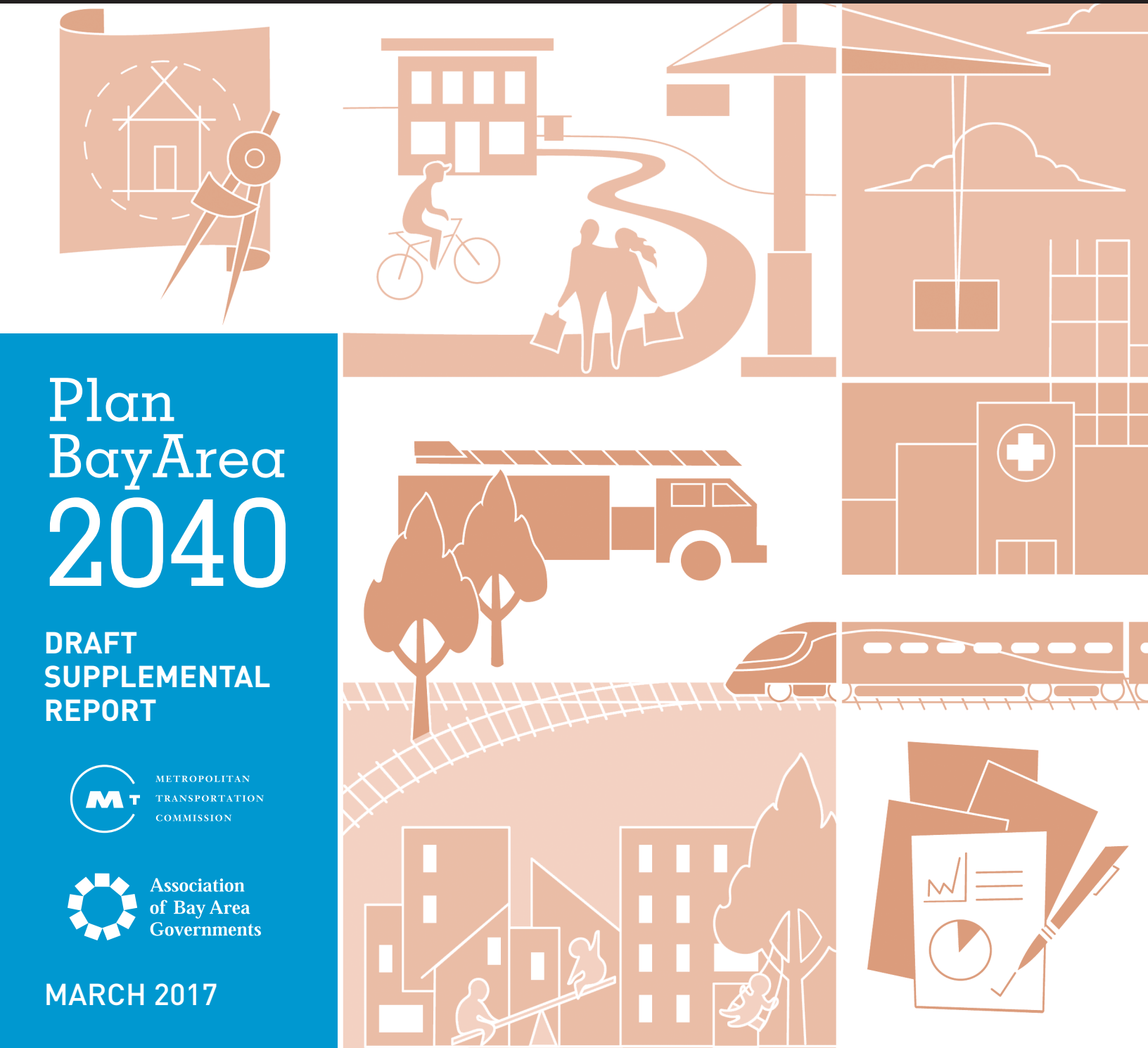# LAND USE MODELING REPORT

# Plan BayArea 2040

## DRAFT SUPPLEMENTAL REPORT

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MARCH 2017

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# Plan Bay Area 2040:
# Draft Land Use Modeling Report

March 2017

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# Executive Summary

This report presents a technical overview of the Bay Area UrbanSim Land Use Model application, performed in support of the Association of Bay Area Government (ABAG) and the Metropolitan Transportation Commission's (MTC's) Plan Bay Area 2040 Draft Environmental Impact Report (DEIR). The document provides a brief overview of the technical methods used in the analysis, a description of the key assumptions made in the modeling process, and a presentation of relevant results for each EIR alternative.

# Chapter 2: Analytical Tools

This section provides a high-level overview of the Bay Area UrbanSim Land Use Model application. The model provides a consistent, theoretically-grounded means of forecasting land use change in the Bay Area for the different combinations of control totals and planning policies that are incorporated into the EIR Alternatives. In addition, Bay Area UrbanSim is integrated with the MTC Travel Model to address the interactions between transport system changes and land use changes.[1] This section includes an overview of the model structure, simulation sub-models, a description of the interaction between UrbanSim and the Travel Model, and a brief introduction to the EIR Alternatives.

## Bay Area UrbanSim Land Use Model Application

UrbanSim is a modeling system developed to support the need for analyzing the potential effects of land use policies and infrastructure investments on the development and character of cities and regions. UrbanSim has been applied in a variety of metropolitan areas in the United States and abroad, including Detroit, Eugene-Springfield, Honolulu, Houston, Paris, Phoenix, Salt Lake City, Seattle, and Zürich. The application of UrbanSim for the Bay Area was developed by the Urban Analytics Lab at UC Berkeley under contract to MTC.[2]

The area included in the Bay Area model application includes all incorporated and unincorporated areas of the nine-county Bay Area.[3] This geographic area defined the scope of the data collection efforts necessary to define the modeling assumptions. The year 2010 was selected as the base year for the parcel-based model system.

Within UrbanSim there are several sub-models simulating the real-world choices and actions of households and businesses within the region. Households have particular characteristics such as income that may influence preferences for housing of different types at different locations. Businesses also have preferences that vary by industry for building types and locations. Developers construct new buildings or redevelop existing ones in response to demand and planning constraints, such as zoning. Buildings are located on land parcels that have particular characteristics such as value, land use, topography, and other environmental qualities. Governments set policies that regulate the use of land, through the imposition of land use plans, urban growth boundaries, environmental regulations, or through pricing policies such as development impact fees. Governments also build infrastructure, including transportation infrastructure, which interacts with the spatial distribution of households and businesses to generate patterns of accessibility at different locations that in turn influence the attractiveness of these sites for different consumers.

The Bay Area UrbanSim model system simulates these choices through the sub-models described below and shown in Figures 1, 2, and 3. Figures 1, 2 and 3 also show how the Travel Model and Bay Area UrbanSim interact. Several of the system models include algorithms that aim to match the total number of units (e.g. jobs, households) prepared by ABAG. These control totals are checked at the end of each

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[1] A discussion of the travel forecasting procedure is available in the *Draft Travel Modeling Report*.

[2] More information on UrbanSim is available at http://urbansim.com

[3] Technical information on Bay Area UrbanSim can be found at
   https://github.com/MetropolitanTransportationCommission/bayarea_urbansim

model year run. In each of Bay Area UrbanSim's annual predictions, the model system steps through the following components:

1. The *Employment Transition Model* predicts new businesses being created within or moved to the region, and the loss of businesses in the region – either through closure or relocation out of the region. The role of this model is to keep the number of jobs in the simulation synchronized with aggregate expectations of employment in the region forecasted by ABAG.

2. The *Household Transition Model* predicts new households migrating into the region, the loss of households emigrating from the region, or new household formation within the region. The Household Transition Model accounts for changes in the distribution of households by type over time, using an algorithm analogous to that used in the Business Transition Model. In this manner, the Household Transition Model keeps Bay Area UrbanSim household counts synchronized with the aggregate household projection forecasted by ABAG.

3. The *Real Estate Development Model* simulates the location, type, and density of real estate development, conversion, and redevelopment events at the level of specific land parcels. This sub-model simulates the behavior of real estate developers responding to excess demand within land use policy constraints. The algorithm examines a subset of parcels each forecast year and builds pro formas comparing development costs and income. New structures are built in profitable locations.

4. The *Scheduled Development Events Model* provides an alternative means for the introduction of new buildings into the region. This component is simply a list of predetermined structures to be built in particular future years. These represent large, committed, public-private partnership projects and are shown in Table 1.

5. The *Employment Relocation Model* predicts the relocation of business establishments (i.e. specific branches of a firm) within the region each simulation year. The Business Relocation Model predicts the probability that jobs of each type will move from their current location to a different location within the region or stay in place during a particular year.

6. The *Household Relocation Model* predicts the relocation of households within the region each simulation year. For households, mobility probabilities are based on the synthetic population from the MTC Travel Model. Drawn from Census data, these rates reflects the tendency for younger and lower income households to move more often.
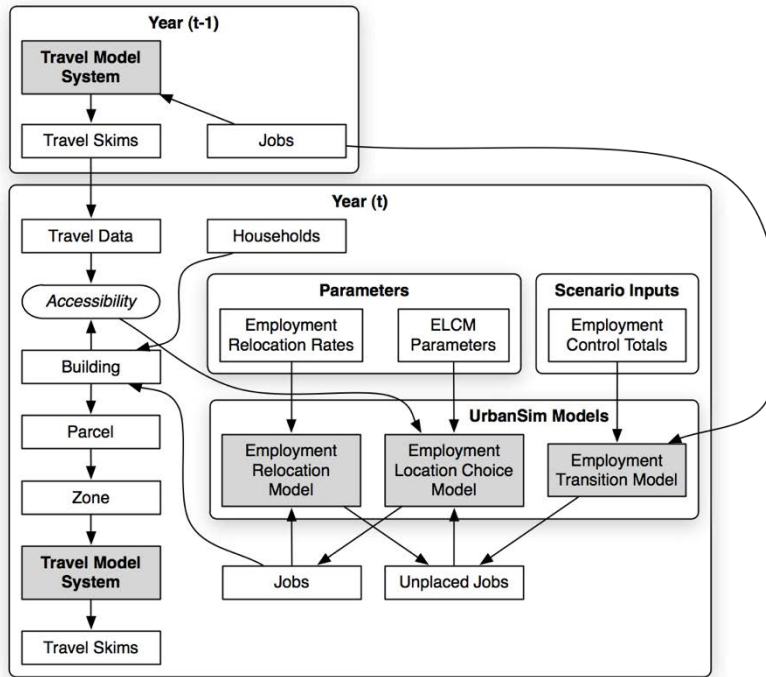
FIGURE 1: URBANSIM MODEL FLOW: EMPLOYMENT FOCUS
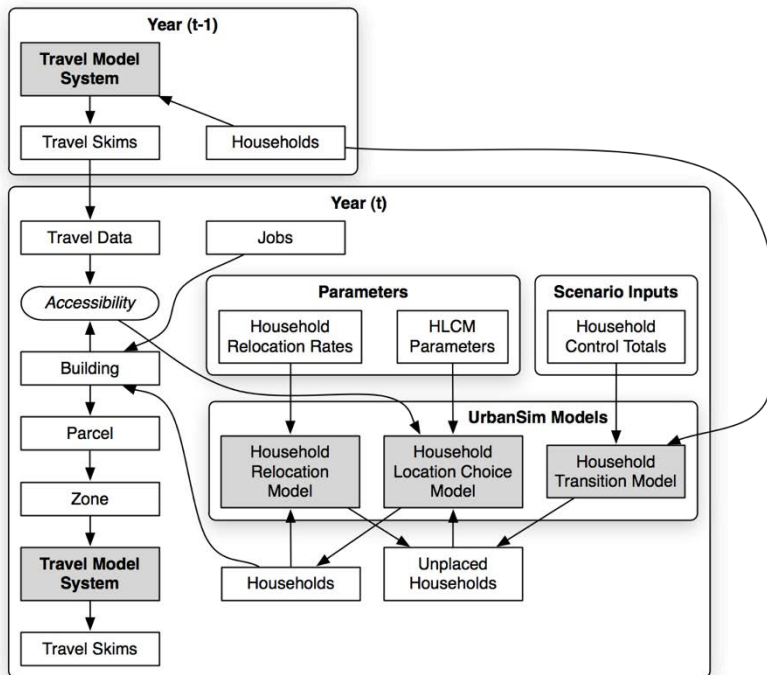


FIGURE 2: URBANSIM MODEL FLOW: HOUSEHOLD FOCUS
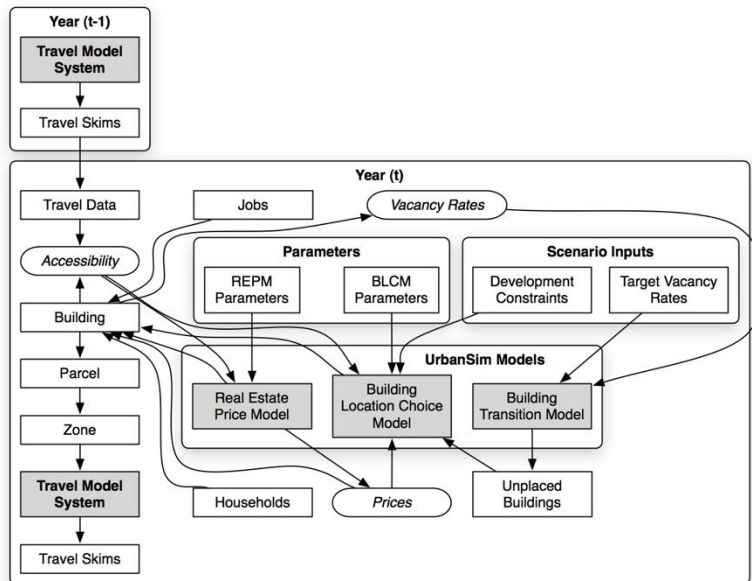
FIGURE 3: URBANSIM MODEL FLOW: REAL ESTATE FOCUS

7. The *Government Growth Model* uses a set of rules to project the employment in non-market sectors such as government and schools based on historical employment in those sectors and projected local, sub-regional, and regional population growth.

8. The *Employment Location Choice Model* predicts the location choices of new or relocating establishments. In this model, we predict the probability that an establishment that is either new (from the Business Transition Model), or has moved within the region (from the Business Relocation Model), will be located in a particular employment submarket. Each job has an attribute of the amount of space it needs, and this provides a simple accounting framework for space utilization within submarkets. The number of locations available for an establishment to locate within a submarket will depend mainly on the total vacant square footage of nonresidential floorspace in buildings within the submarket, and on the density of the use of space (square feet per employee). This sub-model simulates the behavior of businesses moving to suitable locations within the region.

9. The *Household Location Choice Model* predicts the location choices of new or relocating households. In this model, as in the business location choice model, we predict the probability that a household that is either moving into the region (from the Household Transition Model), or has decided to move within the region (from the Household Relocation Model), will choose a particular location defined by a residential submarket. This sub-model simulates the household behavior in selecting a neighborhood based on their sociodemographic preferences.

10. The *Real Estate Price Model* predicts the price per unit of each building. UrbanSim uses real estate prices as the indicator of the match between demand and supply of land at different locations and with different land use types, and of the relative market valuations for attributes of housing, nonresidential space, and location.  This role is important to the rationing of land and buildings to consumers based on preferences and ability to pay, as a reflection of the operation of actual real

estate markets. Since prices enter the location choice utility functions for jobs and households, an adjustment in prices will alter location preferences. All else being equal, this will in turn cause higher price alternatives to become more likely to be chosen by occupants who have lower price elasticity of demand. Similarly, any adjustment in land prices alters the preferences of developers to build new construction by type of space, and the density of the construction.

**Table 1: Scheduled Development Events**

| *Scheduled Development Event* |
| --- |
| Alta Bates Oakland Expansion |
| Kaiser Oakland Expansion |
| MacArthur BART Transit Village Construction |
| South Hayward BART Transit Village Construction |
| Concord Community Reuse Construction |
| Lawrence Berkeley Lab 2 Construction |
| Pleasant Hill BART Transit Village Construction |
| Richmond BART Transit Village Construction |
| Walnut Creek Transit Village Construction |
| Hunters Point Naval Shipyard Construction |
| Mission Bay Construction |
| Moscone Center Expansion |
| Park Merced Redevelopment |
| San Francisco General Hospital Expansion |
| Transbay Terminal Redevelopment |
| Treasure Island Construction |
| Bay Meadows Construction |
| Kaiser Redwood City Expansion |
| Sequoia Hospital Expansion |
| Stanford Medical Center Expansion |
| Berryessa BART Transit Village Construction |

## EIR Alternatives

For the EIR analysis, UrbanSim was used to generate five different alternative land use scenarios for future growth in the Bay Area. Each of these uses identical control totals representing future economic and demographic change but employs different policies constraining or promoting particular types and intensities of real estate development in particular locations. The first alternative is called the No Project and represents the expected trajectory of the region without the implementation of the proposed Plan or any of its alternatives. All policies in the No Project Alternative are determined or extrapolated from existing base year plans and policies. The second alternative is called the proposed Plan and uses a set of policy levers to achieve the spatial distribution of future households and employment envisioned by ABAG Planners. Within UrbanSim, the proposed Plan Alternative starts with base year policies but modifies some of these to achieve its goal of focusing growth in defined compact, accessible, and politically feasible locations called Priority Development Areas (PDAs).

Similarly, the other three alternatives modify existing policies in different ways to provide a range of potential futures that aim to accomplish the goals pursued within the proposed Plan. The Big Cities Alternative modifies policies to focus growth within the region's three largest cities (San Jose, San Francisco, and Oakland) and their closest neighbors. The Main Streets Alternative aims for a region more compact than projected by the No Project Alternative but less focused than either the Preferred Plan or the Big Cities alternatives. Finally, the Environment, Equity and Jobs (EEJ) Alternative promotes housing growth in locations that are job rich and/or are "communities of opportunity" offering high quality schools and services to residents.

## Travel Model Interaction

Bay Area UrbanSim and the Travel Model work as a system to capture the interaction between transportation and land use. Accessibility to a variety of urban features is a key driver in both household and business location choice. For instance, households often prefer locations near employment, retail, and similar households but avoid other features such as industrial land use. Business preferences vary by sector with some firms looking for locations popular with similar firms (e.g. Silicon Valley) while others desire locations near an airport or university. In all cases, the accessibility between a given location in the region (defined as a Transportation Analysis Zone or TAZ) and all other locations/TAZs is provided to UrbanSim by the Travel Model. These files represent overall regional accessibility for future years considering changing infrastructure.

Moving in the other direction, UrbanSim provides the Travel Model with a projected land use pattern and spatial distribution of activities for each year into the future. This pattern incudes the location of housing, jobs, and other activities that serve as the start and end locations for trips predicted by the Travel Model. This information was provided to the Travel Model at a TAZ level aggregation for each future year examined. Overall, the linkages between the two models allow land use patterns to evolve in relation to changes in the transportation system and for future travel patterns to reflect dynamic shifts in land use.

# Chapter 3: Input Assumptions

This chapter describes the Bay Area UrbanSim base year database and assumptions for the various EIR alternatives. Key variables, data sources and processing steps are described, and selected variables are profiled or mapped to illustrate trends, and assess reasonableness. The year 2010 was selected as the base year for the parcel-based model system. The Bay Area UrbanSim application operates at the level of individual households, jobs, buildings, and parcels. Jobs and households are linked to specific buildings, and buildings are linked to parcels.

In the sections below there are tables of the base distribution of employment, population, and buildings in the Bay Area. In some cases, incomplete or inconsistent data was imputed. The base-year database contains around 2.6 million households (not including group quarters), 3.4 million jobs, 1.9 million buildings, and 2 million parcels, based on information from the U.S. census, economic surveys, and county assessor parcel files.

## Base Year Spatial Database

Bay Area UrbanSim uses a detailed geographic model of the Bay Area. A geographic information system was used to combine data from a variety of sources to build a representation of each building and property within the region. These detailed spatial locations are grouped into TAZs to improve model flow and provide summary output. Because this database represents the current state of the Bay Area's land use pattern, it is used as an identical starting point for all five alternatives.

### Parcels

Parcels, or individual units of land ownership, provide a fundamental building block for the Bay Area UrbanSim model: in both the real world and the model they are the entity that is owned, sold, developed, and redeveloped by households and businesses. In a given year, each parcel is associated with 0, 1, or multiple buildings that provide space for activities. The UrbanSim parcel database includes information linking the parcels to zones they are within, buildings that are on them, their size, their monetary value, and their current planning constraints.

### Buildings

The base year database contains around 1,900,000 buildings categorized into 14 different types as seen in Table 2. Households and businesses are assigned to buildings and buildings are linked to a parcel. Each building has attribute information on its size, age, and value, among other things. The building database is modified by the Real Estate Development Model as it tears down buildings and constructs new buildings. The base year (2010) configuration for the buildings database is the same for all EIR Alternatives. Figures 4 and 5 map out illustrative building attributes at the zonal level.

**Table 2:  Building Types and 2010 Counts**

| Building Type | 2010 Count |
|---|---|
| Single Family Detached | 1,479,666 |
| Single Family Attached | 207,088 |
| Multi-Family | 102,022 |
| Office | 37,105 |
| Hotel | 2437 |
| School | 3184 |
| Light Industrial | 21,491 |
| Warehouse | 10,999 |
| Heavy Industrial | 1539 |
| General Retail | 41,870 |
| Big-Box Retail | 1678 |
| Mixed-Use Residential | 7375 |
| Mixed-Use Retail-Focus | 1379 |
| Mixed-Use Employment-Focus | 735 |

**Percent single-family residential by zone, 2010**

- 0% - 70%
- 70% - 86%
- 86% - 92%
- 92% - 96%
- 96% - 100%
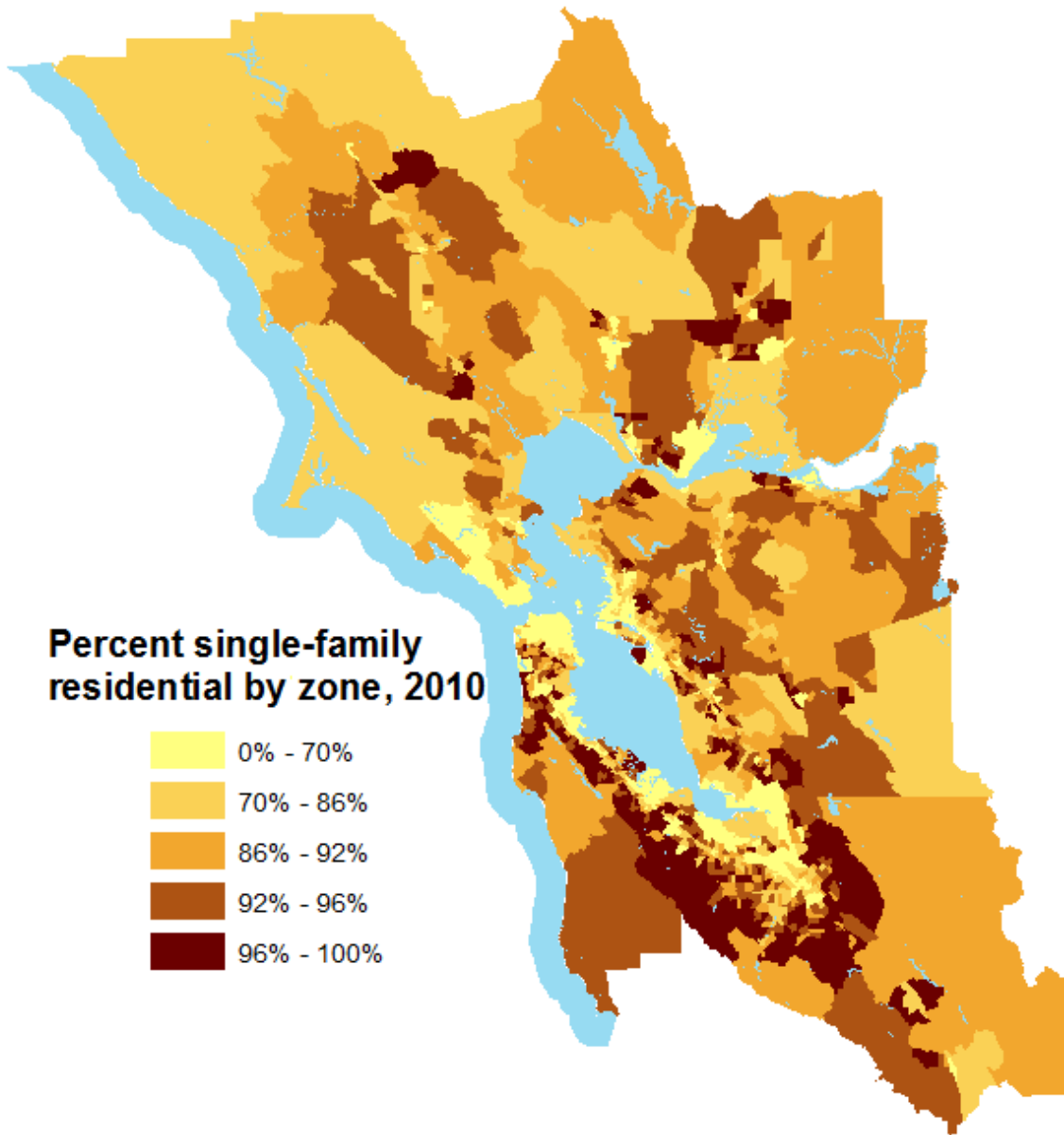
FIGURE 4: PERCENT SINGLE FAMILY RESIDENTIAL BUILDINGS, BY TRAVEL ANALYSIS ZONE (TAZ)

**Buildings per acre
by zone, 2010**

- 0 - 11
- 11 - 26
- 26 - 37
- 37 - 49
- 49 - 127
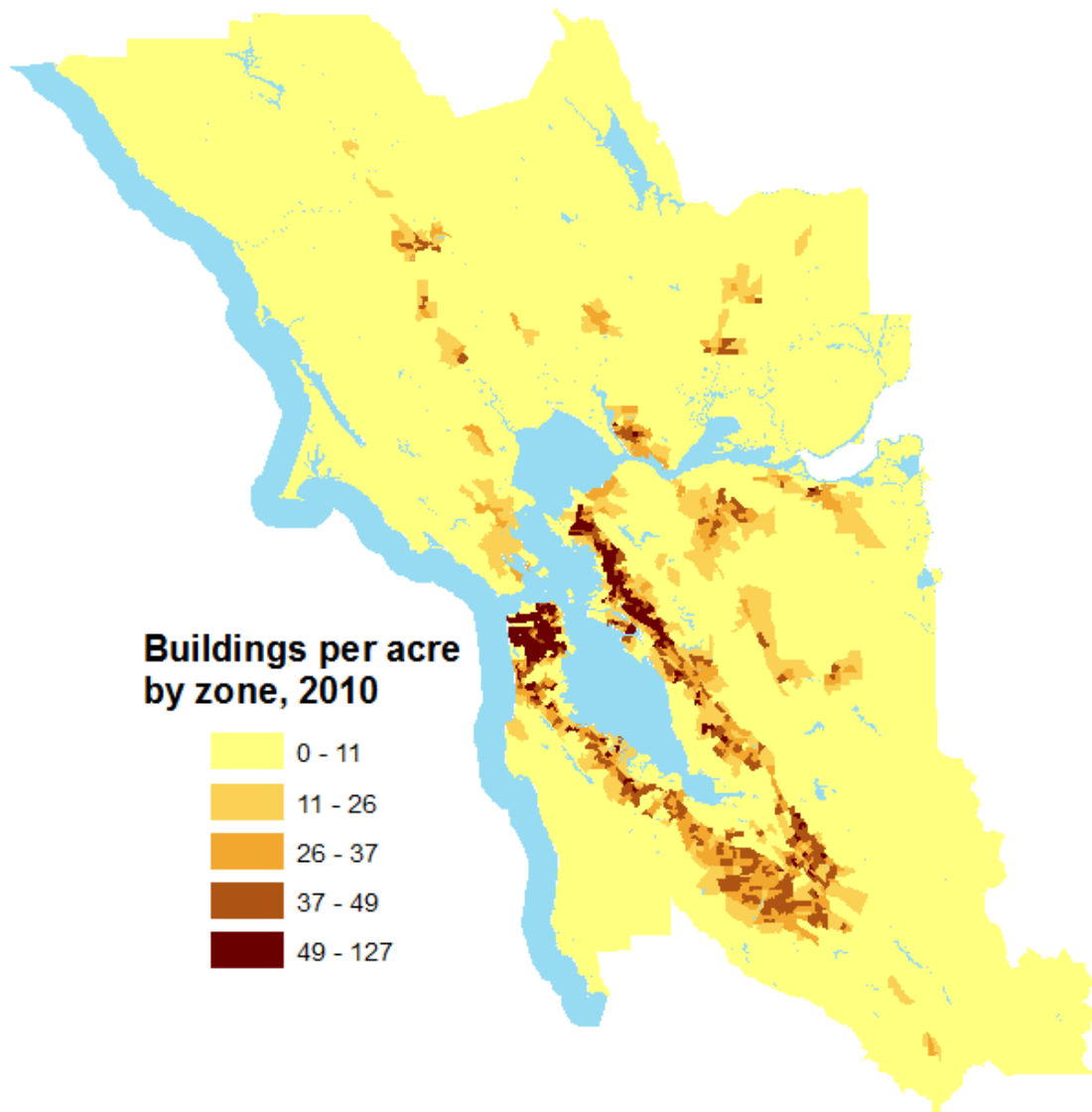
FIGURE 5: BUILDINGS PER ACRE, BY TRAVEL ANALYSIS ZONE

Because buildings are a fundamental nexus in UrbanSim where the physical real estate market interacts with the households and employees who occupy the structures, a variety of key assumptions relate to buildings. While these assumptions greatly simplify the complexity of the region's land use market, they remain identical across EIR Alternatives allowing for consistent comparisons.

Two interrelated factors combine to determine how employees occupy buildings. First, workers in particular sectors use various types of buildings at different rates. For instance, many business service workers will use office buildings but a smaller number will occupy the same amount of light industrial space. The second step looks at the amount of square feet different types of workers use. Both of these use factors (types and amounts of space) were compiled on average for the entire region and assumed to be constant into the future.

Finally, UrbanSim provides flexibility in the representation of subsidized construction. A separate component described above (the Scheduled Development Event Model) allows the construction of predetermined buildings in set future years. This list includes two types of projects: 1) buildings built between 2010 (the model forecast start year) and 2016 (the present year when the alternatives were created), or 2) larger projects to be built with a mixture of public and private funding, that are currently under construction or funded. This definition led to the inclusion of *** new housing units and *** million new commercial square feet (though the net amounts for both were moderately lower on account of redevelopment) between 2010 and 2040. The same list of assumed projects was used for all EIR Alternatives and can be seen above in Table 1.

## Regional Growth Projections

Projections for the region's overall rate of economic and demographic growth are developed by ABAG external to the land use modeling process.[4] Summary information on these inputs to the Bay Area UrbanSim model is presented below.

### Annual business control totals

The total number of employees by sector within the region is forecasted by ABAG and fed into UrbanSim. This information is used to generate new business establishments that in turn generate overall demand for commercial real estate. After new establishments are assigned locations by the Business Location Choice Model, the overall spatial distribution of employment provides input into the travel model's representation of personal travel.

ABAG's economic projections for the Bay Area are provided for the years 2010, 2015, 2020, 2025, 2035, and 2040 while intermediate years are interpolated. As seen in Table 2, the overall regional count of employment is projected to grow from around 3.4 million jobs in 2010 to almost 4.7 million jobs by 2040, or 37.7 percent. These control totals also project a changing sectoral distribution over the projection period: employment in agriculture and natural resources declines over the period while the fastest growing sectors are professional services and business services.

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[4] Please see the *Forecasting Report* for the details of how these control totals were generated.

**Table 3: Household and Employment Regional Control Totals**

| Year | Households | Employment |
|------|-----------|------------|
| 2010 | 2,609,000 | 3,410,853 |
| 2015 | 2,760,479 | 4,010,134 |
| 2020 | 2,881,967 | 4,136,190 |
| 2025 | 3,009,055 | 4,267,761 |
| 2030 | 3,142,016 | 4,405,126 |
| 2035 | 3,281,131 | 4,548,564 |
| 2040 | 3,426,700 | 4,698,374 |

## Annual Household Control Totals

The total number of households by income category within the region is forecasted by ABAG externally to UrbanSim.[5] This information is used to understand the overall demand for housing. In addition to the new households, the division of existing households into income categories is used to segment the population when considering relocation rates in the Household Transition Model. The forecasted new households and relocating households are allocated among the TAZs using the Household Location Choice Model. This spatial distribution of households is input into the Travel Model's representation of personal travel.

ABAG's demographic projections for the Bay Area are provided for the years 2010, 2015, 2020, 2025, 2035, and 2040 while intermediate years are interpolated.

As seen in Table 3 above, the overall regional count of households is projected to grow from around 2.6 million households in 2010 to over 3.4 million households by 2040, or 31.3 percent. These control totals also project a changing income distribution over the projection period: the share of households in each quartile (from lowest to highest income) is projected to shift from 27%/26%/23%/24% in 2010 to 28%/22%/22%/28% in 2040.

## Model Agents

Choices by key actors or agents in the Bay Area are the foundation of the UrbanSim Model. The three classes of agents are households choosing places to live, business establishments choosing locations to

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[5] Please see the *Forecasting Report* for the details of how these control totals were generated.

do work, and real estate developers choosing places to build new buildings. This section discusses inputs related to each agent. Because these represent the fundamentals of the urban economy, input values are consistent across EIR Alternatives.

## Households and People

UrbanSim represents each household individually. A 2010 household table with approximately 2,600,000 households is synthesized for the region from Census 2010 Public Use Micro-Sample (PUMS ) and Summary File 3 (SF3) tables using the PopGen population synthesizer.[6] This process creates a row for each household and gives each characteristics such as number of persons and income so that the overall averages for those characteristics conform to the census information provided for that location. These households have a mean persons per household of 2.7, a mean number of household workers of 1.39, mean age of household head of 48.6 years, a mean household income of $81,937, and a mean number of household children of 0.53.

## Establishments and Employees

Establishments are the other major class of agent in UrbanSim. They represent a unique location of employment for a business. For example, a one-off barbershop is one establishment and so is one particular McDonald's restaurant location. Each establishment contains a number of employees. For the Bay Area UrbanSim model, the 2010 distribution of establishments and their employees are used as input. Future year projections are then made by modeling the movement of individual establishments.

The 2010 establishment database was built by combining establishment data from the Dunn & Bradstreet and EDD[7] datasets and then transforming it to conform to ABAG's subregional employment totals.[8] Each establishment was assigned to one of the 6 sector classes[9] and associated with an appropriate building. Each of these sectors is modeled separately in the Employment Location Choice Model. Because no clear relocation trends were readily observable in historic data, a 1.9 percent chance of relocating was assumed for employment each year, regardless of sector. All employment assumptions (except the control totals as noted above) are the same for all EIR Alternatives.

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[6] http://urbanmodel.asu.edu/popgen.html

[7] http://www.labormarketinfo.edd.ca.gov/

[8] All employment databases contain slightly different counts due to different definitions, data collection strategies, and error. For more information on ABAG's regional control totals please see the *Forecasting Report*

[9] The employment classifications can be found in the *Forecasting Report*
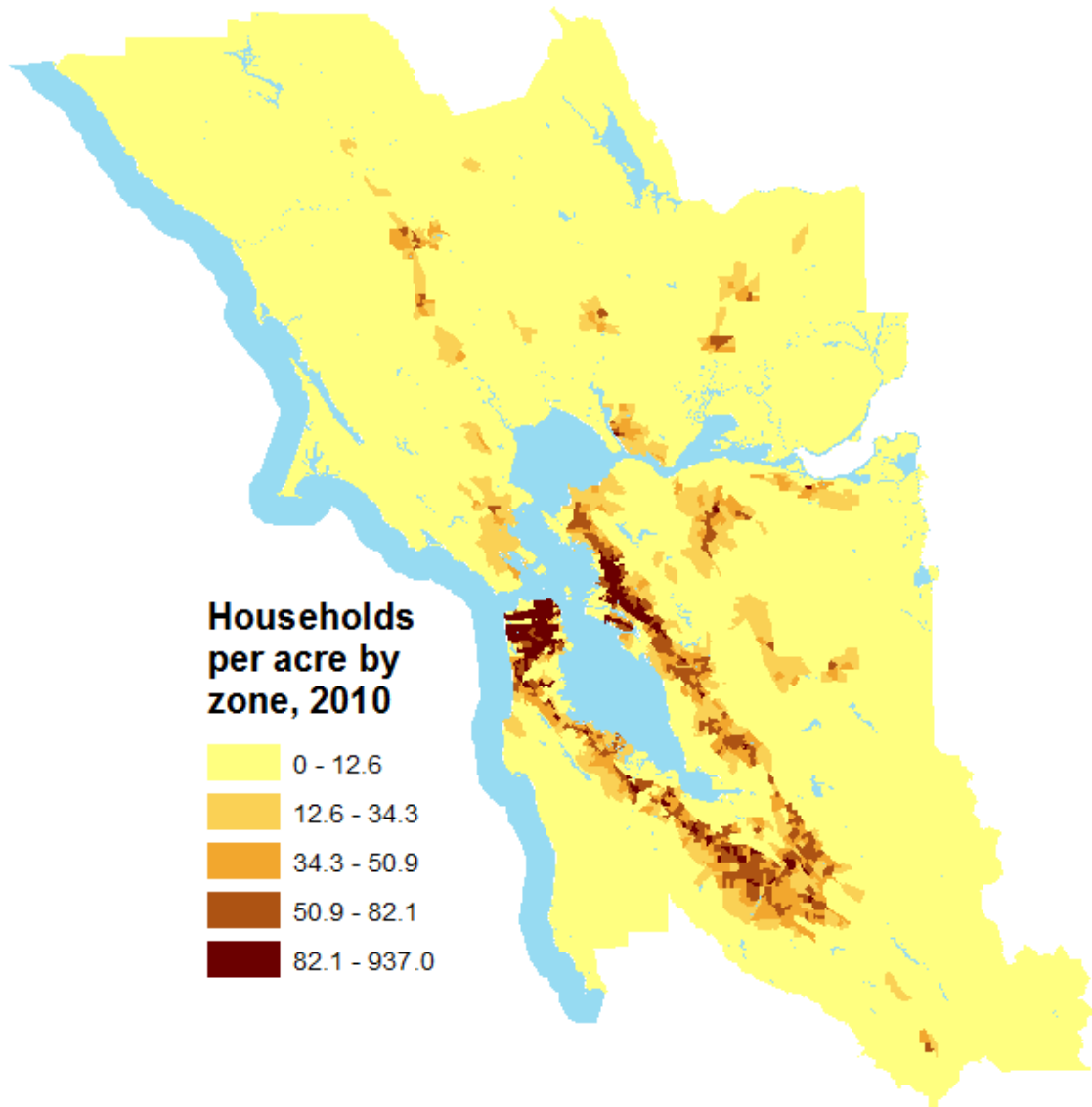
FIGURE 6: SYNTHESIZED HOUSEHOLDS PER ACRE, BY TAZ

## Real Estate Developers

The final UrbanSim agent is a special class of business: the real estate developer. Developers monitor the relationship between supply and demand for different types of buildings across the region and attempt to build new structures in locations where they can make a profit. They are driven by market forces so assumptions related the real estate developers are identical across the five EIR Alternatives.

UrbanSim implements the Real Estate Developer Model as a stochastic, or randomly defined, pro-forma model that explicitly treats these decisions the same way they are made in the real world. The pro forma combines information on costs and income over a proposed project's lifetime, allowing an assessment of overall profitability. The model examines all parcels each year and tests various project concepts allowed under the site's zoning constraints. The developer chooses the project that maximizes profit and builds the project if it is profitable. After a construction period, these new buildings are available to households and businesses for occupation.

# Land Use Policy Levers

Policy makers can apply certain incentives or disincentives — financial or regulatory — to try and influence land use. These are referred to as "policy levers." Differences in the policy lever inputs are the fundamental means of representing the different EIR Alternatives. The policies represent actions that MTC, ABAG, or partner agencies such as the cities and counties could take or seek legislation to allow. These input assumptions vary greatly between alternatives and, when combined with the more fundamental agents described above, produce model outputs.

## Zoning

Current zoning was obtained for all parcels in the region as a representation of the land use controls in place during the base year. Zoning codes, general plans, and specific plans were processed to obtain a consistent indication of each jurisdiction's long-term vision for land use type, residential dwelling units per acre, and commercial floor-area-ratio.[10] Cities and counties were offered the opportunity to review the data for accuracy. Adjustments to zoning were made in some locations to put protected land, government land, and transportation corridors off limits to development. Additionally, parcels containing structures built before 1930 were also deemed non-developable as a rough representation of historical protection ordinances until better data can be obtained.

All alternatives start with this basic zoning classification. For each alternative, zoning modifications are made for various subsets of parcels in the region. The No Project Alternative assumes current land use regulations as captured in the base zoning do not change between now and 2040. In the proposed Plan Alternative, zoning is modified to reflect the classification of ABAG's Priority Development Areas into various place-types (if these require intensities higher than existing zoning allows). For each PDA, the allowable building types are broadened and intensities increased. Similarly, in the Big Cities Alternative

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[10] Zoning or general plan data was collected for all jurisdictions. Due to time constraints, specific plans were only collected for a limited subset of areas where such information was expected to exhibit a great deal of variation from the other planning information. In general, constraints on new development were drawn from the information source judged most likely to represent a jurisdiction's long term expectations for development maximums at each location.

zoning is changed in Transit Priority Areas (TPAs) within the three largest cities and their neighbors in order to encourage growth near transit.

The Main Streets Alternative increases zoning intensities in the PDAs but to a lesser amount than the proposed Plan Alternative in order to create a slightly less dense but still focused land use pattern. The Equity, Environment and Jobs (EEJ) Alternative broadens use types and increases residential densities in a selection of both PDAs and Transit Priority Areas (TPAs) in particular jurisdictions to encourage low income housing in job-rich communities. Figure 10 provides an overview of zoning overlays by alternative.

**Policy Overlays**

**Aternatives**

- 🟥 Plan, Main Streets, Big Three, and EEJ
- 🟦 Plan, Main Streets, and EEJ
- 🟪 Plan and Main Streets
- 🟨 Big Three and EEJ
- 🟧 Big Three
- 🟩 EEJ

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
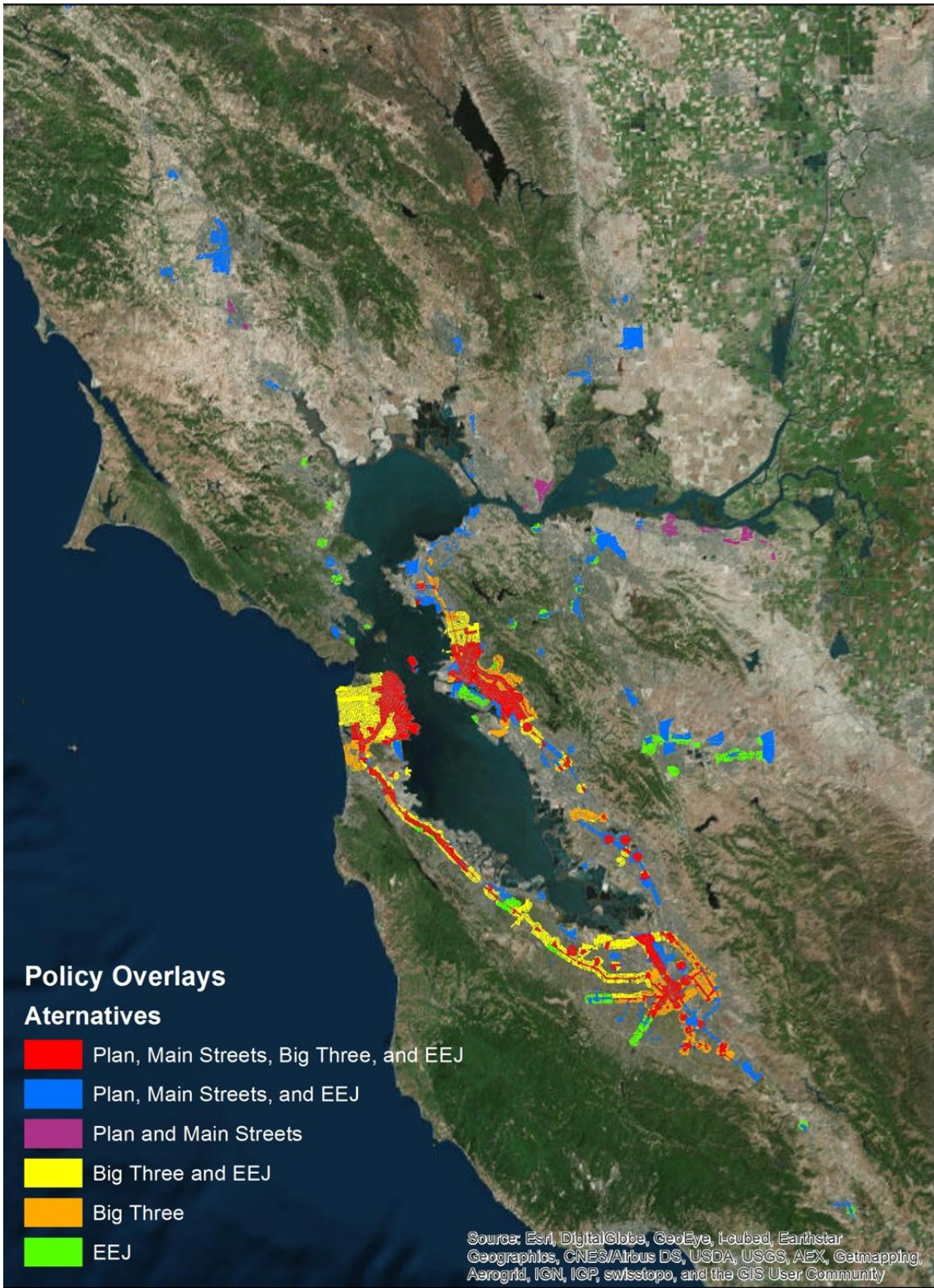
FIGURE 7: ZONING OVERLAYS ACROSS THE ALTERNATIVES

## Urban boundary lines

For the purpose of building EIR alternatives, a consistent set of "Urban Boundary Lines" surrounding each city was established. These are meant to function like urban growth boundaries in the EIR alternatives that stress the implementation of regional urban growth boundaries. In some cases, the Urban Boundary Lines are drawn from true urban growth boundaries or urban limit lines. In other cases existing city boundaries are used to establish the Urban Boundary Line for EIR analysis.

The Urban Boundary Lines are treated two different ways across EIR Alternatives. In the No Project and Main Streets alternatives they are assumed to be weakly enforced meaning that some suburban growth will be allowed to spill out past them. In the other three alternatives, the enforcement is assumed to be strict, meaning that all Urban Boundary Lines are strictly enforced as urban growth boundaries and suburban growth is not allowed beyond them. In all alternatives, low density rural residential growth is permitted beyond the Urban Boundary Line in locations where the base year zoning allows it.

In the No Project and Main Streets alternatives, the amount and location of growth beyond the Urban Boundary Lines must be determined. (In the forecast this can be thought of as land that is expected to become incorporated during the next three decades, either through city expansion or the formation of new cities.) This is done by changing the zoning to suburban densities in particular locations and letting the UrbanSim modeling system decide how much growth to place in those locations based on its representation of the regional land market. 389 square miles of land was upzoned to typical suburban densities (i.e. the maximum housing units per acre and Floor-Area Ratio ( FAR) were increased and single-family dwellings, retail, and office uses were added as allowable) for this alternative based the ratio of new incorporated land to population growth during the past three decades. Upzoned land was located within the region using a simple rule-based model that prioritized parcels that were near divided highways and had low slope within a five-mile radius (i.e. areas posited as most likely to incorporate). All land in this area was considered available in the base year. See Figure 11 for the assumed Urban Boundary Lines and their expansion in the No Project Alternative.

**Urban Boundary Lines**
**Expansion Area**

- Plan, Big Three, and EEJ
- No Project and Main Streets
- Main Streets

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
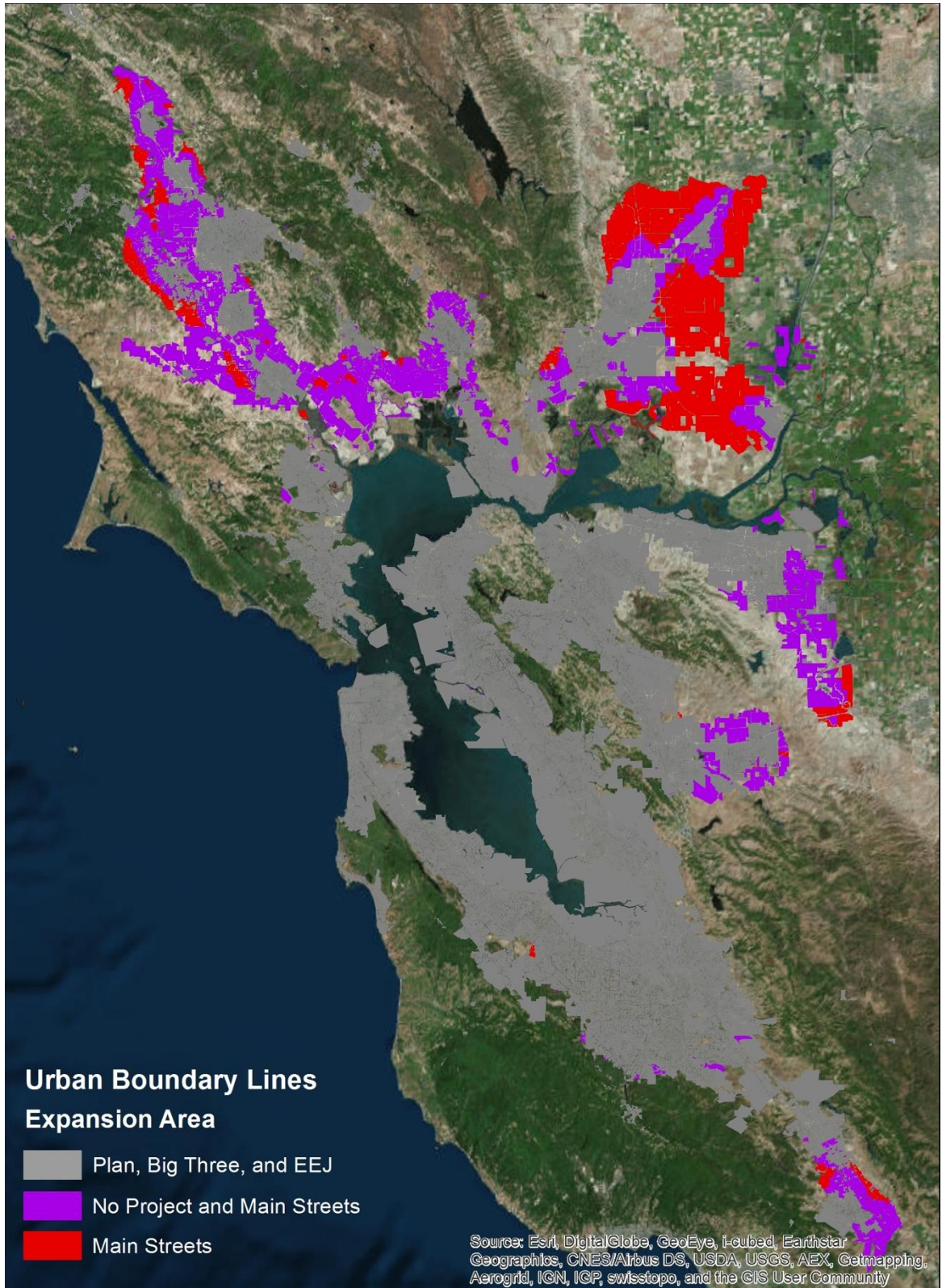
FIGURE 8:  URBAN BOUNDARY LINES ACROSS THE ALTERNATIVES

## California Environmental Quality Act Tiering

To encourage land use planning and development that is consistent with a Sustainable Communities Strategy (SCS), Senate Bill (SB) 375 includes California Environmental Quality Act (CEQA) provisions that can be used by lead agencies to streamline projects that align residential development with transit. It is anticipated that most projects that are able to take advantage of the streamlining will qualify for a limited analysis EIR which would reduce the time required to complete the environmental review, and thus reduce the time it takes to construct a project. This time savings translates into a cost savings for the developer which makes development slightly more likely to occur within TPAs. However, the streamlining time savings is assumed to be modest: on the order of 1 to 3 months in the model. Because no data exists at this point in California or a similar context as to the exact value of this streamlining, a 1 percent savings has been assumed for appropriate projects. Although it is at the discretion of local jurisdictions to determine the appropriateness of using the streamlining provisions in SB 375, the model assumes that this benefit is offered to all projects that meet the density and intensity requirements and are within a TPA. CEQA Tiering benefits are identical in the proposed Plan, Big Cities, Main Streets, and EEJ alternatives. The CEQA streamlining benefits are not present in the No Project alternative.

## One Bay Area Grant Program

The One Bay Area Grant (OBAG) program provides preferential subsidy over the next four years to cities that accept and build housing per the Regional Housing Needs Allocation (RHNA) process. The modeling approach here assumes all jurisdictions will comply with the mandatory complete streets policy and certified housing element requirements and that all OBAG funding is spent in the PDAs with an equal percentage of the county level funding going to each PDA. Additionally, for simplicity all funding is allocated in the model at the start of the modeled time period.

OBAG funding is represented as an increase in the attractiveness of PDAs to development. While some studies have attempted to capture the local impact of pedestrian and other TOD improvements on land values, no one has examined the overall impact of a regional program of this nature on property values or on redirecting the spatial distribution of new development. For now, we assume that the OBAG program results in an increase in profitability of $30,000 per residential unit for residential buildings and $4 per square foot for non-residential buildings in all PDAs. These values are in line with previous studies.[11] A better understanding of the precise impacts of the OBAG program will come after a few years of implementation.

## Senate Bill 743

California Senate Bill 743 is an effort (ongoing at the time of Plan preparation) to change the manner in which the assessment of significance for under the California Environmental Quality Act (CEQA) is assessed. Traditionally, CEQA analysis has examined potential transportation impacts using the Level of Service (LOS) concept where impact significance occurs when highway facilities exceed a particular level of congestion. LOS assessments in dense urban areas often reveal high levels of existing congestion leading to frequent finding of significance and expensive mitigation requirements. SB743 shifts analysis

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[11] For example, please see CABE: *Paved With Gold: The Real Value of Good Street Design*. June 2007.

http://www.cabe.org.uk/files/paved-with-gold.pdf.

to a Vehicle Miles Traveled (VMT) method that is more likely to find transportation impacts in car-oriented suburban locations. Because the exact implementation of SB743 is still being worked out, it is proxied here has a slight (1-2%) increase in costs in suburban locations and a slight (again 1-2%) decrease in costs in urban locations with the amount of shift determined by zone level average VMT for commute trips originating in that zone. This policy is applied in all alternatives except the No Project.

## Inclusionary Zoning

As regional housing prices increase, various stakeholders have been interested in land use policies to produce housing for lower income households. For example, inclusionary zoning is a requirement that new residential construction include a set percentage of units that are available exclusively to low income residents. Here, the policy requires that any new residential construction provide the percentage of units required in each location within an alternative. The land use model reflects the challenges of building projects that have lower revenue but the same costs with some otherwise feasible projects shifting to other locations. When projects are built with inclusionary units, those units are only available to households in the lowest income quartile. This policy is applied in all alternatives except the No Project.

## Regional Development Fees and Subsidies

In two alternatives, a development fee is assessed for certain types of new development in high VMT locations and transferred as a subsidy to areas of low VMT. In the Preferred Alternative, fees are assessed on the development of new office spaces in zones with high average VMT for workers with jobs in that TAZ. These fees make some potential projects infeasible, causing them to locate in more VMT-efficient locations. The projects that are built in high VMT locations contribute to a fund that subsidizes deed-restricted, low-income housing within the PDAs. In the Big Cities Alternative, new residential development is charged a fee based on the average VMT generated by workers with homes in that TAZ. The fee discourages residential construction in these locations and shifts development to more efficient locations. Projects that are built contribute to a fund that subsidizes deed-restricted residential construction in the PDAs.

## Parcel and Housing Capital Gains Taxes

The Main Streets Alternative employs two methods of directly subsidizing deed-restricted low income housing. A tax of $24 per parcel raises around $42 million annually to be spent subsidizing affordable housing in any PDA throughout the region. A capital gains tax on some profit made from housing raises $500 million dollars to similarly be spend on subsidized housing in the PDAs.

## Reduced Parking Minimums

In all of the alternatives except the No Project, the reduction of required parking minimums for new construction was reduced to encourage cheaper infill housing. Time limitations disallowed the collection of a full parking requirement database for the Bay Area. Instead, a subsidy of 1 percent per potential unit was applied to all parcels within the potentially upzoned area relevant to each alternative (the relevant zones are PDAs, TPPs, or some combination of the two as seen above in Figure 9). This number represents a basic estimate of potential savings assuming that around one-fifth of new units would be able to be built with one less parking space.

# Chapter 4: Key Results

Selected land use model results are summarized and discussed here. The output presented is partial and intended to give a general sense of expected behavioral change across the alternatives and through the projection years. Emphasis is given to results that 1) influence the Travel Model, 2) affect Plan Bay Area 2040 target results, and 3) provide a context for understanding the regional development change predicted by each alternative.

## Regional Land Use Outcomes

The overall regional distribution of population and employment growth provides a simple means of comparing the land use model outcomes for the five EIR Alternatives. Figure 13 assigns the region's superdistricts into four large categories: the Big Cities (San Jose, San Francisco, and Oakland), the rest of the region's Urban area, the Suburban area, and the Exurban area.[12] Because the figures are based on superdistricts, the boundaries do not all align with jurisdictional boundaries. Table 5 shows the regional share of households in 2010 and for each alternative in 2040.  Table 6 shows the regional share of employment in 2010 and for each alternative in 2040.

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[12] Boundaries are approximate due to pre-determined superdistrict boundaries and category labels are only intended to be descriptive.
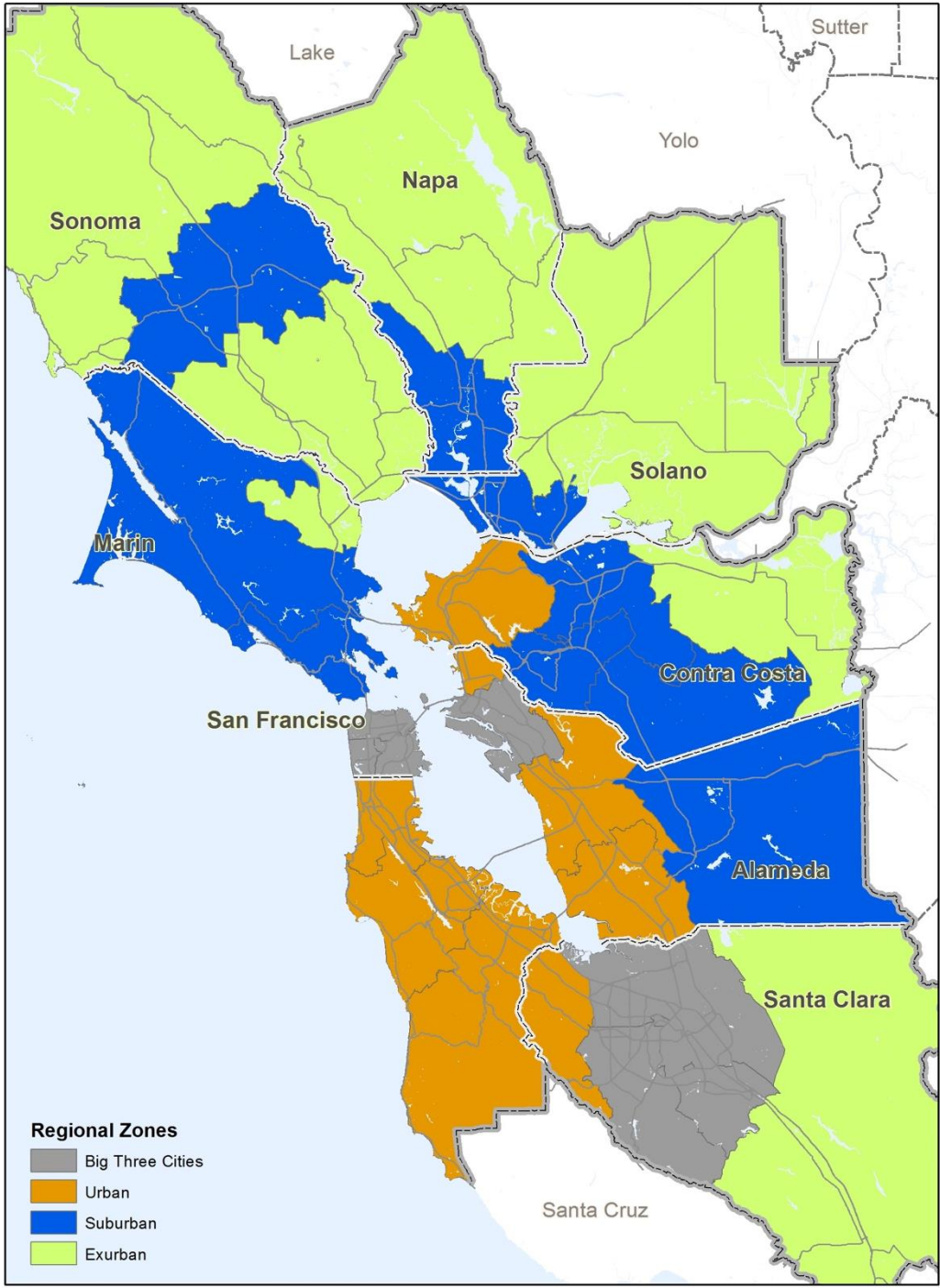
FIGURE 9: REGIONAL ZONES

**Table 4: Regional Share of Households Across Alternatives**

| Area | 2010 | Alternative 2040 | | | | |
|---|---|---|---|---|---|---|
| | | No Project | Proposed Plan | Main Streets | Big Cities | EEJ |
| Big Cities | 40% | 39% | 43% | 44% | 47% | 42% |
| Urban | 27% | 25% | 26% | 25% | 25% | 26% |
| Suburban | 20% | 20% | 18% | 19% | 17% | 19% |
| Exurban | 13% | 16% | 12% | 12% | 11% | 13% |

**Table 5: Regional Share of Employment Across Alternatives**

| Area | 2010 | Alternative 2040 | | | | |
|---|---|---|---|---|---|---|
| | | No Project | Proposed Plan | Main Streets | Big Cities | EEJ |
| Big Cities | 43% | 47% | 47% | 46% | 47% | 47% |
| Urban | 28% | 27% | 27% | 27% | 27% | 27% |
| Suburban | 20% | 18% | 18% | 18% | 18% | 18% |
| Exurban | 10% | 8% | 8% | 8% | 8% | 8% |

## Small Zone Outcomes

While the regional distribution of households and employment will influence travel behavior, a more micro-level understanding of growth is also fundamental in understanding each alternative's ability to achieve transportation and other goals. PDAs are the zones created through a multi-year partnership with local jurisdictions that are seen as a preferred location for urban growth in the proposed Plan. PDAs aim to provide transit and pedestrian accessibility to urban services. TPAs are zones defined by SB 375 as being within a half mile of high-quality transit. TPAs cover a larger portion of the region and are more tightly focused on transit accessibility. Figure 14 show PDAs, TPAs and areas of overlap. Table 7 provides the share of households in PDAs and TPAs for 2010 and the alternatives in year 2040. Table 8 shows similar information for employment shares.

**PDAs and TPAs**

**Parcel is in**
- PDA Only
- TPA Only
- PDA and TPA

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
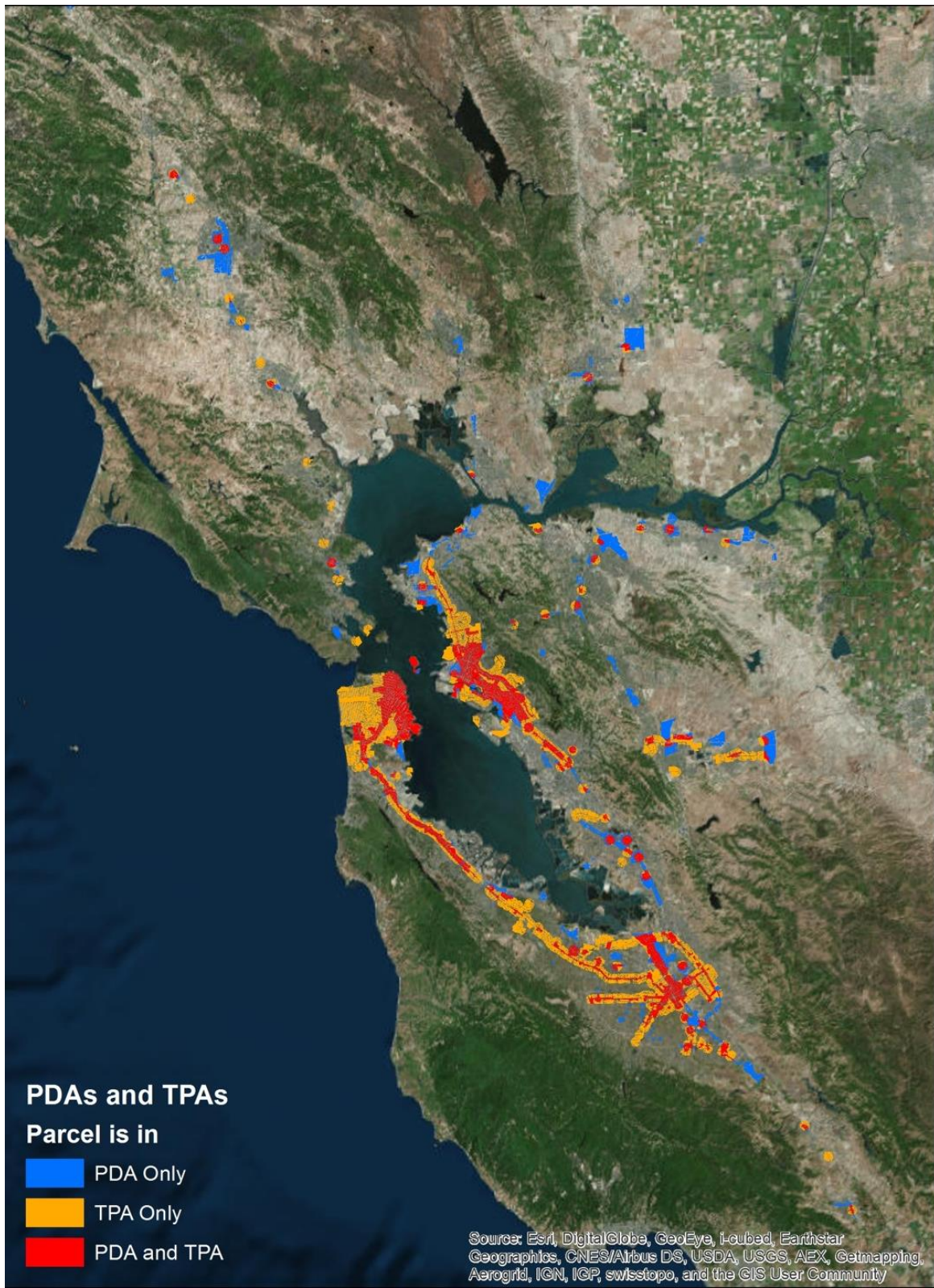
FIGURE 10:  PDAS AND TPAS

**Table 6:  Small Zone Share of Households Across Alternatives**

| Area | 2010 | Alternative 2040 | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | | No Project | Proposed Plan | Main Streets | Big Cities | EEJ |
| PDAs | 23% | 26% | 35% | 36% | 31% | 34% |
| TPAs | 40% | 40% | 44% | 44% | 46% | 44% |

**Table 7:  Small Zone Share of Employment Across Alternatives**

| Area | 2010 | Alternative 2040 | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | | No Project | Proposed Plan | Main Streets | Big Cities | EEJ |
| PDAs | 47% | 45% | 46% | 43% | 45% | 46% |
| TPAs | 51% | 52% | 52% | 51% | 53% | 53% |

# Appendix 1 – Household and Employment Growth Forecasts by Jurisdiction

## Household Growth Forecasts

| County | Jurisdiction | Summary Level | Households 2010 | Households 2040 | Growth in Households |
|---|---|---|---|---|---|
| Alameda | Alameda | Total | 30,100 | 35,100 | 5,000 |
| | | PDA | 1,800 | 5,500 | 3,700 |
| | Alameda County Unincorporated | Total | 48,400 | 56,200 | 7,800 |
| | | PDA | 10,100 | 13,100 | 3,000 |
| | Albany | Total | 7,400 | 7,900 | 500 |
| | | PDA | 320 | 470 | 150 |
| | Berkeley | Total | 46,000 | 55,400 | 9,400 |
| | | PDA | 6,600 | 12,900 | 6,300 |
| | Dublin | Total | 14,900 | 26,500 | 11,600 |
| | | PDA | 3,100 | 11,000 | 7,900 |
| | Emeryville | Total | 5,700 | 18,900 | 13,200 |
| | | PDA | 2,300 | 15,100 | 12,800 |
| | Fremont | Total | 71,000 | 90,200 | 19,200 |
| | | PDA | 23,200 | 40,700 | 17,500 |
| | Hayward | Total | 45,400 | 54,300 | 8,900 |
| | | PDA | 4,400 | 9,500 | 5,100 |
| | Livermore | Total | 29,100 | 39,700 | 10,600 |
| | | PDA | 860 | 10,400 | 9,540 |
| | Newark | Total | 13,000 | 14,100 | 1,100 |
| | | PDA | 220 | 470 | 250 |
| | Oakland | Total | 153,800 | 241,500 | 87,700 |
| | | PDA | 112,600 | 197,700 | 85,100 |
| | Piedmont | Total | 3,800 | 3,900 | 100 |
| | | PDA | | | |
| | Pleasanton | Total | 25,200 | 30,600 | 5,400 |
| | | PDA | 1,300 | 5,200 | 3,900 |
| | San Leandro | Total | 30,700 | 37,300 | 6,600 |
| | | PDA | 4,600 | 10,300 | 5,700 |
| | Union City | Total | 20,400 | 22,800 | 2,400 |
| | | PDA | 500 | 2,200 | 1,700 |
| | **County Total** | **Total** | **545,000** | **734,100** | **189,100** |
| | | **PDA** | **172,000** | **334,500** | **162,600** |

| County | Jurisdiction | Summary Level | Households 2010 | Households 2040 | Growth in Households |
|---|---|---|---|---|---|
| Contra Costa | Antioch | Total | 32,300 | 40,300 | 8,000 |
| | | PDA | 1,400 | 5,300 | 3,900 |
| | Brentwood | Total | 16,500 | 26,100 | 9,600 |
| | | PDA | | | |
| | Clayton | Total | 4,000 | 4,100 | 100 |
| | | PDA | | | |
| | Concord | Total | 44,300 | 64,400 | 20,100 |
| | | PDA | 3,900 | 21,300 | 17,400 |
| | Contra Costa County Unincorporated | Total | 57,700 | 67,700 | 10,000 |
| | | PDA | 4,300 | 12,000 | 7,700 |
| | Danville | Total | 15,400 | 16,000 | 600 |
| | | PDA | | | |
| | El Cerrito | Total | 10,100 | 12,100 | 2,000 |
| | | PDA | 740 | 2,200 | 1,460 |
| | Hercules | Total | 8,100 | 9,700 | 1,600 |
| | | PDA | 870 | 1,700 | 830 |
| | Lafayette | Total | 9,200 | 10,000 | 800 |
| | | PDA | 1,700 | 2,200 | 500 |
| | Martinez | Total | 14,300 | 15,300 | 1,000 |
| | | PDA | 710 | 1,000 | 290 |
| | Moraga | Total | 5,600 | 5,900 | 300 |
| | | PDA | 30 | 180 | 150 |
| | Oakley | Total | 10,700 | 16,400 | 5,700 |
| | | PDA | 770 | 5,900 | 5,130 |
| | Orinda | Total | 6,600 | 6,800 | 200 |
| | | PDA | 230 | 330 | 100 |
| | Pinole | Total | 6,800 | 7,300 | 500 |
| | | PDA | 360 | 640 | 280 |
| | Pittsburg | Total | 19,500 | 26,500 | 7,000 |
| | | PDA | 5,100 | 8,600 | 3,500 |
| | Pleasant Hill | Total | 13,700 | 14,300 | 600 |
| | | PDA | 860 | 1,000 | 140 |
| | Richmond | Total | 36,100 | 54,900 | 18,800 |
| | | PDA | 8,400 | 24,000 | 15,600 |
| | San Pablo | Total | 8,800 | 9,800 | 1,000 |
| | | PDA | 2,000 | 2,600 | 600 |
| | San Ramon | Total | 25,300 | 30,300 | 5,000 |
| | | PDA | 220 | 2,000 | 1,780 |
| | Walnut Creek | Total | 30,400 | 37,500 | 7,100 |
| | | PDA | 4,900 | 10,400 | 5,500 |
| | **County Total** | **Total** | **375,400** | **475,400** | **100,000** |
| | | **PDA** | **36,500** | **101,200** | **64,700** |

| County | Jurisdiction | Summary Level | Households 2010 | Households 2040 | Growth in Households |
|---|---|---|---|---|---|
| Marin | Belvedere | Total | 930 | 990 | 60 |
| | | PDA | | | |
| | Corte Madera | Total | 3,800 | 4,300 | 500 |
| | | PDA | | | |
| | Fairfax | Total | 3,400 | 3,700 | 300 |
| | | PDA | | | |
| | Larkspur | Total | 5,900 | 6,400 | 500 |
| | | PDA | | | |
| | Marin County Unincorporated | Total | 26,200 | 28,400 | 2,200 |
| | | PDA | 1,400 | 1,800 | 400 |
| | Mill Valley | Total | 6,100 | 6,400 | 300 |
| | | PDA | | | |
| | Novato | Total | 20,300 | 21,200 | 900 |
| | | PDA | | | |
| | Ross | Total | 800 | 840 | 40 |
| | | PDA | | | |
| | San Anselmo | Total | 5,200 | 5,500 | 300 |
| | | PDA | | | |
| | San Rafael | Total | 22,800 | 25,600 | 2,800 |
| | | PDA | 1,700 | 2,600 | 900 |
| | Sausalito | Total | 4,100 | 4,400 | 300 |
| | | PDA | | | |
| | Tiburon | Total | 3,700 | 3,900 | 200 |
| | | PDA | | | |
| | **County Total** | **Total** | **103,200** | **111,600** | **8,400** |
| | | **PDA** | **3,100** | **4,400** | **1,300** |

| County | Jurisdiction | Summary Level | Households 2010 | Households 2040 | Growth in Households |
|---|---|---|---|---|---|
| Napa | American Canyon | Total | 5,700 | 6,300 | 600 |
| | | PDA | 410 | 490 | 80 |
| | Calistoga | Total | 2,000 | 2,100 | 100 |
| | | PDA | | | |
| | Napa | Total | 28,200 | 30,600 | 2,400 |
| | | PDA | 370 | 710 | 340 |
| | Napa County Unincorporated | Total | 9,600 | 11,900 | 2,300 |
| | | PDA | | | |
| | St. Helena | Total | 2,400 | 2,700 | 300 |
| | | PDA | | | |
| | Yountville | Total | 1,100 | 1,100 | 0 |
| | | PDA | | | |
| | **County Total** | **Total** | **48,900** | **54,700** | **5,800** |
| | | **PDA** | **780** | **1,200** | **430** |

| County | Jurisdiction | Summary Level | Households 2010 | Households 2040 | Growth in Households |
|---|---|---|---|---|---|
| San Francisco | San Francisco | Total | 345,800 | 483,700 | 137,800 |
| | | PDA | 182,400 | 310,100 | 127,700 |

| County | Jurisdiction | Summary Level | Households 2010 | Households 2040 | Growth in Households |
|---|---|---|---|---|---|
| San Mateo | Atherton | Total | 2,300 | 2,500 | 200 |
| | | PDA | | | |
| | Belmont | Total | 10,600 | 11,600 | 1,000 |
| | | PDA | 2,900 | 3,500 | 600 |
| | Brisbane | Total | 1,800 | 6,400 | 4,600 |
| | | PDA | | 4,400 | 4,400 |
| | Burlingame | Total | 12,400 | 13,700 | 1,300 |
| | | PDA | 7,000 | 8,200 | 1,200 |
| | Colma | Total | 410 | 940 | 530 |
| | | PDA | 320 | 760 | 440 |
| | Daly City | Total | 31,100 | 35,800 | 4,700 |
| | | PDA | 8,500 | 11,600 | 3,100 |
| | East Palo Alto | Total | 6,900 | 8,700 | 1,800 |
| | | PDA | 820 | 1,600 | 780 |
| | Foster City | Total | 12,000 | 15,100 | 3,100 |
| | | PDA | | | |
| | Half Moon Bay | Total | 4,100 | 4,600 | 500 |
| | | PDA | | | |
| | Hillsborough | Total | 3,700 | 3,900 | 200 |
| | | PDA | | | |
| | Menlo Park | Total | 12,300 | 17,700 | 5,400 |
| | | PDA | 180 | 870 | 690 |
| | Millbrae | Total | 8,000 | 9,700 | 1,700 |
| | | PDA | 590 | 2,100 | 1,510 |
| | Pacifica | Total | 14,000 | 14,500 | 500 |
| | | PDA | | | |
| | Portola Valley | Total | 1,700 | 1,800 | 100 |
| | | PDA | | | |
| | Redwood City | Total | 28,000 | 38,100 | 10,100 |
| | | PDA | 650 | 8,500 | 7,850 |
| | San Bruno | Total | 14,700 | 17,900 | 3,200 |
| | | PDA | 3,700 | 6,500 | 2,800 |
| | San Carlos | Total | 11,500 | 14,000 | 2,500 |
| | | PDA | 40 | 110 | 70 |
| | San Mateo | Total | 38,200 | 50,800 | 12,600 |
| | | PDA | 11,300 | 19,600 | 8,300 |
| | San Mateo County Unincorporated | Total | 21,000 | 22,800 | 1,800 |
| | | PDA | 2,400 | 3,200 | 800 |
| | South San Francisco | Total | 20,900 | 25,300 | 4,400 |
| | | PDA | 5,400 | 9,100 | 3,700 |
| | Woodside | Total | 2,000 | 2,100 | 100 |
| | | PDA | | | |
| | **County Total** | **Total** | **257,800** | **318,000** | **60,200** |
| | | **PDA** | **43,800** | **80,000** | **36,200** |

| County | Jurisdiction | Summary Level | Households 2010 | Households 2040 | Growth in Households |
|---|---|---|---|---|---|
| Santa Clara | Campbell | Total | 16,200 | 18,800 | 2,600 |
| | | PDA | 580 | 1,500 | 920 |
| | Cupertino | Total | 20,200 | 23,000 | 2,800 |
| | | PDA | 2,200 | 3,400 | 1,200 |
| | Gilroy | Total | 14,200 | 19,600 | 5,400 |
| | | PDA | 1,400 | 3,800 | 2,400 |
| | Los Altos | Total | 10,700 | 11,700 | 1,000 |
| | | PDA | 9 | 40 | 31 |
| | Los Altos Hills | Total | 2,800 | 3,000 | 200 |
| | | PDA | | | |
| | Los Gatos | Total | 12,400 | 13,000 | 600 |
| | | PDA | | | |
| | Milpitas | Total | 19,200 | 30,400 | 11,200 |
| | | PDA | 790 | 9,600 | 8,810 |
| | Monte Sereno | Total | 1,200 | 1,300 | 100 |
| | | PDA | | | |
| | Morgan Hill | Total | 12,300 | 15,800 | 3,500 |
| | | PDA | 260 | 1,300 | 1,040 |
| | Mountain View | Total | 32,000 | 58,300 | 26,300 |
| | | PDA | 5,800 | 27,300 | 21,500 |
| | Palo Alto | Total | 26,500 | 32,900 | 6,400 |
| | | PDA | 510 | 840 | 330 |
| | San Jose | Total | 301,400 | 448,300 | 146,900 |
| | | PDA | 67,600 | 203,600 | 136,000 |
| | Santa Clara | Total | 43,000 | 57,000 | 14,000 |
| | | PDA | 330 | 6,900 | 6,570 |
| | Santa Clara County Unincorporated | Total | 28,200 | 32,600 | 4,400 |
| | | PDA | | | |
| | Saratoga | Total | 10,700 | 11,000 | 300 |
| | | PDA | | | |
| | Sunnyvale | Total | 53,400 | 84,200 | 30,800 |
| | | PDA | 6,300 | 35,800 | 29,500 |
| | **County Total** | **Total** | **604,300** | **860,900** | **256,600** |
| | | **PDA** | **85,700** | **294,200** | **208,500** |

| County | Jurisdiction | Summary Level | Households 2010 | Households 2040 | Growth in Households |
|---|---|---|---|---|---|
| Solano | Benicia | Total | 10,700 | 11,900 | 1,200 |
| | | PDA | 620 | 1,300 | 680 |
| | Dixon | Total | 5,900 | 7,300 | 1,400 |
| | | PDA | 450 | 600 | 150 |
| | Fairfield | Total | 34,500 | 40,200 | 5,700 |
| | | PDA | 2,300 | 4,500 | 2,200 |
| | Rio Vista | Total | 3,500 | 6,300 | 2,800 |
| | | PDA | | | |
| | Solano County Unincorporated | Total | 6,600 | 13,200 | 6,600 |
| | | PDA | | | |
| | Suisun City | Total | 8,900 | 10,000 | 1,100 |
| | | PDA | 1,100 | 1,900 | 800 |
| | Vacaville | Total | 31,100 | 33,600 | 2,500 |
| | | PDA | 860 | 2,000 | 1,140 |
| | Vallejo | Total | 40,600 | 46,900 | 6,300 |
| | | PDA | 390 | 1,600 | 1,210 |
| | **County Total** | **Total** | **141,700** | **169,300** | **27,600** |
| | | **PDA** | **5,700** | **11,800** | **6,100** |

| County | Jurisdiction | Summary Level | Households 2010 | Households 2040 | Growth in Households |
|---|---|---|---|---|---|
| Sonoma | Cloverdale | Total | 3,200 | 4,900 | 1,700 |
| | | PDA | 800 | 2,400 | 1,600 |
| | Cotati | Total | 3,000 | 4,100 | 1,100 |
| | | PDA | 350 | 1,300 | 950 |
| | Healdsburg | Total | 4,400 | 4,600 | 200 |
| | | PDA | | | |
| | Petaluma | Total | 21,700 | 24,500 | 2,800 |
| | | PDA | 510 | 1,200 | 690 |
| | Rohnert Park | Total | 15,800 | 21,000 | 5,200 |
| | | PDA | 1,300 | 5,100 | 3,800 |
| | Santa Rosa | Total | 63,600 | 80,000 | 16,400 |
| | | PDA | 16,700 | 30,000 | 13,300 |
| | Sebastopol | Total | 3,300 | 3,800 | 500 |
| | | PDA | 2,000 | 2,600 | 600 |
| | Sonoma | Total | 5,000 | 5,300 | 300 |
| | | PDA | | | |
| | Sonoma County Unincorporated | Total | 57,000 | 60,000 | 3,000 |
| | | PDA | | | |
| | Windsor | Total | 9,000 | 10,800 | 1,800 |
| | | PDA | 1,100 | 2,300 | 1,200 |
| | **County Total** | **Total** | **185,800** | **219,100** | **33,200** |
| | | **PDA** | **22,900** | **44,800** | **22,000** |

| Regional Total | | Summary Level | Households 2010 | Households 2040 | Growth in Households |
|---|---|---|---|---|---|
| | | Total | 2,608,000 | 3,426,700 | 818,700 |
| | | PDA | 552,800 | 1,182,300 | 629,400 |

## Employment Growth Forecasts

| County | Jurisdiction | Summary Level | Employment 2010 | Employment 2040 | Growth in Employment |
|---|---|---|---|---|---|
| Alameda | Alameda | Total | 29,300 | 42,400 | 13,100 |
| | | PDA | 6,900 | 16,900 | 10,000 |
| | Alameda County Unincorporated | Total | 29,000 | 29,900 | 900 |
| | | PDA | 6,800 | 7,400 | 600 |
| | Albany | Total | 4,400 | 5,200 | 800 |
| | | PDA | 2,200 | 2,200 | 0 |
| | Berkeley | Total | 90,400 | 121,700 | 31,300 |
| | | PDA | 28,600 | 36,400 | 7,800 |
| | Dublin | Total | 18,100 | 31,100 | 13,000 |
| | | PDA | 5,000 | 13,600 | 8,600 |
| | Emeryville | Total | 15,900 | 20,000 | 4,100 |
| | | PDA | 13,500 | 14,700 | 1,200 |
| | Fremont | Total | 86,200 | 118,500 | 32,300 |
| | | PDA | 38,100 | 56,500 | 18,400 |
| | Hayward | Total | 60,900 | 77,800 | 16,900 |
| | | PDA | 7,600 | 8,500 | 900 |
| | Livermore | Total | 42,700 | 45,900 | 3,200 |
| | | PDA | 24,000 | 23,700 | -300 |
| | Newark | Total | 17,300 | 22,900 | 5,600 |
| | | PDA | 390 | 420 | 30 |
| | Oakland | Total | 179,100 | 272,800 | 93,700 |
| | | PDA | 158,200 | 241,200 | 83,000 |
| | Piedmont | Total | 1,800 | 1,900 | 100 |
| | | PDA | | | |
| | Pleasanton | Total | 60,100 | 75,400 | 15,300 |
| | | PDA | 12,600 | 23,300 | 10,700 |
| | San Leandro | Total | 49,700 | 59,600 | 9,900 |
| | | PDA | 9,800 | 10,000 | 200 |
| | Union City | Total | 21,000 | 28,100 | 7,100 |
| | | PDA | 270 | 230 | -40 |
| | **County Total** | **Total** | **705,700** | **953,100** | **247,400** |
| | | **PDA** | **313,900** | **455,100** | **141,200** |

| County | Jurisdiction | Summary Level | Employment 2010 | Employment 2040 | Growth in Employment |
|---|---|---|---|---|---|
| Contra Costa | Antioch | Total | 20,100 | 25,700 | 5,600 |
| | | PDA | 2,000 | 2,700 | 700 |
| | Brentwood | Total | 11,600 | 12,000 | 400 |
| | | PDA | | | |
| | Clayton | Total | 2,000 | 2,100 | 100 |
| | | PDA | | | |
| | Concord | Total | 54,300 | 95,500 | 41,200 |
| | | PDA | 10,400 | 40,300 | 29,900 |
| | Contra Costa County Unincorporated | Total | 35,600 | 40,900 | 5,300 |
| | | PDA | 8,700 | 11,200 | 2,500 |
| | Danville | Total | 11,800 | 13,100 | 1,300 |
| | | PDA | | | |
| | El Cerrito | Total | 5,300 | 5,900 | 600 |
| | | PDA | 3,800 | 4,100 | 300 |
| | Hercules | Total | 5,000 | 5,400 | 400 |
| | | PDA | 1,100 | 1,100 | 0 |
| | Lafayette | Total | 9,000 | 9,900 | 900 |
| | | PDA | 6,500 | 7,500 | 1,000 |
| | Martinez | Total | 20,700 | 26,100 | 5,400 |
| | | PDA | 6,800 | 9,400 | 2,600 |
| | Moraga | Total | 4,600 | 5,700 | 1,100 |
| | | PDA | 1,400 | 1,600 | 200 |
| | Oakley | Total | 3,400 | 5,400 | 2,000 |
| | | PDA | 1,600 | 3,100 | 1,500 |
| | Orinda | Total | 4,800 | 5,500 | 700 |
| | | PDA | 2,700 | 3,100 | 400 |
| | Pinole | Total | 6,700 | 8,500 | 1,800 |
| | | PDA | 5,200 | 6,200 | 1,000 |
| | Pittsburg | Total | 11,800 | 15,600 | 3,800 |
| | | PDA | 5,100 | 6,700 | 1,600 |
| | Pleasant Hill | Total | 16,400 | 19,800 | 3,400 |
| | | PDA | 6,400 | 7,600 | 1,200 |
| | Richmond | Total | 30,700 | 61,800 | 31,100 |
| | | PDA | 13,400 | 35,300 | 21,900 |
| | San Pablo | Total | 7,400 | 9,100 | 1,700 |
| | | PDA | 4,900 | 5,900 | 1,000 |
| | San Ramon | Total | 48,000 | 71,800 | 23,800 |
| | | PDA | 25,500 | 44,900 | 19,400 |
| | Walnut Creek | Total | 50,900 | 58,100 | 7,200 |
| | | PDA | 27,400 | 29,200 | 1,800 |
| | **County Total** | **Total** | **360,100** | **497,900** | **137,800** |
| | | **PDA** | **132,900** | **219,900** | **87,000** |

| County | Jurisdiction | Summary Level | Employment 2010 | Employment 2040 | Growth in Employment |
|--------|-------------|---------------|-----------------|-----------------|----------------------|
| Marin | Belvedere | Total | 310 | 320 | 10 |
| | | PDA | | | |
| | Corte Madera | Total | 6,500 | 7,200 | 700 |
| | | PDA | | | |
| | Fairfax | Total | 1,600 | 1,700 | 100 |
| | | PDA | | | |
| | Larkspur | Total | 7,500 | 7,700 | 200 |
| | | PDA | | | |
| | Marin County Unincorporated | Total | 18,400 | 21,600 | 3,200 |
| | | PDA | 660 | 740 | 80 |
| | Mill Valley | Total | 6,000 | 6,600 | 600 |
| | | PDA | | | |
| | Novato | Total | 26,400 | 28,300 | 1,900 |
| | | PDA | | | |
| | Ross | Total | 360 | 380 | 20 |
| | | PDA | | | |
| | San Anselmo | Total | 3,300 | 3,400 | 100 |
| | | PDA | | | |
| | San Rafael | Total | 43,400 | 49,000 | 5,600 |
| | | PDA | 9,100 | 10,000 | 900 |
| | Sausalito | Total | 5,200 | 5,900 | 700 |
| | | PDA | | | |
| | Tiburon | Total | 2,800 | 2,900 | 100 |
| | | PDA | | | |
| | **County Total** | **Total** | **121,800** | **135,000** | **13,200** |
| | | **PDA** | **9,700** | **10,800** | **1,000** |

| County | Jurisdiction | Summary Level | Employment 2010 | Employment 2040 | Growth in Employment |
|--------|-------------|---------------|-----------------|-----------------|----------------------|
| Napa | American Canyon | Total | 5,400 | 8,200 | 2,800 |
| | | PDA | 1,300 | 1,600 | 300 |
| | Calistoga | Total | 2,200 | 2,400 | 200 |
| | | PDA | | | |
| | Napa | Total | 33,900 | 42,900 | 9,000 |
| | | PDA | 5,400 | 12,600 | 7,200 |
| | Napa County Unincorporated | Total | 20,700 | 21,100 | 400 |
| | | PDA | | | |
| | St. Helena | Total | 5,700 | 6,000 | 300 |
| | | PDA | | | |
| | Yountville | Total | 2,800 | 2,800 | 0 |
| | | PDA | | | |
| | **County Total** | **Total** | **70,700** | **83,400** | **12,700** |
| | | **PDA** | **6,700** | **14,100** | **7,400** |

| County | Jurisdiction | Summary Level | Employment 2010 | Employment 2040 | Growth in Employment |
|--------|-------------|---------------|-----------------|-----------------|----------------------|
| San Francisco | San Francisco | Total | 576,800 | 872,500 | 295,700 |
| | | PDA | 474,000 | 741,700 | 267,700 |

| County | Jurisdiction | Summary Level | Employment 2010 | Employment 2040 | Growth in Employment |
|---|---|---|---|---|---|
| San Mateo | Atherton | Total | 2,100 | 2,200 | 100 |
| | | PDA | | | |
| | Belmont | Total | 7,900 | 9,400 | 1,500 |
| | | PDA | 3,600 | 3,800 | 200 |
| | Brisbane | Total | 5,200 | 16,900 | 11,700 |
| | | PDA | 560 | 9,500 | 8,940 |
| | Burlingame | Total | 28,000 | 42,600 | 14,600 |
| | | PDA | 11,500 | 17,200 | 5,700 |
| | Colma | Total | 3,900 | 4,300 | 400 |
| | | PDA | 1,500 | 2,000 | 500 |
| | Daly City | Total | 18,400 | 22,500 | 4,100 |
| | | PDA | 4,600 | 4,800 | 200 |
| | East Palo Alto | Total | 5,100 | 6,700 | 1,600 |
| | | PDA | 980 | 1,400 | 420 |
| | Foster City | Total | 15,800 | 27,200 | 11,400 |
| | | PDA | | | |
| | Half Moon Bay | Total | 4,900 | 5,400 | 500 |
| | | PDA | | | |
| | Hillsborough | Total | 2,100 | 2,300 | 200 |
| | | PDA | | | |
| | Menlo Park | Total | 34,600 | 42,500 | 7,900 |
| | | PDA | 6,200 | 11,400 | 5,200 |
| | Millbrae | Total | 5,900 | 11,600 | 5,700 |
| | | PDA | 2,900 | 8,100 | 5,200 |
| | Pacifica | Total | 5,900 | 7,100 | 1,200 |
| | | PDA | | | |
| | Portola Valley | Total | 1,500 | 1,500 | 0 |
| | | PDA | | | |
| | Redwood City | Total | 59,300 | 86,700 | 27,400 |
| | | PDA | 20,600 | 24,100 | 3,500 |
| | San Bruno | Total | 12,900 | 14,800 | 1,900 |
| | | PDA | 9,300 | 10,300 | 1,000 |
| | San Carlos | Total | 16,300 | 19,100 | 2,800 |
| | | PDA | 1,200 | 1,700 | 500 |
| | San Mateo | Total | 51,000 | 68,000 | 17,000 |
| | | PDA | 25,400 | 32,900 | 7,500 |
| | San Mateo County Unincorporated | Total | 21,600 | 25,100 | 3,500 |
| | | PDA | 3,300 | 3,300 | 0 |
| | South San Francisco | Total | 38,700 | 54,200 | 15,500 |
| | | PDA | 8,300 | 9,100 | 800 |
| | Woodside | Total | 2,000 | 2,000 | 0 |
| | | PDA | | | |
| | **County Total** | **Total** | **343,300** | **472,100** | **128,700** |
| | | **PDA** | **100,000** | **139,500** | **39,500** |

| County | Jurisdiction | Summary Level | Employment 2010 | Employment 2040 | Growth in Employment |
|---|---|---|---|---|---|
| Santa Clara | Campbell | Total | 25,500 | 32,700 | 7,200 |
| | | PDA | 5,200 | 6,600 | 1,400 |
| | Cupertino | Total | 26,800 | 38,000 | 11,200 |
| | | PDA | 9,800 | 12,300 | 2,500 |
| | Gilroy | Total | 17,800 | 22,300 | 4,500 |
| | | PDA | 4,600 | 4,800 | 200 |
| | Los Altos | Total | 14,100 | 17,200 | 3,100 |
| | | PDA | 2,200 | 2,700 | 500 |
| | Los Altos Hills | Total | 1,600 | 1,700 | 100 |
| | | PDA | | | |
| | Los Gatos | Total | 18,900 | 20,600 | 1,700 |
| | | PDA | | | |
| | Milpitas | Total | 42,000 | 58,000 | 16,000 |
| | | PDA | 5,600 | 9,900 | 4,300 |
| | Monte Sereno | Total | 530 | 560 | 30 |
| | | PDA | | | |
| | Morgan Hill | Total | 19,300 | 19,600 | 300 |
| | | PDA | 1,500 | 1,300 | -200 |
| | Mountain View | Total | 48,500 | 73,300 | 24,800 |
| | | PDA | 25,200 | 40,100 | 14,900 |
| | Palo Alto | Total | 101,900 | 126,500 | 24,600 |
| | | PDA | 3,900 | 4,900 | 1,000 |
| | San Jose | Total | 387,500 | 554,900 | 167,400 |
| | | PDA | 229,200 | 340,400 | 111,200 |
| | Santa Clara | Total | 102,900 | 170,600 | 67,700 |
| | | PDA | 10,300 | 10,800 | 500 |
| | Santa Clara County Unincorporated | Total | 29,600 | 36,200 | 6,600 |
| | | PDA | | | |
| | Saratoga | Total | 8,800 | 9,100 | 300 |
| | | PDA | | | |
| | Sunnyvale | Total | 65,700 | 108,600 | 42,900 |
| | | PDA | 21,800 | 33,100 | 11,300 |
| | **County Total** | **Total** | **911,500** | **1,289,900** | **378,300** |
| | | **PDA** | **319,300** | **466,800** | **147,400** |

| County | Jurisdiction | Summary Level | Employment 2010 | Employment 2040 | Growth in Employment |
|---|---|---|---|---|---|
| Solano | Benicia | Total | 12,800 | 17,100 | 4,300 |
| | | PDA | 9,200 | 12,900 | 3,700 |
| | Dixon | Total | 4,800 | 5,400 | 600 |
| | | PDA | 280 | 340 | 60 |
| | Fairfield | Total | 43,200 | 50,000 | 6,800 |
| | | PDA | 6,300 | 6,700 | 400 |
| | Rio Vista | Total | 2,400 | 2,500 | 100 |
| | | PDA | | | |
| | Solano County Unincorporated | Total | 4,200 | 4,500 | 300 |
| | | PDA | | | |
| | Suisun City | Total | 2,500 | 2,900 | 400 |
| | | PDA | 1,100 | 1,000 | -100 |
| | Vacaville | Total | 29,300 | 33,600 | 4,300 |
| | | PDA | 5,000 | 4,600 | -400 |
| | Vallejo | Total | 30,900 | 35,000 | 4,100 |
| | | PDA | 2,600 | 2,800 | 200 |
| | **County Total** | **Total** | **130,200** | **151,000** | **20,800** |
| | | **PDA** | **24,600** | **28,300** | **3,700** |

| County | Jurisdiction | Summary Level | Employment 2010 | Employment 2040 | Growth in Employment |
|---|---|---|---|---|---|
| Sonoma | Cloverdale | Total | 1,700 | 2,100 | 400 |
| | | PDA | 590 | 630 | 40 |
| | Cotati | Total | 2,600 | 3,000 | 400 |
| | | PDA | 690 | 570 | -120 |
| | Healdsburg | Total | 8,300 | 9,000 | 700 |
| | | PDA | | | |
| | Petaluma | Total | 30,000 | 39,800 | 9,800 |
| | | PDA | 3,500 | 5,800 | 2,300 |
| | Rohnert Park | Total | 12,100 | 13,900 | 1,800 |
| | | PDA | 5,100 | 4,900 | -200 |
| | Santa Rosa | Total | 76,600 | 92,100 | 15,500 |
| | | PDA | 41,200 | 45,900 | 4,700 |
| | Sebastopol | Total | 5,000 | 5,300 | 300 |
| | | PDA | 4,600 | 4,800 | 200 |
| | Sonoma | Total | 7,100 | 8,000 | 900 |
| | | PDA | | | |
| | Sonoma County Unincorporated | Total | 51,500 | 61,600 | 10,100 |
| | | PDA | | | |
| | Windsor | Total | 7,700 | 8,900 | 1,200 |
| | | PDA | 870 | 1,100 | 230 |
| | **County Total** | **Total** | **202,700** | **243,600** | **40,900** |
| | | **PDA** | **56,600** | **63,700** | **7,100** |

| Regional Total | Summary Level | Employment 2010 | Employment 2040 | Growth in Employment |
|---|---|---|---|---|
| | Total | 3,422,800 | 4,698,400 | 1,275,500 |
| | PDA | 1,437,700 | 2,139,800 | 702,000 |