

WHITE PAPER

**ECONOMIC ANALYSIS IN THE CONTEXT OF 404(b) 1
ALTERNATIVES ANALYSIS**

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September 1999

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ECONOMIC ANALYSIS IN THE CONTEXT OF SECTION 404(b)1 ALTERNATIVES ANALYSIS

INTRODUCTION

This White Paper provides background and insight on the utilization of an economic analysis as one component of the Section 404(b)1 Alternative Analysis as required by the Federal Clean Water Act. The Alternative Analysis is the tool used to identify the “practicable” alternative with the least environmental damage. “Cost” is one of several factors used by the Corps and other agencies to identify the set of alternatives that is practicable. The Alternatives Analysis needs to explore alternatives to a project that may be economically viable for the developer but have the least adverse impact to aquatic resources, without having other significant environmental impacts. The economic analysis described in this White Paper is a means of determining whether an alternative is “economically viable.”

While this White Paper provides information and definitions of economic terms, it also represents the opinions and philosophy of Economic & Planning Systems, Inc., (EPS) reflected in our approach to these analyses. EPS has contributed to several Alternatives Analyses for major projects in the San Francisco Bay Area in the last two years, and many comments have arisen from various individuals and agencies regarding the particulars of the economic analysis. This White Paper addresses many of those comments.

The Corps of Engineers regulations require the evaluation of both “off site” and “on site” alternatives. The economic and financial measures discussed in this paper are used to evaluate “on site” alternatives.

This White Paper has been prepared by EPS for use by staff and decision makers of the Corps of Engineers (Corps), U.S. Environmental Protection Agency (EPA), U.S. Fish & Wildlife Service (FWS), Regional Water Quality Board (RWQB), California Department of Fish and Game (DFG), and any other interested parties. This White Paper, along with the definition of terms included in the appendices, is meant to serve as a reference document for staff reviewing Alternatives Analysis with economic screening criteria, and also to provide the overall rationale for the type of economic analysis EPS has prepared for the following projects:

1. Blue Rock Country Club, Hayward, California
2. Gale Ranch, San Ramon, California
3. Schaefer Ranch, Dublin, California

Each of the above projects is a master planned residential community. The screening criteria used in the Alternatives Analysis are not necessarily the criteria used by developers or the real estate industry. Rather, these criteria or economic measures have been developed to allow public agencies to understand financial feasibility overall

(“practicability”) without having to review confidential information or information that may not be available to the public. Definitions of particular terms used in the above Alternatives Analysis are provided in **Appendix A**. Other relevant information and references are provided in subsequent sections or appendices.

STATUTES & GUIDELINES

The guidelines for Alternatives Analysis¹ state that the burden of proof to demonstrate compliance with the guidelines rests with the applicant. The economic analysis and the particular financial/economic measures used in the three Alternatives Analyses noted above have been developed with careful consideration of the guidelines the Corps, EPA, and others must follow. These financial/economic measures have been developed over time for use in all types of financial and economic analysis of urban development by EPS and other consultants, and only recently have they been applied to the 404(b)1 Permit Alternatives Analysis. In addition, these measures have been used by numerous public agencies in evaluating new development (see **Appendix B** for a list of EPS studies prepared for public agencies). These measures must be simple enough for non-real estate professionals to understand but complex enough to capture the economics of development, and they must be able to compare and contrast the differences between alternatives.

EPA 404(b)1 guideline 40 CFR *Section 230.10 (Restrictions on Discharge), Item A2*, states: “An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purposes.”

The preamble to the EPS 404(b)1 Guidelines provides direction concerning the cost of the analysis and the scope of the analysis. It states: “Our intent is to consider those alternatives which are reasonable in terms of the overall scope/cost of the proposed project.² The determination of what constitutes an unreasonable expense should generally consider whether the project cost is substantially greater than the costs normally associated with the particular type of project under consideration.”³ The preamble also states: “[I]f an alleged alternative is unreasonably expensive to the applicant, the alternative is not practicable.”⁴ The most important point is that the guidelines are not meant to consider financial standing of an individual applicant, but rather “characteristics” of the project and what constitutes a reasonable expense for these projects that are most relevant to practicability determinations.⁵

¹ EPA 404(b)1 CFR 40, *Section 230.10 (Restrictions on Discharge)*.

² EPA 49 FR 85339. It is noted that the term “cost” was substituted for “economic” in the final rule.

³ Guidelines preamble, “Alternatives,” 45 CFR 85339 (December 1980).

⁴ Guidelines preamble, “Economic Factors,” 45 CFR 85343 (December 1980).

⁵ Guidelines preamble, “Economic Factors,” 45 CFR 85343 (December 1980).

The above guidelines and statements strongly direct us to believe that agencies should not consider the particular financial standing of a developer (i.e., how much was paid for the land, or the anticipated financial return), but rather what costs are typical for the type of project under consideration. The cost burden measure, which is discussed in more detail below, is a measure that excludes the consideration of financial return or profit, land price, and other types of individual financial considerations. Instead, it treats the project and its alternatives as if it is a “typical project.” The threshold of cost burden is not dependent on private, confidential information and does not require decision makers to consider risk, return, and investment.

The guidelines discussed above provide the general direction for the Corps and other agency staff in evaluating a Section 404(b)1 Permit Alternatives Analysis. A certain amount of discretion is required in this type of process because every district has a set of unique conditions, biological resources, and opportunities for preserving wetlands and other waters of the United States. However, the guidelines suggest that certain rules must be followed, including that an alternative must be practical and economically viable. The economic analysis measures used in recent 404(b)1 Permit Alternatives Analyses are meant to shed light on the practicability of alternatives without delving into the realm of developer risk, investment, or return (i.e., profit).

OVERVIEW OF REAL ESTATE ECONOMICS

Real Estate Development involves the creation of value through the construction of new residential, commercial, industrial, or other uses that generate income. The development process typically involves most of the steps described in **Table 1**.

Table 1
Real Estate Development Process

Ownership/Entitlement

- Acquire Land
- Obtain Entitlements (1) and Other Approvals

Construction

- Obtain Financing
- Construct Infrastructure
- Construct Site Improvements
- Construct Building(s)

Sales/Operations

- Lease or Sell Buildings
- Repay Lenders & Investors
- Distribute Remaining Returns

(1) Entitlements refer to the local, state and/or federal planning approvals required to proceed with development; at the local level they usually involve some type of plan for the project and in California, some type of CEQA review.

Source: Economic & Planning Systems, Inc.

For a developer, the primary test of whether a project is “viable” is, if after all costs have been paid from project revenues, the remaining value is sufficiently high to proceed with the project. Revenues less than costs will immediately render a project infeasible. The following represents some key terms in real estate economics. Residual value and hurdle rates are a key function of how much profit a project will generate.

RESIDUAL VALUE

If revenues do exceed costs, the next question is: How much revenue, or “residual value,” should remain? Several factors need to be considered in determining the developer’s “hurdle rate” of return and whether a project is feasible. A hurdle rate is a threshold or benchmark rate of return sufficient to compensate potential investors for a given investment. The hurdle rate is typically equal to or in excess of the investors’ effective cost of debt. The hurdle rate should take into account such factors as the level of risk, timing, inflation, and other factors. The timing of costs and revenues is a key factor. For example, if costs are incurred in the first few years but revenues accrue over 20 years, a project may not be feasible.

RISK

Risk is a key factor and generally means the greater the risks, the greater must be the anticipated returns to compensate for the potential losses. Risk refers to the variation in probability and magnitude of expected future costs and revenues, which affect returns. Some examples of risk categories in real estate development include: entitlement risk, market risk, and interest rate risk, to name a few. The returns from the project being evaluated can be compared to alternative investment opportunities for funds, including alternative real estate projects. These factors are not typically considered in a 404(b)1 Alternatives Analysis as specified by the guidelines; however, they are important to understand relative to the economics of real estate.

LAND VALUE

The project must not only generate acceptable returns, but must also include an acceptable value for land in the total costs. The land needs to achieve a value that is at least above the developer’s hurdle value. Otherwise, the landowner will be unwilling to sell land for development if the price of the land is below the value of land for its current economic use (e.g., agricultural land). What level of land value is necessary for a project to be feasible? As described above, the value should be at least equal to the landowner’s value from the existing or alternative use of the land, or the landowner has no economic reason to sell or participate.

PRINCIPLES OF REAL ESTATE FEASIBILITY

Real estate development is contingent on various factors such as cost, space, time, and location. In order to understand the context of these variables, EPS uses relative and robust measures to estimate the feasibility of a particular project. The application of real estate economics to prospective projects is an attempt to promote sound development that balances a variety of issues.

A well-formulated financial analysis and “financing plan” provides a solid base for consideration of any type of development. A financing plan is composed of sound technical analysis and a consensus on goals and obligations that have been developed methodically throughout the planning and entitlement process. The overall goal is to create the most feasible project, from both a private and public perspective, given all the competing needs and other constraints facing any project, including environmental considerations. EPS uses the following principles to guide our analyses and frame the issues for all of our feasibility studies.

1. *Geography. The unique attributes, constraints, and opportunities of each site must be considered carefully.*

Real estate economics are driven by the unique conditions affecting every individual site, city, or region. As the old saying goes, the value of real estate is based on “location, location, location.” The unique attributes, constraints, and opportunities of each site are different whether considering a 10-acre site or a 5,000-acre site. What makes sense for one site can be inappropriate or infeasible for a similar site nearby. Two nearby sites may have different levels of existing infrastructure or the potential to tie into existing infrastructure. Two similar sites in different cities operate in two different “fiscal” environments, and impact fees affecting the cost of development can vary widely.

While real estate economists use “comparable projects” or “comps” to determine market values, i.e., use other projects to determine the market values and competitiveness of a new project, the unique characteristics of a site must always be weighted heavily. In addition, what “works” in one part of the Bay Area in terms of a type or density of housing may be totally inappropriate for another part of the Bay Area or market.

2. *Public Policy. Real estate analysis must take account of unique local public policy and the particular need in California to ensure that public services and infrastructure can be provided in an efficient and cost-effective way. Urban limit lines are a typical public policy that respond to this need.*

Every assignment that EPS undertakes must consider the policy framework and issues within which the analysis takes place. Each local government has its own unique set of policy objectives, restrictions, and political realities. Rational analysis

only takes us so far in a debate about new development, and often logical solutions are not politically feasible. In the Alternatives Analysis, one of the most common policy issues facing a project and the alternatives is the location of the “urban limit line” or growth boundary, which has often been ratified by voters. These limits have usually been set in the midst of intense public debate and controversy. In many communities, the allowable density of residential development is also a hotly contested issue, and changing the maximum density can be extremely difficult. This is not to say that local policies cannot be changed in some extended time frame. However, careful consideration must be given to these local decisions.

Some public policy is more flexible in nature. The General Plan guides development on a case-by-case basis. Flexible policies include noise buffering, steep slope development limitations, and avoidance of sensitive vegetation.

3. *Project Constraints. Real estate development must often consider a wide variety of constraints that may contradict each other, including the need to balance natural resources with the need for a project to generate revenues for local government.*

When EPS conducts alternatives analyses or is asked to develop the “preferred alternative” for a particular project, it is often in the context where conflicting conditions exist. For example, an alternative may generate the most revenue to local government but require extremely costly infrastructure that either cannot be funded by the private sector or makes the project require financial public assistance. For instance, redevelopment creates “new tax increment revenue” for the redevelopment agency, which can be used to finance new infrastructure, but it shifts revenue away from the General Fund which is needed to pay for the project’s associated annual public services.

Thus, one solution can often lead to another, separate problem. Our economic analyses for local governments are often structured to shed light on these tradeoffs and conflicts to solve for the “best alternative,”⁶ which balances a variety of considerations. Environmental analysis often strives for the same type of solutions, i.e., the practicable alternative with the least environmental impacts. What the economic analysis strives to do in the context of the 404(b)1 Permit Alternatives Analysis is to include economic considerations at the same time as environmental considerations in a thoughtful and problem-solving manner. As the guidelines suggest, a practicable alternative must be economically viable as well as present the least environmental impact.

⁶ This is slightly different than the agency definition of “practicable” alternative.

4. *Supply and Demand Considerations. The unique supply and demand characteristics in every real estate market must be considered carefully.*

In every real estate market there are unique supply and demand considerations that must be evaluated. In certain markets there may be numerous alternative sites for new development, all of which are more or less the same. This is particularly true in less urbanized areas or areas without significant topographic constraints. In the Bay Area, there are relatively very few remaining sites for new large developments. What sites exist have been owned and tied up in the entitlement process for years. Other “brownfield” or redevelopment sites are often too expensive because of extraordinary clean-up costs. At the same time local governments are tightening the development envelope by establishing urban limit lines, or moving them closer towards existing development.

EPS APPROACH TO ALTERNATIVES ANALYSIS

EPS is often involved in evaluating alternatives for projects during the local entitlement process. EPS is hired by local governments to provide analysis that allows decision makers to choose the best possible alternative for a project that considers all the issues at hand, including financial, fiscal, economic, social, political, and environmental. **Appendix B** presents a list of studies EPS has prepared that use the types of measures discussed in this paper. The list includes studies and conservation-related projects we have been involved in or authored.

Economic analysis techniques familiar to local governments may also be applied to the 404(b)1 analysis to determine which alternatives are practicable in terms of cost, and then to determine which of the practicable alternatives is least environmentally damaging. While the local governments may apply economic analysis to different policy questions than state and federal wetland regulatory agencies, the same economic analysis techniques are validly applied to both decision-making processes. The following is a discussion of different economic analysis techniques EPS has applied to urban development projects for both local entitlement processes and wetland regulatory processes.

We believe that any alternatives analysis should be detailed enough to shed light on the unique opportunities and constraints of a project, and it should focus decision makers on the key policy decisions to be made. If particular aspects of a project or an alternative are not relevant to the key policy issues, we feel this type of information or analysis should be excluded or put into a background report. For instance, the fiscal impact of a project may not be an issue for the local jurisdiction because all alternatives generate a positive surplus of revenues; or, the fiscal impact may not vary by alternative.

MARKET AREA

The first step in any real estate study is the definition of the appropriate market area for the project or types of land uses being evaluated. Once a specific project is defined and the land uses are identified for a study, EPS defines the geographic extent of the market area based on the location, nature, and characteristics of that particular project or land use. According to *Barron's Dictionary of Real Estate Terms*, a market area is a geographic region from which one can expect the primary demand for a specific product or service provided at a fixed location.⁷ A well-defined market area allows EPS to analyze the local market supply and demand conditions and determine a project's feasibility (see **Appendix A** for more information). It is important to note that the same type of project located on another site can be subject to different supply and demand conditions and, thus, a different size market area. In addition, a project may have more than one land use that requires consideration of different market areas for each land use. For example, a grocery store has a rather small market area, i.e., one to two miles, while a movie theater will have a much greater market area from which to draw support.

ECONOMIC/FINANCIAL MEASURE OVERVIEW

The next step is to identify different types of financial or economic measures with which to evaluate the project and its alternatives. The measures that we use have evolved over time and are relatively simple economic and financial measures that address the key issues facing development. They include:

1. **Cost Burden.** Can a project pay for its required infrastructure and public facilities such as parks and schools (or its fair share) and still be considered feasible? This measure compares a project's basic infrastructure costs to its overall finished product market value.
2. **Residual Land Value.** After considering all the project costs, impact fees, and infrastructure requirements, does the project generate value that would be equal to or greater than the current price of land for a comparable project in a particular market area? If the residual land value for a project is less than the expected price of land in the market area, then the project would be considered infeasible.
3. **Market Absorption.** A component of residual land value is market absorption. Is there enough market demand for a project to sell within an acceptable time frame? Is the time frame sufficient to generate an acceptable financial return to carry the developer's investment in infrastructure and other project costs that typically occur up front? For projects with a large financial investment in infrastructure upfront, absorption is a key concern.

⁷ Friedman, Jack P., Harris, Jack C., Linderman, J. Bruce. *Barron's Dictionary of Real Estate Terms*. Fourth Edition, 1997, p. 205.

- 4. Fiscal Impact.** Will a project generate enough annual revenues (such as sales tax, property tax, etc.) to the local government to pay for the required annual (ongoing) public services (such as police and fire) and other public benefits (e.g., a fiscal surplus)?

While the first three measures deal with financial issues, the fourth one (fiscal impact) indirectly deals with financial issues but also relates to local governments' desire to have a "certain mix of units or land uses" that will generate a certain amount of net new revenue to local government. Some land uses generate more net revenue than others do, and cities often only want those uses that generate positive fiscal impact or net new revenues. In general, projects that generate negative fiscal impacts are not approved.

Market absorption is important because often the amount, type of land use, or mix of residential units is not consistent with current market demand in a particular market. This has financial implications because if there is limited market demand for a project, it may not develop in a sufficient time frame to fund its infrastructure or pay for its related services to the extent they are required early in the construction process ("up front"). Each of these types of measures is discussed in more detail later in this paper.

DEFINITION OF ECONOMIC/FINANCIAL MEASURES

To date, EPS has used several economic measures to evaluate on-site alternatives in the 404(b)1 permit process. Each of these is described below.

COST BURDEN ANALYSIS

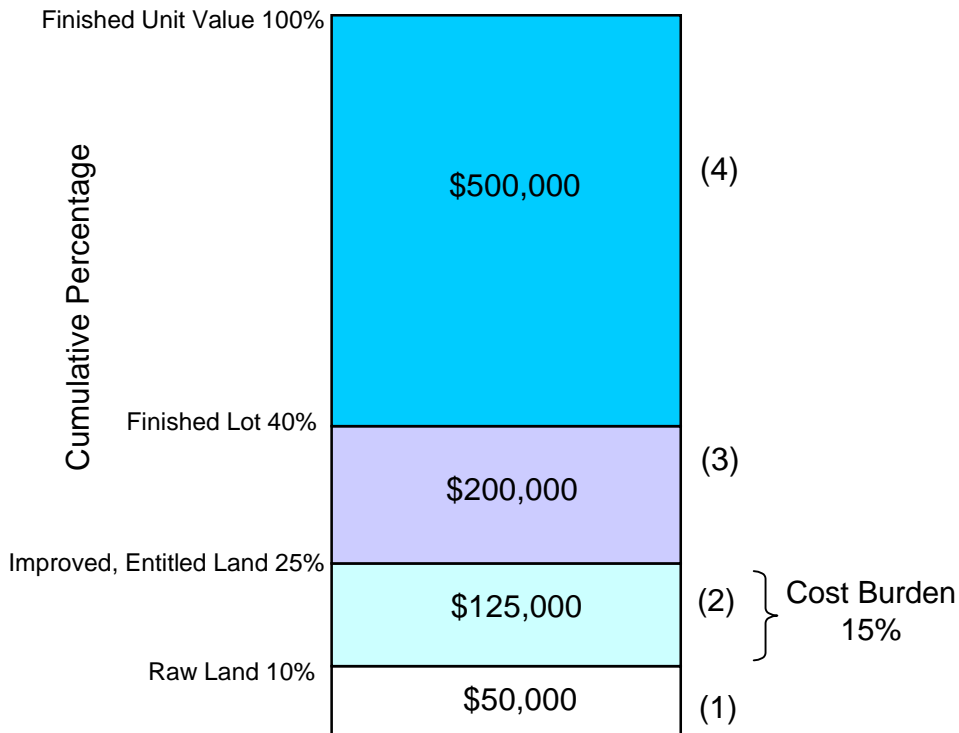
The cost burden measure allows cities and other public agencies to evaluate development proposals and alternatives when detailed financial information is not available and/or not appropriate for public discussion. Cost burden analyses measure one of several key aspects of financial feasibility and refer to the financial burden of a project's required infrastructure and fees (i.e., roads, water, sewer, storm drainage systems, engineering design costs, as well as city/county-required impact fees) relative to its market value. This is highly relevant to a 404(b)1 Alternative Analysis. Cost burdens can vary widely for alternative project designs that have the same number of housing units but different mixes of unit types and distribution of development. The cost burden measure specifically allows the cost of alternatives with widely differing market values to be compared against a standard of "reasonable" costs. This measure also addresses the fact that infrastructure improvements often are fixed and cannot be scaled back proportional to reductions in unit counts.

The cost burden measure is a planning-type financial measure that has been used numerous times by public sector agencies in evaluating the financial feasibility of new development, infrastructure financing, and other public policies (see **Appendix B** for studies that have used this measure). This measure is not typically used by banks, developers, or other financial institutions, which use more detailed and often rely on

confidential information, including estimates of profit and internal rates of return (IRR). Although the cost burden analysis is more general in nature than a detailed financial analysis, it is not necessarily a less accurate method of judging project feasibility.

This infrastructure cost/market value equation must be in balance if a project is to be implemented. Feasibility criteria are based on industry standards regarding property value at successive stages of entitlement and improvement. The economics of real estate development suggest that from 10 to 15 percent of the market value of a dwelling unit (or project) can be used to fund required infrastructure and public services.⁸ This 10 to 15 percent industry standard for cost burdens indicates approximately how much cost can be carried at each stage of development, given expected finished development values.

Figure 1
Components of Residential Market Value



- (1) Raw, unimproved, unentitled land.
- (2) Usually includes basic sewer, water and storm drainage system, mass grading, major roadways such as arterials and collectors, off-site improvements such as traffic signals, and public facilities such as schools and parks, which can be funded directly or through impact fees.
- (3) Includes internal circulation, utility hook-ups to main system, and fine lot grading.
- (4) Includes project construction costs, soft costs, financing, and developer profit.

Source: Economic & Planning Systems, Inc.

⁸ Musbach, James R. *Financing Multiple-Owner Master Plans*. Urban Land, July 1993. P.30.

Figure 1 (see previous page) summarizes the components of market value and shows how the cost burden measure relates to total market value. After raw land value, which is usually about 10 percent of total value, an additional 10 to 15 percent of value is related to improved entitled land value. This means land with basic infrastructure in place and entitled for development.⁹ Finished lot value is comparable to a completely improved lot with all basic backbone infrastructure in place, in-tract development, fine lot grading, etc., that would be sold to a residential builder essentially ready for building contractors to begin construction of homes.¹⁰ Forty percent is the norm for finished lot value, but given the cost of gaining entitlements and other increases in infrastructure cost burdens for new development (i.e., new development must fund all of its infrastructure), this percentage has been increasing to closer to 50 percent of finished market value.

Figure 1 applies the percentages to a \$500,000-priced home. While the percentages can vary somewhat, total basic infrastructure costs should not exceed about \$75,000 for a \$500,000 home or about 15 percent of market value; 10 percent is ideal. For lower priced homes, the amount is less.

Table 2 presents a simple summary of the cost burden measure for two alternative residential projects.

Table 2
Example Cost Burden Analysis
(in millions of dollars)

	Hillside Lots Alternatives	Proposed Project Alternative
Total Market Value		
Number of Units	381	464
Average Market Value per Unit	\$521,861	\$512,450
Market Value or Revenues	\$198.8	\$237.8
Basic Infrastructure Costs		
Infrastructure Costs	\$29.3	\$29.0
Impact Fees	<u>\$6.5</u>	<u>\$7.9</u>
Total Basic Costs	\$35.8	\$36.8
Cost Burden Measure (1)	17.6%	15.0%

(1) Equals total basic costs divided by total market value or revenues.
Source: Economic & Planning Systems, Inc.

⁹ Basic infrastructure includes grading, streets, sewer, water, electrical and phone, and storm drainage.

¹⁰ In-tract development usually refers to required basic infrastructure that provides access, circulation, and utilities for individual lots within a subdivision (e.g., fine lot grading, curb and gutter, arterial roads, etc.).

RESIDUAL LAND VALUE ANALYSIS

When the cost burden measure for particular alternatives is close to 15 percent, an additional financial measure can be used to further evaluate the feasibility: residual land value analysis. This further evaluation explains why a 3 percent difference in a cost burden measure is significant, i.e., 15 percent compared to 18 percent.

Typically, the residual land value is the maximum price that a developer can pay for raw, unentitled, unimproved land, taking into account the site-specific costs of development. As discussed earlier, this maximum price must equal or exceed the value of the land for its current use (e.g., agriculture) if an alternative is to be feasible. In the example described below, the total costs for the project have been compared to total net revenues (after sales expense), and the balance or difference between the two figures represents the cost of raw, unentitled land. If raw unentitled land sells for about \$5,000 to \$8,000 per acre, a viable development alternative should be somewhere in the range of this amount on a per acre basis, but it should not be significantly less than this amount.

The residual land value reflects the current value of a site after deducting all anticipated development costs from estimated project revenues. If the value is near zero or negative, the project is not economically feasible. Although the residual value measure is a good approximation of land value, other factors such as land availability in the market area may also affect the ultimate purchase price or market value. The analysis provided is a “static” (single period) cash flow analysis and does not take into account issues related to development over time, such as phasing, or require returns over several years based on an initial investment (i.e., risk).

Table 3 (next page) presents an example residual land value analysis for two alternatives for a residential project.

MARKET ABSORPTION

Market absorption refers to the amount of time it takes for a particular project and type of unit to sell in the market place. Carrying and financing (e.g., interest) costs become excessive when the absorption rate for a particular project is too low. Higher carrying and financing costs result in less profit and revenue to cover a developer’s project costs. If large amounts of infrastructure are required up front to construct a project, the project needs to sell in a relatively short time frame, generally no longer than five years. However, a project that does not require major upfront infrastructure may not place as much weight on the market absorption measure and may rely on other measures of feasibility. In other words, market area absorption is only an issue for projects with high up-front costs, or high carrying costs for the land, and is not relevant in all circumstances.

Table 3
Example Residual Land Value Analysis
(in millions of dollars)

Revenue and Cost Item	Hillside Lots Alternative	Proposed Project Alternative
No. of Units	381	464
<u>Project Revenues</u>		
Total Revenues	\$198.8	\$237.8
Minus Marketing Costs (6%)	<u>(\$11.9)</u>	<u>(\$14.3)</u>
Net Revenue	\$186.9	\$223.5
<u>Project Costs</u>		
Construction Costs	\$77.9	\$93.7
Infrastructure Costs	\$29.3	\$29.0
Impact Fees	<u>\$6.5</u>	<u>\$7.9</u>
Total Basic Costs (1)	\$35.8	\$36.8
Other Costs (2)	\$78.5	\$87.6
Total Costs	\$192.2	\$218.2
Net Revenue/(Shortfall)	(\$5.3)	\$5.4
Residual Land Value/Shortfall per Acre (3)	(\$10,523)	\$10,704

(1) Represents costs used in cost burden measure.

(2) Includes building/administration city fees, in-tract improvements, architecture and engineering, legal, insurance, property taxes, warranty, overhead, profit, and entitled land costs.

(3) Based on entire site, at 500 acres; represents the value of unimproved, unentitled property used as ranch or agricultural land in this example.

Source: Economic & Planning Systems, Inc.

To estimate market absorption, the average absorption for all projects by unit type in the current market for a particular product type is used. For example, a 2,500-square foot unit on a 6,000-square foot lot is selling on average at about 1.32 units per week or 69 units per year. An individual project with this product may sell slightly faster or slower depending on the individual characteristics of the project (i.e., schools, location, home features, etc.), but in general it is likely to sell around the average. The number of units in that product category for the project is divided by the average weekly or annual

sales rate, resulting in an estimate of the number of years to sell that product. Given that a project may have a variety of products or types of units, full absorption of a project is complete when all the units in each category have been sold.

Table 4 presents market absorption for two alternatives for a sample residential project. This table contrasts the market absorption differences between an alternative with condominiums versus an alternative with single family lots.

**Table 4
Example Market Absorption by Type of Unit and Alternative**

Item	Increased Density (High) Alternative	Proposed Project (Low) Alternative
<u>Type & No. of Residential Units</u>		
Condominiums	472	--
Single Family, Large Lot	--	464
Average # of units sold per year	42	228
Number of years to sell entire project	11.2	2.04

Source: Economic & Planning Systems, Inc.

FISCAL IMPACT ANALYSIS

The fiscal impact on local government may also determine if a particular alternative is practicable in light of cost. The fiscal impact analysis estimates the potential annual (re-occurring) revenues and expenditures within a particular governmental jurisdiction (i.e., city, county, district) associated with each alternative, based on the current adopted government budget and project characteristics, such as sales prices, household income, etc. Revenue projections include property taxes, sales and business taxes, franchise fees, and other fees and services charges. Expenditure projections include general government services, police, fire, public works, community development, and library services. The fiscal analysis is not a budget forecast for a particular government jurisdiction, such as a city. Rather, the fiscal analysis estimates the project's specific incremental revenues and expenditures that could be expected to occur, considering the required service needs of the project and revenue restrictions, such as Proposition 13. For instance, a project alternative may contain too few home sites, or too many low and moderately priced homes, within a city and thus not generate enough tax revenue to

balance the increased public service expenditures of the alternative. In general, a city will not approve residential projects that would have a negative impact on their annual General Fund budget.

Alternatives with negative fiscal impacts can appropriately be characterized as alternatives where costs to the local government, rather than costs to the applicant, are not reasonably acceptable or typical. In other words, fiscal impacts on a city General Fund can vary from positive to negative between alternatives, based largely on whether or not an alternative requires the construction and staffing of a new public facility, such as a fire station, and whether or not an adequate number and type of homes would be constructed to provide sufficient tax revenue for the public services, maintenance, and staff. Thus, the analysis provides an estimate of the fiscal balance (project revenues minus public service expenditures) of the project over a period of time where alternatives that result in a net negative fiscal impact to a city's budget in excess of a certain amount would not pass the screening criterion.

Table 5 (next page) presents a simple comparison of the fiscal impact for two alternatives for a residential project. **Appendix C** summarizes the assumptions and methodology used to estimate these annual revenues and costs.

SUMMARY AND CONCLUSION

This White Paper has provided an overview of the economic analysis techniques that may be applied to the Section 404(b)1 analysis to determine which alternatives are practicable in terms of cost. Four different, but related, economic and financial measures have been described in this White Paper: cost burden, residual land value, market absorption, and fiscal impact. Depending on the nature of the project, one or more of these measures may be required to test the overall financial viability.

In conclusion, we believe that any Alternatives Analysis should provide decision makers with sufficient economic data to determine whether an environmentally sound alternative is also a financially feasible alternative in terms of cost. The economic and financial measures described herein allow policy makers to shape practicable alternatives that meet standard financial feasibility tests when compared to similar types of real estate projects. These measures also address the regulatory requirements of the 404(b)1 permit process.

Table 5
Example Summary of Annual Revenues & Expenditures
of a Project at Buildout

Fiscal Impact Analysis

Budget Item	Alternative 1	Alternative 2
Total Project Units	4,614	3,031
Commercial Sqft of Spaces	420,000	420,000
Annual Revenues from Project		
Property Tax	\$731,032	\$491,724
Sales Tax	\$158,260	\$103,963
County Service Area (CSA)		
Assessment (1)	\$3,400,518	\$2,233,847
Other Revenues	\$655,587	\$430,664
Total Revenues from Project	\$4,945,397	\$3,260,198
Annual Expenditures of Project		
Fixed Costs	\$604,886	\$604,886
Road and Landscape	\$716,988	\$728,305
Maintenance		
Park & Open Space	\$1,434,950	\$987,057
Maintenance.		
Police Services	\$1,264,015	\$830,349
City Adm./Overhead	\$442,292	\$346,566
Total Expenditures of Project	\$4,463,131	\$3,497,162
Net Fiscal Balance	\$482,267	(\$236,963)
(Revenue minus Expenditure)		

(1) The County Service Area (CSA) Assessment funds a wide variety of municipal services (e.g., extended police coverage, park and community facilities maintenance, and internal street network maintenance).

Source: Economic & Planning Systems, Inc.

APPENDIX A: DEFINITION OF TERMS AND JOURNEY-TO-WORK DATA

The following provides some definition of terms used in the Alternatives Analysis, which EPS has provided the economic analysis. It also provides some examples of different types of market areas for various land uses. At the end of this appendix is a discussion of journey-to-work data from the U.S. Census, which provides a good statistical illustration of market areas for residential uses.

MASTER PLANNED COMMUNITIES

Master planned communities are comprehensive projects built on a single tract of land primarily used for residential development, but may include ancillary uses such as local-serving retail. Typically, infrastructure such as streets and amenities such as tennis courts and golf courses are also part of the community master plan development. As such, this concept combines the two definitions, “master plan,” and “planned unit development.”

A master plan is a document that describes, in narrative and with maps, an overall development concept. The master plan is used to coordinate the preparation of more detailed plans or may be a collection of detailed plans. The plan may be prepared by a local government to guide private and public development or by a developer on a specific project.¹¹

A planned unit development (PUD) is defined as an area of minimum contiguous size, as specified by ordinance, to be planned, developed, operated, and maintained as a single entity; it contains one or more residential cluster or planned unit residential development and one or more public, quasi-public, commercial, or industrial area in such ranges or ratios of non-residential uses to residential uses as specified in the ordinance.¹² PUD differs from a subdivision because PUD is a self-contained development in which the subdivision and zoning controls are applied to the project rather than to individual lots, which is the case for subdivisions.¹³

¹¹ Friedman, Jack P., Harris, Jack C., Linderman, J. Bruce. *Barron's Dictionary of Real Estate Terms*. Fourth Edition, 1997, p. 209.

¹² Moskowitz, Harvey S. and Lindbloom, Carl G., *The New Illustrated Book of Development Definitions*. 1993, p.204.

¹³ Merritt, Robert E. and Danforth, Ann R. *Development Regulations* 1994 p.207

MARKET AREA EXAMPLES

RESIDENTIAL MARKET AREAS

A residential market area is defined by first establishing the places of employment possible for households buying/renting residential units at the subject site. This, in turn, requires an assumption of the maximum time that most people would devote to daily commute to and from work. Based on the commute time assumptions, a map can be drawn indicating the geographic area that can be reached within this time from the subject site.¹⁴

Prospective buyers/renters also tend to look at other key factors, such as access to commercial areas, school system quality, and cultural/social characteristics. For example, a project site in the Tri-Valley would not use the San Francisco Bay Area as a market area because of the significant size (7,200 square miles) and population (6.5 million people), diversity of regions, transportation access and networks, geographic constraints, and distribution of employment. Instead, an appropriate geographic area would be the surrounding cities of San Ramon, Danville, Dublin, Livermore, and unincorporated areas of the northern portion of Alameda County and the southern portion of Contra Costa County. The Tri-Valley market is distinguished from other Bay Area markets by such characteristics as major employment centers (i.e., Hacienda Business Park and Bishop Ranch Business Park), expected job growth, commute pattern (i.e., BART extension and I-680 and I-580 corridors), and housing demand. The market area provides a reasonable range of alternative sites, but does not provide so many as to be logistically impracticable.

The following examples of market areas are based on previous EPS studies which may not have been subject to any 404(b)1 guidelines.

A Market Analysis of the Peabody-Walters Master Plan Area

EPS analyzed the residential markets in Fairfield, Suisun City, and Vacaville to estimate demand for housing in the Peabody-Walters Master Plan Area, located northwest of Travis Airforce Base in Fairfield. The three cities were considered the market area because they were located at key points in Solano County's transportation network, which affects commute patterns and contained major competition from several new residential developments.

HOTEL MARKET AREAS

Market Analysis of a Proposed Extended Stay Hotel in San Ramon

The market area for a new hotel in San Ramon refers to the geographic area within which the majority of projects will compete for the same group of customers. The

¹⁴ McMahan, John. *Property Development, Effective Decision Making in Uncertain Times*, p. 133.

market area examined as part of the study encompasses the “Tri-Valley” and includes the cities of San Ramon, Dublin, Pleasanton, and Livermore in addition to the adjacent unincorporated portions of Alameda County. Demand could be derived from areas further north, including Danville, due to limited hotel accommodations; capture of a portion of this demand is included in the analysis.

LOCAL, REGIONAL, AND ENTERTAINMENT RETAIL MARKET AREAS

The size and configuration of retail market areas depend on the number of consumers needed to support particular types of retail, the distance shoppers are willing to travel for certain types of goods, and the location of alternative shopping opportunities for these types of goods. Thus, in defining relevant market areas, it is necessary to take account of typical travel times for each type of retail, the configuration of the transportation system, and the location of competing retail supply.

Vallejo Theater Market Area

The market area for a movie theater is determined by the inter-relationship between population size, travel time, and existing supply of competitive screens. Moviegoers will generally travel up to 25 minutes to see their preferred showing, although longer travel times do occur, especially if part of a larger entertainment and or retail experience (dining, shopping, recreation, etc.). Movie houses, meanwhile, prefer to be centrally located relative to the large population base and transportation corridors of a particular region. However, distributors prefer to spread the release of a particular movie in a wide geographical area rather than running the same movie in nearby theaters. Given that there are generally between 20 to 24 first-run movies out at any given time, a particular market area will generally not contain more than this many screens.

JOURNEY-TO-WORK PATTERNS

The commute patterns of Bay Area residents to their place of employment varies from one county to another, but a high proportion of residents (from 55 to 80 percent) work within their county, while the remaining residents commute to adjoining counties or counties further out as shown in **Table A-1**. San Francisco County, a regional employment center which is relatively built out, contains more jobs than residents, which means an in-commute from residents primarily in Marin County, Contra Costa County, Alameda County, and San Mateo County is higher than other Bay Area Counties.

Figures A-1 through **A-4** display travel data for Alameda and Contra Costa Counties in the Bay Area as reported in the 1990 U.S. Census and the Metropolitan Transportation Commission. These journey-to-work data show the percentage of where a county’s residents work and where the employees in that county live. The size of the arrow represents the magnitude of commuters traveling to each County.

In Alameda County, as shown in **Figure A-1**, the majority of Alameda County residents, at about 71 percent, work in Alameda County. About ten percent of Alameda County residents work in San Francisco, while eight percent were employed in Santa Clara County. **Figure A-2** shows the place of residence for employees in Alameda County. Almost 74 percent of all employees in Alameda County reside in Alameda County while about 14 percent of Contra Costa residents work in Alameda County. The remaining Alameda County employees reside in the other counties, ranging from 0.2 percent in Napa County to 4.0 percent in Santa Clara County.

In Contra Costa County, about 61 percent of Contra Costa residents work in Contra Costa County, which means 40 percent of the remaining residents commute primarily to Alameda and San Francisco Counties, as shown in **Figure A-3**. About 74 percent of employees in Contra Costa County live in Contra Costa County, about 11 percent live in Alameda County, and about 6 percent live in Solano County (see **Figure A-4**).

**Table A-1
Journey to Work Patterns by County, 1990
San Francisco Bay Area**

County	Place of Work for County Residents as % of Total	Place of Residence for County Workers as % of Total
Alameda	71%	73%
Contra Costa	61%	74%
Marin	59%	71%
Napa	76%	82%
San Francisco	81%	55%
San Mateo	59%	65%
Santa Clara	90%	87%
Solano	65%	86%
Sonoma	83%	95%

Sources: U.S. 1990 Census; Economic & Planning Systems, Inc.

Figure A-1
Place of Work for Alameda County Residents (1990)

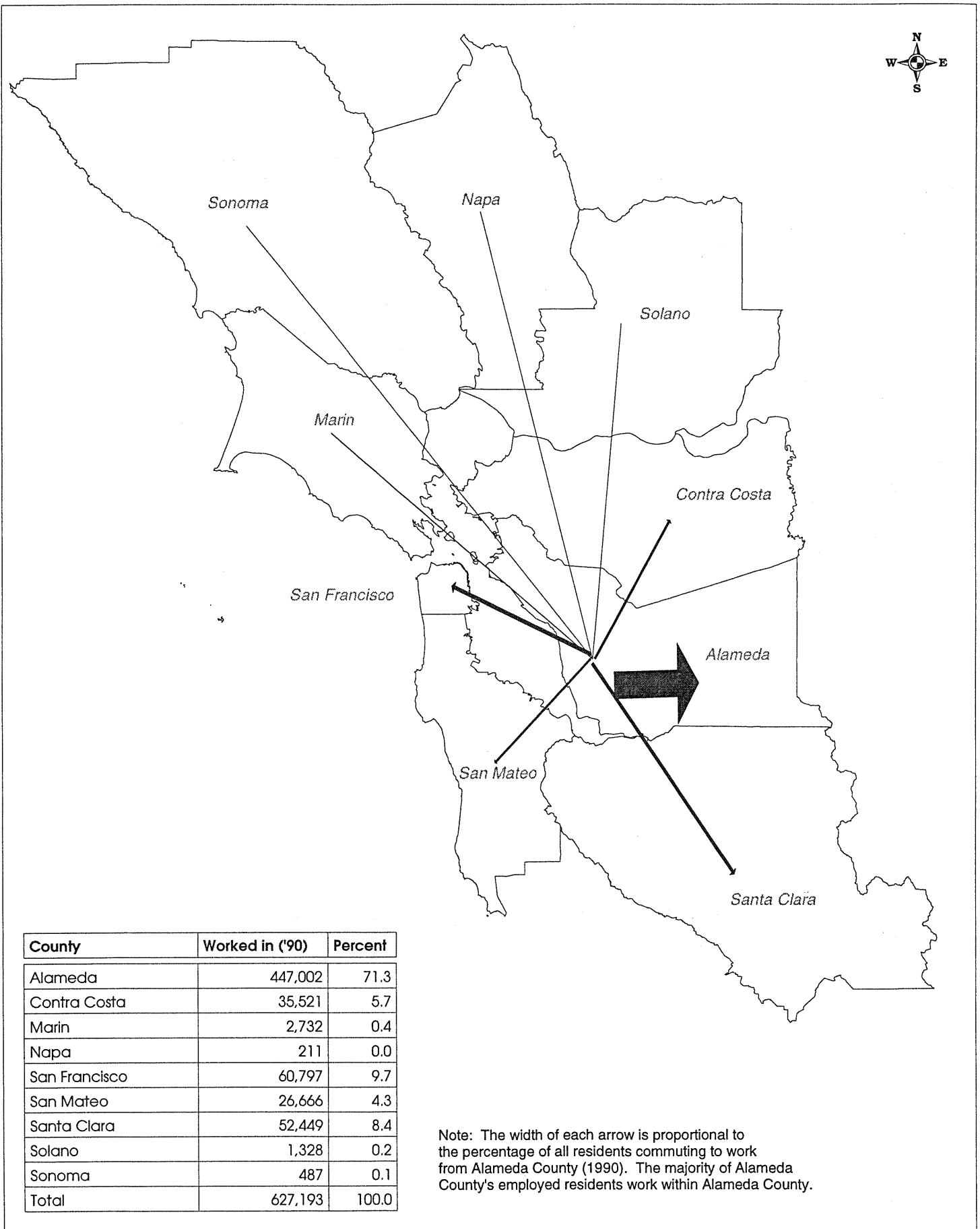


Figure A-2
Place of Residence for Employees who Work in Alameda County (1990)

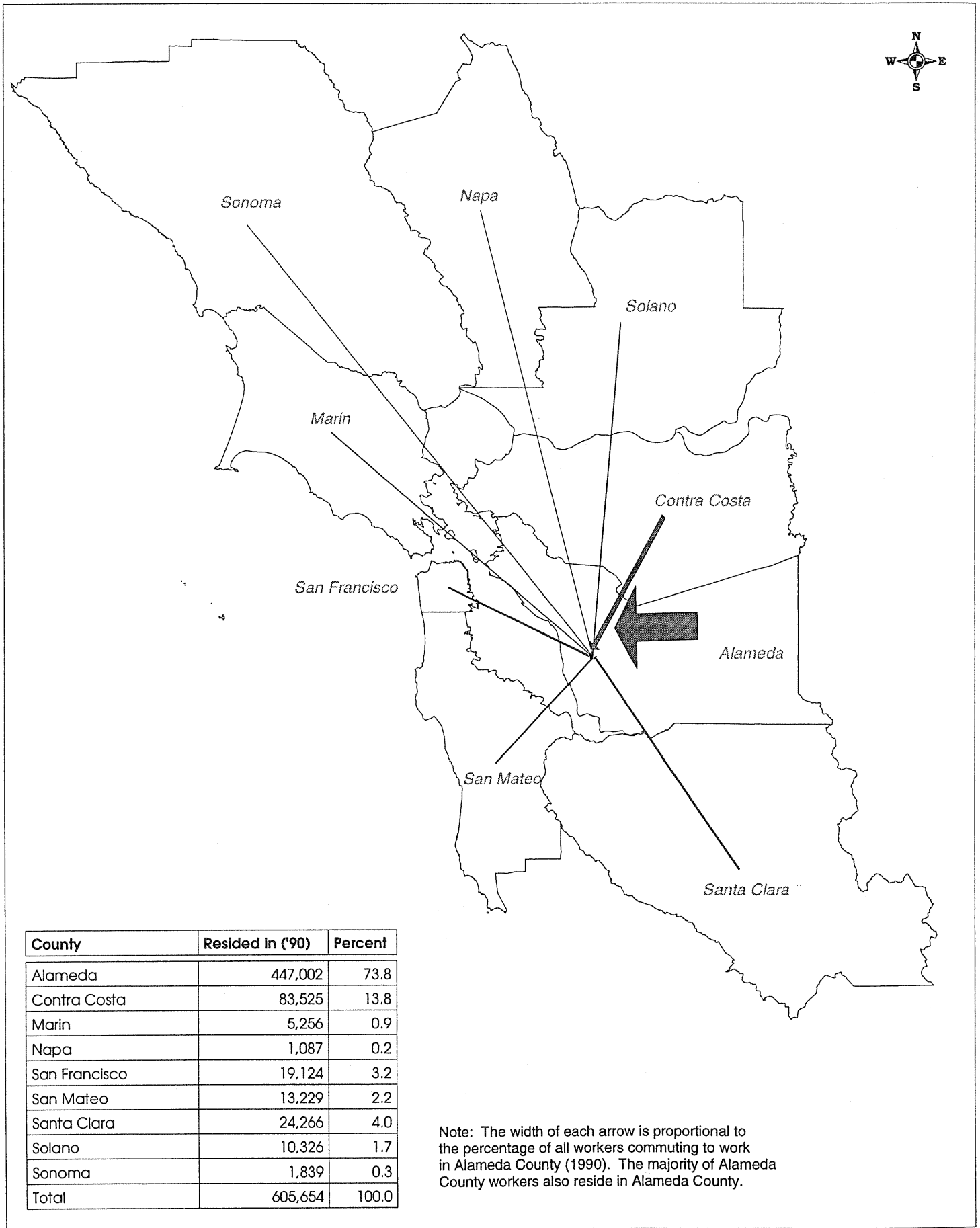


Figure A-3
Place of Work for Contra Costa County Residents (1990)

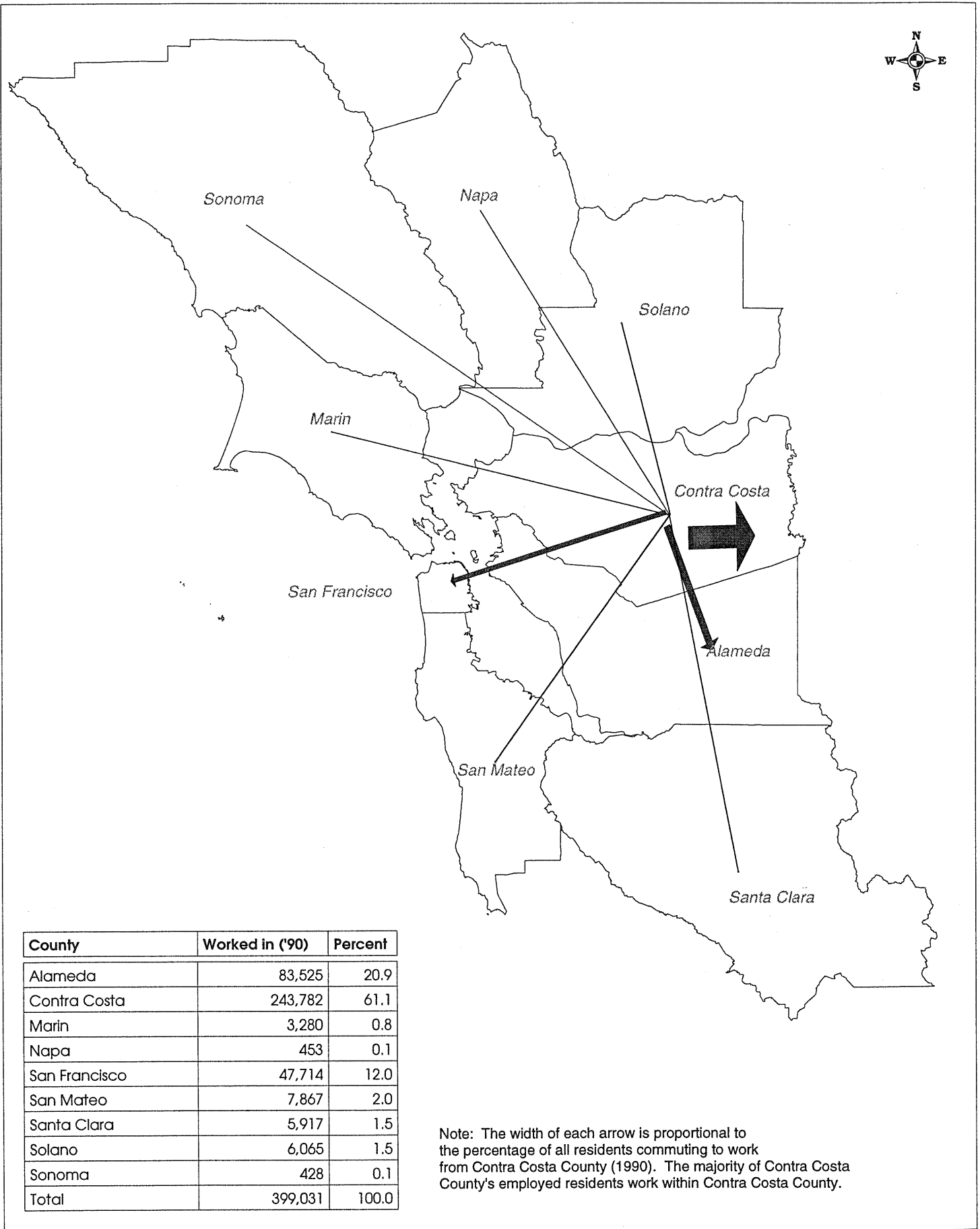
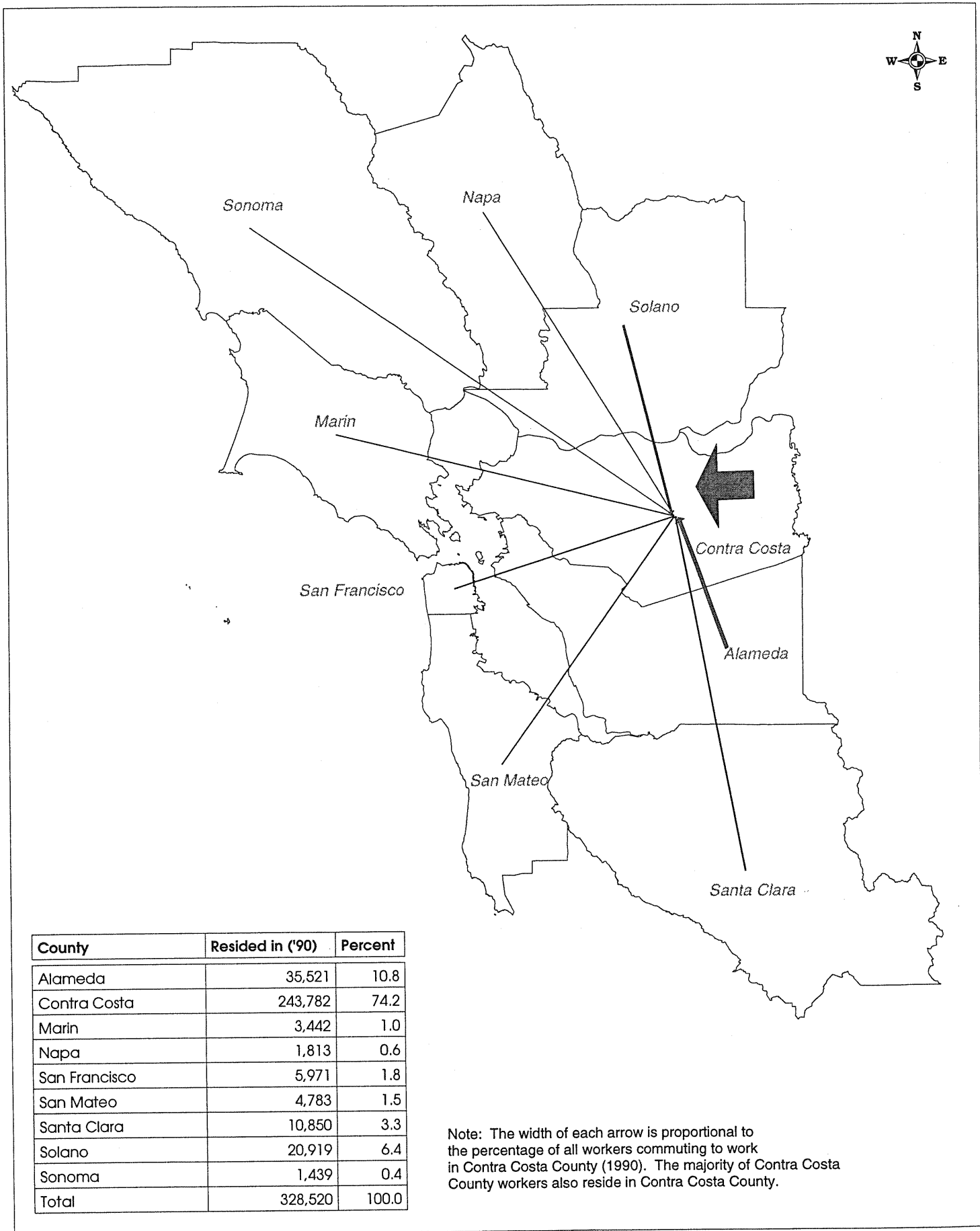


Figure A-4
Place of Residence for Employees Working in Contra Costa County (1990)



APPENDIX B: RELEVANT EPS STUDIES

EPS FINANCIAL FEASIBILITY STUDIES WITH COST BURDEN MEASURE

AB 1600 Fee Program. Prepared for the City of Fremont, 1989. (EPS #595)

Big Ranch Financing Plan. Prepared for the City of Napa, 1996. (EPS #4020)

Big Ranch Special Parks Fee. Prepared for the City of Napa, 1997. (EPS #7166)

Big Ranch Specific Plan Infrastructure Financing. Prepared for the City of Napa, 1997. (EPS #6227)

Blue Rock Country Club U.S. Army Corps 404 Permit Analysis. Prepared for the YCS/Hayward 1900, 1998. (EPS #8069)

City of Alameda Capital Facilities Impact Fees. Prepared for the City of Alameda, 1999. (EPS #8177)

El Dorado County General Plan Update. Prepared for the County of El Dorado, 1993. (EPS #3008)

El Dorado County Growth Initiative Analysis. Prepared for the County of El Dorado, 1996. (EPS #6122)

Evergreen Specific Plan and Financing Plan. Prepared for the City of San Jose, 1990. (EPS #828)

Fairfield Economic Impact of Fees Study. Prepared for the City of Fairfield, 1994. (EPS #4115)

Fairfield Proposed Development Fee Program Nexus Study and Economic Impact Analysis. Prepared for the City of Fairfield, 1995. (EPS #5022)

Fiscal and Economic Impacts of Development on the Oliver and Weber Properties in Southwestern Hayward. Prepared for the Oliver Trust and Weber Properties, 1997. (EPS #4149)

Gale Ranch U.S. Army Corps 404 Permit Analysis. Prepared for Shapell Industries, 1998. (EPS #8204)

McCarthy Ranch General Plan Amendment Fiscal and Financial Impact Analysis. Prepared for the McCarthy Ranch and City of Milpitas, 1995. (EPS #4218)

Midtown Specific Plan Financing Feasibility Analysis. Prepared for the City of San Jose, 1991. (EPS #1077)

Mountain House Public Financing Plan. Prepared for the County of San Joaquin, 1998. (EPS #5195, #4058)

North Coyote Valley Feasibility Study and Pro Forma Analysis. Prepared for the City of San Jose, 1999. (EPS #8150)

North Livermore General Plan Amendment Open Space Strategy. Prepared for the City of Livermore, 1992. (EPS #2107)

North Sycamore Financing Plan. Prepared for Sycamore Funding Development Company, 1998. (EPS #6045)

Orlando Southeast Development Plan: Market & Financial Feasibility Analysis. Prepared for the City of Orlando, 1996. (EPS #6031)

Plumas Lake Specific Financing Plan. Prepared for the County of Yuba, 1992. (EPS #4036)

Public Facilities Improvement Fee Update. Prepared for the City of Santa Rosa, 1995. (EPS #5147)

SFPUC Pleasanton II. Prepared for the City of San Francisco, 1992. (EPS #2037)

San Joaquin County General Plan Financing Study. Prepared for the County of San Joaquin, 1989. (EPS #536)

San Joaquin County General Plan Forecast and Update. Prepared for the County of San Joaquin, 1990. (EPS #949)

San Jose General Plan Update Fiscal Impact Analysis. Prepared for the City of San Jose, 1992. (EPS #2125)

Schaefer Ranch U.S. Army Corps 404 Permit Analysis. Prepared for the Schaefer Heights Associates, 1999. (EPS # 8186)

South Livermore Financing Plan Update. Prepared for the City of Livermore, 1997. (EPS #7282)

Southeast and Southwest Area Plans Financing Plans. Prepared for the City of Santa Rosa, 1993. (EPS #3023, #3024)

Southwest Area Plan Infrastructure Financing Technical Report. Prepared for the City of Santa Rosa, 1995. (EPS #4113)

Spring Valley Specific Plan. Prepared for DKM Investments, 1990. (EPS #877)

Union City Fee Study. Prepared for Union City, 1998. (EPS #7245)

Walpert Ridge Fiscal and Financial Analysis. Prepared for the City of Hayward, 1997.
(EPS #6162)

CONSERVATION PLANNING AND HABITAT MANAGEMENT/ FINANCING STUDIES

Bel Marin Keys Unit 5 EIR Agricultural Review. Prepared for the County of Marin, 1998.
(EPS #7124)

City of Brentwood Parks Master Plan Financial Review. Prepared for the City of Brentwood,
1994. (EPS #4044)

Davis Agricultural Buffer and Farmland Mitigation Ordinance Evaluation. Prepared for the
City of Davis, 1994. (EPS #4230)

Davis Open Space Financing. Prepared for the City of Davis, 1998. (EPS #6124)

Economic Feasibility Study for the El Dorado County Ecological Preserves. Prepared for the
County of El Dorado, 1997. (EPS #6170)

Preservation Strategies for the Santa Rosa/Rohnert Park Community Separator Area. Prepared
for the Sonoma County Agriculture Preservation and Open Space District, 1996.
(EPS #5018)

Rancho San Carlos Conservation Plan. Prepared for the Trust for Public Land, 1998.
(EPS #7158)

Sacramento County Interim Open Space Commission. Prepared for the County of
Sacramento Parks and Recreation Department, 1990. (EPS #737)

San Martin - Gilroy Greenbelt Implementation Strategy Report. Prepared for the County of
Santa Clara, 1991. (EPS #1026)

South Sacramento Habitat Conservation Plan (HCP). Prepared for the County of
Sacramento, 1997. (EPS #6176)

South Livermore Valley Area Plan Economic Study. Prepared for the County of Alameda,
1992 and updated in May 1999. (EPS #2031)

Subregional Wastewater Project Economic Analysis of Disposal Alternatives. Prepared for the City of Santa Rosa, 1993. (EPS #3083)

Yolo County Habitat Conservation Plan (HCP). Prepared for the County of Yolo, 1992. (EPS #2131)

APPENDIX C: ASSUMPTIONS FOR FISCAL IMPACT ANALYSIS

The following summarizes the assumptions used to project revenues and expenditures for a master planned residential/golf course community in a Bay Area city. These assumptions are common for a fiscal analysis in California, given current regulations and tax-sharing agreements between local governments and the State of California.

FISCAL MODEL ASSUMPTIONS

REVENUE ASSUMPTIONS

Revenue forecasting methods used to project revenues for the project are based on the City's estimated current Budget. For some items, the current average revenue per capita or per daytime population¹⁵ figure is applied to the new incremental growth; for other items, a "case study" or marginal increase approach is used. The marginal increase approach, for example, estimates actual new revenues from new retail space. The method used for each revenue item is described below.

Property Tax Revenues

Property tax revenues are estimated by using the average land use values expected for each residential unit type and the commercial uses. These land use values are multiplied by the incremental increase in residential units and commercial development for an estimate of the new assessed value projected over the twenty-year analysis period. While property tax is forecast in nominal dollars, the final estimate of property tax is converted into constant dollars to be consistent with the rest of the fiscal model. It is assumed that the residential land uses will turnover at a rate of 7.5 percent per year and will be reassessed at current market values; the analysis assumes annual inflation averages of four percent. Commercial uses are not assumed to turnover during the analysis period. This projection also reflects the restrictions of Proposition 13, which restricts assessed values from increasing more than two percent per year, and the loss of local property tax revenues to the State through the Education Revenue Augmentation Fund (ERAF).

The standard one percent tax rate is applied to the new assessed value to determine the property tax revenues. These revenues are then allocated using the following factors: the City would receive on average 19.9 percent of total property tax revenues after the City's loss of revenue to ERAF. The remaining revenues are distributed to the County, the Park District, and other agencies. These tax factors represent weighted average factors based on the tax rate areas in the project site.

¹⁵ For this analysis, daytime population includes total population and one-half of employment. This is a type of service unit measure and is not directly related to the actual amount of population present in the City during the day.

Sales and Use Tax

Sales tax receipts will increase due to new residents and employees who make purchases from existing and new City businesses and by sales in new retail and restaurant space developed at the site. The City receives about 1.05 percent of all taxable sales. The 0.05 percent accounts for unallocated sales tax revenues that are distributed to cities by the State. For this analysis, separate calculations are made to estimate revenue generated from new retail and restaurant at the country and tennis clubs. Revenue from new retail space is forecast using average sales per square foot figures of \$150; this is a somewhat conservative assumption.

To forecast taxable sales by new residents, household retail expenditures are estimated based on the average household incomes required to support the housing prices. Bureau of Labor Statistics (BLS) *Consumer Expenditure Survey* data is used to estimate household retail expenditures. BLS survey data shows that on average total household expenditures are 88 percent of total income, and taxable retail expenditures are 45.6 percent of total expenditures, which includes average auto related expenditures. This analysis assumes that the majority of “convenience” goods sales or 50 percent of households’ retail sales will be captured in the City; the remaining retail expenditures are assumed to be made elsewhere and would not generate sales tax revenue for the City.

Business License Tax

The business license tax revenue is based on the estimated gross revenues associated with the golf course and country and tennis clubs. As shown, gross annual revenues are estimated at \$5.45 million per year. Based on the City’s tax rates, the project generates \$1,470 per year in business license tax revenue once the golf course and county club are operating.

Documentary Stamp or Property Transfer Tax

The documentary stamp tax is a real estate transfer tax on the transfer of real property. The tax is \$4.50 per \$1,000 of assessed value. New assessed value is estimated by using the average land use market values multiplied by the increase in residential development. Only residential uses are assumed to turnover during the analysis period. The projected real estate transfer tax is then calculated by using the assessed value for each year, the assumed 7.5 percent turnover rate of residential property, and the real estate transfer tax rate. Property transfer taxes are also calculated for new units that are developed and sold each year.

Construction Improvement Tax

The Construction Improvement Tax is a one-time fee charged to new development to help offset capital facilities requirements associated with new development. This is a pre-Proposition 13 type tax or bedroom tax. The tax is applied only to residential development at a rate of \$750 per single family unit. This tax is only a revenue source while the project is under construction; it is also forecast in the financial analysis as it is considered a cost of development.

Emergency Facilities Tax

The emergency facilities tax is an annual tax placed on residential and non-residential development. The residential tax is \$36 per dwelling unit, regardless of size or type of unit. The non-residential tax is \$100 per firm; while it is not known how many firms would be associated with the country club, tennis club and golf course, this tax has been forecast assuming an average firm size of 25.

Franchise Fees

Franchise fees are paid by the providers of utility, garbage collection (i.e., transportation and disposal), and cable television services. For the purposes of this analysis, franchise fees resulting from new development are estimated on a per daytime population basis, which is \$22.18 per daytime population from this source.

Licenses and Permits

The City collects a variety of revenues from licenses and building permits, which is forecast based on an average of \$8.46 per daytime population.

Fines and Forfeitures

This category includes fines for traffic and parking violations and vehicle code fines and is forecast on a per capita basis at \$2.09 per person.

Revenues From Other Agencies

This category includes revenue sources received from local, State, and federal agencies. Some of the revenue items are restricted to a specific department or service, and thus, are considered to offset costs. The largest revenue source is the State motor vehicle in-lieu fees, which is forecast on a per capita basis at \$41.88 per person.

Charges for Current Services

This category consists of charges for General Fund services. The City expects to receive about \$1.88 million from these sources. All of these revenues are expected to directly offset departmental costs and, thus, are not forecast.

EXPENDITURE ASSUMPTIONS

As with revenues, cost multipliers are based on the current Budget. Some items are forecast based on current per capita or daytime population while others use a case study method. The method used to forecast expenditures by each department is described below. Departmental costs represent net costs of all dedicated or department revenues, when such revenues are available.

General Government

This category includes functions such as the City Council, City Manager, City Attorney and City Clerk. To account for the economies of scale generally experienced by mature cities, a factor equal to 50 percent of daytime population or \$25.38 is used to estimate expenditures for this category. This assumes that 50 percent of this department's cost are fixed.

Community and Economic Development

This department includes planning, economic development, and building inspection among others. Net expenditures for community development are \$2.6 million (i.e., minus charges for services, permit fee revenue, and intergovernmental revenues). Projected expenditures for this category also are based on the current per daytime population, assuming 50 percent of net departmental costs are fixed and are projected at \$8.14 per daytime population.

Police Services

The expected total current Budget for police services is about \$22.35 million or about 40 percent of the City's General Fund expenditures. Fees dedicated to police costs are \$350,000, and thus, the net cost of police services is only slightly less than the total costs. Police costs are forecast on a case study basis. The incremental cost increase due to new development is calculated using the assumption that the provision of police services per 1,000 population will be at the current goal of 1.5 sworn officers per 1,000 population; currently the City is providing slightly less service than the goal at about 1.37 officers per 1,000 population. The project would generate a need for 3 new officers at an average cost of about \$98,800 per officer. Police administrative costs are excluded from this average cost factor and assumed not to be impacted.

Fire Services

For this analysis a "worse case" approach is assumed and includes the higher level of service and cost that could be required by the City. Fire protection services represent the most costly aspect of providing the site with public services. That is, the City currently has about 1.01 firefighters per 1,000 residents. This factor is applied to the projected population, assuming the average cost per firefighter in the City, which equals about \$100,000 per firefighter. The cost and need for new firefighters is averaged annually over the 20-year period; in reality, the need for each new staff person would be staggered in increments of one new full-time firefighter based on review of the actual project absorption and service needs.

Public Works (Street and Other Maintenance)

The project will include development of new public road miles that will require maintenance. The City currently has about 266 road miles to maintain at an average cost of \$11,423 per road mile. This cost includes landscape, street light and traffic signal, and road maintenance. It does not include the cost of slurry seals and overlays, which is funded through a separate capital fund with gas tax and other revenues. The average road maintenance cost is applied to the new expected road miles, which total 7.92 miles.