can last easily 150 years and perhaps several decades more (Nelson 2013). In contrast, the typical nonresidential space lasts on average around 40 to 45 years, as illustrated in Figure 4.1.

Over time, nonresidential space will need to be recycled through demolition, rebuilding or repurposing in ways that renew the structure for different kinds of uses than for which it was originally built.

The speed with which nonresidential structures are recycled depends on two major factors: the rate of depreciation of the building and the rate of appreciation of the land on which it sits. Buildings depreciate at widely varying rates. Depreciation for most kinds of low-rise properties ranges from about 30 to 60 years.[21] But this assumes the structure is used until its intended purpose has run its course.

Table 4.2. Nonresidential Space Development and Redevelopment, 2010-2020

County	Jobs 2010 (1,000s)	Jobs 2020 (1,000s)	Change 2010-20 (1,000s)	Percent 2010-20	Space Supported 2010 (millions sf)	Space Supported 2020 (millions sf)	Net Change in Space 2010-20 (millions sf)	Space Replaced 2010-20 (millions sf)	Total Space Built 2010-20 (millions sf)	Space Built 2010-20 as Share of Space in 2010
Fresno	353	393	40	11%	185	204	19	53	72	39%
Kern	273	317	44	16%	137	157	20	38	58	42%
Kings	41	44	3	8%	20	22	2	5	7	36%
Madera	43	46	3	7%	21	23	2	6	7	35%
Merced	73	81	7	10%	38	43	5	11	15	41%
San Joaquin	239	269	30	13%	141	160	19	40	59	42%
Stanislaus	184	211	27	15%	105	119	13	30	43	41%
Tulare	137	149	12	9%	72	79	7	19	26	37%
San Joaquin Valley	1,343	1,510	167	12%	720	806	86	202	288	40%

* Figures may not sum due to rounding. Source: Arthur C. Nelson (2013).

Table 4.3. Nonresidential Space Development and Redevelopment, 2010-2035

County	Jobs 2010 (1,000s)	Jobs 2035 (1,000s)	Change 2010-35 (1,000s)	Percent 2010-35	Space Supported 2010 (millions sf)	Space Supported 2035 (millions sf)	Net Change in Space 2010-35 (millions sf)	Space Replaced 2010-35 (millions sf)	Total Space Built 2010-35 (millions sf)	Space Built 2010-35 as Share of Space in 2010
Fresno	353	472	118	34%	185	248	63	174	237	128%
Kern	273	411	138	50%	137	209	71	135	206	150%
Kings	41	51	10	25%	20	26	6	14	20	101%
Madera	43	53	10	23%	21	26	5	16	21	100%
Merced	73	95	22	30%	38	52	14	32	46	121%
San Joaquin	239	332	94	39%	141	207	65	148	213	151%
Stanislaus	184	260	76	41%	105	150	45	107	151	143%
Tulare	137	169	32	23%	72	91	19	55	74	103%
San Joaquin Valley	1,343	1,842	500	37%	720	1,009	289	681	970	135%

** Figures may not sum due to rounding. Source: Arthur C. Nelson (2013).

Table 4.4. Nonresidential Space Development and Redevelopment, 2010-2050

County	Jobs 2010 (1,000s)	Jobs 2050 (1,000s)	Change 2010-50 (1,000s)	Percent 2010-50	Space Supported 2010 (millions sf)	Space Supported 2050 (millions sf)	Net Change in Space 2010-50 (millions sf)	Space Replaced 2010-50 (millions sf)	Total Space Built 2010-50 (millions sf)	Space Built 2010-50 as Share of Space in 2010
Fresno	353	547	194	55%	185	288	103	201	304	164%
Kern	273	572	299	109%	137	290	153	188	341	248%
Kings	41	68	28	68%	20	35	15	19	34	171%
Madera	43	86	43	99%	21	42	22	25	47	223%
Merced	73	134	61	83%	38	73	35	45	80	212%
San Joaquin	239	424	186	78%	141	264	122	189	311	220%
Stanislaus	184	313	129	70%	105	181	75	128	203	193%
Tulare	137	238	101	74%	72	129	57	78	134	186%
San Joaquin Valley	1,343	2,381	1,038	77%	720	1,301	581	874	1,455	202%

* Figures may not sum due to rounding. Source: Arthur C. Nelson (2013).

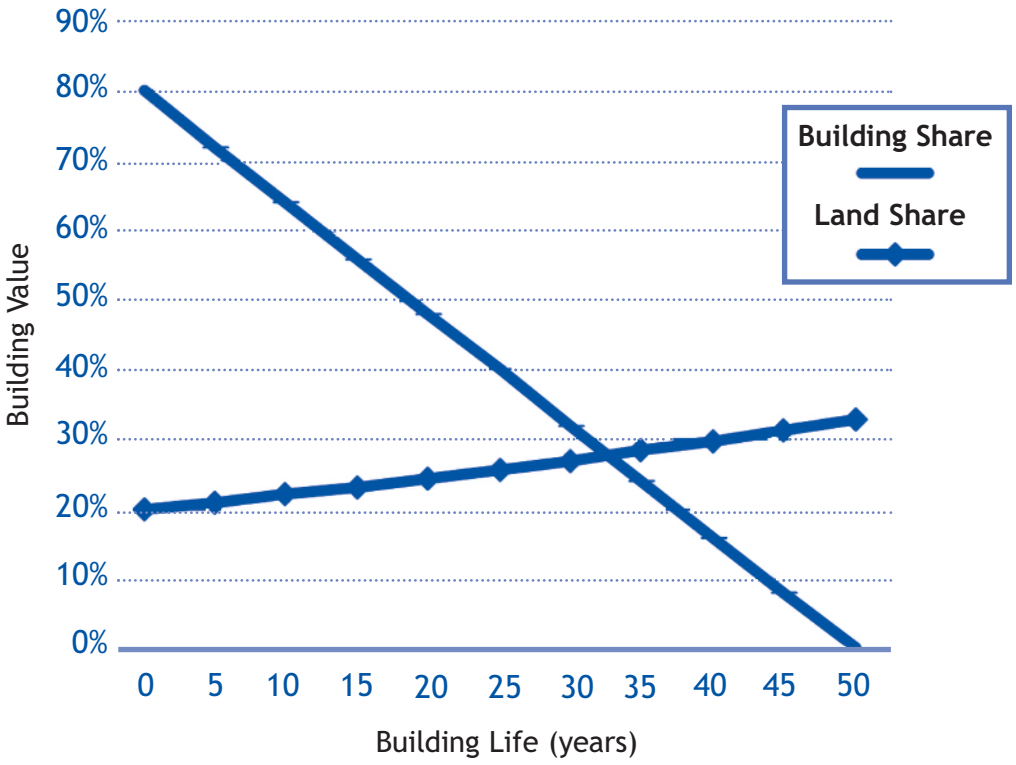


Figure 4.2. Conversion Timing of Nonresidential Buildings

* Timing is based on structure depreciation (building share line) and land value appreciation (land share line). Source: Arthur C. Nelson.

In dynamic metropolitan areas, few building owners use nonresidential structures for their intended purpose through the expected useful life of the building. As the structure depreciates, land value usually appreciates, and at some point the land is worth more than the structure. The structure's owner may see a better return on investment by recycling the land use.

Consider how the recycling decision is made. Assume the structure has a depreciable life of 50 years, which is a common period for nonresidential, low-rise structures. Suppose that when the structure is built, about 80% of the total property value is in the structure itself and 20% is in the land. Suppose also that the average annual appreciation of land (after inflation) is 1%. A 50-year structure depreciating at 2% annually with land appreciating at 1% annually (compounded) — roughly the national average annual rate of growth — will be worth less than the land in about the 33rd year. This is illustrated in Figure 4.2.

Typically about the 25th year, if not before, the property owner begins to consider demolishing and building a new structure, or renovating the existing structure to serve a higher and better use. This is called "recycling." However, the developer often defers the actual moment of recycling until market forces justify the cost of demolition and reinvestment.

Because of building depreciation and land value appreciation, the equivalent of the entire nonresidential stock in the U.S. is recycled about every 40 years.[22] (This is adjusted to consider historically significant and multi-floor structures that may survive centuries.)

This analysis assumes that the average life of all nonresidential structures will be about 40 years. Certainly, some structures such as cheaply built big-box stores may become ripe for recycling after just 15 years or so, while Class-A, high-rise office buildings may last a century or longer.

The overall effect of building depreciation and land value appreciation is that more than 200 million square feet or about 30% of the stock of non-residential buildings existing in the San Joaquin Valley in 2010 will become opportunities for redevelopment by 2020.

Nearly 700 million square feet, or nearly all the nonresidential stock existing in 2010, will become opportunities for redevelopment by 2035.

Approximately 900 million square feet, or 1.2 times more than the equivalent of all space existing in 2010, will become opportunities for redevelopment by 2050 principally because hundreds of millions of square feet built after 2010 will be recycled yet again.

KEY FINDINGS

The next three tables estimate space-occupying jobs, the net change to the inventory of all nonresidential space, the volume of space that is estimated to be recycled, and the total space that is estimated to be built, rebuilt, renovated or in other ways recycled for all counties in the San Joaquin Valley and the Valley as a whole for the periods 2010 to 2020, 2035 and 2050. Key findings are:

- The San Joaquin Valley jurisdictions will need to increase their inventory of nonresidential space by about 600 million square feet between 2010 and 2050, or about 80% more than existed in 2010.
- A much larger amount, about 900 million square feet, will be recycled between 2010 and 2050.
- For the San Joaquin Valley as a whole, it is estimated that nearly 1.5 billion square feet of nonresidential space will be built or recycled between 2010 and 2050. This is more than twice the amount of all nonresidential space that existed in 2010.

5.A Strategy to Implement the Scenario

The Scenario does not offer specific land-use planning or design guidance, but it does provide key findings needed to guide those and related activities. These findings lead to a strategy to address the Scenario, which is outlined here.

A substantial share of all new nonresidential and residential development may occur on existing nonresidential development sites especially along corridors and at activity centers. Outside of downtowns, these areas are typically dominated by one- and two-floor structures that comprise two-thirds of the nonresidential structures in metropolitan areas.[23]

Those structures are also at very low floor-area-ratios (FAR). FAR is a measure of land-use intensity; it relates total building square footage to total land area. For example, a structure of 10,000 square feet sitting on a parcel of 50,000 square feet has an FAR of 0.20.

About three-quarters of all nonresidential parcels throughout the San Joaquin Valley outside of downtowns have an FAR of less than 0.20, which means 80% of the land area is used for parking, loading, storage and other non-structural purposes.

By 2020, about 25,000 acres of this land may provide opportunities for redevelopment rising to about 80,000 acres by 2035. By 2050, more than 100,000 acres of these low-FAR sites may become opportunities for redevelopment. In some cases, they may provide opportunities twice, as structures with short, useful lives may replace current structures and become replaced themselves.

The redevelopment opportunities presented by commercial corridors is largely under-appreciated by both the public and private sectors across the nation. Public-private-nonprofit partnerships can be formed to leverage all of their resources to facilitate emerging market demand. After all, much of the land uses along these corridors have attributes making them ideal candidates for redevelopment:

1. They are already flat and reasonably well-drained, so this part of the development process is largely finished.
2. Almost all of these sites sit along major highways with four or more lanes often with wide rights-of-way. Because they are along multi-lane corridors that connect urban and suburban centers, many of these corridors are "transit-ready" for such options as bus rapid transit, street car and light rail.
3. Large-scale utilities run along those major highways and are easily accessed for upgrading if needed. As they age, these utilities will need to be replaced. The conundrum facing local governments is whether to approve new greenfield development where initial utility capital costs are low, or brace for the upgrades of major utility infrastructure along built-out corridors that would have to be done anyway, probably by 2050, and at lower long-term cost per unit of service delivery. Prudent fiscal management would seem to favor the latter investment decision.
4. Prior development approvals have already committed these sites to nonresidential, higher-density residential, and/or mixed land uses.
5. These sites have motivated owners interested in maximizing their profit. The motivated owner is important because he or she can help overcome the typical impediments to redevelopment, which include the inability to assemble multiple, small ownerships; to gain the confidence of owners that it is in their best interest to redevelop; and to acquire clear title.

6. As these sites age, the deterioration of structures compromises the value of nearby residential property.
7. Those neighbors may be motivated to deflect development pressure away from their neighborhoods into these aging commercial sites, especially if they have a constructive say in how they are redeveloped. In other words, potential NIMBYs (not-in-my-backyard) may become YIMBYs (yes-in-my-backyard) if they appreciate that their property value increases when blighted, aging corridors and centers are renewed.

Research shows that redevelopment of sites along such corridors can achieve FARs of 0.50 to 0.80. These higher FARs maximize land-use intensity at a low cost per square foot of structure, and provide adequate on-site parking, especially if there are "smart parking" designs that share parking among activities or tuck-under parking options that avoid building parking structures (see Dunham-Jones and Williamson 2009).

Mixed uses represent one of the key design opportunities possible in achieving FARs of more than 0.50 is mixed uses which can reduce and internalize vehicle trips (see Ewing and Cervero 2013).

The Scenario thus outlines a strategy whereby potentially all attached residential and nonresidential development is attracted to commercial corridors and centers.

Table 5.1 shows the change in floor-area-ratio between 2010 and 2020, to 2035, and then to 2050 if all new space-occupying jobs and all new attached residential units were built in existing commercial corridors and centers. It is assumed that attached residential units will average 1,500 square feet, which includes common areas in the case of multi-family structures.

For those respective periods, the FAR would rise from an assumed 0.20 to 0.27, then to 0.36, and finally to 0.51.

Research shows that such a strategy will yield important benefits (Nelson 2013). In addition to making more transportation options feasible, vehicles miles traveled per person and greenhouse emissions will be reduced substantially (Ewing, et al. 2007), a key goal of SB 375. This strategy will also revitalize neighborhoods and communities and improve the overall economy.

Table 5.1. Change in Floor-Area-Ratio in the San Joaquin Valley when Accommodating All Space-Occupying Jobs and All New Attached Residential Units in Existing Commercial Corridors and Centers

Metric	Figure
Space Supported 2010	720,000,000
2010-2020	
Space Supported 2020	800,000,000
Attached Dwellings 20010-20	94,345
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	140,000,000
Total Space 2020	940,000,000
FAR factor	1.31
Assumed FAR 2010	0.20
FAR 2020	0.26
2010-2035	
Space Supported 2035	1,000,000,000
Attached Dwellings 20010-35	201,291
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	300,000,000
Total Space 2035	1,300,000,000
FAR factor	1.81
Assumed FAR 2010	0.20
FAR 2035	0.36
2010-2050	
Space Supported 2050	1,351,988,474
Attached Dwellings 20010-50	315,372
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	473,058,000
Total Space 2050	1,825,046,474
FAR factor	2.53
Assumed FAR 2010	0.20
FAR 2050	0.51

* Figures may not sum due to rounding.

Table 5.1 shows that, technically, all new nonresidential and attached residential development can occur as infill and redevelopment of existing developed nonresidential areas.

There are some qualifications and cautionary observations that can reduce redevelopment opportunities, however. For instance, preserving historically and culturally significant structures and places may be necessary to preserve community character. Nonetheless, many older structures sit on larger tracts of land that can be redeveloped, and older structures can be repurposed (from warehousing to office or residential) while retaining their historical and architectural character.[24]

Low-intensity parcels may not be candidates for redevelopment at a density that could support walkable, mixed-use, transit-oriented neighborhoods. In most metropolitan areas, land values increase over time at least in proportion to population growth; and the higher the land value, the more intensively land needs to be used to justify the cost of acquiring the property and redeveloping it.

Indeed, a major roadblock to timely redevelopment is uncertainty by property owners about when to redevelop, usually erring on the side of caution, so that redevelopment is deferred perhaps longer than may be efficient. Public officials and planners should be proactive in identifying those parcels that may become ripe for redevelopment within various time frames, especially between 2010 and 2050, and even beyond.

Despite their potential, other factors may also make it challenging to recycle nonresidential centers and corridors in the short term in some situations:

- Land ownership in most centers and along many corridors has been subdivided and sold to a number of different owners, often as small parcels; assembly will be a challenge.
- Many areas may be difficult to attract new development because of crime and declining property values, at least in the short term.
- In the short term, it may be more expensive to develop these nonresidential sites than it will be to develop new greenfield projects. One obstacle is the more complex permitting and regulatory process for redevelopment, when compared to greenfield development.
- Urban infrastructure problems will be expensive to fix and require bonding sources, which will be problematic, considering State and local agencies' credit ratings.

State and local policies will need to support infill and redevelopment efforts to accommodate future demand. Otherwise, the current regulatory and financial incentives unfairly benefit greenfield development.

An overall strategy would not only seek to maximize infill and redevelopment opportunities but also facilitate new communities with mixed uses, including mixed-residential options connected by multiple modes of transportation to existing urban and suburban centers and corridors.[25]

Public-private-nonprofit partnerships will be needed to take advantage of emerging market opportunities to implement such a combined strategy. The State of California needs to be a key partner, especially by enabling local governments to facilitate infill and redevelopment.[26]

Toward a New San Joaquin Valley

As the population in the rest of California expands by about a quarter between 2010 and 2050, the number of San Joaquin Valley residents will increase by nearly three-quarters. Population growth will be primarily attributable to the New Majority as the number of white non-Hispanics is projected to fall.

Because of emerging economic conditions, income growth may stagnate, and indeed median household income may fall in real terms between 2010 and 2020. If Valley leaders wish to sustain the region's agricultural economy, they must minimize further conversion of farmland to urban uses.

At the same time, the market demand for housing seems to be changing. The demand for attached options appears to be increasing and may require twice as many apartments, condominiums and townhouses in 2050 as existed in 2010. Yet attached owner-occupied options such as townhouses and condominiums may be too costly per square foot than detached homes, at least for the foreseeable future. Moreover, the market for attached homes may be dominated by rental apartments.

A larger change is poised to occur among detached homes. As household incomes stagnate or even fall, the demand for detached homes on small lots (6,000 square feet or less) may dominate the market.

Three different surveys suggest that at least 40% of the current demand for detached homes is for small lots, with much of this attributable to New Majority households.

As the New Majority increases its market share, it seems likely that the demand for small lot homes will increase. Already in Kern County, small lots may account for nearly half of the demand for new detached homes, based on the Kern COG 2012 survey.

Public officials, developers, planners and citizens seem generally aware of these emerging trends. The challenge is to adjust land-use controls and infrastructure investments to accommodate this change.

In addition, hundreds of millions of square feet of existing nonresidential buildings are in urban and suburban centers and along commercial corridors at very low intensities, and they are aging quickly. The Scenario estimates that nearly 900 million square feet will be recycled and that there will be a net increase of 600 million square feet to the nonresidential inventory between 2010 and 2050. Recycled and net new space may be twice the space existing in 2010.

As space is recycled and new space added, the land-use intensity can increase from an average of an estimated 0.20 in 2010 to about 0.50 in 2050 without sacrificing parking. If so, technically all new nonresidential development and all new attached housing demand could occur through infill and redevelopment of urban and suburban centers and commercial corridors.

Many Valley planners indicate that targeting a large share of this development to these existing developed areas could be feasible as an effective long-term strategy for policymakers. Such a strategy would revitalize neighborhoods and communities, provide transportation choices, create viable close-knit, mixed-use areas, reduce greenhouse gas emissions, and improve the overall economy.

The combination of growth and aging nonresidential stock provides cities and counties in the San Joaquin Valley with the kind of opportunities to reshape development patterns that many other regions across America would envy. For the most part, local and regional governments in the Valley are positioning themselves to take advantage of them.

However, as the State has stripped local governments of many powers they need to reshape the built landscape, they need new legislation to reinvent redevelopment authorities in ways that can move California toward achieving the goals of SB 375.

Ultimately, the San Joaquin Valley will only be able to take full advantage of the changing market with a concerted, multi-level effort to focus California's resources and priorities on the homes and businesses of the future.

Appendices

The following appendices include data for each of the San Joaquin Valley's eight counties. Each county appendix include three tables:

A. County Demographic Changes, 2010-2050

B. County Market Viable Housing Distribution, 2010-2050

C. Change in Floor-Area-Ratio in County when Accommodating All Space-Occupying Jobs and All New Attached Residential Units in Existing Commercial Corridors and Centers

Appendix A. Fresno County

Table A.1. Fresno County Demographic Changes, 2010-2050

Year	Population	White, non-Hispanic	Hispanic All Races	All Other Races	Total New Majority	New Majority Share
2010	910,520	304,522	442,992	163,006	605,998	65%
2020	1,059,233	256,023	596,327	206,883	803,210	74%
2035	1,272,410	201,429	805,087	265,894	1,070,981	82%
2050	1,487,918	159,100	1,004,444	324,374	1,328,818	87%
2010-20	148,713	(48,499)	153,335	43,877	197,212	137%
2010-20%	16%	-16%	35%	27%	33%	----
2010-35	361,890	(103,093)	362,095	102,888	464,983	126%
2010-35%	40%	-34%	82%	63%	77%	----
2010-50	577,398	(145,422)	561,452	161,368	722,820	124%
2010-50%	63%	-48%	127%	99%	119%	----

* Figures may not sum due to rounding. Source: Adapted from The Planning Center (2012).

Table A.2. Fresno County Market Viable Housing Distribution, 2010-2050

Time Period	Total	Attached	Attached Share	Small Lots	All Other Lots	Detached	Detached Share
2010	311,194	106,464	34%	33,580	171,150	204,730	66%
2020	347,434	126,920	37%	49,364	171,150	220,514	63%
Change 2010-2020	36,240	20,456	----	15,784	0	15,784	----
Change 2010-2020%	12%	19%	----	47%	0%	8%	----
2035	401,860	147,473	37%	83,237	171,150	254,387	63%
Change 2010-2035	90,666	41,009	----	49,657	0	49,657	----
Change 2010-2035%	29%	39%	----	148%	0%	24%	----
2050	456,286	171,238	38%	113,898	171,150	285,048	62%
Change 2010-2050	145,092	64,774	----	80,318	0	80,318	----
Change 2010-2050%	47%	61%	----	239%	0%	39%	----

* Figures may not sum due to rounding.

Source: Adapted from The Concord Group (2012) by assigning the difference between market demand and market viable units to rental viable flat and townhouse units proportionate to their 2050 rental viability distribution.

Table A.3. Change in Floor-Area-Ratio in Fresno County when Accommodating All Space-Occupying Jobs and All New Attached Residential Units in Existing Commercial Corridors and Centers

Metric	Figure
Space Supported 2010	185,000,000
2010-2020	
Space Supported 2020	205,000,000
Attached Dwellings 20010-20	20,456
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	31,000,000
Total Space 2020	236,000,000
FAR factor	1.28
Assumed FAR 2010	0.20
FAR 2020	0.26
2010-2035	
Space Supported 2035	250,000,000
Attached Dwellings 20010-35	41,009
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	62,000,000
Total Space 2035	312,000,000
FAR factor	1.69
Assumed FAR 2010	0.20
FAR 2035	0.34
2010-2050	
Space Supported 2050	290,000,000
Attached Dwellings 20010-50	64,774
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	97,000,000
Total Space 2050	387,000,000
FAR factor	2.09
Assumed FAR 2010	0.20
FAR 2050	0.42

* Figures may not sum due to rounding.

Appendix B. Kern County

Table B.1. Kern County Demographic Changes, 2010-2050

Year	Population	White, non-Hispanic	Hispanic All Races	All Other Races	Total New Majority	New Majority Share
2010	802,090	323,794	391,144	87,152	478,296	57%
2020	959,344	281,482	557,363	120,499	677,862	68%
2035	1,204,508	246,658	789,886	167,964	957,850	76%
2050	1,472,525	227,959	1,027,764	216,802	1,244,566	81%
2010-2020	157,254	(42,312)	166,219	33,347	199,566	122%
2010-2020%	20%	-13%	42%	38%	42%	----
2010-2035	402,418	(77,136)	398,742	80,812	479,554	114%
2010-2035%	50%	-24%	102%	93%	100%	----
2010-2050	670,435	(95,835)	636,620	129,650	766,270	109%
2010-2050%	84%	-30%	163%	149%	160%	----

* Figures may not sum due to rounding. Source: Adapted from The Planning Center (2012).

Table B.2. Kern County Market Viable Housing Distribution, 2010-2050

Time Period	Total	Attached	Attached Share	Small Lots	All Other Lots	Detached	Detached Share
2010	269,446	71,855	27%	23,145	174,446	197,591	73%
2020	303,472	100,903	33%	28,123	174,446	202,569	67%
Change 2010-2020	34,026	29,048	----	4,978	0	4,978	----
Change 2010-2020%	13%	40%	----	22%	0%	3%	----
2035	356,543	126,156	35%	55,941	174,446	230,387	65%
Change 2010-2035	87,097	54,301	----	32,796	0	32,796	----
Change 2010-2035%	32%	76%	----	142%	0%	17%	----
2050	409,616	142,426	35%	92,744	174,446	267,190	65%
Change 2010-2050	140,170	70,571	----	69,599	0	69,599	----
Change 2010-2050%	52%	98%	----	301%	0%	35%	----

* Figures may not sum due to rounding.

Source: Adapted from The Concord Group (2012) by assigning the difference between market demand and market viable units to rental viable flat and townhouse units proportionate to their 2050 rental viability distribution.

Table B.3. Change in Floor-Area-Ratio in Kern County when Accommodating All Space-Occupying Jobs and All New Attached Residential Units in Existing Commercial Corridors and Centers

Metric	Figure
Space Supported 2010	137,000,000
2010-2020	
Space Supported 2020	157,000,000
Attached Dwellings 20010-20	29,048
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	44,000,000
Total Space 2020	201,000,000
FAR factor	1.47
Assumed FAR 2010	0.20
FAR 2020	0.29
2010-2035	
Space Supported 2035	209,000,000
Attached Dwellings 20010-35	54,301
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	81,000,000
Total Space 2035	290,000,000
FAR factor	2.12
Assumed FAR 2010	0.20
FAR 2035	0.42
2010-2050	
Space Supported 2050	290,000,000
Attached Dwellings 20010-50	70,571
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	106,000,000
Total Space 2050	396,000,000
FAR factor	2.89
Assumed FAR 2010	0.20
FAR 2050	0.58

* Figures may not sum due to rounding.

Appendix C. Kings County

Table C.1. Kings County Demographic Changes, 2010-2050

Year	Population	White, non-Hispanic	Hispanic All Races	All Other Races	Total New Majority	New Majority Share
2010	131,295	53,879	73,630	3,786	77,416	51%
2020	155,685	49,214	102,662	3,809	106,471	59%
2035	192,119	45,248	142,942	3,929	146,871	66%
2050	229,247	43,109	182,126	4,012	186,138	70%
2010-2020	24,390	(4,665)	29,032	23	29,055	74%
2010-2020%	19%	-9%	39%	1%	38%	----
2010-2035	60,824	(8,631)	69,312	143	69,455	79%
2010-2035%	46%	-16%	94%	4%	90%	----
2010-2050	97,952	(10,770)	108,496	226	108,722	73%
2010-2050%	75%	-20%	147%	6%	140%	----

* Figures may not sum due to rounding. Source: Adapted from The Planning Center (2012).

Table C.2. Kings County Market Viable Housing Distribution, 2010-2050

Time Period	Total	Attached	Attached Share	Small Lots	All Other Lots	Detached	Detached Share
2010	44,214	12,749	29%	4,766	26,699	31,465	71%
2020	49,503	17,134	35%	5,670	26,699	32,369	65%
Change 2010-2020	5,289	4,385	----	904	0	904	----
Change 2010-2020%	12%	34%	----	19%	0%	3%	----
2035	57,950	22,670	39%	8,581	26,699	35,280	61%
Change 2010-2035	13,736	9,921	----	3,815	0	3,815	----
Change 2010-2035%	31%	78%	----	80%	0%	12%	----
2050	66,395	25,476	38%	14,220	26,699	40,919	62%
Change 2010-2050	22,181	12,727	----	9,454	0	9,454	----
Change 2010-2050%	50%	100%	----	198%	0%	30%	----

* Figures may not sum due to rounding.

Source: Adapted from The Concord Group (2012) by assigning the difference between market demand and market viable units to rental viable flat and townhouse units proportionate to their 2050 rental viability distribution.

Table C.3. Change in Floor-Area-Ratio in Kings County when Accommodating All Space-Occupying Jobs and All New Attached Residential Units in Existing Commercial Corridors and Centers

Metric	Figure
Space Supported 2010	20,000,000
2010-2020	
Space Supported 2020	22,000,000
Attached Dwellings 20010-20	4,385
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	7,000,000
Total Space 2020	29,000,000
FAR factor	1.45
Assumed FAR 2010	0.20
FAR 2020	0.29
2010-2035	
Space Supported 2035	26,000,000
Attached Dwellings 20010-35	9,921
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	15,000,000
Total Space 2035	41,000,000
FAR factor	2.05
Assumed FAR 2010	0.20
FAR 2035	0.41
2010-2050	
Space Supported 2050	35,000,000
Attached Dwellings 20010-50	12,727
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	19,000,000
Total Space 2050	54,000,000
FAR factor	2.70
Assumed FAR 2010	0.20
FAR 2050	0.54

* Figures may not sum due to rounding.

Appendix D. Madera County

Table D.1. Madera County Demographic Changes, 2010-2050

Year	Population	White, non-Hispanic	Hispanic All Races	All Other Races	Total New Majority	New Majority Share
2010	141,932	57,380	77,097	7,455	84,552	56%
2020	174,077	52,780	113,697	7,600	121,297	66%
2035	222,683	48,966	165,072	8,645	173,717	74%
2050	274,138	47,343	217,283	9,512	226,795	78%
2010-2020	32,145	(4,600)	36,600	145	36,745	88%
2010-2020%	23%	-8%	47%	2%	43%	----
2010-2035	80,751	(8,414)	87,975	1,190	89,165	91%
2010-2035%	57%	-15%	114%	16%	105%	----
2010-2050	132,206	(10,037)	140,186	2,057	142,243	83%
2010-2050%	93%	-17%	182%	28%	168%	----

* Figures may not sum due to rounding. Source: Adapted from The Planning Center (2012).

Table D.2. Madera County Market Viable Housing Distribution, 2010-2050

Time Period	Total	Attached	Attached Share	Small Lots	All Other Lots	Detached	Detached Share
2010	45,117	8,888	20%	5,477	30,752	36,229	80%
2020	52,260	15,105	29%	6,403	30,752	37,155	71%
Change 2010-2020	7,143	6,217	----	926	0	926	----
Change 2010-2020%	16%	70%	----	17%	0%	3%	----
2035	63,490	20,351	32%	12,387	30,752	43,139	68%
Change 2010-2035	11,648	11,463	----	6,910	0	6,910	----
Change 2010-2035%	26%	129%	----	126%	0%	19%	----
2050	74,723	23,884	32%	20,087	30,752	50,839	68%
Change 2010-2050	29,606	14,996	----	14,610	0	14,610	
Change 2010-2050%	66%	169%	----	267%	0%	40%	----

* Figures may not sum due to rounding.

Source: Adapted from The Concord Group (2012) by assigning the difference between market demand and market viable units to rental viable flat and townhouse units proportionate to their 2050 rental viability distribution.

Table D.3. Change in Floor-Area-Ratio in Madera County when Accommodating All Space-Occupying Jobs and All New Attached Residential Units in Existing Commercial Corridors and Centers

Metric	Figure
Space Supported 2010	21,000,000
2010-2020	
Space Supported 2020	22,000,000
Attached Dwellings 20010-20	6,217
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	9,000,000
Total Space 2020	31,000,000
FAR factor	1.48
Assumed FAR 2010	0.20
FAR 2020	0.30
2010-2035	
Space Supported 2035	26,000,000
Attached Dwellings 20010-35	11,463
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	17,000,000
Total Space 2035	43,000,000
FAR factor	2.05
Assumed FAR 2010	0.20
FAR 2035	0.41
2010-2050	
Space Supported 2050	42,000,000
Attached Dwellings 20010-50	14,996
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	22,000,000
Total Space 2050	64,000,000
FAR factor	3.05
Assumed FAR 2010	0.20
FAR 2050	0.61

* Figures may not sum due to rounding.

Appendix E. Merced County

Table E.1. Merced County Demographic Changes, 2010-2050

Year	Population	White, non-Hispanic	Hispanic All Races	All Other Races	Total New Majority	New Majority Share
2010	250,577	81,599	133,256	35,722	168,978	66%
2020	294,222	66,862	188,797	38,563	227,360	75%
2035	368,067	52,434	271,965	43,668	315,633	82%
2050	441,233	40,399	350,943	49,891	400,834	87%
2010-2020	43,645	(14,737)	55,541	2,841	58,382	113%
2010-2020%	17%	-18%	42%	8%	35%	----
2010-2035	117,490	(29,165)	138,709	7,946	146,655	103%
2010-2035%	47%	-36%	104%	22%	87%	----
2010-2050	190,656	(41,200)	217,687	14,169	231,856	99%
2010-2050%	76%	-50%	163%	40%	137%	----

* Figures may not sum due to rounding. Source: Adapted from The Planning Center (2012).

Table E.2. Merced County Market Viable Housing Distribution, 2010-2050

Time Period	Total	Attached	Attached Share	Small Lots	All Other Lots	Detached	Detached Share
2010	79,352	20,161	25%	6,147	53,044	59,191	75%
2020	93,758	29,374	31%	11,340	53,044	64,384	69%
Change 2010-2020	14,406	9,213	----	5,193	0	5,193	----
Change 2010-2020%	18%	46%	----	84%	0%	9%	----
2035	116,098	38,468	33%	24,586	53,044	77,630	67%
Change 2010-2035	36,746	18,307	----	18,439	0	18,439	----
Change 2010-2035%	46%	91%	----	300%	0%	31%	----
2050	138,440	49,238	36%	36,158	53,044	89,202	64%
Change 2010-2050	59,088	29,077	----	30,011	0	30,011	----
Change 2010-2050%	74%	144%	----	488%	0%	51%	----

* Figures may not sum due to rounding.

Source: Adapted from The Concord Group (2012) by assigning the difference between market demand and market viable units to rental viable flat and townhouse units proportionate to their 2050 rental viability distribution.

Table E.3. Change in Floor-Area-Ratio in Merced County when Accommodating All Space-Occupying Jobs and All New Attached Residential Units in Existing Commercial Corridors and Centers

Metric	Figure
Space Supported 2010	38,000,000
2010-2020	
Space Supported 2020	43,000,000
Attached Dwellings 20010-20	9,213
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	14,000,000
Total Space 2020	57,000,000
FAR factor	1.50
Assumed FAR 2010	0.20
FAR 2020	0.30
2010-2035	
Space Supported 2035	52,000,000
Attached Dwellings 20010-35	18,307
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	27,000,000
Total Space 2035	79,000,000
FAR factor	2.08
Assumed FAR 2010	0.20
FAR 2035	0.42
2010-2050	
Space Supported 2050	73,000,000
Attached Dwellings 20010-50	29,077
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	44,000,000
Total Space 2050	117,000,000
FAR factor	3.08
Assumed FAR 2010	0.20
FAR 2050	0.62

* Figures may not sum due to rounding.

Appendix F. San Joaquin County

Table F.1. San Joaquin County Demographic Changes, 2010-2050

Year	Population	White, non-Hispanic	Hispanic All Races	All Other Races	Total New Majority	New Majority Share
2010	669,136	245,919	244,695	178,522	423,217	62%
2020	790,488	185,717	341,789	262,982	604,771	75%
2035	986,382	118,995	483,094	384,293	867,387	86%
2050	1,186,031	62,612	620,688	502,731	1,123,419	93%
2010-2020	121,352	(60,202)	97,094	84,460	181,554	158%
2010-2020%	18%	-24%	40%	47%	43%	----
2010-2035	317,246	(126,924)	238,399	205,771	444,170	137%
2010-2035%	47%	-52%	97%	115%	105%	----
2010-2050	516,895	(183,307)	375,993	324,209	700,202	133%
2010-2050%	77%	-75%	154%	182%	165%	----

* Figures may not sum due to rounding. Source: Adapted from The Planning Center (2012).

Table F.2. San Joaquin County Market Viable Housing Distribution, 2010-2050

Time Period	Total	Attached	Attached Share	Small Lots	All Other Lots	Detached	Detached Share
2010	215,941	52,026	24%	24,449	139,466	163,915	76%
2020	250,699	63,204	25%	48,030	139,466	187,496	75%
Change 2010-2020	34,758	11,178	----	23,581	0	23,581	----
Change 2010-2020%	16%	21%	----	96%	0%	14%	----
2035	303,192	83,380	28%	80,347	139,466	219,813	72%
Change 2010-2035	87,251	31,354	----	55,898	0	55,898	----
Change 2010-2035%	40%	60%	----	229%	0%	34%	----
2050	355,687	103,952	29%	112,270	139,466	251,736	71%
Change 2010-2050	139,746	51,926	----	87,821	0	87,821	----
Change 2010-2050%	65%	100%	----	359%	0%	54%	----

* Figures may not sum due to rounding.

Source: Adapted from The Concord Group (2012) by assigning the difference between market demand and market viable units to rental viable flat and townhouse units proportionate to their 2050 rental viability distribution.

Table F.3. Change in Floor-Area-Ratio in San Joaquin County when Accommodating All Space-Occupying Jobs and All New Attached Residential Units in Existing Commercial Corridors and Centers

Metric	Figure
Space Supported 2010	141,000,000
2010-2020	
Space Supported 2020	160,000,000
Attached Dwellings 20010-20	11,178
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	17,000,000
Total Space 2020	177,000,000
FAR factor	1.26
Assumed FAR 2010	0.20
FAR 2020	0.25
2010-2035	
Space Supported 2035	207,000,000
Attached Dwellings 20010-35	31,354
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	47,000,000
Total Space 2035	254,000,000
FAR factor	1.80
Assumed FAR 2010	0.20
FAR 2035	0.36
2010-2050	
Space Supported 2050	264,000,000
Attached Dwellings 20010-50	51,926
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	78,000,000
Total Space 2050	342,000,000
FAR factor	2.43
Assumed FAR 2010	0.20
FAR 2050	0.50

* Figures may not sum due to rounding.

Appendix G. Stanislaus County

Table G.1. Stanislaus County Demographic Changes, 2010-2050

Year	Population	White, non-Hispanic	Hispanic All Races	All Other Races	Total New Majority	New Majority Share
2010	506,838	240,423	201,738	64,677	266,415	52%
2020	585,621	197,325	303,438	84,858	388,296	65%
2035	711,581	146,067	451,053	114,461	565,514	78%
2050	837,544	100,476	591,753	145,315	737,068	87%
2010-2020	78,783	(43,098)	101,700	20,181	121,881	134%
2010-2020%	16%	-18%	50%	31%	46%	----
2010-2035	204,743	(94,356)	249,315	49,784	299,099	150%
2010-2035%	40%	-39%	124%	77%	112%	----
2010-2050	330,706	(139,947)	390,015	80,638	470,653	138%
2010-2050%	65%	-58%	193%	125%	177%	----

* Figures may not sum due to rounding. Source: Adapted from The Planning Center (2012).

Table G.2. Stanislaus County Market Viable Housing Distribution, 2010-2050

Time Period	Total	Attached	Attached Share	Small Lots	All Other Lots	Detached	Detached Share
2010	136,220	31,357	23%	15,898	88,965	104,863	77%
2020	151,478	45,352	30%	17,161	88,965	106,126	70%
Change 2010-2020	15,258	13,995	----	1,263	0	1,263	----
Change 2010-2020%	11%	45%	----	8%	0%	1%	----
2035	176,756	53,033	30%	34,758	88,965	123,723	70%
Change 2010-2035	40,536	21,676	----	18,860	0	18,860	----
Change 2010-2035%	30%	69%	----	119%	0%	18%	----
2050	262,058	73,860	28%	76,417	111,781	188,198	72%
Change 2010-2050	93,434	36,565	----	56,869	0	56,869	----
Change 2010-2050%	55%	98%	----	358%	0%	43%	----

* Figures may not sum due to rounding.

Source: Adapted from The Concord Group (2012) by assigning the difference between market demand and market viable units to rental viable flat and townhouse units proportionate to their 2050 rental viability distribution.

Table G.3. Change in Floor-Area-Ratio in Stanislaus County when Accommodating All Space-Occupying Jobs and All New Attached Residential Units in Existing Commercial Corridors and Centers

Metric	Figure
Space Supported 2010	105,000,000
2010-2020	
Space Supported 2020	119,000,000
Attached Dwellings 20010-20	7,762
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	12,000,000
Total Space 2020	131,000,000
FAR factor	1.25
Assumed FAR 2010	0.20
FAR 2020	0.25
2010-2035	
Space Supported 2035	150,000,000
Attached Dwellings 20010-35	21,961
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	33,000,000
Total Space 2035	183,000,000
FAR factor	1.74
Assumed FAR 2010	0.20
FAR 2035	0.35
2010-2050	
Space Supported 2050	181,000,000
Attached Dwellings 20010-50	36,565
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	55,000,000
Total Space 2050	236,000,000
FAR factor	2.25
Assumed FAR 2010	0.20
FAR 2050	0.45

* Figures may not sum due to rounding.

Appendix H. Tulare County

Table H.1. Tulare County Demographic Changes, 2010-2050

Year	Population	White, non-Hispanic	Hispanic All Races	All Other Races	Total New Majority	New Majority Share
2010	436,415	143,935	255,785	36,695	292,480	66%
2020	494,922	109,617	344,592	40,713	385,305	77%
2035	599,607	75,522	474,373	49,712	524,085	87%
2050	704,151	48,410	597,911	57,830	655,741	92%
2010-2020	58,507	(34,318)	88,807	4,018	92,825	133%
2010-2020%	13%	-24%	35%	11%	32%	----
2010-2035	163,192	(68,413)	218,588	13,017	231,605	125%
2010-2035%	37%	-48%	85%	35%	79%	----
2010-2050	267,736	(95,525)	342,126	21,135	363,261	121%
2010-2050%	61%	-66%	134%	58%	124%	----

* Figures may not sum due to rounding. Source: Adapted from The Planning Center (2012).

Table H.2. Tulare County Market Viable Housing Distribution, 2010-2050

Time Period	Total	Attached	Attached Share	Small Lots	All Other Lots	Detached	Detached Share
2010	136,220	31,357	23%	15,898	88,965	104,863	77%
2020	151,478	45,352	30%	17,161	88,965	106,126	70%
Change 2010-2020	15,258	13,995	----	1,263	0	1,263	----
Change 2010-2020%	11%	45%	----	8%	0%	1%	----
2035	176,756	53,033	30%	34,758	88,965	123,723	70%
Change 2010-2035	40,536	21,676	----	18,860	0	18,860	----
Change 2010-2035%	30%	69%	----	119%	0%	18%	----
2050	202,874	63,119	31%	50,790	88,965	139,755	69%
Change 2010-2050	66,654	31,762	----	34,892	0	34,892	----
Change 2010-2050%	49%	101%	----	219%	0%	33%	----

* Figures may not sum due to rounding.

Source: Adapted from The Concord Group (2012) by assigning the difference between market demand and market viable units to rental viable flat and townhouse units proportionate to their 2050 rental viability distribution.

Table H.3. Change in Floor-Area-Ratio in Tulare County when Accommodating All Space-Occupying Jobs and All New Attached Residential Units in Existing Commercial Corridors and Centers

Metric	Figure
Space Supported 2010	72,000,000
2010-2020	
Space Supported 2020	79,000,000
Attached Dwellings 20010-20	13,995
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	21,000,000
Total Space 2020	100,000,000
FAR factor	1.39
Assumed FAR 2010	0.20
FAR 2020	0.28
2010-2035	
Space Supported 2035	91,000,000
Attached Dwellings 20010-35	21,676
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	33,000,000
Total Space 2035	124,000,000
FAR factor	1.72
Assumed FAR 2010	0.20
FAR 2035	0.34
2010-2050	
Space Supported 2050	129,000,000
Attached Dwellings 20010-50	31,762
Assumed Attached Dwelling Size	1,500
Attached Dwelling Space	48,000,000
Total Space 2050	177,000,000
FAR factor	2.46
Assumed FAR 2010	0.20
FAR 2050	0.49

* Figures may not sum due to rounding.

Endnotes

1 See www.valleyblueprint.org/files/San%20Joaquin%20Valley%20Demographic%20Forecasts%20-%20Final%2027%20Mar%202012_0.pdf.

2 See www.nahb.org/news_details.aspx?newsID=12403, accessed April 24, 2011.

3 Considering there were about 75 million home owners in 2010, losing 5 million would reduce the home ownership rate from about 65% to about 60% — a rate not seen since 1960.

4 Data adapted from source: U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplements. www.census.gov/apsd/techdoc/cps/cpsmar12.pdf.

5 This is based on analysis of data available from www.labormarketinfo.edd.ca.gov/Content.asp?pageid=145

6 State figures for metropolitan areas over the period 2010 to 2020 have not been released as of this writing.

7 Historical Census of Housing Tables Ownership Rates, www.census.gov/hhes/www/housing/census/historic/ownrate.html.

8 Housing Vacancies and Homeownership for 2005, www.census.gov/hhes/www/housing/hvs/annual05/ann05t13.html.

9 Based on an unpublished presentation to the Southern California Association of Governments pertaining to broad state and national trends.

10 For details including policy implications and recommendations, see Unger and Thompson (2013).

11 There was also a question where respondents were read a list of housing options and asked what type of housing they would "consider" if they were to relocate within the county in the next 10 years. As "consider" is not a "preference," results were not conclusive for purposes of this report.

12 For instance, if respondents could choose only one "definitely yes" option the sum of all choices would not exceed 1,201 which is the number of respondents. But the sum of choices came to 1,854, indicating that about half of the respondents gave this answer to two or more options.

13 The option for "A building with offices and stores on the first floor and condominiums on the upper floors" received the fewest responses and would seem to be a subset of the condominium and townhouse option.

14 Respondents judge for themselves what is considered a short or long commute.

15 The commuting trip accounts for up to half of the distance and time travel during a typical day and is usually considered the most important housing location factor when considering accessibility only. The unweighted average may therefore be low.

16 While the minimum detached preference from surveys is 44%, the Scenario assumes small lots will account for about 40% of the share of all detached units. The Scenario may thus overstate the 2050 demand for homes on lots larger than 6,000 square feet.

17 See the Excel workbook dashboard for the San Joaquin Valley developed by The Concord Group.

18 Similar requests have been made of the other counties but none have been forthcoming for reasons of individual assessors. The author thanks Robert Terry for processing these requests.

19 Most states have homestead exemption policies resulting in assessed values for residential development being less than market value, with the effect of shifting the property tax burden to nonresidential development.

20 The Energy Information Administration of the U.S. Department of Energy conducts a periodic stratified random sample Commercial Buildings Energy Consumption Survey of all nonindustrial/nonindustrial buildings in the nation. Total space in 1992 was 69.7 billion square feet and for 2003 it was 71.7 billion square feet, or an average of 233 and 246 square feet per person for populations of 256.5 million and 290.8 million respectively.

21 See Marshall & Swift (2012).

22 See *Commercial Buildings Energy Consumption Survey* for 2003.

23 Estimated based on the Commercial Buildings Energy Consumption Survey, www.eia.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/detailed_tables_2003.html.

24 See the National Trust for Historic Preservation, www.preservationnation.org.

25 There is a new quantitatively based concept called "complete communities," which many San Joaquin Valley governmental units are considering. For a review of the concept, see reconnectingamerica.org/assets/PDFs/20121001AreWeThereYet-web.pdf.

26 These insights were offered by Keith Bergthold and John Wright.

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ACKNOWLEDGEMENTS

While all conclusions and errors are his own, the author acknowledges the many reviewers who critiqued and strengthened this report:

John Wright, Valley Planners Network • Keith Bergthold, City of Fresno • Barbara Steck, Rob Terry, Kristine Cai and Kathy Chung and Tony Boren, Fresno Council of Governments • Rob Ball and Troy Hightower, Kern Council of Governments

Those who attended a luncheon in Fresno to hear the presentation on the methodology and offer their constructive comments, including:

Kim Anderson San Joaquin COG • Rachel Audino and Keith Woodcock, CSU Fresno • Adam Avila, Alvarado Group • Robert Borchard, City of Waterford • Tony Boren, Kathy Chung, Rob Terry and Barbara Steck, Fresno COG • Dan Cort, Cort Companies • Amanda Eaken, Natural Resources Defense Council • Jaylen French, Stanislaus COG • Rhonda Haynes, City of Visalia • Elizabeth Jonasson, Coalition for Clean Air • Christina Lehn, Kings CAG • Virginia Madueño, City of Riverbank • Roberta Marshall, Tejon Mountain Village • Michael Michaud, Wigh Properties • Michael Prandini, BIA-Fresno/ Madera Counties • Wilma Quan, City of Fresno • Jeffrey Roberts, Granville Homes • Michael Sigala, Sigala Incorporated • Pete Smith, Kern COG • Terry Watt, Terrell Watt Planning • Debbie Whitmore, City of Turlock • Rob Woolley, City of Clovis • John Wright, Planningwright

The author also acknowledges the Local Government Commission's Laura Podolsky and Judy Corbett for hosting the luncheon and helping to vet the report.

Ethan Elkind, UC Berkeley and UCLA Schools of Law, provided valuable insights and edits. Garlynn Woodsong and Erika Lew, Calthorpe Associates, also provided valuable feedback on data and analysis.

The author also acknowledges the extraordinary contributions Dave Davis made to this report.

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